

CRITERIA FOR THE SEPARATION OF WATER MAINS AND SANITARY SEWERS

A. PUBLIC HEALTH CONSIDERATIONS

Waterborne disease outbreaks attributed to the entry of sewage-contaminated groundwater into the distribution systems of public water supplies continue to be a problem in the United States. A community with its buried water mains in close proximity to sanitary sewers is vulnerable to waterborne disease outbreaks.

Sanitary sewers frequently leak and saturate the surrounding soil with sewage. This is caused primarily by structural failure of the sewer line, improperly constructed joints, and subsidence or upheaval of the soil encasing the conduit. A serious public health hazard exists when the water mains are depressurized and no pressure or negative pressures occur. The hazard is further compounded when, in the course of installing or repairing a water main, existing sewer lines are broken. Sewage spills into the excavation and, hence, enters into the water main itself. Additionally, if a water main fails in close proximity to a sewer line, the resultant failure may disturb the bedding of the sewer line and cause it to fail. In the event of an earthquake or man-made disaster, simultaneous failure of both conduits often occur.

The water supplier is responsible for the quality of the water delivered to consumers and must take all practical steps to minimize the hazard of sewage contamination to the public water supply. Protection of the quality of the water in the public water system is best achieved by the barrier provided by the physical separation of the water mains and sewer lines.

This document sets forth the construction criteria for the installation of water mains and sewer lines to prevent contamination of the public water supplies from nearby sanitary sewers.

B. BASIC SEPARATION STANDARDS

The "California Waterworks Standards" sets forth the minimum separation requirements for water mains and sewer lines. These standards, contained in Section 64630, Title 22, California Administrative Code, specify:

- (c) (1) Parallel Construction: The horizontal distance between pressure water mains and sewer lines shall be at least 10 feet.
- (2) Perpendicular Construction (Crossing): Pressure water mains shall be at least 12 inches above sanitary sewer lines where these lines must cross.
- (d) Separation distances specified in (c) shall be measured from the nearest edges of the facilities.
- (e) Common Trench: Water mains and sewer lines must not be installed in the same trench.

When water mains and sanitary sewers are not adequately separated, the potential for contamination of the water supply increases. Therefore, when adequate physical separation cannot be attained, an increase in the factor of safety should be provided by increasing the structural integrity of both the pipe materials and joints.

REVISIONS	BY	APP	DATE		WATER – SEWER SEPARATION CRITERIA TEXT
Revise notes: B.c.2, B.e Add F note	SR	BL	3-06		
Add notes: B.4.g and h	JDL	WAP	2-99		
Consolidate 6110, 6120 & 6130	JDL	JDW	6-02		
STANDARD CURRENT AS OF:		January 2010			Page 1 6110

C. EXCEPTIONS TO BASIC SEPARATION STANDARDS

Local conditions, such as available space, limited slope, existing structures, etc., may create a situation where there is no alternative but to install water mains or sewer lines at a distance less than that required by the Basic Separation Standards. In such cases, alternative construction criteria as specified in Section E should be followed, subject to the special provisions in Section D.

Water mains and sewers of 24 inch diameter or greater may create special hazards because of the large volumes of flow. Therefore, installations of water mains and sewer lines 24 inch diameter or larger should be reviewed and approved by the health agency prior to construction.

D. SPECIAL PROVISIONS

1. The Basic Separation standards are applicable under normal conditions for sewage collection lines and water distribution mains. More stringent requirements may be necessary if conditions such as high groundwater exist.
2. Sewer lines shall not be installed within 26 feet horizontally of a low head (5 psi or less pressure) water main.
3. New water mains and sewers shall be pressure tested where the conduits are located 10 feet apart or less.
4. In the installation of water mains or sewer lines, measures should be taken to prevent or minimize disturbances of the existing line. Disturbance of the supporting base of this line could eventually result in failure of this existing pipeline.
5. Special consideration shall be given to the selection of pipe materials if corrosive conditions are likely to exist. These conditions may be due to soil type and/or the nature of the fluid conveyed in the conduit, such as a septic sewage which produces corrosive hydrogen sulfide.
6. Sewer Force Mains
 - a. Sewer force mains shall not be installed within 10 feet (horizontally) of a water main.
 - b. When a sewer force main must cross a water line, the crossing should be as close as practical to the perpendicular. The sewer force main should be at least 12 inches below the water line.
 - c. When a new sewer force main crosses under an existing water main, all portions of the sewer force main within 10 feet (horizontally) of the water main shall be enclosed in a continuous sleeve.
 - d. When a new water main crosses over an existing sewer force main, the water main shall be constructed of pipe materials with a minimum rated working pressure of 200 psi or equivalent pressure rating.

