SECTION 221113 - FACILITY WATER DISTRIBUTION PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes water distribution piping and related components outside the building for water service and fire-service mains.

B. Utility-furnished products include water meters that will be furnished to the site, ready for installation.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Detail precast concrete vault assemblies and indicate dimensions, method of field assembly, and components.

C. Field quality-control test reports.

D. Operation and maintenance data.

1.3 QUALITY ASSURANCE

A. Regulatory Requirements:
   1. Comply with requirements of utility company supplying water. Include tapping of water mains and backflow prevention.
   2. Comply with standards of authorities having jurisdiction for potable-water-service piping, including materials, installation, testing, and disinfection.
   3. Comply with standards of authorities having jurisdiction for fire-suppression water service piping, including materials, hose threads, installation, and testing.

B. Piping materials shall bear label, stamp, or other markings of specified testing agency.

C. Comply with ASTM F 645 for selection, design, and installation of thermoplastic water piping.

D. Comply with FMG's "Approval Guide" or UL's "Fire Protection Equipment Directory" for fire-service-main products.

E. NFPA Compliance: Comply with NFPA 24 for materials, installations, tests, flushing, and valve and hydrant supervision for fire-service-main piping for fire suppression.

F. NSF Compliance:
1. Comply with NSF 14 for plastic potable-water-service piping. Include marking "NSF-pw" on piping.
2. Comply with NSF 61 for materials for water-service piping and specialties for domestic water.

1.4 COORDINATION

A. Coordinate connection to water main with utility company.

PART 2 - PRODUCTS

2.1 PIPE AND FITTINGS – Domestic Water Service

A. Copper Tube:
   1. Soft Copper, ASTM B 88, Type K, water tube, annealed
   2. Hard Copper, ASTM B 88, Type K, water tube, drawn temper.
   4. Solder Filler Metals: ASTM B 32, lead-free alloy, Sterling Premium Grade or Silverbrite 100. Include water-flushable flux according to ASTM B 813.
   5. Brazing Filler Metals: AWS A5.8, BCuP Series, copper-phosphorus alloys for general-duty brazing, unless otherwise indicated; and AWS A5.8, BAg1, silver alloy for refrigerant piping, unless otherwise indicated.

B. PVC Pipe:
   1. Pipe:
      a. PVC, AWWA C900, Class 165, with bell end with gasket, and with spigot end.

   2. Fittings:
      a. Ductile Iron, Mechanical Joint type, AWWA C110, ductile iron standard pattern or AWWA C153, ductile iron compact pattern.
      b. Mechanical Wedge Action Joint Restraints, Grade 65-45-12 ductile iron per ASTM A536, break-off torque control nuts, UL listed, FM approved
      c. Glands, Gaskets, and Bolts: AWWA C111, ductile iron glands, rubber gaskets, and steel bolts.

C. Ductile Iron Pipe:
   1. Pipe:
a. Ductile Iron, AWWA C151, with bell and spigot ends or flanged ends.

2. Fittings:
   a. Ductile Iron, Mechanical Joint type, AWWA C110, ductile iron standard pattern or AWWA C153, ductile-iron compact pattern.
   b. Mechanical Wedge Action Joint Restraints, Grade 65-45-12 ductile iron per ASTM A536, break-off torque control nuts, UL listed, FM approved
   c. Glands, Gaskets, and Bolts: AWWA C111, ductile iron glands, rubber gaskets, and steel bolts.
   d. Flanges: ASME B16.1, Class 125, cast iron.

2.2 PIPE AND FITTINGS – Fire Service @City Water Pressure

A. Polyethylene Pipe:
   1. Pipe: ASTM F 714, AWWA C906, or equivalent for Polyethylene (PE) water pipe; FMG approved, with minimum thickness equivalent to FMG Class 150.
   2. Molded PE Fittings: ASTM D 3350, PE resin, socket- or butt-fusion type, made to match PE pipe dimensions and class.

B. PVC Pipe:
   1. Pipe:
      a. PVC, AWWA C900, Class 235, with bell end with gasket, and with spigot end.
   2. Fittings:
      a. Ductile Iron, Mechanical Joint type, AWWA C110, ductile iron standard pattern or AWWA C153, ductile iron compact pattern.
      b. Mechanical Wedge Action Joint Restraints, Grade 65-45-12 ductile iron per ASTM A536, break-off torque control nuts, UL listed, FM approved
      c. Glands, Gaskets, and Bolts: AWWA C111, ductile iron glands, rubber gaskets, and steel bolts.

