

Subject Matter: Water Distribution Specifications
Date First Presented to Council at Public Meeting: September 18, 2006
Date of Second Reading and Public Hearing Before Town Council: October 2, 2006
Date of Adoption: October 2, 2006

**TOWN OF SHARPSBURG
COUNTY OF COWETA
STATE OF GEORGIA**

**ORDINANCE NUMBER 06-16
(as enacted)
TOWN OF SHARPSBURG, GEORGIA**

PREAMBLE AND FINDINGS

WHEREAS, it is the desire of the Town of Sharpsburg to promote and to provide for the health, safety and general welfare of its citizens; and

WHEREAS, the purpose of this Ordinance is to establish minimum standards for the specifications for water distribution in the Town of Sharpsburg. The ordinance describes materials and equipment to be incorporated into the water distribution system; and requirements for the installation and use of these items.

AN ORDINANCE OF THE TOWN OF SHARPSBURG

**WHEREFORE THE TOWN OF SHARPSBURG HEREBY ADOPTS AND ORDAINS THE
FOLLOWING ORDINANCE:**

ARTICLE ONE

The Town hereby enacts and ordains the following ordinance regulating water distribution in the Town of Sharpsburg:

General Provisions

Sec. 23-300. Title.

This ordinance shall be known as the "Town of Sharpsburg Water Distribution Specifications Ordinance."

Sec. 23-301. Purpose.

The purpose of this specification is to describe materials and equipment that may be incorporated into the water distribution system; and requirements for the installation and use of these items. The Developer of new water lines shall furnish all new materials and equipment and perform all labor necessary to fulfill the requirements of these specifications.

Sec. 23-302 Summary

1. This Article includes piping and specialties for combined potable-water and fire-protection water service outside the building.
2. Individual remote water meters and monitors shall be provided by the Developer from the Town's utility meter provider. The Developer is responsible for tapping the water main, any piping leading to the meter, installing water meters, the meter box, and all other labor and materials.
3. For this section, the term Developer and Contractor are synonymous. The term Town refers to Town of Sharpsburg and their Engineer.
4. All plans and specifications shall be reviewed by the Town's consulting engineer at the Developer's expense. If plans are not approved after the resubmittal the Developer will be responsible for all additional costs for rereviewing the plans.
5. The Town will assist the Developer in obtaining necessary permits and easements. The Developer shall prepare all supporting documentation needed by the Town in this effort. A permanent easement shall be a minimum of 20 feet in width to provide access of men and equipment for the purpose of maintaining or repairing the line.
6. All materials shall be supplied and all work performed in accordance with applicable American Society for Testing and Material (ASTM), American Water Works Association (AWWA), or other recognized standards. Latest revisions of all standards shall be applicable. Manufacturers of materials shall submit evidence, if requested by the Town, of having consistently produced materials of satisfactory quality and performance results in service over a period of at least two years.
7. Town of Sharpsburg Standard Details for Water and Sewer Installation and Improvement (latest revision) are applicable to all projects unless specifically waived by the Town.
8. A horizontal separation of at least ten (10) feet must be maintained between a water main and an existing or proposed sewer. When water mains cross sewers, a minimum vertical

separation of eighteen (18) inches must be provided between the two pipes (measured edge to edge). At crossings, one full length of water pipe must be located so both joints are as far from the sewer as possible.

9. All phases of construction must be completed in accordance with the Erosion and Sedimentation Act 12-7-1 et seq., and no water main must be installed on or in close proximity of an abandoned landfill site or any site used for waste disposal."

Sec. 23-303 References

The publications listed below form a part of this specification. The Contractor shall apply the most stringent of statements to any conflict between this chapter and the following references.

1. Georgia Rules of Safe Drinking Water, Chapter 391-3-5, Latest Edition.
2. Minimum Standards for Public Water Systems, Georgia Environmental Protection Division, Latest Edition.
3. Metropolitan North Georgia Water Planning District (MNGWPD) Watershed Management Plan, Water Supply/Water Conservation Management Plan, and the Long-Term Wastewater Management Plan.
4. Recommended Standards for Water Works, 1992 Edition, "Great Lakes Upper Mississippi River Board of State Public Health & Environmental Managers", (Tenn. State Standards).
5. "Guidance Manual for Compliance with the Filtration and Disinfection Requirements for Public Water Systems using Surface Water Sources", U.S.E.P.A., Office of Water, October 1990.
6. "Manual of Small Public Water Supply Systems", U.S.E.P.A., Office of Water, May 1991.
7. "Small System Compliance Technology List for the Surface Water Treatment Rule", U.S.E.P.A., Office of Water, August 1997.
8. Small Water Systems Serving the Public - Manual (Correlated With National Drinking Water Regulations), Conference of the State Sanitary Engineers In Cooperation With Office of Drinking Water, U.S.E.P.A., July 1978.
9. Tennessee Department of Environment and Conservation, "Community Public Water Systems Design Criteria", 1997.
10. North Carolina Department of Environment, Health and Natural Resources, "Rules Governing Public Water Systems", Subchapter 18C-Water Supplies, August 1, 1996.
11. "Design Standards for Public Water Supply Systems", Environmental Health Services, Division of Sanitary Engineering, West Virginia State Department of Health, January 1, 1970.
12. 29 CFR Part 1926 Occupational Safety and Health Standards - Excavations: Final Rule, Department of Labor, Occupational Safety and Health Administration, October 1998.
13. Standard Specifications Construction of Roads and Bridges, Department of Transportation, State of Georgia, Latest Edition.
14. "Cross Connection Control, Backflow and Back Siphonage Preventer", Newnan Water Sewer, and Light, 1997 edition.
15. "Manual on Uniform Traffic Control Devices (For Streets and Highways)", Federal Highway Administration, U.S. Department of Transportation, Latest Edition.

Sec. 23-304 Definitions

Abbreviations:

1. ASTM: American Society for Testing and Materials
2. AWWA: American Water Works Association
3. NFPA: National Fire Protection Association
4. NSF: National Sanitation Foundation
5. NPS: Nominal Pipe Size
6. NPT: National Pipe Thread
7. NRS: Non-Rising Stem
8. HDPE: High Density Polyethylene
9. SIDR: Standard Inside Diameter Ratio
10. UL: Underwriters Laboratories

Sec. 23-305 System Performance Requirements

Minimum Working Pressures: The following are minimum pressure requirements for piping and specialties, unless otherwise indicated:

1. Combined Potable-Water and Fire-Protection Water Service: 200 psig.

Sec. 23-306 Submittals

1. All submittals shall be submitted to Town of Sharpsburg. All submittals are subject to approval at the sole discretion of the Town.
2. Product Data: Provide product submittals (6 copies) for the following:
 - a. Water meters (greater than 2-inch).
 - b. Backflow preventers.
 - c. Pipe and fittings.
 - d. Flexible pipe fittings.
 - e. Valves.
 - f. Fire hydrants.
 - g. Flushing hydrants.
 - h. Fire department connections.
 - i. Yard hydrants.
 - j. Any additional product as requested by the Town of Sharpsburg.
3. Shop Drawings: Provide shop drawings (6 copies) for pre-cast and cast-in-place concrete structures. Include frames, covers, and drains. Include wiring diagrams for alarm devices, if applicable.
4. Coordination Drawings: Provide coordination drawings (6 copies) for piping and specialties including relation to other services in same area. Show piping and specialty sizes and valves, meter and specialty locations, and elevations.

5. Record Drawings (As-Built): Provide acceptable record drawings (3 sets) and one set in electronic format prior to Project acceptance of installed water-service. No system shall be accepted, nor shall the warranty period begin until the as-builts are received on an acceptable media, and approved by the Town.
6. Test Reports: Provide reports (3 sets) as specified in the "Field Quality Control" Article in Part 3.
7. Purging and Disinfecting Reports: Provide reports (3 sets) as specified in "Cleaning" Article in Part 3.
8. Maintenance Data: Provide data (3 sets) for specialties to include in the maintenance manuals. Include data for the following:
 - a. Water meters.
 - b. Backflow preventers.
 - c. Valves.
 - d. Fire hydrants.
 - e. Flushing hydrants.
 - f. Yard hydrants.
 - g. Any additional product as requested by the Town of Sharpsburg.

Sec. 23-307 Quality Assurance

1. Product Options: Drawings indicate size, profiles, and dimensional requirements of water-service piping specialties and are based on specific types and models indicated. Other manufacturers' products with equal performance characteristics must be approved by the Town.
2. Comply with NSF 61, "Drinking Water System Components--Health Effects," for materials for potable water.
3. Comply with NFPA 24, "Installation of Private Fire Service Mains and Their Appurtenances," for materials, installations, tests, flushing, and valve and hydrant supervision.
4. Comply with ASTM F 645, "Guide for Selection, Design, and Installation of Thermoplastic Water Pressure Piping Systems."
5. Comply with NFPA 70, "National Electrical Code," for electrical connections between wiring and electrically operated devices.
6. Provide listing/approval stamp, label, or other marking on piping and specialties made to specified standards.

Sec. 23-308 Delivery, Storage, and Handling

1. **Equipment:** Equipment and facilities for unloading, handling, distributing and storing pipe, fittings, valves and accessories shall be furnished by the Developer and shall at all times be available for use.
2. **Preparation for Transport:** Prepare valves, including fire hydrants, according to the following:
 - a. Ensure that valves are dry and internally protected against rust and corrosion.
 - b. Protect valves against damage to threaded ends and flange faces.
 - c. Set valves in best position for handling. Set valves closed to prevent rattling.
3. **Unloading:** Dropping or dumping materials will not be permitted and any materials dropped or dumped will be subject to rejection by the Town without additional justification.
4. **During Storage:** Use precautions for valves, including fire hydrants, according to the following:
 - a. Do not remove end protectors, unless necessary for inspection; then reinstall for storage.
 - b. Protect from weather. Store indoors and maintain temperature higher than ambient dew-point temperature. Support off the ground or pavement in watertight enclosures when outdoor storage is necessary.
 - c. The Developer shall make his own arrangements for storage areas.
 - d. Store plastic piping protected from direct sunlight. Support to prevent sagging and bending.
 - e. Protect stored piping from moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor when storing inside.
 - f. Protect flanges, fittings, and specialties from moisture and dirt.
5. **Handling:** Pipe, fittings, valves and accessories shall be carefully handled so as to prevent shock or damage to the material.
 - a. Pipe shall be handled by hoist, rolling on skids, slings or clamps and shall be lowered into position using approved slings or clamps which shall be provided for the purpose.
 - b. Use slings to handle valves and fire hydrants whose size requires handling by crane or lift. Rig valves to avoid damage to interior and exterior valve parts.
 - c. Do not use handwheels or stems as lifting or rigging points.
 - d. The Developer shall be responsible for the safe handling of all materials.
 - e. No damaged materials shall be used.
6. **Distribution:** Pipe, fittings, valves and accessories shall be distributed in a manner not to interrupt existing conditions.
 - a. Pipe shall be distributed and placed so as to least interfere with traffic.
 - b. No pipe shall be strung further along the route than 1,000 feet beyond the area in which the Developer is actually working.

- c. No street or roadway may be closed without first obtaining permission of the proper authorities. The Developer shall furnish and maintain proper warning signs and obstruction lights (in accordance with the latest edition of the Manual of Uniform Traffic Control Devices) for the protection of traffic along highways, street, and roadways upon which pipe is distributed.
- d. No distributed pipe shall be place inside drainage ditches.
- e. Protect flanges, fittings, and specialties from moisture and dirt.

Sec. 23-309 Project Conditions

- 1. Perform site survey, research public utility records, and verify existing utility locations. Contact Town of Sharpsburg prior to performing any work.
- 2. Verify that water-service piping may be installed to comply with original design and referenced standards.

Sec. 23-310 Sequencing and Scheduling

- 1. Coordinate connection to water main with Town of Sharpsburg. A minimum 48-hour notification time is required.
- 2. Coordinate with other utility work.

Sec. 23-311 Products

Sec. 23-312 General

- 1. The Developer shall furnish all pipe, fittings, valves, tapping sleeves and valves, hydrants, and all other materials required for completion of the work. All products and materials shall be new. No products stored by the Developer from previous projects will be accepted.
- 2. The Class and size of pipe and the working pressure of the fittings shall be determined by good design practices with regard to the internal pressures and external loading and shall be shown on the drawings submitted for approval.

Sec. 23-313 Manufacturers

Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the work are presented at the end of each section. All product suppliers or manufacturers not detailed in this specification are subject to evaluation and approval by the Town.

Sec. 23-314 Pipes and Tubes

- 1. General: Applications of the following pipe and tube materials are indicated in Part 3 "Piping Applications" Article.

2. Copper Tube: ASTM B88, seamless water tube, type "k", soft annealed temper. NPS 3/4- to 2-inch typical. Tubing may be used in 20 foot straight lengths or 60-100 foot coils.
3. Ductile-Iron, Push-on-Joint Pipe: AWWA C151, with cement-mortar lining and asphaltic seal coat according to AWWA C104, exterior asphaltic coating according to AWWA C151. Include rubber compression gasket according to AWWA C111. NPS 4- to 64-inch typical, and shall be furnished in lengths of at least 18 feet.
4. Ductile-Iron, Mechanical-Joint Pipe: AWWA C151, with cement-mortar lining and seal coat according to AWWA C104. Include gland, rubber gasket, and bolts and nuts according to AWWA C111. NPS 4- to 64-inch typical, and shall be furnished in lengths of at least 18 feet.
5. HDPE Plastic Pipe: ASTM D2239 and AWWA C901 (1/2-inch to 3-inch) and AWWA C906 (4-inch to 54-inch), of PE compound and with SDR required for 200-psig minimum pressure rating. Include marking "NSF-pw" according to NSF14. NPS 1 1/2- to 6-inch typical. All HDPE plastic pipe shall be marked with a permanent blue strip to indicate water service.
6. HDPE Plastic, Fire-Service Pipe: ASTM F 714 and FM approved. NPS 4- to 24-inch typical for class 200. All HDPE plastic pipe shall be marked with a permanent blue strip to indicate water service.
7. PVC Plastic Pipe (4" and larger): Polyvinyl chloride (PVC) pipe shall meet the requirements of AWWA C900. Pipe shall be Pressure Class 150 (DR18) or Class 200 (DR 14) at locations shown on drawings, with outside diameter dimensions of cast iron pipe. Marking on pipe exterior shall be as specified in AWWA C900.
8. PVC Plastic Pipe (3" and smaller): PVC pipe 3" diameter and smaller shall conform to requirements of ASTM D 2241 and shall be pressure Class 200 (SDR 21). Marking on pipe exterior shall be in accordance with ASTM D 2241.

Sec. 23-315 Pipe and Tube Fittings

1. General: Applications of the following pipe and tube fitting materials are indicated in Part 3 "Piping Applications" Article.
2. Copper Fittings: Wrought-copper, bronze, or brass, compression type fittings for applications 1-inch and smaller and flared end joints for fittings larger than 1-inch in accordance with Standards and specifications for this procedure.
3. Cast-Copper-Alloy Flanges: ASME B16.24, Class 150 or 300, as required for system operating pressure.
4. Ductile-Iron, Push-on-Joint Fittings: AWWA C110, ductile-iron; or AWWA C153, ductile-iron, compact type. Include cement-mortar lining and bituminous outside seal coat according to AWWA C104 and rubber compression gaskets according to AWWA C111.
5. Ductile-Iron, Mechanical-Joint Fittings: AWWA C110, ductile-iron or cast-iron; or AWWA C153, ductile-iron, compact type. Include cement-mortar lining, asphaltic sealcoat, and as-

phaltic outside seal coat according to AWWA C104, C110, and C153 and glands, rubber gaskets, and bolts and nuts according to AWWA C111.

6. Ductile-Iron, Grooved-End Fittings: ASTM A 47, malleable-iron; or ASTM A536, ductile-iron casting complying with AWWA-pipe size, with grooved ends. Include cement-mortar lining and seal coat according to AWWA C104 or epoxy, interior coating according to AWWA C550. Include keyed couplings according to AWWA C606.
7. Ductile-Iron, Flanged Fittings: AWWA C110, with cement-mortar lining and seal coat according to AWWA C104 or epoxy, interior coating according to AWWA C550. Include gaskets and bolts and nuts.
8. Ductile-Iron, Flexible Expansion Joints: Compound fitting with combination of flanged and mechanical-joint ends complying with AWWA C110 or AWWA C153. Units have 2 gasketed ball-joint sections and 1 or more gasketed sleeve sections. Include 230-psig minimum working-pressure rating; epoxy, interior coating according to AWWA C550; length for offset and expansion indicated; and glands, rubber gaskets, and bolts and nuts according to AWWA C111.
9. Ductile-Iron, Deflection Fittings: Compound coupling fitting with sleeve and flexing sections, gaskets, and restrained-joint ends complying with AWWA C110 or AWWA C153. Include 230-psig minimum working-pressure rating; cement-mortar lining or epoxy, interior coating according to AWWA C550; deflection of at least 20 degrees; and glands, rubber gaskets, and bolts and nuts according to AWWA C111.
10. Ductile-Iron Expansion Joints: 3-piece assembly consisting of telescoping sleeve with gaskets and restrained-type, ductile-iron bell-and-spigot end sections complying with AWWA C110 or AWWA C153. Include 230-psig minimum working-pressure rating; cement-mortar lining or epoxy, interior coating according to AWWA C550; length for expansion indicated; and glands, rubber gaskets, and bolts and nuts according to AWWA C111.
11. Cast-Iron Flanged Fittings: ASME B16.1, Class 123, unless otherwise indicated.
12. Molded, HDPE Plastic Fittings: ASTM D 3350, PE resin, socket- or butt-fusion type, made to match PE pipe dimensions and class.

Sec. 23-316 Joining Materials

1. General: Applications of the following piping joining materials are indicated in Part 3 "Piping Applications" Article.
2. Ductile-Iron Piping: The following materials apply:
 - a. Push-on Joints: AWWA C111 rubber gaskets and lubricant.
 - b. Mechanical Joints: AWWA C111 ductile-iron or gray-iron glands, high-strength steel bolts and nuts, and rubber gaskets. Recommended product type: Mega Lugs

- c. Flanged Joints: AWWA C115 ductile-iron or gray-iron pipe flanges, rubber gaskets, and high-strength steel bolts and nuts.
 - i. Gaskets: Rubber, flat face, 1/8 inch thick, unless otherwise indicated; ring type, unless otherwise indicated.
 - ii. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.
- d. Keyed Couplings: AWWA C606, consisting of ASTM A 536 ductile-iron housing with enamel finish, with synthetic-rubber gasket with central-cavity, pressure-responsive design, with carbon-steel bolts and nuts to secure grooved pipe and fittings and gasket suitable for hot water, unless otherwise indicated.

Sec. 23-317 Piping Specialties

- 1. Dielectric Fittings: Assembly or fitting with insulating material isolating joined dissimilar metals to prevent galvanic action and corrosion.
 - a. Description: Combination of copper alloy and ferrous; threaded, solder, plain, and weld-neck end types and matching piping system materials.
 - b. Dielectric Unions: Factory-fabricated union assembly, designed for 230-psig minimum working pressure at 180 deg. Include insulating material isolating dissimilar metals and ends with inside threads according to ASME B1.20.1.
 - c. Dielectric Flanges: Factory-fabricated companion-flange assembly, for 150- or 300-psig minimum pressure to suit system pressures.
 - d. Dielectric-Flange Insulation Kits: Field-assembled companion-flange assembly, full-face or ring type. Components include neoprene or phenolic gasket, phenolic or polyethylene bolt sleeves, phenolic washers, and steel backing washers.
 - i. Provide separate companion flanges and steel bolts and nuts for 150- or 300-psig minimum working pressure to suit system pressures.
 - e. Dielectric Couplings: Galvanized-steel couplings with inert and noncorrosive thermoplastic lining, with threaded ends and 300-psig minimum working pressure at 223 deg F.
 - f. Dielectric Nipples: Electroplated steel nipples with inert and noncorrosive thermoplastic lining, with combination of plain, threaded, or grooved end types and 300-psig working pressure at 223 deg F.

Sec. 23-318 PE Encasement

PE Encasement for Ductile-Iron Piping: ASTM A 674 or AWWA C105, PE film, 0.008-inch minimum thickness (8 mil), tube or sheet.

Sec. 23-319 Valves

1. Nonrising-Stem, Metal-Seated Gate Valves, 2 ½-Inch NPS and Smaller: AWWA C500, gray- or ductile-iron body and bonnet; with cast-iron, double-disc gate, bronze gate rings, bronze stem, and stem nut. Include 200-psig minimum working-pressure design; interior coating according to AWWA C550; and handwheel or operating nut operated with flanged, mechanical-joint, or threaded ends, unless otherwise indicated.
2. Nonrising-Stem, High-Pressure, Resilient-Seated Gate Valves, 3-Inch NPS and Larger: AWWA C509, ductile-iron body and bonnet; with ductile-iron gate, resilient seats, bronze stem, and stem nut. Include 230-psig minimum working-pressure design, interior coating according to AWWA C550, and mechanical-joint or flanged ends.
3. Rising-Stem Gate Valves, 3-Inch NPS and Larger: AWWA C500, cast-iron double disc, bronze disc and seat rings, cast-iron or ductile-iron body and bonnet, OS&Y, bronze stem, 200-psig working pressure, and handwheel operated with flanged or mechanical-joint ends, unless otherwise indicated.
4. Rising-Stem Gate Valves, 2 ½-Inch NPS and Smaller: AWWA C509, resilient seated; cast-iron or ductile-iron body and bonnet, OS&Y, bronze stem, 200-psig working pressure, and flanged or threaded ends.
5. Manufacturers: All gate valves shall be manufactured by Dresser, American-Darling, Mueller, Clow, or approved equal.
6. All valve operating nuts and handwheels shall have an arrow and the word "OPEN" cast in raised letters to indicate direction of opening. All valves shall open to the left (counter-clockwise when viewed from the top).
7. No gate valves with diameters larger than 12 inches are permitted. All valves larger than 12 inches shall be butterfly valves.
8. Valve Boxes: All buried valves shall be equipped with valve boxes. Valve boxes shall be heavy roadway type (cast-iron or HDPE box) with top section and cover with lettering "WATER," bottom section with base of size to fit over valve and barrel approximately 5 inches in diameter, and adjustable extension of length required for depth of bury of valve. The valve boxes shall be capable of H-20 loading conditions. The valve boxes shall be adjustable to 6 inches up or down from the nominal required cover over the pipe. The valve boxes shall be 2-piece slip type or screw type with deep covers.
9. Curb Stops: Bronze body, ground-key plug or ball, and wide tee head, with inlet and outlet to match service piping material.
 - a. Manufacturers: All curb stops shall be Mueller or approved equal with compression fittings.
10. Service Boxes for Curb Stops: Cast-iron box with telescoping top section of length required for depth of bury of valve. Include cover with lettering "WATER," and bottom section with base of size to fit over curb-stop and barrel approximately 3 inches in diameter.

11. Tapping Sleeve and Tapping Valve for connections larger than 2-inch NPS: Complete assembly, including tapping sleeve, tapping valve (gate valves in accordance with the specifications detailed in this section), and bolts and nuts. Use sleeve and valve compatible with tapping machine.
 - a. Tapping Sleeve: Cast-iron, ductile-iron, or stainless-steel 2-piece bolted sleeve with flanged outlet for new branch connection. Sleeve shall have mechanical-joint ends with rubber gaskets. Include sleeve matching size and type of pipe material being tapped and outlet flange required for branch connection. All gaskets shall be furnished.
12. Service Clamps and Corporation Stops for connections 2-inch NPS and smaller: Complete assembly, including service clamp, corporation stop, bolts, and nuts. Include service clamp and stop compatible with drilling machine.
 - a. Service Clamp: 1 ½ inch and larger: Cast iron or ductile iron with gasket and AWWA C800 threaded outlet for corporation stop, and threaded end straps.
 - b. Corporation Stops: 1 inch and ¾ inch: Bronze body and ground-key plug, with AWWA C800 threaded inlet and outlet matching service piping material, direct tap.
 - c. Manifold: If Town of Sharpsburg is requiring multiple connections, use copper with 2 to 4 inlets as required, with ends matching corporation stops and outlet matching service piping.
 - d. Manufacturer: All corporation stops shall be Mueller or approved equal with compressions fittings.
13. Ball Valves: AWWA C507, Class 230. Include interior coating according to AWWA C550.
14. Butterfly Valves: AWWA C504, with 150-psig working-pressure rating. Include interior coating according to AWWA C550.
 - a. All butterfly valves shall be bubble-tight closing at the rated pressure with flow in either direction, and shall be satisfactory for applications involving throttling service, frequent operations or operations after long periods of inactivity.
 - b. All interior ferrous surfaces of valves shall have a special epoxy coating meeting the requirements of AWWA C550.
 - c. Valve bodies shall be equipped with integrally cast mechanical joint ends meeting ANSI A21.11 (AWWA C111).
 - d. Mechanical joints shall be fitted with retainer glands with set screws on ductile iron pipe.
 - e. Butterfly valves installed underground shall come equipped with the manual operator specified below:
 - i. Manual operators shall be of the traveling nut, self-locking type and shall be designed to hold the valve in any intermediate position between fully open and fully closed without creeping or fluttering.
 - ii. Operators shall be equipped with mechanical stop-limiting devices to prevent over travel of the disc in the open and closed positions.

