# CITY OF OCEANSIDE

**WATER UTILITIES DEPARTMENT**

## WATER, SEWER, AND RECLAIMED WATER DESIGN & CONSTRUCTION MANUAL

## SECTION 3

## SEWER SYSTEMS - DESIGN GUIDELINES

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# SECTION 3 - SEWER SYSTEMS DESIGN GUIDELINES

## 3.1 GENERAL

A. All sewer system construction shall conform to the most recent edition of the City of Oceanside's Water, Sewer, and Reclaimed Water Design & Construction Manual.

B. If a conflict arises between the requirements in this manual, the order of precedence shall take place:

1. Sections 1-4, Required Notes, & Appendix
2. Standard Drawings
3. Standard Specifications

C. If the standard that is sought does not appear in this Manual, then the following standards shall be utilized in the order listed:

1. State of California Department of Health Services
2. American Water Works Association (AWWA) Standards
3. San Diego County Regional Standard Drawings
4. Standard Specifications for Public Works Construction (SSPWC or "Greenbook"), latest Edition.

Exceptions to this and all other guidelines appearing in this manual may be allowed only upon the approval of the Water Utilities Director.

B. The sewer facilities listed below will require telemetry and control equipment to be incorporated into the design of the facility. The Water Utilities Department will provide specific design requirements when improvement plans are submitted for Plan Check.

1. Treatment Facilities
2. Sewer Lift Stations and force mains
3. Metering Stations

## 3.2 MAINS

A. Minimum size shall be 8 inches.

B. All mains not meeting the minimum main diameter and material shall be replaced to meet current design requirements. This is applicable for all new commercial, industrial, institutional, and residential developments of four (4) units or more. Where the full replacement length(s) from manhole to manhole along the property frontage length impacts more than one main and significantly exceeds the developed

property(ies) or is deemed in excess of the overall project cost, the developer may pay an in-lieu fee upon the approval of the Water Utilities Director.

C. Slip-lining or replacement of sewer mains 8-inch or larger may be required if the main is determined to be in poor condition per CCTV report.

D. For diameters 10 inches and smaller, maximum depth of flow shall not exceed ½ the diameter. For diameters 12 inches and larger, depth of flow shall not exceed 2/3 the diameter.

E. No vertical or horizontal curves shall be permitted, unless otherwise approved by the Water Utilities Director.

F. The maximum slope of sewer line shall be 14% unless otherwise approved by the Water Utilities Director.

G. If the main and/or lateral is at a depth of 20 feet or more than the type of pipe material must be approved by the Water Utilities Department. Calculations must be provided to the Water Utilities Department to verify that the pipe material will accommodate the design depths.

H. Locations:

1. Alley: Mains shall be offset a minimum of 3 feet from the centerline to clear alley gutter. Separation from waterlines shall be per Oceanside Standard Drawing S-1 and S-1a.

2. Street: Sewer main locations shall be located in center of the street. A minimum 10-foot separation outside of pipe to outside of pipe from waterlines shall be maintained.

3. Streets with 84 feet of right-of-way or more may require special location as approved by the Water Utilities Director.

4. Minimum cover for sewer mains shall be 6 feet below the finished grade, unless otherwise approved by the Water Utilities Director.

I. Minimum Slopes:

A minimum velocity of 2 FPS shall be maintained at peak flow. Where 2 FPS is not attainable, a minimum slope of 1.6% shall be used. When velocities are 2.0 FPS or greater the following design criteria will govern:

| Pipe Diameter | Minimum Slope |
|---|---|
| 8 Inch | 0.50% |
| 10 Inch and larger | 0.40% |

J. Demands:

1. Average daily sewer generation rates shall be:

| LAND USE | LAND USE CATEGORY | UNITS |
|---|---|---|

| | | |
|---|---|---|
| Low Density Residential | EA-R, EB-R, SDF-R | 170 gpd/EDU |
| Mid Density Residential | MDA-R, MDB-R, MDC-R, HD-R, UHD-R | 140 gpd/EDU |
| Industrial | LI | 1,000 gpd/acre |
| Commercial | CC, NC, GC, SC, PC, GI, RP-I, CI, PI | 1,000 gpd/acre |
| Hotels | | 100 gpd/room |

Peak daily flows for residential developments, shall be based on a ratio of peak to average flow as shown below:

| Population | Ratio of Peak to Average Flow |
|---|---|
| Less than 500 | 3.5 |
| 500 to 1,000 | 2.75 |
| 1,000 to 5,000 | 2.50 |
| Greater than 5,000 | 2.00 |

3. Peak daily flows for all other uses shall be based on the following formula:

$$Qp = 1.84\ Qa^{.92}$$

Where Qp = Peak Flow in CFS
Qa = Average Flow in CFS

I. Residential area easements shall be constructed by the developer. They shall be fenced on both sides parallel to the easement with a gate at the entrance and the exit. Easements shall be dedicated to the City and maintained by Property Owner with a lock feature.

