

SECTION 6

DOMESTIC WATER SUPPLY SYSTEM

- 6-1 INTRODUCTION - These improvement standards shall govern the engineering design of all domestic water systems intended for operation and maintenance by the County of Sutter or other agencies, such as Community Services District, where the Board of Supervisors is the agency board.
- 6-2 INTENT OF CRITERIA - The intent of these criteria is to provide a water system which will dependably and safely convey the required amount of high quality water throughout the distribution system at the least cost. In establishing the required amount of water, periods of peak domestic demand occurring in conjunction with an emergency fire flow demand shall be considered.
- 6-3 CURRENT STANDARDS - Pertinent and current requirements of the following agencies or standards shall be complied with. In case of conflict, the design criteria of the County of Sutter, as established herein, shall govern. The Department of Public Works shall advise where these standards may be obtained, on request.
- A. Environmental Protection Agency Drinking Water Regulations
 - B. Laws and Standards of the State of California, Department of Public Health Services relating to Domestic Water Supply
 - C. Standard Specifications of the State of California, Department of Transportation (Caltrans, latest edition)
 - D. General Order No. 103 of the California Public Utilities Commission
 - E. Sutter County Code regulating the installation, operation, construction, reconstruction and repair of wells and pumps
 - F. State of California, Water Well Standards (Bulletin 74-81)
 - G. Title 17, Chapter V, Sections 7583-7622, California Administrative Code, regarding cross-connections and backflow prevention
 - H. Uniform Fire Code

- 6-4 CONNECTION PERMITS AND FEES - A permit shall be obtained for each connection to the water system.
- 6-5 WATER SUPPLY QUALITY - The quality of the water shall conform to the Environmental Protection Agency Drinking Water Act and the State Department of Health Services Drinking Water Standards
- 6-6 WATER SUPPLY PRESSURE - Minimum operating pressures of not less than 40 psi nor more than 60 psi shall be maintained at service connections to the distribution system, except during periods of peak domestic and fire demand the pressure shall not be less than 20 psi.
- 6-7 DESIGN CRITERIA - For design of the distribution system, the following criteria shall be used in designing and constructing the water systems. Water system design criteria and construction practices shall conform to the following criteria.

**OPERATING CONDITIONS
WATER SUPPLY PRESSURE**

	Pressure		Velocity
	Maximum	Minimum	Maximum
Maximum day	60 psi	40 psi	5 fps
Maximum day and Fire	80 psi	20 psi	10 fps
Peak hour	80 psi	30 psi	7 fps

Maximum pipe velocity and minimum operating pressure is for worst case scenario, maximum day demand plus fire flow or peak hour, whichever is higher.

RATE OF DOMESTIC USE

Land Use	Average Day Demand Gallons Per Acre Day	Fire Flow (gpm)	Fire Duration (hr)
Low Density Residential	2,500	1,500	2
Medium Density Residential	3,200	1,500	2
High Density Residential	3,600	2,500	3
Commercial/Office	2,200	3,000	3
Light Industrial	2,000	3,000	3
Schools	2,200	4,000	4
Parks	2,700		
Environmental Corridor	2,700		
Open Space	500		

Maximum Day Demand	2.0 x Average Day
Peak Hour Demand	4.0 x Average Day

STORAGE AND PUMPING PLANT DESIGN

Minimum Capacity Requirements for Storage Facilities

Operational	1/4 Maximum Day Demand
Fire	Highest fire flow demand in service area multiplied by required duration
Emergency	3/4 Average Day Demand, or 1/2 Average Day Demand with Reliable Supply, whichever is higher

6-8 WELL AND PUMPING PLANT DESIGN - All phases of well and pumping plant design shall be coordinated with, and shall be under the direction of Sutter County. Particular attention shall be given, both in design and construction, to conformance with Bulletin 74-81, "Water Well Standards: State of California" of the State Department of Water Resources. Well production shall be based on the test wells drilled in the vicinity of the proposed well site and as approved by the Director.

