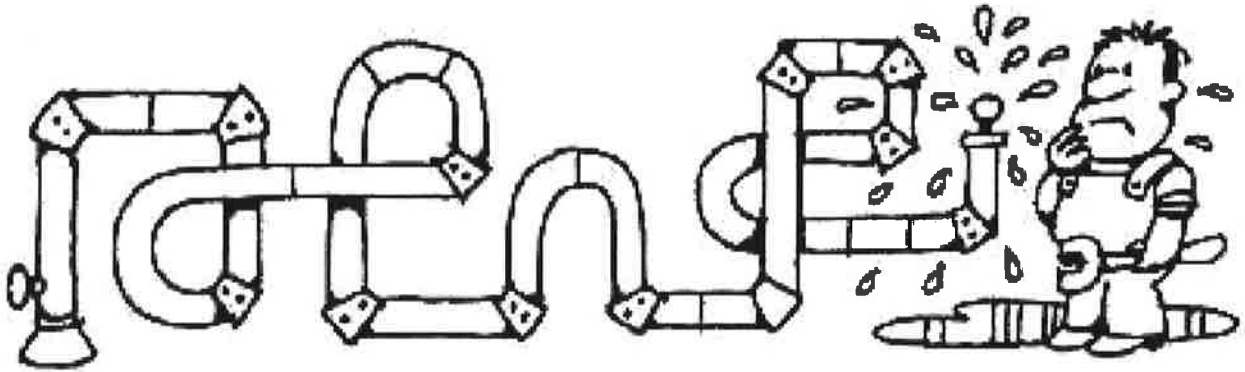


PLUMBING FOR HOME OWNERS

The intent of this handout, is to familiarize the home owner or plumber installing plumbing, with some of the basic theory of household plumbing, along with the Washington State and Uniform Plumbing Code requirements. This handout covers only a small part of the requirements for household plumbing, and is subject to possible misunderstanding or confusion. Please feel free to have the plumbing inspector check your plumbing and/or venting prior to gluing fittings. It may save you a lot of time and money.



If your property is located in the National Scenic Area, the Columbia River Gorge Commission requires you to comply with all National Scenic Area regulations. They can be contacted at (509) 493-3323.

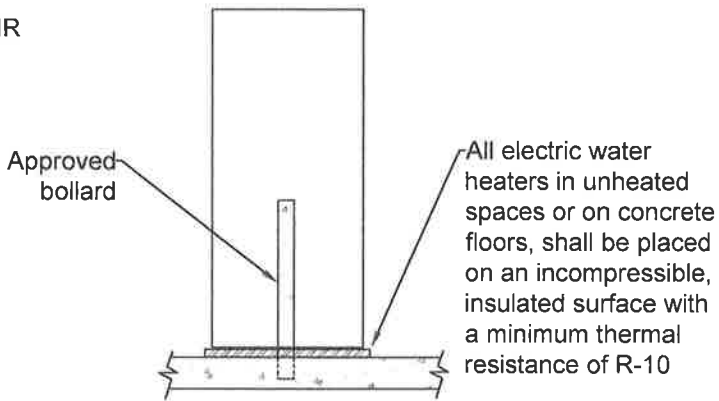
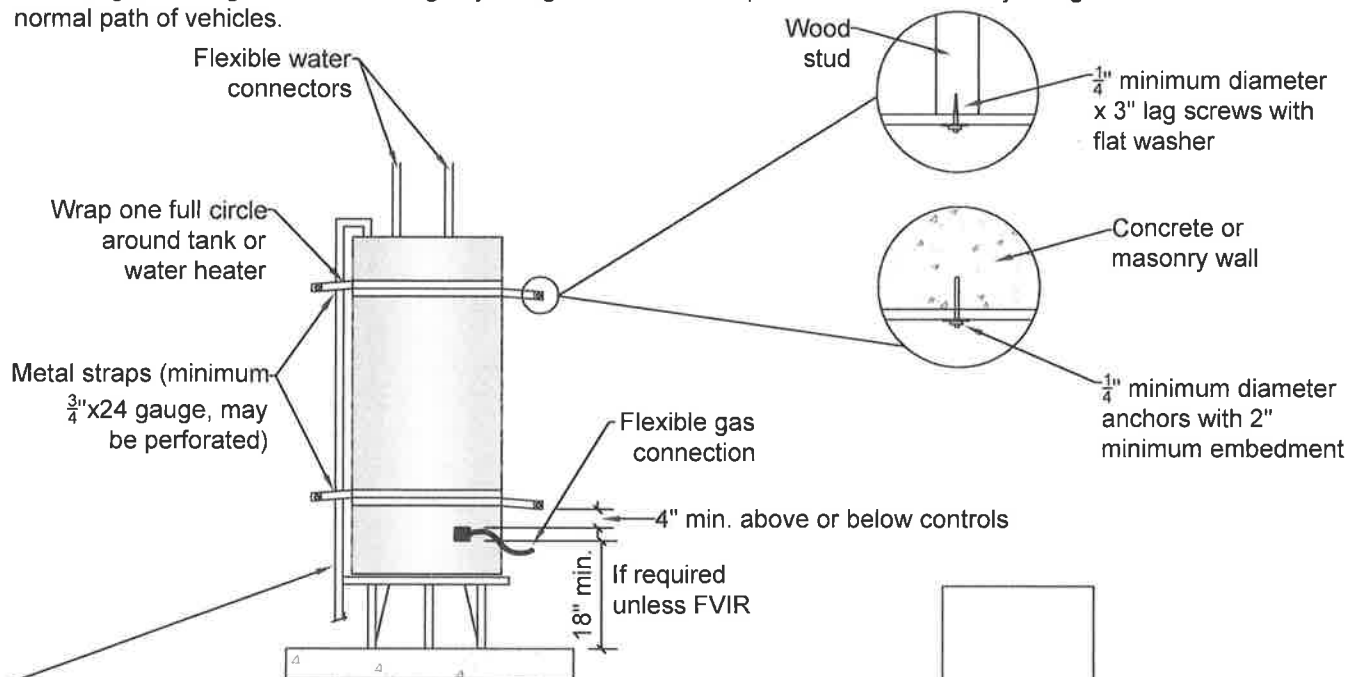
SIZING AND PROTECTION OF WATER HEATERS