C. Ductile Iron Pipe:
   1. Pipe:
      a. Ductile Iron, AWWA C151, with bell and spigot ends or flanged ends.
   2. Fittings:
      a. Ductile Iron, Mechanical Joint type, AWWA C110, ductile iron standard pattern or AWWA C153, ductile iron compact pattern.
      b. Mechanical Wedge Action Joint Restraints, Grade 65-45-12 ductile iron per ASTM A536, break-off torque control nuts, UL listed, FM approved
      c. Glands, Gaskets, and Bolts: AWWA C111, ductile iron glands, rubber gaskets, and steel bolts.
   3. Flanges:
      a. Cast iron, ASME B16.1, Class 125.
      b. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.
         1) ASME B16.21, rubber, flat, asbestos free, 1/8-inch (3.2-mm) maximum thickness, unless otherwise indicated.
         2) Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
3) Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.

4) AWWA C110, rubber, flat face, 1/8 inch (3.2 mm) thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.

5) Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.

2.3 PIPE AND FITTINGS – Fire Service @Booster Pump Pressure

A. PVC Pipe:
   1. Pipe:
      a. Ductile Iron, AWWA C900, Class 305, with bell end with gasket, and with spigot end.
   2. Fittings:
      a. Ductile Iron, Mechanical Joint type, AWWA C110, ductile iron standard pattern or AWWA C153, ductile iron compact pattern.
      b. Mechanical Wedge Action Joint Restraints, Grade 65-45-12 ductile iron per ASTM A536, break-off torque control nuts, UL listed, FM approved.
      c. Glands, Gaskets, and Bolts: AWWA C111, ductile iron glands, rubber gaskets, and steel bolts.

B. Ductile Iron Pipe:
   1. Pipe:
      a. Ductile Iron, AWWA C151, with bell and spigot ends or flanged ends.
   2. Fittings:
      a. Ductile Iron, AWWA C110, ductile iron standard pattern or AWWA C153, ductile iron compact pattern.
      b. Mechanical Wedge Action Joint Restraints, Grade 65-45-12 ductile iron per ASTM A536, break-off torque control nuts, UL listed, FM approved.
      c. FM approved Glands, Gaskets, and Bolts: AWWA C111, ductile iron glands, rubber gaskets, and steel bolts.
   3. Flanges:
      a. Cast iron, ASME B16.1, Class 125.
      b. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.
         1) ASME B16.21, rubber, flat, asbestos free, 1/8-inch (3.2-mm) maximum thickness, unless otherwise indicated.
         2) Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
         3) Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.
         4) AWWA C110, rubber, flat face, 1/8 inch (3.2 mm) thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.
         5) Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.
2.4 PIPING SPECIALTIES

A. Transition Fittings: Manufactured fitting or coupling same size as, with pressure rating at least equal to and ends compatible with, piping to be joined.

B. Tubular-Sleeve Pipe Couplings:

1. Description: Metal, bolted, sleeve-type, reducing or transition coupling, with center sleeve, gaskets, end rings, and bolt fasteners and with ends of same sizes as piping to be joined.

2.5 VALVES

A. Domestic Water, NPS 4 to NPS 8, AWWA, Cast-Iron Gate Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   b. McWane, Inc.; Clow Valve Co. Div. (Oskaloosa).
   c. McWane, Inc.; Kennedy Valve Div.
   d. Mueller Co.; Water Products Div.
   e. Watts.
   f. Apollo.

2. Nonrising-Stem, Resilient-Seated Gate Valves:
   a. Description: Gray or ductile iron valve body and bonnet; with bronze, gray, or ductile iron valve gate, resilient seats, bronze stem, and stem nut.
      1) Standard: AWWA C509.
      2) Minimum Pressure Rating: 200 psig.
      3) End Connections: Mechanical joint or flanged.
      4) Interior Coating: Complying with AWWA C550.
      5) 2" square operating nut for below grade installations, hand wheel for above grade installations

B. Underground Domestic Water, NPS 3/4 to NPS 2, AWWA, Brass Corporation Stops:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Mueller
   b. A. Y. McDonald
   c. Ford Meter Box

2. Ball Type Corporation Stops
   a. Description: Brass body, coated ball.
1) Standard: AWWA C800
2) Minimum Pressure Rating: 300 psig
3) EPDM seats and gaskets
4) 2” square operating nut

C. Aboveground Domestic Water, NPS 3/4 to NPS 4, AWWA, Ball Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Mueller
   b. Watts
   c. Apollo.