In general, all developments shall have a minimum of two (2) sources of water. Pump stations shall contain a minimum of two pumps and have the ability to meet all operating conditions efficiently and with largest pump out of service. Standby power may be required at the option of the Director. Standby power must be provided to be considered a reliable supply. Emergency storage for well supply system may be waived if standby power is supplied for each well and the number of wells exceeds the minimum by 20%.

Site selection shall be approved by Sutter County and meet the requirements of the Environmental Health Division of the County Environmental Management Department, and the State Department of Health Services.

6-9 TRANSMISSION SYSTEM DESIGN - Sizing and layout of transmission mains shall conform to Master Water Supply Plans.

Technical specifications for water transmission mains shall be requirement of the proposed improvement plans.

Under no circumstances shall fire hydrants or water services be directly connected to a transmission main over 12" in diameter.

6-10 TRANSMISSION SYSTEM LAYOUT REQUIREMENT -
Improvement Plan Criteria -

1. The transmission main shall be shown in full on the plan and profile, including valves, air relief devices, and blow off devices.
2. Elevations shall be shown at all grade changes.
3. Transmission mains shall maintain a minimum vertical clearance from all other utilities of 1'-0" or as approved by the Director of Public Works.

B. Transmission Main Location - All transmission mains shall be installed within public rights-of-way and easements.

1. In general, the location shall be three (3) feet from the curb and gutter. The transmission main may be located in a landscape frontage if approved by the Director.
2. Ten (10) feet clear shall be the minimum horizontal separation from water mains and sanitary sewer mains.
3. Minimum cover shall be 36" in all locations.

6-11 DISTRIBUTION SYSTEM DESIGN - Sizing of mains shall be such that the stated normal pressures and the minimum requirements for main spacing and sizing are maintained.

The Hazen-Williams formula shall be used in the hydraulic study of the system, using a "C" value of 130 for cement-lined pipe, PVC C900, and ductile iron pipe.

A Cybernet hydraulic analysis of any proposed distribution system shall be supplied to Sutter County upon request. In design of the system, the maximum delivery from any hydrant of a type conforming to current County Fire Department Specifications shall be assumed to be limited to 1,500 gallons per minute.

6-12 DISTRIBUTION SYSTEM LAYOUT REQUIREMENTS - The water system layout requirements are as follows:

A. Improvement Plan Criteria -

1. The distribution main shall be shown on plan and profile (top of pipe only). A water plan at 1" = 100' scale shall be included as part of the improvement plans, showing locations of valves, fire hydrants, and water services.
2. Details of water mains crossing other utilities or unusual alignments shall be provided if deemed necessary by the Director.

B. Main Location - All water mains shall be installed within public rights-of-way or easements.

1. The water main location shall be three (3) feet from the curb and gutter on the northerly or westerly side of the street. If it should be necessary because of existing improvements or possible conflict with other utilities, and with the approval of the Director, the mains shall be installed within an easement immediately adjacent to and behind the property lie fronting on the public right-of-way.
2. If it is necessary to install a water main within a private road, the easement shall be the width of the paving plus one foot each side.
3. Ten (10) feet clear shall be the minimum horizontal distance between parallel water and sanitary sewer lines and the water main shall be higher than the sewer. On crossings, the water line shall be at least 12" above the sewer line or as approved by the Director.
4. When crossing a sanitary sewer force main, it shall be specified that the water main be installed a minimum of three (3) feet above the sewer line and be of cast iron or ductile iron.
5. In every instance where a water main is to be installed in public right-of-way or easement, the Director shall be consulted for preferred location and approval obtained.

C. Main Layout and Sizing - The distribution system, whenever possible, shall be in grid form so pressures throughout the system tend to become equalized under varying rates and locations of maximum demand. The minimum pressures and flows as specified shall govern design of the

system. The following conditions are to be considered for the distribution system design:

