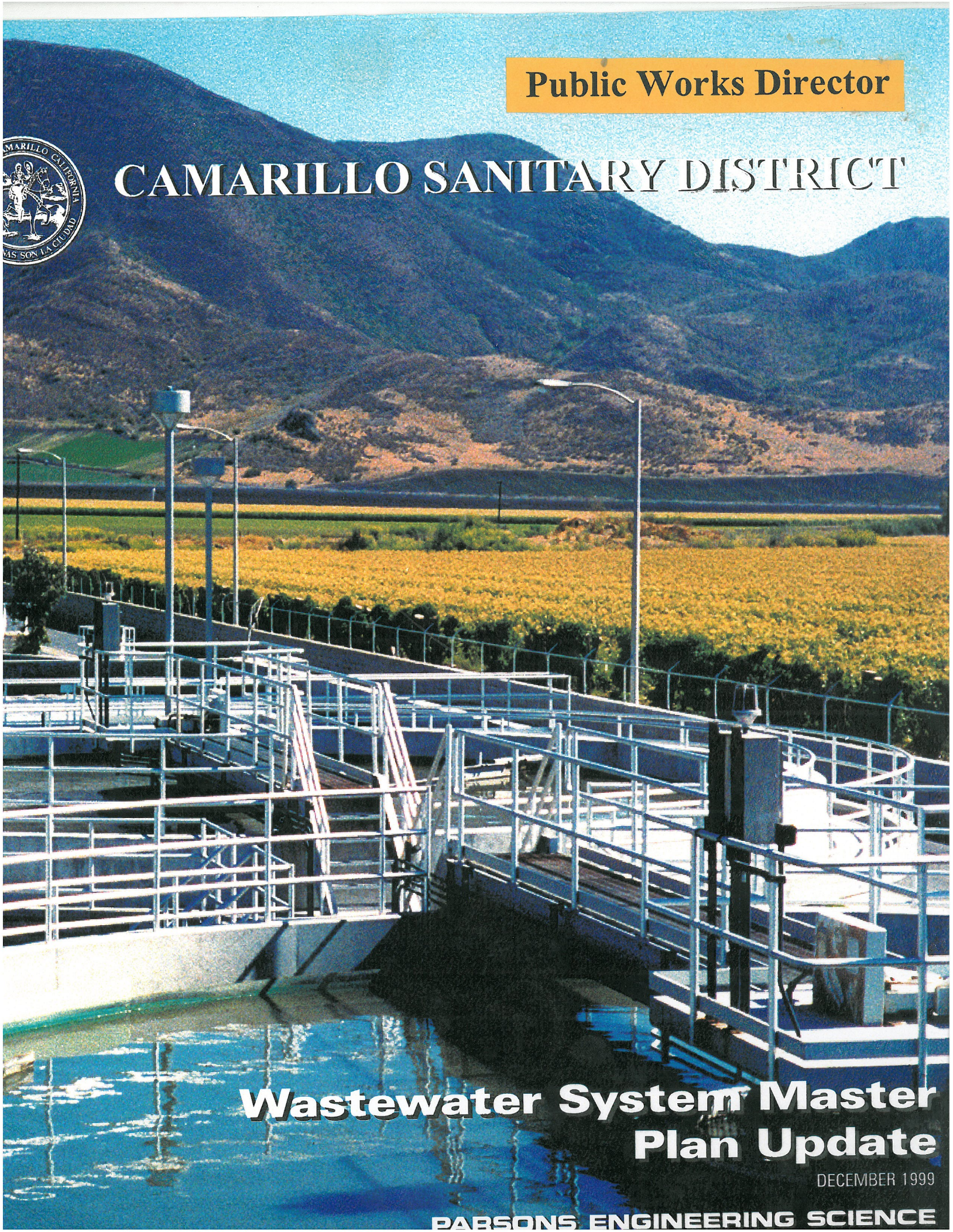
Public Works Director

CAMARILLO SANITARY DISTRICT



Wastewater System Master Plan Update

DECEMBER 1999

PARSONS ENGINEERING SCIENCE

CAMARILLO SANITARY DISTRICT

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WASTEWATER SYSTEM MASTER PLAN

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Chapter 1

INTRODUCTION

BACKGROUND

Since its formation in the mid 1950s, the Camarillo Sanitary District (CSD) has provided wastewater service for the City of Camarillo and adjacent areas. At the time of its formation, the CSD was offered 20 acres for the construction of its wastewater treatment facility in exchange for treated effluent to be used for irrigation purposes. The property (Smith Property) is located to the southeast of the City of Camarillo. Due to the topography and geographical location of this site, the wastewater collection system consists of a number of trunk sewers, which are intercepted by a series of pumping stations which pump wastewater through force mains laterally across the tributary areas to the treatment plant.

Due to sustained growth in the area, the treatment plant was expanded several times from its initial design capacity of 2.75 million gallons per day (mgd). The first expansion occurred in 1964 and increased the design rated capacity of the plant to 4.75 mgd. The second addition occurred in 1980 and increased the design rated capacity of the plant to 6 mgd. In 1992, the overall plant capacity was increased to its present rated capacity of 6.75 mgd.

Portions of the existing treatment plant and the wastewater pumping system are over 30 years old. In the 1980s, several of the existing pumping stations were operating very near their design capacity. Plant personnel were also having increasing difficulty in achieving a quality of treated effluent that would meet regulatory permit requirements with the existing treatment facilities. Consequently, in 1989 the CSD initiated two studies; a flow projection study and a treatment plant capacity study. The flow projection study concluded that the existing flow rate of 4 mgd could increase by as much as 30 percent within a few years based on proposed development projects that had already been approved for construction within the CSD's service area. The treatment plant capacity study concluded that, due to a number of deficiencies, the actual firm capacity of the plant was only 5 mgd rather than the 6 mgd previously believed. Faced with the prospect of rapidly increasing system flow rates and a treatment facility with questionable capacity, the CSD determined that it would be worthwhile to prepare a Wastewater Master Plan for its system which would consider the results of these two studies and provide a detailed review of the overall needs of and recommended direction for the CSD.

In May of 1990, Black & Veatch prepared a Wastewater Master Plan for this service area. The anticipated (and actual) increase in flow rates required complete replacement of much of the existing wastewater pumping system. In 1992, new pumping stations 2, 3 and 5 were designed and constructed, replacing the existing pumping stations. Pumping station 6 was decommissioned as part of these improvements.

PURPOSE OF MASTER PLAN UPDATE

The CSD, in order to continue providing excellent and reliable wastewater services to its customers, must plan for future growth and anticipated regulatory changes to meet the wastewater services needs of the community. The purpose of this Master Plan Update is to provide an updated comprehensive wastewater master plan to be used by the CSD for planning and anticipating their future wastewater system needs, through the planning period of Year 2010. This master plan update serves as the planning tool for the CSD to implement system improvements when needed, to serve their existing and future customers. This Master Plan Update addresses future growth and population projections, existing and future wastewater flows, wastewater treatment standards and future regulatory trends related to stream discharge and water recycling, modeling and analysis of the existing (and future) wastewater collection system, and recommendations for wastewater system improvements to meet future needs.

AUTHORIZATION AND SCOPE OF WORK

On January 13, 1999, the City of Camarillo/Camarillo Sanitary District authorized Parsons Engineering Science, Inc. (Parsons ES) to prepare an update to the May 1990 Wastewater Master Plan. This wastewater master plan update includes revisions and updates to sewage flow projections for the service area, regulatory review, modeling and evaluation of the wastewater collection system (10" sewers and larger), and evaluation of the existing wastewater treatment facilities.

ACKNOWLEDGMENTS

Parsons ES thanks and gratefully acknowledges the following City staff for their efforts, involvement, input and assistance in preparing this Master Plan Update:

Bob Westdyke, Director of Public Services
Doug Frost, Jr., Wastewater Systems Superintendent
Tom Welch, Systems Supervisor
Janet Starr, Administrative Secretary
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Parsons ES Project Staff

The following Parsons ES key team members were involved in the preparation of this Master Plan Update:

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Joe Reichenberger, P.E., Technical Director
Eric Mische, Ph.D., P.E., Technical Director
Reena Galano, Staff Engineer
Ron Carbone, Graphic Designer

Chapter 2

EXISTING CONDITIONS

This chapter describes the existing conditions pertinent to the Master Plan Update for the CSD Service Area. Included in this chapter is a description of the planning area and general characteristics thereof, the existing wastewater collection and treatment system, and an overview of the two pertinent agreements (Smith and Camrosa Water District) relative to the wastewater system.

PLANNING AREA

This section describes the general characteristics of the planning area, including climate (wind, rainfall, temperature, humidity), geology, and other characteristics which are of importance to the planning of wastewater facilities.

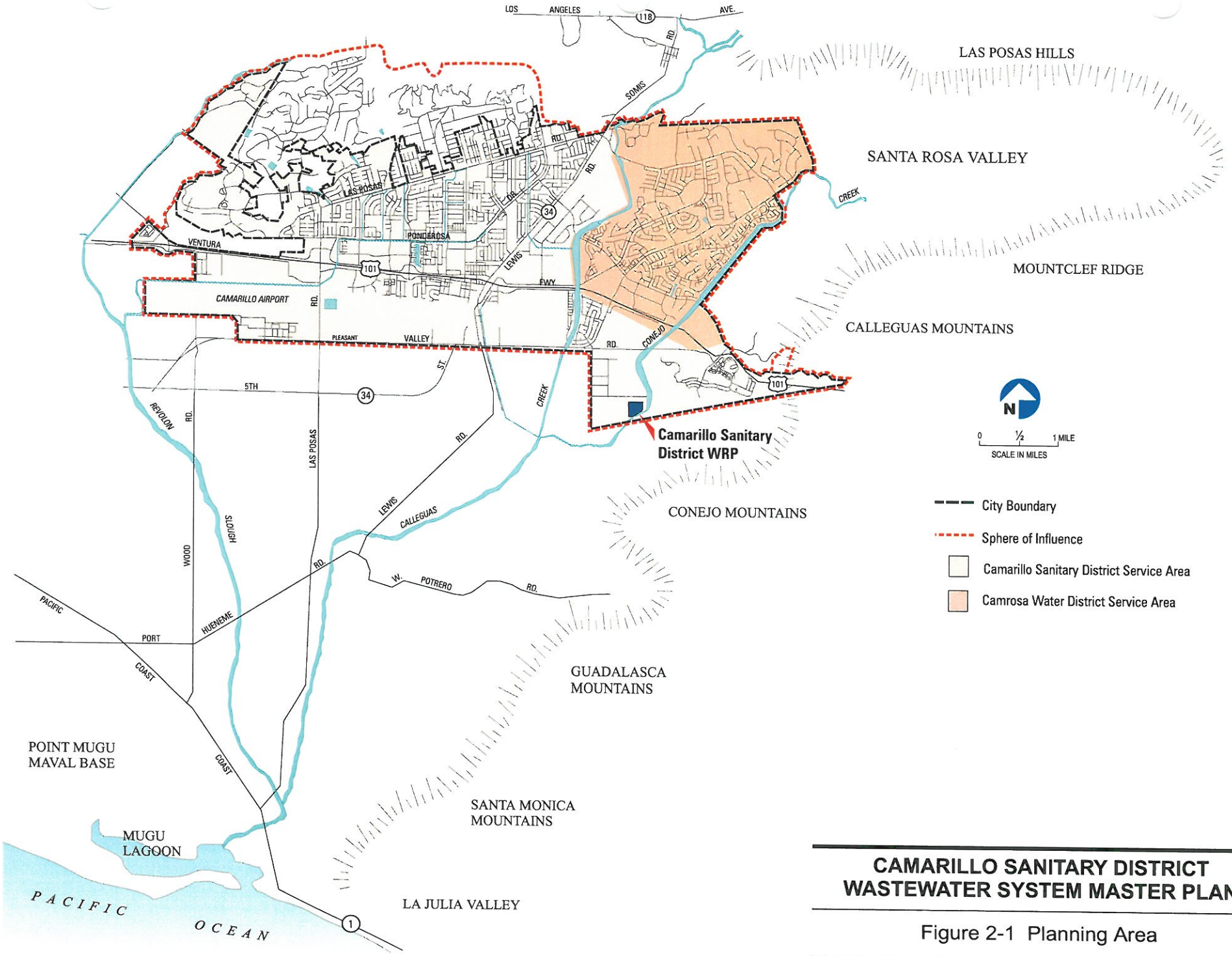
General Characteristics[1]

The CSD was formed in the 1950s to serve the area of Camarillo. The City of Camarillo was incorporated in 1964, and the CSD then became part of the City's services provided to the community. The City is situated in the Pleasant Valley portion of the vast agricultural Oxnard Plain, 9 miles inland from the Pacific Ocean, 45 miles northwest of the City of Los Angeles. Camarillo is situated in the southern portion of Ventura County, and is surrounded by open hills, mountains and agricultural lands. The majority of the City is situated approximately 150 feet above mean sea level, with upper elevations as high as 360 feet in portions of the City in the foothill regions. Figure 2-1 depicts the general planning area included in this Master Plan Update.

Climate. The climate in the City of Camarillo and CSD service area is Mediterranean-type and mild year-round. Prevailing winds are from the southwest at 9 mph (at noon). During the fall and winter months, periodic "Santa Ana" wind conditions bring dry, warm wind from the south and east. With the ocean being only 9 miles to the west and south, coastal fog is not uncommon to the area. Temperature, rainfall and humidity data are summarized in Table 2-1.

The spring, summer, and early fall climates are characteristically governed by an on-shore flow of marine air. In the late fall and winter, the coastal high pressures typically shrink and retreat to the southwest. Freezing temperatures occur only occasionally. During the winter, occasional extreme high pressures over the Great Basin produce winds ("Santa Anas") that descend into the area heating adiabatically in the process. Temperatures in the 80s frequently result, with temperatures of 90 degrees F or more having been recorded.

[1] Corresponds to numbered references provided in Appendix C of this report.



CAMARILLO SANITARY DISTRICT
WASTEWATER SYSTEM MASTER PLAN

Figure 2-1 Planning Area

Table 2-1. Climate Data, City of Camarillo

	Average Temperature, °F			Rainfall	Rel. Humidity, %	
Month	Min.	Mean	Max.	Inches	4 a.m.	4 p.m.
January	42	53	64	4.0	71	60
April	46	56	66	1.6	79	63
July	57	66	75	0.0	84	65
October	50	61	72	0.1	78	64
Year:	49	59	71	13.6	n/a	n/a

Most rainfall occurs during late fall and winter. Nearly 85 percent of the total rainfall occurs from November through March. There is a marked variability in monthly and seasonal totals.

The dry climate is characterized by high evaporation rates. This can vary from a minimum average monthly rate of about 2 inches in the winter to a maximum monthly rate of about 6 inches in the summer. The estimated annual average evaporation rate is between 50 and 60 inches.

Geology. The planning area lies on the Oxnard Plain, an alluvial deposit consisting of sand, gravel, silt and clay. The alluvium is a major source of groundwater for domestic and irrigation use. The area is bounded on the north, east, and southeast by several geologic outcroppings composed of sandstone, shale, and volcanic rock formations. With the exception of those rock formations most of the topsoil layers within the area of interest are permeable, fine to medium texture soils which are suitable for agricultural purposes. With the addition of tile drainage systems to ensure adequate drainage of these topsoil layers and leaching of excess salts from the soil, the land has been transformed into prime agricultural land. To ensure its continued usefulness for agricultural purposes, good management practices, including provisions for adequate drainage and the use of good quality irrigation water low in total dissolved solids must be maintained.

Other Characteristics

Surface Drainage. There are three major watercourses that provide drainage in the Camarillo area. These watercourses are:

- Calleguas Creek, the primary surface water course that flows through the eastern portion of Camarillo toward the south and southwest, eventually to the Mugu Lagoon and Pacific Ocean.
- Conejo Creek, which lies east and south of Camarillo and flows through the Santa Rosa Valley in the northeast toward the southwest to its confluence with Calleguas Creek. The City of Thousand Oaks and the CSD discharge treated effluent to this stream. Camrosa WD discharges effluent downstream of the confluence of Conejo Creek with Calleguas Creek.

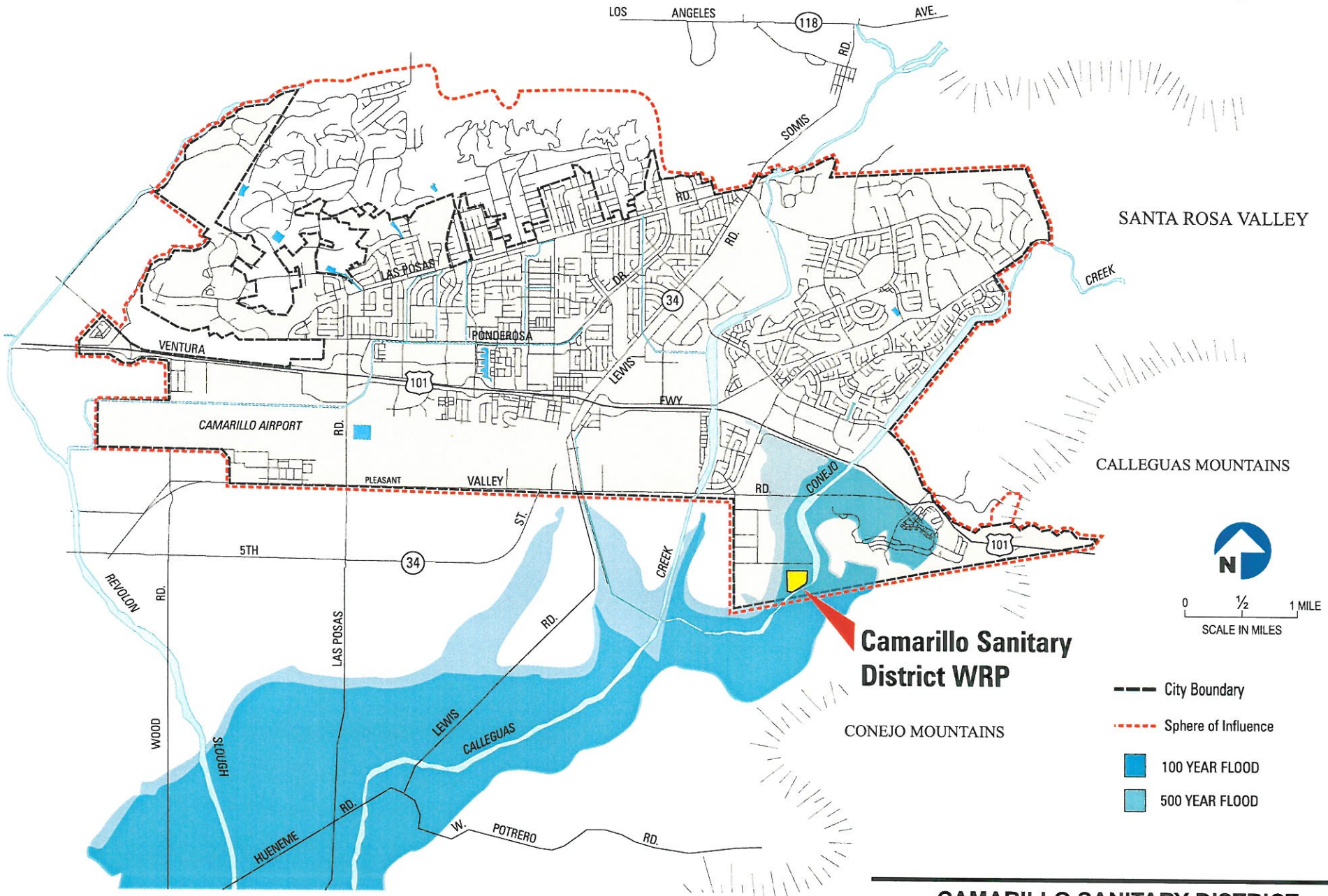
- Revolon Slough, a smaller watercourse which lies west and south of the City of Camarillo and flows toward the southeast to its confluence with Calleguas Creek.