2015 Uniform Plumbing Code

507.2 Water heaters shall be anchored or strapped to resist horizontal displacement due to earthquake motion. Strapping shall be at points within the upper one-third and lower one-third of its vertical dimensions. At the lower point, a distance of not less than 4 inches shall be maintained from the controls with the strapping.

507.13 Installation in Garages. Appliances in garages and in adjacent spaces that open to the garage and are not part of the living space of a dwelling unit shall be installed so that burners, burner-ignition devices and ignition sources are located not less than 18 inches above the floor **unless listed as flammable vapor ignition resistant (FVIR).**

507.13.1 Physical Damage. Appliances installed in garages, warehouses, or other areas subject to mechanical damage shall be guarded against such damage by being installed behind protective barriers or by being elevated or located out of normal path of vehicles.



608.5 The discharge piping serving a temperature relief valve, pressure relief valve, or combination of both shall have no valves, obstructions, or means of isolation and be provided with the following: 1) Equal to the size of the valve outlet and shall discharge full size to the flood level of the area receiving the discharge and pointing down. 2) Materials shall be rated at not less than the operating temperature of the system and approved for such use. 3) Discharge pipe shall discharge independently by gravity through an air gap into the drainage system or outside of the building with the end of the pipe not exceeding 2' and not less than 6" above the ground and pointing downwards. 4) Discharge in such a manner that does not cause personal injury or structural damage. 5) No part of such discharge pipe shall be trapped or subject to freezing. 6) The terminal end of the pipe shall not be threaded. 7) Discharge from a relief valve into a water heater pan shall be prohibited. **Exception:** Where no drain was provided, replacement heating equipment shall only be required to provide a drain pointing downward from the relief valve to extend between 2' and 6" from the floor. No additional floor drain need be provided.

Sizing
Table 501.1^{1,3}

| | | | | | | | | | | | |
|--|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Number of Bathrooms | 1 - 1.5 | 1 - 1.5 | 1 - 1.5 | 2 - 2.5 | 2 - 2.5 | 2 - 2.5 | 2 - 2.5 | 3 - 3.5 | 3 - 3.5 | 3 - 3.5 | 3 - 3.5 |
| Number of Bedrooms | 1 | 2 | 3 | 2 | 3 | 4 | 5 | 3 | 4 | 5 | 6 |
| First Hour Rating ² , Gallons | 42 | 54 | 54 | 54 | 67 | 67 | 80 | 67 | 80 | 80 | 80 |

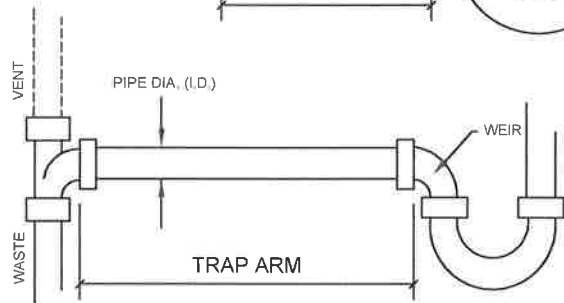
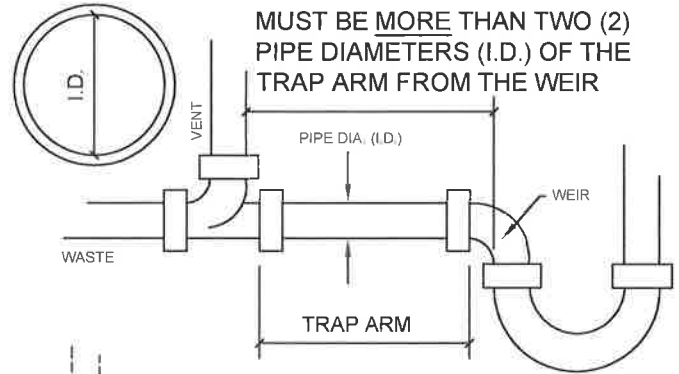
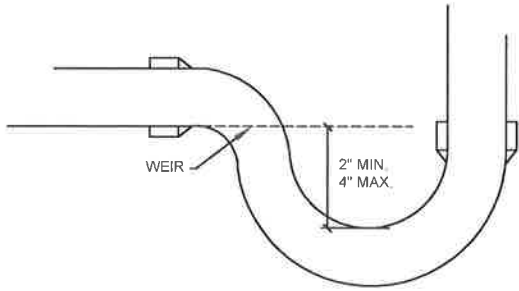
Notes:

1. The first hour rating is found on the "Energy Guide" label.
2. Non-storage and solar water heaters shall be sized to meet the appropriate first hour rating as shown in the table.
3. For replacement water heaters, see Section 102.4

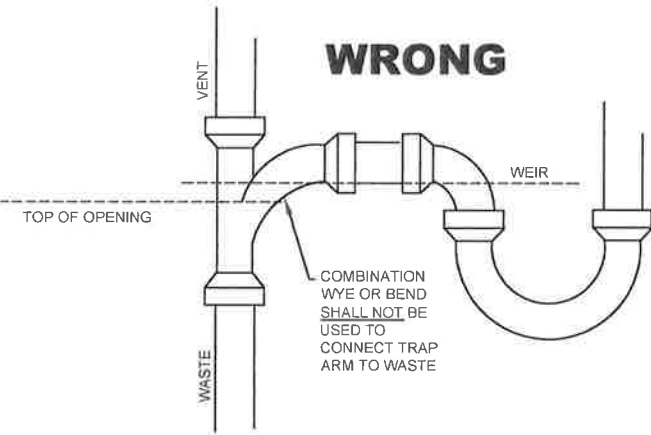
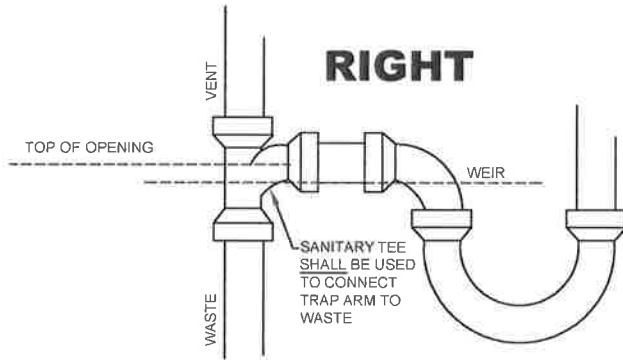
P-TRAPS

All piping shall be protected in an approved manner.

NOTE: No form of trap that depends for its seal upon the action of movable parts shall be used.



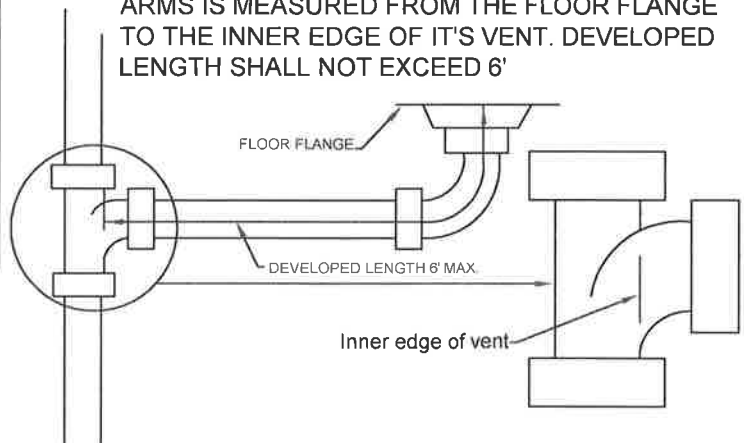
The weir of a p-trap must be below the top of the opening in the fitting that connects it to its vent.



