CITY OF SAN BERNARDINO
DEPARTMENT OF PUBLIC WORKS
SEWER POLICY & PROCEDURES
Issued 1/5/87

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DIVISION I -- AUTHORITY

It is the intent of this policy statement to provide guide lines and acceptable practices to be used for the design and/or modification of sewer systems within the City of San Bernardino. It is intended to clarify and join together the Standard Specifications for Public Works Construction Code and Municipal Code, as well as accepted practices and Design Standards making a general reference guide.

Criteria set forth herein is for the design of City Sewer Systems to be dedicated to the City for operation and maintenance. Guidelines shall also be used for private on-site sewer mains.

Authority for connection or construction of public sewers is contained in the City of San Bernardino Municipal Code in Sections 13.08 "Connection with Public Sewers," Section 13.32 "Wastewater Facilities," and Section 18.44 "Improvements." These code sections (attached at back of policy paper) establish the criteria, fees, policies and discharge limitations for the sewer system. They in turn refer to council resolutions that establish the specific charges for services. As the resolutions setting fees are from time to time changed, please contact the public counter in the Engineering Section for the current fee structure.

In addition to the Muncipal Code and its authority, the City has conducted two separate master sewer plan studies and reports. This information is on file in the office of the Director of Public Works/ City Engineer and contains information on the capacity, size and future needs of the system. It may be used as a guideline for both alignment and size of proposed sewer lines as well as indicating deficiencies in the present system that may require correction prior to development and/or connection to the system.

The Director of Public Works/City Engineer must review and approve all sewer plans prior to construction and approved plans are required prior to the recordation of Final Maps. Permits for lateral connections to the existing sewer are obtained from the Public Services Section.

All developments must secure sewer capacity rights for disposal at the treatment plant prior to approval of the plans. Information on sewer capacity rights can be obtained from the Water Department.

All development must connect to the City sewer system. Septic systems must be approved by Building and Safety with concurrence by Regional Water Quality Control Board.

Developments within East Valley Water District shall contact East Valley Water for connection information. On-site mains shall be approved by the City of San Bernardino.

DIVISION II — DESIGN CRITERIA FOR MAIN LINE SEWERS (under 15' dia.)

1. Pipe shall be designed to flow at 0.5D or less at design flow. Minimum pipe slope shall be 0.4% except cul-de-sac streets where the pipe slope shall not be less than 1.0%.

2. Minimum design velocity shall be 2 feet per second.

3. Maximum design velocity shall not exceed 10 feet per second.

4. N = 0.013 for VCP or N = 0.011 PVC/ABS unless other values approved in advance.

5. Depth from surface to flow line 8 feet (desirable design depth that may be modified by special field conditions). Less than 8 feet to a minimum of 4 feet requires special approval of the Director of Public Works/City Engineer. Sewers less than 4 feet deep shall be encased in concrete per City Standard No. 309.

6. Recommended depth of lateral at property line is 6 feet (minimum acceptable depth is 4 feet).

7. Minimum pipe diameter is 8 inches.

8. 6-inch diameter sewers are permitted providing they serve no more than 24 units, extend no more than 500 feet and there is no possibility of further extension beyond the 500 foot limit and normal design criteria for grade and velocity are met.

9. Design flow is calculated as $Q_d = 3.6(Q_a)^{.85}$ where Q_d = Design Q and Q_a = Average flow.

10. Average flows are as contained in Table A.

11. Typical manhole spacing 300 to 500 feet with considerations made for line size, alignment and site topography.

12. Clean outs may be permitted at the end of 8- inch and smaller lines as a temporary measure provided the clean out is not more than 150 feet from the downstream manhole, and there are no immediate plans for extension of the sewer line.

13. Drop manholes are not permitted unless no other solution exists and approval is obtained from the Director of Public Works/City Engineer.

14. Preferred location for sewers is 5 feet north or 5 feet east of centerline of streets.

15. All sewers shall be contained in street right-of-way or, if necessary, in a dedicated easement (minimum width 10 feet).

16. A minimum of 0.10 ' fall shall be provided across the manhole base unless slope requires greater fall.

17. Curved sewers wilI be considered that conform to minimum radius of 250' . Manholes will be required at the B.C. and the E.C. of the curved section as well as normal spacing along the curve.