- iii. Valves shall open counter clockwise.
- iv. Operators shall be fully enclosed and designed for buried operation.

15. Check Valves: AWWA C508, with 175-psig working-pressure rating. Include interior coating according to AWWA C550.

Sec. 23-320 Specialty Valves

1. Pressure-Regulating Valves for 2-inch NPS or larger: Automatic, pilot-operated, cast-iron body with interior coating according to AWWA C550. Include 230-psig working-pressure design, bronze pressure-reducing pilot valve and tubing, and means for discharge pressure adjustment.
2. Flow-Regulating Valves for 2-inch NPS or larger: Automatic, pilot-operated, cast-iron body with interior coating according to AWWA C550. Include 230-psig working-pressure design, bronze pressure-reducing pilot valve and tubing, and means for flow adjustment.
3. Air-Release Valve for 2-inch NPS or larger: AWWA C512, hydromechanical device to automatically release accumulated air. Include 300-psig working-pressure design.
4. Air/Vacuum Valve for 2-inch NPS or larger: AWWA C512, direct-acting, float-operated, hydromechanical device with large orifice to automatically release accumulated air or to admit air during filling of piping. Include 300-psig working-pressure design.
5. Combination Air Valves for 2-inch NPS or larger: AWWA C512, float-operated, hydromechanical device to automatically release accumulated air or to admit air. Include 300-psig working-pressure design.

Sec. 23-321 Automated Meter Reading System – Part I

Sec. 23-321.1 General

Under this specification a single manufacturer shall supply all equipment necessary to furnish a fully automated meter reading management system. While the primary function shall be to provide accurate and timely meter reading data for billing purposes, the system shall also furnish consumption and other pertinent data to facilitate enhanced operation and management of the total water distribution system, as described herein.

Sec. 23-321.2 System Description

The Automatic Meter Reading (AMR) System should be a one-way bubble-up RF system. The AMR system will utilize an FCC non-licensed radio frequency band to communicate meter-reading data, tamper conditions and leak detection notification to a Receiver. The AMR system is comprised of an transmitter located at the meter that transmits readings, tamper and leak data to the Receiver when the Receiver is in the proximity range of the transmitted signal. As an option, the transmitter may also contain data profiling capabilities. The transmitter with data profiling capabilities will have sufficient memory to store over 20,000 readings with tam-

per detection and potential leak information that can be downloaded and graphed in an analysis software program. To promote efficiency and conservation, a monitor shall also be available that allows customers to capture their read, tamper and leak data on an LED display upon command. The system shall be able to process and maintain the information gathered from each Transmitter in a database for billing purposes.

Sec. 23-321.3 Performance Requirements

In combination with Transmitters located at the meter, the AMR system must be capable of performing the following functions:

1. METER READING - The Transmitter shall bubble-up and transmit readings every four seconds.
2. HIGH RESOLUTION - To provide useful consumption data the AMR system shall record usage through the meter to the closest one (1) gallon or one tenth (1/10) cubic foot increment on residential sized meters, 5/8" through 1". For 1 1/2" and 2" meters usage shall be recorded to the nearest ten (10) gallons or one (1) cubic foot.
3. LEAK DETECTION - To assist in the timely identification of potential leaks, the Transmitter shall have an option to report information to the utility in regard to potential leaks.
4. CONSERVATION AND EFFICIENCY MONITORING - To assist in water conservation and to improve utility efficiency, an optional Monitor shall be available that allows customers to display their consumption reading for two separate, user-defined time intervals and tamper and leak indication data upon command on a Monitor.

Sec. 23-321.4 Communication Parameters

The AMR System shall be comprised of a radio frequency Transmitter and Receiver. The Transmitter and Receiver will operate as a non-licensed system in the 902 to 928 MHz utility frequency band. The Transmitter shall operate at a nominal 916.45 MHz+/- 1 MHz, requiring only FCC certification under part 15, Subpart C and no customer license.

Sec. 23-321.5 Hardware Requirements

1. Mobile Reading System

The Reading System (RS) shall consist of an optional Premium or Standard laptop computer (with LCD, keypad, and diskette drive) and a Receiver. Capabilities include reading up to 5000 meters per minute limited only by travel speed and meter installation density (reading meters at posted speed limit).

Route load/unload: Meter records can be transferred between the Reading System and the utility's computer by use of 3.5" HD diskettes. These records can be transferred through CONNECT® Route Management System.

Route Information: Utility selects up to five fields from CONNECT to be used for the purpose of meter reading.

Meter Reading: The meter Transmitter sends data to the Reading System including: ID number, meter reading and tamper or leak (optional) status.

The Reading System must be portable and adaptable to any vehicle with a 12VDC cigarette lighter.

2. Handheld Reading System

The handheld reading system shall be comprised of a handheld data collector with an integrated receiver board and no external antenna for reading RF transmitters. The handheld shall operate on a Windows CE platform for ease of use. The handheld must be of a rugged design sealed to meet an IP67 waterproof rating of up to 3' submerged, operate in extreme temperature conditions (-22°F to 131°F / -30°C to 55°C), withstand drops of 5' to concrete, and shall contain a 40-key alphanumeric keypad with tactile operation for data entry. The handheld shall contain a powerful 2200 maH lithium-ion battery to prevent memory and to extend field life. A sharp monochrome display is required to provide eight rows of twenty characters each to provide information necessary for meter reading.

To meet the needs of different utilities, the handheld operator shall be able to select five fields from the route management software for display on the account records in the handheld. As an option, handheld reading software shall also be available with leak detection capabilities when reading RF transmitters.

The handheld system shall provide a flexible solution to read manual, touch or RF transmitters broadcasting in the 902 - 928 MhZ bandwidth.

Handheld shall utilize FTP protocol through a RS232 serial connection to upload and download account information to the route management software. A Main Line and Secondary Loader-Charger assemblies shall be available to maintain the handheld batteries and to communicate route data from the host PC. To facilitate accurate and high-speed data communications, the loader-charger units must use infrared data ports and patented optical light guide technology.

Handheld shall incorporate an IR data port and programming software that can be used for uploading and downloading account information and to program Orion transmitters while in the field or in the office.

3. Monitor

The Monitor must be installed with any handheld or mobile system as an optional tool used to promote efficiency and the conservation of water. The Monitor will contain an LED display and

operate on a single 9-volt battery. The monitor shall display totalized and incremental reading data for two user selected intervals along with tamper and leak detection data based on end user input when installed in proximity to a transmitter. When used in conjunction with RTR encoder register, the Monitor shall report readings and leak detection down to the gallon in residential applications.

4. Remote Profile Receiver

The Remote Profile Receiver can be installed and operated with any transmitter. The Orion Remote Profile Receiver consists of a receiver and sufficient memory to store readings, tamper detection and potential leak information from a transmitter. Once programmed for a specific transmitter number and time interval, the Remote Profile Receiver shall be able to store over 20,000 readings that can be downloaded and graphed in an analysis software program.

Sec. 23-321.6 Software/Hardware Administrative Requirements

The Reading System shall be a Geographic Information System (GIS) based meter-reading system. The software shall use a GIS system for displaying meter reading information on a MAP program, in conjunction with a Global Positioning System (GPS) to display the location of the vehicle reading the meters on the MAP program. The laptop computer running the software shall be equipped with touch screen functionality.

Leak detection shall be available with the software. The Transmitter sends an alarm condition to the meter reading software when the meter is read. The system reports the leak condition when a one-hour window of no usage is not found within a 24 hour time period. The system shall automatically reset when the next one-hour window of no usage is found.

Software/Hardware shall include:

- A. Ruggedized Panasonic®Toughbook® 29 laptop computer
- B. Touch screen with anti-glare display
- C. GPS system for locating the reading vehicle
- D. GIS data base for meter reading
- E. MAP based user interface
- F. Unread meter list interface also available
- G. Display of Potential Leak conditions
- H. Spill-resistant keyboard, LCD and touch pad
- I. Backup memory for previously read meters

CONNECT route management software shall be provided which allows transfer of route information from the Reading System to the utility computer. Software shall provide splitting, re-sequence and combining of routes. Management reports shall include meter reading, exception and productivity information along with standard and customized reporting features.

Route management software requires an interface program be written to allow the billing software and the route management software to communicate with each other. Appropriate documentation regarding interface requirements must be supplied to the billing vendor. Successful bidder must provide assistance to the utility in order to complete the interface program.

Sec. 23-321.7 FCC Requirements

The Transmitters and Receiver shall be certified by the manufacturer and shall not require a license under Part 15, Subpart C.

Sec. 23-321.7 Installation, Training, and Tools

The manufacturer's certified training personnel shall set-up and test the Reading System and CONNECT route management software at the utility location. Upon successful completion of the set-up, the manufacturer's certified training personnel shall provide a minimum of two (2) days training at the utility site on the operation and maintenance of the system. Training shall include training of field technicians on the installation of field Transmitters. Initial configuration and initial test are the complete responsibility of the successful bidder. Follow up training will be available.

Sec. 23-321.8 Warranty

All hardware included with the Reading System shall include an original manufacturers warranty, along with a one-year hardware service contract on all hardware components of the system. Annual extended warranties are also available. Software supplied with the system shall be updated and maintained by the manufacturer for a period of one (1) year from the date of system purchase, for compatibility with all other components of the system. Annual software service agreements are also available.

The manufacturer shall also supply a system support diagnostic program to insure timely response and assistance in the event of temporary system malfunction.

Sec. 23-321.9 Manufacturers and Product Support

1. Manufactures

Manufacturer shall be Orion or approved equal and supply references of three systems of similar size and installation type that have been sold, not trials or pilots.

2. Product Support

Manufacturer shall provide continued support of the AMR system after completion of training. Technical support shall be available 24 hours a day, 365 days a year.

Sec. 23-322 Automated Meter Reading System – Part II

Sec. 23-322.1 General

The manufacturer shall provide various types of meter modules for specific application depending on the meter setting at the installation. All meter modules must be compatible with Part I of these specifications.

Sec. 23-322.2 Types

1. REMOTE TRANSMITTER - The meter module is designed for installations not subjected to submergence.
2. INTEGRAL TRANSMITTER - The meter module is designed for installations not subjected to submergence.
3. PIT TRANSMITTER - The meter module is designed for through the lid or under the lid pit installations subject to submergence.

Sec. 23-322.3 Communication Parameters

The Transmitters shall be designed to operate at 916.45 MHz +/- 1 MHz. The receiver shall be wide band, single channel with -105 dBm sensitivity. The field strength shall be no greater than 94dbuV/Meter @ 3 Meters.

All Transmitters shall require no customer license as specified in FCC Part 15, Subpart C.

Sec. 23-322.4 Registration

All Transmitters shall be connected to a Recordall® Transmitter Register (RTR®) which shall provide for visual registration at the meter. The RTR shall function in temperature variations from 32°F (0°C) to 110°F (43°C). The signal transmission assembly shall induce no drag that could result in accelerated wear of the meter or cause under registration.

Sec. 23-322.5 Module Requirements

1. Remote Transmitter

Lithium thionyl chloride batteries shall power the Remote Transmitter with typical battery life exceeding 13.5 years under typical operating conditions. The Remote Transmitter shall be designed for indoor or outdoor non-submerged applications.

The Remote Transmitter enclosure shall be constructed of a weatherproof high impact plastic and all internal components shall be conformal coated. Wire entrances shall be drip protected and strain relief shall be provided. As standard the Transmitters shall be provided pre-wired to the Recordall Transmitter Register with the utility specifying the wire length.

The Remote Transmitter can be stored and shall operate in temperatures ranging from -40° to 140°F. The Remote Transmitter shall operate in atmospheres of 5% to 100% condensing humidity. Each Remote Transmitter shall weigh a maximum of 10 oz.

2. Integral Transmitter

Lithium thionyl chloride batteries shall power the Integral Transmitter with typical battery life exceeding 13.5 years under typical operating conditions. The Integral Transmitter shall be designed for indoor and outdoor non-submerged applications.

The Integral Transmitter enclosure shall be constructed of a weatherproof high impact plastic and all internal components shall be conformal coated. The Integral Transmitter mounts directly to the meter and has no exposed wires. The Integral Transmitter can be stored and shall operate in temperatures ranging from -40° to 140°F. The Integral Transmitter shall operate in atmospheres of 5% to 100% condensing humidity. Each Integral Transmitter shall weigh a maximum of 10 oz.

3. Pit Transmitter

Lithium thionyl chloride batteries shall power the Pit Transmitter with a typical battery life exceeding 13.5 years in typical operating conditions. The Pit Transmitter case shall be constructed of high impact waterproof plastic. The Pit Transmitter enclosure shall be factory potted and factory wired to the Recordall Transmitter Register. The Pit Transmitter can be stored and shall operate in temperatures ranging from -40° to 140°F. The Pit Transmitter shall operate in atmospheres of 0% to 100% condensing humidity. The Pit Transmitter shall be designed for submerged pit applications. Each Pit Transmitter shall weigh a maximum of 18 oz. For maximum reading performance, a separate pit transmitter for below and through the lid installations should be available.

4. Recordall Transmitter Register

The Recordall Transmitter Register (RTR) consists of a mechanical local register combined with electronic circuitry capable of producing a signal compatible with the Remote Transmitter (RT), the Integral Transmitter or the Pit Transmitter. The electronic circuitry shall contain a piezoelectric switch, which shall be covered by US Patent.

The RTR is a water resistant transmitter constructed of a scratch resistant glass face, non-corrosive metal bottom, and non-gasketed permanent seal. The encoder shall have a plastic or bronze lid that covers the glass face for added protection with an optional serial number for identification. The electronic encoder register shall provide a digital output based on a piezoelectric solid-state switch with a digital output resolution of 1/10th of the register test circle. The output of the electronic encoder register must have the characteristics of an open drain Field Effect Transistor (FET) and shall require no electrical contacts to stick, wear or corrode.

The RTR consists of a permanently sealed glass face and metal bottom to eliminate moisture, dirt, and other contaminants. The electronic encoder register must exceed all applicable requirements of the AWWA standards and C707 regarding moisture intrusion. The electronic encoder register offered must consist of a six-digit straight-reading mechanical odometer totalizer located in the six o'clock position, a 360° test circle with full-face sweep hand, and a flow finder to detect leaks. The RTR is enclosed in a self-contained plastic shroud assembly with either plastic or bronze lid and is magnetically coupled to the meter-measuring element.

The RTR encoder should also provide an optional submersible connector for present and future connectivity. This plug-n-play connector will allow utilities to easily migrate to any current or future Badger Meter approved technology solution without having to splice wires.

The RTR encoder, due to its simplicity in design, shall have been successfully life tested to accumulate 25 million gallons.

Sec. 23-323 Water-Meter Boxes

1. All water meter boxes located in sidewalks or traffic areas shall be cast iron box and cover. All non-traffic boxes shall be mid-states plastics rectangular box model BC1416-12 with solid ductile iron cover, or equal.
2. Cast-iron cover shall include lettering "WATER METER" in cover; and slotted, open-bottom base section of length to fit over service piping.

Sec. 23-324 Pits

1. Plans for pre-cast or cast-in-place pit are required to be submitted and stamped by a registered structural engineer.
2. Description: Precast, reinforced-concrete pit, 4,000 psi concrete, designed for A-16 load designation according to ASTM C 857, and made according to ASTM C 858.
 - a. Minimum thickness of walls, floor, and top shall be 6 inches.
 - b. The inside height shall be a minimum 6 feet.
 - c. Vault bottom shall be sloped to gravel sump.
 - d. Vault shall be set plumb and level on a minimum of 12 inches compacted #57 stone.
 - e. Vault shall have inlet/outlet pipe openings that are sealed with non-shrink grout. Pipe must not support vault.
 - f. Vault shall be sized to provide a 2-foot corridor around the enclosed device.
 - g. Vaults to be installed on owner's private property shall provide a 15-foot by 30-foot easement and right-of-way clause.
3. Ladder: ASTM A 36, steel or polyethylene-encased steel steps and centered with hatch cover.
4. Hatch Cover: Hatch cover shall be aluminum with locking cover and drain, cast into the box top and large enough for equipment removal.
 - a. Manufacturer: Bilco Model No. J-4A or approved equal.
5. Drain: ASME A112.21.1M, cast-iron area drain, of size indicated. Include body anchor flange, light-duty cast-iron grate, bottom outlet, and integral or field-installed bronze ball or clapper-type backwater valve.

Sec. 23-325 Protective Enclosures

Description: Manufactured, weather-resistant enclosure designed to protect aboveground water piping equipment or specialties. Include size and dimensions indicated, but not less than those required for access and service of protected unit and the following:

- a. Housing: Reinforced-aluminum or -fiberglass construction.
- b. Drain opening for units with drain connection.
- c. Access doors with locking devices.
- d. Precast concrete base of dimensions required to extend at least 6 inches beyond edges of housing.
- e. Anchoring devices to attach housing to base.

Sec. 23-326 Freestanding Fire Hydrants

1. Description: Cast-iron body, compression-type valve, opening against pressure and closing with pressure, 6-inch mechanical-joint inlet, and 150-psig minimum working-pressure design. Hydrants shall be required to have 4 feet of cover over pipe with a mechanical joint connection to the spigot of the 6-inch hydrant lead. In the event of a traffic accident, the hydrant barrel shall break away from the stand pipe at a point above grade in a manner that will prevent damage to the barrel and system preclude opening of the valve, and permit rapid and inexpensive restoration without digging or cutting off the water. Hydrant shall be a non-freezing design and provided with a simple positive and automatic drain which shall be fully closed whenever the main valve is opened.
2. Outlet Threads: NFPA 1963, with external hose thread used by local fire department. Include cast-iron caps with steel chains.
3. Operating and Cap Nuts: The means for attaching the barrel to the stand pipe shall permit facing the hydrant a minimum of three different directions. Cap nuts shall match the existing in-use hydrants in the Town of Sharpsburg. The operating threads shall be totally enclosed in an operating chamber separated from the hydrant barrel by a rubber o-ring system seal and lubricated by a grease or oil reservoir. A stop nut shall be positioned in the top operating mechanism so that the valve cannot contact the bottom of the shoe when fully open. All working parts, including the seat ring shall be removable through the top without disturbing the barrel of the hydrant.
4. Direction of Opening: Open hydrant valve by turning operating nut to left or counter-clockwise.
5. Exterior Finish: All outside surfaces of the barrel above grade shall be painted with Koppers Glamortex 501 enamel or approved equal. Color shall be chosen by the Town.
6. Dry-Barrel Fire Hydrants: AWWA C502, two 2-1/2-inch NPS and one 4-1/2-inch NPS outlets, 5-1/4-inch main valve, drain valve, and 6-inch NPS mechanical-joint inlet. Include 150-psig minimum working-pressure design and interior coating according to AWWA C550.

7. Manufacturer: Hydrants shall be 5 1/4-inch American B-62-B. See details for further specifications.

Sec. 23-327 Flushing Hydrants

1. Description: Nonfreeze and drainable, with 150-psig minimum working-pressure rating and of length required for shutoff valve installation below frost line. Include one operating wrench for each unit.
2. Post-Type Flushing Hydrants: With the following features:
 - a. Outlet: One, with horizontal discharge.
 - b. Hose Thread: 2-1/2-inch NPS, with NFPA 1963 external hose thread used by local fire department. Include cast-iron cap with brass chain.
 - c. Barrel: Cast-iron or steel pipe with breakaway feature.
 - d. Valve: Brass body with brass-ball or plunger closure, and automatic draining.
 - e. Security: Locking device for padlock.
 - f. Exterior Finish: Red alkyd-gloss enamel paint, unless otherwise indicated.
 - g. Inlet: 2-inch NPS minimum.
3. Ground-Type Flushing Hydrants: With the following features:
 - a. Outlet: One, with angle discharge.
 - b. Hose Thread: 2-1/2-inch NPS, with NFPA 1963 external hose thread used by local fire department. Include cast-iron cap with brass chain.
 - c. Barrel: Cast-iron or steel pipe.
 - d. Valve: Brass body with brass-ball or plunger closure, and automatic draining.
 - e. Inlet: 2-inch NPS minimum.
 - f. Hydrant Box: Cast iron with cover, for ground mounting.
4. Sampling Station: Post type with the following features:
 - a. Sampling Outlet: One unthreaded nozzle with handle.
 - b. Valve: Brass body with brass-ball or plunger closure. Include operating handle.
 - c. Drain: Tubing with separate manual vacuum pump.
 - d. Inlet: 3/4-inch NPS minimum.
 - e. Housing: Weatherproof material with locking device. Include anchor device.
5. Exterior Finish: All outside surfaces of the barrel above grade shall be painted with Koppers Glamortex 501 enamel or approved equal. Color shall be chosen by the Town.

Sec. 23-328 Detector Check Valves

Detector Check Valves: UL 312, galvanized cast-iron body, bolted cover with air-bleed device for access to internal parts, and flanged ends; designed for 175-psig working pressure. Include one-piece bronze disc with bronze bushings, pivot, and replaceable seat. Include threaded by-

pass taps in inlet and outlet for bypass meter connection. Set valve to allow minimal water flow through bypass meter when major water flow is required.

- a. Water Meter: AWWA C700, disc type, of size at least one-fourth size of detector check valve. Include meter, bypass piping, gate valves, check valve, and connections to detector check valve in accordance with Section 2.10.

Sec. 23-329 Backflow Preventers

1. General: Manufactured backflow preventers, of size indicated for maximum flow rate and maximum pressure loss indicated; as approved by the latest applicable ASSE, ANSI, AWWA, and SBCCI standards. All backflow preventers, including accessories, components, and accessories in sizes 2 inches and smaller shall be bronze with threaded connections. Sizes above 2 inches shall be bronze or iron that has been fused epoxy-coated inside and out, and have flanged connections.
2. Working Pressure: 150 psig minimum, unless otherwise indicated.
3. 2-Inch NPS and Smaller: Bronze body with threaded ends.
4. 2-1/2-Inch NPS and Larger: Cast-iron, steel, or stainless-steel body with flanged ends.
5. Interior Lining: AWWA C550, epoxy coating for backflow preventers with cast-iron or steel body.
6. Location: All backflow prevention devices shall be in an area that provides a safe working environment for testing and maintenance. The area shall be readily accessible, dry, free from dirt, extreme cold, heat, and electrical hazards.
 - a. Reduced pressure zone backflow preventers must be installed above grade or in a building.
7. All backflow preventers shall be installed in the position recommended by the manufacturer. No intervening branch connections shall be allowed between the Towns corporation stop and the backflow preventer.
8. Interior Components: Corrosion-resistant materials.
9. Strainer on inlet if strainer is indicated.
10. Hose-Connection Vacuum Breakers: ASSE 1011, nickel plated, with nonremovable and manual drain features, and ASME B1.20.7, 3/4-11.5NH threads for garden hose on outlet. Units attached to rough-bronze-finish hose connections may be rough bronze.
11. Reduced-Pressure-Principle Backflow Preventer: AWWA C511, with OS gate valves on inlet and outlet, and strainer on inlet. Include test cocks and pressure-differential relief valve with ASME A112.1.2 air-gap fitting located between 2 positive-seating check valves for continuous-pressure application.