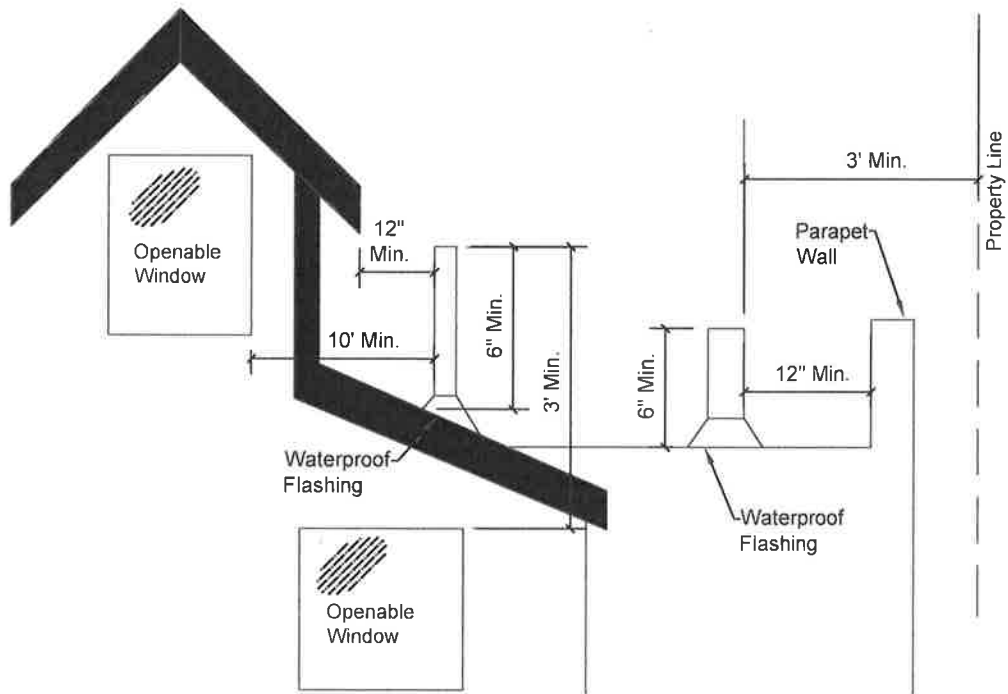
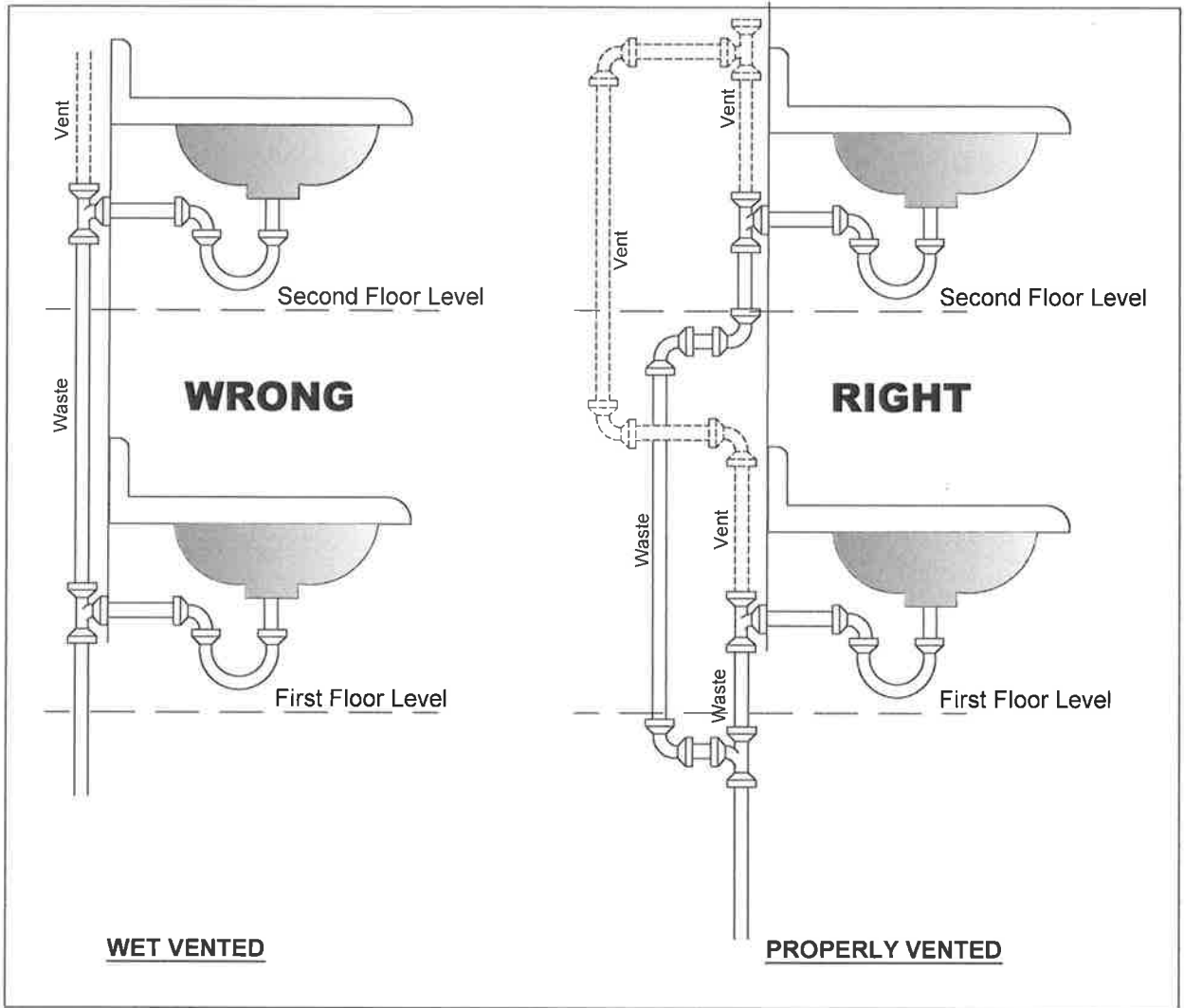
HORIZONTAL LENGTH OF TRAP ARMS (Except for water closets and similar fixtures)*

| Trap Arm Pipe Size (I.D.) | Distance Trap to Vent | |
|------------------------------|--------------------------|--------------|
| | Max. | Min. |
| 1 1/4" | 2'-6" | 2 1/2" |
| 1 1/2" | 3'-6" | 3" |
| 2" | 5' | 4" |
| 3" | 6' | 6" |
| 4" | 10' | 8" |
| >4" | 10' | .2x diameter |

