

SECTION 6 WATER SYSTEM

6.01 GENERAL

- A. **SYSTEM REQUIREMENTS** - The existing City of West Sacramento water system supplies treated water within the developed areas of the City and is served by the George Kristoff Water Treatment Plant (GKWTP). This plant is located adjacent to the westerly bank of the Sacramento River and immediately west of the Interstate 80 bridge over the Sacramento River. The plant treats water drawn from the river and the treated water is transmitted and distributed through a system consisting of nine (9) tank reservoirs and booster pump stations. An average operating pressure of fifty-five (55) psi is maintained.

6.02 DESIGN REQUIREMENTS

- A. **GENERAL** - Water system design within a development area shall conform to the City General Plan, City Master Water Plan, and any applicable Specific Plan of the City of West Sacramento and shall be capable of transmitting and distributing adequate flows and maintaining sufficient pressures based on anticipated conditions of full ultimate development. All improvements including extensions, replacements, and repairs shall conform with but not be limited to the requirements of the Uniform Plumbing Code, the California Fire Code (CFC), California Health & Safety Code, American Water Works Association Standards, the Water Code of the City of West Sacramento, California Safe Drinking Water Act and Related Laws, California Building Code (CBC), State Water Resources Control Board, Division of Drinking Water (SWRCB/DDW), these Design Standards, Standard Construction Specifications, and Standard Details of the City of West Sacramento.
- B. **NORMAL OPERATING PRESSURE** - Normal operating pressures of not less than thirty-five (35) psi shall be maintained at all service connections except during periods of peak domestic and fire demand when the pressure shall not be less than twenty (20) psi. City Fire Department may revise these minimums based on the proposed development or revisions to state and local codes or requirements. Developer is required to check with the City Fire Department prior to starting project design.
- C. **DESIGN FLOW** - Design flow for sizing public water distribution mains shall be based on the City Water Master Plan.
- D. **FIRE FLOW REQUIREMENTS** - For the following general areas, the fire flows shall conform to the latest edition of the California Fire Code or the indicated fire flows noted below, whichever is greater. Fire flows shall be provided by the City with the initial development review. Expansion or change in zoning of the development shall be subject to requirements of the CFC.
- E. **LAYOUT OF WATER MAINS**

1. The distribution system, whenever possible, shall employ the "Gridiron System" of water circulation so as to allow pressure equalization. Dead-end water mains shall require specific approval by the City Engineer. In no case shall the dead-end length of water mains exceed six hundred (600) feet.
 2. All water pipelines designed for the transmission or distribution of domestic water supply shall be constructed and installed within public streets unless such construction or installation is determined to be impractical by the City Engineer. All water mains that lie outside of public streets shall be in a water main easement or public utility/service easement (PUE/PSE). Attention is directed to Division I, Section 6.03 of these Design Standards for easement requirements.
 3. The location of the water main in any street shall be three (3) feet from the lip of gutter on the northerly or westerly side of the street unless otherwise approved by the City Engineer.
 4. Plans shall be drafted to provide plan and profile views in accordance with Section 2 of these Design Standards and shall include existing and proposed water main size, fire hydrants, water valves, water main blow-off valves, trench details, crossings with other utilities, lateral distances to nearest sanitary sewer and storm drainage lines, top of pipe elevations at all grade changes, and surveying coordinates (stationing) of water main intersections, points of direction change, water main taps, water main terminations, and service locations.
 5. Landscape Corridors shall be served by a standard irrigation service including a meter and backflow device.
 6. Water Mains clearance shall meet all State requirements and have a minimum of ten (10) feet horizontally from and one (1) foot higher than sanitary sewers located parallel to the main. Water mains crossing sanitary sewers shall have at least one (1) foot higher than sanitary sewers at the point the utilities cross. Sections of water mains crossing sewer lines shall be a continuous section of pipe approximately eighteen to twenty (20) feet in length centered on the sewer main. Should a water main be required to be constructed under a sanitary sewer line, such crossing will only be allowed with the written approval of the City Engineer and the SWRCB/DDW, and at a minimum, the sewer line is reconstructed using a continuous section of ductile iron approximately eighteen (18) to twenty (20) feet in length centered over the water main and the sewer be concrete encased. Additional requirements by the City Engineer may be required as part of the approval process.
- F. SIZES - The minimum size water main shall be eight (8) inches in diameter. In all cases, water mains shall be of sufficient size to meet fire flow requirements.
- G. PIPE MATERIALS
1. Allowable materials shall be as specified in the Standard Construction Specifications Section 15.
 2. When a ferrous material (i.e., ductile iron or concrete coated and/or concrete lined welded steel pipe) is used for a new water line, the City Engineer may

require that the soil within the vicinity of the new water line be tested for corrosive potential. If it is determined that the soil is corrosive to the material being placed, the new water system must be protected by a corrosion control system. The corrosion control system must be designed by a licensed corrosion engineer and shall be submitted to the City Engineer for approval.

