

Sativa LA County Water District

WATER SYSTEM PROJECT DESIGN STANDARDS

I. PURPOSE

To provide guidelines for the design of water utilities projects and thereby reduce the time required for processing the plans. These guidelines do not include, but may reference, additional conditions which may be promulgated by all other pertinent ordinances, codes, and official policy set forth by Sativa LACWD or other government agencies. These guidelines establish minimum acceptable design criteria. More stringent requirements may be imposed by the Director of Utilities based on specific project conditions.

Portions of these standards apply to fire systems, both public and private, and are intended as general reference to aid in the design of the public water system. Final designs are subject to approval of the Fire Department.

It is the responsibility of the design engineer to initiate written requests to the General Manager for approval of any design concepts that differ from these criteria, verify additional requirements imposed, perform any necessary calculations or studies, and resolve specific design problems with the, appropriate agency, department or division.

II. REQUIREMENTS FOR IMPROVEMENT PLANS AND SUBDIVISION MAPS

A. Provide a detailed utility plan showing onsite and offsite public and private water and fire protection systems, including mains, services, hydrants, and all other required appurtenances, and their connections to existing Sativa-maintained water facilities. Show the location, type, and diameter of public and private water mains. Reference any existing fire hydrants within 300' of the project boundary. Show any wells existing or to be abandoned. When a separate irrigation service is necessary, an irrigation plan is required.

B. Annotate the local agency information sheet of the Subdivision Map with any information that is needed to notify property owners of requirements for connection to the District water system. These include, but are not limited to:

1. payment of fees prior to issuance of Building Permits,
2. lots requiring pressure regulating valves or booster pumps,
3. backflow protection,
4. public water access requirements, such as gates or access roads. The appropriate information may be obtained from the District.

C. Miscellaneous specific items required on improvement plans are indicated throughout these Standards.

D. Before combustible materials may be delivered, stored or constructed on site, fire flow and access must be provided and approved by the Fire Department and the District. In addition, public and/ or private fire hydrants must be installed, flushed, tested, and operational. This information must be included on all improvement plans. Provide any necessary calculations with the submittal of improvement plans or with the Tentative Map submittal to demonstrate adequate fire flows are available.

E. No permits or new connections granted if not a California Licensed Plumber is used for said water connection. The Plumber must meet State Requirements for plumbing and be knowledgeable in water connection standards.

III. WATER MAINS - GENERAL

A. Public water mains may not be designed outside the street right-of-way without District approval.

B. In general, publicly maintained water systems will be designed only where they serve multiple ownership lots and where appropriate access for maintenance can be provided.

C. Water mains installed at a slope of 15% or greater will be designed with restrained joints. The Design Engineer must provide adequate drainage measures to protect the trench from erosion.

D. Water mains installed outside of any roadway, called "cross-country mains," must be Ductile Iron Pipe and will have suitable access. In general, cross-country mains must be isolated with valves in the public right-of-way and must be identified with blue locating posts (Carsonite +92 CW-112 or approved equal) at approximate 500' intervals, at any angle point, and at the entrance to an easement. Stakes should have vandal-proof metal bottoms.

E. For system reliability, to minimize pipe size, and to minimize the number of people affected by a system shutdown, either for domestic or fire protection purposes, no more than 1 residential units may be served by a single-feed water system, providing it is hydraulically adequate. Where more than 1 units are to be served, a dual-feed (or "looping") public water system must be designed to provide a secondary source of water to the project. Onsite private fire requirements, such as dual fire services and looping mains, will be determined by the Fire Department for residential and nonresidential developments.

F. For purposes of leak detection and maintenance access, no reinforced concrete may be designed over publicly maintained water facilities. Unreinforced concrete will be allowed under special circumstances such as crosswalks.

- G. Extent of water main improvements will be as follows:
 - 1. Any offsite water main improvements needed to serve the project must be shown on the improvement plans, including upgrades to existing mains that may be required as a result of a flow analysis or modeling effort.
 - 2a. In general, water mains must be designed at least across one-half of the property frontage or to the last service connection, whichever is greater; or
 - 2b. Where the project is required to provide new street improvements over the water main alignment and the water main will serve properties beyond the project limits, the water main must be designed to cross the full property frontage or to the limits of the street improvements, whichever is greater.
- H. No water or sewer mains may be installed in alleys.