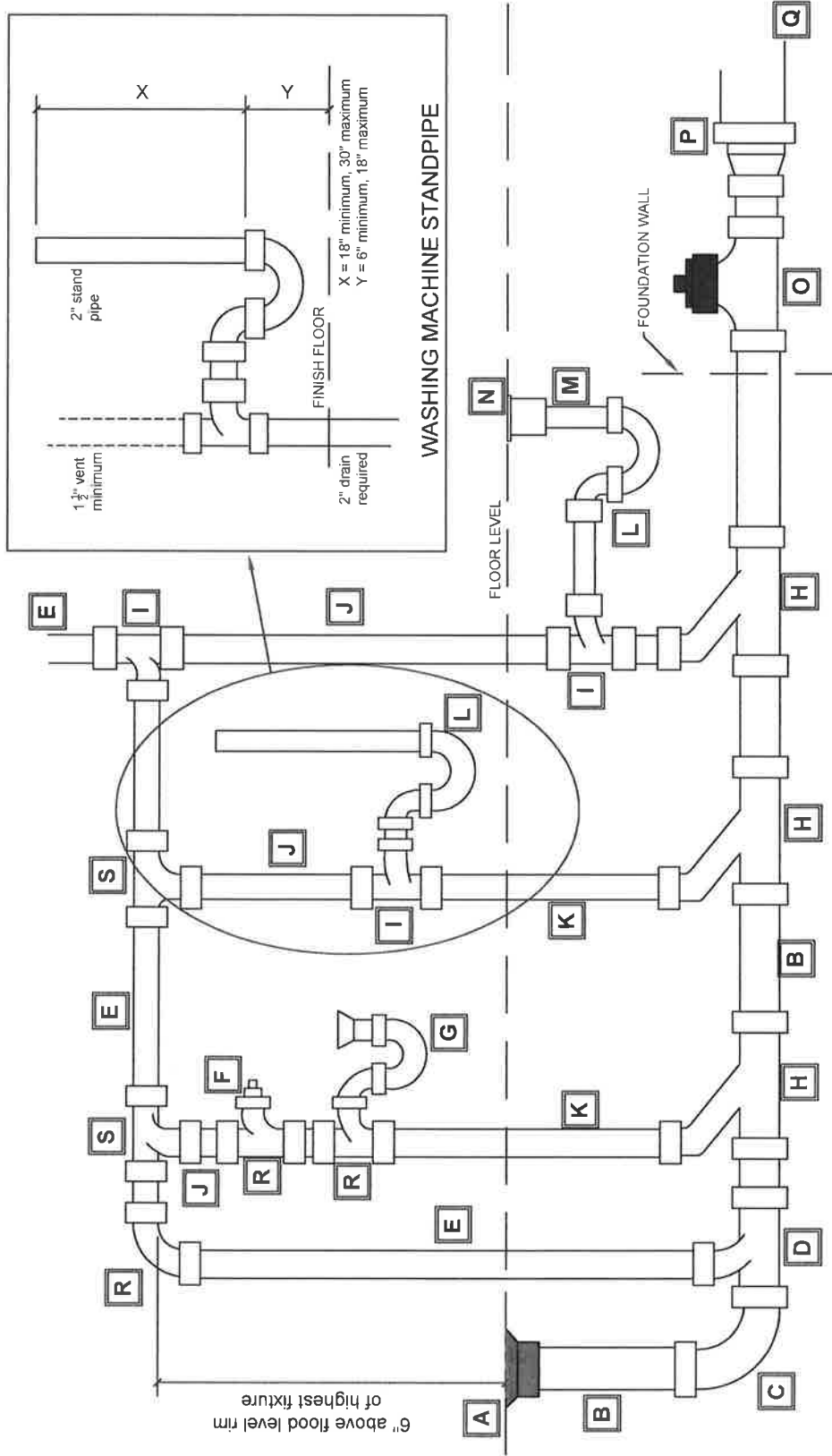
* THE LENGTH OF WATER CLOSET (TOILET) TRAP ARMS IS MEASURED FROM THE FLOOR FLANGE TO THE INNER EDGE OF IT'S VENT. DEVELOPED LENGTH SHALL NOT EXCEED 6'



NOTE: Floor drains or similar traps directly connected to the drainage system and subject to infrequent use shall be protected with a trap seal primer.