12. Double-Check-Valve Assembly: AWWA C510, with OS&Y gate valves on inlet and outlet, and strainer on inlet; equipped with cubic feet meters.
13. Antisiphon, Pressure-Type Vacuum Breakers: ASSE 1020, with valves, spring-loaded check valve, and spring-loaded floating disc. Include test cocks and atmospheric vent for continuous-pressure application.
14. Reduced-Pressure Detector Assembly Backflow Preventers: ASSE 1047, FM approved or UL listed, with OS&Y gate valves on inlet and outlet, and strainer on inlet. Include pressure-differential relief valve with ASME A112.1.2 air-gap fitting located between 2 positive-seating check valves, test cocks, and bypass with displacement-type water meter, valves, and reduced-pressure backflow preventer, for continuous-pressure application.
15. Double-Check Detector Assembly Backflow Preventers: ASSE 1048, FM approved or UL listed, with OS&Y gate valves on inlet and outlet, and strainer on inlet. Include 2 positive-seating check valves and test cocks, and bypass with displacement-type water meter, valves, and double-check backflow preventer, for continuous-pressure application.
16. Manufacturers: Approved manufacturers are Watts, Febco, Wilkins, and Conbraco.

Sec. 23-330 Anchorages

1. Anchorages shall be installed as required for all pressure piping applications. Bends, tees, valves, and other points where hydraulic thrust may develop shall be blocked or harnessed to resist movement. All fire hydrants and other fittings shall be harnessed with mechanical restraints. Method of harnessing shall be as shown on the drawings submitted for approval.
2. Clamps, Straps, and Washers: ASTM A 506, steel.
3. Rods: ASTM A 575, steel.
4. Rod Couplings: ASTM A 197, malleable iron.
5. Bolts: ASTM A 307, steel.
6. Cast-Iron Washers: ASTM A 126, gray iron.
7. Concrete Reaction Backing: Portland cement concrete mix, 3,000 psig.
 - a. Cement: ASTM C 150, Type I. One bag shall be considered to weigh 94 pounds. Minimum cement content shall be 376 pounds (4 bags) per cubic yard.
 - b. Fine Aggregate: ASTM C 33, sand. Fine aggregate shall be clean natural sand free of Sulfate or other injurious substances.
 - c. Coarse Aggregate: ASTM C 33, crushed gravel. Coarse aggregate shall be clean gravel or crushed stone. Sizes of coarse aggregate shall be the largest which are obtained from the producer and which are readily workable.
 - d. Water: Fresh, Clean, and Potable.

- e. The water-cement ratio of the mix shall be established in the design and shall be based on the established relationship between the water-cement ration and the strength of the concrete, and shall be such as to produce the required strength of the concrete with the least amount of water contained in the aggregate shall be included as part of the mixing water in computing the water content. The design shall provide for a slump of 3 inches minimum, and 5 inches maximum.
- f. Concrete blocking shall be formed and poured at the backs of fittings. Blocking shall be poured against undisturbed earth and all forms shall be removed before backfilling. Blocking shall be properly designed for the thrust encountered and detailed on the drawings submitted for approval.

Sec. 23-331 Identification

Detectable warning tapes (minimum 3 inch width) made of solid blue film with metallic core and continuously printed black-letter caption "CAUTION--WATER LINE BURIED BELOW."

Sec. 23-332 Execution

Sec. 23-333 Existing Underground Utilities and Obstructions

1. The Developer shall not operate any existing system valves without a representative of the Town present.
2. It is the Developers responsibility to verify all utility locations prior to start of work. At a minimum, the Developer must contact the Utilities Protection Center (UPC) before performing any site work. A current (not expired) UPC number should be kept on file by the Developer at all times. Any damage to existing utilities by the Developer shall be corrected at no cost to the utility owner.
3. The Developer shall locate existing water and sewer lines, gas lines, telephone cables, culverts, and cross drains; and show on the Drawings submitted for approval, according to the best information available. The Drawings shall indicate the pipe lines to be laid over, under or around underground utilities or obstructions that are known to exist. Where these or unforeseen underground utilities are encountered, the location and alignment may be changed, upon written approval of the Town to avoid interference.
4. The Developer shall furnish and have available at all times an Electronic Pipe and Cable Finder in working order, for purposes of locating existing pipe lines or other obstructions in the way of or along the route of new work.
5. Before the water line is laid, the Developer shall locate sewer and other utilities services to avoid interference with such services or to determine whether services should be relocated. The Developer shall be responsible for and shall repair any damage done to utilities services or pipe lines resulting from the work of locating services or resulting from the construction operation. The Town should be notified of any damaged utilities.

6. The Town shall have the right to determine the services which are to remain in place and the services which shall be relocated. Where the Town determines the services shall be relocated, the cost for the necessary changes will be negotiated.

Sec. 23-334 Excavation for Utility Trenches

1. General: Excavation of pipe trenches shall include all excavation of every description and whatever substance for backfilling of trenches, and all rock excavation.
2. Earth excavation shall include all excavation of whatever substance encountered, except rock excavation, as further provided for in these Specifications. In locations where pipe is to be bedded in earth excavated trenches, the bottoms of such trenches shall be fine graded to allow firm bearing for the bottom of the pipe on undisturbed earth. Excavation in solid rock shall be as follows:
 - a. Rock: Rock is defined as such materials in the original bed or wall-defined ledges, which upon demonstration to the Engineer, cannot be reasonably removed with pick and shovel, ditching machine, backhoe or other similar equipment, but which requires drilling and blasting, the use of jack-hammers, paving breakers, or other mechanical means. Boulders or detached pieces of rock having volumes or more the $\frac{1}{2}$ cubic yard shall be considered rock.
 - b. Excavation: Where rock is encountered in trenches, the trench shall be excavated to the minimum depth and width which will provide six (6) inches clearance beyond the outside diameter of the pipe bell.
 - c. Blasting: Blasting operations shall be conducted in accordance with all existing ordinances and regulations. All structures shall be protected from the effects of the blast. The blasting shall be done by experienced workmen.
 - d. Removal of Rock: Excavated rock shall not be used as backfill material. Surplus rock shall be disposed of by the Developer.
3. Excavate trenches to indicated gradients, lines, depths, and elevations.
 - a. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.
 - b. Trenches shall be excavated so as to provide for a minimum depth of cover of four (4) feet below the nearest pavement edge for pipe lines laid along or within the right-of-way limits of highways, streets or roadways, and a minimum of four (4) feet of cover in other locations, except as directed by the Town.
 - c. Where necessary to increase the depth of cover to more than five (5) feet to avoid interference with underground utilities, obstructions and utilities services, the Developer shall provide additional trench depth.
4. Excavate trenches to uniform widths to provide a working clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit, unless otherwise indicated.
 - a. Clearance: 12 inches on each side of pipe or conduit, or as indicated.

5. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit, and to not less than 6 inches clear of the outside barrel of the pipe on any side at any point. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.
 - a. For pipes and conduit less than 6 inches in nominal diameter and flat-bottomed, multiple-duct conduit units, hand-excavate trench bottoms and support pipe and conduit on an undisturbed subgrade.
 - b. For pipes and conduit 6 inches or larger in nominal diameter, shape bottom of trench to support bottom 90 degrees of pipe circumference. Fill depressions with tamped sand backfill.
 - c. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.
 - d. In situations where unsuitable bearing conditions are encountered during trench excavation, the Developer must immediately notify Town of Sharpsburg. Undercutting and backfilling of all utility trenches will be performed under the direction of Town of Sharpsburg. Any unauthorized undercutting and backfilling of trenches is the sole responsibility of the Developer.
6. No pipe shall be laid in water. The Developer shall be required to operate pumps, if necessary, to remove water from the trench while pipe is being laid and joints being made.
7. Excavate trenches in accordance with current OSHA standards and regulations from outermost bench. If required, the Contractor shall use alternate methods of trench excavation support such as trench boxes, temporary shoring, etc.

Sec. 23-335 Piping Applications

1. General: Piping is arbitrarily limited to 20-inch NPS and smaller. Use pipe, fittings, and joining methods for piping systems according to the following applications:
2. Transition couplings and special fittings with pressure ratings at least equal to piping pressure rating may be used in applications below, unless otherwise indicated.
3. Do not use flanges or keyed couplings for underground piping.
 - a. Exception: Piping in boxes and structures, but not buried, may be joined with flanges or keyed couplings instead of joints indicated.
4. Flanges, keyed couplings, and special fittings may be used on exposed piping.
5. Water-Service Piping: Use the following:
 - a. 3/4- to 1-Inch NPS: Copper tube, Type K; copper, bronze, or brass compression fittings.
 - b. 1- to 3-1/2-Inch NPS: Copper tube, Type K; copper; bronze, or brass fittings and soldered joints.

- c. 4- to 6-Inch NPS: Ductile-iron, mechanical-joint pipe, Class 50; ductile-iron, mechanical-joint fittings; and mechanical joints.
 - d. 4- to 20-Inch NPS: PE plastic pipe, minimum SDR of 13.5; fittings for PE plastic pipe; and heat-fusion (in accordance with manufacturer's specifications) or mechanical joints.
- 6. In locations where the water main may be exposed to non-routine installation conditions, they shall be constructed using ductile iron pipe. These conditions include, but are not limited to:
 - a. Where depth of cover is less than four feet or greater than fourteen feet;
 - b. Where water main is installed under pavements;
 - c. Where water main crosses under a creek or stream;
 - d. Where water main crosses over or under a sewer main;
 - e. Other locations deemed necessary by the Town.

Sec. 23-336 Valve Applications

Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:

- a. Underground Valves, 3-Inch to 12-Inch: Resilient seat, gate valves, nonrising stem, with valve box.
- b. Pit and Aboveground Installation Valves, 3-Inch to 12-Inch: AWWA, OS&Y gate valves.
- c. All Valves, 12-Inch and Larger: AWWA, butterfly valves.

Sec. 23-337 Joint Construction

- 1. Ductile-Iron Piping, Gasketed Joints: According to AWWA C600.
- 2. Flanged Joints: Align flanges and install gaskets. Assemble joints by sequencing bolt tightening. Use lubricant on bolt threads.
- 3. Threaded Joints: Thread pipes with tapered pipe threads according to ASME B1.20.1, apply tape or joint compound, and apply wrench to fitting and valve ends into which pipes are being threaded.
- 4. Ductile-Iron, Keyed-Coupling Joints: Cut-groove pipes. Assemble joints with keyed couplings, gaskets, lubricant, and bolts according to coupling and fitting manufacturer's written instructions.
- 5. Copper Tubing, Soldered Joints: According to AWS's "Soldering Manual," Chapter "The Soldering of Pipe and Tube."
- 6. Copper Tubing, Compression Fittings: According to AWS standards and specifications for this procedure.

7. HDPE Piping Heat-Fusion Joints: According to ASTM D 2657 and piping manufacturer's written instructions.
8. HDPE Piping Mechanical Joints: Always install and design mechanical joints according to manufacturer's written instructions. Always use internal stiffeners in accordance with manufacturers recommendation for this procedure.
9. Dissimilar Materials Piping Joints: Use adapters compatible with both piping materials, OD, and system working pressure. Refer to "Piping Systems - Common Requirements" Article below for joining piping of dissimilar metals.
10. PVC Pipe (4" and greater): Joints shall be made with elastomeric gaskets. Bell end pipe using elastomeric gaskets shall meet requirements of ASTM D 2122. Elastomeric gasket couplings shall meet the requirements of ASTM F 477.
11. PVC Pipe (3" and smaller): PVC plastic extrusion compound shall meet requirements of ASTM D 1784 for Class 12454-B (PVC 1120). Pipe and couplings shall bear the National Sanitation Foundation Testing Laboratories, Inc. seal of approval for potable water use. Elastomeric gasket couplings shall meet the requirements of ASTM F 477.

Sec. 23-338 Piping Systems – Common Requirements

1. General Locations and Arrangements: Drawings indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated, unless deviations to layout are approved on Coordination Drawings.
2. Install piping at indicated slope.
3. Install components with pressure rating equal to or greater than system operating pressure.
4. Install piping free of sags and bends.
5. Locate groups of pipes parallel to each other, spaced to permit valve servicing.
6. Install fittings for changes in direction and branch connections.
7. Piping Connections: Unless otherwise indicated, make piping connections as specified below:
 - a. Install unions, in piping 2-inch NPS and smaller, adjacent to each valve and at final connection to each piece of equipment with 2-inch NPS or smaller threaded pipe connection.
 - b. Install flanges, in piping 2-1/2-inch NPS and larger, adjacent to flanged valves and at final connection to each piece of equipment with flanged pipe connection.
 - c. Install dielectric fittings to connect piping of dissimilar metals.

Sec. 23-339 Piping Installation

1. General: Proper and suitable tools and equipment, for the safe and convenient handling and laying of pipe shall be used, and great care shall be taken to prevent the pipe from being damaged, particularly the cement lining on the interior of the pipe. All pipe shall be carefully examined for cracks and other defects, and no pipe or casting shall be laid which is known to be defected. All pipe, fittings, valves and accessories shall be carefully lowered into the prepared trench piece by piece by suitable means to prevent damage. Dropping or dumping pipe or accessories into trench will not be permitted. If any pipe or other casting is discovered to be cracked, broken or defective after being laid, it shall be removed and replaced with sound material. All pipe and fittings shall be thoroughly cleaned before being laid, and shall be kept clean until accepted in the completed work.
2. Water-Main Coordination: Coordinate taps in water main, of size and in location indicated, with Town of Sharpsburg.
3. Water-Main Connection: Tap water main with size and in location as indicated according to these specifications and details, and as required by Town of Sharpsburg.
4. Make connections larger than 1 ½-inch NPS with service saddle.
5. Make connections, 1-inch NPS and smaller, by direct tap method.
6. Install ductile-iron piping according to AWWA C600.
 - a. Encase piping with PE film according to ASTM A 674 or AWWA C105.
7. Install copper tube and fittings according to CDA's "Copper Tube Handbook."
8. Install HDPE plastic pipe according to ASTM D 2774, ASTM F 645, and manufacturer's written instructions.
9. Bury piping with a depth of cover over top of pipe of at least 48 inches, with top at least 12 inches below level of maximum frost penetration, and according to the following:
 - a. Under Driveways: With at least 48 inches cover over top of pipe.
 - b. Under Railroad Tracks: In accordance with AREMA's "Manual for Railway Engineering", latest edition.
10. Install piping under streets and other obstructions that cannot be disturbed, by tunneling, cased bore, jacking, or a combination.
11. The Developer shall keep a transit and accessories on the job to be used for laying out the angles required for making bends and other work of this nature.
12. Pipe alignment and gradient shall be straight or shall follow true curves as near as is practicable. Wherever necessary to deflect pipe from a straight line, either vertically or horizontally, to avoid obstructions, plumb valve stems, or form curves, the amount of deflection

shall be approved by the Town. In no case shall deflection per joint be greater than recommended by the manufacturer of the pipe material.

13. Excavation, cleaning, laying, jointing and backfilling, in that order, shall be kept as closely together as is possible to progress in a minimum of time and in a workman like manner.
14. In no case shall pipe be left in the trench overnight without completing jointing.
15. The completed pipe line shall not be left exposed in the trench unnecessarily and the Developer will be required to backfill and compact the trench as soon as possible after laying and jointing is completed.
16. Each day at the close of work, and at all times when laying is not in progress the exposed end of the pipe line in the trench shall be closed by the use of an approved head or barrier of wood or metals. If any time it becomes necessary to cover the end of an uncompleted pipe line with backfill, the end of such pipe line shall be closed using a mechanical joint plug.
17. Wherever pipe or special castings are required to be cut, the cutting shall be done by skilled workmen using pipe cutters or cutting torches on ductile iron pipe and pipe cutters only on cast iron pipe. HDPE should be cut according to manufacturers specifications. The use of hammer and chisel will not be permitted.

Sec. 23-340 Anchorage Installation

1. Install anchorages for tees, plugs and caps, bends, crosses, valves, and hydrant branches. Include anchorages for the following piping systems:
 - a. General: Anchorages shall be installed for all pressure piping applications.
 - b. Gasketed-Joint, Ductile-Iron, Potable-Water Piping: According to AWWA C600.
 - c. PE, Potable-Water Piping: According to manufacturers written specifications for anchorage installation.
2. Apply full coat of asphalt or other acceptable corrosion-retarding material to surfaces of installed ferrous anchorage devices.

Sec. 23-341 Valve Installation

1. General Application: Use mechanical-joint-end valves for 3-inch NPS and larger underground installation. Use threaded- and flanged-end valves for installation in pits. Use bronze corporation stops and valves, with ends compatible with piping, for 2-inch NPS and smaller installation.
2. AWWA-Type Gate Valves: Comply with AWWA C600. Install underground valves with stem pointing up and with cast-iron valve box.
3. Bronze Corporation Stops and Curb Stops: Comply with manufacturer's written instructions. Install underground curb stops with head pointed up and with cast-iron curb box.

Sec. 23-342 Fire Hydrant Installation

1. General: Install each fire hydrant with separate gate valve in supply pipe, anchor with restrained joints or thrust blocks, and support in upright position.
2. AWWA-Type Fire Hydrants: Comply with AWWA M17.

Sec. 23-343 Flushing Hydrant Installation

1. Install post-type flushing hydrants with valve below frost line and provide for drainage. Support in upright position. Include separate gate valve or curb stop and restrained joints in supply piping.
2. Install ground-type flushing hydrants with valve below frost line and provide for drainage. Install hydrant box flush with grade. Include separate gate valve or curb stop and restrained joints in supply piping.
3. Install sampling stations with valve below frost line and provide for drainage. Attach weather-resistant housing and support in upright position. Include separate curb stop in supply piping.

Sec. 23-344 Water-Meter Installation

1. Install water meters, piping, and specialties according to these specifications and details, and in accordance with manufactures written specifications.
2. Water Meter: Install displacement-type water meters, 2-inch NPS and smaller, in meter boxes with shutoff valve on water-meter inlet. Include valve on water-meter outlet and valved bypass around meter, unless prohibited by authorities having jurisdiction.
3. Water Meter: Install compound-type water meters, 3-inch NPS and larger, in meter pits. Include shutoff valves on water-meter inlet and outlet and valved bypass around meter. Support meters, valves, and piping on brick or concrete piers.
4. Water Meter: Install detector-type water meters according to AWWA M6 in meter pit. Include shutoff valves on water-meter inlet and outlet and full-size valved bypass around meter. Support meters, valves, and piping on brick or concrete piers.

Sec. 23-345 Roughing-In for Water Meters

Rough-in piping and specialties for water meters according to these specifications and details, and in accordance with manufactures written specifications.

Sec. 23-346 Pit Construction and Installation

1. Install pits and vaults according to these specifications and details, and in accordance with manufactures written specifications.

2. Construct cast-in-place concrete pits, with manhole frame and cover, ladder, and drain. Include sleeves with waterproof mechanical sleeve seals for pipe entry and exit. Refer to Division 3 Section "Cast-in-Place Concrete."
3. Install precast concrete pits according to ASTM C 891.
4. Connect area drain outlet to storm drainage piping or to existing ditch. Discharge point to be approved by the Town of Sharpsburg prior to construction.

Sec. 23-347 Detector Check Valve Installation

1. Install detector check valves in pits for proper direction of flow. Install bypass with water meter, gate valves on each side of meter, and check valve downstream from meter.
2. Support detector check valves, meters, shutoff valves, and piping on brick or concrete piers.

Sec. 23-348 Backflow Preventer Installation

1. Install backflow preventers of type, size, and capacity indicated. Include valves and test cocks. Install according to plumbing and health department authorities having jurisdiction.
2. Do not install reduced-pressure-principle type in pit.
3. Do not install bypass around backflow preventer.
4. Support backflow preventers, valves, and piping on brick or concrete piers.

Sec. 23-349 Identification Installation

1. Install continuous metallic underground warning tape during back-filling of trench for underground water-service piping. Detection tape or wire shall be installed approximately two (2) feet below finished grade.
2. Service lines and valves shall be located via marked curbing or other approved Town of Sharpsburg method. Adjacent street curb to service line and valves shall be marked via saw-cut as follows. Curb markings shall be a minimum of four (4) inches in height.
 - a. "W" for water service location.
 - b. "V" for water valve location.
 - c. "X" for sewer Service location.

Sec. 23-350 Backfilling

1. Trench backfill shall consist of earth fill only. No rock excavated from trenches will be permitted to be placed in the trench backfill; and, if necessary, the Developer shall supply sufficient and suitable earth for trench backfill.

2. Backfill material in the bottom of the trench and up to two feet over the top of the pipe line shall be placed in 8-inch layers and shall be power tamped on each side of the pipe equally. The remainder of the trench shall be compacted to the specified compaction effort by mechanical means acceptable to the Town.
3. Backfill shall be further compacted, if necessary either by leaving the backfill trench open to traffic or by the use of rolling equipment as may be required. The method and the amount of compaction shall be subject to approval by the Town.
4. Compact soil to not less than the following percentages of maximum dry unit weight according to ASTM D 698:
 - a. Under road surfaces, road right-of-ways, pavement areas, and sidewalks, compact each layer of backfill material at 98 percent.
 - b. Under lawns, compact each layer of backfill or fill material at 85 percent.

Sec. 23-351 Construction along Highways, Streets, and Roadways

1. General: All construction work detailed in this subsection shall be performed in accordance with the specifications detailed in this section.
2. The Developer shall install pipe lines and accessories along highways, streets and roadways in accordance with the applicable regulations of the Georgia Department of Transportation, Coweta County, and the Town of Sharpsburg with reference to construction operations, safety, traffic control, road maintenance and repair.
3. The Developer shall provide suitable signs, barricades and lights for protection of traffic, in locations where traffic may be endangered by construction operations. All highway signs removed by reason of construction shall be replaced as soon as the condition which necessitated such removal has been cleared. No highway, street, or roadway shall be closed without first obtaining permission from the proper authorities. The Contractor shall also provide flag men to direct and expedite the flow of traffic, if possible, at its normal flow rate.
4. The Developer shall construct all work along highway, street and roadways using the following sequence of construction operations, to least interfere with traffic.
 - a. Stripping: Where the pipe line is laid along road shoulders all sod, topsoil and other material suitable for shoulder restoration shall be stripped and stockpiled for replacement.
 - b. Trenching, Laying and Backfilling: The Developer shall open trenches, install pipe line, and backfill. The trench shall not be opened any further ahead of pipe laying operations than is necessary. Trenched shall be backfilled and excess material removed immediately behind laying operations. Excavating and backfilling, for any portion of any trench, shall be completed the same day.
 - c. Shaping: The Developer, immediately after completing back filling operations shall reshape any damaged cut and fill slopes, side ditches and ditch lines, and shall replace topsoil, sod and any other materials removed from shoulder.

5. Excavated material shall not be placed along highways, streets and roadways in such manner as to obstruct traffic. All scattered excavated material shall be kept swept away and shall not be allowed to remain on the pavement.
6. All side ditched, culverts, cross drains, and other drainage structures shall be kept clear of excavated material and be free to drain at all times.
7. All streets, highways, and roadways shall remain clean and clear for traffic movement until completion and final acceptance of the work. The Developer shall use steel running plates to maintain traffic until replacement paving is completed. The Developer shall provide chamfered asphalt edges along each side and at each corner of the steel running plates. The Developer shall immediately repair all driveways that are cut or damaged and shall maintain them in a suitable condition for use until completion and final acceptance of the work.

Sec. 23-352 Connection to Existing Cast Iron Pipe Lines

1. General: All construction work detailed in this subsection shall be performed in accordance with the specifications detailed in this Section.
2. Connections to existing cast iron pipe lines shall be made by the use of tapping sleeves and valves, unless specifically shown otherwise on the drawings.
3. The Developer shall, before opening pipe line trenches locate the various points of connections to be made into existing pipe lines and shall uncover as necessary for the Town to determine the types of connections and fittings to be installed.
4. Connections to existing pipe lines shall be made only at such times and in such manner as will meet operating requirements. Existing valves shall be operated only by authorized representatives of the Town.

