1. This information provides guidelines for the design and construction of plumbing systems within buildings. Additional requirements for heating, ventilating and air conditioning systems (HVAC), fire sprinkler systems, steam distribution systems, natural gas distribution systems, and other fuel systems, civil site utilities (water, sanitary, storm, irrigation) and temporary facilities and controls are covered in other parts of these standards, or are available from the Facilities Management project representative.

2. Facilities Management project representative, Facilities Maintenance, Public Safety Office and Environmental Health and Safety Office, shall approve selection of materials, means and methods. Unless otherwise approved, the design intent requires means and methods that provide minimal disruption to adjacent building activities and operations.

3. When working in or adjacent to occupied buildings, require means and methods that protect occupants from exposure to noise, dust, traffic and other hazards.

4. Facilities Management project representative shall inform Facilities Maintenance and other campus departments or groups affected by the work.

5. General:
   a. Stop valves: Provide in the water connections to each fixture in accessible locations. Utilize washerless ¼ turn stops with handle. Prefer threaded connections. Minimize compression fittings.
   b. Escutcheons: Provide at each wall, floor and ceiling penetration in exposed finish locations and within cabinets and millwork. Escutcheons shall be chrome plated metal only. Prohibit plastic escutcheons.
   c. Floor drains: Provide in all mechanical rooms, baths, toilet rooms, kitchens, laundry rooms, shower drying areas, swimming areas, whirlpool rooms, saunas and service sink closets with wall mounted sink.
   d. Trap primers: Require readily accessible trap primers for floor drains in mechanical rooms and unoccupied spaces. Prefer Jay R. Smith Prime-Eze Water Saver Trap Primer Model 2698 or approved equal. Prohibit PPP automatic metering trap primers.
   e. Trap primers are not required in rooms that will be cleaned regularly such as toilet rooms, shower rooms, etc. Consider specifying and/or detailing a deeper trap where trap primer is not provided to lengthen the evaporation time. Confirm cleaning schedule and use of water with the FM project representative/custodial department responsible for cleaning the area.
   f. Hose bibbs: Require within 25’ ft (8.3 m) of service entrances, in mechanical rooms over 400 sq. ft. (40 sq m), in all restrooms and on exterior of buildings at a maximum of 100 feet (30m) intervals. Interior hose bibbs shall have lockable vandal proof valve stems. Include atmosphere vacuum breakers (removable and repairable) and separate isolation valve for each. Require all exterior hose bibbs to be freeze proof.
   g. Shut-off and drain valves: Required at the bottom of all risers so that branches may be isolated for repairs without draining down the complete system. Require labeled access doors for all shut off and drain valves.

6. The following information should be shown on drawings:
   a. Configuration and sizes for all piping systems.
   b. Whether piping is run above or below ground, floors, ceilings, and concealed or exposed. Show how piping is supported and show direction of slope.

c. Locations of shut-off ball valves (clearly labeled) for each restroom, each floor and each piece of equipment. Show drain valves after shutoffs.
d. Locations and sizes of access panels to each valve, cleanout, etc.
e. Location and type of each plumbing fixture.
f. Details for attaching wall-hung fixtures to walls.
g. Locations, sizes and types of cleanouts in building, in crawl spaces or exterior of buildings.
h. Location of acid-resistant DWV piping, cleanouts, traps, drains and accessories.
i. Locations, sizes, and typical details for trap primers. Show access doors.
j. Typical detail sections through roof drain, floor drain, floor sink and individual source grease trap.
k. Detail sections through exterior grease interceptors.
l. Location and size of water hammer arresters or air chambers.
m. Capacity, size, by-pass valves and piping for water meters and detail of water meter box.
n. Detail of building domestic water main service entrance piping – backflow preventer (show adequate access, elevation, anchors), bypass, strainer with gauges on inlet and outlet, (with blow-off outlet, pipe nipple, and ball valve) in water supply to each building.

7. Require appropriate testing and flushing of system. See “Testing Adjusting and Balancing” standard.

8. Require appropriate insulation for piping. See ”Mechanical Insulation” standard.

9. Require appropriate hangers per UPC/ASTM. Size appropriately to accommodate insulation. Provide stainless steel hangers for below grade piping supported from structural slabs.

10. Require hot and cold water supply within laboratory buildings and laboratory rooms to be piped separately from the domestic water supply. Isolate systems with backflow device.