Vent Clearances



- A. 3" closet flange (toilet)
- B. 3" drain
- C. 3" bend
- D. 3" x 3" x 2" san-T
- E. 2" vent
- F. 1 1/2" cleanout
- G. 1 1/2" P-trap
- H. 3" x 3" x 2" combination wye and 1/8 bend
- I. 2" san-T
- J. 1 1/2" vent

- K. 2" drain for kitchen sinks, 1 1/2" drain for lavatory
- L. 2" P-trap for showers & laundry, 1 1/2" P-traps for bath tubs & sinks
- M. 2" drain
- N. 2" shower drain with strainer
- O. 3" two way clean-out tee
- P. 3" to 4" adapter (if needed)
- Q. 3" or 4" drain line to sewer or septic tank
- R. 1 1/2" san-T
- S. 2" x 2" x 1 1/2" san-T

The aggregate cross-sectional area of the vents that extend through the roof to the atmosphere shall not be less than that of the largest drain pipe within the structure.

NOTE: Different suppliers use different names for their parts.

The aggregate cross-sectional area of the vents that extend through the roof to the atmosphere shall not be less than that of the largest drain pipe within the structure

All traps shall be the same size as the trap arm to which it is connected

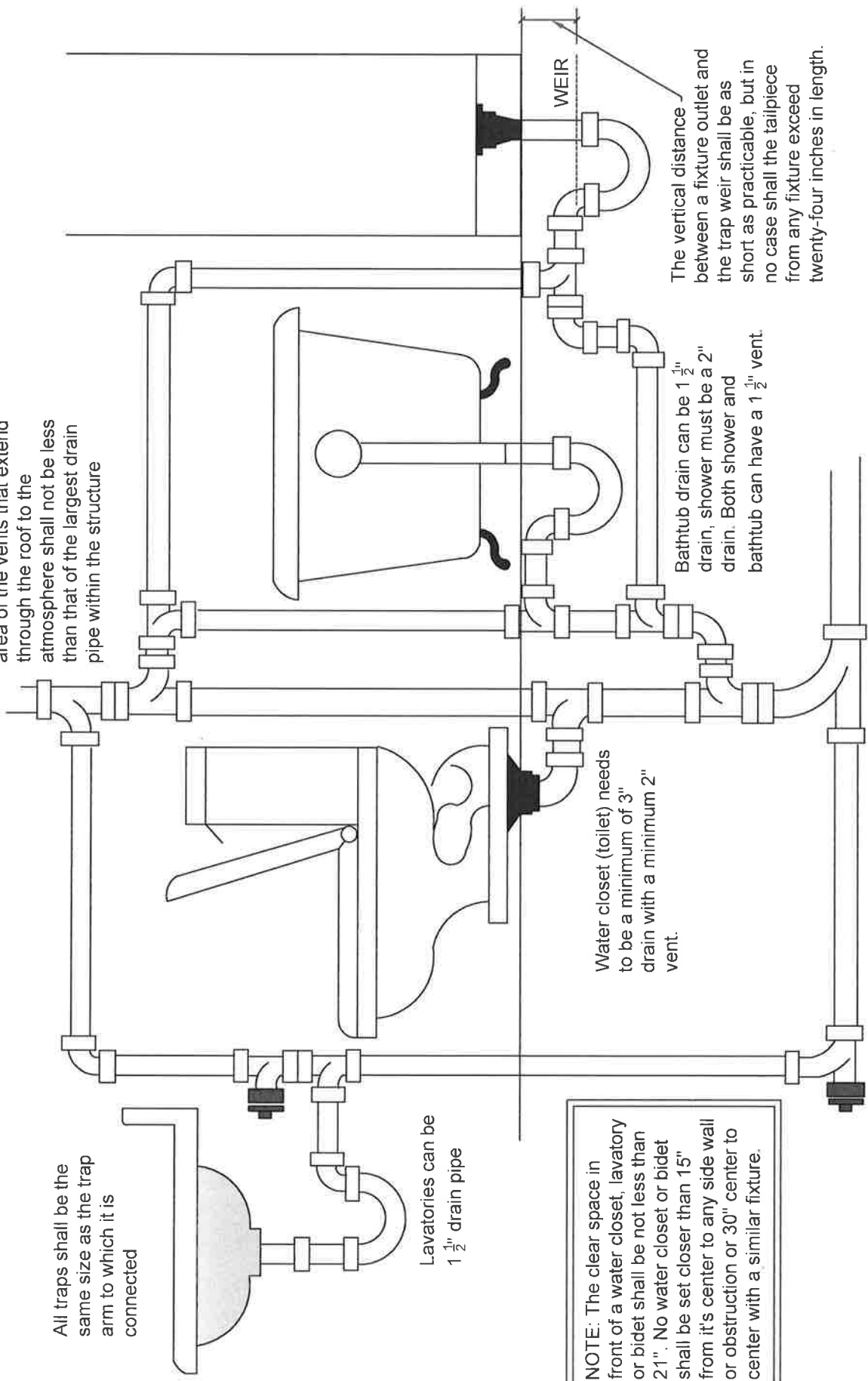
Lavatories can be 1 1/2" drain pipe

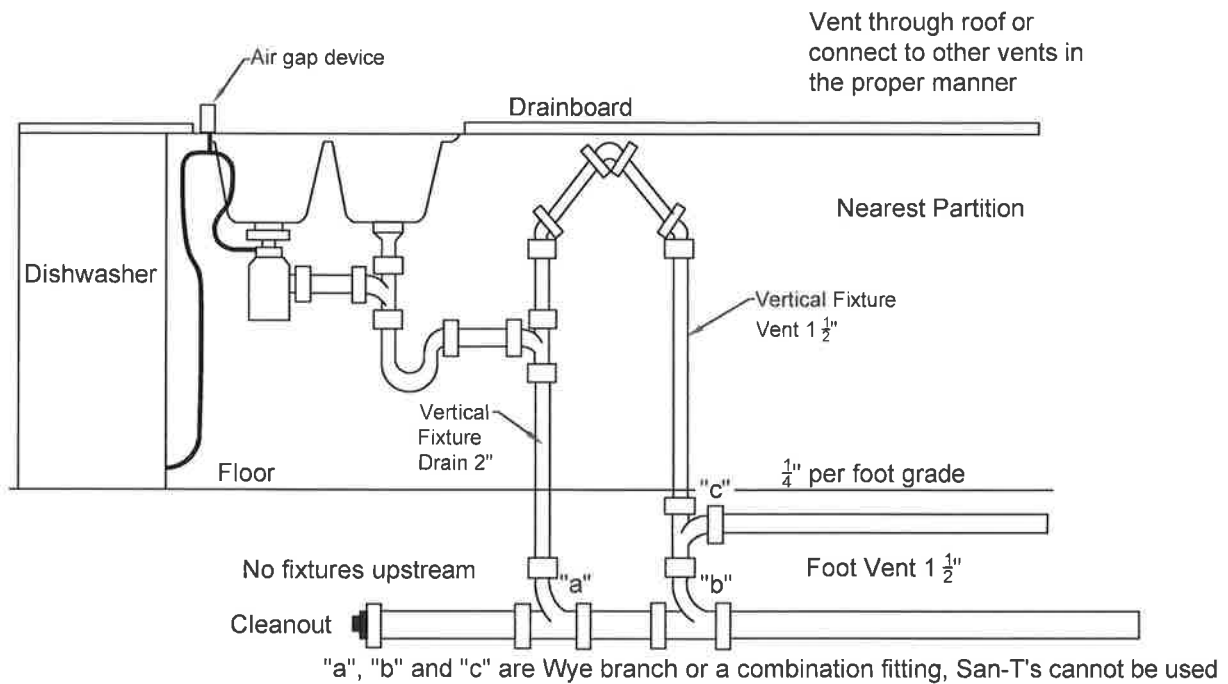
NOTE: The clear space in front of a water closet, lavatory or bidet shall be not less than 21". No water closet or bidet shall be set closer than 15" from its center to any side wall or obstruction or 30" center to center with a similar fixture.

Water closet (toilet) needs to be a minimum of 3" drain with a minimum 2" vent.

Bathtub drain can be 1 1/2" drain, shower must be a 2" drain. Both shower and bathtub can have a 1 1/2" vent.

The vertical distance between a fixture outlet and the trap weir shall be as short as practicable, but in no case shall the tailpiece from any fixture exceed twenty-four inches in length.





SPECIAL VENTING FOR ISLAND FIXTURES

Traps for island sinks and similar equipment shall be roughed-in above the floor and may be vented by extending the vent as high as possible, but not less than drain board height. The vent is then returned downward and connected to the horizontal sink drain immediately downstream from the vertical fixture drain.