The predominant direction of surface drainage for the area is to the southwest. During most of the year, these watercourses have relatively low flow. These watercourses are not naturally perennial streams; only by virtue of the continual discharges of municipal effluent do these streams maintain flow year-round. During occasional periods of heavy and/or prolonged precipitation, these watercourses realize significant natural flow.

Because of the relatively flat terrain of the area, potentially high rainfall intensity, and limited watercourse capacity, flooding can be a problem that affects large portions of the Camarillo area, particularly those areas adjacent to the watercourses. The limits of expected flood boundaries have been established by the Federal Emergency Management Agency (FEMA) and are shown in Figure 2-2. Limits are shown for the 100-year and the 500-year flood. A 100-year flood is the term to describe a storm event producing floodwaters that can be expected to occur on an average of once every 100 years. A 500 year flood would be a flood of such magnitude that its expected frequency would be once every 500 years. The existing treatment plant lies within the 100-year flood boundary. Discussions with representatives of the Ventura County Flood Control District indicate that there is a conceptual plan under consideration to widen Conejo Creek. If approved this construction could reduce the potential for flooding in this area and reduce the limits of the 100-year flood boundary.

Groundwater. Camarillo and the surrounding area rests on an alluvial deposit approximately 1,000 feet thick which is comprised of several aquifers interbedded with gravel and sand and clay lenses. The clay lenses preclude significant groundwater movement from one aquifer to the next. In addition, there are several separate groundwater basins in the area, each separated by a series of faults or folds which reduces groundwater movement from one basin to the next. Groundwater generally flows in the same direction as surface drainage, to the southwest.

Water from the aquifers is used for both domestic and irrigation purposes. The quality of the water varies from one basin to the next and from one aquifer to the next. Five aquifer zones have been identified as follows: the Oxnard, Mugu, Hueneme, Fox Canyon and Grimes Canyon aquifers. The first two are considered to comprise the upper aquifer system, the latter three the lower aquifer system. The lower system is generally considered to contain the better quality water with total dissolved solids (TDS) as low as 250 mg/L, although in some areas the TDS levels can be in excess of 2,000 mg/l. TDS concentrations in excess of 1,000 mg/L are not uncommon in the upper aquifer system. Recent (1998) data obtained from Camrosa Water District (Camrosa WD) for the Woodcreek Well (in the Fox Canyon aquifer), shows a TDS of 840 mg/L. In addition, there are a number of alluvial aquifers throughout the area, which contain fairly impermeable soils and small amounts of relatively poor quality groundwater. These usually are not considered as reliable sources of groundwater.



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WASTEWATER SYSTEM MASTER PLAN

Figure 2-2 FEMA Flood Zones in Project Area

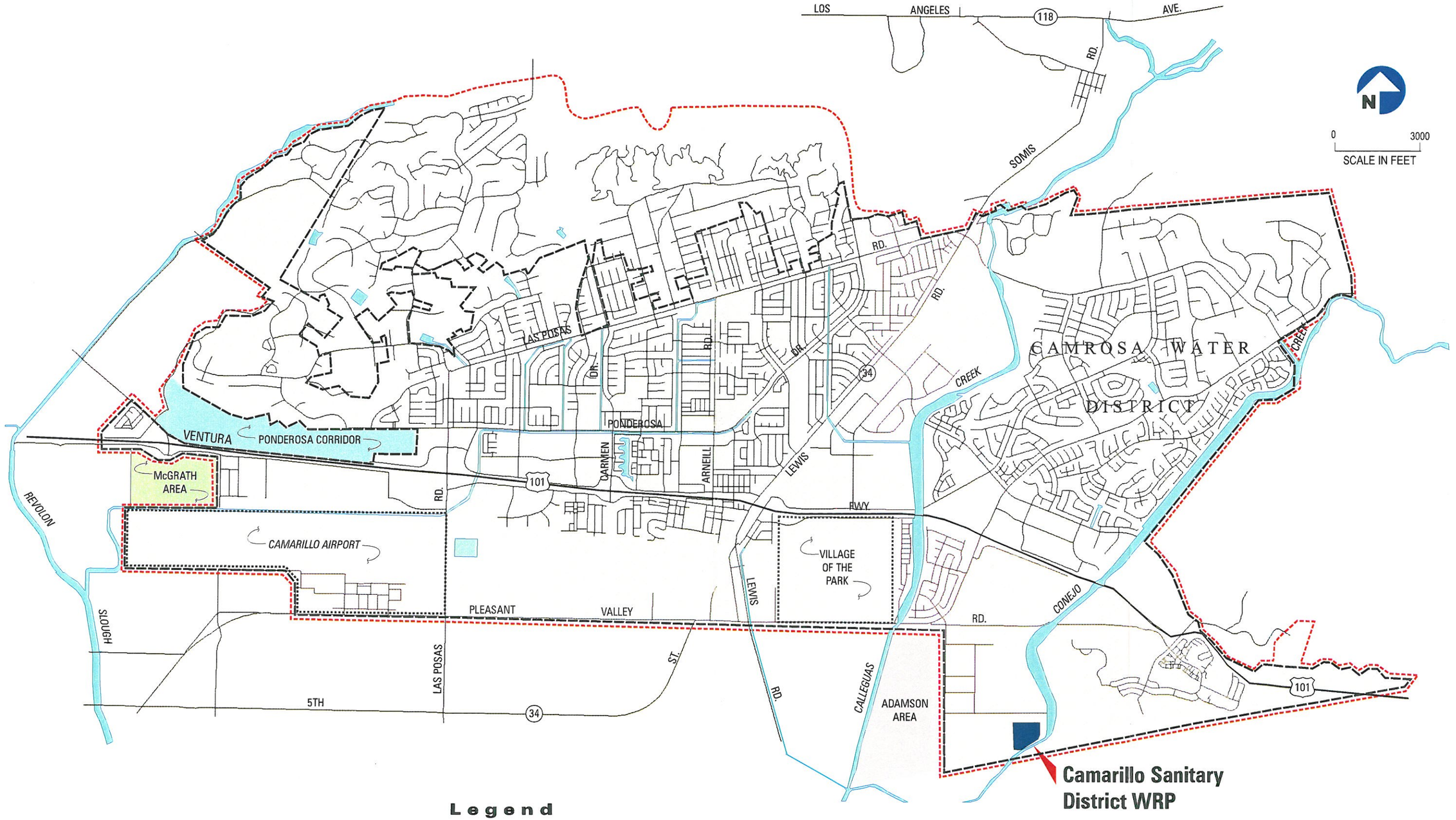
Study Area and Service Area Boundaries

This section describes the study area (City limits) and wastewater service area boundaries in the project area, and are depicted in Figure 2-3.

Study Area Boundary. The study area is comprised of the City of Camarillo City limits, and the Sphere of Influence. Although it is possible that future development may occur beyond the Sphere of Influence (SOI), factors such as the Save Open space and Agricultural Resources (SOAR) initiative, local slow growth influence, and other factors will likely restrict development for this planning horizon to the City limits. Thus, the study area for this Master Plan Update focuses on the City of Camarillo City limits and specific plan areas that may be annexed into the City in the near future. These specific plan areas include the Ponderosa Corridor, McGrath and Adamson areas. The Village of the Park specific plan area is within the City limits. The McGrath and Adamson specific plan areas will be primarily commercial and industrial developments, and will not include residential development. However, potential wastewater flows from these areas will be considered as part of this mater plan. Ponderosa Corridor and Village of the Park will include residential development for which wastewater services need to be planned.

Service Area Boundary. The CSD wastewater service area boundary is generally defined to the east by Calleguas Creek and to the north, south and west by City limits. The area east of Calleguas Creek, and south of Highway 101, is included in the CSD's boundary, and wastewater from this area flows by gravity to the Camarillo Sanitary District Water Reclamation Plant (CSDWRP). The Camrosa WD provides wastewater services for the remainder of the City, north of Highway 101 and east of Calleguas Creek. This area is approximately 3,200 acres. The area east of Calleguas Creek and south of Highway 101 is conveyed by gravity to the CSD's wastewater facility. In addition, the CSD and Camrosa WD have a mutual agreement (presented later in this chapter) for the CSD to accept and treat up to 0.75 mgd of municipal wastewater from the Camrosa WD sewer service area. The CSD intends to "buy back" this 0.75-mgd capacity, and construct diversion structure improvements to allow diversion to either treatment plant during maintenance or emergency conditions at either plant.

The service areas of the CSD and the Camrosa WD include most of the area recognized as being within the City's sphere of influence. The Sphere of Influence boundary is the boundary adopted by the Ventura County Local Agency Formation Commission (LAFCO) beyond which the City cannot annex land. Consequently it represents the current anticipated probable limits for service areas supported by local agencies such as the CSD. Annexation of the McGrath and Adamson areas will require an amendment to the Sphere of Influence in the western area of the City.



Legend

- Camarillo Service Area
- Ponderosa Corridor
- McGrath Area
- Adamson Area
- City Boundary
- Sphere of Influence

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Figure 2-3 Service Area Boundary Map

Anti-Growth Initiatives. Initiatives adopted by the City of Camarillo and Ventura County voters require a 2/3 vote to develop land outside of the Camarillo urban limit line. Due to the City's proximity to General Plan build-out, this initiative will have little impact on the population and growth projections within the Camarillo City Limits. Specific area plans, such as Pitts Ranch, are already included in the City's planned population and dwelling unit (DU) projections for the City. Projections of development on agricultural lands outside the City's sphere of influence and City limits cannot be determined within the limits of this study. It is relatively certain, however, that existing developable lands within the City limits will develop to build-out before any future consideration is given to developing beyond these boundaries. Because of the suitability of the area south of Camarillo for agriculture, and the need to maintain focus on General Plan objectives to maintain a "rural atmosphere", it is not anticipated that the majority of this area will develop in the foreseeable future. However, the Village of the Park area (already within City limits) may develop, as well as the Ponderosa Corridor. According to the City Planning Department, development of the Adamson area in the foreseeable future is uncertain.

Land Use

All land within the Camarillo City limits is currently zoned for use according to one of about a dozen major categories. These categories are described in detail in the Camarillo General Plan and can be summarized as follows:

Agricultural:

AE (Agricultural Exclusive) - Intended for the promotion and preservation of agricultural activities on lands capable of producing and supporting agricultural uses and excluding those uses which would have a detrimental effect on areas designated for agricultural purposes.

Residential:

RE (Rural Exclusive) - Large lot residential zone with lots varying in size from 10,000 square feet to 1 acre or larger in size with a limited area used for mobile home parks.

R1 (Residential) - Basic single family residential zone.

RPD (Residential Planned Development) - Intended to encourage imaginative residential design. The majority of the RPD zone has 5 or fewer units per acre with the density ranging from 3 units to 30 units, which is high density. (Apartments and condominiums would be in this category.)

MHPD (Mobile Home Park Development) - Oriented toward mobile homes.

Open Space:

Open space, established in 1978, is to preserve valuable natural environmental and recreational resources.

Commercial:

RC (Recreation Commercial) - intended to provide for outdoor recreation and agricultural uses suitable for development without significant impact to the environment of the area. The RC Zone also recognizes incidental and accessory uses such as residences, commercial and public service facilities subject to review, and in some cases, conditions to protect natural scenic or recreational value.

CN (Commercial Neighborhood) - intended to provide facilities supplying both daily convenience goods and services as well as to provide an environment of a stable, desirable character which will be in harmony with exiting and potential development of the surrounding neighborhoods.

CPD (Commercial Planned Development) - Intended for commercial development associated with planned communities or large subdivision tracts.

SC (Service Commercial) - Areas of development for service type uses that are normally heavier than general retail and somewhat lighter than the industrial categories such as service, assembly of materials, or a craft.

PO (Professional Office) - Intended as a primary office zone.

Industrial

LM (Limited Manufacturing) - The most restrictive industrial zone with approval required for any use under a planned development permit and intended for industrial parks.
M1 - Industrial classification (can also be used for commercial, office, and semi-public purposes).
M2 - Industrial classification, manufacturing.

The June 1996 General Plan Update indicates that the incorporated area of the City covers around 12,350 acres. Based on current information, the total incorporated City area is estimated to be 12,378 acres. Of the total acreage within City limits, the CSD serves a majority of the area (9,180 acres), while the Camrosa WD serves the remaining 3,200 acres. The land use distribution for the entire City of Camarillo is depicted in Table 2-2. The land use distribution for the City based on zoning designation is depicted in Table 2-3.

Table 2-2. Existing Land Use Acreage

Category	Acres
Agricultural	1,322
Rural Residential	1,715
Low Density Residential	1,959
Low Medium Density Residential	1,004
Medium Density Residential	135
High Density Residential	199
Mobile Home/Residential	208
Commercial/Office	525
Industrial	1,050
R&D	174
Open Space	480
Public	1,124
Quasi-Public	337
Rights-of-Way/Water Courses	2,145
TOTAL:	**12,378**

Notes:
1. Land Use breakdowns for the wastewater service area was not available. Acreage does not reflect Ponderosa Corridor or McGrath area.

Table 2-3. Zoning Areas (City Limits)

Zone	Area, Acres				No. of D.U. (exist.)
	Developed	Undeveloped	Total	% of Total	
AE	8	1,516	1,524	14.7	6
RE	1,289	1,672	2,962	28.6	1,615
R-1	1,311	17	1,327	12.8	8,100
RPD	1,707	342	2,049	19.8	11,300
MHPD	47	--	47	0.5	359
RC	--	--	--	0.0	--
PO	79	41	120	1.2	4
CPD	262	150	412	4.0	9
SC	4	--	4	0.0	1
LM	150	373	523	5.0	1
M-1	1,025	125	1,150	11.1	2
M-2	52	28	80	0.8	2
OS	--	175	175	1.7	--
SUBTOTAL	**5,933**	**4,440**	**10,373**	**100.0**	**21,399**
Streets	--	--	2,005	--	--
TOTAL			**12,378**		

Notes:
1. Distribution of existing equivalent dwelling unit (E.D.U.) and developed acreages were not available, and were estimated based on current total estimated E.D.U.
2. Acreage does not reflect Ponderosa Corridor or McGrath Area.

Wastewater Service Area Population

As of year-end 1998, the overall city population was estimated to be 61,329[2]. This population data was provided by the City planning department through the monthly planning update reports, and based on City Department of Finance data. In order to project future service area population, it was first necessary to establish the existing service area population.

Existing Service Area Population. The 1998 water and sewer rate study report[3] was referenced to determine the breakdown and distribution of dwelling units in the CSD service area. Using the General Plan 1996 dwelling unit population density figures, the number of dwelling units was multiplied by the respective population densities per dwelling unit to establish the "base" population in this service area. Table 2-4 presents the breakdown of existing dwelling units by category, and the calculated service area population as of Year end 1998. This population was used as the basis for projecting future population to Year 2010 "build-out". As part of this calculation, and subsequent discussions with City staff regarding population densities, the City is experiencing a trend where the population density of dwelling units is increasing. The City also has observed that residential units are not developing to the full build-out density allowed in the General Plan. To adjust for this anomaly, the low-medium density housing (at 2.5 people per DU) was adjusted upwards to 3.2 people per DU to reflect actual dwelling densities being experienced by the City.

Table 2-4. 1998 Sewer Service Area Population

User Group	Dwelling Units Existing[1]	Population per EDU	Service Area Population
Single Family	8,343	3.2	26,698
Senior Citizen	138	1.8	248
Outside City	72	3.2	230
Mobile Home Parks	756	1.8	1,361
Duplex/Triplex	175	2.0	350
Condos/Cluster Housing	1,484	2.5	3,710
Multiple Family	2,427	2.5	6,068
TOTAL:	13,395	--	38,665
PERCENTAGE OF TOTAL POPULATION[2]			**63%**

Notes:
1. The number of existing dwelling units were taken from the June 1998 Water and Sewer Rate Study.
2. Based on total City population of 61,329.

Future Service Area Projections. After establishing the "base" service area populations, the January 1999 monthly planning status report, the General Plan and additional information provided by the City Planning Department were used to project future "build-out" population (Year 2010) for the City and wastewater service area, respectively.

The City's January 1999 monthly planning status report was referenced to determine the breakdown and distribution of the future growth of dwelling units in the City. Based on this January 1999 planning status report, it was found that about 85% of the current permitted City-wide development will fall within the CSD sewer service area, with the remaining 15 percent of development occurring in the Camrosa WD Service Area. This percentage was used as a guide to estimate what percentage of total build-out projections should be allocated to the City of Camarillo Service area.

Projected City and Service Area Build-Out. After establishing estimated percentages of growth in the CSD and Camrosa WD service areas, the future build-out for the City and CSD was established. Based on discussions with City staff, the existing general plan build-out will likely occur first, before any subsequent development would occur in the following areas:

- Ponderosa Corridor, estimated 800 units at 3.2 persons per DU (currently outside of City limits but within SOI).
- Village of the Park, estimated 1,050 units at 3.2 persons per DU (currently designated Agricultural in General Plan).
- McGrath and Adamson areas are proposed commercial and industrial uses with no anticipated dwelling units. The McGrath area is outside of the City limits but within the SOI. The Adamson area is within the General Plan area, designated for agricultural use. The McGrath and Adamson areas comprise 100 and 308 acres, respectively.

The current General Plan allows for a City build-out population of 72,093. With possible development in the Ponderosa Corridor and Village of the Park areas, ultimate build-out could reach a population of 78,013. Refer to Table 2-5 for a breakdown of the General Plan and projected ultimate build-out EDUs and population for the City of Camarillo.

Projected Rate of Growth. The rate of growth for the anticipated City and CSD build-out was established with the following limitations in mind:

1. Maximum growth of 1,350 people per year in accordance with Air Quality requirements. This "growth allotment" can be "banked" from year to year, but the overall growth trend needs to be limited to this amount. Thus, growth can exceed this allotment from year to year, and has so in the past, based on "stored" unused allotments from prior years.
2. Closely matching the prior growth trends in the City from 1980 to 1998.

Based on these criteria, the City's overall growth rate is anticipated to be steady at a rate of 1,346 people per year until ultimate build-out is reached in 9 to 10 years, around Year 2010.

Table 2-5. Future Build-Out Projections

Zone Designation	Dwelling Units				Population Per EDU	Build-Out Population
	Existing	Future	Build-Out	% Build-Out		
Agricultural	6	16	22	27.3	3.2	70
Rural	1,615	290	1,905	84.8	3.2	6,096
Low	8,100	2,198	10,298	78.7	3.2	32,954
Low Medium	5,989	65	6,054	98.9	3.2	19,160
Medium	1,243	66	1,309	95.0	2.0	2,618
High	4,068	260	4,328	94.0	2.0	8,656
Mobile Home	359	1,052	1,411	25.4	1.8	2,540
Comm./MFG	19	--	--	0.0	--	--
General Plan Build-Out SUBTOTAL:	**21,399**	**3,947**	**25,327**	**84.5**	**--**	**72,093**
Ponderosa Corridor	--	800	800	0.0	3.2	2,560
Village of the Park	--	1,050	1,050	0.0	3.2	3,360
Projected Ultimate Build-Out TOTAL:	**21,399**	**4,747**	**26,127**	**84.5**	**--**	**78,013**

Future Service Area Population Projections. As indicated earlier, the service area ultimate build-out population is expected to account for approximately 85% of the City-wide growth. Based on this, ultimate build-out population for the CSD service area is expected to be approximately 53,000 people. This projection is summarized in Table 2-6. Figure 2-4 depicts the historic and future projected City-wide population. Figure 2-5 depicts the City-wide and sewer service area population projections that are used for wastewater flow projections described in Chapter 3. As can be seen in this table, the projected annual growth rate will be slightly less than City-wide projections due to the proportionate area served by the CSD as compared to the entire City.

