

SECTION 500

DESIGN CRITERIA DOMESTIC WATER FACILITIES

500.1 MINIMUM SIZE MAINS

The normal minimum size distribution main shall be 8-inch looped line except in special short street configurations where 4-inch, ductile iron pressure pipe may be permitted.

On dead-end streets, the minimum size main shall be 8 inches to at least the last fire hydrant.

Smaller mains may be individually approved by the Director of Engineering on dead-end mains without fire hydrants. These mains shall be sized so that sufficient water is regularly drawn to prevent stagnation.

500.2 DESIGN FLOW AND PIPE VELOCITY CRITERIA

The criteria for velocity shall be as described herein. The maximum velocity in a line shall not exceed 5 fps (feet per second) during the peak hour condition. The peak hour is defined as 4 times the average day demand. The maximum velocity in a line shall not exceed 7 fps during the maximum day plus fire demand condition. The maximum day is defined as 2 times the average day demand.

500.3 TYPE OF MAIN PIPE

Residential Areas (Distribution Mains). Only C-900 P.V.C. pipe, Class 200 or ductile-iron pipe, Pressure Class 350, is to be used for distribution mains of 6 inches thru 12 inches in diameter. Only ductile iron pipe shall be used for 4-inch pipeline. For 16-inch diameter pipe, pipe must be ductile-iron pipe, or CML&C steel pipe. For pipes larger than 16 inches in diameter, only CML&C steel pipe is allowed. Where water mains pass through nonpaved areas, the pipe shall be ductile iron pipe, or CML&C steel pipe.

All DIP, 6-inches thru 12-inches in diameter, will be pressure Class 350 unless a higher pressure class is required for special installations. DIP shall be provided and installed per Section 15056. Fully restrained DIP shall be used within easements with restricted access and slopes exceeding 10%.

500.4 MINIMUM DEPTH TO TOP OF WATER MAIN PIPE

500.4.1 Residential Areas (Distribution Mains 12" and smaller)

The top of the pipe is to be a minimum of 30 inches below the street subgrade or 30 inches below the undercut, whichever is greater, unless indicated otherwise on job plans or directed otherwise by the District inspector because of unusual field conditions. The top of pipe is to be a minimum of 48 inches below finish grade in unpaved areas.

500.4.2 Transmission Mains. (Usually 12" and larger)

The top of the pipe is to be a minimum of 36 inches below the street subgrade or 36 inches below the undercut, whichever is greater, unless indicated otherwise on job plans or directed otherwise by the District inspector because of unusual field conditions. The top of pipe is to be a minimum of 60 inches below finish grade in unpaved areas.

500.5 STANDARD LOCATION

Domestic water main center-lines shall normally be located 6 feet from the curb face and may be deflected to avoid cross gutters, concrete bus lanes or other interferences.

500.6 WATER VALVE SPACING

As a general rule, there should be three (3) control valves where one main ties into another. Where two mains cross, there shall be four valves. On long blocks, intermediate valves should be installed so that only a maximum of 20 lots or 600 feet, whichever is less, would have to be shut off at any one time.

Valves should also be spaced so that not more than two fire hydrants should be out of service at any one time.

In most cases where water mains pass through easements outside traveled streets, a valve shall be located at each end of the easement. The final determination of valves and locations shall be per the District.

500.7 SEPARATION OF DOMESTIC WATER, SEWER, AND RECYCLED WATER LINES

500.7.1 Horizontal Separation

State Health Department regulations require a 10-foot-minimum separation between water and sewer water mains. However, in special situations where there is no alternative but to install the mains with less than the required separation, special construction will be considered on an individual basis by District for approval. (See Standard Drawing W-14). Minimum separation of domestic water service line and sewer lateral shall be 5 feet. Domestic water lines are normally located on the opposite side of the street from the recycled water line.

500.7.2 Vertical Separation

Normally, water, sewer, and recycled water shall be located vertically from the street surface in order of the higher quality, i.e., domestic water shall be above recycled water and recycled water shall be above sewer.

Whenever a crossing must occur where a sewer main passes within 1 foot of a domestic water main or where a sewer main passes within 1 foot of a recycled water main, special construction will be required as shown on Drawing W-14.

Encasement may be required if Drawing W-14, conditions cannot be met and then one of the following types of alternates may be required:

1. Reinforced concrete encasement, a minimum thickness of 6 inches.
2. Piping within a continuous steel casing, per Standard Drawing W-13, which shall have a thickness of not less than 1/4 inch.