18. For sewers increasing in size, the soffit grades shall match across the manhole.

19. Sewers to extend across ful 1 frontage of development if there is the possibility of future extension.

20. AlI recommendations of the State Department o f Health Services relative to crossing and parallel lines with water supply lines shall be complied with. (See attached Standard Drawings)

21. Laterals and main connections shall be at 90' angle unless approved otherwise. Use standard WYE connection.

22. Supplemental size or capacity may be required based on the City Master Plan or other design considerations.

23. Backflow device required where floor elevation is below rim of upstream manhole. Cleanout shall be installed immediately downstream of the backflow device.

24. Private on-site mains are private sewers serving more than one legally defined lot or unit and where the units are accessed by legally defined private roads or streets.

25. Private lateral systems are private sewer systems that fall entirely within a single legally defined lot that is not served by private streets or roads. Private lateral systems shall be constructed in conformance with the Uniform Plumbing Code and must be submitted for review, approval, and permit.

DIVISION III — DESIGN CRITERIA FOR TRUNK SEWERS (15 inch dia. and over)

1. Pipe designed to flow at .75D at design flow.

2. Minimum velocity is 2 feet per second.

3. Maximum design velocity is 10 feet per second unless abrasive characteristics and pipe materials are established to preclude erosion .

4. Minimum design slope 0.0008 (must meet design velocity requirements).

5. N= .013 for VCP N = 0.011 for PVC unless otherwise approved.

6. Minimum depth from surface to top of pipe is 7.5 feet. Special field conditions may permit adjustments but it must be approved prior to submittal of design drawings.

7. Lateral connections to individual units are not permitted.

8. Design flow is calculated as $Q_d = 3.6(Q_a)^{.85}$ where Q_d = Design Q and Q_a = Average flow.

9. Average flows by type of development are contained in Table A.

10. Manhole spacing is 500 to 1000 feet depending on grade, line size, connections and flow rates.

11. Sewers to be in dedicated street right of way or easements. Minimum easement width to be 10 feet wider than pipe diameter.

12. At changes in pipe diameter, soffit grades are to match.

13. All recommendations of the State Department of Health Services relative to crossings and parallel lines with water supply lines shall be complied with.

14. Parallel water and sewer lines shall have a minimum of 10 feet separation (outside of pipe to outside of pipe).

15. Siphons are not permitted without specific approval and only in cases where no other solutions are possible. Criteria for design will be decided on a case by case basis.

16. Lift stations or pump stations are not permitted without approval and will be evaluated on a case by case basis. They should be avoided if at all possible. Approved lift stations shall also provide for operation and maintenance by Assessment District or other approved method.

17. Supplemental size or capacity may be required based on the City Master Plan or other design considerations.

18. Connection to existing systems may be denied if the system is beyond design capacity or connection would pose a threat to the health and safety of the community.

19. Curved sewers will be considered that conform to minimum radius 250 feet and will require manholes at the E.C. and B.C. additionally, curved sections must maintain integrity of the joints and maintain normal manhole spacing.

20 .Sewers must be extended across the full frontage of the development if there is a possibility for future extension of the line.

TABLE A				
AVERAGE FLOWS — DU = DWELLING UNIT				
Land Use Designation	Description	DU/Acre	Persons/Ac	CFS/AC
R-1	Residential	1	2.6	.000282
R-2	Residential	2	5.2	.000563
R-3	Residential	3	7.8	.000845
R-4	Residential	4	10.4	.001130
R-6	Residential	6	15.6	.001690
R-8	Residential	8	20.8	.002250
R-11	Residential	11	28.6	.003100
R-14	Residential	14	36.4	.003940
R-15	Residential	15	39.0	.004220
R-20	Residential	20	52.0	.005630
R-30	Residential	30	78.0	.008450
E	Elementary School			.002000
J	Junior High School			.002000
S	Senior High School			.002000
JC	Junior College			.002500
SC	Colleges and Universities			.002500
(E)	Proposed Elementary School			.002000
(J)	Proposed Junior High School			.002000
(S)	Proposed Senior High School			.002000
C	Commercial			.003000

RC	Retail Core (Central City)	.006000

TABLE A (CONTINUED)

Land Use Designation	Description	CFS/AC
LI	Light Industrial	.003000
GI	General Industrial	.005000
HI	Heavy Industrial	.005000
A	Airport	.001000
H	Hospital	.008000
SH	State Hospital (Patton)	.008000
OS	Open Space	.000000