Table 2-6. Summary of Projected Service Area Population

Parameter	Population/ No. of People
1998 Year-end City-wide population	61,329
1998 Year-end Sewer Service Area population	38,665
Expected City-wide population growth, 1999 to 2010	General Plan: 10,764 Amendments: 5,920 Total: 16,684
Expected sewer service area population growth, 1999 to 2010 (85% of total growth)	14,181
Annual Growth Rate, Sewer Service Area	1,182
Service Area Year 2010 "ultimate" build-out population	38,665 14,181 52,846

EXISTING WASTEWATER COLLECTION SYSTEM

This section describes the CSD wastewater collection system, which consists of approximately 44 miles of 10-inch diameter to 30-inch diameter gravity trunk sewers and interceptors, three pumping stations, and 12-inch, 30-inch and 18-inch diameter force mains from Pumping Stations 2, 3 and 5, respectively. There are also approximately 97 miles of 6-inch and 8-inch gravity sewers as part of the collection system, which are not included in the wastewater collection system model. The modeled wastewater collection system is depicted on Figure 2-6. Also included as part of this description of the CSD's collection system is the CSD's gravity sewer hydraulic model, and a description of the diversion facilities which allows up to 0.75 mgd of raw sewage to be diverted from the Camrosa WD service area to the CSD service area.

Trunks and Interceptors

The CSD collection system is composed of a number of manholes and gravity sewers which feed into three lift stations (2, 3 and 5) in the southern and southwestern portions of the CSD.

Smaller pipes drain by gravity to sewer trunks in their respective tributary areas. Major trunk sewers lie along City streets and/or within easements in these streets, as summarized in Table 2-7.

The trunk sewers convey sewage by gravity to one of the three lift stations at the base of the tributary areas, except in the eastern portion of the service area, where sewage flows by gravity directly to the plant. Trunk sewer diameters vary between 10 and 30 inches at varying slopes. The larger trunks are at the lower (southern) portions of the drainage areas. The largest trunk, 30 inches in diameter, is the trunk that feeds directly into the CSDWRP.

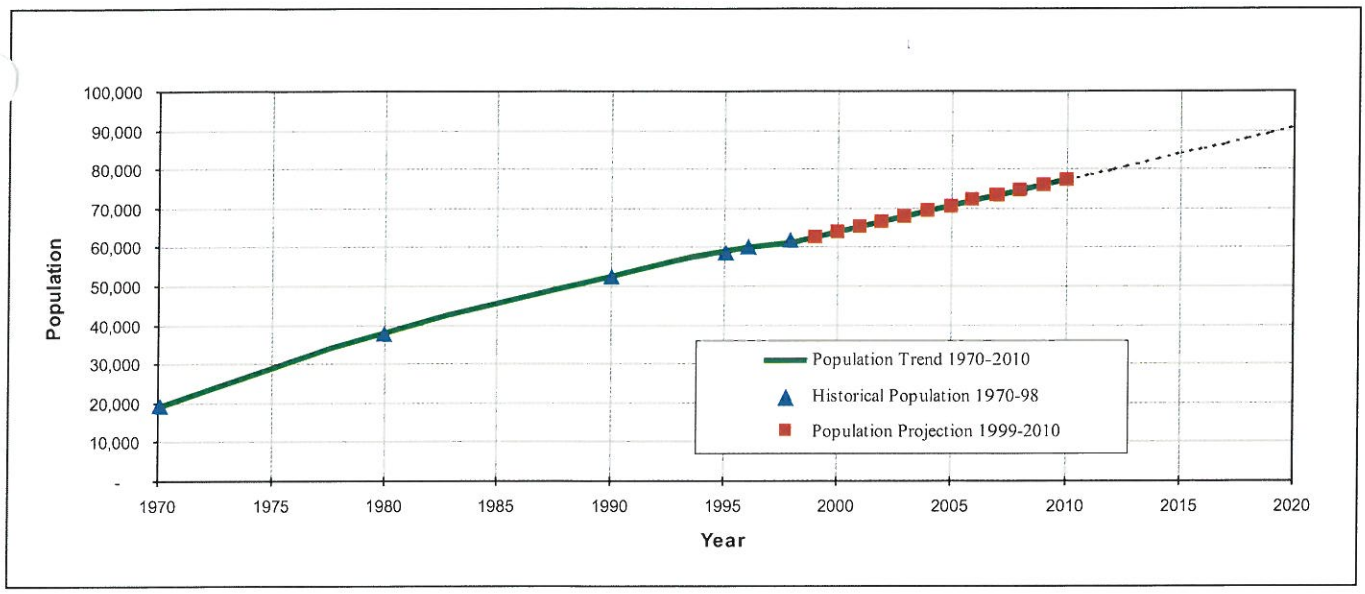


Figure 2-4 Historic and Future Population Trend, City of Camarillo

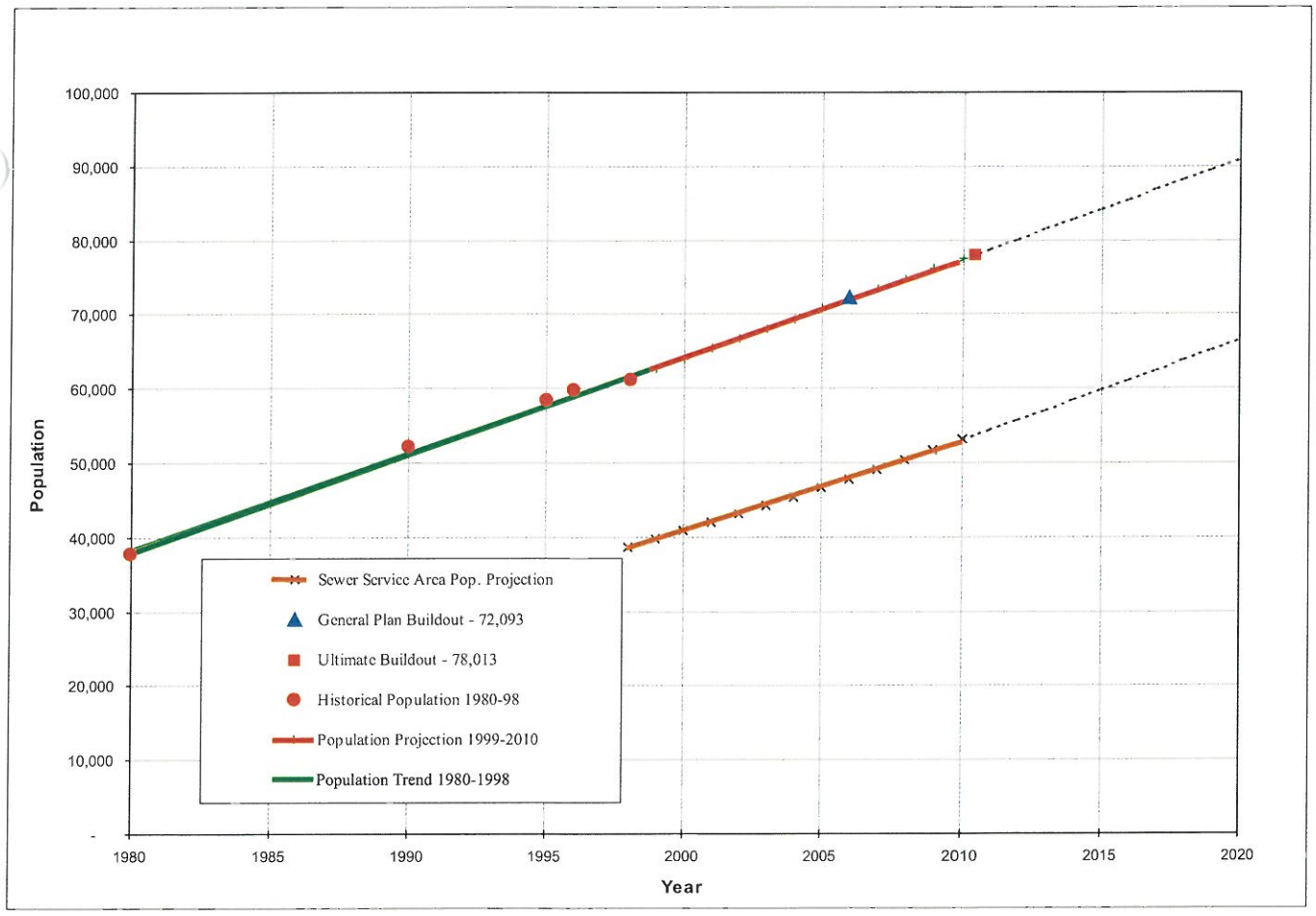
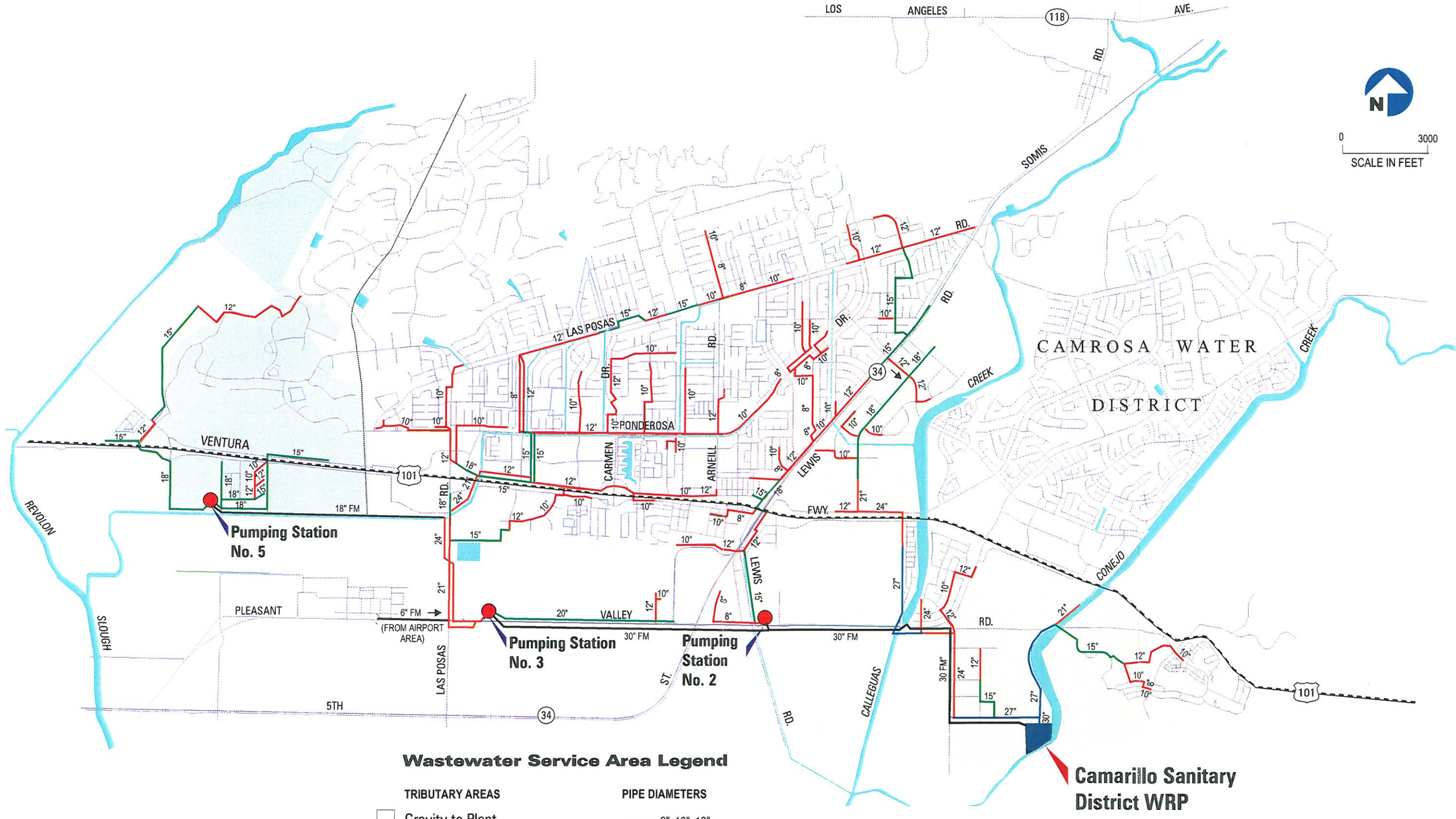


Figure 2-5 City-Wide and Wastewater Service Area Population Projections



Wastewater Service Area Legend

TRIBUTARY AREAS

- Gravity to Plant
- To Pumping Station 2
- To Pumping Station 3
- To Pumping Station 5

PIPE DIAMETERS

- 8", 10", 12"
- 15", 18", 20"
- 21", 24"
- 27", 30"
- Force Main

Note: Not All 8" Gravity Sewers Are Shown

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CAMARILLO SANITARY DISTRICT
WASTEWATER SYSTEM MASTER PLAN

Figure 2-6 Collection System Overview

Table 2-7. Summary of Main Trunk Sewers, Camarillo Sanitary District

Street/Corridor	Trunk Sewer Diameter, Inches	Sewer Tributary to:
Calle Quetzal	27	CSDWRF
Pancho Road	24	CSDWRF
Pleasant Valley Road	24, 30	CSDWRF, Pump Station 2, 3
Mission Oaks Boulevard	24	CSDWRF
Flynn Road	21, 18	CSDWRF
Las Posas Road	21,24	Pump Station 3
Springville Road	18	Pump Station 5
Verdulera Street	18	Pump Station 5
Wood Road	18	Pump Station 5

System Hydraulic Model

The objective of the gravity sewer hydraulic model is to analyze the existing (and proposed) gravity sanitary sewer system to determine the following:

- Identification of those portions of the sewer system which are, or will become, over capacity;
- Establishment of basic data so that a master sewer reconstruction plan and schedule can be developed;
- Provide estimates of cost of sewer reconstruction necessary to assure adequate capacity.

A computer model was developed by the City to accomplish the capacity investigation easily and quickly. The model uses the City's GIS database, allowing the user to interactively explore many possible solutions by changing the sewer data. The user can explore the impact of proposed new developments or changes to the physical sewer facilities with minimal effort. It is easy to determine the impacts of a change from the point of change to the outlet of the tributary area. During development and verification of the collection system model data, instructional enhancements were prepared to the existing User Manual for the model. The Sewer Model User Manual and the addendum (with instructional enhancements) to the manual are provided in Appendix A of this Report.

In the model, a pipeline is considered to be overloaded when the flow is greater than the design capacity of the pipe. In this case, the model calculates the sewer pipeline diameter, if on the same grade and alignment, that would be necessary to accommodate the flow without overloading.

The model does not have the ability to evaluate inverted siphons or force mains. These situations may be handled by indicating a pipe reach with a steep slope, or these facilities can be modeled separately using conventional manual calculations.

The model computes the design capacity of each gravity sewer pipeline reach using a combination of the Chezy Equation and Kutter formula:

$$Q = A * \frac{(41/66 + (0.00281/s) + (1.811/n)) * (rs)^{1/2}}{(1+(41.66 + 0.00281/s) * (n/(r^{1/2}))}$$

Where: *s is the slope of the pipe*
r is the hydraulic radius
n is the roughness coefficient, and
A is the cross sectional area of the stream of the sewage carried in the pipe.

The Camarillo Sanitary District Manual of Design[4], Construction Standards, and Standard Plans specifies that "average daily flow rate shall be determined by the owner's Engineer based on good engineering practice." Based upon this criterion, the sewer hydraulic model uses a rate of 300 gallons per equivalent residential unit (ERU) per day, as a default setting. This standard can be used when assessing new proposed developments throughout the CSD.

The sewage flow contributed along each pipe reach is combined with the sewage flow entering the upstream manhole from all other sources. The resulting flow is expressed in cubic feet per second (cfs), but is also shown as a percentage of pipe carrying capacity so it is easily compared to other flow situations.

The model calculations were verified by hand calculating sewage flows for selected pipes in the CSD's sewer system, using Manning's Formula as follows:

$$Q = A * (1.49/n) * R^{2/3} S^{1/2}$$

Based on this validation of the model hydraulics, the model is suitable for modeling the CSD's collection system.

Pumping Stations

The CSD operates and maintains three sewage-pumping stations (Stations 2, 3 and 5) as part of the CSD's collection system. These pumping stations, and the tributary areas corresponding to each lift station, are shown on Figure 2-6. Historically, there were four pumping stations (Stations 2, 3, 5 and 6), but Station 6 was decommissioned as part of the upgrades of Stations 2, 3 and 5 constructed in 1995. The predominant gravity flow and drainage direction is to the south and west. Thus, with the CSDWRP situated at the extreme southeast end of the CSD, the majority of the sewage flow that flows by gravity to the south must be lifted and pumped to the east to the treatment facility. An overview of the tributary areas of each lift station is as follows:

- Pumping Station 5. Sewage flows by gravity from the western and northern Camarillo area, including the Spanish Hills and Sterling Hills areas, and flows to the south to Pumping Station 5, south of Highway 101 at Wood Road. Sewage is

pumped from Pumping Station 5 through an 18-inch force main to Pumping Station 3 located on Pleasant Valley Road east of Las Posas Road.

- Pumping Station 3. Sewage flows by gravity from the central and northern portions of the CSD flow by gravity to Pumping Station 3, located south of Highway 101, located on Pleasant Valley Road east of Las Posas Road. This gravity flow, and the flow from Pumping Station 5, is pumped through a 30-inch force main directly to the headworks at the CSDWRP.

- Pumping Station 2. Pumping Station 2, located on Pleasant Valley Road at Constitution Avenue, receives gravity flow from the eastern portion of the CSD, and pumps this sewage flow through a 12-inch force main directly into the 30-inch force main from Pumping Station 3 and discharges at the headworks of the CSDWRP.

The pertinent operational parameters for the three pumping stations are included in Table 2-8.

Table 2-8. Operational Parameters for Pumping Stations 2, 3 and 5

Parameter	PS 2	PS 3[a]	PS 5
No. of Pumps	3	3	3
Pump Type	submersible	non-clog/drypit	submersible
Pump Motor Drive	variable speed	variable speed	constant speed
Pump Horsepower, each pump	40	165	60
Station Firm Capacity, gpm (mgd)	2,250 (3.2)[b]	9,300 (13.4)[c,d]	3,200 (4.6)[b]

[a] Pumping station has room for four pumps.
[b] Firm capacity with two pumps running.
[c] Maximum capacity at 83 TDH (feet) with 75% efficiency.
[d] Maximum capacity with three pumps running.

EXISTING WASTEWATER TREATMENT SYSTEM

This section describes the CSD water reclamation plant (CSDWRP), which includes:

- headworks facilities
- primary clarifiers
- aeration basins
- secondary clarifiers
- anaerobic digesters (primary sludge only)
- aerobic digesters (for waste activated sludge only)
- chlorine contact basin

The layout of the existing CSDWRP is shown on Figure 2-7 and a plant schematic is shown on Figure 2-8.

The plant has developed in three major stages and the liquid treatment portion operates as three separate plants (numbered 1, 2, and 3) on a common site. Only Plants 1 and 3 are currently in use. Plant 2 was decommissioned in 1992. Plants 1 and 3 provide primary treatment followed by an activated sludge secondary treatment process. Chlorination, storage ponds, and dechlorination, each of which is common to all three plants, follow these processes.

The liquid treatment facilities are supplemented by two stage anaerobic digestion for primary solids, an aerobic digester for waste activated sludge, a reactor thickener to thicken aerobically digested sludge, and sludge drying beds for drying stabilized sludge.

Wastewater enters the plant through one of two main trunk sewers and flows through a common influent pumping station and headwork facilities. The wastewater flow splits between Plant 1 and the three primary clarifiers at Plant 3 at the primary flow distribution structure. Pipelines from the primary flow distribution structure to Plant 2 have been removed from service.