2. Full Port Ball Valve
   a. Description: Copper alloy body, stainless steel or coated brass ball.
      1) Standard: NSF/ANSI 61
      2) Minimum Pressure Rating: 150 psig
      3) PTFE Seats
      4) Blowout proof stem

D. Fire Service, NPS 4 to NPS 8, UL/FMG, Cast-Iron Gate Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   b. McWane, Inc.; Clow Valve Co. Div. (Oskaloosa).
   c. McWane, Inc.; Kennedy Valve Div.
   d. Mueller Co.; Water Products Div.

2. UL/FMG, Nonrising-Stem Gate Valves:
   a. Description: Iron body and bonnet with flange for indicator post, bronze seating material, and inside screw.
      1) Standards: UL 262 and FMG approved.
      2) Minimum Pressure Rating: 175 psig.
      3) End Connections: Flanged.

3. OS&Y, Rising-Stem Gate Valves:
   a. Description: Iron body and bonnet and bronze seating material.
      1) Standards: UL 262 and FMG approved.
2) Minimum Pressure Rating: 175 psig.
3) End Connections: Flanged.

2.6 VALVE ACCESSORIES AND SPECIALTIES

A. Tapping-Sleeve Assemblies:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   b. McWane, Inc.; Kennedy Valve Div.
   c. Mueller Co.; Water Products Div.

2. Description: Sleeve and valve compatible with drilling machine.
   a. Standard: MSS SP-60.
   b. Tapping Sleeve: Cast- or ductile-iron or stainless-steel, two-piece bolted sleeve with flanged outlet for new branch connection. Include sleeve matching size and type of pipe material being tapped and with recessed flange for branch valve.
   c. Valve: AWWA, cast-iron, nonrising-stem, resilient-seated gate valve with one raised face flange mating tapping-sleeve flange.

B. Valve Boxes: Comply with MAG Standard Detail No. 391-1 and 270, Type A with a Class C900 PVC sleeve instead of cast iron sleeve. Include top section, adjustable extension of length required for depth of burial of valve, plug with lettering "WATER," and bottom section with base that fits over valve and with a barrel approximately 5 inches in diameter.
   1. Operating Wrenches: Steel, tee-handle with one pointed end, stem of length to operate deepest buried valve, and socket matching valve operating nut.
   2. Valve Stem Extensions: Steel, centering ring, rock guard, 2" operating nut, 2" socket with two locking screws

C. Indicator Posts: UL 789, FMG-approved, vertical-type, cast-iron body with operating wrench, extension rod, and adjustable cast-iron barrel of length required for depth of burial of valve.

2.7 WATER METERS

A. Water meters will be furnished by utility company.

2.8 WATER METER BOXES

A. Installed by Municipal Water Department or their contractors

2.9 BACKFLOW PREVENTERS

A. Reduced-Pressure-Principle Backflow Preventers for water service:
B. Double-Check, Backflow-Prevention Assemblies for fire service:

Wilkens 350A

2.8 CONCRETE VAULTS

A. Description: Precast, reinforced-concrete vault, designed for A-16 load designation according to ASTM C 857 and made according to ASTM C 858.

2. Manhole: ASTM A 48/A 48M Class No. 35A minimum tensile strength, gray-iron traffic frame and cover.
   a. Dimension: 36-inch minimum diameter, unless otherwise indicated.
3. Manhole: ASTM A 536, Grade 60-40-18, ductile-iron traffic frame and cover.
   a. Dimension: 36-inch minimum diameter, unless otherwise indicated.
4. Drain: ASME A112.6.3, cast-iron floor drain with outlet 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.