The returned vent shall be connected to the horizontal drain through a wye-branch fitting (see "b" in figure above) and shall in addition be provided with a foot vent taken off the vertical fixture vent by means of a wye-branch fitting immediately below the floor. This foot vent extends to the nearest partition and thence through the roof to the open air, or may be connected to the other vents at a point not less than six (6) inches above flood level rim of the fixture served.

DOMESTIC DISHWASHING MACHINE

Domestic dishwashing machines shall discharge indirectly through an air gap fitting in accordance with Section 807.4* into a waste receptor, a wye branch fitting on the tailpiece of a kitchen sink, or dishwasher connection of a food waste disposer. 807.3* No domestic dishwashing machine shall be directly connected to a drainage system or food waste disposer without the use of an approved dishwasher air gap fitting on the discharge side of the dishwashing machine. Listed air gaps shall be installed with the flood-level (FL) marking at or above the flood level of the sink or drain board, whichever is higher.

WATER SUPPLY

Water Distribution (within the building)

1. Water pipe and fittings shall be of brass, copper, cast iron, galvanized malleable iron, galvanized wrought iron, galvanized steel, or other approved materials. CPVC and PB water pipe and tubing may be used for hot and cold water distribution systems within a building. All materials used in the water supply system, except valves and similar devices shall be of a like material, except where otherwise approved by the Administrative Authority.
2. **Do not use PVC water pipe for water supply inside the structure.** Supply piping shall convert to the proper approved piping before entering any part of the building. Plastic water service piping may terminate within a building, provided the connection to the potable water distribution system shall be made as near as is practical to the point of entry and shall be accessible. Barbed insert fittings with hose clamps are prohibited as a transition fitting within the building.
3. Piping and tubing which has previously been used for any purpose other than for potable water systems shall not be used.