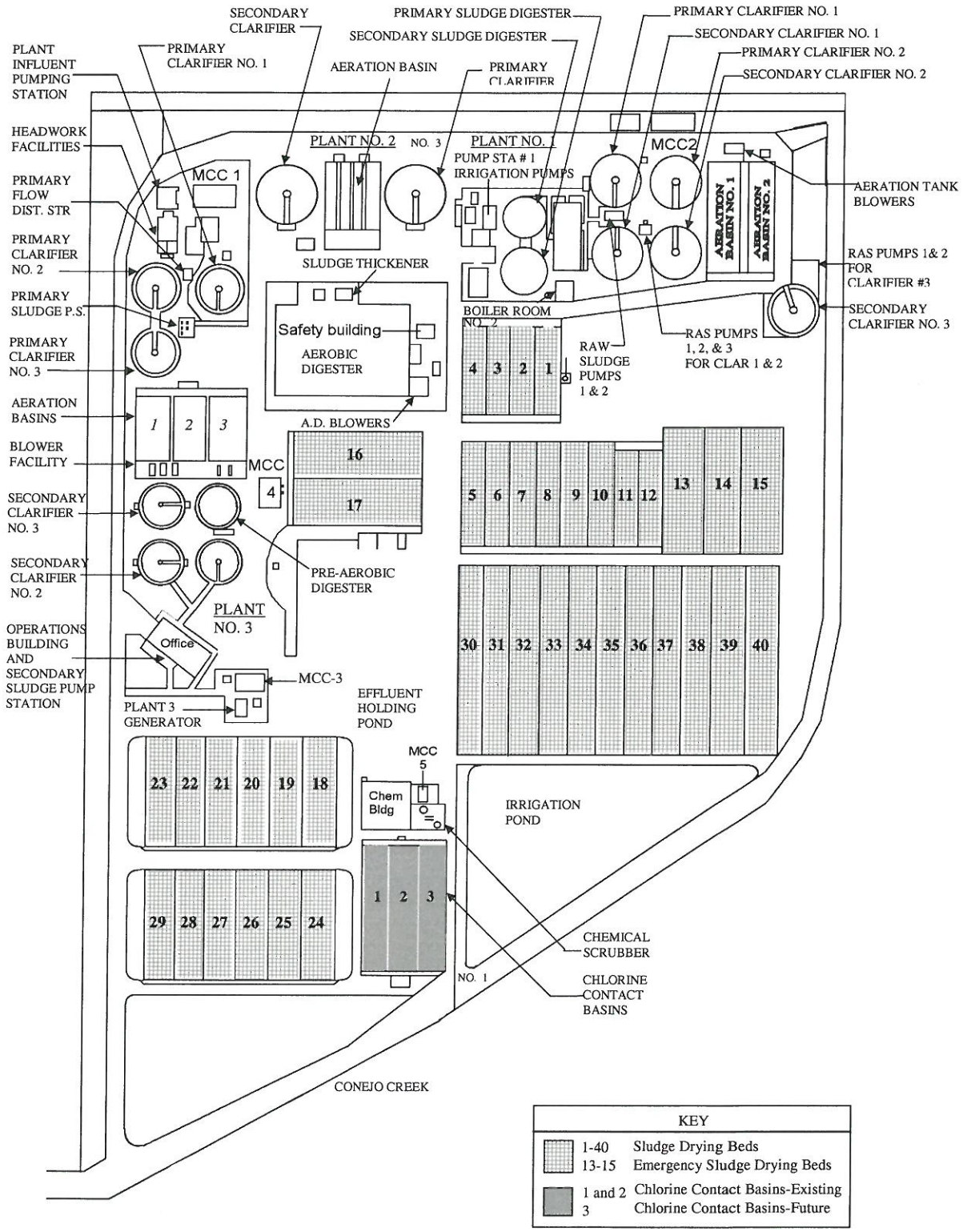
Outfall to Conejo Creek

Treated effluent from the CSDWRP is discharged to Conejo Creek or is used for crop and turf irrigation at Smith Ranch and Conejo Mountain Memorial Cemetery, respectively. During the past two years, the percentage of flow used for irrigation purposes has varied from as little as 14 percent in the winter months to as much as 74 percent in the summer and fall months. Historically, Smith Ranch has, at times, used all of the CSD plant effluent during summer peak irrigation season.

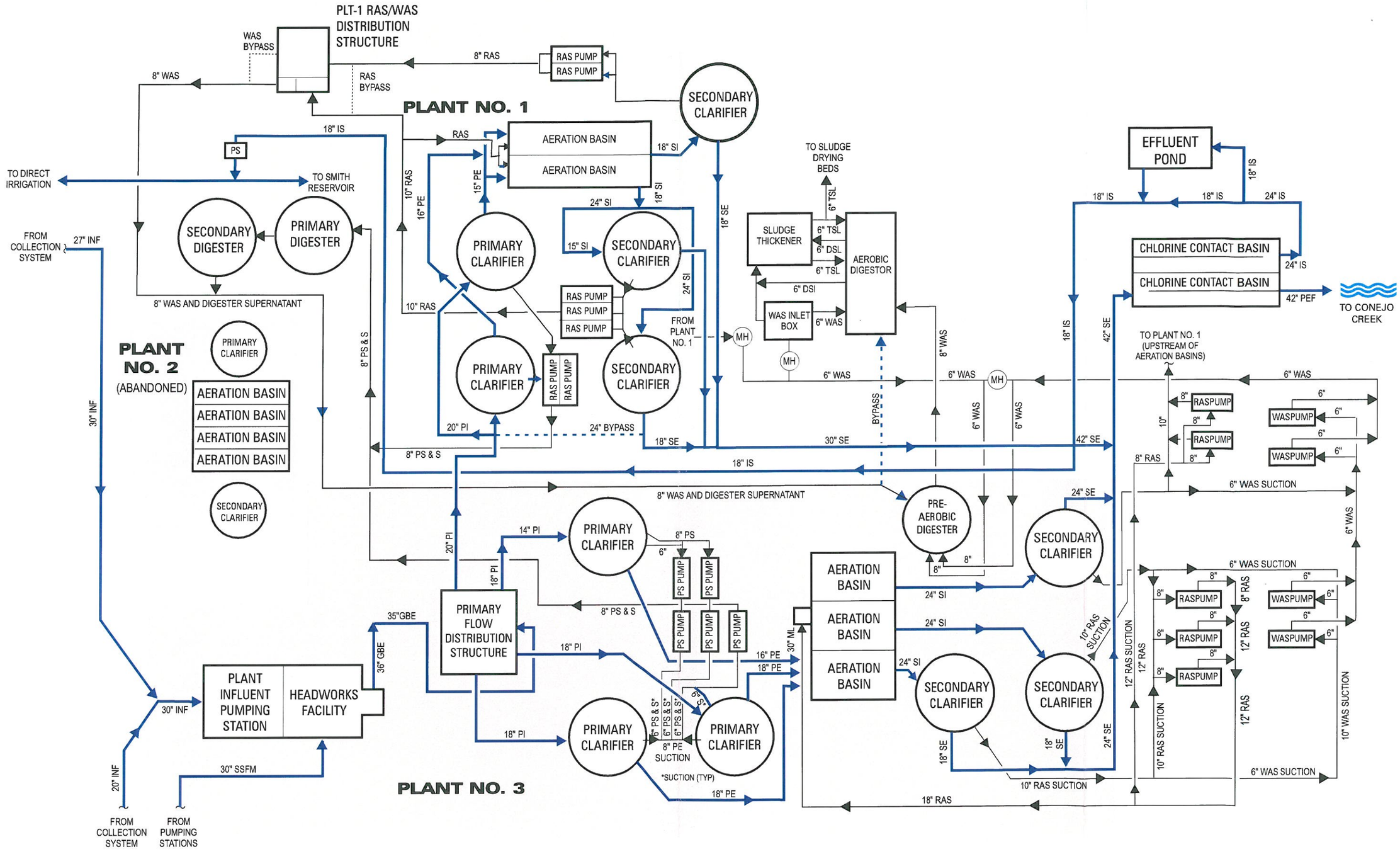
Effluent Pumping Station to Smith Property

The CSD operates and maintains the pumping station which pumps treated effluent to the storage pond at the Smith Property. The pumping station consists of two non-clog centrifugal 2-speed pumps, each rated at 1,000 gpm at 80 feet head. The pumping station is not capable of pumping its rated capacity due to several factors including:

- Pump operation is restricted by distribution system headlosses.
- The force main is in marginal condition, and is undersized creating excessive headloss;
- Effluent pump usage is limited due to a vortexing problem at the plant effluent pond.



PARSONS ENGINEERING SCIENCE	Camarillo Sanitary District Wastewater System Master Plan	Camarillo Sanitary District Water Reclamation Plant Site Plan	FIGURE 2-7



LEGEND

WASTEWATER TREATMENT TRAIN

SOLIDS HANDLING TRAIN

NOTE: ABANDONED PIPING NOT SHOWN

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WASTEWATER SYSTEM MASTER PLAN

Figure 2-8 Water Reclamation Plant Schematic Diagram

The effluent distribution system consists of approximately 4,200 feet of 8-inch diameter force main, to deliver water from the CSDWRP to Smith Ranch. The alignments extend from the CSDWRP effluent pumping station southward across the plant site, crossing beneath Conejo Creek, and continuing southward along Howard Road to the storage pond on the Smith property. A second recycled water pipeline, also believed to be 8-inch in diameter, extends westward from the CSDWRP site to provide irrigation water to adjacent fields on the Smith Ranch.

Contractual Agreements

The CSD has two existing Agreements, which impact the operations at the treatment facility. These Agreements are: 1) Smith Agreement, whereby the property owner provided land for the treatment plant in exchange for treatment plant effluent for irrigation; and 2) Camrosa WD, whereby Camrosa WD is entitled to divert up to 0.75 mgd of raw wastewater from the Camrosa WD service area to be treated at the CSDWRP.

Smith Agreement. This Agreement was originally signed on December 28, 1955, and was rescinded and replaced by a new Agreement dated February 28, 1977, between Mary Smith and CSD. The original Agreement called for Smith to convey property to the CSD for the purpose of treating wastewater, and in return, Smith is entitled to receive a certain amount of treated effluent for irrigation. The Agreement was replaced in 1977 when the CSD planned to expand the treatment plant on CSD property, not lands conveyed to the CSD by Smith. The pertinent features of this Agreement are as follows:

- CSD will provide Smith up to 750 million gallons of treated effluent annually, if requested.
- Maximum monthly delivery of effluent to Smith is 100 million gallons.
- There are no guaranteed minimum deliveries of effluent to Smith.
- There are no effluent treatment or quality standards stipulated in the contract.
- Effluent to Smith is not guaranteed to be continuous; however, the CSD shall "endeavor" to keep the effluent reservoir full and maximize delivery of water to Smith.
- If effluent in excess of delivery limitations is available and effluent is considered surplus and not for sale, Smith may receive additional water deliveries at no cost.
- The CSD is required to operate and maintain the pump station and pipeline to deliver effluent to Smith reservoir, but is not obligated to deliver water to any other location. Smith is responsible for maintenance of the effluent reservoir.

Camrosa Water District Agreement. The U.S. Bureau of Reclamation in 1972 established the Camrosa WD primarily as an agricultural water purveyor. The Camrosa WD now serves over 27,000 people, including portions of the City of Camarillo.

The Camrosa WD completed construction of a new 1.5-mgd water reclamation facility in 1997. Current wastewater flows to this plant are approximately 1.2 mgd. The Camrosa WD, in 1966, purchased 0.75 mgd capacity in the CSDWRP.

The Agreement between CSD and Camrosa WD, dated June 20, 1977, is summarized as follows:

CSD was required to construct, at Camrosa WD's expense, flow measuring and diversion facilities to adequately measure and divert sewage flows to the CSDWRP.

Camrosa WD will share the cost of additional capital improvements required to meet discharge requirements on a pro rata basis. They also share in operating costs on a pro rata basis.

Should Camrosa WD's discharge exceed 0.75 mgd, their share of operating costs for all of their discharge will double if the excess is up to 15 percent and triple if the excess exceeds 15 percent.

Future Status of Agreement. The CSD and Camrosa WD are considering modification to this Agreement. At the time of preparation of this Master Plan Update, the "direction" of this issue is that the CSD will buy back the 0.75 mgd capacity in its existing water reclamation plant, allowing either CSD or Camrosa WD to divert raw sewage to the other District's plant only on an occasional basis during times of maintenance or operational constraints. Camrosa WD and CSD are in the process of developing an agreement to address this future provision. This is an important issue with respect to planning for future capacity and needs at the CSDWRP.

Chapter 3

WASTEWATER FLOW AND QUALITY PROJECTIONS

This chapter describes the current and future influent flow and wastewater quality characteristics for the CSDWRP.

FLOW PARAMETERS FOR DESIGN

The flow parameters shown in Table 3-1 are typical parameters that are used to assess the capacity of the existing treatment facilities, to determine when additional capacity will be needed, and to evaluate options available for achieving that capacity. Generally, the rated capacity of a wastewater treatment facility is reported in terms of average annual flow.

Table 3-1. Flow Rate Design Parameters

	Parameter	Application
AADWF	Average Annual Dry Weather Flow The average daily flows for the calendar year.	Development of base wastewater flow projections and sizing of wastewater treatment facilities.
ADMMF	Average Day Maximum Month Flow The average daily flow occurring during the maximum flow month of the year.	Sizing of wastewater treatment facilities.
PDF	Peak Day Flow The average daily flow occurring during maximum flow day of the year.	Sizing of certain critical wastewater treatment facilities.
PIF	Peak Instantaneous Flow The peak treatment plant inflow resulting from the design rainfall event.	Sizing of hydraulics and conveyance facilities.

Anomalies in flow measurement at the plant have occurred in recent years. These anomalies were the result of calibration and weir elevation differences, which impacted influent flow readings. This condition resulted in higher than actual flow measurements of the plant influent. The CSD first suspected anomalies in flow measurements in December of 1994. At this time, a 12% increase in flow from the prior year was recorded, while it was known that the City did not see such growth. The influent flow recorder and weir have since been re-calibrated and actual flows now are consistent with historic recorded flows.

PARAMETERS FOR MASTER PLAN UPDATE

This section summarizes the flow and quality characteristics to be used for evaluation of treatment facilities, presented in Chapter 5. These characteristics are discussed in the subsequent sections of this chapter, and are summarized in Table 3-2.

Table 3-2. Summary of Master Plan Update Parameters

Parameter	Units	Value
Year End 1998 Service Area Population		38,665
AADWF (Current year end 1998)	mgd	3.6
Per Capita Flow	gpcd	90
Year 2010 AADWF	mgd	4.8
Diurnal Peaking Factor	---	2
I/I Component	mgd	0.29
Per Capita Organic Loading	ppcd	0.19
Influent BOD_5 (Average)	mg/l	200
Influent BOD_5 (Design)	mg/l	250
Influent TSS (Average)	mg/l	191
Influent TSS (Design)	mg/l	250

Historical Trends

This section describes the flow and quality characteristics of wastewater in past years up to 1998.

Wastewater Flows. Annual increases of plant flow have varied from as little as 2 percent to as much as 6 percent in a given year. From 1980 to 1998, wastewater flow increases have been relatively steady at approximately 0.1 mgd per year.

Wastewater Characteristics. The wastewater flow to the CDSWRP is comprised of domestic, commercial and industrial waste discharges. The standard typically used to measure the strength of a wastewater is the concentration of total suspended solids (TSS), and the biological oxygen demand (BOD_5), which is the amount of oxygen required to allow microorganisms to stabilize the wastewater. Historically, the average measured concentration for these two parameters in the influent wastewater was 177 mg/l TSS and 246 mg/l BOD_5, compared to more recent data of 191 mg/L TSS and 200 mg/L BOD_5. These concentrations are fairly typical of domestic wastewater. Presently, the CSDWRP, through the treatment process, reduces these constituents to an average of 5.8 mg/l and 19 mg/l respectively in the effluent, representing a 97 percent removal rate for TSS and a 92 percent removal rate for BOD_5.

Water sources that generate the wastewater are an important consideration with regards to overall effluent quality. Water is provided for domestic and industrial use in the CSD service area by the City Water Department, the Calleguas Municipal Water District (Calleguas MWD) and several private mutual water companies. Water provided by the City is drawn from three local wells, which penetrate into the Fox Canyon aquifer system that underlies the region. Water delivered by Calleguas MWD comes primarily from the Metropolitan Water District (MWD) Jensen filtration plant which is 100 percent California State Project Water. The majority of the wastewater generated in the CSD service area is from water supplied by City wells and Calleguas MWD water. Local groundwater supplies serve the Airport Area. Camrosa WD serves the CSD service area south of Highway 101 and east of Calleguas Creek. Camrosa WD water supplies originate from a combination of local water wells and Calleguas MWD water.

Current and Projected Wastewater Flows

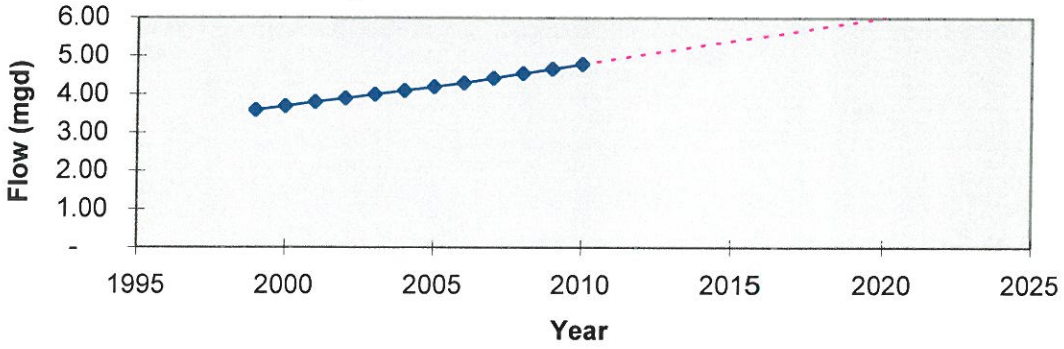
Current plant data was evaluated to determine current and projected characteristics.

Per Capita Wastewater Flows. Based upon the estimated current service area population and influent flows to the plant, the service area produces a wastewater flow of 90 gallons per capita per day (gpcd). This per capita flow, in conjunction with service area growth projections, is used to project future wastewater flows. Wastewater flow projections are shown on Figure 3-1. Service area growth projections were presented in Chapter 2. With the year 2010 service area population projected at 52,846, the year 2010 wastewater flow from the District service area is projected to be 4.76 mgd. By projecting linearly out to year 2020, the anticipated future wastewater flow will be 6.0 mgd. It is emphasized that this latter flow projection (to Year 2020) is used solely for the purpose of evaluating potential footprint expansion requirements of the plant.

Camrosa WD discharges to the CSDWRP on an occasional basis during maintenance of Camrosa's facilities. Since Camrosa's discharge is intermittent in nature and the City and Camrosa WD are considering "buy-back" of the 0.75-mgd capacity (which Camrosa WD is contractually entitled to at the CSDWRP) to the City, future flow projections exclude wastewater flows from Camrosa WD. Refer to Chapter 2 for a discussion on this contractual issue.

Per Capita Organic Load. Based upon the current (year end 1998) service area population, measured flow to the plant of 3.58 mgd, and plant BOD_5 influent data (90 percentile) of 250 mg/l, a per capita organic load of 0.19 pounds per capita per day (ppcd) is used to project wastewater loading. This is consistent with the typical per capita organic load of 0.18 ppcd for a community of Camarillo's size.

Figure 3-1
Camarillo Sanitary District Service Area Current and Projected Wastewater Flows



Infiltration/Inflow. Infiltration is the water entering a sewer system from below ground through defective pipes, pipe joints, illicit connections, or manhole walls. Inflow is the water that is discharged from illicit drains (steady inflow), connections to the sewer, or direct stormwater runoff (direct inflow). Steady inflow cannot be identified separately, but direct inflow can cause an almost immediate increase in flowrates in the sewers. As seen in Figure 3-2, the treatment plant influent remains steady during non-rainfall months, but during wet months, treatment plant influent is higher. During the first major El Niño rain in February 1998, unusually high infiltration was evident with the increase in measured wastewater flow from the plant. This peak can be attributed to a shifted manhole ring, allowing flow from a flooded field to enter the wastewater system, and therefore is not considered typical for storm-related inflow. Analysis of selected 1998 flow data from CSDWRP shows that I/I is not a significant factor in the system. As shown in Table 3-3, average wet weather flow to the plant was 4.1 mgd, and average dry weather flow to the plant was 3.8 mgd.