DIVISION IV -- GUIDELINES FOR PLAN PREPARATION

A Plan Requirements

1. Sheet size is 24 x 36 inches. (Plan and Profile)

2. Plan to show the following:

a)	Vicinity Map	k)	Existing/proposed surface over sewer line
b)	North arrow	l)	Rights-of-way
c)	Scale	m)	Existing/proposed improvements
d)	Profile	n)	Lot Lines
f)	Utility crossing (shown in profile)	o)	Wyes/laterals
g)	Legend	p)	Manhole top/flow elevation
h)	General Notes	q)	Rate of grade
i)	Registered Civil Engineer	r)	Peak discharge
j)	Expiration date of license	s)	Quantity estimate
		t)	Details & Standards

3. Submit 2 sets of plans for checking, with calculations.

4. Private on-site sewer mains may be shown in plan view.

B. General Notes (On all Plans)

1. All work shall be in accordance with the Standard Specifications for Public Works Construction (Green Book) latest edition and all supplements .

2. Approval of this plan by the City of San Bernardino does not constitute a representation as to the accuracy of the location or of the existence or non-existence of any underground utility pipe or structure within the limits of this project. The Contractor shall assume full responsibility for the protection of all utilities within the limits of the project.

3. Inspection shall be by the City of San Bernardino, Department of Public Works. All requests for inspection shall be made at least 24 hours in advance of the proposed construction.

4. During the period of construction, the Contractor shall furnish, erect and maintain such warnings, signs, stop signs, barricades and other safety measures as directed by the City of San Bernardino, Department of Public Works with reference to W.A.T.C.H. manual.

5. Sewer pipe shall comply with Section 207-7, “Asbestos Cement Pressure Pipe”: Section 207- 16. “ABS Composite Pipe”; Section 207-17, “Polyvinyl Chloride Plastic Pipe'; Section 207-15, “ABS Solid Wall Pipe”; and Section 207-8, “Vitrified Clay Pipe”, of the Standard Specifications.

6. All PVC and ABS solid wall pipe shall have a Standard Diameter Ratio (S.D.R.) of 26 or less.

7. Use of a pipe deflector or re-rounder shall not be permitted on over-deflected pipe.

8. A f ter backfilling and compaction of ABS or PVC pipe, the sewer shall be cleaned and mandrelled. Mandrell shall be rigid type with 9 runners, minimum diameter of 96% of inside pipe diameter and a length equal to or greater than the pipe diameter.

9. Contractor shall not open more trench than can be properly constructed and filled in a days operation. Any trench unavoidably left open during the hours of darkness or over a weekend shall be fenced with 6 foot chain link fencing and properly lighted.

10. Contractor shall reinstall pavement markings and striping that has been disturbed by his operations.

11. OSHA Permit required for trenches over 5 feet in depth prior start of trench excavation.

12. Contractor shall contact Underground Service Alert prior to beginning work.

Additional Notes (To be used as required by specific projects)

1. The Contractor shall provide safe and continuous passage for local pedestrian and vehicular traffic at all times.
2. Traffic signal functions shall be the responsibility of the City. However, the Contractor is required to give 48 hour notice prior to construction that will

damage or affect any buried traffic detectors.

3. Should any of the existing utilities or any other facilities conflict with the proposed sewer line, the Contractor shall notify the engineer and await the relocation and/or alternate design .

4. The Contractor shall so conduct his operations as to offer the least possible obstruction and inconvenience to the public, and he shall have under construction no greater length or amount of work than he can prosecute properly with due regard to the rights of the public.

   Convenient access to driveways, houses, and buildings along the line of work shall be maintained, and temporary crossings shall be provided and maintained in good condition. Not more than one crossing or intersecting street or road shall be closed at any one time without the approval of the Engineer.

   The Contractor shall provide and maintain such fences, barriers, directional signs, lights, and flagmen as are necessary to give adequate warning to the public at all times of any dangerous conditions to be encountered as a result of the construction work and to give directions to the public.

5. The Contractor shall exercise due care to avoid injury to existing improvements or facilities, utility facilities, adjacent property, and trees and shrubbery that are not to be removed. Contractor shall notify USA prior to entering project site.

6. In accordance with generally accepted construction practices, the Contractor shall be soley and completely responsible for conditions of the job site, including safety of all persons and property during performance of the work, and the Contractor shall fully comply with all state and federal laws, rules, regulations, and orders relating to safety to the public and workmen.