Sec. 23-353 Removing and Replacing Pavement

1. General: All construction work detailed in this subsection shall be performed in accordance with the specifications detailed in this Section.
2. The Developer shall remove existing pavement as necessary for installing the new water lines and appurtenances.
 - a. Marking: Before removing any pavement, the pavement shall be marked for cuts neatly paralleling pipe lines and existing street lines. The marks shall be spaced the width of the trench.
 - b. Breaking: Asphalt pavement shall be broken along the marked lines by use of jack hammers or other suitable tools. The concrete pavement within the limits of the trench may be broken along the marked cuts by scoring to a depth of approximately 1-1/2 inches with a rotary saw and breaking below the score by the use of jack hammers or other suitable tools.

- c. Machine Pulling: No pavement shall be machine pulled until completely broken and separated along the marked cuts.
 - d. Damage to Adjacent Pavement: The pavement adjacent to pipe line trenches must not be disturbed or damaged. If the adjacent pavement is disturbed or damaged, due to any cause such as caving ditch banks, indiscriminate use of construction machinery, etc., the Developer shall remove and replace the damaged pavement.
 - e. Sidewalk: Sidewalks shall be removed and replaced for their full width.
 - f. Curbs: The Developer shall remove and replace or tunnel under any curb encountered.
3. Upon completion of backfilling and consolidation of the backfill, the Developer shall furnish all materials and labor necessary to replace all pavements, sidewalks and curbs removed for construction of the pipe lines and appurtenances and restore all pavements adjacent to pipe trenches which may have been disturbed or damaged as the result of construction operations.
- a. Supervision and Approval: Pavement restoration shall meet the requirements of the regulatory agency responsible for the pavement. It shall be the Developer's responsibility to obtain agency approval of pavement restoration before final payment is made. Restoration of payment not the responsibility of a regulatory agency such as private roads and drives shall be supervised and approved by the Town. Pavement restoration shall follow the backfilling operation as closely as is practicable. If in the opinion of the Town, the re-paving program is allowed to lag, the Town shall order work stopped on other sections of the project until the re-paving operation shows adequate progress.
 - b. Replacement: Prior to replacing pavement, the Developer shall make a final cut in concrete pavement nine inches back from the edge of damaged pavement. The cut shall be made using a rotary saw. Asphalt pavement shall be removed similarly using jack hammers or other suitable tools. This pavement shall be removed to provide a firm bench for placement of the new pavement. All street and roadway replacement shall be as detailed on the Drawings. Driveways, sidewalks, and curbs shall be replaced with the same material and to the same dimensions as existing.
 - c. Failure of Payment: Should any pavement restoration or repairs fail or settle during a period of one year after acceptance of the completed line, the Developer shall promptly restore or repair such pavement to the satisfaction of the Town.

Sec. 23-354 Stream and Ditch Crossing

1. General: All construction work detailed in this subsection shall be performed in accordance with the specifications detailed in this section.
2. At all points where banks of streams or drainage ditches are disturbed by excavation or where natural vegetation is removed, the Developer shall carefully compact backfill and place stone rip rap to prevent subsequent settlement and erosion.

3. This requirement applies equally to construction alongside a stream or drainage ditch as well as crossing stream or drainage ditch. Stone rip rap shall be placed a distance of not less than 10 feet upstream and 10 feet downstream from any disturbed area. Rip rap shall extend from 1 foot below stream bed to top of bank and shall be placed to conform with the natural slope of the stream bank.
 - a. Stone Rip Rap: All stone for rip rap shall be sound, tough, durable pieces, resistant to the action of air and water. Slabbly or shaley pieces will not be acceptable. Specific gravity shall be 2.0 or higher.
 - b. Minimum weight of individual stones shall be 50 pounds. Maximum size need not exceed 24 inches and 12 inches for the two larger dimensions a minimum of 6 inches. At least 50% of the pieces shall have a minimum dimension of 12 inches.
 - c. Stone rip rap shall be imbedded into place by hand so as to form a compact layer at least 12 inches thick. It shall be placed in such a way that the smaller stones are not segregated but evenly distributed. Chinking stones shall be placed in the crevices between the larger stones so that a dense ,well graded mass is produced.

Sec. 23-355 Jacking & Boring Pipe

1. General: All construction work detailed in this subsection shall be performed in accordance with the specifications detailed in this Section.
2. This work shall consist of installing various sizes of pipe by jacking and boring through whatever materials may be encountered. Lengths of casing pipe shall be fully welded to the preceding section in accordance with AWS recommended procedures.
3. Qualifications: The Developer (or his jacking and boring subcontractor) shall have qualifications approved by the Town. The Developer shall submit evidence of his experience with shop drawings for review by the Town.
4. Safety: The Developer shall provide all necessary bracing, bulkheads, and shields to ensure complete safety to all traffic at all times during the work, and he shall perform the work in such a manner as to not permanently damage the roadbed or interfere with normal traffic over it. If in the opinion of the Town the installation is being conducted in an unsafe manner detrimental to the over passing roadway or to the safety of the traveling public, the Developer will be required to stop work and bulkhead the heading until suitable agreements are reached between the Developer and the Town. The Town will not be responsible in the event of delays to the Developer's work resulting from any cause whatsoever. In the event that distress occurs to the roadway, the Developer shall be required to submit a plan to repair the roadway. The plan must be acceptable to both DOT and the Town.
5. Jacking
 - a. When required, suitable pits or trenches shall be excavated for the jacking operation and for placing the end joints of pipe. Where necessary, they shall be securely sheeted and braced to prevent caving.
 - b. Where pipe is required to be installed under railroads, highways, streets or other facilities by jacking or boring methods, construction shall be done in a manner

that will not interfere with the operation of the facility, and shall not weaken the roadbed or structure.

- c. Jacks for forcing the pipe through the roadbed shall have a jacking head constructed in such a manner as to apply uniform pressure around the ring of the pipe. The pipe to be jacked shall be set on guides, braced together, to properly support the section of the pipe and direct it to the proper line and grade. In general, roadbed material shall be excavated just ahead of the pipe, the excavated material removed through the pipe, and the pipe then forced through the roadbed into the excavated space.
- d. The Contractor shall furnish for the Engineer's approval, a plan showing the proposed method of handling, including the design for the jacking head, jacking support or back stop, arrangement and position of jacks, pipe guides, etc., complete as assembled.
- e. The diameter of the excavation shall conform to the outside diameter and circumference of the pipe as closely as practicable. Any voids which develop during the installation operation and which are determined by the Engineer to be detrimental to The Work, shall be pressure grouted with an approved mix.
- f. The distance that the excavation extends beyond the end of the pipe will depend upon the character of the excavated material, but shall not exceed 2 feet in any case. This distance shall be decreased on instructions from the Engineer if the character of the material being excavated makes it desirable.
- g. The pipe shall be jacked from the low or downstream end. Variation in the final position of the pipe from the line and grade established by the Engineer will be permitted only to the extent of 2 percent in lateral alignment, and 1 percent in vertical grade, providing that the final grade of flow line shall be in the direction indicated on the Plans.
- h. If the Contractor desires, he may use a cutting edge around the head end and extending a short distance beyond the pipe end, with inside angles or lugs to keep the cutting edge from slipping back into the pipe.
- i. Once jacking of pipe is begun, the operation shall be carried on without interruption, insofar as practicable, to prevent the pipe from becoming firmly set in the embankment.
- j. Any pipe damaged in jacking operations shall be removed and replaced at the Contractor's expense.
- k. The pits or trenches excavated to facilitate jacking operations shall be backfilled immediately after the jacking has been completed.

6. Boring

- a. The boring shall proceed from a pit provided for the boring equipment and borers. Excavation for pits and installation of shoring shall be as outlined above. The location of the pit shall meet the approval of the Engineer. The holes are to be bored mechanically. The boring may be done using a pilot hole approximately 2 inches in diameter which shall be bored the entire length of the installation and shall be checked for line and grade on the opposite end of the bore from the work pit. This pilot hole shall serve as the centerline of the larger diameter hole to be bored. Excavated material will be placed near the top of the working pit and disposed of as required. The use of water or other fluids in connection

with the boring operation will be permitted only to the extent necessary to lubricate cuttings. Jetting will not be permitted.

- b. In unconsolidated soil formations a gel-forming colloidal drilling fluid consisting of at least 10% of high grade carefully processed bentonite may be used to consolidate excavated material, seal the walls of the hole, and furnish lubrication for subsequent removal of material and immediate installation of the pipe.
- c. Allowable variation from line and grade shall be as specified under Jacking. The diameter of the excavation shall conform to the outside diameter of the pipe as closely as practicable. Any voids which develop during the installation operation and are determined by the Engineer to be detrimental to the work, shall be pressure grouted with an approved mix.

Sec. 23-356 Directional Drilling

1. General: All construction work detailed in this subsection shall be performed in accordance with the specifications detailed in this section.
2. This work shall consist of installing various sizes of pipe by directional drilling methods through whatever materials may be encountered.
3. Qualifications: The directional drilling subcontractor shall have qualifications approved by the Town. The Developer shall submit evidence of his experience with shop drawings for review by the Town.
4. Safety: The Developer shall provide all necessary bracing, bulkheads, and shields to ensure complete safety to all traffic at all times during the work, and he shall perform the work in such a manner as to not permanently damage the roadbed or interfere with normal traffic over it. If in the opinion of the Town the installation is being conducted in an unsafe manner detrimental to the over passing roadway or to the safety of the traveling public, the Developer will be required to stop work and bulkhead the heading until suitable agreements are reached between the Developer and the Town. The Town will not be responsible in the event of delays to the Developer's work resulting from any cause whatsoever. In the event that distress occurs to the roadway, the Developer shall be required to submit a plan to repair the roadway. The plan must be acceptable to both DOT and the Town.
5. When required, suitable pits or trenches shall be excavated for the directional drilling operation and for placing the end joints of pipe. Where necessary, they shall be securely sheeted and braced to prevent caving.
6. Where pipe is required to be installed under railroads, highways, streets or other facilities by directional drilling methods, construction shall be done in a manner that will not interfere with the operation of the facility, and shall not weaken the roadbed or structure.
7. The Contractor shall furnish for the Engineer's approval, a plan showing the proposed method of handling, including the type of directional drilling equipment.
8. Any pipe damaged in directional drilling operations shall be removed and replaced at the Contractor's expense.

9. The pits or trenches excavated to facilitate directional drilling shall be backfilled immediately after the drilling has been completed.
10. The holes are to be bored mechanically.
11. Excavated material will be placed near the top of the working pit and disposed of as required. The use of water or other fluids in connection with the drilling operation will be permitted only to the extent necessary to lubricate cuttings. Jetting will not be permitted.
12. The diameter of the excavation shall conform to the outside diameter of the pipe as closely as practicable. Any voids which develop during the installation operation and are determined by the Engineer to be detrimental to the work, shall be pressure grouted with an approved mix.

Sec. 23-357 Field Quality Control

1. Piping Tests: Conduct piping tests before joints are covered and after thrust blocks (anchors) have hardened sufficiently. Fill pipeline 24 hours before testing and apply test pressure to stabilize system. Use only potable water. Developer shall furnish all labor, materials, and equipment for carrying out these tests. All joints then shall be examined during open trench test and all leaks entirely stopped. The Developer shall furnish a test pump, and means for accurate measurement of water introduced into a line during testing, and shall furnish and install corporation stops at all high points on the line as required for blowing lines free from air and at the test pump location.
2. We suggest that the state tests will be done "in accordance with AWWA C600 and/or AWWA C605." We all suggest that tests be done on each section of line between valves. Valve spacing should be mandated at no more than 2300', but we suggest a spacing of no more than 2000'.
3. Hydrostatic Tests: Test at not less than 1½ times working pressure for 2 hours.
 - a. The Developer shall furnish, install, and remove all temporary bulkheads, flanges or plugs, to permit the required pressure tests and shall furnish all equipment and labor to properly carry out such tests and to replace defective material.
 - b. When a section of pipe of a length deemed adequate by the Town is ready for testing, the line shall be thoroughly blown free from air and a leakage test made.
 - c. Tests pressures shall be 1½ times the maximum working pressure at the highest point in the line but in no case less than 150 psi.
 - d. Increase pressure in 50-psig increments and inspect each joint between increments. Hold at test pressure for one hour; decrease to 0 psig. Slowly increase again to test pressure and hold for one more hour. Minimum test period shall be two hours, however, if in the opinion of the Town, additional testing is required, such additional testing shall be performed by the Developer at no expense to the Town.
 - e. No allowable leakage is permitted.

- f. Any cracked or broken material such as pipe, fittings, valves, or hydrants, shall be removed and replaced with sound pieces, at no expense to the Town. Joints which leak shall be carefully remade. Remade joints and replaced material shall be re-tested under the same conditions of operation. If joints or material are then found to be defective, they shall be remade and replaced until the line passes the required test.
- 4. Prepare reports for testing activities.

Sec. 23-358 Disinfection of Water Mains

- 1. Disinfection of water distribution piping as follows:
 - a. All new water mains, as well as those taken out of service for inspection, repair or other activities that might lead to contamination of water shall be disinfected before they are placed in or returned to service.
 - b. Disinfection of the new mains and the disposal of the heavily chlorinated water, following the disinfection, shall be accomplished in accordance with the latest edition of AWWA Standard C651.
 - c. The "tablet method" of disinfection which consists of placing calcium hypochlorite granules or tablets in the water main as it is being installed and then filling the main with potable water when installation is complete is not allowed.
 - d. Before the main is chlorinated, it shall be filled to eliminate air pockets and shall be flushed to remove particulates. A flushing velocity of not less than 2.5 feet/second is usually maintained in pipe sizes less than 24 inches in diameter. For larger diameter mains, an alternative to flushing, such as broom-sweeping of the main, is acceptable prior to chlorinating the main.
 - e. During disinfection of the water mains, an appropriate cross-connection control device, consistent with the degree of hazard, shall be provided for backflow protection of the active distribution system.
 - f. The quality of the water used during the disinfection procedures shall meet the required drinking water standards.
 - g. The chlorine solution used for disinfection of water mains shall have a free chlorine residual concentration not less than 23 mg/L. This heavily chlorinated water shall be retained in the main for at least 24 hours, during which time all valves and hydrants shall be operated to ensure disinfection of the appurtenances. At the end of the 24-hour period, the treated water in all portions of the main shall have a residual of not less than 10 mg/L free chlorine. Re-chlorinate if required results are not obtained on all samples.

- h. After the applicable retention period, the heavily chlorinated water must not be disposed in a manner that will harm the environment. Neutralizing chemicals, such as Sulfur Dioxide, Sodium Bisulfite, Sodium Sulfite or Sodium Thiosulfate can be used to neutralize the chlorine residual remaining in the water to be wasted.
 - i. Flush all lines until residual is equal to existing system. After final flushing and before the water main is placed into service, water samples shall be collected from the main and tested for microbiological quality in accordance with the Georgia Rules for Safe Drinking Water, Chapter 391-3-5. The laboratory results must show the absence of coliform organisms in the water. Reflush and redisinfect the lines, as necessary, until satisfactory bacteriological results are obtained.
2. Disinfection when cutting into or repairing existing mains
- a. Shall be performed when mains are wholly or partially dewatered;
 - b. Shall follow the current AWWA C651 Standards, including trench treatment, swabbing with hypochlorite solution, flushing and/or slug chlorination as appropriate;
 - c. Bacteriological testing shall be performed after the repairs are complete. However, depending upon the circumstances, the water main may be returned to service prior to completion of testing to minimize the time the customers are out of service.
 - d. Leaks or breaks that are repaired with clamping devices while the mains remain full of water under pressure may require no disinfection.
3. Prepare reports for purging and disinfecting activities.
4. Amount of Chlorine necessary for disinfection
- a. Chlorine required to produce 23 mg/L concentration in 100 feet of pipe by diameter:

Pipe Diameter	100% Chlorine		1% Chlorine Solution	
	(lbs)	(g)	(gal)	(L)
4	0.013	5.9	0.16	0.6
6	0.030	13.6	0.36	1.4
8	0.054	24.5	0.65	2.5
10	0.085	38.6	1.02	3.9
12	0.120	54.4	1.44	5.4
16	0.217	98.4	2.60	9.8

Note: 1% chlorine solution may be prepared with sodium hypochlorite (contains

5% to 15% available chlorine) or calcium hypochlorite (contains approximately 65% available chlorine by weight). To prepare 1% chlorine solution using calcium hypochlorite, add one (1) pound (454 grams) of calcium hypochlorite in approximately 8 gallons of water.

- b. Amounts and types of chemicals advised to be used for neutralizing various residual chlorine concentration in 100,000 gallons of water.

Residual Chlorine Concentration	Chemicals							
	Sulfur Dioxide (SO ₂)		Sodium Bisulfate (NaHSO ₃)		Sodium Sulfite (Na ₂ SO ₃)		Sodium Thiosulfate (Na ₂ S ₂ O ₃ 5H ₂ O)	
Mg/L	Lb	Kg	Lb	Kg	Lb	Kg	Lb	Kg
1	0.8	0.36	1.2	0.54	1.4	0.64	1.2	0.54
2	1.7	0.77	2.5	1.13	2.9	1.32	2.4	1.09
10	8.3	3.76	12.5	5.67	14.6	6.62	12.0	5.44
50	41.7	18.91	62.6	28.39	73.0	33.11	60.0	27.22

Sec. 23-359 Protection and Restoration of Work Area

1. General: It is the intent of these specifications to return all in terms and all areas disturbed, directly or indirectly, to their original condition or better, as quickly as possible after work is started. Compliance with the Town of Sharpsburg Environmental Code should be followed.
2. The Developer shall be responsible for protecting, removing and replacing, with the Town's approval, all fences, walkways, mail boxes, pipe lines, drain culverts, power and telephone lines, cables, and other improvements that may be encountered in the work.
3. Cultivated trees or shrubbery shall not be disturbed unless absolutely necessary and in accordance with the Town of Sharpsburg Tree Protection and Landscape Ordinance, subject to the approval of the Town. Any such trees or shrubbery which must be removed shall be heeled in and re-planted. Heeling in and re-planting shall be done under the direction of an experienced landscaper.
4. No trees shall be cut for the performance of the work except as absolutely necessary. Trees that remain in the vicinity of the work shall be protected from damage from equipment and shall not have spoil from excavation stored against the trunks. Where excavated materials are stored over the root system of trees, it shall be removed within 30 days to allow proper natural watering of the root system. Any tree over 3-inches in diameter, not to be removed, that is damaged in the work will be repaired under the direction of an experienced landscaper. All trees and brush that require removal shall be promptly and completely removed from the work area and disposed of by the Developer. No stumps, wood piles, or trash piles will be permitted on the work site.

5. Grass removed or damaged in residential areas shall be re-planted using the same variety of grass and at the first appropriate season. Outside of residential areas, the entire area disturbed by the work shall be planted in rye, fescue, bermuda, clover or other suitable ground cover on completion of work in any area. In all areas, the Contractor shall be responsible for promptly establishing successful stands of grass.
6. The Developer shall so plan his excavation work to prevent erosion and the washing of soil into adjacent streams. This shall be accomplished by limiting the amount of open excavation at any one time, by placing spoil in the proper place and by keeping natural water routes open.
7. All materials cleared and grubbed during the construction of the project will be disposed of by the Developer in accordance with the applicable codes and rules of the appropriate city, county, state, and federal regulatory agencies.

Sec. 23-360 Violations, Enforcement and Penalties.

Any action or inaction that violates the provisions of this ordinance or the requirements of an approved plan or permit shall be subject to the enforcement actions or penalties outlined herein. Any such action or inaction that is continuous with respect to time is deemed to be a public nuisance and also may be abated by injunctive or other equitable relief. The imposition of any of the enforcement actions or penalties described herein shall not prevent such equitable relief.

Sec. 23-361 Notice of Violation.

If the Town Administrator or his designee determines that an applicant or other responsible person has failed to comply with the terms and conditions or the provisions of this ordinance, they shall issue a written notice of violation to such applicant or other responsible person. Where a person is engaged in activity covered by this ordinance without having first secured the appropriate permit therefor, the notice of violation shall be served on the owner or the responsible person in charge of the activity being conducted on the site.

The notice of violation shall contain:

1. The name and address of the owner or the applicant or the responsible person;
2. The address or other description of the site upon which the violation is occurring;
3. A statement specifying the nature of the violation;
4. A description of the remedial actions or measures necessary to bring the action or inaction into compliance with a permit, approved plan or this ordinance and the date for the completion of such remedial action;
5. A statement of the penalty or penalties that may be assessed against the person to whom the notice of violation is directed; and

Sec. 23-362 Penalties.

In the event the remedial measures described in the notice of violation have not been completed by the date set forth for such completion in the notice of violation, any one or more of the following actions or penalties may be taken or assessed against the person to whom the notice of violation was directed. Before taking any of the following actions or imposing any of the following penalties, the Town Administrator or his designee shall provide a reasonable opportunity, of not less than ten days (except that in the event the violation constitutes an immediate danger to public health or public safety, 24 hours notice shall be sufficient) to cure such violation. In the event the applicant or other responsible person fails to cure such violation after such notice and cure period, the Town Administrator or his designee may take any one or more of the following actions or impose any one or more of the following penalties.

1. **Stop Work Order** - The Town Administrator or his designee may issue a Stop Work Order which shall be served on the owner, applicant or other responsible person. The Stop Work Order is effective immediately and shall remain in effect until the applicant or other responsible person has taken the remedial actions or measures set forth in the Notice of Violation or has otherwise cured the violation or violations described therein, provided the Stop Work Order may be withdrawn or modified to enable the applicant or other responsible person to take necessary remedial measures to correct and cure such violation or violations.
2. **Withhold Certificate of Occupancy** - The Town Administrator or his designee is authorized to refuse to issue a Certificate of Occupancy or Completion for the building or other improvements constructed or being constructed on the site until the applicant or other responsible person has taken the remedial actions and measures set forth in the Notice of Violation or has otherwise corrected and cured the violations described therein.
3. **Suspension, Revocation or Modification of Permit** - The Town Administrator or his designee is authorized to suspend, revoke or modify the permit authorizing the land disturbing activities or development. A suspended, revoked or modified permit may be reinstated after the applicant or other responsible person has taken the remedial actions and measures set forth in the Notice of Violation or has otherwise corrected and cured the violations described therein, provided such permit may be reinstated (upon such conditions as the Town Administrator or his designee may deem necessary) to enable the applicant or other responsible person to take the necessary remedial measures to cure such violations.
4. **Civil Penalties** - In the event the applicant or other responsible person fails to take the remedial actions and measures set forth in the notice of violation or otherwise fails to cure the violations described therein within ten days (or such greater period as the Town Administrator or his designee shall deem appropriate) (except that in the event the violation constitutes an immediate danger to public health or public safety, 24 hours notice shall be sufficient) after the Town Administrator or his designee has taken one or more of the actions described above, the Town Administrator or his designee may issue a citation and impose a penalty not to exceed the maximum amount allowed by the Town Charter as is from time to time amended (depending on the severity of the violation) for each day the violation remains unremedied after receipt of the Notice of Violation.

5. Other Legal Remedies

- a. In any case in which a violation of this ordinance has occurred, the town, in addition to other remedies provided by law, may petition for a restraining order, injunction, abatement, or take any other appropriate legal action or proceeding through a court of competent jurisdiction to prevent, restrain, or abate such unlawful use or activity.
- b. In any case in which any land is, or is proposed to be, used or activities are undertaken in violation of these Regulations or any amendment thereto adopted by the Mayor and Council, the Town, in addition to other remedies provided by law, may petition for a restraining order, injunction, abatement, or take any other appropriate legal action or proceeding through a court of competent jurisdiction to prevent, restrain, or abate such unlawful use or activity.

ARTICLE TWO

The Water Distribution Specifications Ordinance shall be codified at Chapter 23 of The Town of Sharpsburg's Code of Ordinances.

ARTICLE THREE

This Ordinance shall become immediately effective upon its second reading and adoption by the Town Council.

ARTICLE FOUR

The Preamble of this Ordinance shall be construed to be, and is hereby incorporated by reference as is fully set out herein.

ARTICLE FIVE

The sections, paragraphs, sentences, clauses, and phrases of this Ordinance are severable, and if any phrase, sentence, paragraph, or section of this Ordinance shall be declared illegal by the valid judgment or decree of any court of competent jurisdiction, such an illegality shall not affect any of the remaining phrases, clauses, sentences, paragraphs, and sections of this Ordinance.