IV. MATERIALS

- A. Service laterals will be copper, Polyvinyl Chloride (PVC), or Ductile Iron Pipe (DIP) per applicable City Standards.
- B. 4" 6" and 8" public water will be Polyvinyl Chloride (PVC) Pressure Class 150, DR18 per AWWA Standard C900, minimum or Ductile Iron Pipe Pressure Class 350 per AWWA Standard C 151 minimum. Where the normal mainline static pressure exceeds 100psi, Ductile Iron Pipe or PVC Pressure Class 200, DR14 must be used.
- C. 10" diameter water mains will be Polyvinyl Chloride (PVC) per AWWA Standard C905, DR25 with a pressure rating of 165 psi or Ductile Iron Pipe per AWWA Standard Class 1, or as shown on plans and specifications. Where the normal mainline static pressure exceeds 100 psi, AWWA Standard C905, DR18 with a pressure rating of 235 psi or Ductile Iron Pipe must be used.
- D. Asbestos cement pipe will not be allowed.

v. CONNECTION TO AN EXISTING PUBLIC WATER MAIN

- A. Indicate a "hot tap" for connection of service laterals 2" in diameter and smaller.
- B. Indicate connection of pipes 4" - 12" in diameter with a hot tap or a cut-in tee in conformance with the provisions of the Water System Construction Standard Specifications Section 99-1.20. Hot taps will be allowed only when no main line valves are required.
- C. Design a cut-in tee if additional valves are required on the existing main. If the new main /lateral is larger than the existing main, the tee and main/lateral valve will be the size

of the existing main unless it is hydraulically necessary to increase the tee and valve to the size of the new main/lateral.

D. Tie-ins to the existing District water system must be inspected by a Utilities Dept. representative and the improvement plans must be so annotated.

E. Size-on-size taps are allowed up to 8" in accordance with the approved standards. 12" size-on-size taps are allowed only under emergency situations and with the specific approval of the District.

F. In most major streets, or where the street surface is less than five years old, installation methods other than open cutting may be required. The Encroachment Officer or the General Manager as appropriate will determine the requirements based on the condition of the existing street.

VI. ALIGNMENT

A. Horizontal

1. Alignment will be in accordance with the provisions of Standard 871.
2. The minimum allowable radius of curvature for an 6" water main is 250 feet and for a 12" water main is 350 feet. In situations such as streets that have smaller radius curves, the water system will be designed in straight segments parallel to the sewer or storm drain system so that future locating is simplified.
3. Conform to the State of California Department of Health Services.
4. The minimum horizontal separation from storm drains, monuments, gas, electrical, and telephone lines will be 4 feet clear except at crossing.
5. The minimum clear horizontal separation from a metallic pipeline with an induced current or from an anode field will be 5 feet. Where the new water main will be in proximity to an anode field, special design will be required for. approval by the Director of Utilities.
6. All public water mains must be designed a minimum 5 feet from all structures, such as manholes or drop inlets. Provide a minimum of 3 feet from the lip of gutter for service connections and repairs. Water mains will be designed a minimum of 5 feet from the edge of easements.
7. All water main trenches that are parallel to and deeper than the footing of any adjacent structure must be designed at least forty-five (45) degrees from the footing as required in the Uniform Plumbing Code. Any exceptions must be approved in writing by the General Manager.

8. Where dual water mains are designed, a minimum 5 feet clear horizontal separation will be maintained.

9. In general, water main crossings over or under other underground facilities will be designed as close as 90° to that facility as possible. Crossings of less than 45° will only be approved when no other design is possible.

B. Vertical

I. Generally, provide a minimum of 6" of vertical separation from storm drains or other underground utilities such as telephone, cable to, gas, or electric conduit. When the minimum cannot be maintained, plans will indicate installation of felt expansion material, Styrofoam, or equivalent between facilities. Other measures, such as the use of concrete encasement, controlled density backfill, or ductile iron pipe may be submitted for approval of the General Manager. The absolute minimum separation between water and other underground facilities, except sewer mains will be 0.1'.

2. Conform to the State of California Department of Health Services "Criteria for the Separation of Water Main and Sanitary Sewers"(See Appendix "A").

3. Where dual water mains are designed, a minimum 1' clear vertical separation will be maintained.

VII. MAIN SIZING CRITERIA

A. Allowable nominal sizes for public water mains are 6" and 8". Mains larger than 8" must have specific approval of the General Manager.

B. Public water mains must be sized to meet minimum Fire Code requirements in addition too domestic and irrigation demands. Private fire protection mains must be sized to meet minimum Fire Code requirements.

C. The minimum new public main size is 8 inches. New public mains serving commercial, industrial and/ or multi-family residential developments greater than two units, must be a minimum of 12 inches. Existing mains that will serve such proposed uses must be upgraded as needed to meet the current Fire Code.