REVISIONS	BY	APP	DATE
Revise notes: B.c2, B.e Add F note	SR	BL	3-06
Add notes: B.4.g and h	JDL	WAP	2-99
Consolidate 6110, 6120 & 6130	JDL	JDW	6-02
STANDARD CURRENT AS OF: January 2010			



**WATER – SEWER
SEPARATION CRITERIA
TEXT**

E. ALTERNATIVE CRITERIA FOR CONSTRUCTION

The construction criteria for sewer lines or water mains where the Basic Separation Standards cannot be attained are shown in Figures 1 and 2, Engineering Standard #6140. There are two situations encountered:

Case 1 -- New sewer line -- new or existing water main.

Case 2 -- New water main -- existing sewer line.

For Case 1, the alternate construction criteria apply to the sewer line.

For Case 2, the alternate construction criteria may apply to either or both the water main and sewer line.

The construction criteria should apply to the house laterals that cross above a pressure water main but not to those house laterals that cross below a pressure water main.

F. CONSIDERATION OF RECYCLED WATER

1. Recycled water mains shall be treated as sewer mains when considering their separation from potable water.
2. Recycled water mains shall be treated as potable water mains when considering their separation from sewers.

REVISIONS	BY	APP	DATE
Revise notes: B.c2, B.e Add F note	SR	BL	3-06
Add notes: B.4.g and h	JDL	WAP	2-99
Consolidate 6110, 6120 & 6130	JDL	JDW	6-02
STANDARD CURRENT AS OF: January 2010			



CASE 1
NEW SEWER MAIN BEING INSTALLED
(See Figure 1, Engineering Standard #6140)

ZONE	SPECIAL CONSTRUCTION REQUIRED FOR SEWER
A	Sewer lines parallel to water mains shall not be permitted in this zone without approval from the responsible health agency and water supplier.
B	A sewer line placed <u>parallel</u> to a water line shall be constructed of: <ol style="list-style-type: none"> 1. Plastic sewer pipe with rubber ring joints (per ASTM D3034) or equivalent. 2. Ductile iron pipe with compression joints.
C	A sewer line <u>crossing</u> a water main shall be constructed of: <ol style="list-style-type: none"> 1. Ductile iron pipe with hot dip bituminous coating and mechanical joints. 2. A continuous section of Class 200 (DR 14 per AWWA C900) plastic pipe, or equivalent, centered over the pipe being crossed. 3. Any sewer pipe within a continuous sleeve.
D	A sewer line <u>crossing</u> a water main shall be constructed of: <ol style="list-style-type: none"> 1. A continuous section of ductile iron pipe with hot dip bituminous coating. 2. A continuous section of Class 200 (DR 14 per AWWA C900) plastic pipe or equivalent, centered over the pipe being crossed. 3. Any sewer pipe within a continuous sleeve. 4. Any sewer pipe separated by a 10 feet by 10 feet, 4 inches thick reinforced concrete slab.

CASE 2
NEW WATER MAIN BEING INSTALLED
(See Figure 2, Engineering Standard #6140)

ZONE	SPECIAL CONSTRUCTION REQUIRED FOR WATER
A	No water mains parallel to sewers shall be constructed without approval from the health agency.
B	If the sewer <u>paralleling</u> the water main does not meet the Case 1, Zone B requirements, the water main shall be constructed of: <ol style="list-style-type: none"> 1. Ductile iron pipe with hot dip bituminous coating. 2. Class 200 pressure rated plastic water pipe (DR 14 per AWWA C900) or equivalent.
C	If the sewer <u>crossing</u> the water main does not meet the Case 1, Zone C requirements, the water main shall have no joints in Zone C and be constructed of: <ol style="list-style-type: none"> 1. or 2. as in Zone B, above.
D	If the sewer <u>crossing</u> the water main does not meet the Case 1, Zone D requirements, the water main shall have no joints within 4 feet from either side of the sewer and shall be constructed of: <ol style="list-style-type: none"> 1. or 2. as in Zone B, above.

REVISIONS	BY	APP	DATE
Revise notes: B.c.2, B.e Add F note	SR	BL	3-06
Add notes: B.4.g and h	JDL	WAP	2-99
Consolidate 6110, 6120 & 6130	JDL	JDW	6-02
STANDARD CURRENT AS OF: January 2010			



**WATER – SEWER
SEPARATION CRITERIA
TEXT**