

K. SEWER SYSTEM BASELINE CONDITIONS



Appendices

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**CITY OF ANAHEIM
GENERAL PLAN UPDATE**

SANITARY SEWERS

**BASELINE CONDITIONS
OPPORTUNITIES AND CONSTRAINTS**

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I. INTRODUCTION

This report presents a brief summary of baseline conditions and a general overview of key opportunities and constraints associated with sanitary sewer collection system conditions within the City of Anaheim. The main intent of the preliminary assessments presented here is to provide macro-level, order of magnitude assessment of baseline local (City) sewer system facilities conditions, which will be used in updating the General Plan for the City. Detailed accounting of baseline conditions would be part of a comprehensive Master Plan of Sewer Facilities or of specific area sewer master plans. The information presented in this report will be the basis for evaluating proposed land use alternatives and in the preparation of an updated General Plan and an Environmental Impact Report (EIR). The main objectives of this report are to:

1. Research, collect, and synthesize background information and data previously prepared.
2. Identify areas where recent sewer system studies have not been conducted and provide qualitative descriptors of existing conditions.
3. Provide an evaluation of existing City sewer system facilities based on a comparison of existing capacities with the estimated sewer flows in the existing condition.

The identification of sewage collection systems that are presently at capacity, or which may reach capacity as the City reaches the level of development projected by the current General Plan, will be useful in identifying constraints to growth or requirements for improvement to the collection system.

II. BACKGROUND

General

The City of Anaheim encompasses an approximate area of about 50 square miles bounded generally by the Cities of Fullerton, Placentia and Yorba Linda to the north; the Cities of Stanton, Garden Grove and Orange to the south; County of Orange unincorporated areas to the east; and the City of Buena Park to the west. The City is comprised of mostly developed land with a variety of land uses including residential, commercial, industrial, roads, and parkland.

Sewage is collected by City collector facilities and conveyed to trunk sewers owned and maintained by the Orange County Sanitary District. There are small portions of the City that receive local sewer service from adjacent agencies, including Stanton County Water District and the Garden Grove Sanitary District. The topography in the majority of the City is relatively flat. The exception is the northeast area of the City (south of Route 91 Freeway) where there are hills and canyons. The area served by the City collector system is shown on the Sewer System Study Index Map, Exhibit A.

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Master Plans

The City is currently updating its General Plan. In the existing plan, the City has been divided into two geographic planning areas, Areas A and B. These areas were separated because of their distinct topographic and land use covers. Planning Area A includes the primarily developed portion of the City, west of the Santa Ana River. Planning Area B included both developed and undeveloped hills and canyon areas, east of the intersection of the Riverside and Costa Mesa/Newport Freeways. The General Plan's policies and goals related to sanitary sewers include the following:

1. To provide adequately sized collector sewers to serve new developments in the City;
2. Monitor the existing sewer systems for impacts caused by changes in land use and living patterns and provide additional sewer capacity where necessary;
3. Construct sewers in the unserved portions of the City, such as the Mohler Drive area.

The City has recently conducted Area Sewer deficiency studies in the areas of the City most prone to have sewer capacity issues. These areas are the West Anaheim Area, The Stadium Area, The Northeast Industrial Area, The Old Town/Basin 8 Area, and the South Central Area. The reports of each of these areas are discussed in a subsequent section. The various areas are delineated on Exhibit A.

III. SANITARY SEWER STANDARDS AND CRITERIA

The ratio of flow depth to pipe diameter is designated d/D . The depth of flow is related to the quantity of effluent carried in the pipe and the slope (or fall) of the pipe. The theoretical depth of flow of a gravity line can be greater than the diameter of the pipe. This condition, called pressure flow, can result from either an elevated depth of flow in the receiving facility (called backwater) or from a surcharge at the entrance to the pipe, called headwater.

City criteria for d/D ratios are a maximum of 75 percent ($d/D=0.75$) for pipes equal or larger than 12-inches and 67 percent ($d/D=0.67$) for pipes smaller than 12 inches in diameter. Sewer pipes are identified as deficient if they exceed the d/D criteria for the pipe diameter.

Velocity of flow is also a consideration in the design of sanitary sewer collectors. It is desirable to maintain a minimum velocity sufficient to keep the pipe self-cleaning. While this criteria is important in the design of new sewers, it was not used in the sub-area studies.

IV. METHODOLOGY

The methodology presented herein was developed commensurate with the appropriate level of detail associated with General Plan efforts. Any detailed analyses would be conducted as part of a future City-wide Sewer Master Plan and Capital Improvement Project. For General Planning purposes, a compilation of previous studies supplemented with a macro-level, order of magnitude, assessment of sewer demands and hydraulic sewer pipe relationships is sufficient.