Diurnal Fluctuations. Wastewater flow rates tend to follow characteristic diurnal patterns. Minimum flows occur during the early morning hours when water consumption is lowest and when the base flow consists of infiltration and small quantities of sanitary wastewater. The first peak generally occurs in the later morning when wastewater from the peak morning water use reaches the treatment plant. A second peak flow generally occurs in the early evening between 7 and 9 p.m., following peak water use in the evenings. Based upon analysis of select flow data from the CSDWRP on selected wet and dry weekday and weekend days, a peaking factor of 2 (into the plant) was determined. BOD_5 variation typically follows the flow variation. The peak BOD_5 concentration often occurs in the evening around 9 p.m.

Figure 3-2
1998 Wastewater Effluent Flows

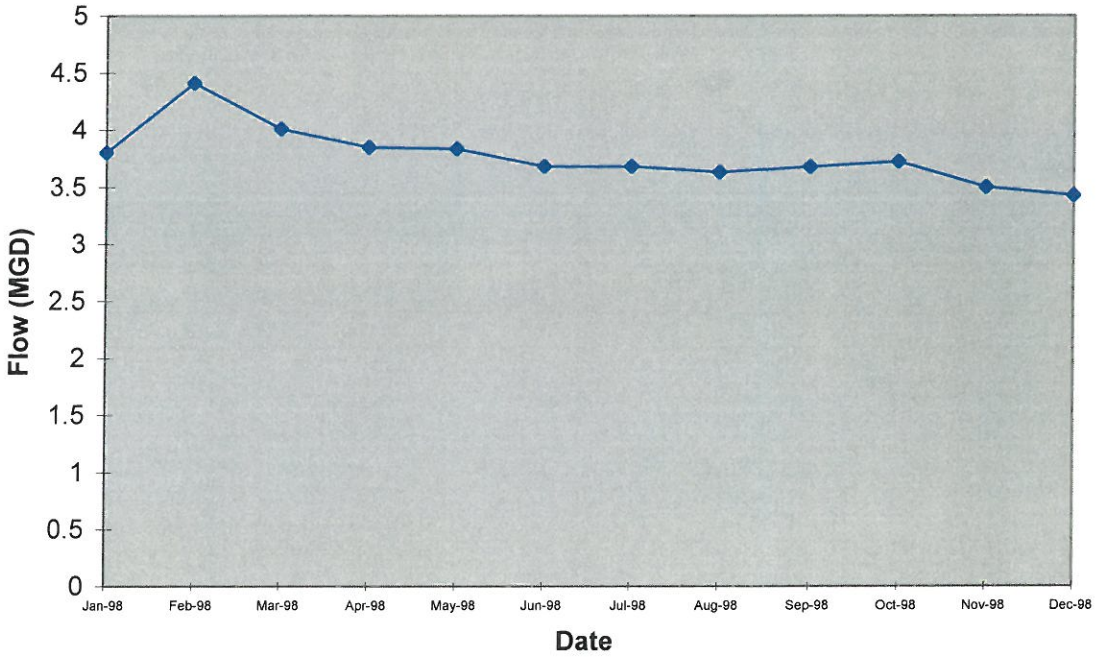


Table 3-3. 1998 Plant Flow Data

Weather	Day	Date	Flow (mgd)
Rain	Wednesday	1/28/98	3.74
Rain	Thursday	1/29/98	4.03
Dry	Thursday	3/12/98	3.80
Rain	Sunday	3/15/98	4.35
Rain	Wednesday	3/25/98	4.10
Dry	Thursday	5/28/98	3.82
Dry	Wednesday	7/15/98	3.65
Dry	Saturday	7/18/98	3.78
Ave. Wet Flow			4.06
Ave. Dry Flow			3.76

Current and Projected Influent Wastewater Characteristics

BOD_5 and suspended solids influent concentrations are monitored in compliance with the NPDES influent monitoring program. 24-hour composite samples for influent BOD_5 and suspended solids are taken weekly at influent sampling stations. Since the City is approaching build-out, it is not anticipated that future wastewater characteristics will change

appreciably from current characteristics. Thus, future characteristics should closely match existing characteristics.

BOD_5. Based upon analysis of current plant influent data[5] for three months from August 1998 to October 1998, selected as typical months in which there is little or no rainfall, the current average BOD_5 concentration in the wastewater influent is 201 mg/l, as shown in Figure 3-3. This lies within the typical range of BOD_5 concentrations in wastewater. The 90-percentile BOD_5 concentration is typically used as the basis for treatment process capacity evaluation and design. This value, which for the CSDWRP is 250 mg/l, as shown in Figure 3-4, is only exceeded 10% of the time.

Figure 3-3
3 Month BOD_5 Influent

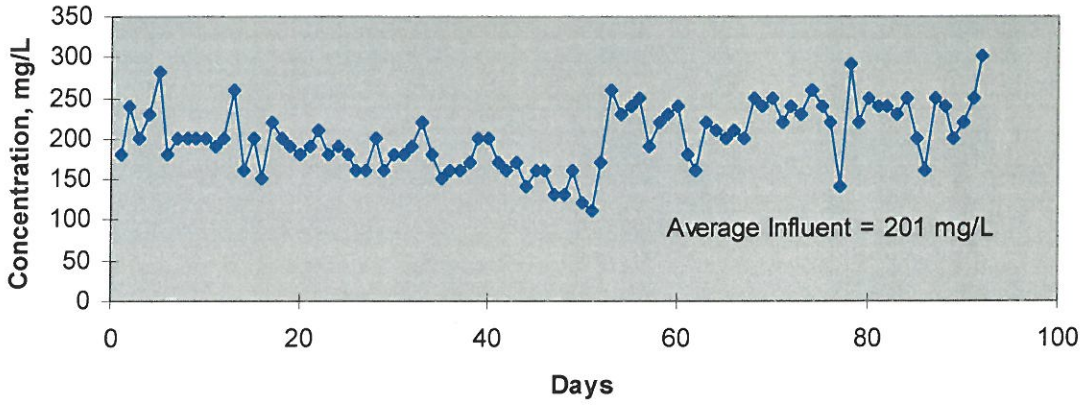
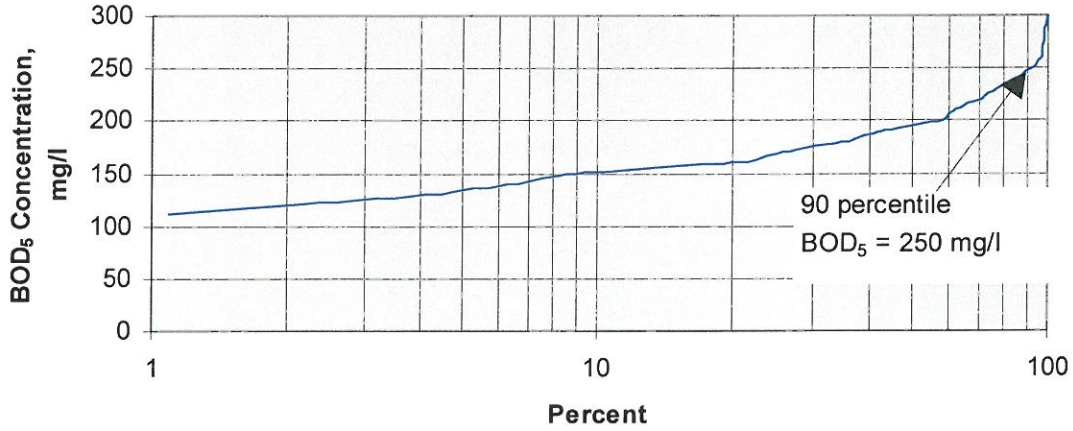


Figure 3-4
BOD_5 Influent Cumulative Distribution



The current BOD_5 loading to the plant is 7,464 pounds per day (ppd) based upon a 90 percentile BOD_5 influent concentration of 250 mg/l and a current flow of 3.58 mgd. Using a per capita organic loading factor of 0.19 ppcd, the projected BOD_5 loading to the plant in the year 2010 is 10,040 ppd based upon a projected service area population of 52,846.

Suspended Solids. The current average total suspended solids (TSS) concentration in the wastewater influent is 191 mg/l based upon an analysis of current plant influent data[5], as shown in Figure 3-5. The 90-percentile TSS concentration is 250 mg/l, as shown in Figure 3-6. This concentration is only exceeded 10% of the time, and was used to evaluate wastewater treatment facility design.

Current TSS loading to the plant is 7,494 pounds per day (ppd) based upon a 90 percentile TSS influent concentration of 250 mg/l and a current flow of 3.58 mgd. The projected TSS loading to the plant in 2010 is 10,040 ppd, based upon projected service area population of 52,846 and per capita suspended solids loading of 0.19 ppcd.

Additional Wastewater Characteristics

Characteristics shown below, although not measured in the influent, are important components of wastewater, critical to treatment process design, and were measured in the plant effluent.

- pH 6.9
- TKN 4.02 mg/l

Figure 3-5
3 Month TSS Influent

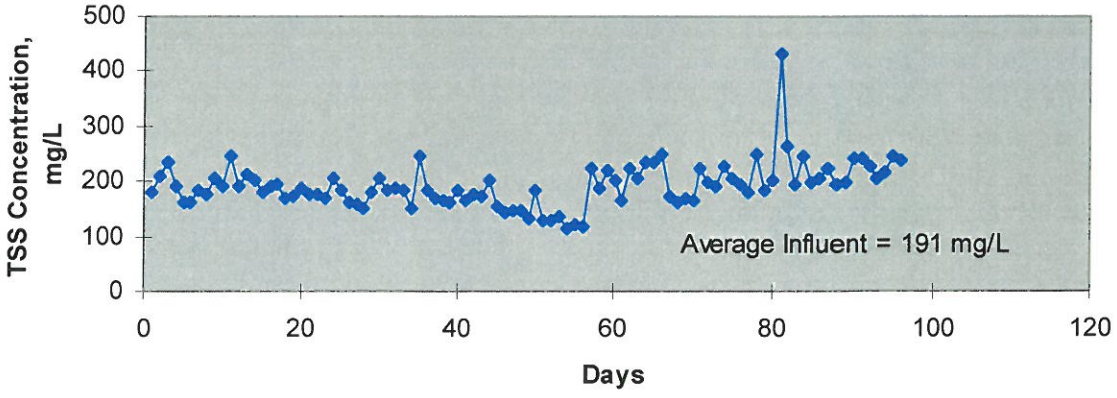
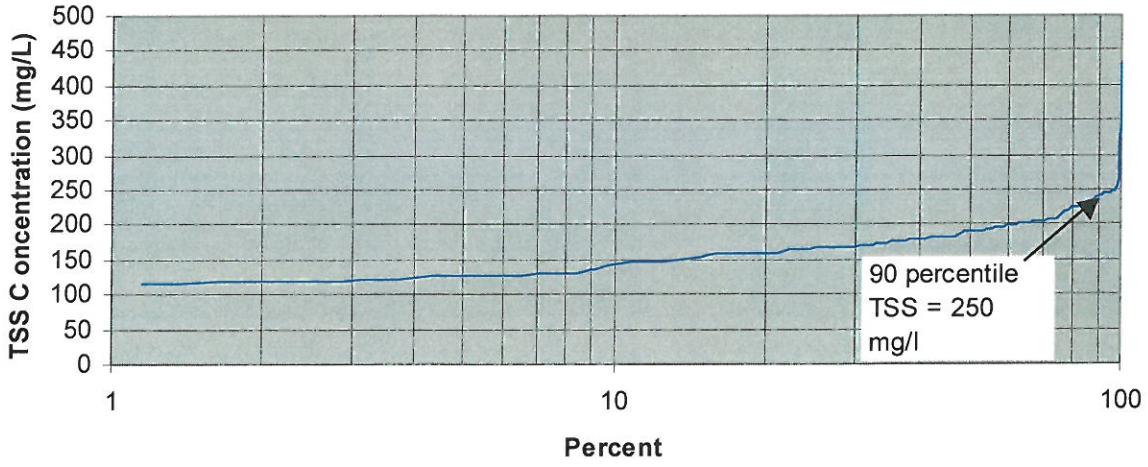


Figure 3-6
TSS Influent Cumulative Distribution



pH is an important parameter in the biological treatment process. pH of the environment is a key factor in the growth of organisms, particularly in the operation of nitrification processes. Most bacteria can not tolerate pH levels above 9.5 or below 4.0. Generally, the optimum pH for bacterial growth lies between 6.5 and 7.5. Low pH values may inhibit the growth of nitrifying organisms and encourage the growth of filamentous organisms, requiring a pH adjustment.

TKN, total Kjeldahl nitrogen, is the total of organic and ammonia nitrogen. Nitrogen content in the effluent is often a regulated nutrient due to the effect it may have on receiving waters.

Chapter 4

REGULATORY REQUIREMENTS

Wastewater treatment, discharge and water recycling require meeting minimum standards established by local, state and federal agencies. With the regulatory requirements continually evolving, it is important to delineate existing regulations and anticipate potential future regulatory changes that may impact the operation of and potential expansions to the Camarillo Sanitary District's Wastewater Treatment facilities.

REGULATORY BACKGROUND

Wastewater and solids must be disposed of in a manner that will protect the public health, maintain receiving and groundwater quality consistent with its beneficial uses, prevent nuisance in the vicinity of the discharge area, and comply with federal, state and local requirements. These conditions determine the degree and often the type of treatment, which must be provided prior to discharge or reuse.

Federal Clean Water Requirements

Water quality control throughout the nation was firmly established by the Federal Water Quality Control Act (Act) of 1965. This Act required the establishment of stream standards for all interstate streams, the review of such standards by the (then) Water Pollution Control Administration, and the Department of Health, Education, and Welfare, and their adoption by state water pollution control agencies. This Act, along with later amendments, is now administered by the Environmental Protection Agency (EPA). In California, administration, monitoring and surveillance for compliance with both state and federal water quality requirements are the responsibilities of the nine Regional Water Quality Control Boards (Regional Boards), now under the State of California Environmental Protection Agency (Cal-EPA). In this study area, this agency is the Los Angeles Region, Region 4 of the State Regional Water Quality Control Boards.

Public Law 92-500. Since adoption of the Act in 1965, two amendments have been passed: the Federal Water Pollution Control Act Amendments of 1972, otherwise known as Public Law 92-500, and the Clean Water Act of 1977, otherwise known as Public Law 95-217. The general objective of the Act, as stated in 1965, and amendments thereto, is the restoration and maintenance of "the chemical, physical, and biological integrity of the Nation's waters.". The Act was designed to encourage construction of wastewater management facilities to preserve and protect the quality of interstate streams and to provide federal assistance in the funding of such facilities. PL 92-500 substantially increased federal financial assistance for the planning and construction of publicly owned treatment works and established effluent quality

parameters and limitations for discharge to receiving waters. Major items adopted by the Clean Water Act of 1977 include requirements and incentives for innovative and alternative technologies and pretreatment regulations for industrial wastes.

State of California/Regional Board Requirements

In California, the nine Regional Boards oversee the Federal clean water regulations and implement the federal National Pollutant Discharge Elimination System (NPDES) program. However, biosolids management under the federal Part 503 regulations remain under the jurisdiction of the federal EPA (in California, Region 9, San Francisco). The Regional Board authority to protect Waters of the State is stated in the Porter-Cologne Water Quality Act of 1969. In protecting Waters of the State, each of the 9 Regional Boards (which are territorially divided by drainage basins) develop and adopt water quality control plans (Basin Plans) whereby beneficial uses of waters in the respective drainage basins are established, and water quality objectives are also established to protect such beneficial uses. The Regional Boards issue NPDES permits and waste discharge requirements consistent with protection of the beneficial uses in the Basin Plan, as well as ensuring compliance with federal clean water standards. Camarillo is within the Calleguas Creek Watershed, regulated by the Los Angeles Region, Region 4. The Regional Board office is located in downtown Los Angeles.

Basin Plan. The Regional Board adopted a revised Basin Plan[6] for the Coastal watersheds of Los Angeles and Ventura Counties on June 13, 1994. The Basin Plan contains beneficial uses and water quality objectives for Calleguas Creek, its tributaries, the Coastal waters, the Mugu Lagoon, and groundwater basins underlying Camarillo and the Oxnard Plain. The beneficial uses of hydrologic units in the Calleguas Creek Watershed are as follows:

- Conejo Creek, Hydrologic Unit 403.12, municipal and domestic supply (potential), industrial service supply, industrial process supply, agricultural supply, groundwater recharge, contact and non-contact water recreation, warm freshwater habitat, and wildlife habitat.

- Calleguas Creek, Hydrologic Unit 403.12, same as Conejo Creek.

- Calleguas Creek, Hydrologic Unit 403.11, same as Conejo Creek, but also including cold freshwater habitat; and rare, threatened or endangered species, and wetland habitat.

- Groundwater, Oxnard Plain. The groundwater in the Oxnard Forebay has existing beneficial uses which include municipal, industrial, process and agricultural supply

- Mugu Lagoon and Coastal Waters, Hydrologic Unit 403.11. Mugu Lagoon has existing beneficial uses which include navigation, water contact recreation (potential only, access is currently restricted by the Navy), non-contact water recreation,

estuarine habitat, marine habitat, wildlife habitat, biological habitat, rare and endangered species, migration of aquatic organisms, spawning, shellfish harvesting, wetlands.

Camarillo Sanitary District Discharge Requirements

The Camarillo Sanitary District has two avenues for discharge of treated effluent from the water reclamation plant; 1) discharge to Conejo Creek; and 2) water recycling. The Regional Board under the CSD's existing NPDES Permit No. CA 0053597 (Order No. 96-042) regulates discharge to Conejo Creek. This permit is subject to renewal by May 10, 2001, based on this expiration date specified in the existing permit. Effluent recycling to Smith Ranch and Conejo Mountain Cemetery is regulated under Order No. 87-132. Both permits are provided as Appendix B to this report.

The effluent limitations for the water reclamation plant include requirements for "conventional and non-conventional pollutants", and "toxic pollutants" which include heavy metals and pesticides. A summary of the effluent limitations for conventional/non-conventional pollutants is included as Table 4-1. Refer to Appendix B and the NPDES Permit for details on toxic pollutants.

Pertinent effluent limitations include:

- Disinfection. Effluent must at all times be adequately disinfected (meeting 2.2 MPN 7-day median and 23 MPN maximum).
- Acute Toxicity. Effluent must meet an acute toxicity standard of three consecutive 96-hours bioassay tests (meeting 90% survival). No test shall have a survival rate below 70%.

Receiving water limitations include:

- Temperature. Receiving water shall not be raised in temperature by more than 5 degrees F in a 24-hour period (or above 70 degrees F if ambient receiving water temperature is below 60 degrees F).
- pH. The pH shall not be depressed in the stream below 6.5 or raised above 8.5, nor shall ambient levels of pH be changed by more than 0.5.
- Chlorine Residual, 0.1 mg/L maximum.
- Dissolved Oxygen. Dissolved oxygen levels shall not be depressed below 5 mg/L.
- Ammonia Objective. Within 8 years following adoption of the Basin Plan, the CSD must comply with stated objectives in the Basin Plan for un-ionized ammonia limitations, or conduct studies substantiating site specific, less restrictive requirements.

Table 4-1. Summary of Effluent Limitations, Camarillo Sanitary District WRP

Constituents	Units	Discharge Limitations		
		30-day Average[1]	7-day Average[1]	Daily maximum[2]
BOD_5 (20°C)	mg/L lb/day[3]	20 1,130	30 1,90	45 2,530
Suspended Solids	mg/L lb/day[3]	15 840	40 2,250	45 2,530
Oil and Grease	mg/L lb/day[3]	10 560	--- ---	15 840
Settle-able Solids	ml/L	0.1	---	0.3
Total Dissolved Solids	mg/L lb/day[3]	850 47,850	--- ---	850 47,850
Total Nitrogen	mg/L lb/day[3]	30 1,690	--- ---	40 2,250
Sulfate	mg/L lb/day[3]	250 14,070	--- ---	250 14,070
Chloride[4]	mg/L lb/day[3]	150 8,440	--- ---	190[5] 10,696
Boron	mg/L lb/day[3]	1.0 56	--- ---	1.0 56
Fluoride	mg/L lb/day[3]	1.4 110	--- ---	1.4 110
Total residual chlorine	mg/L	---	---	0.1
Detergents (as MBAS)	mg/L lb/day[3]	0.5 28	--- ---	0.5 28

[1] As defined in Standard Provisions, Attachment N of the NPDES Permit.
[2] Except for grab samples, the daily maximum effluent concentration limit shall apply to flow-weighted 24-hour composite samples.
[3] Based on the plant design flow rate of 6.75 mgd. During events such as storms in which the flow exceeds the design capacity, the mass discharge rate limitations will be tabulated using the concentration limits and the actual flow rates.
[4] In accordance with the Resolution 90-004, the chloride limitation shall not be considered to be violated unless the effluent concentrations of chlorides exceed 250 mg/L or water supply concentrations plus 85 mg/L, whichever is less.
[5] Revised daily maximum for chlorides, Regional Board Order No. 98-027, valid through January 9, 2001.