If a sewer is above a water main, the special construction shall extend a sufficient distance on both sides of the crossing to provide a minimum of 10 feet of horizontal clearance. If a sewer is located below a water main, and within a vertical distance of a 1-foot clearance distance, the special construction shall extend a sufficient distance on both sides of the crossing to provide 4 feet of horizontal clearance. These construction requirements shall not apply to house laterals that cross perpendicular less than 1 foot below a pressure water main.

500.8 FIRE FLOW DEMAND

The design criteria to be used for determining fire flow requirements shall be **the actual fire flow requirements as determined by the Orange County Fire Marshal**. Before designing the domestic water system for a project, the applicant shall obtain the Orange County Fire Marshal's fire flow requirements for the project. These requirements, plus indication of the Fire Marshal's approval, are required to be on the improvement plans prior to District's approval. All fireflow tests shall be performed by the District. District shall charge a fee to perform this fireflow test. As a general guide, the following shall be considered:

500.8.1 Residential Dwelling Units

The water system shall be capable of providing a residential fire flow minimum of 2,000 gpm, combined flow, for a 4-hour duration from any two adjacent hydrants at a minimum 20 pounds of residual pressure (psi) at the main. For residences 3,600 square feet and under and not contiguous with open space areas, the minimum requirement shall be 1,000 gpm per hydrant at 20 psi. For residences 3,600 square feet and under which are contiguous with open space areas, the minimum requirement shall be 1,000 gpm per hydrant at 30 psi. For residences over 3,600 square feet, the Fire Marshal shall be consulted. The open space area is defined as any area bordering an undeveloped open space with no fire control mechanism.

500.8.2 Schools and Commercial Areas

The system shall be capable of providing a fire flow of at least 3,000 gpm for 3 hours duration (or as required by the Orange County Fire Marshal) out of any two adjacent hydrants at a minimum 20 pounds of residual pressure at the main.

500.8.3 Industrial Areas

In industrial developments requiring a high fire flow, the applicant shall consult with the Fire Department to discuss options for upgrading the domestic water system to deliver the fire flow or provide built-in sprinkler protection for the structures.

500.9 FIRE HYDRANT LOCATIONS

The location of fire hydrants shall be as determined by the Orange County Fire Marshal, and per the guidelines set herein. The exact location with respect to the curb and sidewalk shall be as shown in District standard W-7.

500.9.1 Fire Hydrant spacing

The maximum fire hydrant separation shall be 300 feet from fire hydrant to fire hydrant. The only exceptions will be at the discretion of the Fire Marshal.

Fire hydrants shall be located near the beginning of curb return (BCR) or lot lines.

No fire hydrant shall be located within 3 feet of a driveway, or closer than 40 feet to any structure (unless approved by the Fire Marshal).

In situations where the fire hydrant run is over 20 feet, the size of the hydrant lateral shall be 8-inches.

500.9.2 Types of Hydrants

Wet barrel all-bronze type hydrants, as specified by the District, are to be used except in hill areas or special "high-risk" situations where the District may require a wet barrel with check valve.

500.9.3 Plan Requirements

Fire hydrants shall be shown on the plans where the hydrant is to be located with respect to the property line, and what easements will be provided. The building foot prints or building pad areas are also to be shown.

500.10 SERVICE MATERIALS AND MINIMUM SERVICE SIZE

500.10.1 General

Approved materials and manufacturers for various service material tubing and connections are as listed in District's Standard Specifications, herein.

500.10.2 Minimum Domestic Service Size

Minimum domestic service line size shall be 3/4-inch with a 5/8 x 3/4-inch meter. The sizing of the service shall be specified on the plans designated by lot numbers. Services for commercial or industrial developments are to be as shown on plans or as directed by the Director of Engineering.

For industrial, commercial, private-street residential, and other nonresidential development, the District may require a detail on the plans of the location of the proposed service.

500.10.3 Type of Service Line

Acceptable service line material is as described below:

1. 3/4-inch through 2-inch service line shall be copper tubing.
2. 4 inches and larger, use DIP per section 15056, or PVC per section 15064, as determined by the Director of Engineering. (3" size not District Standard - use 4" piping up to meter).

500.10.4 Meters

All residential meters 5/8" through 2" will be furnished by the District, subsequent to payment of all applicable charges, and installed by the applicant. All residential developments utilizing 2" meters shall be limited to 8 dwelling units per meter and one building per meter. All industrial, commercial, individual service meters 3" and larger will be supplied and installed by the applicant and dedicated to the District subsequent to payment of applicable charges.