7. Street cuts must be obtained from the Department of Public Works/City Engineer.

8. All removals in paved areas shall be saw cut on a neat, straight line parallel to the pipe line. The cut edge shall be protected from crushing and all broken edges shall be recut prior to paving operations .

DIVISION V — TESTING AND INSPECTION

Testing and inspection shall be per the Standard Specifications for Public Works Construction (Green Book), and the provisions of the City of San Bernardino Municipal Code. Requirements for separation and location of crossings of water supply lines shall be per the standards of the Department of Health Services State of California.

In addition to the above requirements, the following will apply:

1. All trench backfills shall be tested and certified by a soils engineer prior to acceptance.

2. 24 hours advance notice is required for inspection. Arrangements for inspection can be made by calling (714) 383-5166 between 7:30 a.m. and 4:30 p.m. weekdays. Please also refer to the 9/80 work schedule posted at this site for downloading.

3. Base inspection hours are 7:30 a.m. to 4:30 p.m. Monday through Friday. Requests for inspection at other times or on other days must be submitted to the Department of Public Works a minimum of 48 hours before the inspection is required. The contractor must bear the cost of such overtime inspections and will be billed accordingly. Normal overtime rates are 1.5 times the base rate. Overtime inspections will be made soley at the discretion of the City and based on staff availability. Closed Fridays under the 9/80 schedule are also subject to overtime inspection rates.

4. Contractors will be required to obtain City business licenses, insurance and provide evidence of same to inspection staff upon request.

5. Pipe deflection testing may be required as provided for in the Standard Specifications, Air or water tests for pipe line integrity are required.

6. Permits are required for all sewer connections.

DIVISION VI — SEWER PLAN CHECK LIST

SEWER PLAN CHECK LIST

_____1st submittal
_____2nd submittal
_____3rd submittal

Project Name
Owner_____Checked by
Engineer _____Phone

_____OK

_____Needs Correction

_____No Requirement

Submittal Completion

_____2 sets of plans

_____2 copies of design calculations

_____Engineer's cost data and itemized quantity estimate complete

_____Permit or clearance needed from

_____ Condition #_____ from Review Committee or Planning Commission needs to be satisfied.

_____Street Cuts require a separate permit.

_____Plans signed by RCE with expiration date shown

_____Return check prints from previous plan checks

Show on Plans:

_____Vicinity map
_____North arrow
_____Horizontal and vertical scales
_____Profile
_____Utility Crossing (Shown in profile)
_____Legend
_____General notes and additional notes as required
_____Registered Civil Engineer's Signature and License Expiration Date.
_____Right-of-way
_____Existing and proposed construction
_____Lot Lines
_____Wyes and Laterals
_____Manhole top and flowline elevations
_____Rate of Grade
_____Peak discharge rate
_____Quantity Estimate
_____Details and Standards
_____Bench Mark
_____Backflow prevention device required
_____Separation requirements from existing or proposed water lines per DHS standards

FEES AND PERMITS

_____Pay plan check fee

_____Pay permit fee

_____Reimbursement fee

_____Inspection fee

_____Plans signed and approved by Director of Public Works/City Engineer

_____Permit issued

_____Other Departments notified

_____CAL-OSHA Permit on File

APPENDIX "A"

(Note: These regulations are promulgated by the Department of Health Services and are reproduced herein for the convenience of the user. The City of San Bernardino can offer no guarantee that these regulations are current or complete)

STATE OF CALIFORNIA — HEALTH AND WELFARE AGENCY
DEPARTMENT OF HEALTH SERVICES

REQUIRED SEPARATION BETWEEN WATER MAINS AND SANITARY SEWERS
(10 Feet Horizontal and I Foot Vertical)

I PUBLIC HEALTH REASONS

Sanitary sewers frequently leak and saturate the surrounding soil with sewage. Water mains cannot always be relied upon to have continuous Positive pressure therein and can be contaminated by a nearby leaking sewer. To install new water mains or to repair breaks in existing mains in sewage contaminated areas is a serious public health hazard. Hazards also can exist if a nearby existing sewer is broken in the course of installing or repairing a water main; this can allow sewage to enter the water main trench or the water main. Water main failures will likely result in failure of any sewer located above or too near the water main.