2.9 FIRE HYDRANTS

A. Dry-Barrel Fire Hydrants:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   d. American Foundry Group, Inc.
   e. East Jordan Iron Works, Inc.
   f. McWane, Inc.; Clow Valve Co. Div. (Oskaloosa).
   g. McWane, Inc.; Kennedy Valve Div.
   h. McWane, Inc.; M & H Valve Company Div.
   i. Mueller Co.; Water Products Div.
   j. Troy Valve; a division of Penn-Troy Manufacturing, Inc.
   k. U.S. Pipe and Foundry Company.

2. Description: Freestanding, with one NPS 4-1/2 and two NPS 2-1/2 outlets, 5-1/4-inch main valve, drain valve, and NPS 6 mechanical-joint inlet. Include interior
coating according to AWWA C550. Hydrant shall have cast-iron body, compression-type valve opening against pressure and closing with pressure.

b. Pressure Rating: 150 psig minimum.

B. Wet Barrel Fire Hydrants:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   c. McWane, Inc.; Clow Valve Co. Div. (Corona).
   d. McWane, Inc.; Clow Valve Co. Div. (Oskaloosa).
   e. Mueller Co.; Water Products Div.

2. Description: Freestanding, with one NPS 4-1/2 and two NPS 2-1/2 outlets, NPS 6 threaded or flanged inlet, and base section with NPS 6 mechanical-joint inlet. Include interior coating according to AWWA C550.

   b. Pressure Rating: 150 psig minimum.

2.10 FIRE DEPARTMENT CONNECTIONS

A. Fire Department Connections:

1. Manufacturers: Subject to compliance with requirements of the municipality where installed, provide products by one of the following:

   b. Fire End & Croker Corporation.
   c. Guardian Fire Equipment, Inc.
   d. Kidde Fire Fighting.
   e. Potter Roemer.
   f. Reliable Automatic Sprinkler Co., Inc.

2. Description: Freestanding, with cast-bronze body, thread inlets according to NFPA 1963 and matching local fire department hose threads, and threaded bottom outlet. Include lugged caps, gaskets, and chains; lugged swivel connection and drop clapper for each hose-connection inlet; 18-inch high brass sleeve; and round escutcheon plate.

   b. Connections: Two NPS 2-1/2 inlets and one NPS 4 outlet.
   c. Inlet Alignment: Inline, horizontal.
   d. Finish Including Sleeve: Polished bronze.
   e. Escutcheon Plate Marking: "[AUTO SPKR] [&] [STANDPIPE]."
2.11 DIELECTRIC FITTINGS

A. Dielectric Fittings, General: Assembly of copper alloy and ferrous materials or ferrous material body with separating nonconductive insulating material suitable for system fluid, pressure, and temperature. These fittings are to be used only where necessary.

B. Dielectric Unions:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Central Plastics Company.
   b. Epco Sales, Inc.
   d. Watts Water Technologies, Inc.
   e. Zurn Plumbing Products Group; Wilkins Div.

C. Dielectric Flanges:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Central Plastics Company.
   b. Epco Sales, Inc.
   c. Watts Water Technologies, Inc.
   d. CTS Flange

D. Dielectric Couplings:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Calpico, Inc.
   b. Lochinvar Corporation.

E. Dielectric Nipples:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Matco-Norco.
b. Precision Plumbing Products, Inc.
c. Watts.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Refer to Section 312000 "Earth Moving" for excavating, trenching, and backfilling.

3.2 PIPING APPLICATIONS

A. Domestic Water Service – Underground
   1. NPS 3/4 to NPS 3: Type K soft copper tube, cast copper alloy or wrought copper fittings, brazed joints
   2. NPS 4 to NPS 8: C900 PVC pipe with push-on joints, ductile iron fittings with mechanical wedge action restraint connections
   3. NPS 4 to NPS 8: Ductile iron pipe with push-on joints, ductile iron fittings with mechanical wedge action restraint connections

B. Domestic Water Service – Within Boxes and Vaults Below Grade
   1. NPS 3/4 to NPS 3: Type K hard copper tube, cast copper alloy or wrought copper fittings, soldered joints, unions
   2. NPS 4 to NPS 8: C900 PVC pipe with push-on joints, ductile iron fittings with mechanical wedge action restraint connections
   3. NPS 4 to NPS 8: Ductile iron pipe with push-on joints, ductile iron fittings with mechanical wedge action restraint connections
   4. NPS 4 to NPS 8: Ductile iron pipe, ductile iron fittings, flanged connections