Prepayment of meters and appurtenances is not allowed. Upon payment of fees for meter and appurtenances, the entire meter package must be collected at that time. The District will not store meters and appurtenances after payment of charges. The meter package consists of meter box, gaskets, tailpieces, shut-offs, meter, and all other appurtenant facilities. If tailpieces or shut-offs are used, then the applicant will be charged for the specified minimum billing per billing period.

500.10.5 Pressure Reducing Valves

All residential lots shall be provided with approved pressure regulators set at 80 psi, and shall be installed per O.C.E.M.A. or appropriate governing agency's standards.

500.11 STANDARD WATER NOTES

The following standard water notes shall be included on all street improvement plans or water system construction plans.

1. The water system is to be installed by the applicant. All water system work shall conform to the District's "Standard Specifications for the Construction of Domestic Water, Sewer and Recycled Water Facilities," as last revised. The contractor shall have a copy of these plans and standard specifications on the job at all times.
2. The Inspector shall be notified at least two working days before start of work or any inspection. To arrange for inspection, call (949) 425-3532.
3. The District shall be furnished with three (3) copies of approved construction plans prior to starting construction. A preconstruction conference of representatives from affected agencies and the contractor shall be held on the job site 24 hours prior to start of work.
4. Domestic water mains shall be installed after the installation of curb and gutter at six feet off of curb face, or as staked by the applicant's surveyor at a minimum 50-foot stationing, if not within a roadway.

All nuts and bolts, including valves, shall be grade 316 stainless steel. All buried flanges, valves and fittings shall be wrapped with 10-mil polyethylene sheet.

5. Any water service found to be within a driveway or sidewalk shall be removed completely and reinstalled at the proper location, at no cost to the District.
6. All main line valves shall be maintained so as to be accessible during tract development, and all valve stem tops having over 48 inches of cover will require an extension as per MNWD standard drawing W-8.
7. The top of the pipe 12 inches and smaller shall be a minimum of 30 inches of cover from the street subgrade or undercut, whichever is greater, unless indicated otherwise on the job plans or directed otherwise by the District because of unusual conditions. Pipe shall be bedded and backfilled per MNWD standard drawing W-11.
8. Fire hydrants shall be installed in accordance with the appropriate details herein and installed behind curbs and sidewalks where the sidewalks are adjacent to the curbs. Fire hydrants shall be per the District's specifications and shall have a concrete pad poured around them. All fire hydrants shall be set with the bottom flange 4 inches above the concrete pad or sidewalk.
9. All water mains 4" through 16" in unpaved areas shall be pressure Class 350, ductile iron pipe (DIP) unless otherwise noted.

No facility is to be backfilled until inspected by the District.

Shut down or tapping of existing domestic waterlines to facilitate connection to existing facilities shall be coordinated with the District. Any relocations of existing facilities are subject to approval of the Director of Engineering.

10. No taps or other connections shall be made to existing District water mains prior to conducting an approved pressure and bacteriological test on the new water distribution system. Tapping sleeves shall be pressure tested in an approved manner in the field in the presence of the District inspector, prior to tapping the main line. Tapping of the main line shall not proceed unless a District inspector is present.

11. All water services shall be installed per the District's standard specifications. All meters shall be installed in grass or planter areas and accessible by vehicle. Any services located in sidewalks are subject to O.C.E.M.A. or appropriate governing agency and District approval. Any meters located in banks of 4 shall be manifolded per MNWD standard drawing W-2. All meter registers and lids shall be marked with address identification.
12. Where meters and meter boxes are located within slopes, the angle meter stops shall be so located that the meters and boxes will be parallel and flush, respectively, with the finished street surface. A retaining wall may be required around the meter box.
13. The applicant shall furnish and install the service connections between water mains and meters and meter boxes. Water services shall be installed to the property line prior to paving of the street.
14. Curbs shall be inscribed with a "W" indicating locations of all domestic water services.
15. Water low-flow devices shall be provided for all units within this development in accordance with rules and regulations of the District.
16. All valves shall be located off the tee unless otherwise approved by the District. At intersections and bus stops with concrete pads, the main line shall be roped to avoid cross gutter conflict.
17. Individual pressure regulators will be required by the plumbing codes of the city having jurisdiction if static pressure reaches 80 psi or more.
18. All 5/8" through 2" meters and customer service valves will be furnished by Moulton Niguel Water District following receipt of application and deposit. The contractor shall install all meters and customer service valves. The contractor shall expose all angle meter stops and properly locate the meter boxes to grade prior to requesting inspection of the meters and customer service valves by the District.
19. Any District water used shall be metered with a construction meter obtained from the District. The use of jumpers is allowed by permit only. Meters must be installed prior to occupancy of a dwelling.
20. An Encroachment Permit from the County or city having jurisdiction is required prior to any work within public right-of-way or easement.
21. The existence and location of any underground utilities or structures shown on these plans were obtained by a search of the available records. Approval of these plans by the District does not guarantee the accuracy, completeness, location, or the existence or non-existence of any utility pipe or structure within the limits of this project. The contractor is required to take all due precautionary means necessary to protect those utility lines not shown on these plans.
22. The applicant shall remove to the satisfaction of the MNWD inspector all unused water stubs and/or services that were provided to the project site.