A community with its buried water mains end sanitary sewers in close proximity is extremely vulnerable to waterborne disease outbreaks in the event of earthquake or man-made disasters that would cause simultaneous fractures to these conduits.

Any case in which both a water main and sewer fail in close proximity is extremely hazardous to the water consumers. There can be no dollar value set on the reduction Of such hazards. All practical steps must be taken to avoid them.

II. BASIC SEPARATION REQUIREMENTS

Water Mains and sewer, should be separated as far as is reasonable in both the horizontal and vertical directions with sewers always lower than water mains.

Parallel construction: The horizontal distance between pressure water mains and sewers shall be at least 10 feet.

Perpendicular Construction (crossing): Pressure water mains shall be at least one foot above sanitary sewers where these lines must cross.

III. EXCEPTIONS TO SEPARATION REQUIREMENTS

Certain local conditions of topography, available space. etc. may create a situation where there is no alterative but to install water mains or sewer lines at less than the

required separation. In such cases, more rigid construction requirements must be met as specified in Section IV below subject to the special provisions and restrictions given in Section V.

The basic separation requirements apply to sewers of 24 inches in diameter or less. Larger sewers may create special hazards because of flow volumes and type of joints used. Each installation of sewers larger than 24 inches in diameter must be reviewed in advance to determine if the separation end protection provided to nearby water mains is adequate.

IV SPECIAL CONSTRUCTION REQUIREMENTS

The special construction requirements necessary for sewers or water mains where the minimum required separation cannot be maintained are given in Attachment No.

1. There are three situations encountered in the field:

Case 1	-	New sewer - Existing water main
Case 2	-	New water main - Existing sewer
Case 3	-	New water main and new sewer

For Case I and 3 the special construction requirements apply to the-sewer. For Case 2 the special requirements may apply to either or both the water main and sewer.

The special construction requirements shall apply to house laterals that cross above pressure water main but not to those house laterals that cross below a pressure water main.

The special construction requirements given are for the normal conditions found with sewage collection lines and water distribution mains. More stringent requirements may be necessary for special circumstances such as water mains buried deeper than normal, unstable soil conditions, high ground water, etc. These situations must be reviewed with the Health Department in advance.

The special provisions and restrictions given in Section V must be followed.

V SPECIAL PROVISIONS AND RESTRICTIONS

1 Sewer force mains are not permitted to be constructed over water mains. Force mains constructed parallel to water mains must have the required separation as given in Section II regardless of construction. When sewer force mains must cross under-water mains, special approval of the Health Department is required in advance.

2 Construction of any sanitary sewers within 25 feet horizontal distance of low head water mains shall be reviewed and approved by the Health Department in advance. (Low head water mains are defined in the State Health Department Policy as any water main which has less than 5 psi at any time at any point in the mark.)

3 Where a sewer must cross over a water main, it should cross at a 90 degree angle if possible and the length of sewer pipe shall be centered on the water main so the sewer joints are the maximum distance from the water main.

4 In pressure tested new water means and/or sewers, special attention should be given to those area where the lines are in close proximity.

ATTACHMENT NO. 1 TO
REQUIRED SEPARATION BETWEEN WATER MAINS AND SANITARY SEWERS

SPECIAL CONSTRUCTION REQUIREMENTS
Where Required Separation Cannot Be Maintained

CASE 1 AND 3: NEW SEWER BEING INSTALLED

Zone	Special Construction Required for Sewer
A	Sewer lines will not be permitted in this zone without special permission from the Department of Health.
B	Extra-strength vitrified clay pipe with compression Joints; or Concrete pipe with reinforced concrete collars around the joints, which joints shall have & minimum thickness of six inches and a minimum distance along the Pipe of six inches on either side of the joint; or rubber gasket,. reinforced concrete pipe; or rubber gasketed asbestos cement pipe; or rubber gasketed plastic pipe; or cast iron with compression joints.
C or D	Class 150 or heavier cast-iron pipe with hot dip bituminous coating and approved mechanical joints; or any sewer pipe within a continuous steel casing, which casing shall have a thickness of not less than one-fourth inch and with all voids between Fewer pipe end compression grouted with sand-cement grout.