J. All sewer mains not located within the public right-of-way shall be provided with a minimum 20-foot wide sewer easement. In some special cases, a wider easement may be required; the Water Utilities Director shall determine size. All easements shall be easily accessible to City maintenance equipment with all weather roadways. An access road will be built for trucks and as approved by the Water Utilities Department.

K. All utility easements that contain sewer mains, which will be publicly maintained, shall demonstrate that the largest vehicle within the Sewer Collections Fleet can transverse the streets without damage to both public and private property. The turning radius of this vehicle will be made available upon request.

L. Where water and sewer mains are located within the same easement, the minimum easement size shall be 30 feet wide. All easements shall be easily accessible to the City's maintenance equipment with all-weather access roadways. No trees or structures or building overhang are allowed within the City easements. When easements are located on private properties, the property owner shall keep the easement free and clear of weeds and debris.

M. 3-inch minimum width color coded detector tape marked "SEWER" in 1-½ inch black letters shall be placed on the compacted and graded bedding material one foot above and centered over the sewer main prior to backfilling the trench.

## 3.3 MANHOLES

A. Minimum pipe inlet—to—outlet invert elevation drop through manholes shall be 0.20 feet.

B. Manholes shall be required:

1. At all changes of slope.
2. At all changes of direction.
3. At all intersections of mains – match soffits
4. At all ends of lines and beginning of lines.
5. At locations of connections 6-inches or larger
6. Changes in pipe size and/or material

C. Prohibited locations for Manholes.
Manholes shall not be placed in the following locations:

1. Inaccessible locations
2. Gutters and other depressions
3. In sidewalks, crosswalks, or pedestrian ramps
4. In driveways
5. In freeway ramps or lanes
6. Between railroad tracks (within a railroad right-of-way the manhole shall be located a minimum of fifteen feet from the track bed and in accordance with the jurisdictional authority)
7. Within fifteen feet of any structure
8. Within any area subject to flooding

D. All manholes shall be numbered and stationed on the improvement plans, and on the sewer table calculations.

E. Manhole spacing shall be a maximum of 300 feet, or as approved by the Water Utilities Director.

F. Drop manholes will be evaluated on a case by case basis by the Water Utilities Director. If there are other alignments and/or methods that would be used to eliminate the use of drop manholes these will be used in lieu of drop manholes.

G. When changes in grade of the inlet and outlet pipes are greater than 10 percent of the potential for a hydraulic jump exists, the grade change will be made in a smooth vertical curve, upstream of the manhole, with the manhole located 25 feet

downstream of the lower end of the vertical curve. Each hydraulic jump will be carefully evaluated by the Water Utilities Director prior to approval.

H. Large Diameter Manholes. For sewer mains greater than 36 inches in diameter, special design and structural details for the manholes or vaults shall be shown on the plans. Vaults shall require a minimum of two access manholes.

I. Deep Manholes. For manholes that exceed 25 feet in depth, vaults shall be provided with a minimum of two access manholes for each vault. Structural calculations (signed by a structural engineer) shall be provided to verify that the structure is designed to accommodate the design depths.

J. Inspections of Existing Manholes. The removal of existing City manhole covers is not permitted under any circumstance. If access to any City manhole is required for design or construction purposes, then Water Utilities should be contacted at 760-435-5800.

K. For all commercial and industrial uses, an inspection manhole on the lateral is required, per Oceanside Standard Drawing S-7, and located immediately behind the property line. For residential uses, a clean out shall be provided within 2 feet behind of the property line.

## 3.4 LATERALS

A. Size - Minimum 4 inches, per Oceanside Standard Drawing S-3.

B. Sewer laterals 6 inches and larger shall be connected to an existing manhole or a new manhole shall be constructed.

C. All sewer laterals are private.

D. All un-used sewer laterals shall be properly abandoned at the main.

E. An inspection manhole shall be provided behind the property line for all commercial and industrial projects per City of Oceanside Standard Drawing S-7.

F. All laterals are to be shown on improvement plans by stationing or a lateral table. On “As-Built” plans all laterals shall be shown in plan view to scale and dimensioned from the nearest sewer manhole.