FUTURE REGULATORY REQUIREMENTS

As indicated at the beginning of this Chapter, the regulatory process is dynamic and constantly changing. Not only do specific regulations change throughout the years, environmental conditions, particularly in drought years, can induce temporary or short-term requirements to be adopted to handle specific concerns such as TDS and chlorides. Also, with focus on overall management of the Calleguas Creek watershed, and on-going studies to determine the beneficial uses of Conejo Creek and impacts and impairments from urban development, treatment discharges, and other factors, future effluent requirements are envisioned to become more stringent. It should be emphasized, however, that specific

requirements stipulated in the adopted basin plan alone, could require upgrades to the CSD's water reclamation plant in coming years.

Basin Plan Objectives and Stream Discharge Issues

Specific issues which the CSD must address based on current regulations and Regional Board requirements for protection of beneficial uses of waters in the Calleguas Creek watershed include provisions to comply with TDS, ammonia, nitrate, sulfate, and chloride TMDLs.

Total Dissolved Solids. In order to protect beneficial uses of groundwater basins in the area, the Regional Board has set the groundwater quality objective for TDS well below 1,000 mg/l. TDS levels over 1,000 mg/l pose quality problems for irrigation and industrial reuse customers. In addition to TDS, specific mineral concentrations, such as boron, chloride, and sodium, must be within certain limits for certain crops (e.g., boron for citrus and avocados). With daily maximum effluent limitations for total dissolved solids set at 850 mg/l, the CSD is marginally meeting the discharge requirements, and occasionally violates the TDS limitation. This is in part due to TDS violations from discharges from the Camarillo Airport Area. In this particular area, infiltration into the existing collection system allows high-TDS shallow groundwater to enter the sewer system. Also, the Airport Area is served by local groundwater, which is also relatively high in TDS. The infiltration issue is being addressed under a 5-year compliance schedule, of which the first year has been completed. However, as further demands are placed on the watershed's waters, and wastewaters are recycled and reused, and periods of drought again reach northern and southern California, there will continue to be concerns in future years about overall TDS limitations in the watershed.

Regional Brine Disposal Line. Calleguas MWD and other water management agencies in Ventura County recognize the need for overall management of salt build-up and TDS in area waters. Continued withdrawal of groundwater from the basins for agricultural and urban use, increased recycling of wastewater from area water reclamation plants, periodic droughts in the State, and other factors, will lead to salt accumulation and increased TDS in the groundwater and eventually the water supply to undesirable levels, without a means for disposal of these salts. Calleguas MWD, in conjunction with other water management agencies in the region, are proposing a regional brine disposal line to protect the region from undesirable salt accumulations. For brackish water desalination, five common brine disposal methods were considered as part of the planning effort for this brine disposal project; in-stream disposal, discharge into the ocean through dedicated pipelines and/or ocean outfalls, discharge to local wastewater collection system for conveyance to and treatment at a wastewater treatment plant not producing reclaimed water, deep well injection, and local concentration and evaporation ponds. The most viable brine disposal alternative appears to be a dedicated brine disposal pipeline using an ocean outfall. TDS management options would include an evaluation of desalting source supplies, imported water blending strategies, desalting at the point of use (brackish

groundwater and at wastewater treatment plants), dilution at point of use, source control regulations, and corresponding changes in Basin Plan requirements.

The proposed project would construct facilities to facilitate the disposal of brine, which would be generated from the demineralization of reclaimed water and brackish groundwater. The proposed facility would be constructed in four phases coinciding with four pipeline reaches that would make-up the system. Initially, the brine disposal pipeline would be used to collect and dispose of brine from the West Simi Valley and South Las Posas Brackish Groundwater Recovery Projects. Ultimately, the regional brine disposal pipeline may be expanded to collect and dispose of brine from the six existing major wastewater treatment plants within the Calleguas service area, including CSDWRP. The brine would be conveyed via the regional brine line for disposal to the Pacific Ocean via an ocean outfall. The maximum capacity of the regional brine disposal facility pipeline would be approximately 13.2 MGD. This brine disposal pipeline is an important component of the overall salinity management program for the region, and would enhance opportunities in the future for the CSD to demineralize plant effluent to meet basin plan objectives and to improve the quality of the effluent for local agricultural and/or landscaping reuse. This would also enhance the feasibility of demineralization of fresh water supplies (local groundwater) to improve drinking water and plant effluent quality. This project would need to be implemented coincident with the implementation of the proposed brackish groundwater desalination projects and reclaimed water demineralization projects.

Chlorides. Historically, CSDWRP and other area treatment facilities, have had difficulty meeting the existing 150 mg/l limitation. The Regional Board placed a temporary relaxation on the chloride limitation (Resolution No. 90-004) recognizing that the chloride levels are linked to raw water quality and drought conditions. Regional Board Order No. 98-027 recognizes that imported source water chloride levels continue to make it difficult for area dischargers to meet the chloride limitation of 150 mg/L, and as such, the maximum daily chloride limitation has been changed to 190 mg/L until January 9, 2001. With chloride TMDLs likely being more restrictive, the effluent limitation will likely become more restrictive in coming years. In addition to limiting infiltration of high-TDS groundwater into the collection system, the CSD may need to "back-calculate" new local limits on the discharge of salts to the CSD's wastewater collection system. This could have an impact on some of the local industrial dischargers.

Water Contact Recreation (REC1). Beneficial uses of the receiving waters (Conejo Creek) include water contact recreation. This issue is part of the on-going Calleguas Creek Characterization Study, to determine the extent of body contact recreation in this receiving water. Wastewater discharge into receiving waters which are used for water contact recreation require filtration under Title 22 to reduce the turbidity to 2 MPN to allow for more effective disinfection. Timing of the resolution of this issue is uncertain at this time.

Calleguas Creek Watershed Management Plan

The Calleguas Creek watershed drains an area of approximate 343 square miles, predominantly in southern Ventura County. This watershed includes Conejo Creek (to which the CSDWRP effluent discharges), Arroyo Las Posas, Arroyo Conejo, Arroyo Santa Rosa, and Arroyo Simi, along with the Revolon Slough and the Mugu Lagoon. Mugu Lagoon is considered one of southern California's largest wetlands areas remaining in the region. Approximately 50% of the watershed is open space, 25% is agricultural, and the remaining 25% is urban land use. This watershed management plan is being implemented to address a broad range of land use, environmental, resource management, economic, public infrastructure, recreation, and other issues.

One of the key issues surrounding the watershed management plan which can impact future effluent discharge and receiving water limitations in the Camarillo area is compliance with the Clean Water Act and on-going studies to establish total maximum daily loads (TMDLs) and beneficial uses of the receiving waters in this watershed. With these issues pending and studies in progress, it is difficult to ascertain what specific changes may come about in future years. Some key areas of focus, which may impact treatment levels at the treatment plant, and subsequent recycled water quality, include:

- TMDLs for chlorides discharged to Conejo Creek, expected to be established by January 2000;
- TMDLs for nitrate and ammonia discharged to Conejo Creek, expected to be established by Year 2001;
- Recreational (REC1), municipal (MUN), and warm and cold water habitat beneficial use designations of Conejo Creek;
- Conejo Creek Diversion Project.

The 1994 Basin Plan for this watershed and drainage basin sets forth water quality objectives and beneficial uses for waters in this region. The issues of cold water habitat and municipal beneficial uses for Conejo Creek are being included in the on-going study of the Calleguas Creek Characterization Study. With an established beneficial use of warm water habitat, the Regional Board may desire that a certain level of discharge be maintained, in addition to that required by the Conejo Creek Diversion Project, to protect this beneficial use. A cold water habitat designation for Conejo Creek would allow for spawning and migration of steelhead trout, now a Federally listed endangered species. In addition to chemical water quality enhancements, temperature of treatment plant discharges to this reach could need to be further limited than that already specified in CSD's discharge permit.

The Conejo Creek Diversion Project, expected to be implemented by summer of 2000, may have the impact of reducing the "natural" stream flow of the creek upstream of CSDWRP. This proposed diversion would divert stream flow from Conejo Creek to the Camrosa WD's system for agricultural irrigation purposes. This diversion could impact the CSD by reducing available stream flow for "dilution" of certain pollutants including chlorides, nitrates, ammonia, and temperature.

Ground Water Quality and Quantity

In 1982, State AB 2995 was passed which formed the Fox Canyon Groundwater Management Agency (GMA). GMA agencies involved are those located directly above the Fox Canyon Aquifer in the Oxnard Plain, and include the City of Camarillo and surrounding areas. In addition to overall management of the quality of the area groundwater, one of the key goals of the GMA is to protect Basin overdraft and resulting seawater intrusion. This emphasizes the need for reduction in groundwater pumping in the area.

Efforts continue to limit groundwater pumping from the Ventura Central Basins, to limit overdraft in the area. Since these aquifers are hydraulically connected to seawater, seawater intrusion inland is a continuing and growing concern. Agriculture is extensive in this area, and as such, groundwater quality has diminished over the years due to nitrates, TDS and other dissolved constituents which migrate downwards from the surface soils. The City continues to strive towards a 25 percent overall reduction in groundwater pumping as part of management of the groundwater system in the Oxnard Plain. As part of this overall reduction, the City must continue to purchase additional Calleguas MWD water for potable use, and convert some agricultural lands (which irrigate with GMA Fox Canyon Aquifer Water) to urban use, to meet this goal.

Consideration should also be given to supplying local agricultural lands with CSDWRP recycled water to reduce Fox Canyon GMA Aquifer pumping. Alternatives to supply recycled water are presented in the City of Camarillo Water System Master Plan Update Report.

Industrial Pretreatment Program

Based on review of the regulatory arena, and discussions with Regional Board staff, there does not appear to be any upcoming significant changes to the federal Industrial Pretreatment Program. However, with changing and more restrictive effluent limitations on the horizon, it will become necessary for the CSD to review and possibly modify local limits to area industrial dischargers, as a means of ensuring the CSD's future compliance with effluent discharge and receiving water limitations. This may also be an issue with regards to the quality of biosolids, particularly with respect to heavy metals.

Water Recycling

The State recognizes the importance of recycling water in California, to meet the State's overall water demand. The State's view on the importance of recycling water is backed by Resolution No. 77-1, State Board's Policy with Respect to Water Reclamation in California, and is further specifically addressed in the California Water Code, Sections 13575 and 13577. As California's demand on water continues to increase, so will the demand for and the necessity to recycle wastewater effluent from water reclamation facilities throughout the State. The CSD currently allows reuse of some of their secondary effluent, and Smith Properties irrigates nearby farmlands with the secondary effluent. Some of the flow is also

used for irrigation at the Conejo Mountain Memorial Cemetery. Continued recycling on agricultural lands, and possibly expanding the recycled water market to greenbelt irrigation and non-restricted use, will be an important consideration for the future, particularly in light of the need to diminish overdraft concerns on the groundwater supplies in the area. The market for such unrestricted reuse, however, is contingent upon a tertiary upgrade of the CSDWRP.

The California Department of Health Services (DHS) establishes water quality standards and treatment reliability criteria for water recycling under Title 22, Chapter 4, of the California Code of Regulations (Title 22), and in Title 17, Division 1, Chapter 5, Group 4, Article 1, Section 7604. Requirements for recycled water use in California, not described in Title 22, are considered and approved by DHS on a case-by-case basis.

Title 22 sets bacteriological water quality standards on the basis of the expected degree of public contact with recycled water. For water reuse applications with a high potential for the public to come in contact with the recycled water, Title 22 requires disinfected tertiary treatment. For applications with lower potential for public contact, Title 22 requires three levels of secondary treatment, basically differing by the amount of disinfection required. In addition to establishing recycled water quality standards, Title 22 specifies the reliability and redundancy for each recycled water treatment and use operation. Title 17 provides protection against cross-connections between potable water system s and recycled water systems. The latest versions of these regulations (both Title 17 and 22) were issued by the California DHS on August 30, 1999 for public comment prior to formal adoption.

At this time, the proposed Title 22 water recycling regulations are under public review. These regulations could impact future planning for recycled water use in the area, particularly if the CSDWRP requires an upgrade to a tertiary facility in the future. It should also be noted that on-going studies and developments with the Calleguas Creek Watershed Study may have a significant impact on future discharge limitations to Conejo Creek.

Summary of Proposed Title 22 Regulations. The significant pending changes to Title 22 tertiary water treatment standards are with respect to the disinfection and filtration processes. These proposed changes are described as follows:

- Section 60301.230, Disinfected Tertiary Recycled Water. The chlorine disinfection process to achieve a 2.2 MPN would require a "CT" (chlorine dosage times time, milligrams-minutes/liter) of not less than 450 at all times with a modal[a] contact time of at least 90 minutes, based on peak dry weather flow. The current criteria requires a 2 hour detention time at plant maximum flow rate. The combined disinfection/filtration process must also achieve 99.999 percent removal of the plaque-forming units of F-specific bacteriophage MS2, or polio virus in the recycled water. A virus that is at least as resistant to disinfection as polio virus may be used for purposes of the

[a] The amount of time elapsed between the time that a tracer, such as a salt or dye, is injected into the influent at the entrance to a chamber and the time that the highest concentration of the tracer is observed in the effluent from the chamber.

demonstration. This proposed requirement allows alternative disinfection processes, in combination with conventional filtration (chemical coagulation, clarification prior to filtration) and direct filtration alternatives. The proposed treatment process must be able to demonstrate that it reliably meets the virus removal criteria.

- Section 60301.320, Filtered Wastewater. The filtration requirement recognizes direct filtration as an acceptable alternative, and now lists microfiltration, ultrafiltration, nanofiltration and reverse osmosis as other alternative means of filtration.

Biosolids Management

The federal regulations (40 CFR Part 503) for the disposal of municipal wastewater sludge is not currently under the regulatory authority of the Regional Boards in California. As such, EPA is the jurisdictional entity overseeing biosolids management in California. Management of biosolids is not included in the scope of this master plan study, and as such, the issue of planning studies and long-range forecasts for biosolids for the CSDWRP will be addressed in a separate study.

The CSD currently takes all of the plant biosolids to land application sites in Kern County, located in the San Joaquin Valley, Central California. The CSD has concerns about the future reliability of, and dependence on, land-farming outside of Ventura and Los Angeles Counties, and has purchased 55 acres of land adjacent to the CSDWRP for possible land farming.

The County of Kern has adopted a permanent ordinance to regulate land application of biosolids on farm lands in Kern County. Information regarding this ordinance can be found on the County's web site, "www.co.kern.ca.us/rma/bsurgenc.htm". This permanent ordinance will have a significant and direct impact on the CSDWRP and their existing biosolids management program. The ordinance, which will become effective January 1, 2000, will provide for the following:

- A ban on the land application of biosolids not meeting "Exceptional Quality" standards starting January 1, 2003;
- A limit on the continuing land application of biosolids to existing permitted sites and subject to significant regulatory oversight by the County.

The CSDWRP is capable of producing Class B biosolids (as defined in the 40 CFR 503.33), but not biosolids considered to be of exceptional quality (40 CFR 503.33, Table 3). The direction and development of this proposed ban and regulation of biosolids application needs to be carefully tracked by CSD staff. In addition, it is recommended that CSD staff implement a biosolids management study as soon as possible to evaluate the feasibility of alternative management/disposal alternatives available to the CSD.

Clean Air Act, Chemical Accidental Release Prevention

Section 112(r) of the amended Clean Air Act (CAA), signed into law on November 15, 1990 mandates a new federal focus on the prevention of chemical accidents. The main objective of Section 112(r) is to prevent serious chemical accidents that have the potential to affect public health and the environment. In response to Section 112(r) requirements, the United States Environmental Protection Agency (EPA) established a list of regulated substances and thresholds, and issued the final Risk Management Program regulations. The final regulations were issued on June 20, 1996 (Federal Register Vol. 61, p. 31668). They address "Risk Management Programs for Chemical Accidental Release Prevention" and are listed in the Code of Federal Regulations, Title 40, Part 68 (40 CFR 68). A facility that has more than the threshold quantity of the regulated substance in a process is required to implement a Risk Management Program and submit a summary of the program, the Risk Management Plan (RMP) to EPA by June 21, 1999. Anhydrous chlorine and sulfur dioxide are regulated substances under RMP regulations; the threshold quantity for chlorine and sulfur dioxide is 2,500 pounds and 5,000 pounds, respectively.

While Congress intended Section 112(r) to protect human health and the environment outside of facilities (i.e. offsite), it also directed attention to worker safety. Section 304 of the 1990 CAA amendments directed federal Occupational Safety and Health Administration (OSHA) to promulgate regulations requiring chemical Process Safety Management (PSM) in the workplace. This standard is designed to protect employees from accidental releases. PSM requirements became effective nationwide on May 26, 1992, and apply to all manned facilities handling one or more of 128 chemicals listed, or flammable liquids and gases, when stored in amounts exceeding the threshold quantity. RMP and PSM regulations complement each other and a number of technical documents required to be prepared for these two regulations are same.

The federal OSHA PSM standard was adopted by the California Occupational Safety and Health Administration (Cal-OSHA) under Title 8 of the California Code of Regulations (CCR), Section 5189 in 1992. Anhydrous chlorine and sulfur dioxide are regulated substances under PSM regulations; the threshold quantity for chlorine and sulfur dioxide is 1,500 pounds and 1,000 pounds, respectively.

A State of California Risk Management and Prevention Program (RMPP), including most of the elements of the PSM and RMP programs has been in effect since 1989. Senate Bill 1889 required California to implement a new Accidental Release Prevention Program. Thus, effective, January 1, 1997 the new California Accidental Release Prevention (Cal-ARP) Program replaced the California RMPP; it is found in the CCR Title 19, Division 2, Chapter 4.5. The Cal-ARP Program is a merging of the federal and state programs for the prevention of accidental release of regulated toxic and flammable substances. Cal-ARP Program adopts the federal RMP rule with certain additional requirements specific to California, pursuant to Article 2, Chapter 6.95, of the California Health and Safety Code.

Cal-ARP RMP regulations will be implemented in two phases (Phase I and Phase II); Phase I list of regulated substances and thresholds is similar to the EPA's list of regulated substances. The threshold quantity for chlorine and sulfur dioxide is 2,500 pounds and 5,000 pounds, respectively under the Phase I Program; facilities were required to submit the RMPs to regulatory agencies by June 21, 1999.

The CSDWRP has one chlorination facility and one dechlorination facility, which store and use anhydrous chlorine and sulfur dioxide, respectively. Anhydrous chlorine is used for disinfection of treated effluent and sulfur dioxide is used for removing excess chlorine after chlorine disinfection to meet waste discharge requirements for the protection of water quality and beneficial uses to Conejo Creek. The maximum quantity of chlorine and sulfur dioxide stored at a given time at the CSDWRP exceeds the EPA and Cal-ARP Phase I Program as well as PSM threshold quantities; thus, the facility is subject to federal EPA and Cal-ARP Program, and PSM regulations. The CSD is having a Risk Management Program document prepared as a support document to Risk Management Plan which satisfies the requirements of 40 CFR 68 and Article 2, Chapter 6.95, of the California Health and Safety Code.

Development of the RMP for the CSDWRP is being addressed as part of a separate study and report, which includes (1) a facility description and chlorine and sulfur dioxide process description, (2) additional details of the applicability of the EPA and Cal-ARP Program regulations, (3) general requirements for the facility, and (4) the details of a management system to oversee the implementation of the risk management program elements.