CASE 2: NEW WATER MAIN BEING INSTALLED - EXISTING SEWER

If an existing sewer is located within Zone A, B, C, or D of a proposed water main, the following special requirements apply:

Zone	Special Construction Requirements
A	No water mains shall be constructed without special permission from the Department of Health..
B	If the sewer does not meet the Zone B requirements given above the water main shall be of Class 200 pipe or equivalent.
C	No water mains shall be constructed without, special permission from the Department of Health. If permission Is granted, the sewer shall be encased with reinforced concrete and the water main shall be of Class 200 pipe or equivalent.
D	The sewer shall be encased with reinforced concrete.

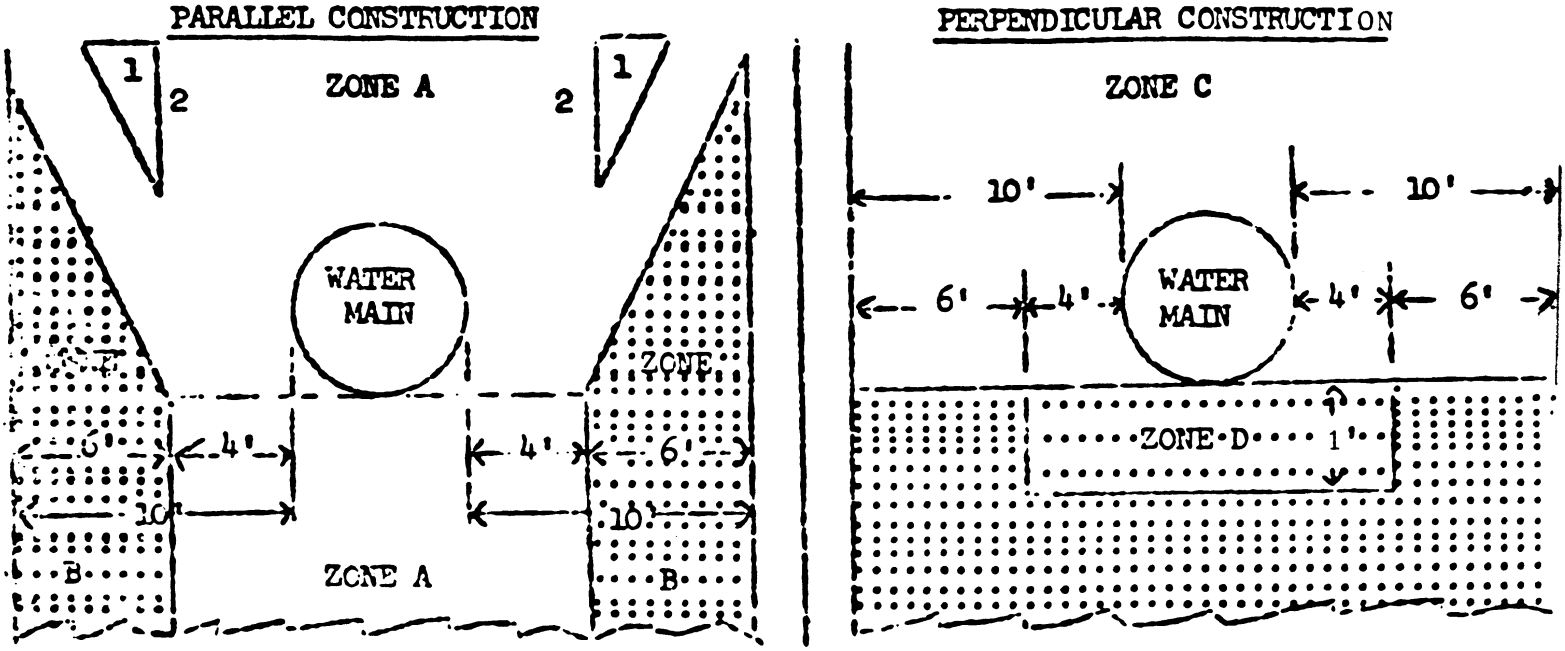
Definitions:

1. Compression joints are rubber ring or gasket joints.
2. Mechanical joints are bolted joints.
. Acceptable reinforced concrete encasement is as follows:

Concrete shall be Class 3 (California Department of Transportation Standard Specifications, Section 90, current issue) or equivalent.

ATTACHMENT NO. 1 to
REQUIRED SEPARATION BETWEEN WATER MAINS AND SANITARY SEWERS

SPECIAL CONSTRUCTION REQUIREMENTS
Where Required Separation Cannot Be Maintained



Notes: Dimensions are from outside of water main to outside of sewer. Explanation of compression and mechanical joints and reinforced concrete encasement on page 4.