C. Domestic Water Service – Above Grade
   1. NPS 3/4 to NPS 3: Type K hard copper tube, cast copper alloy or wrought copper fittings, soldered joints, unions
   2. NPS 4 to NPS 8: Ductile iron pipe, ductile iron fittings, flanged connections

D. Fire Service @City Water Pressure - Underground
   1. Polyethylene water pipe, FMG approved Class 150, with molded PE fittings
   2. PVC pipe, AWWA C900, Class 235, with bell end with gasket, and with spigot end, ductile iron fittings with mechanical wedge action restraint connections
   3. Ductile iron pipe with push-on joints, ductile iron fittings with mechanical wedge action restraint connections

E. Fire Service @City Water Pressure – Above Grade
   1. Ductile iron pipe, ductile iron fittings, flanged connections

F. Fire Service @Booster Pump Pressure - Underground
   1. PVC pipe, AWWA C900, Class 305, with bell end with gasket, and with spigot end, ductile iron fittings with mechanical wedge action restraint connections
   2. Ductile iron pipe with push-on joints, ductile iron fittings with mechanical wedge action restraint connections

G. Fire Service @Booster Pump Pressure – Above Grade
1. Ductile iron pipe, ductile iron fittings, flanged connections.

3.3 PIPING INSTALLATION

A. Install piping, valves, devices, and accessories in accordance with the manufacturer’s published installation instructions.

B. Drawing plans, schematics, and diagrams 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 the Coordination Drawings.

C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

D. Install piping to permit valve servicing.

E. Install piping at indicated slopes.

F. Install piping free of sags and bends.

G. Install fittings for changes in direction and branch connections.

H. Select system components with pressure rating equal to or greater than system operating pressure and test pressures.

I. Permanent sleeves are not required for holes formed by removable PE sleeves.

J. Verify final equipment locations before roughing-in.

K. Refer to equipment specifications in other Sections for roughing-in requirements.

L. Water-Main Connection: Municipal water supplier shall make all taps.

M. Comply with NFPA 24 for fire-service-main piping materials and installation.

N. Install copper tube and fittings according to CDA’s "Copper Tube Handbook."

O. Install PE pipe according to ASTM D 2774 and ASTM F 645.

P. Install PVC, AWWA pipe according to ASTM F 645 and AWWA M23.

Q. Bury piping with a minimum of 6 inches of sand on all sides and at least 30 inches below grade.

R. Extend water-service piping and connect to water-supply source and building-water-piping systems at outside face of building wall in locations and pipe sizes indicated.

1. Terminate water-service piping at building wall until building-water-piping systems are installed. Terminate piping with caps, plugs, or flanges as required for piping.
material. Make connections to building-water-piping systems when those systems are installed.

S. Sleeves are specified in Section 220515 "Common Work Results for Plumbing."

T. Mechanical sleeve seals are specified in Section 220515 "Common work Results for Plumbing."

U. Install underground piping with restrained joints at horizontal and vertical changes in direction. Use restrained-joint piping, thrust blocks, anchors, tie-rods and clamps, and other supports.

V. Copper tube, ductile iron pipe, fittings, and associated ferrous components installed underground shall be protected with 8 mil polyethylene wrap or 10 mil tape.

3.4 JOINT CONSTRUCTION

A. Join pipe and fittings according to the following requirements.

B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

D. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

   1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
   2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.


F. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

G. Soldered Joints: Apply ASTM B 813 water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy (0.20 percent maximum lead content) complying with ASTM B 32.


I. Plastic Pressure Piping Gasketed Joints: Join according to ASTM D 3139.

J. Make pipe joints according to the following:
3. PE Piping Insert-Fitting Joints: Use plastic insert fittings and fasteners according to fitting manufacturer's written instructions.
4. PVC Piping Gasketed Joints: Use joining materials according to AWWA C900. Construct joints with elastomeric seals and lubricant according to ASTM D 2774 or ASTM D 3139 and pipe manufacturer's written instructions.
5. Dissimilar Materials Piping Joints: Use adapters compatible with both piping materials, with OD, and with system working pressure.