G. Locations:

1. Right angle or radial to street right-of-way.

2. Standard is from the center of lot to 5 feet above downstream lot line (shown on “As-Built” plans).

3. Service shall not be located in the driveway.

4. An “S” shall be stamped on the curb face directly above the lateral location.

5. Separation between sewer and water laterals shall be per Oceanside Standard Drawings S-1 and S-1a.

6. Sewer laterals shall be at right angles to the sewer main, except in a cul-de-sac.

F. Cover: 5 feet minimum at property line.

G. Any lot with a finished pad elevation lower than the top of the finish street grade where the sewer main is located and services this lot, must install a sewer Backwater Valve equal to that shown in Oceanside Standard Drawing S-4, on private property. The valve must be installed in a valve box for easy access and be visible from the public right-of-way. The property owner shall be responsible for the installation and maintenance of the sewer Backwater Valve. The Backwater Valve shall be shown on the precise grading and improvement plans.

H. Each parcel or lot shall be a separate connection to public sewer main.

## 3.5 LIFT STATIONS

A. Lift Stations shall not be employed unless deemed essential by the Water Utilities Director. The City of Oceanside Water Utilities Department will provide design criteria.

## 3.6 LIST OF AUTHORIZED MATERIALS USED IN THE CITY SEWER SYSTEM

A. Interior of manholes: Coat with Sancon 100, Zebron, or Sauereissen SewerGard No. 210X with a minimum dry film thickness of 125 mils. All of the manufacturer's recommendations for cleaning and installation of coating must be strictly adhered to.

B. Pipe:

1. Sewer House Laterals in public right-of-way or public easement shall be Polyvinyl Chloride (PVC), ASTM D3034—SDR 35 pipe minimum.

2. Sewer Mains:

a. Preferred material for mains shall be PVC. However, DIP and other alternative material may be approved by the Water Utilities Director.

b. PVC Pipe: Minimum size of 8 inches is required. 4"-15" PVC shall meet ASTM D3034—SDR-35 requirements, minimum. 18"-24" shall meet ASTM F679 requirements, minimum and shall be submitted to the Water Utilities Department for approval.

c. For depths less than 6 feet or greater than 12 feet, within easements, and for pipe slopes greater than 6%, PVC ASTM 3034—SDR-26 (non-IPS) shall be used (PVC C-900 or C-905 may be used in some cases).

d. PVC pipes shall not have slopes less than 2%. The maximum diameter shall be 24 inches. A PVC application may be allowed for a slope of less than 2% provided that the length of each section does not exceed 14 feet, a minimum 2 FPS velocity is maintained, or as approved by the Water Utilities Director.

e. Joint gasket material shall be an elastomeric seal meeting ASTM Specification F 477 unless otherwise specified.

f. All pipe placed between manholes shall be the same material.

g. Plastic sewer pipe shall meet the applicable material specification of 207-17 of the Standard Specifications for Public Works Construction ("Greenbook"), most recent edition.

h. An approved seal or water-stop shall be placed over the plastic sewer main at the manholes. Per Oceanside Standard Drawing S-2.

i. Ductile Iron Pipe shall be polyethylene lined, or approved equal.

j. Polyethylene Encasement: All Ductile Iron pipe fittings and appurtenances are to be encased with two (2) layers of 8-mil thick tubing of white or black polyethylene in accordance with AWWA C-105 and SSPWC 207-9.2.6

k. Design calculations shall be submitted to verify line size and bedding design. Normally a Manning "n" = 0.013 will be satisfactory.

C. Backwater Valve (Per Oceanside Standard Drawing S-4)

1. Flo-Control Series 1530, Non-pressure, or approved equal.

2. See Section 3.4, Paragraph G for requirements. The backwater valve shall be similar to the one as described above in function and design.

D. Backfill and Bedding Materials

1. Bedding standards are contained in this Manual's Oceanside Standard Drawing S-2. PVC sewer mains shall meet this requirement.

2. Where sand or native materials are specified for Type "A" material, they shall meet the testing specification requirements of the Construction Guidelines and Requirements section of this Manual.

3. ¾-inch rock may be used to 1 foot over pipe if submitted to, and approved by, the Water Utilities Department.

4. Trench backfill to be compacted to 95%.

## 3.7 PRIVATE SEWER SYSTEMS

A. All private sewer systems shall be governed by and permitted through the Water Utilities Department. The Engineering Department shall be performing all inspections on private sewer systems. An inspection manhole shall be set at the property line and at the mainline if required.