CASE 1 and 3: NEW SEWER BEING INSTALLED

Zone	Special Construction Required for Sewer
A.	Sewer lines will not be permitted in this zone without special permission from the Department of Health.
B.	Extra-strength vitrified clay pipe with compression joints; or concrete pipe with reinforced concrete collars around the joints, which joints shall have a minimum thickness of six inches and a minimum distance along the pipe of six inches on either side of the joint; or rubber gasket reinforced concrete pipe; or rubber gasketed asbestos-cement pipe; or rubber gasketed plastic pipe; or cast iron pipe with compression joints.
C. or D.	Class 150 or heavier cast-iron pipe with hot dip bituminous coating and approved mechanical joints; or any sewer pipe within a continuous steel casing, which casing shall have a thickness of not less than one-fourth inch and with all voids between sewer pipe and casing pressure grouted with sand-cement grout.

(Continued on page 4)

CASE 2: NEW WATER MAIN BEING INSTALLED - EXISTING SEWER

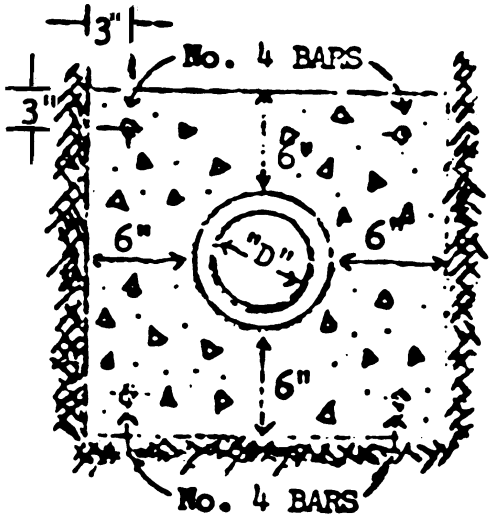
If an existing sewer is located within Zone A, B, C, or D of a proposed water main, the following special requirements apply.

Zone

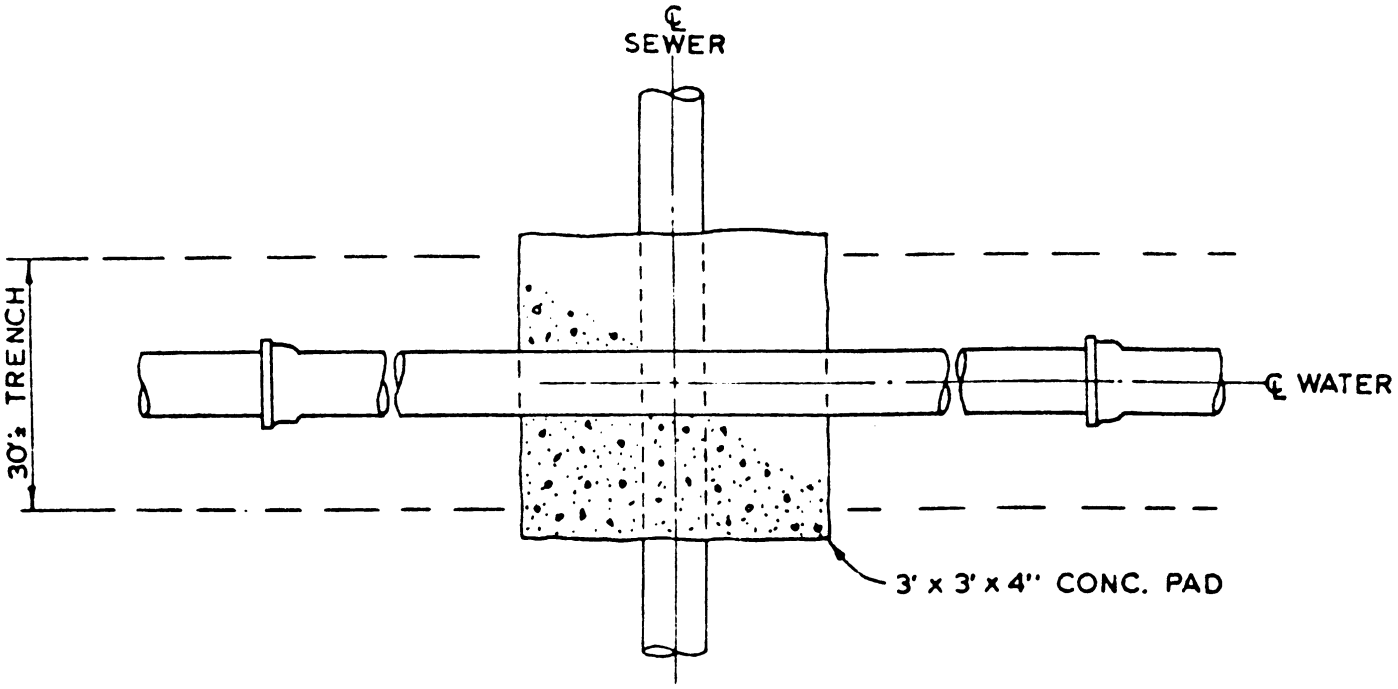
A.	**No water mains shall be constructed without special permission from the Department of Health.**
B.	**If the sewer does not meet the Zone B requirements given above the water main shall be of Class 200 pipe or equivalent.**
C.	**No water mains shall be constructed without special permission from the Department of Health. If permission is granted, the sewer shall be encased with reinforced concrete and the water main shall be of Class 200 pipe or equivalent.**
D.	**The sewer shall be encased with reinforced concrete.**

