Chapter 20
PLUMBING DRAWINGS

SECTION 2001 - GENERAL

2001.1 General: Plumbing Drawings shall delineate pipes, equipment, materials, components and accessories to convey liquids and gases, other than those used for HVAC systems (see Chapter 19 Mechanical Drawings) and for Fire suppression systems (see Chapter 21 Fire suppression Drawings). The drawings shall indicate complete design. Prior written acceptance is required for any design-build component. Section 1804 Flow Diagram Requirements and Section 1805 Drawings for Piping shall apply to the plumbing drawings as needed.

2001.2 Potable and Non-Potable Water:
   A. Potable domestic water is supplied by the City of Fort Collins Utilities Department.
   B. Irrigation and process cooling water is supplied by the CSU non-potable water system originating at College Lake.
   C. Some buildings (Chemistry Building) have components of older domestic water systems that have been downrated to non-potable status.

SECTION 2002 - SEQUENCE

2002.1 Plumbing Drawings are divided into specific groups. Drawings within a group are numbered consecutively, ie P2.01, P2.02, etc. The group designation shall always remain the same, regardless of the size or scope of the individual project. If specific projects do not include work related to a group, that group shall be eliminated from the drawings. When appropriate, the Consultant shall obtain written permission from the Project Manager to vary the sequence.

   P0.xx General Notes
   P1.xx Site Plan
   P2.xx Floor Plans
   P3.xx Riser Diagrams
   P4.xx Piping Flow Diagram
   P5.xx Details


SECTION 2003 – PLUMBING FLOW DIAGRAMS

2003.1 Plumbing flow diagrams shall illustrate the following:
   A. Plumbing waste and storm drainage systems.
   B. Plumbing hot and cold water supply systems.
   C. Process systems; chemical feed systems.
   D. Gas piping systems.
   E. Fuel systems.
   F. Automation and temperature controls for these systems.

SECTION 2004 – DRAWINGS FOR PLUMBING

2004.1 General: Plumbing drawings shall establish procedures for construction of the plumbing system design, including pertinent utility connections, fixtures, equipment and piping. The delineation for these
drawings shall incorporate dimensions, symbols, codes, conventions, schedules, diagrams, etc., in describing the plumbing system design.

A. Drawings shall be prepared showing routing of the conveyed fluid or gas piping. The preferred scale for arrangements is 1/4" = 1'-0" to aid in checking drawings and resolving potential interferences among other components, such as ductwork, electrical equipment, etc. The plumbing drawing shall be prepared to the same scale as the drawings of the other disciplines, where feasible.

B. Plumbing drawings shall include pipe sizes and routing, direction of flow, valves, service locations, schedules of fixtures, equipment and valves, invert elevations for gravity drainage piping, and locations for vent piping roof penetrations.

C. Materials for piping, insulation, valves, fixtures and equipment shall be covered in the technical specifications of Division 22.

D. An isometric diagram shall be provided for each piping system to five feet outside the building, with pertinent invert elevations indicated for gravity drainage.

E. The drawings for each plumbing system shall include Load Charts for fixtures and equipment.

2004.2 Domestic Water: Domestic water plumbing drawings delineate the components required to supply domestic hot and cold water to plumbing fixtures and then to remove this water after use through a sanitary drainage and vent system. A re-circulation hot water piping system may be required.

A. Pipe routing drawings and isometric diagrams shall be prepared for domestic cold, hot water, re-circulating hot water, sanitary drainage and vent piping systems.

B. Indicate locations of water meters, water heaters, valves, cleanouts and tie-in locations for connection to water and sanitary utility services. Include invert elevations.

C. Itemize all plumbing fixtures in a schedule(s) on the drawings. The schedule shall list the type of fixture, water usage rate and connection sizes of hot, cold, sanitary and vent piping. Water heaters may be scheduled in cases where several are required.

D. Automatic (infra-red) lavatory valve operators and flush valves shall be coordinated with the electrical engineer and shown on the plumbing drawings.

2004.2 Non-Potable Water: Non-potable water systems shall be delineated separately from potable systems to avoid confusion and potential cross-connection.

2004.3 Storm Water (Roof Drains): Roof drain plumbing plans shall be coordinated with architectural roof taper plans. Discharge locations shall be coordinated with landscape plans and paving plans.

2004.4 Gray Water: Gray water recycling has experimental status. It requires special review and authorization before proceeding beyond the conceptual phase.

2004.5 Deionized Water: Standalone systems at point of use are preferred. Central building systems must be recirculated back to source and have no dead legs.

2004.6 Chilled Water

A. Provide building cooling system schematic sheet, showing all equipment, coils, isolation valves, control valves, pumps, VFD’s, meters, temperature sensors, and accessories.
B. Provide a separate schematic for significant cooling sub-systems, for example, a process cooling loop serving lab equipment.

C. Provide a schedule listing all of the design cooling loads in the building, by equipment, and a tallied design load for the building as a whole, including any assumed method for load diversity, if used.

2004.7 Natural Gas and Fuel

A. Provide a schedule listing all of the design gas loads in the building, by equipment, and a tallied design load for the building as a whole, including any assumed method for load diversity, if used.

B. Concealed gas or fuel pipe shall be Schedule 40 black iron with no concealed mechanical connections.

2004.8 Steam

A. Provide building steam and heating system schematic sheet, including all equipment, coils, isolation valves, control valves, pumps, VFD’s, meters, temperature sensors, and accessories for both the steam and hydronic portions of the system.

B. Provide a separate schematic for significant steam or heating sub-systems, for example, a process steam distribution which supplies lab autoclave equipment.

C. Provide schedule listing all of the design heating and process loads in the building, by equipment, and a tallied design load for the building as a whole, including any assumed method for load diversity, if used.

2004.9 Compressed Air and Specialty Gases:

SECTION 2005 – PLUMBING DESIGN

2005.1 General: Prior to commencing design, the Consultant shall study and be familiar with the CSU Construction Standards, Part III, Divisions 20 General Mechanical, 21 Plumbing, 22 Fire Suppression, 23 HVAC and 33 Utilities, along with all other parts of the CSU Construction Standards (Administrative, Design and Construction Standards), current edition, as posted on the Facilities Management website.

END OF CHAPTER 20