H. VALVES

1. The distribution system shall be equipped with a sufficient number of valves so that no single shutdown will result in shutting down a transmission main or necessitate the removal from service of a length of pipe greater than five hundred (500) feet. Additionally, in no case shall more than two (2) fire hydrants be removed from service. The valves should be so located that any section of the water main can be shut down without going to more than three (3) locations to close valves.
2. All tees shall have two (2) valves.
3. All crosses shall have three (3) valves.
4. Valves, incorporating a blow-off device, or a fire hydrant, shall be installed at the terminus of all dead-end water mains.
5. A valve shall be installed on services immediately off the main for services four (4) inches and greater in diameter.
6. Air Release valves shall be installed at high points in the vertical alignment of all water mains. The vertical alignment of water mains shall be designed to minimize this requirement.
7. Blow-off valves shall be installed at all dead ends and low points in the vertical alignment of water mains. The vertical alignment of water mains shall be designed to minimize this requirement.
8. Bollards or markers shall be installed at all valves and related appurtenances when located in unpaved areas.

I. FIRE HYDRANTS

1. Spacing
 - a. Fire hydrants shall be placed at or near street intersections and at a maximum spacing of five hundred (500) feet measured along the street centerline and as required by the City Fire Marshal.
 - b. Fire hydrants on streets without fronting lots shall have a maximum spacing of one thousand (1,000) feet measured along the street centerline.
 - c. Blue reflective markers within the roadway pavement shall be installed at all fire hydrant locations in accordance with the Standard Construction Specifications, Section 15 and the Standard Details.
2. Service Requirements
 - a. The minimum size water line serving a fire hydrant shall be six (6) inches in diameter and no more than two (2) hydrants will be allowed on any eight (8) inch main between intersecting mains.
 - b. Fire hydrants shall be installed as specified in the Standard Details.

J. SERVICES

1. In all new subdivisions, the residential service line shall be located a minimum of two (2) feet from the side yard property line. Services for two (2) lots with a common property line may be placed in a common trench straddling alternate property lines. Service lines from the water main to the property line shall be installed at the time the main is constructed to avoid frequent cutting of the street, unless otherwise approved by the City Engineer.
2. Service lines to existing buildings shall be installed so as to make the most direct connection to the existing structure.
3. A single domestic service connection shall not serve more than one (1) parcel. Separate parcels shall be supplied water through separate service connections.
4. More than one (1) domestic service shall not be supplied to a single property for the purpose of avoiding water connection charges. Water meters shall be sized consistent with the water service size. Backflow prevention devices shall be sized, as necessary.
5. Minimum service line diameter for a single-family residence is three-fourths (3/4) inch and may be replaced in-kind if the residence does not have fire sprinklers. All new service lines are for a single-family residences are minimum one (1) inch to accommodate residential fire sprinkler flows. Services to schools, commercial, industrial, multi-family units, roadway landscaping, or municipal parks shall be sized according to demand. Once demand is determined, service size should be based on a maximum velocity of ten (10) feet per second.
6. For major commercial, industrial, or multi-family developments, a single service line may be utilized for combined fire and domestic services. The service line shall equal or exceed the combined sizes, in cross-sectional area, of the separate fire and domestic services. Service line meter and valve layout shall be in accordance with Standard Details or as approved by the City Engineer.
7. For landscape irrigation systems, the City may consider the use of a turbo type meter and/or varying meter and line sizes.
8. Meters shall be required for all service connections except connections that are for fire protection purposes only. Water service meter assemblies shall be designed and constructed in accordance with City Standard Detail #501, #502, or #503, as appropriate.

K. CROSS CONNECTIONS

1. Attention is directed to Title 17, Chapter V, Sections 7583 to 7622, inclusive, of the California Administrative Code, regulating the construction of cross connections between drinking water systems and other sources of water. All construction shall be in strict compliance with said regulations and all applicable City Ordinances. The addition of a backflow prevention device to any water system supplying an automatic fire sprinkler system shall cause the automatic sprinkler system to be recalculated. It is the responsibility of the property owner

- to ensure that all sprinkler system requirements are met after installation of the device.
2. Backflow prevention devices shall be installed on all commercial, industrial, multifamily, fire, domestic, and irrigation services as shown in the Standard Details.
 - L. ANCHORS - Concrete anchors, thrust blocks, or mechanical joint restraints, if approved by the City Engineer, shall be provided at all bends, behind tees, fire hydrants, crosses (which are valved in such a manner that they can be used as tees), and valves, as shown in the Standard Details.
 - M. FITTINGS - Standard approved fittings shall be used at all bends of eleven and one quarter (11 1/4) degrees and greater. Deflections shall not exceed eighty (80) percent of manufacturer's recommended maximum values.
 - N. COVER REQUIREMENTS - Water mains and services shall be installed at a depth which will provide a minimum of thirty (30) inches from the top of the pipe to finished grade or a minimum of twenty-four (24) inches from the top of pipe to the street subgrade, whichever is greater.

6.03 RIGHT-OF-WAY POLICY

- A. REQUIREMENTS - All water lines shall be located within the City right-of-way dedicated for public streets unless the use of a public utility easement is specifically approved by the City Engineer. Easements outside public street right-of-way shall be granted or dedicated for water lines and/or public utility/service easement (PUE/PSE). In the case that public water lines installation is within public rights-of-way for streets, further dedication is not necessary.
- B. WIDTH - Easements for water lines shall meet both of the following width criteria:
 1. Minimum width of any easement shall be fifteen (15) feet.
 2. All easements shall have a minimum width in feet equal to the required trench width according to the standard detail for trench backfill plus two (2) additional feet of width for every (1) foot of depth of the pipe as measured from the bottom or the pipe to finished grade. All water lines shall be centered within their easements.