ARTICLE SIX

The repeal of any stricken, deleted or repealed language of this ordinance of the now former language of the Town of Sharpsburg ("Former Language") shall not be construed or held to repeal the Former Language as to any offense committed against such Former Language or as to any act done, any penalty, forfeiture or punishment so incurred, or any right accrued or claim arising under the Former Language, or in any way whatever to affect any such offense or act so committed or so done, or any penalty, forfeiture or punishment so incurred or any right accrued or claim arising before the herein newly enacted language ("New Language") takes effect, save only that proceedings thereafter shall conform to the New Language, so far as practicable. If any penalty, forfeiture or punishment be mitigated by any provision of the New Lan-

guage, such provision may be, by the consent of the party affected, applied to any judgment announced after the New Language takes effect.

ARTICLE SEVEN

All ordinances and parts of ordinances in conflict herewith are hereby expressly repealed.

[signatures on next page]

APPROVED BY THE MAYOR AND COUNCIL OF THE TOWN OF SHARPSBURG
at a regular meeting of the Mayor and Council on the _____ day of October, 2006, by the following voting for adoption:

Wendell L. Staley, Mayor

J. Clay Cole, Council Member

Larry W. Hyde, Council Member

Derrick G. McElwaney, Council Member

Standly D. Patten, Council Member

Attest:

Donna M. Camp, Town Clerk

Robin L. Spradlin, Town Administrator

GENERAL NOTES

- 1) SHARPSBURG REQUESTS THAT THE PROPERTY OWNER/ DEVELOPER AND ENGINEER DISCUSS SERVICES NEEDED PRIOR TO PLAN SUBMITTAL.
- 2) SHARPSBURG REQUIRES THAT ALL SHARPSBURG STANDARD DETAILS AND NOTES ARE INCLUDED IN THE CONSTRUCTION PLANS. THESE DETAILS AND NOTES SHALL NOT BE ALTERED IN ANYWAY.
- 3) SHARPSBURG REQUIRES THAT (4) FOUR SETS OF CONSTRUCTION PLANS AND (1) ONE DIGITAL SITE PLAN BE PROVIDED IN DWG OR DXF FORMAT FOR REVIEW.
- 4) THRUST BLOCKING OR APPROVED RESTRAINT SYSTEMS SHALL BE INSTALLED AS REQUIRED FOR ALL PRESSURE PIPE INSTALLATIONS.
- 5) ALL WATER DESIGNS MUST BE APPROVED AND STAMPED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF GEORGIA. DRAWINGS MUST INCLUDE BUT ARE NOT LIMITED TO MANHOLES, TAPS, WATER METERS, VALVES, LINES AND ALL APPURTENANCES RELATED TO THE INSTALLATION AND CONSTRUCTION OF THE WATER SYSTEMS.
- 6) ALL MATERIALS SHALL BE NEW AND THE MANUFACTURERS APPROVED BY THE TOWN OF SHARPSBURG.
- 7) THE DEVELOPER SHALL NOTIFY SHARPSBURG A MINIMUM OF 48 HOURS PRIOR TO ANY WORK ON, OR ADJACENT TO, SHARPSBURG WATER SYSTEM.
- 8) THE DEVELOPER SHALL VERIFY AND BE PREPARED TO PROVIDE PROOF THAT NO WATER SYSTEM INFRASTRUCTURE IS PLACED UPON OR IN CLOSE PROXIMITY OF AN ABANDONED LAND FILL SITE OR ANY OTHER SITE USED FOR WASTE DISPOSAL.
- 9) THE PROPERTY DEVELOPER OR CONTRACTOR SHALL PROVIDE A 1 YEAR WARRANTY, FROM THE DATE OF ACCEPTANCE, FOR ALL WATER AND SEWER INFRASTRUCTURE. DATE OF ACCEPTANCE STARTS WHEN ADEQUATE AS-BUILTS INFRASTRUCTURE.
- 10) IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY ALL UTILITY LOCATIONS PRIOR TO START OF WORK. ANY DAMAGE TO EXISTING UTILITIES BY THE CONTRACTOR SHALL BE CORRECTED AT NO COST TO THE UTILITY OWNER.
- 11) NO SYSTEM SHALL BE ACCEPTED, NOR SHALL THE WARRANTY PERIOD BEGIN UNTIL ASBUILTS ARE RECEIVED ON AN ACCEPTABLE MEDIA BOTH PAPER AND ELECTRONIC (TIFF IMAGE OR DXF), AND APPROVED.
- 12) NO WATER METERS SHALL BE INSTALLED UNTIL SYSTEM IS ACCEPTED.
- 13) ALL SUBDIVISION ROADS SHALL HAVE A 5' UTILITY EASEMENT ON EACH SIDE OUTSIDE OF THE RIGHT-OF-WAY.
- 14) DEVELOPER MUST RESUBMIT PLANS IF CONSTRUCTION HAS NOT BEGAN WITHIN 6 MONTHS OF THE TOWN OF SHARPSBURG'S ACCEPTANCE OF PLANS.
- 15) THE UTILITY CONTRACTOR SHALL MAINTAIN A CURRENT UTILITIES CONTRACTOR'S LICENSE.



GENERAL NOTES

WATER SYSTEM NOTES

- 1) ALL WATER DISTRIBUTION PIPING SHALL BE A MINIMUM OF 4 INCH DIAMETER, CLASS 50, CEMENT AND ASPHALTIC LINED AND ASPHALTIC COATED AS PER AWWA C104, C110, C115, C151, AND C153 DUCTILE IRON PIPE.
- 2) ALL SERVICE LINES LESS THAN 2 INCHES SHALL BE TYPE "K" SOFT ANNEALED COPPER FROM THE CORPORATION STOP TO THE WATER METER. ALL 2" SERVICE LINES SHALL BE HIGH DENSITY (BLUE) POLYETHELENE PIPE.
- 3) ALL SERVICE TAPS LESS THAN 2 INCHES SHALL BE DIRECT TAP TO THE MAIN; TAP SADDLES ARE NOT ALLOWED.
- 4) ALL CORPORATION STOPS AND CURB STOPS SHALL BE MUELLER COMPRESSION FITTINGS OR EQUAL.
- 5) ALL FIRE HYDRANTS SHALL BE 5 1/4" AMERICAN DARLING B-62-B.
- 6) ALL NEW WATER LINE INSTALLATIONS SHALL BE LEAK AND PRESSURE TESTED AS PER AWWA C600, IN THE PRESENCE OF A SHARPSBURG REPRESENTATIVE AND CERTIFIED IN WRITING BY THE INSTALLER PRIOR TO ACCEPTANCE.
- 7) THE INTRODUCTION OF POTABLE WATER INTO AN UNDISINFECTED LINE MUST BE ACCOMPLISHED THROUGH AN APPROVED BACK FLOW PREVENTION DEVICE. AT NO TIME SHALL INSTALLERS ALLOW CROSS-CONNECTIONS BETWEEN POTABLE WATER SYSTEMS AND NON-POTABLE SYSTEMS.
- 8) ALL NEW LINES SHALL BE DISINFECTED AS PER AWWA C601 AND CERTIFIED IN WRITING BY THE INSTALLER PRIOR TO ACCEPTANCE.
- 9) ALL WATER SYSTEM IMPROVEMENTS WILL COMPLY WITH "THE MINIMUM STANDARDS FOR PUBLIC WATER SYSTEMS", MAY 2000 EDITION AND UPDATES.
- 10) ALL WATER SYSTEM PIPING SHALL BE BURIED A MINIMUM OF THREE FEET DEEP.
- 11) VALVES SHALL BE AWWA RESILANT GATE VALVES WITH NRS, 2" OPERATING NUT AND OPENING TO THE LEFT BY AMERICAN DARLING OR APPROVED EQUAL.
- 12) VALVE BOXES WILL BE CAST IRON HEAVY TRAFFIC GRADE WITH ADJUSTABLE TOP, ALONG WITH 17 INCH (ROUND OR SQUARE) CONCRETE VALVE BOX PAD AND CONCRETE VALVE MARKER POST.
- 13) ALL METER BOXES USED OUTSIDE CONCRETE AREAS SHALL BE TYPE MSBC1416-12, MID-STATES PLASTICS OR EQUAL AS SHOWN IN THE DETAILS.
- 14) ALL METER BOXES USED IN CONCRETE AREAS SHALL BE C.I. RECTANGULAR METER BOX OR EQUAL AS SHOWN IN THE DETAILS.
- 15) NO FIELD CHANGES OR DEVIATIONS SHALL BE MADE WITHOUT PRIOR APPROVAL OF THE ENGINEER AND THE TOWN OF SHARPSBURG.
- 16) ANY COMMERCIAL AND/OR RESIDENTIAL APPLICATION REQUIRING FIRE FLOW PROTECTION SYSTEM, SHALL BE DESIGNED BY A PROFESSIONAL ENGINEER AND REQUIRES A SEPERATE SERVICE TAP OFF OF MAIN.



WATER SYSTEM
NOTES

WATER SYSTEM NOTES CONTINUED

- 17) THE WATER SYSTEM MUST BE DESIGN TO MAINTAIN A MINIMUM PRESSURE OF 20 PSI AT EACH SERVICE CONNECTION AND AT ALL POINTS IN THE DISTRIBUTION SYSTEM UNDER ALL CONDITIONS OF FLOW. THE NORMAL WORKING PRESSURE IN THE DISTRIBUTION SYSTEM SHOULD BE APPROXIMATELY 60 PSI AND NOT LESS THAN 35 PSI.
- 18) THE WATER SYSTEM SHALL BE DESIGNED TO MAINTAIN MINIMUM COUNTY FIRE FLOW PROTECTION AS WELL AS MAINTAIN MINIMUM PRESSURE IN THE SYSTEM.
- 19) VALVES ARE TO BE PLACED AT ALL INTERSECTIONS OF WATER MAINS. VALVES SHOULD BE LOCATED AT NOT MORE THAN 500 FOOT- INTERVALS IN COMMERCIAL DISTRICTS AND AT NOT MORE THAN ONE BLOCK OR 800-FOOT INTERVALS IN OTHER DISTRICTS. WHERE SYSTEMS SERVE WIDELY SCATTERED CUSTOMERS, THE VALVE SPACING SHOULD NOT EXCEED 4000 FEET.
- 20) AT HIGH POINTS IN WATER MAINS WHERE AIR CAN ACCUMULATE, PROVISIONS SHALL BE MADE TO REMOVE THE AIR BY MEANS OF HYDRANTS OR AIR RELIEF VALVES. AUTOMATIC AIR RELIEF VALVES SHALL NOT BE USED IN AREAS WHERE FLOODING OF MANHOLE OR CHAMBER MAY OCCUR.
- 21) THE INSTALLATION OF DUCTILE IRON PIPE WITH RESTRAINED PUSH-ON JOINTS AND ENCASED IN CONCRETE, MAY BE CONSIDERED WITH PRIOR APPROVAL OF THE DIVISION, OTHERWISE, WHEN CROSSING WATER COURSES WHICH ARE GREATER THAN 15 FEET IN WIDTH, ONLY PIPES OF SPECIAL CONTRUCTION, HAVING FLEXIBLE, WATERTIGHT JOINTS SHALL BE INSTALLED.
- 22) VALVES SHALL BE PROVIDED AT BOTH ENDS OF WATER CROSSINGS SO THAT THE SECTION CAN BE ISOLATED FOR TESTING OR REPAIR (VALVES SHALL BE ACCESSIBLE AND NOT SUBJECT TO FLOODING); THE VALVE CLOSEST TO THE SUPPLY SOURCE SHALL BE IN A MANHOLE.
- 23) SAMPLING TAPS SHALL BE INSTALLED AT EACH END OF THE CROSSING, AND PERMANENT TAPS SHALL BE MADE FOR TESTING AND DETERMINING LEAKS.
- 24) SOLVENT-CEMENTED JOINTS ARE NOT ALLOWED FOR BURIED PIPES.
- 25) WATER MAINS SHALL BE LAID AT LEAST TEN (10) FEET HORIZONTALLY FROM ANY EXISTING OR PROPOSED SANITARY SEWER, STORM SEWER OR SEWER MANHOLE. THE DISTANCE SHALL BE MEASURED EDGE TO EDGE.
- 26) WHENEVER A STATE ROUTE OR HEAVILY TRAVELED OFF-SYSTEM ROAD OR A RAIL-ROAD IS CROSSED, THE AGENCY THAT HAS JURISDICTION OVER THE ROAD OR THE RAIL-ROAD MUST BE NOTIFIED, PRIOR TO INSTALLATION OF THE MAINS. AT THE CROSSING, A STEEL CASING WITH SUFFICIENT DIAMETER BE JACKED AND BORRED TO ACCOMMODATE THE CARRIER PIPE. ANY FREE BORING AT LOW TRAFFIC CITY STREETS AND COUNTY ROADS MUST CONFORM TO THE APPLICABLE LOCAL AND/OR STATE REQUIREMENTS.
- 27) 2" WATER LINES SHALL NOT EXTEND GREATER THAN 1000 FEET FROM MAIN. IF 2" INCH WATER LINE IS NOT LOOPED BACK INTO MAIN, THEN NO GREATER THAN 20 RESIDENTS CAN BE ATTACHED ON 2 INCH SERVICE. IF 2" WATER LINE IS LOOPED, THEN NO MORE THAN 40 RESIDENTS CAN BE ATTACHED.



WATER SYSTEM
NOTES CON'T

UTILITY IDENTIFICATION INSTALLATION

1) INSTALL CONTINUOUS METALLIC UNDERGROUND WARNING TAPE DURING BACK-FILLING OF TRENCH FOR UNDERGROUND WATER-SERVICE PIPING. DETECTION TAPE OR WIRE SHALL BE INSTALLED APPROXIMATELY TWO (2) FEET BELOW FINISHED GRADE.

2) SERVICE LINES AND VALVES SHALL BE LOCATED VIA MARKED CURBING OR OTHER APPROVED TOWN OF SHARPSBURG METHOD. ADJACENT STREET CURB TO SERVICE LINE AND VALVES SHALL BE MARKED VIA SAW-CUT AS FOLLOWS.

3) CURB MARKINGS SHALL BE A MINIMUM OF FOUR (4) INCHES IN HEIGHT.

- A) "W" FOR WATER SERVICE LOCATION.
- B) "V" FOR WATER SERVICE LOCATION.



UTILITY
IDENTIFICATION
INSTALLATION

DESIGN AND PLAN PREARATION

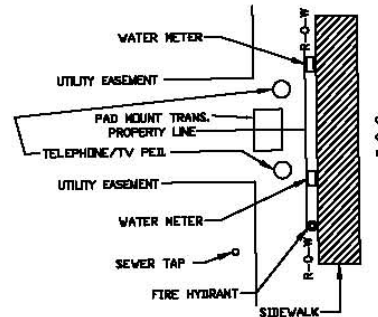
1. GENERAL- THE DESIGN AND PLAN PREPARATION OF WATER DISTRIBUTION SYSTEM SHALL CONFORM TO SHARPSBURG SPECIFICATION, NOTES AND DETAILS.
2. LICENSED PROFESSIONALS - WATER DISTRIBUTION SYSTEM DESIGN AND PLAN PREPARATION
FOR A RESIDENTIAL SUBDIVISION OR PARTS THEREOF ON A DEVELOPER'S PROPERTY, PROPERTY OFFSITE OF A DEVELOPER'S PROPERTY, COMMERCIAL/ INDUSTRIAL PROPERTY, DESIGN SHALL BE PERFORMED BY A GEORGIA LICENSED PROFESSIONAL ENGINEER WHO HAS SUFFICIENT KNOWLEDGE TO PROPERLY PERFORM THE DESIGN.
3. THE PROFESSIONAL PERFORMING THE DESIGN AND PREPARING THE PLANS SHALL SEAL EACH SHEET WITH THEIR STAMP AND SIGN THEIR NAME ACROSS THE STAMP.
4. PLAN REQUIREMENTS - WATER DISTRIBUTION SYSTEM PLANS SHALL BE COMPRISED OF THE FOLLOWING SHEETS AS REQUIRED.
 - A. COVER SHEET
 - B. SITE PLAN SHEET
 - C. GRADING PLAN SHEET
 - D. STORM WATER SYSTEM PLAN SHEET
 - E. WATER DISTRIBUTION PLAN SHEETS
 - F. ALL SHARPSBURG NOTES AND DETAILS
 - G. ALL OTHER PERTINENT SHEETS
5. PLAN SUBMITTAL - WATER DISTRIBUTION SYSTEM PLAN SHALL BE SUBMITTED TO SHARPSBURG
TWO (2) SEPARATE FULL SET OF PLANS AND AutoCAD REV 14 OR NEWER DWG FILE ARE REQUIRED FOR EACH SUBMITTAL DURING THE SHARPSBURG REVIEW PROCESS. THE DESIGN ENGINEER SHALL ADDRESS THE TOWN OF SHARPSBURG COMMENTS. PLANS CONTAINING THE ORIGINAL RED LINE COMMENTS SHALL ACCOMPANY EACH RE-SUBMITTAL TO THE TOWN OF SHARPSBURG. FOUR (4) SEPARATE SETS OF PLANS AND AutoCAD REV 14 OR NEWER DWG FILE SHALL BE REQUIRED FOR FINAL SHARPSBURG APPROVAL.
6. PERIOD OF PLAN APPROVAL - THE APPROVAL PERIOD OF WATER DISTRIBUTION SYSTEM PLAN SHALL BE SIX (6) MONTHS.
APPROVED PLANS THAT ARE NOT INITIATED OR ARE ACTIVE FOR A SIX (6) MONTH PERIOD SHALL BECOME INVALID.



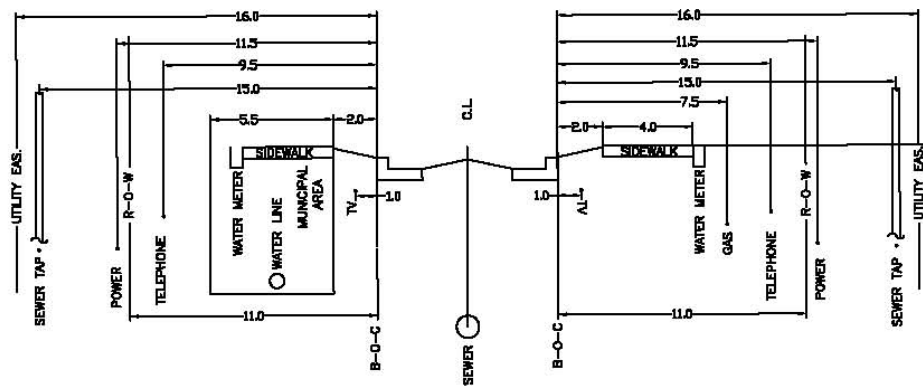
DESIGN AND PLAN PREPARATION NOTES

GENERAL NOTES:

- 1) GAS AND WATER WILL BE ON OPPOSITE SIDES OF THE ROAD.
- 2) UTILITY LOCATIONS ARE MEASURED FROM THE BACK OF CURB (B-O-C).
- 3) POWER, CABLE TV, AND TELEPHONE WILL USE JOINT TRENCHES WHERE PRACTICAL. THE LOCATION SHALL BE THE UTILITY TRENCH FURTHEST FROM THE B-O-C.
- 4) BURIAL DEPTH MEASURED FROM THE TOP OF CURB TO THE TOP OF THE UTILITY.
- 5) ALL RESIDENTIAL ROADS REQUIRE AN ADDITIONAL 5 FOOT UTILITY EASEMENT AT THE FRONT OF THE LOT.
- 6) BEFORE ANY UTILITY IS INSTALLED, THE REQUIRED WIDTH OF THE ROADWAY SHALL BE ROUGH GRADED AND ALL CONCRETE CURBING SHALL BE SET AT FINAL GRADES.
- 7) IN GENERAL, THE WATER MAINS SHOULD BE INSTALLED FIRST. FOLLOWING WATER MAIN INSTALLATION, UTILITIES ARE TO BE INSTALLED IN THIS ORDER: 1) ELECTRIC POWER 2) GAS 3) TELEPHONE 4) CABLE T.V. ALL UTILITIES SHALL BE INSTALLED PRIOR TO PAVING.
- 8) EACH UTILITY SHALL BE RESPONSIBLE FOR REPAIRS OF ANY DAMAGE THEY CREATE TO OTHER UTILITIES AND TO THE STREET IMPROVEMENTS WITHIN THE RIGHT-OF-WAY.



RESIDENTIAL STREET ABOVE GRADE PLAN



STREET WIDTH



UTILITY PLACEMENT

ROAD AND CREEK CROSSING

- 1) BORE CASING PIPE SHALL BE STANDARD WALL, UNCOATED STEEL PIPE. JOINTS SHALL BE CONTINUOUS WELD WITH 70XX FILLER MATERIAL. THE INSIDE DIAMETER OF THE CASING SHALL BE A MINIMUM OF 6 INCHES LARGER THAN THE OUTSIDE DIAMETER, AT THE BELL, OF THE CARRIER PIPE.
- 2) ALL HIGHWAY AND RAILROAD CROSSINGS SHALL COMPLY WITH APPLICABLE FEDERAL, STATE, AND LOCAL REGULATIONS, AND IN THE CASE OF RAILWAY BORINGS WITH THE RAILROAD COMPANY.
- 3) CARE IS TO BE EXERCISED IN PUSHING OR PULLING THE CARRIER PIPE INTO CASING. USE WOOD CHOCKS OR SKIDS TO ENSURE APPROXIMATE CENTERING OF THE CARRIER PIPE WITHIN THE CASING.
- 4) ALL CARRIER PIPE SHALL BE CLASS 50, CEMENT AND ASPHALTIC LINED AND ASPHALTIC COATED WITH AMERICAN FAST GRIP OR EQUAL RESTRAINED JOINTS.
- 5) ALL PRESSURE PIPE INSTALLATIONS SHALL HAVE VALVES PLACED ON EACH SIDE OF A ROAD, BRIDGE OR CREEK CROSSING.
- 6) ALL BRIDGE CROSSING SHALL HAVE A VALVE LOCATED ON EACH SIDE



ROAD AND CREEK CROSSING

BACK-FLOW PREVENTERS

- 1) ALL BACK-FLOW PREVENTERS, INCLUDING ACCESSORIES, COMPONENTS, AND FITTINGS IN SIZES THROUGH 2" SHALL BE BRONZE WITH THREADED CONNECTIONS. SIZES ABOVE 2" SHALL BE BRONZE OR IRON THAT HAS BEEN FUSED EPOXY-COATED INSIDE AND OUT, AND HAVE FLANGED CONNECTIONS.
- 2) ALL BACK-FLOW PREVENTION DEVICES SHALL BE APPROVED IN ACCORDANCE WITH THE APPLICABLE STANDARDS OF THE AMERICAN SOCIETY OF SANITARY ENGINEERING (ASSE), THE AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI), THE AMERICAN WATER WORKS ASSOCIATION (AWWA), AND THE TOWN OF SHARPSBURG PLUMBING CODE (SBCCI).
- 3) THE FOLLOWING MANUFACTURERS ARE APPROVED BY THE TOWN OF SHARPSBURG FOR USE IN BACK-FLOW PREVENTION APPLICATIONS.
MEETS THIS CRITERIA IS AN APPROVED DEVICE.
 - * WATTS
 - * FEBCO
 - * WILKINS
 - * CONBRACO
- 4) LOCATION OF ALL BACK-FLOW PREVENTION DEVICES SHALL BE IN AN AREA THAT PROVIDES A SAFE WORKING ENVIRONMENT FOR TESTING AND MAINTENANCE. THE AREA SHALL BE READILY ACCESSIBLE, DRY, FREE FROM DIRT, EXTREME COLD, HEAT AND ELECTRICAL HAZARDS.
- 5) ALL BACK-FLOW PREVENTERS SHALL BE INSTALLED IN THE POSITION RECOMMENDED BY THE MANUFACTURER.
- 6) NO INTERVENING BRANCH CONNECTIONS SHALL BE ALLOWED BETWEEN THE TOWN OF SHARPSBURG CORPORATION STOP AND THE BACK-FLOW PREVENTER.
- 7) REDUCED PRESSURE ZONE BFP, MUST BE INSTALLED ABOVE GRADE OR IN A BUILDING.
- 8) ALL DOUBLE DETECTOR CHECK BACK-FLOW PREVENTERS SHALL BE EQUIPPED WITH CUBIC FEET METERS.
- 9) ALL BACK-FLOW PREVENTERS SHALL BE TESTED PRIOR TO SYSTEM PLACED IN SERVICE.