D. Analysis and design of water systems will be based upon the criteria listed in the District's Water System Master Plan where applicable. The General Manager may require increased pipe size for overall system benefit. When the project is required to provide larger water mains than needed for the development, the applicant may apply to the District for oversize reimbursement.

E. Maximum flow velocity for new public or private water mains is 10 feet per second, to be calculated by applying the demands.

VIII. MAIN / LATERAL COVER

A. Cover is the distance from the top of the pipe to final finished grade measured directly over the pipe.

B. Typically, the minimum standard depths of cover for public water mains and private fire protection mains are:

Pipe Size	4"	6"	8"	10"	12"
Cover (in.)	36"	36"	36"	40"	44"

C. Where minimum cover is less than standard or greater than 8', special permission from the General Manager is required. Show mains with nonstandard cover in a profile on the Improvement Plans or Encroachment Permit applications. Where cover is less than the standard, Pressure Class 350 Ductile Iron Pipe is required.

D. Where standard cover cannot be maintained, such as at the crossing of a water main 1'1th a sewer main or any other utility line, either an undercrossing or overcrossing will be chosen based upon the evaluation by the Developer's Engineer. Evaluation will include the need for higher class pipe; use of controlled density backfill as pipe encasement, ability to meet California Criteria for Separation of Water Mains and Sanitary Sewers and the resulting need for air / vacuum release valves. This evaluation will be submitted to the Director of Utilities for renew.

E. The minimum cover for service laterals will be as shown on the appropriate District Standard Plan. Where service laterals have conflicts with other facilities, a detail or profile must be shown on the plans, or the plans must be sufficiently annotated to give clear direction for the installation.

F. When designing a cut-in tee for a service or main connection that is larger than the existing main, the new assembly must be shown at a depth sufficient to allow the valves to remain below the street subgrade, which may necessitate lowering the existing main.

IX. VALVING

A. Valving at intersections will be in accordance with the provisions of Standard 871. A minimum of three (3) mainline valves are required for "T" intersections and four (4) valves are required for cross intersections. A valve may not be required on any leg of a tee or cross intersection if another valve is within 250 feet, except as needed to isolate fire hydrants.

B. All hydrants must be on separately valve sections of the public main, including fire lines serving private hydrants.

C. Any water main which does not have a fire hydrant or lateral connection will have valves designed at approximately 1,000 foot intervals or as required by the General Manager.

D. Water main valves must be designed outside of concrete areas wherever possible to facilitate repairs.

X. SERVICE LATERALS AND METERS FOR DOMESTIC AND IRRIG. SERVICE

A. Combination Services for Private Fire Service with Domestic and / or Irrigation Service

1. Only 6", 8" and 12" combination service laterals are allowed.

2. The combination service lateral must not exceed the size of the required fire line and must be hydraulically sized to provide adequately combined domestic, irrigation, and fire flows without exceeding allowable velocity of 15 feet per second.

3. A minimum 8" combination service lateral is required for lots with unknown commercial, multi-family, or industrial uses where onsite hydrants are not likely to be required for development.

4. A minimum 12" combination service lateral is required for lots with unknown commercial, multi-family, industrial or shopping center uses where onsite hydrants are likely to be required for development.

XI. PUBLIC IMPROVEMENTS FOR PRIVATE FIRE SYSTEMS

A. The General Manager is responsible for mapping private fire systems, including hydrants, for the Fire Department and for assuring properly sized services. Design plans showing private fire systems must be submitted to the appropriate Fire and/ or Building jurisdiction for approval and: 1) may be included with the Public Improvement Plans for the project; or 2) copies of the approved plans may be submitted to the General Manager prior to requesting a meter set and activating the fire system.

B. Generally, the lateral size must be designed the same size or larger than the size required for the fire sprinkler system and / or the private hydrant system. Caution - onsite fire system design may necessitate changes to pre-approved public improvements. The hydraulic calculations for laterals serving private fire systems will be based on the required fire flow or the fire sprinkler demand, whichever is greater, combined with the peak domestic flow.

C. All private fire systems that only serve onsite hydrants require above-ground single detector check valves in accordance with Standard 888. Where above-ground installations are not reasonable due to site constraints, design for single detector check valves in vaults per Standard 879.

D. Double-check detector backflow assemblies are required for:

1. All connections serving commercial fire sprinkler systems; or
2. Any property with multiple fire service connections; or
3. Any fire line connections to properties with auxiliary water supply.

E. Reduced-pressure detectors are required for:

1. any fire suppression system using chemical additives such as antifreeze or fire suppressants; or
2. any building where an extreme hazard exists, as determined by the General Manager.