B. The sewer system upstream of the inspection manhole at the property line shall be considered private. If no inspection manhole is required, the entire lateral from the main shall be considered private.

C. In the event that a private sewer system is proposed to be converted to a public system, the entire system must be upgraded to meet the public standards as presented in this manual.

## 3.8 PRIVATE LATERAL SYSTEMS

A. All private laterals are defined as a conveyance pipe from private property to the City's sewer main. The private lateral connection point is at the City's sewer main.

B. Any maintenance that encroaches into the public right-of-way shall obtain an encroachment permit.

C. Existing laterals to be lined shall obtain a permit through the City's Engineering Department.

D. The wye extension shall be considered part of the lateral and the homeowners responsibility.

## 3.9 POLLUTION PREVENTION AND PRETREATMENT PROGRAM

Inspection Manholes

A. All domestic or sanitary wastewaters from restrooms, showers, drinking fountain, etc., shall be kept separate from all industrial/commercial wastewaters until the industrial/commercial wastewaters have passed through any required pretreatment system or device. The owner of any property discharging industrial wastes or other non-domestic water into the public sewer shall install and maintain, at its expense, an Inspection manhole for each separate discharge conveying process wastewater from its facility to the City sewerage system. Inspection manholes sewer lines shall not convey waste from bathrooms or other non-process wastes. Each such Inspection manhole shall have ample room to allow the City to perform inspections, sampling and flow measurement operations. They must be fully accessible at all times and safely located, and shall conform to the most recent edition of the City of Oceanside Water Utilities Engineering Manual and be constructed in accordance with plans and specifications approved by the City Engineer or as approved by the Water Utilities Director.

B. Each such Inspection manhole shall be located outside of any buildings or enclosed spaces and as near to the facility site boundary as practicable; shall not be obstructed by temporary or permanent construction, manufacturing operations or activities, landscaping, parked vehicles or any other activities, and shall be safely and directly accessible to representatives of the City at all times, without any restriction of any kind.

C. If a building or enclosed space contains more than one industrial user, then each industrial user therein, shall install and maintain, at its own expense, an Inspection manhole for each discharge from the facility, which shall comply with all requirements set forth herein. All process wastewater flows from the facility shall, at all times, pass through an Inspection manhole installed in conformance with this Ordinance and no process wastewater flows shall be discharged without passing through an Inspection manhole acceptable to the City. It shall be safely and directly

accessible to representatives of the City at all times, without any restrictions of any kind.

D. Inspection manholes are required where circumstances indicate that monitoring may be required at some future time due to a facility's location, design, or intended future use.

E. Inspection manholes are generally necessary to monitor for:

1. Prohibited waste streams such as those potentially having high temperature, high oil and grease, high or low pH, or other unusual characteristics. See Section 29 of the City of Oceanside Ordinance for more information regarding prohibited wastes.

2. Permitted wastes for local limits.

3. Permitted wastes for categorical limits.

4. High strength waste subject to surcharge costs.

5. Flow or volume measurement.

6. Visual observations, etc.

F. To assist the industrial user, the following criteria are set:

1. Each Inspection manhole must be located outside the facility, at or near the property boundary.

2. All process wastewater flows from the facility must pass through the Inspection manhole without capability or possibility of bypassing any Inspection manhole.

3. Only process wastewater shall flow through the Inspection manhole. The Inspection manhole shall be located after the treatment system prior to joining the City sewer system.

4. Each Inspection manhole must be constructed in such a manner as to allow for the installation of locked City sampling and flow measurement equipment.

5. Access to each Inspection manhole must be unrestricted at all times. If an outside Inspection manhole is located within a fenced or secured area, unrestricted access must be guaranteed. A key to any locked gate must be provided to City personnel.

6. Each Inspection manhole must be free of all physical, chemical and atmospheric safety hazards.

7. Prior to the installation of any new Inspection manhole, a formal proposal, including site and design drawings, must be submitted to the City for approval. The submitted proposal must be certified by a professional engineer registered in the state of California.

G. Existing industries undergoing remodeling, which require a building permit or Change in Operations, shall be required to install an Inspection manhole that meets the criteria mentioned above. An application for a new Wastewater Contribution Permit must be submitted with the building permit.

H. Existing industries with a current City of Oceanside Wastewater Contribution Permit at the time of the adoption of this Ordinance shall not be required to install Inspection manholes until the industry undergoes remodeling that requires a building or tenant improvement permit or has a change in ownership, lease, transfer or assignment of the business or premises or a Change in Operations.

**END OF SEWER SYSTEMS DESIGN GUIDELINES**