BACK-FLOW
PREVENTERS

ABOVE GROUND ENCLOSURE

- 1) ALL BACK-FLOW PREVENTION DEVICES LOCATED ABOVE GROUND SHALL BE IN A FREEZE PROOF ENCLOSURE. THE ENCLOSURE SHALL MOUNT ON A 4" MINIMUM THICKNESS CONCRETE PAD. RISER PIPES SHALL HAVE EXPANSION MATERIALS WHERE PENETRATING THROUGH THE CONCRETE.
- 2) IT IS REQUIRED THAT THE CUSTOMER PLACE A HEATING DEVICE OR HEAT TAPE IN THE ENCLOSURE OR ON THE DEVICE TO PREVENT THE DEVICE FROM FREEZING.
- 3) THE ENCLOSURE MUST BE LARGE ENOUGH TO ACCOMMODATE VALVE STEMS WITH VALVES OPEN.
- 4) DRAIN PORT MUST REMAIN CLOSED EXCEPT WHEN DEVICE IS DISCHARGING WATER.
- 5) ENCLOSURE SHALL BE EASILY REMOVABLE, HAVE DOORS OR ACCESS PANELS TO ALLOW EASY ACCESS FOR OPERATION, MAINTENANCE AND TESTING OF THE ASSEMBLY WITHOUT THE REMOVAL OF THE ASSEMBLY.
- 6) ENCLOSURE SHALL BE SECURELY FASTENED TO CONCRETE PAD WITH STAINLESS ANCHOR BRACKETS INSTALLED ON THE INTERIOR OF THE ENCLOSURE OR THROUGH THE FLANGE BASE.
- 7) ACCESS PANELS SHALL BE LOCKABLE.



ABOVE GROUND
ENCLOSURE

BELOW GRADE VAULTS

- 1) BELOW GRADE VAULTS OTHER THAN RESIDENTIAL WATER METER VAULTS SHALL BE REINFORCED PRECAST CONCRETE WITH 4000 PSI. STRENGTH AFTER 28 DAYS. MINIMUM THICKNESS OF FLOOR, WALLS, AND TOP IS 6 INCHES. THE INSIDE HEIGHT OF THE VAULTS SHALL BE A MINIMUM OF 6 FEET.
- 2) VAULT BOTTOM - SHALL BE SLOPED TO GRAVEL SUMP. VAULT SHALL BE SET PLUMB AND LEVEL ON A MINIMUM OF 12 INCHES OF COMPACTED #57 STONE.
- 3) VAULT TOP - SHALL BE REINFORCED CONCRETE, WITH HATCH OPENING OFFSET TO SIDE, AND LARGE ENOUGH FOR DEVICE REMOVAL.
- 4) ACCESS LADDER - DOWELED TO WALL AND CENTERED AT HATCH OPENING.
- 5) HATCH COVER - SHALL BE ALUMINUM WITH A LOCKING COVER AND DRAIN, CAST INTO THE VAULT TOP AND LARGE ENOUGH FOR EQUIPMENT REMOVAL, BILCO MODEL NO. J-4A OR EQUAL.
- 6) VAULT INLET/OUTLET PIPE OPENINGS SHALL BE SEALED WITH NON SHRINK GROUT PIPE MUST NOT SUPPORT VAULT.
- 7) VAULT SHALL BE SIZED TO PROVIDE A 2 FOOT CORRIDOR AROUND THE ENCLOSED DEVICE.
- 8) VAULT TO BE INSTALLED ON OWNER'S PRIVATE PROPERTY PROVIDED FOR BY A 15 x 30 FOOT EASEMENT AND/OR RIGHT OF ENTRY CLAUSE.



BELOW GRADE VAULTS

DISINFECTING OF WATER MAINS

A: DISINFECTION OF WATER MAINS

1. ALL NEW WATER MAINS, AS WELL AS THOSE TAKEN OUT OF SERVICE FOR INSPECTION, REPAIR, OR OTHER ACTIVITIES THAT MIGHT LEAD TO CONTAMINATION OF WATER SHALL BE DISINFECTED BEFORE THEY ARE PLACED IN OR RETURNED TO SERVICE.
2. DISINFECTION OF THE NEW MAINS AND THE DISPOSAL OF THE HEAVILY CHLORINATED WATER, FOLLOWING THE DISINFECTION, SHALL BE ACCOMPLISHED IN ACCORDANCE WITH THE LATEST ADDITION OF AWWA STANDARD C651.
3. THE "TABLET METHOD" OF DISINFECTION WHICH CONSISTS OF PLACING CALCIUM HYPOCHLORITE GRANULES OR TABLETS IN THE WATER MAIN AS IT IS BEING INSTALLED AND THEN FILLING THE MAIN WITH POTABLE WATER WHEN INSTALLATION IS COMPLETE IS NOT ALLOWED
4. BEFORE THE MAIN IS CHLORINATED, IT SHALL BE FILLED TO ELIMINATE AIR POCKETS AND SHALL BE FLUSHED TO REMOVE PARTICULATES. A FLUSHING VELOCITY OF NOT LESS THAN 2.5 FEET/SECOND IS USUALLY MAINTAINED IN PIPE SIZES LESS THAN 24 INCHES IN DIAMETER. FOR LARGER DIAMETER MAINS, AN ALTERNATIVE TO FLUSHING, SUCH AS BROOM-SWEEPING OF THE MAIN, IS ACCEPTABLE TO CHLORINATING THE MAIN.
5. DURING DISINFECTION OF THE WATER MAINS, AN APPROPRIATE CROSS-CONNECTION CONTROL DEVICE, CONSISTENT WITH THE DEGREE OF HAZARD, SHALL BE PROVIDED FOR BACKFLOW PROTECTION OF THE ACTIVE DISTRIBUTION SYSTEM.
6. THE QUALITY OF THE WATER USED DURING THE DISINFECTION PROCEDURES SHALL MEET THE REQUIRED DRINKING WATER STANDARDS.
7. THE CHLORINE SOLUTION USED FOR DISINFECTION OF WATER MAINS SHALL HAVE A FREE CHLORINE RESIDUAL CONCENTRATION NOT LESS THAN 25 mg/L. THIS HEAVILY CHLORINATED WATER SHALL BE RETAINED IN THE MAIN FOR AT LEAST 24 HOURS, DURING WHICH TIME ALL VALVES AND HYDRANTS SHALL BE OPERATED TO ENSURE DISINFECTION OF THE APPURTENANCES. AT THE END OF THE 24-HOUR PERIOD, THE TREATED WATER IN ALL PORTIONS OF THE MAIN SHALL HAVE A RESIDUAL OF NOT LESS THAN 10 mg/L FREE CHLORINE. RE-CHLORINATE IF REQUIRED RESULTS ARE NOT OBTAINED ON ALL SAMPLES.
8. AFTER THE APPLICABLE RETENTION PERIOD, THE HEAVILY CHLORINATED WATER MUST NOT BE DISPOSED IN A MANNER THAT WILL HARM THE ENVIRONMENT. NEUTRALIZING CHEMICALS, SUCH AS SULFUR DIOXIDE, SODIUM BISULFITE, SODIUM SULFITE OR SODIUM THIOSULFATE CAN BE USED TO NEUTRALIZE THE CHLORINE RESIDUAL REMAINING IN THE WATER TO BE WASTED.



DISINFECTING OF
WATER MAINS

CON'T. DISINFECTING OF WATER MAINS

9. FLUSH ALL LINES UNTIL RESIDUAL IS EQUAL TO EXISTING SYSTEM. AFTER FINAL FLUSHING AND BEFORE THE WATER MAIN IS PLACED INTO SERVICE, WATER SAMPLES SHALL BE COLLECTED FROM THE MAIN AND TESTED FOR MICROBIOLOGICAL QUALITY IN ACCORDANCE WITH THE GEORGIA RULES FOR SAFE DRINKING WATER, CHAPTER 391-3-5. THE LABORATORY RESULTS MUST SHOW THE ABSENCE OF COLIFORM ORGANISMS IN THE WATER. REFLUSH AND REDISINFECT THE LINES, AS NECESSARY, UNTIL SATISFACTORY BACTERIOLOGICAL RESULTS ARE OBTAINED.

B: DISINFECTION WHEN CUTTING INTO OR REPAIRING EXISTING MAINS

1. SHALL BE PERFORMED WHEN MAINS ARE WHOLLY OR PARTIALLY DEWATERED.

2. SHALL FOLLOW THE CURRENT AWWA C651 STANDARDS, INCLUDING TRENCH TREATMENT, SWABBING WITH HYPOCHLORITE SOLUTION, FLUSHING AND/OR SLUG CHLORINATION AS APPROPRIATE.

3. BACTERIOLOGICAL TESTING SHALL BE PERFORMED AFTER THE REPAIRS ARE COMPLETE. HOWEVER, DEPENDING UPON THE CIRCUMSTANCES, THE WATER MAIN MAY BE RETURNED TO SERVICE PRIOR TO COMPLETION OF TESTING TO MINIMIZE THE TIME THE CUSTOMER ARE OUT OF SERVICE.

4. LEAKS OR BREAKS THAT ARE REPAIRED WITH CLAMPING DEVICES WHILE THE MAINS REMAIN FULL OF WATER UNDER PRESSURE MAY REQUIRE NO DISINFECTION.

C: PREPARE REPORTS FOR PURGING AND DISINFECTING ACTIVITIES.

D: AMOUNT OF CHLORINE NECESSARY FOR DISINFECTION

1. CHLORINE REQUIRED TO PRODUCE 25 mg/L CONCENTRATION IN 100 FEET OF PIPE DIAMETER:

Pipe Diameter	100% Chlorine		1% Chlorine Solution	
Inches	(lbs)	(g)	(gal)	(L)
4	0.013	5.9	0.16	0.6
6	0.030	13.6	0.36	1.4
8	0.054	24.5	0.65	2.5
10	0.085	38.6	1.02	3.9
12	0.120	54.4	1.44	5.4
16	0.217	98.4	2.60	9.8

NOTE 1% CHLORINE SOLUTION MAY BE PREPARED WITH SODIUM HYPOCHLORITE (CONTAINS 5% TO 15% AVAILABLE CHLORINE) OR CALCIUM HYPOCHLORITE (CONTAINS APPROXIMATELY 65% CHLORINE BY WEIGHT). TO PREPARE 1% CHLORINE SOLUTION USING CALCIUM HYPOCHLORITE, ADD ONE (1) POUND (454 GRAMS) OF CALCIUM HYPOCHLORITE IN APPROXIMATELY 8 GALLONS OF WATER.



DISINFECTING OF
WATER MAINS

CON'T. DISINFECTING OF WATER MAINS

NOTE 1% CHLORINE SOLUTION MAY BE PREPARED WITH SODIUM HYPOCHLORITE (CONTAINS 5% TO 15% AVAILABLE CHLORINE) OR CALCIUM HYPOCHLORITE (CONTAINS APPROXIMATELY 65% CHLORINE BY WEIGHT). TO PREPARE 1% CHLORINE SOLUTION USING CALCIUM HYPOCHLORITE, ADD ONE (1) POUND (454 GRAMS) OF CALCIUM HYPOCHLORITE IN APPROXIMATELY 8 GALLONS OF WATER.

2. AMOUNTS AND TYPES OF CHEMICALS ADVISED TO BE USED FOR NEUTRALIZING VARIOUS RESIDUAL CHLORINE CONCENTRATION IN 100,000 GALLONS OF WATER.

Residual Chlorine Concentration	Chemicals							
	Sulfur Dioxide (SO ₂)		Sodium Bisulfate (NaHSO ₃)		Sodium Sulfite (Na ₂ SO ₃)		Sodium Thiosulfate (Na ₂ S ₂ O ₃ 5H ₂ O)	
Mg/L	Lb	Kg	Lb	Kg	Lb	Kg	Lb	Kg
1	0.8	0.36	1.2	0.54	1.4	0.64	1.2	0.54
2	1.7	0.77	2.5	1.13	2.9	1.32	2.4	1.09
10	8.3	3.76	12.5	5.67	14.6	6.62	12.0	5.44
50	41.7	18.91	62.6	28.39	73.0	33.11	60.0	27.22



DISINFECTING OF
WATER MAINS

AS-BUILT AND ACCEPTANCE

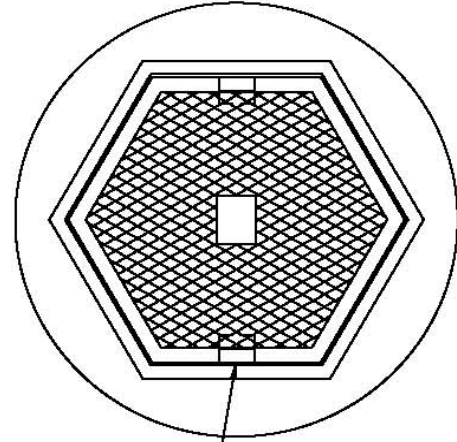
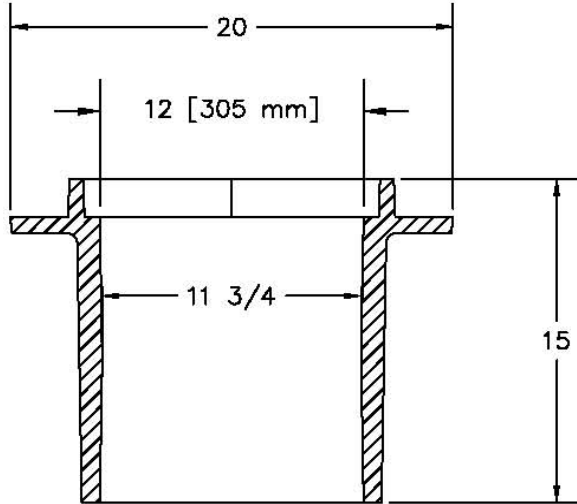
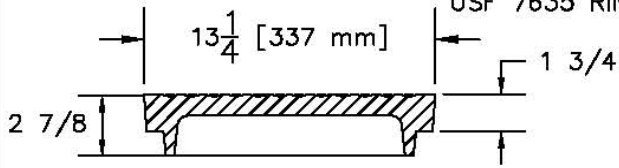
1. AS-BUILT DRAWINGS
 - A. AS-BUILT DRAWING OF INSTALLED WATER DISTRIBUTION SYSTEM SHALL BE PREPARED AND SEALED BY A PROFESSIONAL ENGINEER AND/ OR REGISTERD LAND SURVEYOR.
 - B. AS-BUILT DRAWINGS SHALL BE COMPLETED AND ACCEPTED PRIOR TO SHARPSBURG ISSUING ANY SERVICES.
 - C. AS-BUILT DRAWINGS SHALL SHOW ALL STREET NAMES, RIGHT-OF-WAY WIDTHS, RELATED EASEMENTS, LOT NUMBERS, SITE LOCATION, LOCATION OF SERVICES, PIPE SIZE, PIPE LENGHTS, AND TYPE OF MATERIAL OF ALL WATER DISTRIBUTION SYSTEM COMPONENTS.
 - D. AS-BUILT DRAWINGS SHALL BE PREPARED USING A SURVEY TO TIE THE DEVELOPMENT'S WATER DISTRIBUTION SYSTEM HORIZONTALLY TO THE FOLLOWING STATE PLANE COORDINATE SYSTEM OR AS AMENDED BY SHARPSBURG.
 1. HORIZONTAL CONTROL: NORTH AMERICAN DATUM 83/84
 2. GRID ZONE: GEORGIA WEST
 - E. THE DEVELOPER'S WATER DISTRIBUTION SYSTEM AND/OR SANNITARY SEWER SYSTEM SHALL NOT BE CONSIDERED COMPLETE UNTIL THE AS-BUILT DRAWINGS HAVE BEEN REVIEWED AND APPROVED IN WRITING BY SHARPSBURG. NOTE THAT ONE (1) REPRODUCIBLE SET OF THE APPROVED AS-BUILT DRAWINGS SHALL BE SUBMITTED TO THE TOWN OF SHARPSBURG ENGINEER. THE APPROVED ASBUILT DRAWINGS SHALL ALSO BE SUBMITTED TO THE TOWN OF SHARPSBURG ENGINEER IN DIGITAL FORMAT (AutoCAD VER 14 OR NEWER VERSION).
2. ACCEPTANCE OF WATER DISTRIBUTION
 - A. ACCEPTANCE OF THE WATER DISTRIBUTION SYSTEM IS NOT FINAL UNTIL AS-BUILT HAVE BEEN ACCEPTED AND ANY DEFICIENCIES HAVE BEEN FIXED.
 - B. WATER METERS SHALL NOT BE INSTALLED UNTIL ASBUILTS HAVE BEEN ACCEPTED.



ASBUILT AND ACCEPTANCE NOTES	

TRAFFIC CLEAN-OUT COVER

USF 7635 RING & FJ COVER



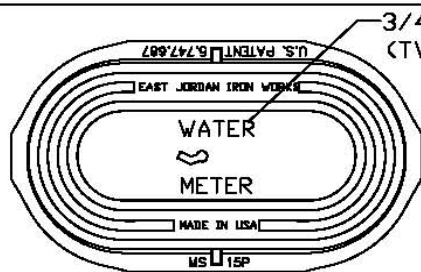
(2)- NON-PENETRATING PICKHOLES

NOTES:

- 1- USE U.S. FOUNDARY & MFG. CORP.
OR APPROVED EQUAL
- 2- MATERIAL: ASTM-A48 CLASS 30B
GRAY IRON.
- 3- RING WT: 165 LBS. APP.
- 4- COVER WT: 55 LBS. APP.



TRAFFIC
CLEAN-OUT
COVER

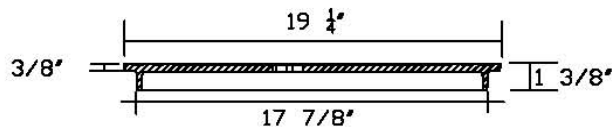


BOX & COVER TOP VIEW

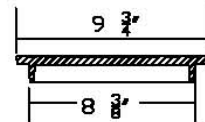
METER BOX IS A EAST JORDAN IRON WORKS MS15P BOX OR APPROVED EQUAL

METER BOX COVER IS A EAST JORDAN IRON WORKS 15-P COVER OR APPROVED EQUAL

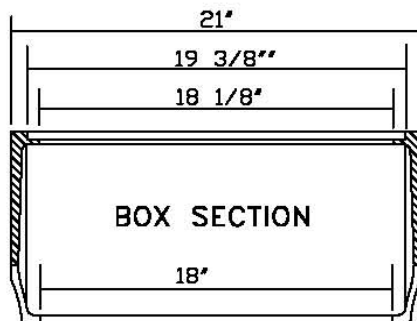
NOTE: IN RESIDENTIAL INSTALLATION THE DEVELOPER RESPONSIBLE FOR THE INSTALLATION OF ALL EQUIPMENT EXCEPT THE METER



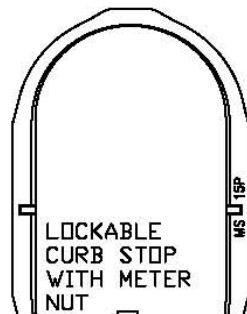
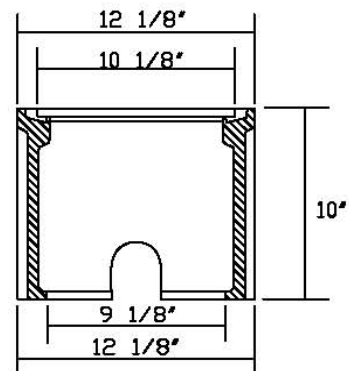
COVER SECTION



COVER SECTION



BOX SECTION



LOCKABLE
CURB STOP
WITH METER
NUT

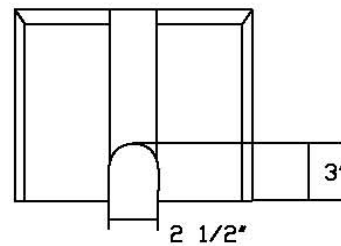
COMPRESSION BY METER
COUPLING TYPE "K" COPPER

Q-NUT
CORP STOP
AND DIRECT TAP

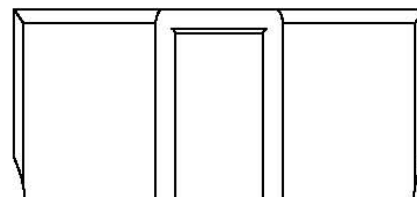
COMPRESSION FITTING
TYPE "K" COPPER



WATER MAIN



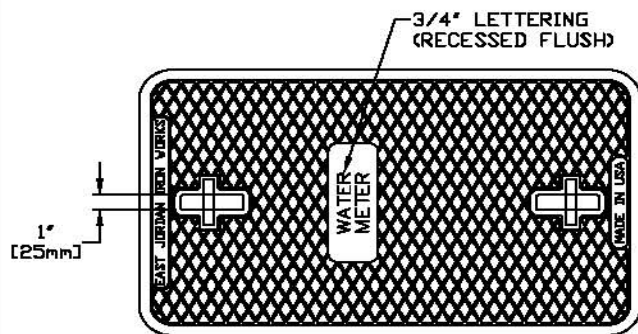
SHORT SIDE VIEW



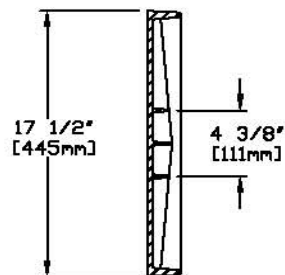
LONG SIDE VIEW



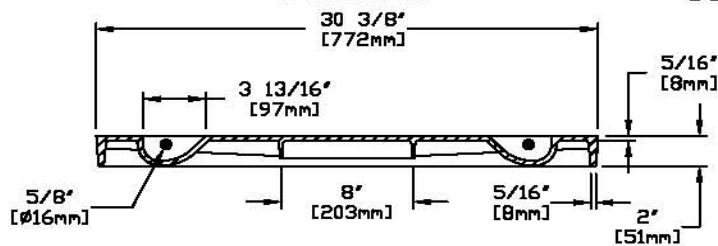
SINGLE 3/4" or 1"
RESIDENTIAL
WATER TAP
METER BOX



PLAN VIEW



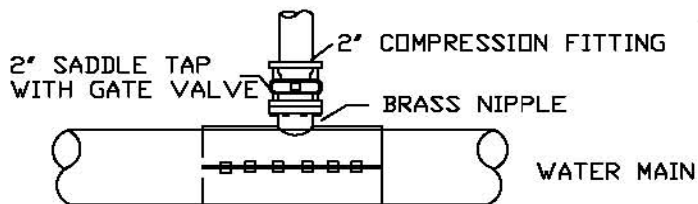
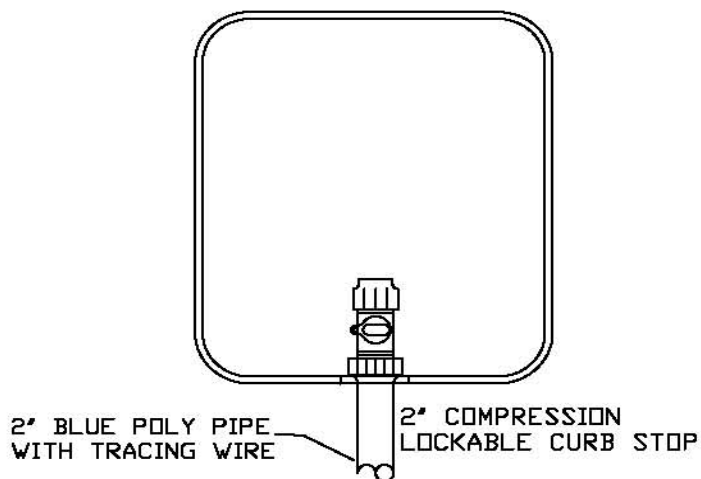
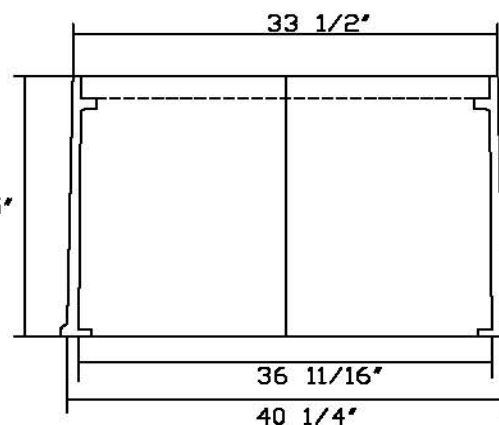
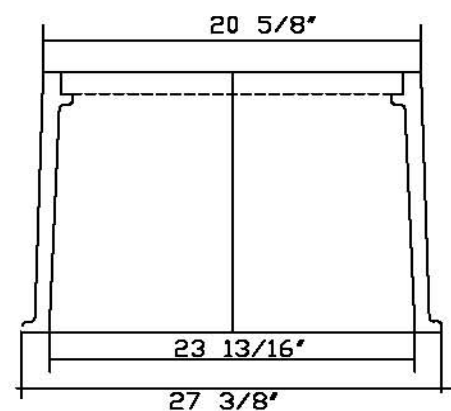
COVER SECTION