F. For one- and two-family residential fire sprinkler systems:

1. Where a multipurpose system circulates water for fire sprinklers and domestic supply, no backflow device is required.
2. Where the fire system does not circulate water with the domestic supply, double-check backflow assemblies are required to protect the public water supply by either of the two methods shown on District Standard 875 and must be located in the public right-of-way or the P. U.E. adjacent to the right-of-way.
3. Where a fire sprinkler system is to be installed in a one- or two-family dwelling, design the service lateral from the street main to the water meter and the water meter to be 1" minimum. Larger size laterals and meters may be permitted where hydraulic calculations indicate the need.

G. The location of any Fire Department connection must be approved by the Fire Department.

XII. FIRE HYDRANTS

- A. Generally, fire hydrants required onsite to serve one lot will be private.
- B. Generally, fire hydrants required onsite to serve two or more lots will be public.
- C. Design of hydrant locations must meet the Fire Code requirements and be approved by the Fire Department for logistics and by the General Manager for maintainability.

- D. Each hydrant must be on a separately valve main line section.
- E. Whenever possible, locate hydrants near street intersections.
- F. If it is not possible to locate near an intersection, locate the hydrant near a property line or where it will minimize interference with property use.
- G. Locate hydrants a minimum of 10' from roll down of driveways for commercial or multi-family sites and 5' from residential driveways.
- H. On streets with raised medians or with four or more travel lanes, design hydrants on alternate sides of the street per current City Fire Code. Each side of the street will be considered independently relative to hydrant placement per subsections XII-J and All K below.
- I. Residential property with one or two dwelling units ·Typical locations
 - 1. Design hydrants with a maximum of 500' spacing, or as approved by the Fire · Department. Design hydrants at a maximum spacing of 300' in High Fire Severity Zones.
 - 2. Generally, design hydrants at intersections and then evenly distribute hydrants throughout the project.
 - 3. No one or two family dwellings may be more than 250' from the nearest hydrant or more than 150' in High Fire Severity Zones.
 - 4. Specify "residential" hydrants per District Std. 857 on the plans.
- J. Commercial, Industrial, and Multi-family (3 or more units) - Typical locations
 - 1. Generally, design hydrants at intersections or driveway entrances and then evenly distribute hydrants throughout the project.
 - 2. No portion of the exterior wall of the facility or building may be more than 150' from the nearest hydrant as measured by an approved route around the building per the City Fire Code.
 - 3. Specify "commercial" hydrants per City Std. 857 on the plans.
- L. Minimum fire flow required at all hydrants:
 - I. Fire flow as specified in the following subsections is defined as the amount of water supply available in the water main nearest the flowing hydrant with 30 psi residual pressure, J O. psi of that residual pressure being required to overcome losses in a typical hydrant and lateral assembly at the required flow.

2. Single and two family residential uses require 1,500 gallons per minute flow, except as in subsection L-4 of this section below.

3. The required fire flows for schools, commercial, industrial, and multi-family residential (3 or more units) uses will be based on the Fire Code and the District. The water system will be designed so that 1,500 gpm is available from the hydraulically most demanding hydrant and the remaining flow required is available at the next most demanding hydrant(s), up to a maximum of 1,500 gpm per hydrant.

4. The minimum required fire flow in High Fire Severity Zones is 2,500 gpm for all occupancies, including one and two family residential dwellings. System design will accommodate flow apportionment as in subsection L-3 above.

5. Fire flow requirements are under the jurisdiction of the Fire Department and the District. The guidelines given above are general. Actual flow requirements must be verified with the Fire Department and the District prior to submittal of plans. Calculations may be required by the Fire Department and the District to verify the adequacy of the proposed design. Mitigation measures may be required by the Fire Department and the District if the minimum fire flow requirements cannot be met for a specific project.

XIII. BACKFLOW DEVICES (EXCEPT FOR FIRE LINES)

- A. Backflow devices are required to be designed in accordance with State of California Title 17 and current District Code, Section 14-16, Backflow Regulations.
- B. All backflow devices must be listed on the latest revision of the approved. UFC Foundation for Cross-Connection Control and Hydraulic Research list.
- C. Design backflow assemblies as near as possible to the water meter as shown on Standards 874, 875 and 876.
- D. Backflow preventors will be designed in accordance.

XIV. PRESSURE

- A. To obtain water system data for these calculations, contact the General Manager. A fee will be imposed if flow testing is required.
- B. Mainline
 - I. The minimum allowable static pressure in the system is 20 psi. The maximum allowable static pressure in the system is 120 psi.