Definitions:

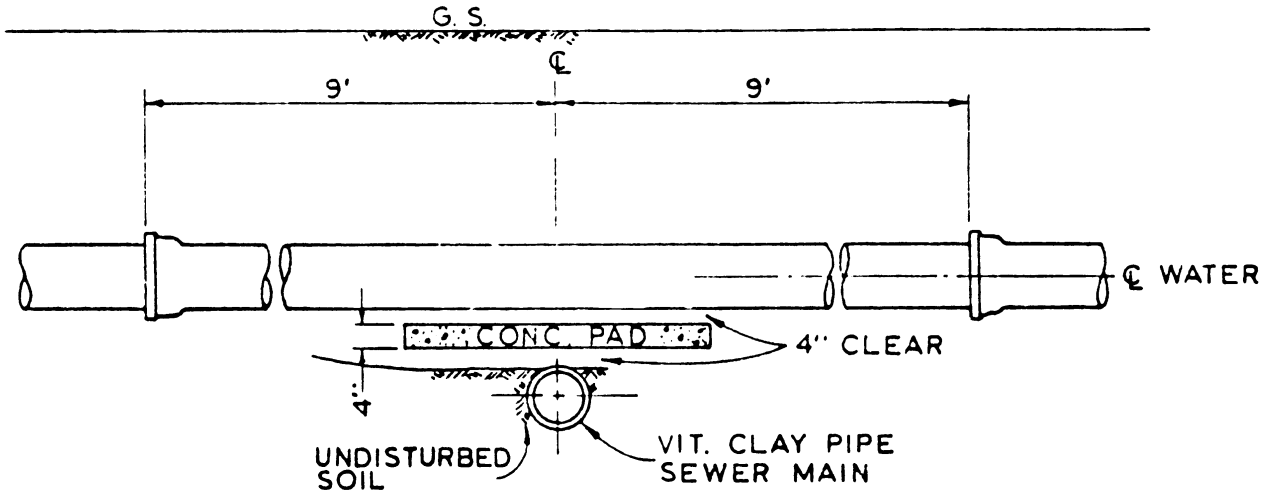
1. **Compression joints are rubber ring or gasket joints.**
2. **Mechanical joints are bolted joints.**
3. **Acceptable reinforced concrete encasement is as follows:**



Concrete shall be Class B (California Department of Transportation Standard Specifications, Section 90, current issue) or equivalent.



PLAN
1/2"=1'-0"



PROFILE
1/2"=1'-0"

WATER & SEWER MAIN INTERFERENCE
SPECIAL CONSTRUCTION - WATER OVER SEWER

A

NO.	DATE	INT'L'S.	REVISIONS DESCRIPTION	APP'V'D

DEPARTMENT OF WATER AND POWER
WATER SYSTEM — CITY OF LOS ANGELES

	NAME	DATE	APPROVED
DESIGNED	K L N.	12-75	
DRAWN	K L N.	✓	
CHECKED	R.G.W.	✓	