11. Require recirculation for domestic hot water and laboratory water with no deadends.

12. Plumbing fixtures:
    a. Vitreous china fixtures: Kohler or approved equal.
    b. Stainless steel countertop kitchen sinks: Elkay or approved equal.
    c. Lab, kitchen dining hall and janitor sink faucets: Chicago or approved equal.
    d. Shower, lavatory and kitchen sinks: Delta faucets or approved equal.
    e. Flushometers: Sloan Royal. Prefer wall mounted water closets and urinals with manually operated flushometers. Avoid tank type water closets.
    f. Urinals: Avoid waterless urinals.
    g. Hands-free fixtures: Avoid hands free fixtures.
    h. Automatic shutoff lavatory faucets: Prohibit automatic shutoff lavatory faucets.
    i. Porcelain cast iron sinks, tubs, etc: Prefer Kohler.
    j. Lavatory widespread faucets: Prefer Chicago, Wolverine or approved equal. Provide grate style drains at public restrooms. Within University Residences prefer non-widespread faucets with pop-up style drains.
    k. Drinking fountains: Prefer Kohler or Elkay.
    l. Service Sinks: Require mop sink type only. Avoid wall mounted type. Trap primer typically not required.
    m. Service sink faucets: Require integral check valve, stops and vacuum breaker to prevent backflow when hose is attached.
    n. Emergency shower and eyewash:
        i. Acceptable manufacturer: Hawes or approved substitute.

ii. Require emergency shower and eyewash or emergency eyewash in all laboratories, shops and workrooms using chemical or hazardous materials. Comply with latest WISHA/OSHA rules.
iii. Require tempered water 60-85 deg F (15-29 deg C) wherever feasible.

13. Pipe and fittings: See "Basic Mechanical Methods and Materials."

14. Backflow preventer:
    a. Design and install in accordance with local and State codes.
    b. Require for domestic, building fire, lawn hydrant and irrigation, lab water, mechanical heating and cooling water makeup systems.
    c. All backflow preventer installations are to have a strainer upstream of inlet.
    d. Require double detector check (DDC) backflow with bypass meter on fire mains.
    e. Require water lines to be flushed prior to backflow preventer installation.
    f. Require redundancy to allow shut down during required annual testing.
    g. Size relief drains for maximum flow and pipe relief to nearby drain per local and State code.
    h. Acceptable manufacturer: Wilkins/Zurn Industries, low pressure drop type. Coordinate any special conditions, or alternate product requirements with WWU project manager & WWU plumbing shop prior to bidding.

15. Water meters:
    a. Require for all building water supply.
    b. Provide separate flow meters for heating and chilled water makeup and irrigation systems to allow separate billing for these systems.
    c. Flow meters shall read in gallons.
    d. Acceptable manufacturer: Hayes, Zurn or approved equal.

16. Domestic water heater:
    a. Require semi-instantaneous unit utilizing low pressure steam as the heating source.
    b. Design for minimum working pressure of 150 psig (1034kPa).
    c. Provide expansion tanks with water heater installations where required.
    d. Require ASME rated and National Board stamped.
    e. Provide seismically restrained support.
    f. Acceptable manufacturers: AERCO or Armstrong.
    g. Provide ASME rated pressure and temperature relief valves, inlet and outlet thermometers, pressure gages upstream and downstream of the control valve, bronze body circulating pump, control valve, storage/accumulator tank and all auxiliaries necessary to compose a complete working unit.
    h. Provide control diagram and sequence of operation to be compatible with the University's BAC system.
    i. Provide approved anti-scald temperature level/alarm systems in University Residence environment or academic buildings with shower/bath.

17. Exterior grease interceptors:
    a. This standard does not apply to interior in-floor kitchen grease traps which shall be limited to serving a single source fixture.
    b. Comply with City of Bellingham requirements for design of interceptor.
    c. Require witness tests for water tightness and hydrostatic testing.
    d. Require readily accessible concrete interceptor located on the exterior of the building for commercial kitchen and dining facilities. Prohibit masonry, polyethylene or fiberglass construction.

e. Tank construction shall be water tight. Manhole cover shall be gas tight and shall be sized greater than 30" (750mm) diameter.
f. Require minimum 1000 gallon capacity. Do not oversize. Provide calculations utilizing University historical data for sizing and emptying schedule.
g. Require cleanouts in inlet and outlet piping.
h. Coordinate the need for system additives with the Facilities Management project representative, Environmental Health and Safety, and the City of Bellingham.
i. Require discharge piping from exterior grease interceptors to be piped to an exterior sanitary system. Evaluate the condition (air tight) and capacity (surge volume) of downstream sanitary system accepting discharge from interceptor Prefer all discharge connection direct to manholes. Prohibit reconnection of discharge piping to the interior building sanitary system.
j. Comply with City of Bellingham requirements for venting to minimize odors. Prohibit reconnection of vent piping to interior building vent system.
k. Minimize odors and spills which may generate health and safety complaints.
l. Require concrete pad for pumper truck with lined spill containment. Require appropriate traffic loading design (fire lanes or parking lots). Pumper truck pad shall be located within 50’ of the grease intercepter.
m. Require a freeze-proof hose bibb, electrical power connection, adequate lighting (appropriately classified) and safety signage to facilitate maintenance.

End