2. The maximum allowable pressure in a high-level zone is calculated by assuming the reservoir full. In the Aqueduct zone or other reduced pressure zones, calculate the pressure by using the high setting of the pressure regulating valve at the nearest aqueduct connection or system regulator.

3. The minimum allowable pressure in a high level zone is calculated by assuming the reservoir drawn down 10' from the high water level. In the Aqueduct zone or other reduced-pressure zones, use the low setting of the pressure regulating valve at the nearest aqueduct connection or system regulator.

C. Domestic service

1. The minimum allowable pressure is 20 psi measured at the meter. If pressure measured at any faucet is less than 35 psi, a pressure booster system is required.

2. The maximum allowable pressure at a meter is 120 psi. If service pressure measured at any faucet exceeds 80 psi, a private pressure regulating device is required.

XV. SPECIALTY VALVES AND WATER SAMPLING STATIONS

A. Specific locations will be reviewed for each project by the General Manager.

B. Air release and vacuum relief valves are required at substantial high points in the system such as over a hilltop or at the upper end of a dead end main.

C. Design pressure reducing valves to maintain overall system balance and to maintain service pressure levels within the parameters established within these system design standards.

D. Typically surge or pressure relief valves are to be designed near the low points of any high level pressure zone where discharge may be directed to an approved disposal system.

E. Water sampling stations are required to provide representative sampling within each pressure zone. At a minimum, one water sample station is required in each pressure zone, at each reservoir and at pump stations.

XVI. SPECIAL CONDITIONS FOR DELINEATED FAULT ZONES

A. Fault zones must be identified on improvement plans.

B. Ductile iron pipe must be indicated on the improvement plans in delineated fault zones and extend to 100' outside each side of the delineated fault boundaries.

C. Pumper connections or fire hydrants will be designed approximately 50' outside each side of the delineated fault zone. Gate valves must be designed between the fault zone and the fire hydrant/ pumper connection.

D. Mechanical joint double-ball Flextend assemblies with 8" expansion/contraction capability, as manufactured by EBAA Iron, Inc. of Eastland, Texas, or approved alternative, must be designed adjacent to each side of the fault zone.

XVII. EASEMENTS

A. An easement must be provided over any public water system when it is installed outside a public right-of-way.

B. The easement must be a minimum of 15' wide if it only contains a water main or 20' wide if it contains another facility, such as sewer, storm drain, or other utility. The easement will be dedicated as a "public water easement" if it contains water only. It will be dedicated as a "public utilities easement" if it contains other facilities as well.

C. Easements must be configured to encompass all publicly maintained appurtenances, such as water service laterals, meters and fire hydrants and will be generally centered over the facility. Separate access easements may be required depending on site conditions. When water mains are to be installed along a property line the easement will be wholly contained on one parcel.

D. All property restrictions placed as a result of dedication of easements will be so noted on the Subdivision Map, or on the Easement Deed if the easement is not dedicated as part of a subdivision.

XVIII. EASEMENTS

1. No structures may encroach on, above or below the surface of the ground in any public water easement. This includes footing of foundations or eaves from the roof of any adjacent structure, pools, ponds or outbuildings on slabs or foundations. Decks, sheds, or other structures which may be easily removed for maintenance of the water system may be allowed at the discretion of the General Manager.

2. No trees may be planted in a public water easement without first obtaining approval of the General Manager. Trees may be allowed to the extent that damage to the water system does not occur from root intrusion and adequate access can be provided for maintenance and repair vehicles.

XVII. ABANDONMENT OF WATER MAINS AND SERVICES

A. Any existing water mains and service laterals that will not be used must be abandoned and must be shown on the Improvement Plans with appropriate notation.

B. For all abandoned water services up to and including 2", annotate to remove the valve and saddle and install a full circle clamp on main under the General Manager inspection.

C. For flanged or mechanical joint tees, annotate the Improvement Plans to remove the valve and install a blind flange or mechanical joint plug under the General Manager's inspection.

D. For push-on tees, the tee, valve and concrete thrust block must be removed and the main repaired with approved pipe and suitable couplings, and so noted on the Improvement Plans.

E. Valve boxes for abandoned valves must be removed and so noted on the Improvement Plans.

F. Abandoned mains, valves and risers located within any street structural section or within any new trench must be shown on the Improvement Plans to be removed.

G. Show all 12" diameter and larger water mains to be abandoned within the public right-of-way as removed or broken every 50' and filled with sand slurry.

H. Where a fire hydrant is to be abandoned, note that the hydrant barrel, break off riser, and check valve are to be removed, the bury is to be capped or plugged, and the lateral abandoned at main as stated above. Abandonments of fire hydrants must be approved by the General Manager.