This report is a compilation of information appearing in studies previously conducted by or for the City.

The following previous reports were used in preparing this report:

1. **Combined West Anaheim Area Master Plan of Sanitary Sewers**, CH2M Hill, December 2001.
2. **Stadium Area Sewer Deficiency Study**, Merit Civil Engineering, Inc., December 1998.
3. **Northeast Industrial Area Sewer Deficiency Study**, ASL Consulting Engineers, May 1998.
4. **Old Town/Basin 8 Sewer Deficiency Study**, Public Works/Engineering Department Design Division, October 1993.
5. **South Central Area Sewer Deficiency Study (2nd Revision)** Public Works/Engineering Department Design Division, January 1993.

Exhibit A shows the areas of the City studied in the above reports. There are some areas within the City that are not included in the above studies. The omitted areas also appear on Exhibit A.

These reports are generally consistent in their methodology and approach to the analysis. Each report relies on population data and land use information prepared by the City Planning Department. The Department of Public Works has adjusted this data by considering such factors as Orange County Sanitary District's standard population density assumptions, reviews of actual land use (such as non-generating areas within an area zoned for residential use) and flow monitoring studies conducted by CH2M-Hill and MGD Technologies under contract to the City.

V. BASELINE CONDITIONS

Each of the reports mentioned above focused on two scenarios, the “baseline condition” and the “buildout condition.”

The “baseline condition” is the condition at the time of the report generation. The purpose of that portion of the study is to identify existing deficiencies in the sanitary sewer system in the current sewer flow rates.

The study of the “buildout condition” seeks to identify portions of the collection system that are presently satisfactory, but lack the capacity to support the growth envisioned by the governing planning document. In most cases, the governing planning document is the current General Plan. In some cases, the proposed “buildout” does not utilize the entire capacity of the sanitary sewer collection system, creating an opportunity for further growth or alternate land uses.

The paragraphs below summarize the “baseline” studies in each of the sewer areas mentioned. The following section addresses constraints and opportunities during and following the proposed “buildout.”

West Anaheim Area

This area consists of all portions of the City of Anaheim west of the sewer boundaries of the Central City/Basin 8 and South Central Areas. The area includes all City territory westerly of Euclid Street and small portions of the Cities of Fullerton and Garden Grove and small portions of unincorporated Orange County. (See Area 1, Exhibit A.)

The area consists of residential, commercial and industrial land uses. The population of the area is stable and major shifts in land use are not anticipated in the existing General Plan.

The sanitary sewer system in the area studied is generally satisfactory for current conditions. Reference Report Number 1 identified approximately 5,325 linear feet of pipe in the western section of the area, which should be improved to fully meet the depth of flow criteria previously discussed. These deficiencies are shown on Exhibit B (sheet B-1) of this report and are described in Reference Report Number 1.

Stadium Area

The Stadium Area is a portion of the City situated easterly of the South Central Area and bordered on the east by the Santa Ana River. The northern boundary is approximately at Ball Road, and the southern boundary is the Santa Ana Freeway (Interstate 5). (See Area 2, Exhibit A.)

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The area was studied in 1998 (Reference Report Number 2) after the construction of Edison Stadium. Approximately 1006 feet of 10-inch line was found to be undersized in the current condition. These deficiencies are shown on Exhibit B (sheet 1) of this report and are described in Reference Report Number 2.

Northeast Industrial Area

This area was the subject of the Anaheim Northeast Area Specific Plan No. 93-1. The boundaries of the wastewater service area, shown on Exhibit A, are nearly coincident with the boundaries of that document. For location purposes, this area can be thought of as the portion of the City southerly of the Burlington Northern Santa Fe Railroad, northerly of the Santa Ana River and easterly of Imperial Highway. (See Area 3, Exhibit A)

The land use at the time of the 1998 study was a mixture of residential, commercial and industrial activities. The specific plan has guided the development of the area and modified the General Plan to accommodate an increase in commercial uses. This change was anticipated by Reference Report Number 3.

The only deficiency noted in the base line condition was a relatively minor problem in the eastern end of the area. This deficiency is shown on Exhibit B (sheets 1 & 2) of this report and is described in Reference Report Number 3.

Old Town/Basin 8

This area lies easterly of the West Anaheim Area. It is identified as Area 4 on Exhibit A and is that portion of the City easterly of Euclid Street, northerly of Vermont Avenue, and westerly of State College Boulevard.

This area represents the most historic part of the City. Much of the sewer system was constructed nearly 50 years ago based on significantly different land use parameters. As a combination of capacity limitations and operation and maintenance requirements of a system at or beyond its life expectancy, 68,200 linear feet of sanitary sewer was deficient at the time of the 1993 study (Reference Report Number 4). These deficiencies are shown on Exhibit B (sheet 2) are described in Reference Report Number 4.

