

## **WATER DISTRIBUTION SYSTEMS**

---

**U of I Distribution System:** The University of Illinois at Urbana-Champaign owns, operates and maintains the water distribution system that serves the Urbana-Champaign campus. This system provides treated potable water for domestic water systems, fire protection systems, irrigation systems, HVAC systems as well as non-potable water systems within buildings (e.g. laboratory and process applications).

The water distribution system is a consecutive system supplied from *Illinois American Water Company (IAWC)* through five separate delivery points. A small number of campus facilities are fed directly from IAWC. As opportunities are presented and when cost effective these buildings shall be connected to the U of I water distribution system. The U of I system is regulated by the Illinois Environmental Protection Agency. Daily testing, monthly reporting, other required testing, construction permits and operating permits for new mains are required by IEPA regulations.

**Water Quality:** Continuous automated monitoring and recording of water quality data is in place at the five IAWC delivery points. Data for the U of I water distribution system is presented annually in the *Consumer Confidence Report (CCR)* which is available via the *Facilities and Services* website and published in campus media. Requests for data regarding specific characteristics of water or water chemistry shall be directed to *F&S Utility Distribution* staff.

**Compliance:** In addition to compliance with regulatory requirements of the IEPA the design and construction of water distribution systems on campus shall comply with the latest edition of the *Standard Specifications for Water and Sewer Main Construction in Illinois*. Minimum requirements of these standard specifications are often exceeded by those presented in these *UIUC Facilities Standards* in order to meet the needs of the campus community.

**Configuration:** The water distribution system is configured as a looped or grid-type system. This configuration shall be maintained. Three isolation valves shall be provided at each branch connection to maximize system reliability and operational

flexibility. Branch valves shall be located as near the associated mains as practical.

Water main extensions or additions that result in dead end mains are not permitted. Additions and changes to the water distribution system shall be sized and configured to serve long term needs of the campus and be consistent with the Campus Master Plan.

**Pipe and Valves:** Water distribution piping shall be cement-lined ductile iron or shall be constructed of HDPE. All pipe and system components shall be fully mechanically restrained per AWWA standards such that no thrust blocking is required. Depth of earth cover shall comply with requirements of *Standard Specifications for Water and Sewer Main Construction in Illinois* and shall be 48" minimum. Piping shall be completely bedded with sand that will provide a minimum cover of 18 inches. Thus, poly tube or sheet is not required to protect piping from direct contact with soil. Tracer wire with termination boxes shall be provided for all buried piping. Valves shall be gate type for sizes 12" and smaller and butterfly type for sizes 14" and larger. Valves shall be provided with valve boxes and lids appropriately identified. Stabilizing pads shall be provided for all valve boxes and tracer wire termination boxes. Pads shall be cast-in-place concrete, 18" diameter with top surface 1" above grade sloped away from the box.

**Location:** Location of piping beneath drip lines of trees shall generally be avoided. In no case shall piping be located within 6' of a tree trunk. Damage to trees will occur when future pipe excavation is required. The integrity of water utilities will be given priority over landscaping and plantings. Locating valves beneath streets, sidewalks or other paved areas shall generally be avoided. Locations beneath grass areas and/or parkways are ideal. For all construction projects final location and sizing of piping and valves shall be approved by *F&S Utilities Distribution* staff and shall be consistent with the *Utility Program Statement*. Changes or deviations from the Program Statement must be approved by Utility Distribution staff.

## **WATER DISTRIBUTION SYSTEMS**

---

**Locating Buried Water Pipe:** After piping has been placed and prior to backfilling *F&S Facilities Information Resources* shall be contacted to perform on-site GPS data collection. Also, when existing utilities are uncovered the same requirement applies.

**Hydrants:** Hydrants shall be installed at locations throughout the water distribution system as required by the *Utility Program Statement*. Hydrants generally are spaced every 300 feet on the main campus.

**Building Service:** Two water services shall be extended to residence halls, lab buildings and other special purpose buildings as determined by Owner. Standard office/classroom buildings shall be served by a single combined domestic water and fire service. If possible, each building shall be loop fed such that it can be served from either of two directions. A three valve configuration shall be provided at each building service connection. Similarly a five valve configuration shall be provided at each building double service connection. This configuration allows domestic water and fire service to be provided through either service. Such configurations facilitate reliability and delivery of optimal quality water. The water service configuration for a given project shall be as defined in the *Utility Program Statement* for each project.

**Metering / Backflow Prevention:** The domestic water service shall incorporate a meter at the building service entrance. The meter shall be connected to the digital communication network and shall provide data directly to the eDNA campus data historian operated by *F&S*. The fire service shall incorporate a double detector check valve. Installation of meters and/or backflow preventers in outdoor pits is not allowed.

**Irrigation Systems:** Each permanently installed irrigation system shall be fed directly from the water distribution system and shall be metered separately. An RPZ type backflow preventer shall be provided.

**Raw Water System:** The campus continues to develop a raw or untreated water system. This system will eventually be used to supply water for applications that do not require treated water such as

irrigation systems, greenhouse plant watering systems and various agricultural applications.

**Temporary Systems:** When it is necessary to use water from a hydrant for a temporary purpose, such as irrigation or filling an outdoor piping system, the temporary water supply system shall incorporate a portable meter and appropriate backflow prevention device. Those involved in installing and using a temporary water supply system shall contact *F&S Utilities Distribution* for direction, rates, and assistance. It is against the law in Illinois to tamper with or utilize a fire protection hydrant without permission of the owner of the water system.

**Responsibility:** It is the responsibility of the *F&S Utilities and Energy Services Division* to provide oversight of all activities related to construction, modification, operation and maintenance of the water distribution system. Thus, at a functional level said entity serves as the *Owner* of the system. To ensure health, safety and reliability it is essential that advance notification be provided and formal approval be gained prior to any significant non-routine activity as it relates to any aspect of the system.

**Permitting:** Domestic water main installations require an approved IEPA permit prior to construction. The A/E shall obtain and submit a completed permit to the Owner for review and processing. Necessary schedules, drawings, and specifications shall accompany the permit. Documents shall include the average and peak flow rates used to size the domestic water piping. The completed permit shall be submitted by *F&S* to the IEPA for approval.

**Hydrant Flow Test:** Hydrant flow tests are provided upon request by the *F&S Utilities and Energy Services Division*.

**Specific Design Information:** Design information including placement and sizing of system extensions as well as location of hydrants and valves shall be obtained from the *F&S Utilities and Energy Services Division* via a *Utility Program Statement*.