500.12 MISCELLANEOUS STANDARD GUIDELINES

1. Quantity estimates, for the domestic water systems, are to be included on the plans indicating quantity of pipe, valves, fire hydrants, domestic water services, etc.

2. The drawing shall show on plan and profile the position of all other known underground utilities or proposed underground utilities. (Top and bottom of pipe elevations may be required in addition.).
3. Blow-off assemblies shall be installed at end and at low points of all mains. Temporary blow-offs shall be installed as service stub-outs for testing and flushing purposes.
4. Air and vacuum valves are to be installed at all high points in the line for 12-inch size pipe and larger, or as directed by the District.
5. Generally the District requires all fittings and valves to have "push-on" type ends, except at tees and crosses where valves are required. Valve and fitting are to be joined by a flange.
6. The contractor shall restore or replace all removed or damaged or otherwise disturbed existing surfaces or structures not otherwise noted on the plans or specified herein to a condition equal to that before the work began and to the satisfaction of District's Engineer, and the City Engineer. All excess earth and all other debris shall be removed and disposed of by the Contractor and the entire site of the work shall be left in a condition acceptable to the Engineer prior to final acceptance of the work. All restoration and cleanup shall be performed in accordance with the District's Standard Specifications.

500.13 RECORD "AS-BUILT" DRAWINGS

500.13.1 Record Drawings

Record drawings shall be based on an "as built" review and shall show all changes in the work constituting departures from the original contract drawings.

Upon completion of each increment of work, all required information and dimensions shall be transferred to the record drawings. Facilities and items to be located and verified on the record drawings shall include the following:

1. Point of connection
2. Location and elevation of all valves, bends and tees
3. Location of all services
4. Type, mfg., and model of valves & fire hydrant. Turns required for complete open/close cycle shall be provided for all valves.
5. Location of buried conduit and sensor line assemblies
6. Items located and constructed as called out in the plans need not be noted as such.
7. Final settings of instrumentation and control equipment.

Prior to submission of the record mylars, two sets of blue lines will be submitted for review by the District. One set will be returned with comments if necessary. Final 4-mil mylar record drawings are to be submitted only upon incorporation of the District's comments.

500.13.2 “As-Built” Review

An "as-built" survey of the completed water line and appurtenances shall be made by the developer's engineer prior to placement of final paving. Markers or monuments shall be set during the placement of backfill so that all connection points, horizontal and vertical angle points, utility crossings, service connections and any other features and/or appurtenances designated by the engineer may be located. The contractor shall submit to the engineer for review, prior to the start of construction of the project, a program for installing the markers or monuments and shall comply with any recommendations of the engineer to modify such a program. It shall be the responsibility of the contractor to re-establish any lost markers or monuments.

500.13.3 Record Drawings Requirements

500.13.3.1 General Requirements

Keep accurate and legible records on a single set of full size project blue line prints of the drawings.

1. Make the record drawings available for review by District's representative in contractor's field office.
2. Maintain record drawings on an up-to-date basis with all entries reviewed by District's representative.
3. Protect the record set from damage or loss.

500.13.3.2 Detailed Requirements

1. Mark on the drawings all changes in the work which occur during construction, including adding approved changes.
2. Show locations by key dimensions, depths, elevations of all underground lines, conduit runs, sensor lines, valves, capped ends, branch fittings, pull boxes, etc.
3. Record information on maintenance access and/or concealed work.
4. Make a record of finalized hydraulic and electrical equipment control settings in the tables and spaces provided on the drawings.

Deliver the marked record set of drawings to the District prior to acceptance of the work.

END OF SECTION