

2.0 DESIGN CRITERIA FOR POTABLE WATER DISTRIBUTION SYSTEMS

Potable water system improvements proposed for inclusion into the Department's service area shall be designed in accordance with all appropriate Department, California Department of Public Health (CDPH), and American Water Works Association (AWWA) standards and the following criteria.

2.01 SYSTEM DEMAND CRITERIA

The Department's staff reserves the right to determine criteria for each potable water system based upon conditions that may exist for that particular location, anticipated level of development, planned use or other criteria. In general, however, potable water pipelines and appurtenance shall be sized to handle the highest demand on the system within the sphere of influence.

Residential Demand

UNDER CONSTRUCTION

Fire Flow Demand

The following are requirements to determine the Q_{FF} (GPM) (fire flow demand) on the system.

1. Fire Flow Test Results (requires testing existing hydrants)
2. Fire Flow Demand for sprinkler systems;
3. Fire Flow requirements as obtained from the Fire Protection Agency having jurisdiction (City of Long Beach/ Division of State Architect/ State Fire Marshall)

Commercial/Institutional/Industrial Demand

Commercial/Institutional/Industrial development requirements shall be analyzed separately on a case-by-case basis. Please contact the Department for further information regarding the required water demands.

2.02 SYSTEM ANALYSIS

UNDER CONSTRUCTION

2.03 POTABLE WATER PIPELINE SIZING CRITERIA

Minimum size potable water pipeline is 6-inch inner diameter (I.D.) (excluding service lines).

The following table is the maximum allowable headloss within the pipeline for design.

Maximum Allowable Headloss

Design Flow	Headloss (feet/ 1000 feet)
$Q_M + Q_{FF}$ (GPM)	5
Q_P (GPH)	3.5

Q_M = Maximum Daily Demand (GPM)

Q_{FF} = Fire Flow Demand (GPM)

Q_P = Peak Hour Demand (GPH)

For all cases, pipeline velocities are not to exceed 8 feet per second.

Hazen-Williams Coefficient

The pipelines shall be designed using the following Hazen-Williams Coefficients:

Hazen-Williams Coefficients

Pipeline Material	Coefficient
Ductile Iron Pipe (Cement Mortar Lined)	120
Cement Mortar Lined Steel Pipe	120

Potable water system pressures are expected to range from 35 to 70 psi during normal operations. Contact LBWD for further information should the calculated design pressure fall below 35 psi using the design criteria above.

Fire hydrants are to have 20 psi minimum residual pressure at their design capacities during a fire flow event.

The Department's staff reserves the right to specify sizing of any potable water pipeline.

2.04 POTABLE WATER PIPELINE LOCATION

Unless otherwise approved by Department staff, all potable water pipelines shall be located a minimum of 5 feet from curb face. Location shall not interfere with other existing utilities.

The cover over the potable water pipelines shall be sufficient to provide protection of the potable water pipeline and for operation of the appurtenances. The depth shall be a minimum 45 inches and a maximum of 72 inches from the top of the pipeline to the finished surface. The Department's staff may increase or decrease this required depth as necessary to cover non-standard conditions.

Potable water pipelines to all service areas shall be looped to provide dual direction supply and system flexibility. Dead end mains are undesirable, but can be considered on a case-by-case basis.

2.05 Separation Criteria

Potable water pipeline shall be in accordance with California Waterworks Standards, Section 64572, Chapter 16, Title 22 of the California Administrative Code or the Department’s criteria, whichever is most restrictive.

Potable water pipelines parallel to sanitary sewer pipelines shall be located a minimum of ten feet (outside to outside) from the sanitary sewer pipeline.

When crossing other utilities, a minimum vertical clearance of 6” shall be provided (outside to outside) unless otherwise approved by the Department and the California Department of Public Health.

2.06 POTABLE WATER PIPELINE MATERIALS

Potable water pipelines and fire lines shall use the following materials:

TYPE	Size (inch)	Material
Service Lateral	< 4	Copper
Service Lateral	4 ≤ and ≤ 12	Ductile Iron (Class 52)
Fire Line	4 ≤ and ≤ 12	Ductile Iron (Class 52)
Potable Water Pipeline	6 ≤ and < 30	Ductile Iron (Class 52)
Potable Water Pipeline	≥ 30	Ductile Iron (Pressure Class 350) or Cement Mortar Lined and Coated Steel Cylinder

See Department standards for pipe material properties and criteria.

2.07 VALVES

Water pipeline valves shall be specified as follows:

- Potable water pipelines 12-inch diameter and smaller shall be resilient-seated gate valves in accordance with AWWA C509 latest edition and Department criteria
- Potable water pipelines greater than 12-inch diameter shall have butterfly valves in accordance with AWWA C504 latest edition and Department criteria

Water pipeline valves shall be located as follows:

- Potable water pipelines shall have 3 isolation valves installed at every tee
- Potable water pipelines shall have 4 isolation valves installed at every cross

- Potable water pipelines shall have isolation valves installed at the dead end of a water main or at the traverse of an easement.
- Potable water pipeline valves shall be adequately spaced to provide pipeline isolation, repair and maintenance. Spacing shall be determined by the Department for each system to meet operational requirements.
- Place valves in-line with extended property lines and not within traffic intersections

Valves shall be installed with valve can and cover as shown on the applicable Department Standard Drawings.

Pressure class rating shall be the same as the potable water pipe on which the valve is being installed.

2.08 AIR RELEASE VALVES

Air release valves shall be located at high points of potable water pipelines. Minimize usage of air release valves by adjusting the slope of potable water mains to eliminate high points.

In phased developments, air valves are often located at the end of the pipeline as dictated by the phasing plan. When additional phases are constructed, the air valve shall be removed unless it is required.

2.09 BLOW-OFF VALVES

Blow-offs shall be in accordance with the Department's Standard Drawings. Blow-offs shall be located at all low points of the pipeline, and at all dead-end terminal points. Minimum size of permanent blow-offs shall be 2" or as sized based on the applicable water pipeline size. Minimum size of temporary blow-offs shall be 2" or as sized based on the applicable water pipeline size. Minimize usage of blow-off valves by adjusting the slope of potable water mains to eliminate low points.

2.10 FIRE HYDRANTS

Design per requirements of the Long Beach Fire Department. Developer's Engineer should obtain hydrant location and spacing information from the Long Beach Fire Department. In general, fire hydrants are located on the prolongation of the B.C. radial, on property line between lots or parcels, or at locations selected by the Long Beach Fire Department. Fire hydrant spacing is every 500 feet for residential areas, and 300 feet for industrial/commercial areas.

Fire hydrants shall be in accordance with the Department's Standard Drawings, installed behind curb face at right angles to the potable water pipeline.

2.11 SERVICE INSTALLATIONS

Services shall be in accordance with the Department's Standard Drawings. All service installations shall be copper and have a minimum 1" diameter. Each meter shall have its own service connected to the pipeline. Services shall run at a 90-degree angle from the pipeline to the meter box. If a service is over 125 feet (from the pipeline to the meter), the next larger diameter size service shall be installed.

2.12 BACKFLOW PREVENTION

Where the Department's potable water system has the potential of becoming cross-connected to other water supplies or sources, an approved backflow prevention device is required by Title 17 of the California Code of Regulations, and shall be installed in accordance with the Department's Standard Drawings and approved materials list.