PART I - GENERAL

1.1 SUBMITTALS
   A. [Note to AE: EPA Approval: The AE shall prepare submission for the Owner’s signature and forwarding to the EPA in order to secure approval prior to bidding for all new water services.]
   B. Construction Documents shall include the average and peak flows (for the entire building) that were used to size the domestic water piping.]

PART 2 - PRODUCTS

2.1 WATER MAIN
   A. Water lines three inches (3”) and larger shall be ductile iron pipe Class 52 thickness for 350 psi working; push-on joint, outside coated, and cement-lined inside.
   B. Water lines smaller than three inches (3”) shall be copper service tubing conforming to ASTM B88, Type K, heavy wall, soft temper. Copper service lines shall have grip joint type fittings.
   C. Cover: Install at depth to allow for 42-inches minimum cover.

2.2 FITTINGS
   A. Fittings: Shall be ductile-iron or cast-iron. The interior of the fittings shall be cement-motor lined and outside coated with a bituminous seal. The fittings shall have mechanical joints.

2.3 WATER METERS
   A. EMS System: All water meters shall have electronic pulse output capabilities. The meter shall be capable of interfacing with the buildings EMS system. Coordinate data connections with U of I requirements.
   B. Irrigation Meters: Water used for irrigation purposes shall be metered separately. Irrigation meters shall be installed down-stream of the main building water meter, such that the main building water meter measures the water used for irrigation purposes.

2.4 VALVES
   A. Valves: Water main valves shall comply with AWWA Standards C509. Water main valves for mains 12-inches or larger shall be Butterfly type valves. Water main valves for mains under 12-inches shall be Gate valves.

2.5 FIRE HYDRANTS
   A. Design: Fire Hydrants Shall Comply with AWWA C502-94. Design shall be compatible with Mueller or Waterous hydrants since the University maintains repair parts for these hydrants in stock.
   B. Working Pressure: The hydrant shall be equipped with a secondary gate valve designed for 200 psi working pressure.
   C. Connections: Inlet connections shall be 6-inches I.D. and shall be flanged. The attached hydrant secondary gate valve shall have flanged connections at hydrant end and a mechanical joint for 6-inches C.I. pipe at the other end.
   D. Minimum Bury Depth: The minimum bury depth of pipe shall be 42-inches deep from grade to the top of the pipe.
   E. Nozzles: Two 2-1/2 inch nozzles at 180 degrees and one 4-1/2 inch pumper nozzle shall be provided.

G. Nozzle Cap: Each nozzle cap shall have a gasket.

H. Opening Direction: Direction of opening of fire hydrant and valves shall be counterclockwise.

I. Operating Nuts: Hydrant operating nut shall be 1-1/2 inch pentagonal nut. Secondary valve operating nut shall be a 2-inch square.

J. Rock: At least 7-1/2 cubic feet of rock shall be placed around each fire hydrant to allow drainage and prevent freeze-up.

2.6 VALVE BOXES

A. Valves Boxes: Shall be 3 piece cast iron, suitable for water works gate valves, having a 5-1/2 inch diameter, adjustable, screw type jacket and cover marked “Water”.

2.7 WATER SERVICES

A. Branch Connections: Branch connections to all underground piping shall be mechanical joint end fittings, with ductile iron glands and set screws. Nipples shall be not less than 24 inches long.

B. Shut-Off Valve Location: Shut-off valves in branch extension to buildings shall be installed as close to the mains as possible rather than near the buildings.

C. Through Walls: Where water service lines pass through concrete foundation walls, a section of wall pipe having mechanical joints and flanged ends shall be cast in the concrete. The bell on the outer end shall finish near the outer face of the wall, and the flanged end shall project inside of the building not less than 8-inches from the face of the wall. A concrete pad shall be poured behind each bend.

D. Adjacent to Concrete Structures: Where water mains cross over or under concrete tunnels, electric duct lines, or other rigid structures in the ground, there shall be not less than 6-inches clearance between the water line and the nearest surface of such underground service or structure. This clearance is for the installation of other services adjacent to existing water mains. The elevation of the water mains shall be changed when this clearance cannot be obtained otherwise. The earth beneath the pipe shall be thoroughly compacted to provide uniform support of the pipe.

E. Metallic Lined Plastic Underground Warning Tapes: Polyethylene plastic tape with metallic core, 6 inches wide by 4 mils thick, solid green in color with continuously printed caption in black letters “CAUTION WATER LINE BURIED BELOW.”

2.8 THRUST RESTRAINT

A. Blocks shall be provided for all pressure pipe fittings, changes in pipe alignment or direction, and at all points where there is a possibility of joint separation under pressure.

1. Provide anchors and supports where necessary for fastening Work into place. Make proper provisions for expansion or contraction of pipelines. Thrust blocks shall be placed between solid ground and the pipe or fittings to be anchored as detailed.

2. Thrust blocks shall be as detailed on the Drawings, or where not detailed, in accordance with AWWA C600, the Standard Specifications for Water & Sewer Main Construction in Illinois, and the pipe manufacturer’s recommendations.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Compliance to Standards: All material and workmanship involved in underground water main work, including excavation and backfilling, shall be in accordance with American Water Works Association Standard C600, Standard for Installation of Cast-Iron Water
Mains, and the most recent edition of the Standard Specifications for Water & Sewer Main Construction in Illinois.

B. Permits: Contractor shall obtain a permit to operate valves or hydrants from the University of Illinois at Urbana-Champaign. Where valves or hydrants are owned by a utility other than the University, the Contractor must contact the appropriate utility owner and follow that utility's regulations.

C. U of I Supervision: Operation of the Water System shall at all times remain under the supervision of the University of Illinois at Urbana-Champaign.

3.2 FLUSHING AND DISINFECTING WATER LINES

A. Flush and Clean: All newly installed pipe and appurtenances shall be flushed and disinfected according to AWWA C651 and the Standard Specifications for Water & Sewer Main Construction in Illinois.

3.3 BACTERIOLOGICAL TESTING

A. Samples: All bacteriological samples shall be collected and processed by the U of I Operations & Maintenance Water Station.

B. Out of Service: The new facilities shall remain isolated and out of service until a satisfactory test result has been obtained.

C. Repeat Testing: If unsatisfactory or doubtful results are obtained from the initial sampling and testing, the flushing and/or chlorination, sampling and testing process shall be repeated in accordance with AWWA C651 and the Standard Specifications for Water & Sewer Main Construction in Illinois, until acceptable test results are obtained and the Owner is satisfied with those results.

3.4 GPS Data Collection: The contractor shall contact the Facilities & Services project representative a minimum of 24 hours prior to backfilling any underground utility installation exterior to the building including excavation for maintenance and/or repair of an existing utility for the purpose of GPS data collection.

END OF SECTION 33 10 00

This section of the U of I Facilities Standards establishes minimum requirements only. It should not be used as a complete specification.