Current Air Quality Regulatory Requirements

Federal, state, and local agencies regulate air emissions. Enforcement of federal air quality regulations set forth by the Clean Air Act Amendments of 1990 has been delegated to the state and local air quality management districts. These districts are responsible for the implementation of all applicable regulations to meet Federal and State Ambient Air Quality Standards. The air quality regulations for facilities located in Ventura County are implemented by the Ventura County Air Pollution Control District (VCAPCD).

VCAPCD regulations require that facilities emitting air pollutants obtain an authority to construct certificate and permit for sources of air emissions except those specifically exempt from permitting as listed in the rules and regulations. Exempted sources include internal combustion engines with a power input of less than 50 brake horsepower and emergency internal combustion engines (i.e. generators and pumps that operate only during emergencies and engine maintenance). No special permits are currently required for the wastewater treatment process units.

The CSDWRP currently has two permits: one for a boiler and another for the digester gas flare. Source specific operating requirements for the boiler and digester gas flare sources are set forth as permit conditions.

General Regulations. VCAPCD rules and regulations include emissions and equipment standards. All sources must comply with applicable standards and prohibitions regardless of permitted status. Prohibitions applicable to the Camarillo Sanitary District WRP include opacity limits, nuisance prohibitions, and limits on emissions of sulfur compounds. Opacity requirements may be of concern to sources such as the digester gas flare. Nuisance regulations may encompass odor complaints from the public. Limits on the emissions of sulfur compounds (sulfur dioxide and hydrogen sulfide) are applicable to wastewater treatment and flaring processes. Specific exceptions are provided for emergency and planned flaring operations.

Source Specific Regulations. VCAPCD regulations also include requirements for NOx and CO emissions from boilers with heat input capacities greater than 1.0 million Btu/hr. Affected sources are required to perform emissions source testing every 2 years. Other requirements, such as equipment tuning, may also be triggered based on annual usage of each unit.

Future Air Quality Regulatory Requirements

General Regulations. Future additions of air emission sources and modifications to existing sources may trigger requirements in addition to the general permitting requirements and prohibitions listed above.

Source Specific Regulations. Source specific requirements for boilers may also apply to future operations. At present, there are no source specific requirements or anticipated rulemaking actions related to volatile organic compound (VOC) emissions from wastewater treatment facilities. However, Ventura County is a state and federal non-attainment area for ozone. Therefore, VOC reduction regulations applicable to these sources may be established in the future.

New source review regulations apply to all new and modified sources of air emissions of criteria pollutants (total organic gases, particulate matter, and nitrogen oxides, sulfur oxides and carbon monoxide). The rule requires that all new/modified sources be constructed utilizing "best available control technology" (BACT) in order minimize emissions of these pollutants to the atmosphere. The rule also requires emission offsets for the construction of new sources at facilities whose total emissions or permitted potential to emit exceed specified thresholds.

Air Toxics Regulations. VCAPCD also implements air toxics rules under the State Air Toxics Regulations promulgated as part of the Assembly Bill 2588 (AB2588) Air Toxics "Hot Spots" Program. Under this program, emission inventories of toxic air contaminants were originally required for all Wastewater Treatment facilities (including POTWs). The Camarillo Sanitary District prepared and submitted the applicable plans and inventories in 1996. The latest revision of this rule (July 1997) exempts facilities whose emissions of criteria pollutants are less than 10 ton per year and that (1) do not have a sludge incinerator and (2) have a maximum facility

throughput less than 10 mgd. The CSDWRP currently meets these exemption criteria and is not required to submit any further air toxic inventory reports to the district.

Future plant expansion to capacities of greater than 10 mgd or the addition of a sludge incinerator may again trigger the air toxic inventory requirement. Facilities required submitting toxic air emission inventories as part of this program are typically notified by the district of the requirement, including the emission inventory submission deadlines.

Uniform Fire Code

The storage and handling of hazardous materials used at the plant site is regulated by the Uniform Fire Code under Article 80. The Uniform Fire Code contains specific regulations concerning the permitting of installations handling and storing hazardous materials. The City of Camarillo recently adopted the 1997 Uniform Fire Code. The Uniform Fire Code requires the use of a mechanical exhaust system and treatment of toxic gases (i.e., chlorine) before they are discharged into the atmosphere. These requirements for storage are consistent with the Clean Air Act and federal and State OSHA requirements.

Flood Protection

The Flood Control and Water Resources Department of the Public Works Agency of Ventura County reviews all new construction in flood control areas. If the proposed construction lies within a floodway, the Flood Control and Water Resources Department must review and approve the plans before they can be submitted to Ventura County Building and Safety located in the City of Camarillo. For the CSD's existing plant site, this is not likely an issue for future plant expansions. However, should expansion be considered on the CSD's adjacent 55 acres of land, review of development in this area may require involvement by the flood control agency. The County Flood Department has planned for a widening of Conejo Creek for quite some time. The anticipated time frame of this project is not known. This project, once implemented, could change the flood plain definition around the plant area and the 55 acres that could potentially be used for biosolids management in the future.

Chapter 5

ANALYSIS OF EXISTING FACILITIES

This chapter describes the design criteria and capacity of the existing wastewater collection and treatment system.

COLLECTION SYSTEM

Collection System Design Criteria

The following summarizes key CSD design criteria used in the evaluation of existing and recommended collection system facilities, extracted from the Camarillo Sanitary District Manual of Design, Construction Standards, and Standard Plans [4].

Sewer Capacities and Sizes

The average daily flow rate from dwelling units must be determined based upon good engineering practice. The rates shown are used as a guideline, but flows outside of these rates may occur:

1.	Apartments & Condos	250 gals./dwelling unit/day
2.	Single Family Detached	360 gals./dwelling unit/day
3.	Commercial	3000 gals./acre/day
4.	Industrial	5000 gals./acre/day

Peak sewage flow rates must be obtained by using the peak factor obtained from Plate No. 11 of the sanitary sewer standards multiplied by the average daily flow rate outlined above.

Hydraulic Design. For hydraulic design, Manning's "n" = 0.013 or Hazen-Williams' "C" = 100 should be used (n = 0.010, C = 150 for SDR35).

For gravity sewers 15" or less in diameter, the pipe should be designed to carry peak flow at no more than one-half depth.

For gravity sewers 18" or greater in diameter, the pipe should be designed so peak flow rate will be carried when pipe is flowing at no more than three-fourths depth.

Force Mains. Force mains are to accommodate the design peak flow from the lift station calculated from Manning's equation using n=0.010. The nominal design velocity for a force main should be 3.0 fps, with minimum velocity of 2.0 fps, and the

maximum velocity of 6.0 fps. The discharge must be into a manhole with a transition to a gravity sewer. It should be noted that this criterion is different from actual design parameters used for the CSD's existing force mains. Actual design velocities for the existing force mains were based on a maximum of 8 fps.

Evaluation of Collection System with Existing Flows

As described in Chapter 2 of this master plan, the CSD developed a gravity sewer hydraulic computer model to analyze the flow capacity of the collection system. This computer model has been used to identify the portions of the sewer system, which are flowing above their design capacities while flowing at existing conditions.

Development and Allocation of Flows. City of Camarillo 1998 water meter flow data was used as a basis for attributing wastewater flows to the sewer system. Agriculture, landscaping, and fire hydrant flows (temporary construction water) were removed from the data set as these water demands would not generate flow to the sewer system. A factor of 0.67 was applied to the remaining water demand at each water meter, to balance that fraction of water demand that reaches the sewer system as wastewater flow, and the known portion of sewage flows in other areas without water meter data (sanitary customers not served by City water meters). The wastewater flow was then distributed to the nearest sewer manhole by address matching, and applied as a point flow at the upstream manhole of the sewer pipe. A map of water meter addresses and aerial photographs of the City were visually analyzed to determine areas in the CSD not served with water by the City of Camarillo that would contribute wastewater flows to the system. A point flow of 0.075 mgd, based on actual flow data provided by the City, was applied to the system from the Camarillo Municipal Airport. Additional flow of 0.358 mgd was distributed throughout areas of the CSD that are not served water by the City of Camarillo (for which there are no meters and addresses to match).

At locations in which there is a diversion/overflow dam, such as at the Lewis Road and Adolfo Road intersection, and the Hughes and Ventura Boulevard intersection, all flow is diverted (in the model) to the downstream pipeline as indicated by CSD staff, to reflect actual collection system flow conditions.

Based on these inputs to the sewer system model, total average wastewater flow into the sewer system and that which enters the treatment plant is approximately 3.5 mgd. This is consistent with the actual current flow of 3.58 mgd into the plant, and served as a check to ensure that all wastewater flows were accounted for in the model. Based upon the sewer model, the flow leaving Pumping Station 5 is 0.3 mgd, compared to the actual flow data of 0.25 mgd from metered data at the pumping station. Based upon this check of the flows, distribution of wastewater flows throughout the service area was determined to be reasonable.

Sewer Model Results with Existing Flows. The sewer model was run with existing flows, and all results which indicated deficiencies are of minor nature. Minor deficiencies are those which may exhibit flows over capacity only during peak flow conditions, and do not surcharge. Based on the results, all components of the collection system are suitable for existing flow conditions. Model results showing deficient pipes located in the system are summarized in Table 5-1.

Criteria for the sewer model is as described in Chapter 2 of this master plan, using a peaking factor of 2. If Plate 11 is used, with the corresponding wastewater service area population, a peaking factor of 1.55 should be used. Thus, the peaking factor of 2 was used, as this peaking factor was actually observed at the CSDWRP based on actual influent flow data. Flow percent is based upon percentage of actual pipe flow relative to that which corresponds to depth of flow criteria capacity per CSD standards (i.e. flow of 0.25 cfs in a pipe with a capacity of 0.50 cfs is said to have a flow percent of 50% of the pipe carrying capacity). Pipes 15 inches and smaller are at capacity when they are flowing half full, and pipes 18 inches and larger are at capacity when they are flowing at a depth equal to three-fourths of the pipe diameter. The pipeline is considered to be overloaded when the flow is greater than the design capacity of the pipe.

The 15" sewer in Daily Drive at the western edge of the CSD, and the 12" sewer in Dawson Drive at the eastern edge of the CSD, are in areas that may see some future growth. The remaining sewers identified as being over capacity are not expected to see much additional flow. However, all of these pipelines were also modeled with future projected flows as discussed in the following section.

Evaluation of Collection System with Future Flows

The sewer model was used to evaluate and analyze the existing collection system with projected wastewater flows for the year 2010 and to determine which portions, if any, of the sewer system will become overloaded as a result of those projected flows.

Development and Allocation of Flows. Future flows projected for the service area are based upon service area population projections for 2010 as discussed in Chapter 2 of this report. A per capita flow of 90 gpcd is used to project future flows. This value is comparable to that of overall rates used for specific developments (CSD's draft criteria), and is representative of actual per capita flows for the CSD based on current data.

The Ponderosa Corridor area, south of Ponderosa Drive, north of Highway 101, and west of Las Posas Road, is projected to have a population of 2,560, attributing to a wastewater flow of 0.23 mgd (0.36 cfs). This flow is divided amongst 5 gravity sewers in the area along Wood Road, Baja Agua Avenue, Camino Cortina, and Las Posas Drive. Thus, individual point flows corresponding to sub-drainage areas are added to the existing flows at the upstream end of gravity sewer pipes in this area.

Table 5-1. Summary of Sewer Pipe Deficiencies, Existing Flows[a]

General Location	Sewer ID	Diameter (inches)	Flow Percent of Design Capacity[b]	d/D[b]	Length (feet)
Pleasant Valley Road	S0010100	18	113	0.85	67
Las Posas Road	S7003790-S7003860	12	101-134	0.51-0.67	2207
Lewis Road	S6000060	12	117	0.56	334
Daily Drive	S7003040	15	113	0.57	1807
Daily Drive	S7003049, S7003051	12	135-156	0.68-0.78	1798
Easement (Rosewood)	S7003510, S7003520, S7003540 S7003550	15	163	0.82	1775
Easement (Rosewood) (Skeel Relief)	S7003507, S7003514, S7003555	15	125-155	0.63-0.78	1685
Paseo Camarillo	S7003519 S7003530, S7003535	15	102-163	0.51-0.82	900
Ponderosa Drive	S7003560, S7003565 S7003600	15	155-179	0.89-0.77	944
Ponderosa Drive	S7006500-S7006570	12	161-177	0.81-0.89	2489
Ponderosa Drive	S7008170	12	152	0.76	130
Ponderosa Drive	S7008900-S7008930	12	139	0.69	1023
Rosewood Avenue	S7003700-S7003740	12	106-131	0.53-0.66	1571
Rosewood Avenue	S7003780	12	134	0.67	166
Dawson Dr.	S1001440 - S1001490	12	140-145	0.70-0.73	1956

[a] Peak flow conditions.

[b] Lower number denotes upstream reach of pipe; Higher number denotes downstream reach of pipe.

The Village of the Park area, south of Highway 101, north of Pleasant Valley Road, and west of Via de la Rosa, is projected to have a population of 3,360, and a wastewater flow of 0.30 mgd (0.46 cfs). The flow from Village of the Park is equally divided amongst four pipelines along Pleasant Valley Road, and Via de la Rosa. A point flow of 0.078 cfs is also added to the existing flows at the upstream end of these pipes.

In addition to these two areas to be developed, a population growth of 8,261 is expected in the remaining service area by 2010. Using a per capita flow of 90 gpcd, a flow of 0.74 mgd is distributed throughout the CSD. The McGrath area is a commercial area south of Ventura Boulevard and west of Wood Road that is expected to contribute 0.063 mgd of the expected future flows to the sewer collection system, based upon a factor of 630 gallons per acre per day. This flow was divided amongst two 18" pipelines along an easement at the western edge of the CSD boundary. Flows for the Adamson area, south of Highway 101 and east of Calleguas Creek, were projected in a similar fashion as the McGrath area. The Adamson area flows were calculated to be 0.38 mgd peak (0.6 cfs peak). Flows from this area were input along several manholes on Pancho Road, south of Pleasant Valley Road. No additional growth in flow was attributed for the airport area. The distribution of the remaining future flows is concentrated on the northwest and eastern areas of the CSD (Pitts Ranch), as much of the central portion of the CSD is already at build-out. A plot of water meter addresses, land use, recent City planning department information, aerial photographs, and GIS street data were used to identify those areas having potential for development, and thus, future wastewater flows. Future flows were then distributed to these areas of the CSD in which few or no water meter data currently existed.

Total future average flows (year 2010) into the system, including future and existing flows, are 4.8 mgd. Future flows alone contribute 1.27 mgd to the system.

Sewer Model Results with Future Flows. Based on future peak flows and model results, deficient pipes located within the existing sewer system are as shown in Table 5-2.

Deficient pipelines with future flows are the same as those identified for existing flows, with the addition of the 10 inch line on Las Posas Road and the 12 inch line on Del Norte Road, which are flowing slightly over half full at peak flow, indicating that these sewers are just marginally over design capacity. Similar to the results of the existing flow analysis, all deficiencies are minor, with the exception of two specific reaches on Ponderosa Drive and Pleasant Valley Road..

Table 5-2. Summary of Sewer Pipe Deficiencies, Future Flows[a]

General Location	Sewer ID	Diameter (inches)	Flow Percent of Design Capacity[b]	d/D[b]	Length (feet)
Pleasant Valley Road	**S0010100**	**18**	**153**	**1.15[c]**	**67**
Las Posas Rd	S7010880-S7010890	10	120-121	0.61	855
Las Posas Rd	S70010990	10	112	0.56	340
Las Posas Rd	S7003790-S7003870	12	101-161	0.57-0.81	2957
Lewis Road	S1001390 - S1001400	15	135	0.7	1000
Lewis Road	S6000060	12	117	0.58	334
Daily Drive	S7003000-S7003051	15	114-180	0.57-0.90	1807
Easement (Rosewood)	S7003510, S7003520, S7003540 S7003550, S7003540	15	147-191	0.74-0.95	2171
Easement (Rosewood) (Skeel Relief)	S7003507, S7003514, S7003555	15	155-185	0.78-0.93	1685
Paseo Camarillo	S7003519 S7003530, S7003535	15	116-191	0.58-0.95	900
Ponderosa Drive	**S7003560-S7003600**	**15**	**155-214**	**0.76-1.07[c]**	**974**
Ponderosa Drive	S7006500-S7006570	12	161-177	0.80-0.89	2489
Ponderosa Drive	S7008170	12	152	0.76	130
Ponderosa Drive	S7008280-S7008290	12	154	0.77	895
Ponderosa Drive	S7008900-S7008930	12	139	0.69	1023
Rosewood Avenue	S7003700-S7003740	12	127-156	0.64-0.78	1571

[a] Peak flow conditions.

[b] Lower number denotes upstream reach of pipe; Higher number denotes downstream reach of pipe.

[c] This trunk sewer is projected to surcharge.

Table 5-2. Summary of Sewer Pipe Deficiencies, Future Flows[a] (continued)

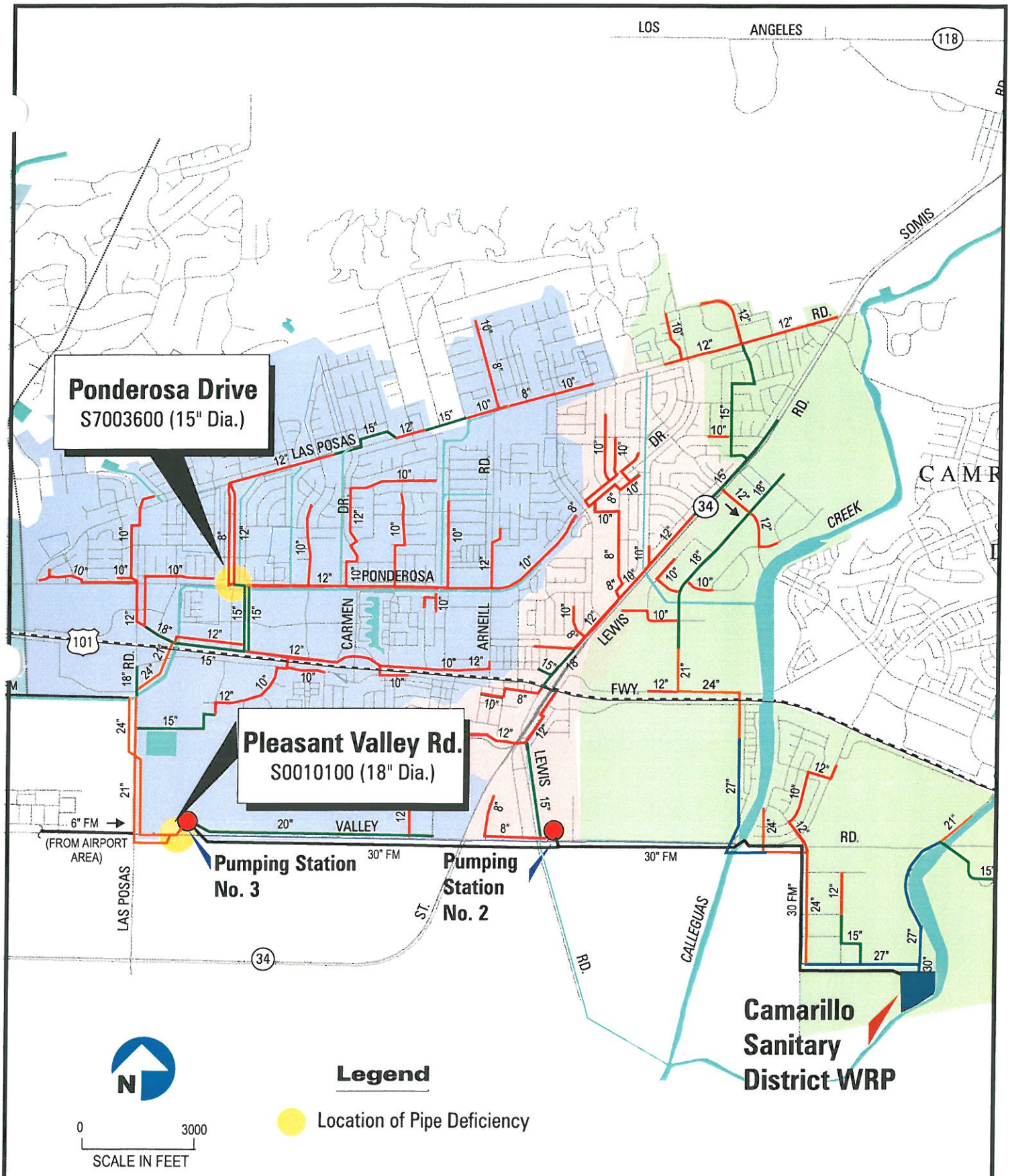
General Location	Sewer ID	Diameter (inches)	Flow Percent of Design Capacity[b]	d/D[b]	Length (feet)
Rosewood Avenue	S7003771	8	103	0.57	2486
Rosewood Avenue	S7003780	12	136	0.68	166
Dawson Dr.	S1001440 - S1001490	12	140-145	0.70-0.73	1956
Del Norte	S8000100-S8000110	12	124	0.62	823

[a] Peak flow conditions.
[b] Lower number denotes upstream reach of pipe; Higher number denotes downstream reach of pipe.
[c]This trunk sewer is projected to surcharge.