Valves

1. **A fullway valve controlling all outlets** shall be installed on the **discharge side of each water meter and on each unmetered water supply.** (The valve on the meter will not fulfill this requirement).
2. A fullway valve shall be installed on the cold water supply pipe to each water heater at or near the water heater and shall be accessible.
3. A control valve shall be installed immediately ahead of each water supplied appliance and immediately ahead of each slip joint or appliance supply. Parallel water distribution systems shall provide a control valve either immediately ahead of each fixture being supplied or installed at the manifold, and shall be identified with the fixture being supplied. Where parallel water distribution system manifolds are located in attics, crawl spaces, or other locations not readily accessible, a separate shutoff valve shall be required immediately ahead of each individual fixture or appliance served.

Backflow Prevention

Potable water outlets with hose attachments, other than water heater drains, boiler drains, and clothes washer connections, shall be protected by a non-removable hose-bibb-type vacuum breaker, or by an atmospheric vacuum breaker, installed not less than six inches above the highest point of usage located on the discharge side of the last valve. In climates where freezing temperatures occur, a listed self-draining frost-proof hose bibb with an integral backflow preventer or vacuum breaker shall be used.

Unions

1. Unions shall be installed in the water supply piping within twelve (12) inches of regulating equipment, water heating, conditioning tanks, and similar equipment which may require service by removal or replacement in a manner which will facilitate its ready removal.

Inspections

1. No water supply system or portion thereof shall be covered or concealed until it first has been tested, inspected and approved by the inspector.

Testing

1. Upon completion of the entire hot and cold water supply system, it shall be tested and proven tight under a water pressure not less than the working pressure under which it is to be used. The water used for tests shall be obtained from a potable water source. Fifty (50) psi air pressure may be substituted for the water test in the supply piping using an approved air gauge. In either method of testing, the piping shall withstand the test without leaking for a period of not less than fifteen (15) minutes. The test shall be verified by the inspector. Radiant heating piping shall be tested at 100 psi.

Cover depth

Building supply yard piping shall be not less than twelve (12) inches below the average local frost depth (18" in Klickitat County) (30" minimum). The cover shall be not less than twelve (12) inches below finish grade.

SANITARY DRAINAGE

Drainage Piping

Materials for drainage piping shall be in accordance with one of the referenced standards in Table 701.2 except that:

1. No galvanized wrought-iron or galvanized steel pipe shall be used underground and shall be kept not less than 6" above ground.
2. ABS and PVC DWV piping installations shall be installed in accordance with applicable standards in Table 1701.1.
3. No vitrified clay pipe or fittings shall be used above ground or where pressurized by a pump or ejector. They shall be kept not less than 12" below ground.
4. Copper tube for drainage and vent piping shall have a weight of not less than that of copper drainage tube type DWV.
5. Stainless steel 304 pipe and fittings shall not be installed underground and shall be kept not less than 6" above ground.
6. Cast-iron soil pipe and fittings shall be listed and tested in accordance with standards referenced in Table 1701.1. Such pipe and fittings shall be marked with country of origin and identification of the original manufacturer in addition to markings required by referenced standards.

Inspections

No Drain Waste and Vent system shall be covered or concealed until it first has been tested, inspected and approved by the inspector.

Testing

Upon completion of the entire Drain Waste and Vent system, it shall be tested and proven tight by filling with water. Vent pipes shall be tested with 10' of head. The piping shall withstand the test without leaking for a period of not less than 15 minutes.

Cover Depth

Drainage piping shall not be less than 1' below the surface of the ground.

Location of Cleanouts

Each horizontal drainage pipe shall be provided with a cleanout at its upper terminal, and each run of piping that is more than 100' in total developed length, shall be provided with a cleanout for each 100', or fraction thereof, in length of such piping. An additional cleanout shall be provided in a drainage line for each aggregate horizontal change of direction exceeding 135 degrees.

Exceptions:

1. Cleanouts shall be permitted to be omitted on a horizontal drain line less than 5' in length unless such line is serving sinks or urinals.
2. Cleanouts shall be permitted to be omitted on a horizontal drainage pipe installed on a slope of 72 degrees or less from the vertical angle.
3. Except for the building drain, its horizontal branches, and urinals, a cleanout shall not be required on a pipe or piping that is above the floor level of the lowest floor of the building.
4. An approved type of two-way cleanout fitting, installed inside the building wall near the connection between the building drain and the building sewer or installed outside of a building at the lower end of a building drain and extended to grade, shall be permitted to be substituted for an upper terminal cleanout.

Clearance at Cleanouts

Each cleanout in piping 2" or less in size shall be so installed that there is a clearance of not less than 12" in front of the cleanout. Cleanouts in piping exceeding 2" shall have a clearance of not less than 18" in front of the cleanout. Cleanouts in under-floor piping shall be extended to or above the finished floor or shall be extended outside the building where there is less than 18" vertical overall, allowing for obstructions such as ducts, beams and piping, and 30" of horizontal clearance from the means of access to such cleanout. No under-floor cleanout shall be located exceeding 20' from an access door, trap door or crawl hole.

NOTE:
No piping shall be directly embedded in concrete.
Sleeve or protect by similar approved method.