COVER SECTION

METER BOX IS A
CARSON INDUSTRIES
1730-15 SUPER JUMBO XL
OR APPROVED EQUAL

THE METER BOX LID
SHALL BE EAST JORDON
IRON WORKS 1730 WATER
METER COVER
PRODUCT # 32131730 OR
APPROVED EQUAL

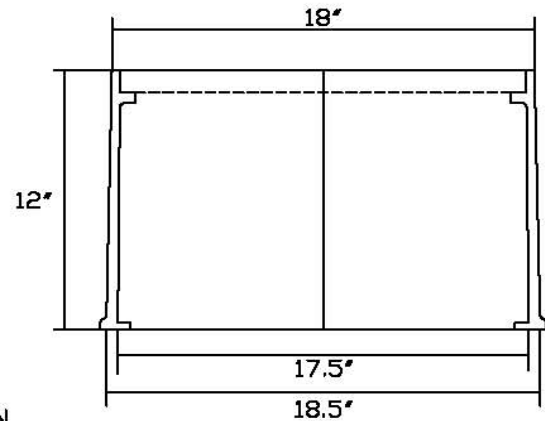
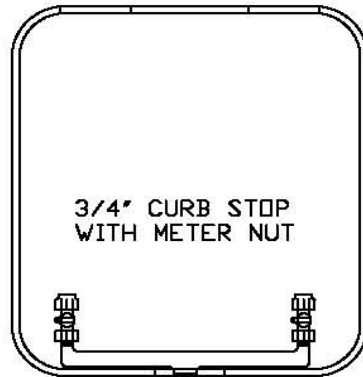
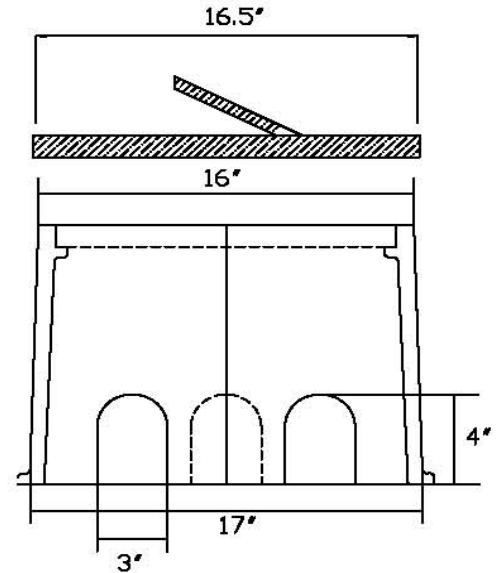
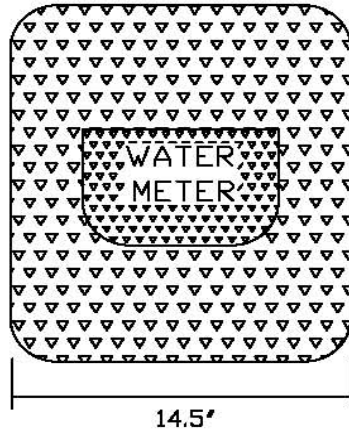


2" METER BOX
AND
WATER TAP

METER BOX IS A MID-STATES PLASTICS
MSBC1416-12 METER BOX WITH CAST IRON LID
OR APPROVED EQUAL

NOTE: THE DUAL METER BOX IS TO BE USED
AT ALL LOTS WHERE IRRIGATION MAY BE INSTALLED

NOTE: IN RESIDENTIAL INSTALLATION THE DEVELOPER
RESPONSIBLE FOR THE INSTALLATION OF ALL EQUIPMENT
EXCEPT THE METER



1' x 3/4" x 7.5"
BRANCH PEICE

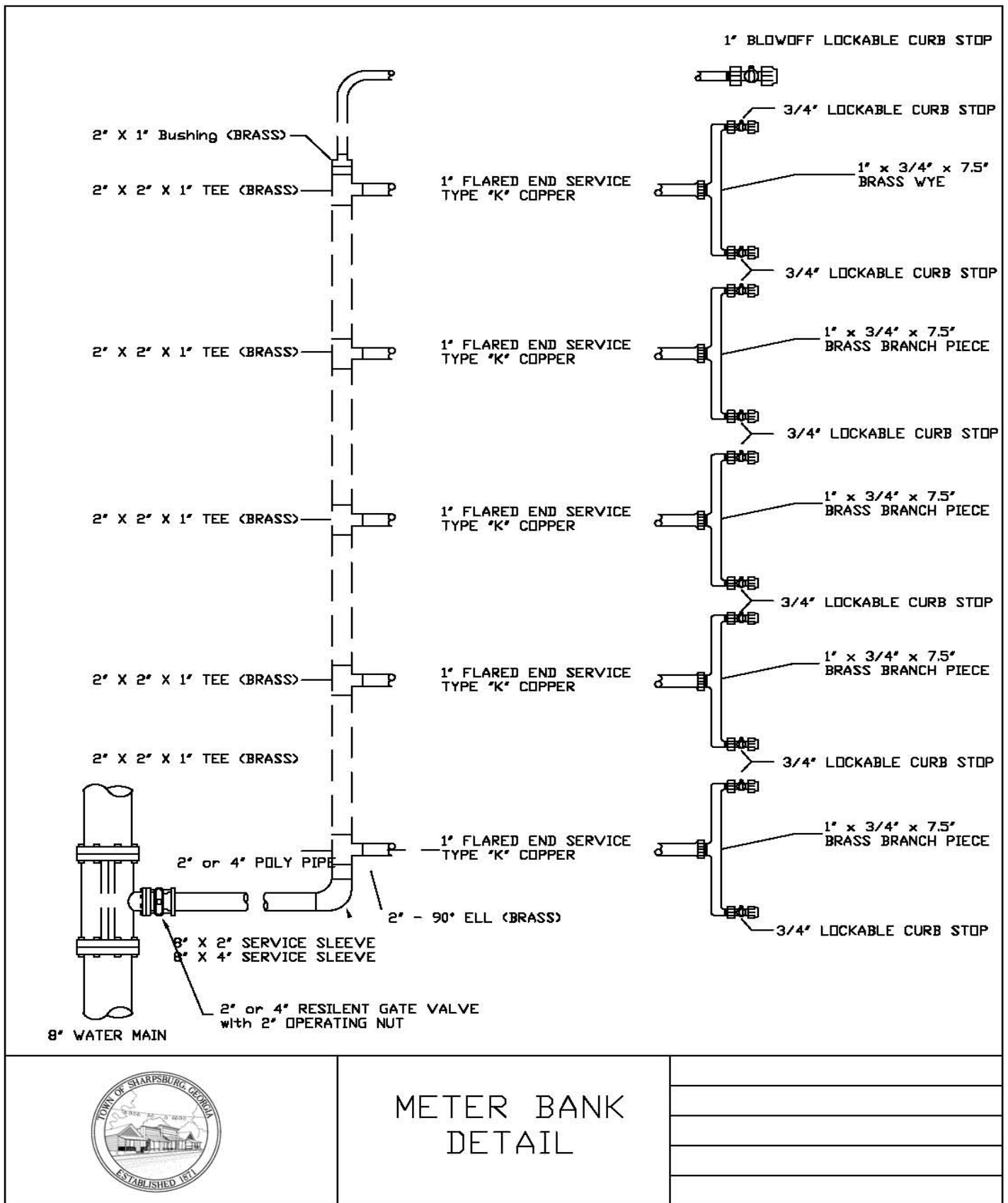
1' Q-NUT COMPRESSION
FITTING, FROM COPPER
TO BRANCH PIECE

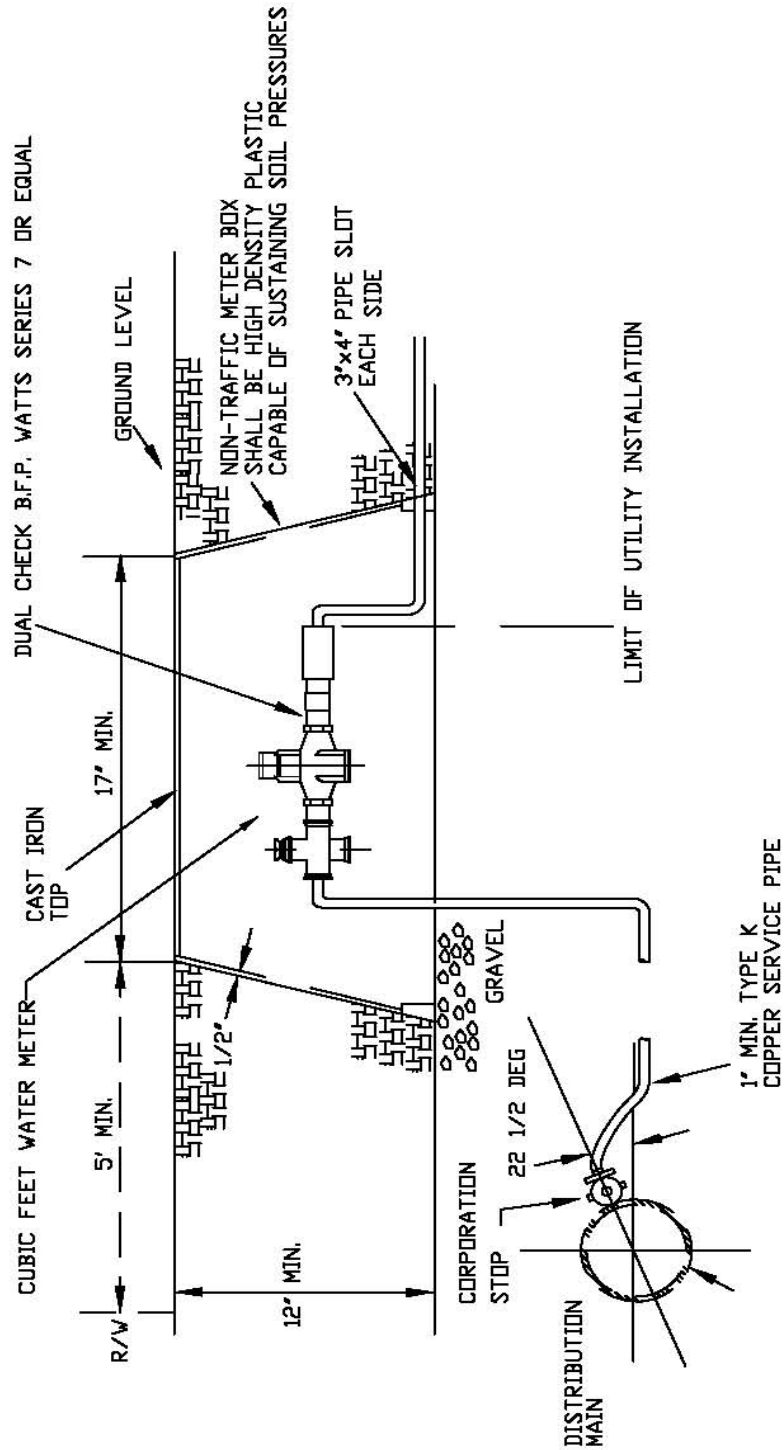
Q-NUT
1" CORP STOP
AND DIRECT TAP

1" COMPRESSION FITTING
TYPE "K" COPPER

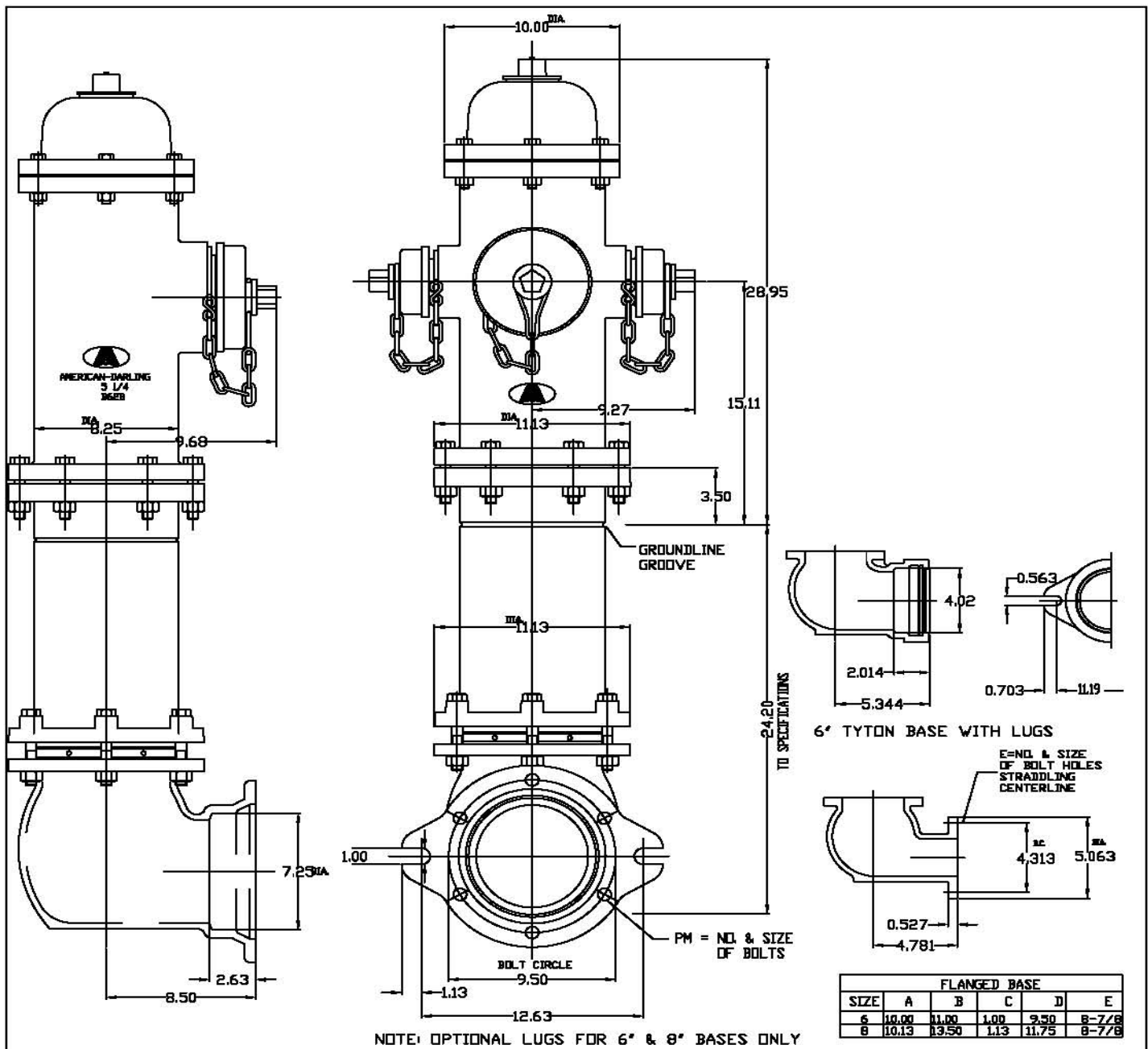


RESIDENTIAL
WATER TAP
METER BOX





TYPICAL RESIDENTIAL WATER METER INSTALLATION

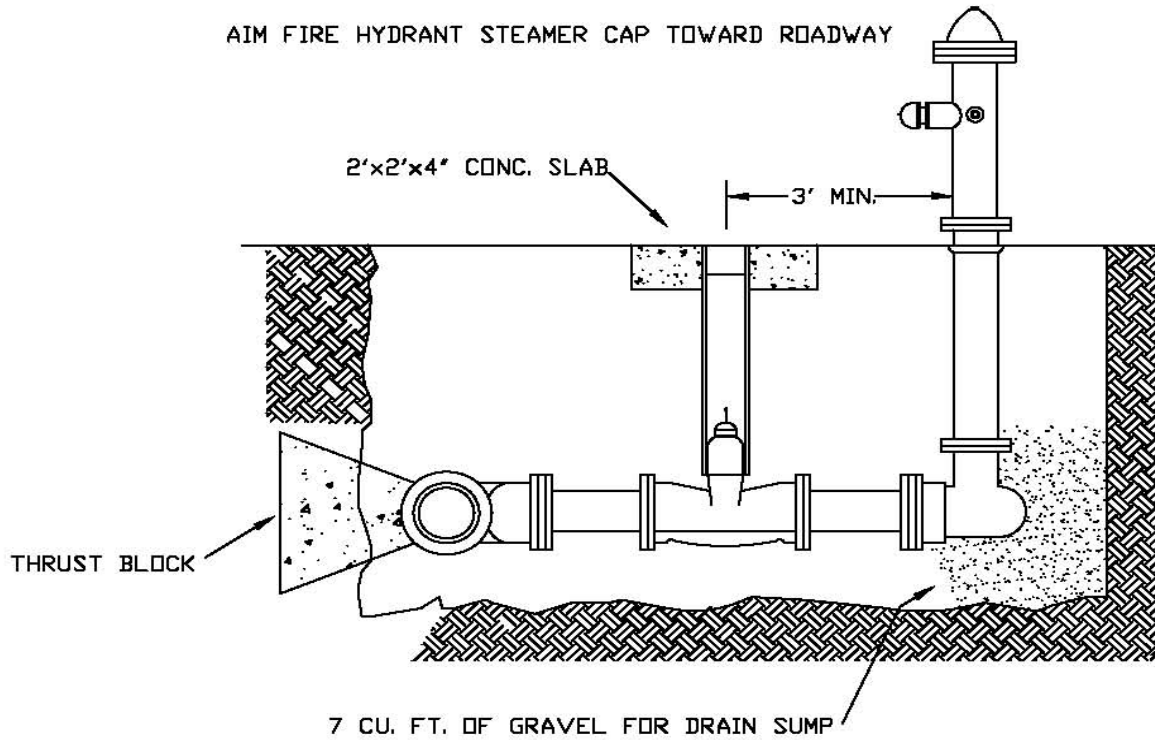


MECHANICAL JOINT BASE						
SIZE	HM	JM	KM	LM	PM	TM
4	9.00	2.50	4.90	7.50	4-3/4	
6	8.50	2.50	7.00	9.50	6-3/4	12.63
8	9.75	2.50	9.15	11.75	6-3/4	15.00

