

22 05 00 – Common Work Results for Plumbing

1. General

A. Definitions:

1. Plumbing: Building mechanical equipment, piping, and fixtures that provide domestic hot and cold water, sanitary and special waste drainage, and roof and other storm drainage.
2. Point of Connection: The plumbing connection point for site distribution is usually located five feet (5') outside the building foundation. A careful study of existing site documentation and field verification should precede any detailed design efforts.

B. Goal: To engineer a functional, economical and efficient plumbing system in compliance with applicable codes.

C. System Conditions:

1. Domestic Water Supply:

- a. Supply pressure: Minimum 50-80 PSIG, consultant to verify.
- b. Chemical Composition: Information regarding the chemical composition of the University water supply is available from the Operations and Maintenance Department.

2. Liquid Waste Removal:

- a. The University Sanitary Sewerage System is connected to the City of Durham Waste Treatment System and must conform to the requirements of the City of Durham.
- b. Acid waste and other contaminated liquid wastes shall not discharge directly into the Sanitary Sewerage System. Specific methods of hazardous waste disposal shall be discussed with personnel from the DUES and OESO early in the design process.

D. Fire Protection: Fire protection system supply water is taken from the building domestic water supply system. Refer to Section 21 13 13 Wet-Pipe Sprinkler Systems for details.

E. Codes: All designs shall comply with the applicable requirements of the City of Durham and current version of the North Carolina Plumbing Code.

2. Design Submission Requirements

A. General:

1. Design drawings, data and calculations at various stages of completion shall be submitted for each phase of the University's plan review process. The specific submittal requirements for each phase are outlined below.
 2. Drawings shall provide location and size, of underground sewer, storm, and potable water service.
 3. Drawings shall provide a schedule sheet for the following items:
 - a. Plumbing fixtures: i.e., water closets, floor drains, sinks, BFP, hose bibs, sump pumps, eyewashes, showers, etc.
 - b. Fixture unit riser stack calculations for each drainage system per UPC.
 4. Drawings shall provide isometric riser diagrams for the waste and vent systems per UPC.
 5. Drawings shall provide typical details for the following items:
 - a. Single pipe hanger with sizing schedule and anchor bolt data.
 - b. Multi-pipe trapeze hanger with sizing schedule and anchor bolt data.
 - c. Expansion joint and fire stop sealant assemblies for walls, floors, and ceiling penetrations.
 - d. Roof drainage assemblies, area drainage assemblies and overflow assemblies per the Roof and Waterproofing Standard of the NRCA and UBC Standard.
 - e. Backflow preventer assemblies per Duke University, NC Plumbing Code, and ASSE Standards.
 - f. Wall mounted trap primer assemblies per NC Plumbing Code.
 - g. Restroom fixture assemblies detail schedule.
3. General Design Considerations
- A. General:
1. Design shall be in accordance with applicable ASHRAE and ASPE handbooks.
 2. Maintenance shall be an important design consideration for all systems. Sectional valving shall be included, so that shutdown of parts of systems need not disrupt operation of entire building systems.
 3. Water and energy conservation shall be important design considerations for all systems. Review water conservation features with Duke Energy Management department.

4. Design parameters for equipment selection shall conform with ASHRAE, ASPE, and NC Plumbing Code.
 5. Water distribution velocities shall be selected for minimal noise levels while maintaining adequate flow.
 6. Careful attention shall be given to the prevention of water hammer in the design of water distribution systems. Devices used to limit water hammer such as shock arrestors shall be installed in areas accessible to maintenance personnel.
 7. Cleanout locations and access shall be selected for service accessibility, as well as to minimize disturbance of occupant functions and building systems operation during cleanout servicing. Refer to 22 11 18 Plumbing Piping for details on cleanout location and height.
 8. Routing of plumbing piping shall be planned such that pipe leakage would result in minimal damage to books, manuscripts, sensitive instruments and equipment, etc.
 9. Coordination: The University expects careful design coordination between plumbing, process piping, HVAC, electrical, and fire protection systems. Scaling of drawings shall be coordinated between major disciplines to facilitate plan checks by the overlay method.
 10. Provide floor drain (with trap and primer) in mechanical rooms, laundry rooms and other locations as required by Code.
 11. Roof vents: Minimize roof penetrations through use of manifold sewer system roof vents.
- B. Roof and Storm Drainage: Design criteria for storm drainage shall be carefully considered for each building to avoid flooding and related water damage. Roof and storm drains shall be designed for ease of maintenance.
- C. Sanitary Waste: Sanitary waste systems shall be designed to allow for future addition of laterals to accommodate twenty (20%) percent expansion of system capacity.
- D. Laboratory Waste
1. Laboratory waste systems shall be designed to allow for future addition of laterals to accommodate expansion of system capacity. Future capacity shall be as directed by the University Project Engineer.
 2. DUES and OESO will work with the Project Engineer and Design Consultants to establish design criteria for acid disposal.
 3. Laboratory waste systems shall be independent from sanitary waste system until point of exits from the building. Proper treatment required by DUES and OESO shall be obtained prior to tying into sanitary waste system.

E. Emergency Eyewash, Deluge Showers and Drench Hoses

1. Emergency Eyewash, Deluge Showers, and Drench hoses shall be provided in buildings as required by Duke OESO requirements.