1. In general, the minimum pipe size shall be six inches inside diameter.
 2. Where water main is installed in a major thoroughfare (84 feet right-of-way or greater), dual mains (one pipeline on each side of the street) may be required.
 3. Mains shall maintain a minimum cover of 30" (36" in rights-of-way 50' and greater) and a maximum depth of 60", both measured from gutter flow-line, unless otherwise specified by the Director.
 4. Mains shall maintain a minimum 1'-0" vertical clearance from all utilities.
 5. Mains shall be installed in a roadway right-of-way or within a water easement. On privately owned, multiple ownership developments shall be maintained by County/District forces. Water mains shall be contained in a public water easement.
- D. Valves, Hydrants and Blow-Offs - The distribution system shall be equipped with a sufficient number of valves so no single shut-down will result in shutting down a transmission main. Valves will also be spaced no greater than 500 feet in school, commercial, industrial, or multiple-family dwelling areas. In other residential areas, valves shall be spaced so no single shutdown will result in shutting down more than 15 services or 800 feet, whichever results first. In no case shall more than two fire hydrants be removed from service. The valves shall be located so any section of main can be shut down without going to more than three locations to close valves. Valves at intersections shall be located within the curb returns, and set as close to minimum pipe depth (30" to 36") as possible. Three valves shall be placed where mains cross and two valves where mains tee. If it is necessary to install valves between street intersections, they shall be located on property lines between lots.

Fire hydrants and blow-off assemblies shall be located as follows:

1. Fire hydrants shall be placed at street intersections wherever possible, and located to minimize the hazard of damage by traffic. They shall have a maximum normal spacing of 500 feet in single family residential areas and 300 feet in duplex and multi-family

areas, commercial areas, or industrial areas, measured along the street frontage. Hydrants located at intersections shall be installed at the curb return. All others shall be located on property lines between lots.

2. Not more than two hydrants shall be placed on a six inch main between intersecting lines. The minimum size main serving a fire hydrant shall be six inches in diameter. The pipeline connecting the hydrant and the main shall be a minimum of six inches, with a gate valve flange connected to the main. On long runs a second valve may be required near the hydrant location by the fire protection district having jurisdiction. The pipe reducer shall be placed at the fire hydrant.
3. A fire hydrant assembly shall be installed on all permanent dead end runs. Blow-off valves shall be used if dead end runs are temporary and less than standard spacing will result if a fire hydrant is used. Wherever possible the blow-off shall be installed in the street right-of-way three feet from the curb and gutter. In no case shall the location be such that there is a possibility of back-siphonage into the distribution system.

E. Service Lines - Service lines from the water main to the property line or edge of easement shall normally be installed at the time the main is constructed. Services from mains installed in private roads shall extend one foot beyond the edge of the pavement. Service line criteria shall be as follows:

1. In all new subdivisions the service line shall preferably be located within 9 inches to 30 inches from the side property line.
2. Normal residential size of a service line shall be one inch. Schools, commercial, industrial, or multiple-family units with higher demand shall be provided with larger service lines, subject to approval of the Director. All services shall be installed with a corporation stop at the main and an angle meter stop or gate valve at the property line. The gate valve shall be used only when the service is 1-1/2 inches or larger. Installation of a concrete meter box is required for all services.
3. The Department of Public Works shall make all water service taps into existing mains upon application for a permit and payment of the required fees. A note to this effect shall be placed on the plan

sheet which details the area requiring such tapping. Application should be made to Sutter County Department of Public Works and the required fees paid at least five (5) working days in advance of the time the tap is desired. All excavation and backfill, and the installation of the remainder of the water service shall be done by the Contractor. (NOTE: The above applies only when the service is constructed as a part of an improvement contract. For rules regarding the installation of an individual water service, contact the Sutter County Department of Public Works.)

- F. Water Meters - Water meters shall be installed on all residential, commercial, industrial, multi-family, and irrigation services. All water services shall be metered with Sensus (formerly Rockwell) SR11 Touch Read, pit lid meters, reading in 100 cubic feet increments installed within a meter box.
- G. Water Pipe - Pipe used in the construction of water distribution systems shall be either ductile or polyvinyl chloride pipe. The pipe and the method of placement shall conform to the Standard Specifications.
- H. Detector-Check Valves - A detector-check valve and bypass meter is required on each fire service line into a building or fire line. See Standard Drawing W-8 for specifications and typical installation details.
- I. Backflow Devices - Backflow devices are required in accordance with Title 17, Chapter V, Sections 7583-7622 of the California Administrative Code.