South Central Area

The South Central Area is the portion of the City southerly of Vermont Avenue, east of 9th Street and West of State College Boulevard (See Area 5, Exhibit A). This Area includes Disneyland and the associated district of hotels, shops, restaurants, and similar enterprises.

At the time of the 1993 study, Reference Report Number 5, approximately 24,100 lineal feet of collector sewers were identified and deficient for either capacity or operational reasons. A significant portion of the deficiencies have since been corrected with the recent I-5 widening and Disneyland refurbishing. The remaining deficiencies are shown on Exhibit B (sheet 1) and are

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described in the Reference Report Number 5. Additional trunk lines were identified as deficient but were not quantified.

Undesignated Areas

Additional areas of the City, principally on the easterly side of the Santa Ana River, were not included in any of the five studies. Due to the steep topography and consequent steep slope of the sewer main, the d/D ratio is not likely to approach the maximum allowed. Moreover, since the development in the area is relatively recent it is reasonable to assume that the most recent standards and land use projections were used, establishing sufficient sewer system capacity both in the present condition and at ultimate buildout.

The information provided above provides a summary of baseline conditions associated with the sewer collection system conditions within the City. As stated before, the methodology presented herein was developed to be commensurate with the appropriate level of detail associated with General Plan efforts. The intent of this evaluation is to provide a macro-scale, order-of-magnitude assessment of baseline sewer system conditions. Furthermore, the analysis provided above is based on an evaluation of local facilities only and without regard to the downstream regional facility hydraulic conditions or treatment facilities. Any detailed assessment of baseline conditions and analyses would be conducted as part of a future City-wide Sewer Master Plan and Capital Improvement Program.

In addition, any deficiencies identified in facilities owned and maintained by the Orange County Sanitation District have not been addressed.

VI. OPPORTUNITIES AND CONSTRAINTS

The City of Anaheim projects a period of growth during the next thirty years in terms of increased population, increased levels of land use, and to some extent possible, annexation of adjacent areas. Each of the referenced reports studied the possible effects of this growth upon the sanitary sewer collection system and identified areas where improvements in the system must parallel development of the land in order to maintain a satisfactory level of service.

In some cases, the proposed “buildout” does not utilize the entire capacity of the sanitary sewer collection system, creating an opportunity for further growth or alternate land uses. In no case did the change in land use proposed by the existing General Plan result in a reduction of flows into the system.

The findings of the various reports are summarized below.

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West Anaheim Area

The West Anaheim Area is an area of substantial development and established infrastructure. The projected redevelopment and revitalization of the existing land use will require corresponding improvements to public facilities, including the sewage collection system. A cumulative total of 23,530 lineal feet of sewer system needs to be improved, as the area develops in order to meet the desired level of service. This includes the 5,325 lineal feet mentioned in the analysis of the base line condition. These deficiencies are shown on Exhibit C (sheet 1) of this report and are described in the Reference Report Number 1.

Stadium Area

At the time of the 1998 report (Reference Report Number 2) the intended "buildout" was nearly complete, so a study of future conditions was not included. With the exception of the deficient sewer line noted in Section V, the collection system operates well below capacity.

Northeast Industrial Area

This is an area of relatively recent development and the existing sewer system (except for the relatively minor problem in the eastern end of the area noted in the baseline study) is sufficient for the City's need as the development proposed in the existing General Plan takes place.

Old Town/Basin 8

The baseline study described the age and condition of the sewage systems in the older portion of the City. To support the projected growth in this area a total of 94,720 lineal feet of sewers should be replaced or upgraded as the area continues to develop. This includes the currently deficient as identified in the baseline study. These deficiencies are shown on Exhibit C (sheet 1) and are described in Reference Report Number 4.

South Central Area

Improvements to both the City collection system and the County trunk lines were implemented with the development of new resort facilities in this area. However, those improvements were intended to serve those resort facilities. The previously existing sewers, like those in Old Town, are of advanced age and outdated design. In addition to the 24,100 lineal feet of sewer considered deficient in the present condition, the projected growth will cause deficiencies in an additional 31,400 lineal feet, for a cumulative 55,500 lineal feet. Again, a significant portion of these projected deficiencies were addressed in the I-5 widening project and the recent Disneyland renovations. The deficiencies are shown on Exhibit C (sheet 1) and are described in Reference Report Number 5.

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Undesignated Areas

Additional smaller studies should be conducted as individual projects are proposed, both in the study areas described above and in areas of the City not currently studied. It is important that each project not only provide for the sewer needs on-site, but that the effect on existing infrastructure be evaluated and that provisions are made to mitigate increased demands.

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