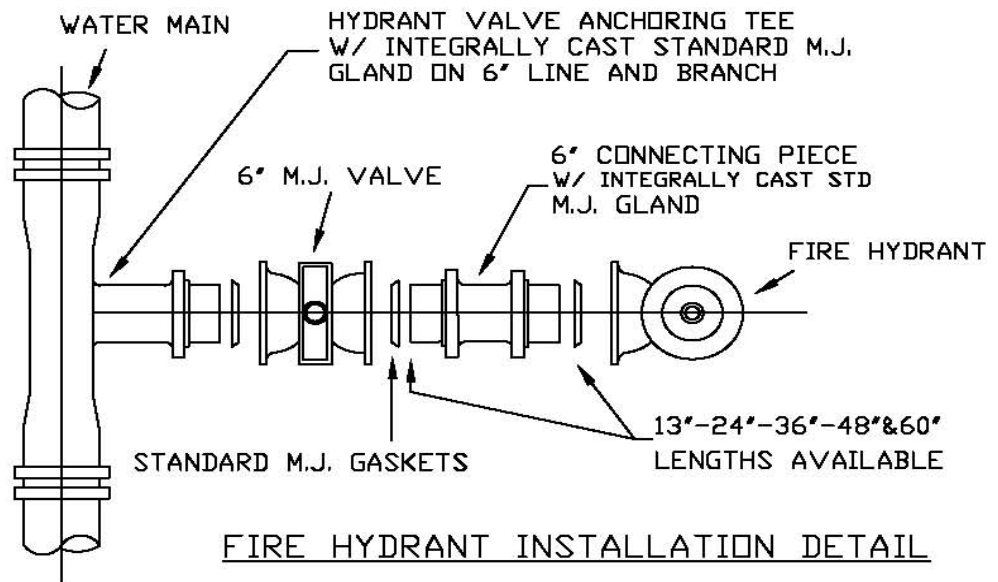


AMERICAN B-62-B
5 1/4" FIRE
HYDRANT DETAIL

AIM FIRE HYDRANT STEAMER CAP TOWARD ROADWAY



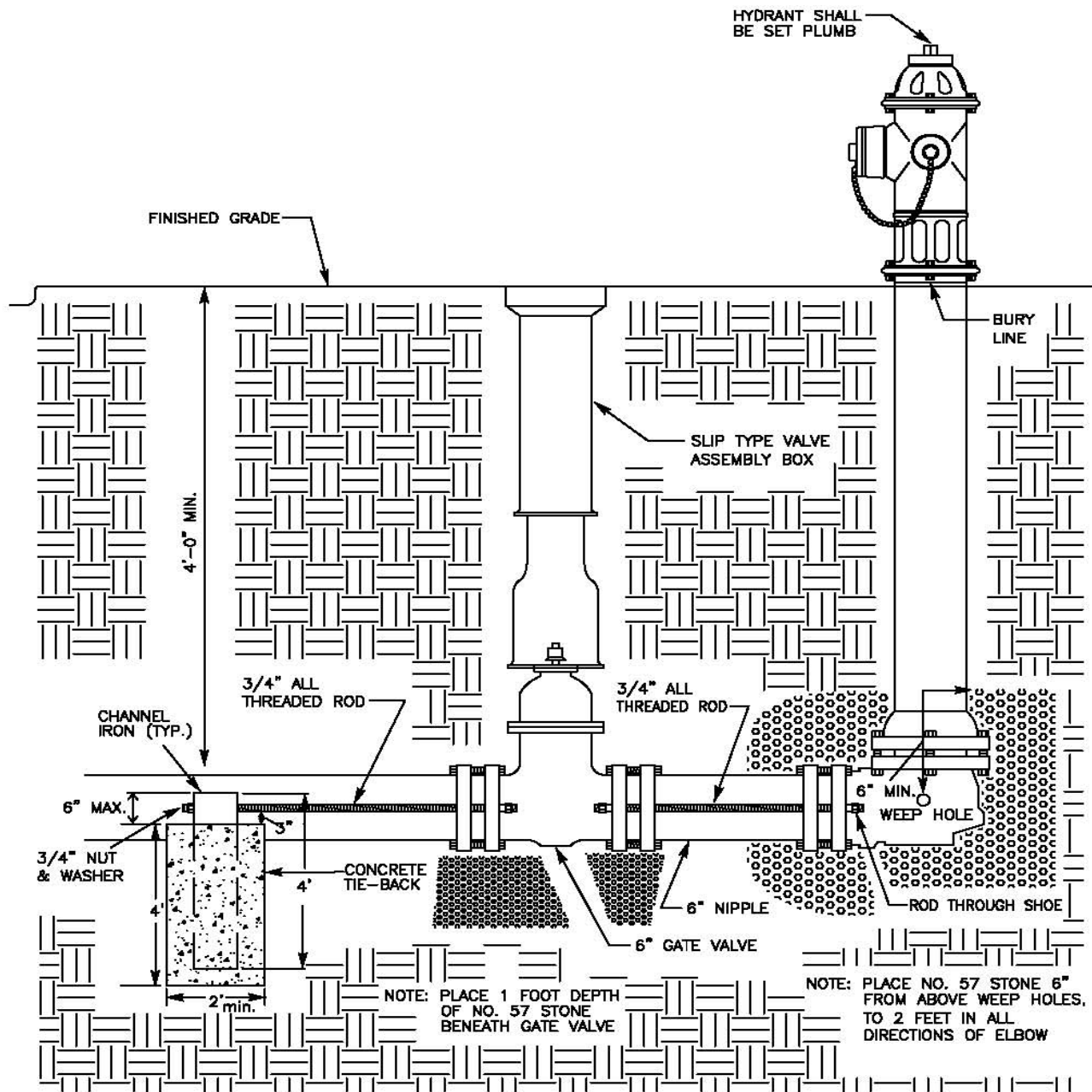
FIRE HYDRANT LOCATION DETAIL



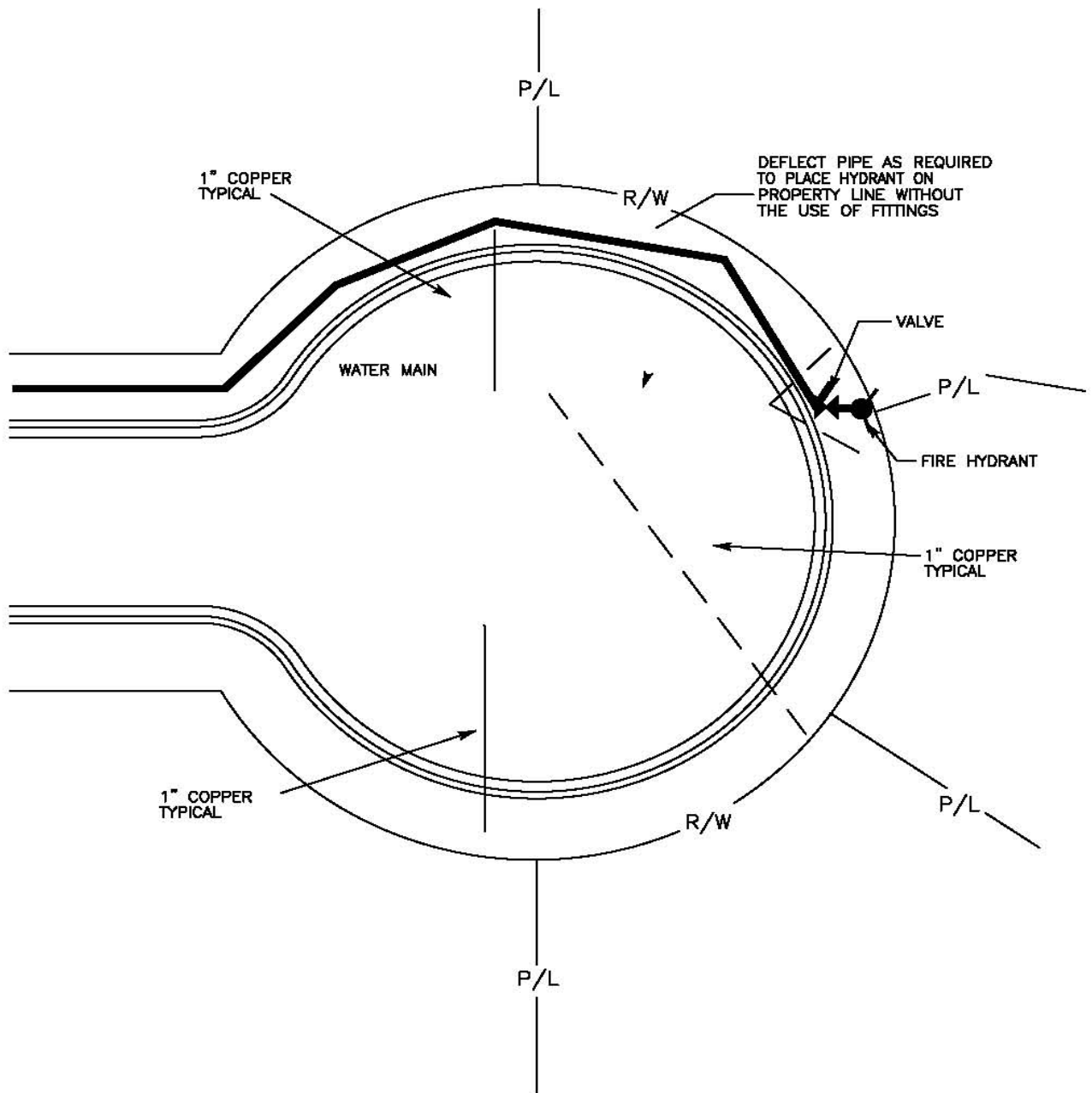
FIRE HYDRANT INSTALLATION DETAIL



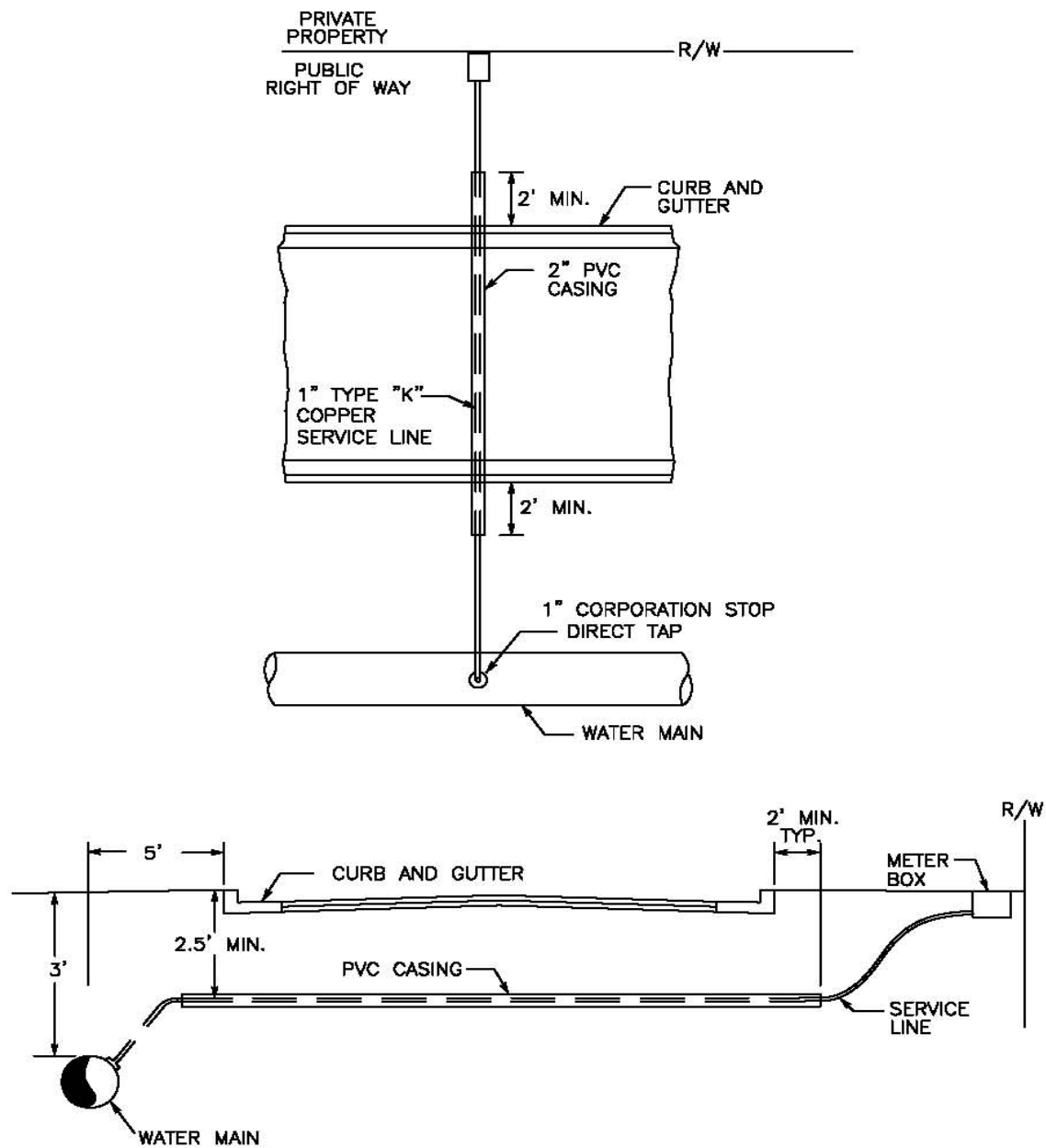
FIRE HYDRANT
LOCATION
DETAIL



FIRE HYDRANT RODDING DETAIL



CUDELSAC DETAIL



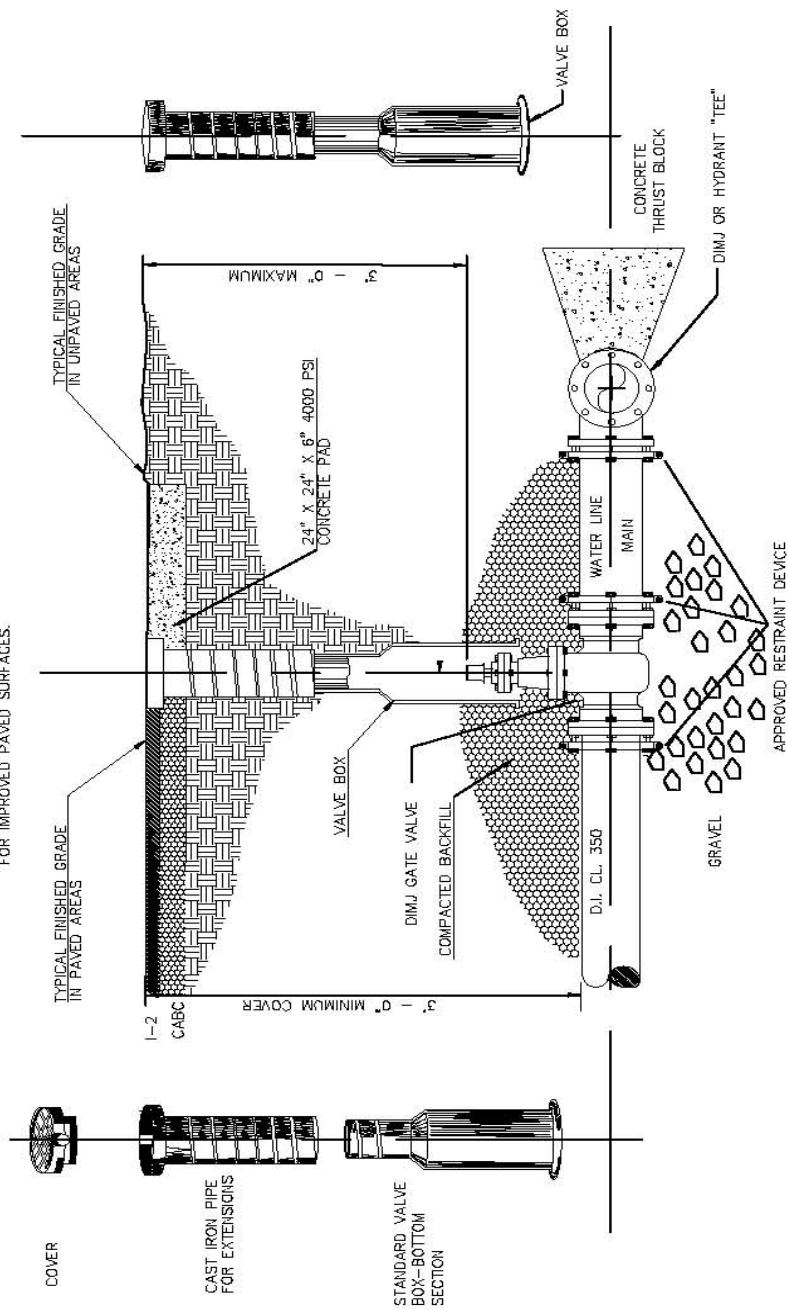
LONG SIDE SERVICE DETAIL



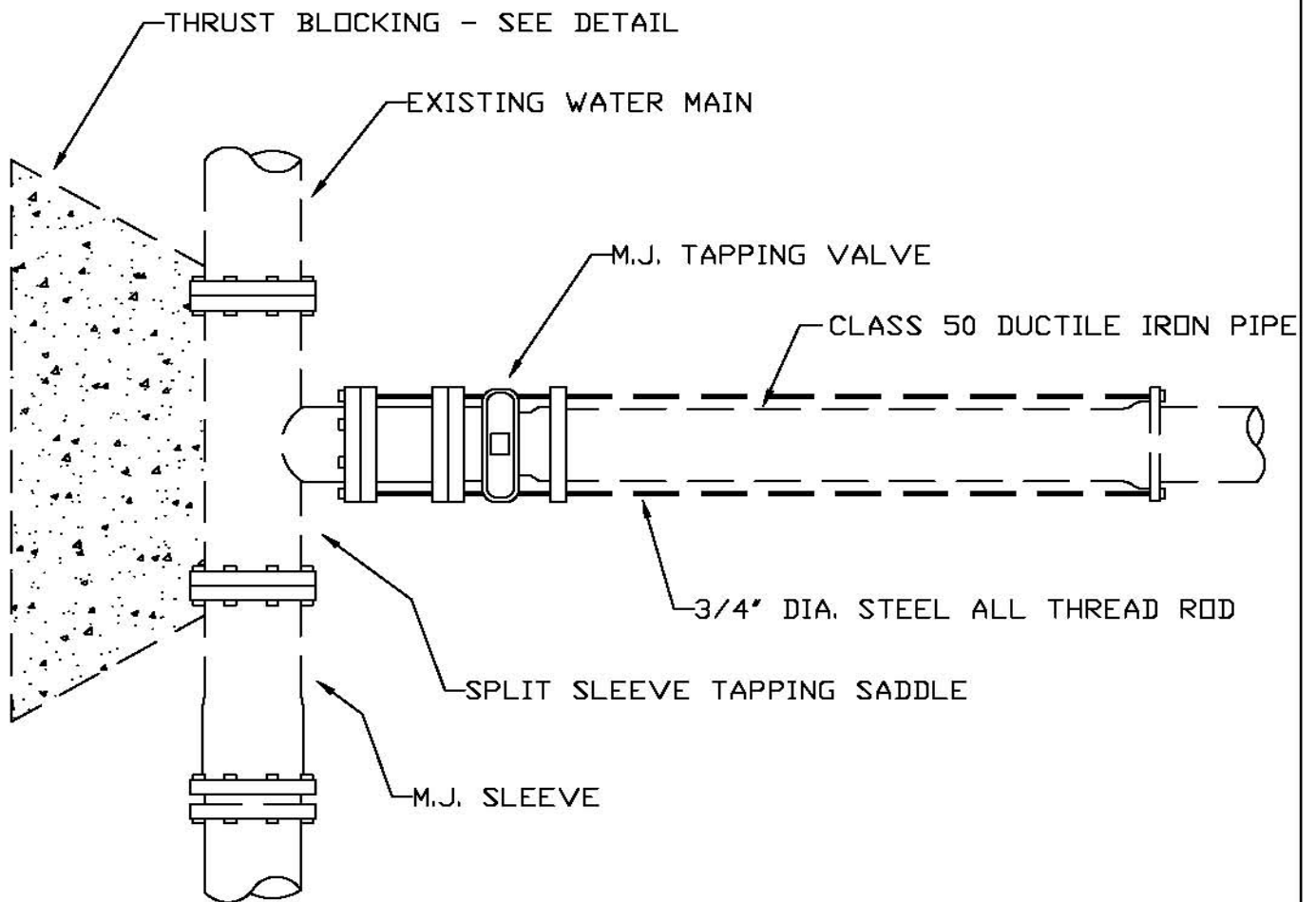
TYPICAL VALVE INSTALLATION

GENERAL NOTES:

1. SEE STANDARD THRUST BLOCK DIMENSIONS.
2. CONCRETE SHALL NOT CONTACT BOLTS OR ENDS OF MECHANICAL FITTINGS.
3. VALVE BOX WILL NOT CONTACT WATER MAIN OR VALVE.
4. VALVE PAD REQUIREMENTS SHALL NOT BE APPLICABLE FOR IMPROVED PAVED SURFACES.

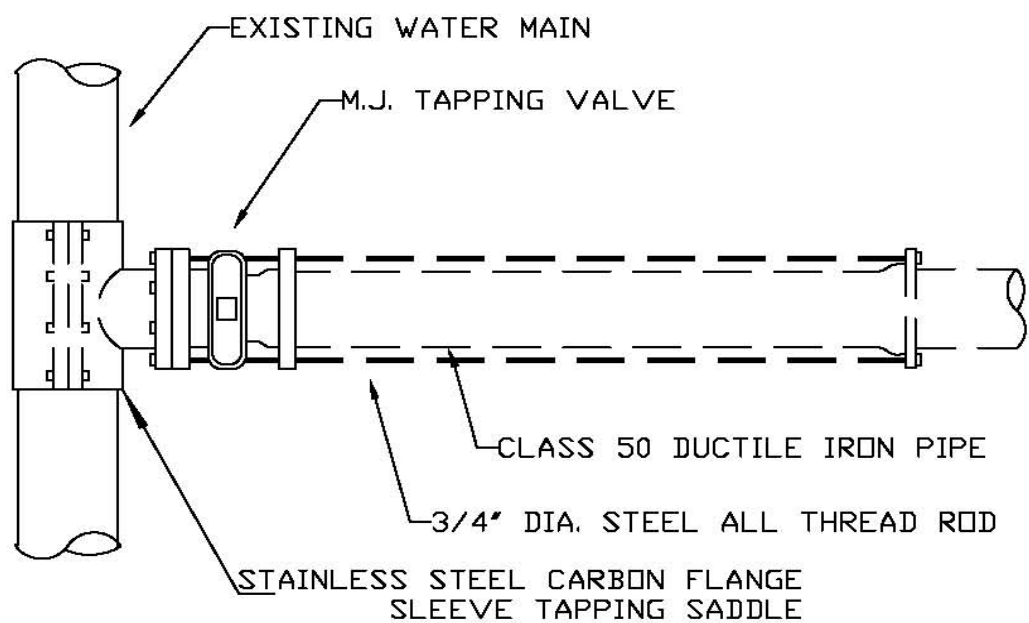


RESILIENT SEAT NON-RISING
STEM GATE VALVES BY PASS REQUIRED
FOR ALL VALVES GREATER THAN 20"

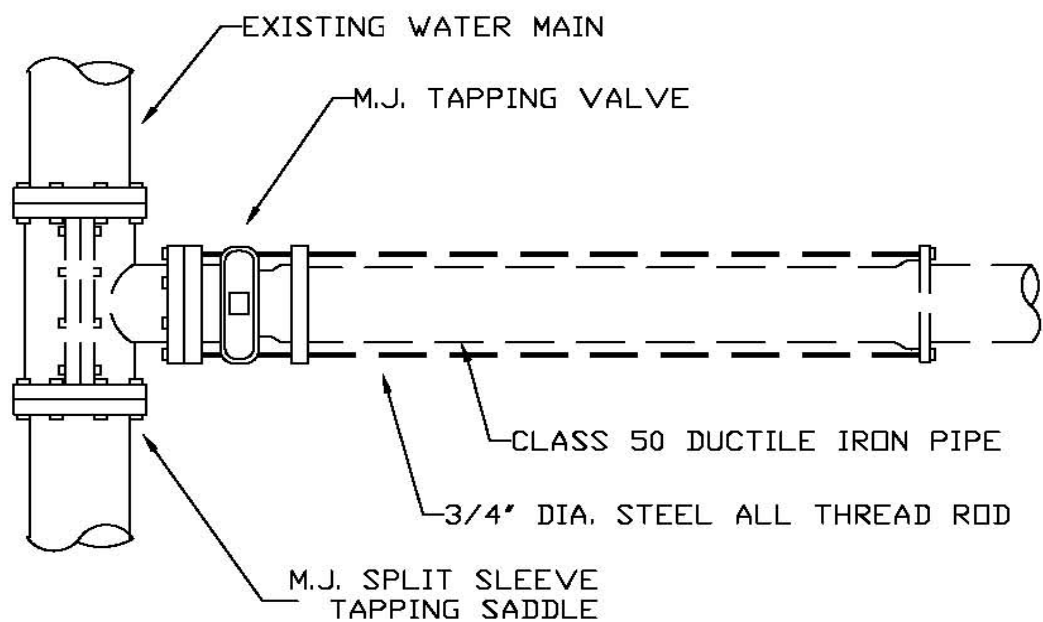


TYPICAL CUT-IN TEE INSTALLATION

TYPICAL STAINLESS STEEL CARBON FLANGE WET TAP INSTALLATION DETAIL



TYPICAL STAINLESS
STEEL WET TAP TEE
INSTALLATION



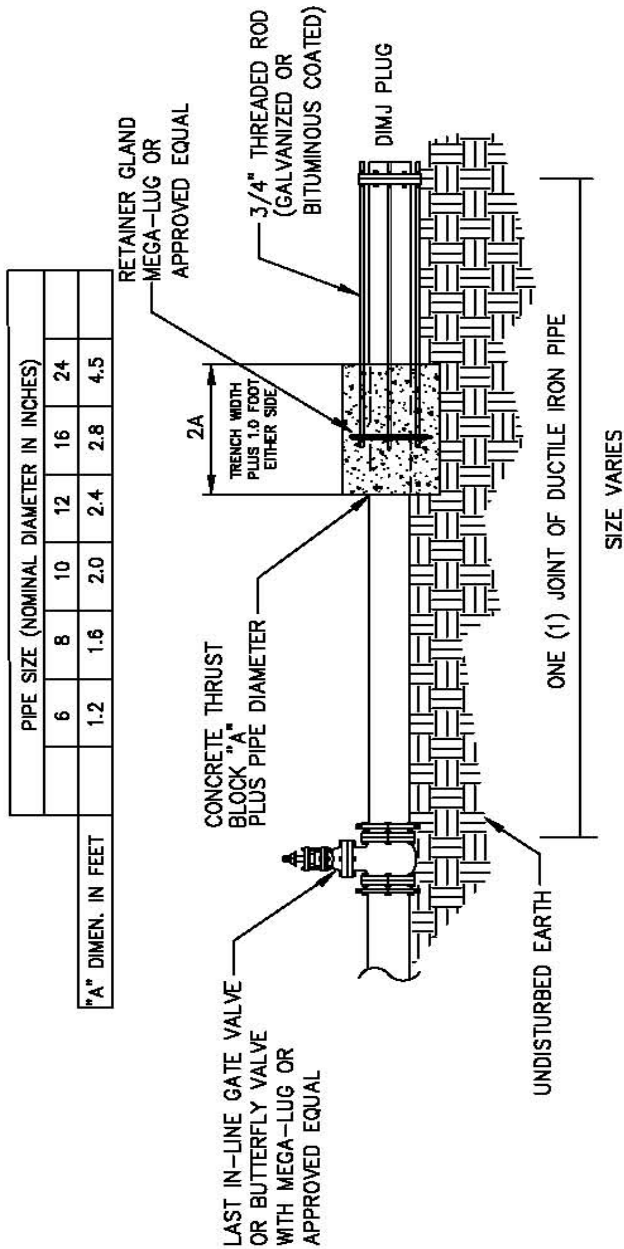
TYPICAL WET TAP INSTALLATION DETAIL



TYPICAL
WET TAP TEE
INSTALLATION



END OF LINE PLUG DETAIL



1. DIMENSION TABLE GIVEN IS A GUIDE ONLY. ENGINEER SHALL BE RESPONSIBLE TO CALCULATE THRUST BLOCK DIMENSIONS BASED ON ACTUAL SOIL AND OPERATING
2. FITTING JOINTS SHALL BE KEPT FREE OF CONCRETE. A LAYER OF POLYETHYLENE PLASTIC SHALL BE PLACED BETWEEN THE FITTING AND THE CONCRETE.