3.5 ANCHORAGE INSTALLATION

A. Anchorage, General: Install water-distribution piping with restrained joints. Anchorages and restrained-joint types that may be used include the following:

1. Concrete thrust blocks.
2. Locking mechanical joints.
4. Bolted flanged joints.
5. Heat-fused joints.
6. Pipe clamps and tie rods.
7. Mechanical wedge action joints

B. Install anchorages for tees, plugs and caps, bends, crosses, valves, and hydrant branches. Include anchorages for the following piping systems:


C. Apply polyethylene wrap or tape to surfaces of installed ferrous anchorage devices.

3.6 VALVE INSTALLATION

A. AWWA Valves: Comply with AWWA C600 and AWWA M44. Install each underground valve with stem pointing up and with valve box.

B. UL/FMG, Gate Valves: Comply with NFPA 24. Install each underground valve and valves in vaults with stem pointing up and with vertical cast-iron indicator post.

3.7 BACKFLOW PREVENTER INSTALLATION

A. Install backflow preventers of type, size, and capacity indicated. Include valves and test cocks. Install according to requirements of plumbing and health department and authorities having jurisdiction.

B. Do not install backflow preventers in vault or in other spaces subject to flooding.

C. Do not install bypass piping around backflow preventers.
D. Support NPS 2-1/2 and larger backflow preventers, valves, and piping near floor and on pipe stands or cast in place concrete piers.

E. Provide a y-pattern strainer upstream of a backflow prevention valve assembly serving a domestic water service line.

3.8 CONCRETE VAULT INSTALLATION

A. Install precast concrete vaults according to ASTM C 891.

3.9 FIRE HYDRANT INSTALLATION

A. General: Install each fire hydrant with separate gate valve in supply pipe, anchor with restrained joints or thrust blocks, and support in upright position.

B. Wet-Barrel Fire Hydrants: Install with valve below frost line. Provide for drainage.

C. AWWA Fire Hydrants: Comply with AWWA M17.

D. UL/FMG Fire Hydrants: Comply with NFPA 24.

3.10 FIRE DEPARTMENT CONNECTION INSTALLATION

A. Install protective pipe bollards on three sides of each fire department connection. Pipe bollards are specified in Section 055000 "Metal Fabrications."

3.11 CONNECTIONS

A. Make connections according to the following, unless otherwise indicated:

1. Install unions, in piping NPS 3 and smaller, adjacent to each valve and at final connection to each piece of equipment.
2. Install flanges, in piping NPS 3 and larger, adjacent to flanged valves and at final connection to each piece of equipment.
3. Install dielectric fittings at connections of dissimilar metal pipes.

B. Connect water-distribution piping to interior domestic water and fire-suppression piping.

3.12 QUALITY CONTROL

A. Piping Tests: Conduct hydrostatic piping tests before joints are covered and after concrete thrust blocks have hardened sufficiently. Fill pipeline 24 hours before testing and apply test pressure to stabilize system. Use only potable water.

B. Hydrostatic Tests: Test at not less than the following for two hours:

1. Water Service Piping – 120 psig.
2. Fire Service Piping exposed to city water pressure – 200 psig.

3. Fire Service Piping exposed to booster pump water pressure – 250 psig.

C. Prepare reports of testing activities.

3.13 IDENTIFICATION

A. Install continuous underground tracer wire and detectable warning tape during backfilling of trench for underground water-distribution piping. Locate below finished grade, directly over piping.

B. Permanently attach signage indicating plastic water-service piping has been provided for building, on main electrical meter panel.

3.14 CLEANING

A. Clean and disinfect water-distribution piping as follows:

1. Purge new water-distribution piping systems and parts of existing systems that have been altered, extended, or repaired before use.

2. Use purging and disinfecting procedure as prescribed below:

   a. Fill system or part of system with water/chlorine solution containing at least 50 ppm of chlorine; isolate and allow to stand for 24 hours.

   b. Drain system or part of system of previous solution and refill with water/chlorine solution containing at least 200 ppm of chlorine; isolate and allow to stand for 3 hours.

   c. After standing time, flush system with clean, potable water until no chlorine remains in water coming from system.

   d. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedure if biological examination shows evidence of contamination.

B. Prepare reports of purging and disinfecting activities.

END OF SECTION