The 15" sewer on Ponderosa Drive (Sewer ID 7003600), and the 18" sewer on Pleasant Valley Road (Sewer ID 0010100) are both projected to surcharge before Year 2010. These specific reaches of gravity sewer are depicted on Figure 5-1. The expected surcharge during peak conditions is relatively minor in nature. Thus, it is recommended that both these reaches of the collection system be monitored and in or around Year 2005, and metered to determine actual flows and peaking factors in the area. Sewer replacements or enlargements can be adequately assessed for this area at that time.

Aside from these two potential collection system deficiencies, the remaining collection system for 10-inch sewers and larger are sufficient to meet future flows. Sufficient capacity is defined to mean the capacity at which surcharge conditions do not occur during peak daily flows. We do not recommend any sewer replacements or enlargements as part of the Year 2010 projections. However, the CSD should periodically assess growth and flows in the areas with minor deficiencies to check for potential capacity concerns.

New sewers for Ponderosa Corridor, McGrath, Adamson, and Village of the Park areas should be designed per the CSD's standards. It is assumed that the developers will install much of the new sewers in these areas. New sewers in these undeveloped areas should be capable of conveying sewage by gravity, and pipe diameters of at least 8-inch should be sufficient for these areas to tie in to the existing 10-inch and larger trunk sewers. Model results have shown that the existing collection system is sufficient to handle these future flow conditions.



PARSONS ENGINEERING SCIENCE	Camarillo Sanitary District Wastewater System Master Plan	Projected Gravity Sewer Deficiencies	FIGURE 5-1

Force Mains and Pumping Stations

Force mains and pumping stations were evaluated (manually) separate from the collection system model. The force mains were evaluated based on hydraulic parameters described at the beginning of this Chapter. In addition, the force mains were evaluated with respect to the capacities of the pumping stations that discharge to the force mains. The pumping stations 2, 3 and 5 have maximum discharge capacities of 2,250 gpm, 9,300 gpm and 3,200 gpm, respectively. Thus, the existing 18-inch force main from Pumping Station 5 receives a maximum of 3,200 gpm; the existing 30-inch force main will receive a maximum of 11,550 gpm (combined discharges from Pumping Stations 2 and 3), and the 12-inch force from Pumping Station 2 receives a maximum flow of 2,250 gpm. Pump station capacities were checked against peak flows using a peaking factor of 2. Table 5-3 summarizes the evaluation of the three force mains and pumping stations. Based on this review, the force mains and pumping stations are of sufficient capacity through the Year 2010 and beyond.

Table 5-3. Summary of Force Main and Pumping Station Evaluation

Facility	Rated Capacity [a], gpm (mgd)	Existing Peak Flow to Facility[b], gpm (mgd)	Future (Year 2010) Peak Flow to Facility[b], gpm (mgd)
Pumping Station 2	2,250 (3.2)	848 (1.2)	918 (1.3)
Pumping Station 3[c]	6,750 (9.7)	3,078 (4.4)	3,242 (4.7)
Pumping Station 3[d]	9,000 (13.4)	3,078 (4.4)	4,149 (6.0)
Pumping Station 5	3,200 (4.6)	575 (0.8)	1,087 (1.6)
12" Force Main	2,820 (4.1)[e]	848 (0.8)	918 (1.3)
18" Force Main	6,345 (9.1)[e]	545 (0.7)	1,087 (1.6)
30" Force Main	17,627 (25.4)[e]	3,926 (5.6)	5,057 (7.3)

[a]Firm capacity with one pump out or service.
[b]Peaking factor of 2 was used.
[c]Based on 3 pumps installed.
[d]Based on 4 pumps installed.
[e]Based on maximum 8 ft/s velocity.

Sewer Manhole Corrosion

The CSD has indicated that approximately 18 to 20 sewer manholes on the Flynn Road 30-inch diameter trunk sewer are in poor condition due to interior corrosion (sulfide attack) of the concrete manholes. The extent of corrosion is not known, but according to CSD staff, the condition of these manholes is such that replacement or re-lining of the manholes is warranted. The replacement and/or re-lining of these sewer manholes should be included in the CSD's capital budget for Year 2000 to ensure integrity of the collection system and worker safety during maintenance of the sewer collection system.

WASTEWATER TREATMENT SYSTEM

The CSDWRP consists of two discrete wastewater treatment plants (Plants 1 and 3). These plants have separate processes for primary and secondary clarification and aerobic treatment, but share common facilities such as head works, solids handling, sludge drying, and disinfection facilities. The CSD also operated a third plant, Plant 2, which was decommissioned in 1992. The following sections summarize the process evaluations of Plants 1 and 3, followed by a separate subsection, which summarizes the assessment of Plant 2.

Existing System Design Criteria, Plants 1 and 3

Flow and loading criteria used to evaluate the wastewater treatment system are based upon an average dry weather flow of 6.75 mgd, the present combined rated capacity of Plants 1 and 3. Based upon design criteria established in the 1992 Wastewater Master Plan, a peaking factor of 2 was used to determine peak flow. A hydraulic peaking factor of 2.5 was used to determine maximum instantaneous hydraulic flows. BOD and suspended solid loadings are based upon 90 percentile values of 250 mg/l that, by definition, are only exceeded 10% of the time. It is assumed that 30 percent of BOD is removed through the primary clarifiers, and that the aeration basins remove 100 percent of the remaining BOD, a good engineering assumption for design and rating analyses. These parameters are summarized in Table 5-4. Design criteria for specific unit wastewater treatment processes are summarized in Table 5-5.

Table 5-4. Existing System Design Criteria

Parameter	Application	Value
Average Dry Weather Flow The average flow occurring over a day	Evaluation of wastewater flow processes.	6.75 mgd
Maximum Hydraulic Flow The maximum flow through hydraulic processes	Sizing of all hydraulic facilities.	17.0 mgd
90 Percentile BOD Influent Concentration That which is only exceeded 10% of the time.	Sizing of aeration facilities.	250 mg/l
90 Percentile TSS Influent Concentration That which is only exceeded 10% of the time.	Sizing of sludge handling facilities.	250 mg/l

Prior Capacity Studies

In 1989, the CSD completed a capacity study[8], which concluded that the actual plant capacity was less than the design rated capacity. The conclusions of this study are summarized in Table 5-6.

TABLE 5-5.
CSDWRP
UNIT PROCESS DESIGN CRITERIA

DESCRIPTION	UNITS	PLANT #1	PLANT #3
Design Flow	gpm	2.75	4.0
INFLUENT PUMPS		Note: majority of influent flow to plant is pumped directly to head works from PS 3.	
Influent Pumping Station			
No. of Pumps	--	2	
Type	--	Screw Pump	
Capacity, each	gpm	3,800; Rated 26' Head	
Size	in.	54	
Max Pump Speed	rpm	38	
Nominal Inclination Angle	degrees	45	
SCREENING			
Mechanically Cleaned Bar Screens			
Number	--	3	
Width	ft.	2.5	
Bar opening size	in.	0.5	
Channel Width	in.	30	
Flow through each Screen			
Maximum	mgd	11	
Minimum	mgd	3	
Approx. Rake Speed	fpm	20	
Max Diff. Head	in. water	3	
Max. Water Depth	ft.	8.083	
Splitter Box			
Type		Weir; splits flow between Plant#1 and #3	
GRIT REMOVAL			
Aerated Grit System Basins			
Number		2	
Size (length x width)	ft.	12' x 13'	
Sidewater Depth	ft.	13	
Ave. Design Flow	mgd	6.75	
Ave. Detention Time	min	6.47	
Diurnal Peaking Factor [a]		2	
Peak Design Flow [a]	mgd	13.5	
Peak Detention Time [a]	min	3.2	

TABLE 5-5.
CSDWRP
UNIT PROCESS DESIGN CRITERIA

DESCRIPTION	UNITS	PLANT #1	PLANT #3
Blowers		Positive Displacement	
Number	--	2	
Rated Pressure	psig	5	
Capacity	scfm	1 @ 195, 1 @ 180	
Grit Pumps			
Type		Horizontal End Suction Centrifugal,Torque Flow	
Number	--	3	
Capacity	gpm	200	
Rated Head	ft	2 @ 30, 1 @ 18	
Cyclones			
Number	--	2	
Type	--	Vortex	
Design Flow	gpm	200	
Design Flow Range	gpm	125 - 300	
Max Pressure Loss	psi	7	
Grit Washer/Classifier		Aerated-grit pumped to cyclone classifier and washer	
Number	--	2	
Capacity, ea	gpm	200	
Grit Removal,ea	cu. ft./day	120; 23	
PRIMARY TREATMENT			
Primary Flow Measurement			
Number	--	1	1
Type		Ultrasonic Flowmeter	
Primary Basins			
Number	--	2	3
Diameter	ft	50	50
Sidewater Depth	ft	10	10
Bottom Slope			1:12
Design Flow (Ave)	mgd	2.75	4
Volume [a]	gal	293,739	440,608
Detention Time at Average Flow [a]	hrs	2.56	2.64
Actual Ave. Surface Overflow Rate [a]	gpd/sq. ft.	701	679
Desired Overflow Rate @ Peak Flow [b]	gpd/sq. ft	2,200	2,200

TABLE 5-5.
CSDWRP
UNIT PROCESS DESIGN CRITERIA

DESCRIPTION	UNITS	PLANT #1	PLANT #3
Primary Basins (con't)			
Unit Process Capacity, Peak [a]	mgd	8.64	12.96
Unit Process Capacity, Average [a]	mgd	4.32	6.48
Primary Sludge Pumps			
Number	--	2	5
Type		Simplex Plunger	Simplex Plunger
Rated Total Head	ft	20	20
Capacity at Rated Head	gpm	50	50
SECONDARY TREATMENT			
Aeration Basins			
Number		2	3
Diffuser Type		Sanitaire Membrane Fine Bubble EPDM Diffusers	Sanitaire Membrane Fine Bubble EPDM Diffusers (Complete Mix)
Size (length X width)	ft.	115' x 30'	80' x 40'
Sidewater Depth	ft.	14.75	20
Average Design Flow	mgd	2.75	4
Volume [a]	gal	761,277	1,436,160
Actual Detention Time for Average Flow (ADWF) [a]	hr	6.64	8.60
Desired Detention Time for Ave. Flow (ADWF) [b]	hrs	7.00	7.00
Unit Process Capacity [a]	mgd	2.61	4.92
BOD Removal (assumed) [b]	mg/l	175	175
alpha [b]		0.55	0.55
Beta [b]		0.95	0.95
C_L @ Ave. Flow [d] [b]	mg/l	2	2
C_{walt} [d] [b]	mg/l	8.99	8.99
C_{S20} [d] [b]	mg/l	9.08	9.08
F/M @ 1800 mg/l MLSS [a]		0.35	0.27

TABLE 5-5.
CSDWRP
UNIT PROCESS DESIGN CRITERIA

DESCRIPTION	UNITS	PLANT #1	PLANT #3
Aeration Basins (con't)			
Oxygen Transfer Efficiency at Standard Conditions [b]		0.21	0.29
Oxygen Transfer Efficiency at Actual Field Conditions [a]		0.08	0.13
Oxygen Required for 1 mgd Flow (Gross SOR) [a]	lb O2/day *Q (mgd)	17,281	12,163
Air Required for 1 mgd Flow [a]	cfm *Q (mgd)	689	485
Air Required @ Design Flow [a]	cfm	1,895	1,940
Air Required @ Peak Flow [a]	cfm	3,790	3,880
Ave. Unit Process Capacity [a]	mgd	4.14	8.66
Residence Time, [a]	days	4.75	6.15
RAS Flow	mgd		1.0 - 4.0
Aeration Blowers			
Number		4	3
Type		Multistage Centrifugal	Multistage Centrifugal
Capacity, ea	scfm	1,900	4,200
Design Discharge Pressure	psig	6.7	9.5
Secondary Clarifiers			
Number	--	3	3
Diameter	ft.	2 @ 50, 1 @ 60	50
Sidewater Depth	ft.	2 @ 8, 1 @ 12	2 @ 15, 1@ 12
Surface Area [a]	sq. ft	6,754	5,890
Desired Surface Overflow Rate, Ave [b]	gpd/sq. ft	700	700
Unit Process Capacity, Ave [a]	mgd	4.73	4.12
Unit Process Capacity, Peak [a]	mgd	9.46	8.25

TABLE 5-5.
CSDWRP
UNIT PROCESS DESIGN CRITERIA

DESCRIPTION	UNITS	PLANT #1	PLANT #3
Secondary Clarifiers (con't)			
Average Design Flow	mgd	2.75	4
Actual Ave. Detention Time w/o RAS [a]	hr	4.23	3.70
Actual Ave. Surface Loading w/o RAS [a]	gpd/sq. ft	404	679
Total Volume [a]	cu ft	65,345	82,467
Desired Detention Time @ Ave. Flow [b]	hrs	3.00	3.00
Unit Process Capacity [a]	mgd	3.91	4.93
Actual Detention Time @ Design Flow [a]	hrs	4.27	3.70
Desired Solids Loading, Ave [b]	lbs/day/sq. ft	25	25
Desired Solids Loading, Peak [b]	lbs/day/sq. ft	40	40
MLSS [b]	mg/l	1,800	1,800
Solids Loading, Ave [a]	lbs/day/sq. ft	12.22	20.39
Solids Loading, Peak [a]	lbs/day/sq. ft	18.34	30.58
Unit Process Capacity (based on Ave. Solids Loading) [a]	mgd	5.63	4.91
Unit Process Capacity (based on Peak Solids Loading) [a]	mgd	6.01	5.24
RAS Sludge Pumps			
Number @ Capacity (gpm) @ Rated Head (ft)	--	5	3 @ 1,000 gpm @ 20'H 2@ 875 gpm @ 17' H
Type		not available	Centrifugal Non-Clog
WAS Sludge Pumps			
Number @ Capacity (gpm) @ Rated Head (ft)	--	0	2 @ 1,000 gpm @ 7'H 2@ 175 gpm @ 20' H
Type		not available	Centrifugal Non-Clog

TABLE 5-5.
CSDWRP
UNIT PROCESS DESIGN CRITERIA

DESCRIPTION	UNITS	PLANT #1	PLANT #3
DISINFECTION			
Chlorine Contact Basins			
Number	--	2	
Size (width x length)	ft	31.5 x 139	
Sidewater Depth	ft	9.83	
Volume [a]	cu ft	86,081	
Design Flow [c]	mgd	6.75	
Hydraulic Peaking Factor [c]		2.5	
Peak Flow (Hydraulic Peak During Floods) [c]	mgd	17	
Actual Detention Time @ Peak Hydraulic Flow [a]	min	55	
Chlorine Contact Mixer			
Number	--	1	
CHLORINATION FACILITIES			
Chlorine Supply Systems			
Chlorine Storage	Ton Containers	12	
Number of Chlorinators		4	
Loading Capacity	lbs/day	3@2000, 1@1000	
Type		Vacuum	
Design Rate of Flow (ea)	lbs/day	2000	
Design Rate of Flow			
Chlorine Contact Basin	lbs/day	2000	
Plant 3 RAS	lbs/day		1000
Standby	lbs/day	2000	
Dosage Range			
Chlorine Contact Basin	ppm	0 to 10	
RAS	ppm	0 to 10	
Chlorine Evaporators			
Number		3	
Type		Electric	

TABLE 5-5.
CSDWRP
UNIT PROCESS DESIGN CRITERIA

DESCRIPTION	UNITS	PLANT #1	PLANT #3
SULFUR DIOXIDE FACILITIES			
Sulfure Dioxide Supply Systems			
Sulfur Dioxide Storage	Ton Containers	8	
Number		4	
Type		Vacuum	
Design Rate of Flow	lbs/day	2000	
Sulfur Dioxide Evaporators			
Number		2	
Type		Electric	
Design Rate of Flow	lbs/day	2,000	
MISC. PROCESSES			
Effluent Ponds			
Effective Storage Capacity	MG	0.5	
Dechlorination Storage		8 - 1 ton cylinder SO_2 storage	
Anaerobic Digester			
Primary	cu. ft.	57,000	
Secondary	cu. ft.	38,000 (no mixing or heating)	
Primary Sludge [a]	lbs/day	8,434	
Volatile Fraction of Primary Sludge [a]	lbs/day	6,747	
Solids Loading [a]	lbs/cu ft. day	0.12	
Sludge Concentration		0.04	
Sludge [a]	gal/day	25,313	
[a]	cu ft/ day	3,384	
Actual Detention Time [a]	days	16.84	
Unit Capacity @ Desired Detention Time = 15 days [a]	mgd	7.6	
Unit Capacity @ 0.2# VS/cu ft. [a]	mgd	11.4	

TABLE 5-5.
CSDWRP
UNIT PROCESS DESIGN CRITERIA

DESCRIPTION	UNITS	PLANT #1	PLANT #3
Pre-Aerobic Digester (Converted Aerobic Digester)			
Diameter	ft.	50	
Sidewater Depth	ft.	28	
Volume	cu. ft.	54,978	
Aerobic Digester			
Number of Basins	--	2	
Volume of each Basin	cu. ft.	50,000	
Sludge/day [a]	lbs sludge/day	5,904	
Concentration [b]	percent	0.005	
Sludge [a]	Gallons/day	142,262	
Actual Detention Time Including Pre-Aerobic Digester [a]	days	8.1	
Operation Mode	--	Complete Mix	
Min. Air Flow Rate for Both Basins	scfm	3,000	
Blowers	num	3	
Air Supply Rate (ea)	scfm	1,500	
Blower Min. Discharge Pressure	psig	7.6	
Blower Motor Nameplate	hp	75	
Sludge Thickener WAS Production Rate	gpd	162,800	
Ave. Day Solids load to Thickener	lbs/day	6,310	
Solids Conc. from Thickener	percent	1.0 - 3.5, Avg. 2.0	
Ave. Day Feed Rate to Thickener	gpm	450	
Number of Sludge Feed Pumps	--	2	
Type of Sludge Feed Pumps	--	Horizontal Self-Priming Centrifugal	

TABLE 5-5.
CSDWRP
UNIT PROCESS DESIGN CRITERIA

DESCRIPTION	UNITS	PLANT #1	PLANT #3
Aerobic Digester (con't)			
Capacity of Sludge Feed Pumps	gpm	450-600	
TDH of Sludge Feed Pumps	ft.	30	
Motor Horsepower of Sludge Feed Pumps	hp	10	
Number of Thickened Sludge Pumps	--	2	
Type of Thickened Sludge Pumps	--	Progressive Capacity	
Capacity of Thickened Sludge Pumps	gpm	50-250	
TDH of Thickened Sludge Pumps	ft.	70	
Motor Horsepower of Thickened Sludge Pumps	hp	20	
Drying Beds			
Total Number	--	40	
Total Area	sq. ft.	217,939	
Ave. Loading Rate (Anaerobically Digested Sludge)	lb/sq. ft/yr.	25	
Ave. Drying Time (Aerobically Digested Sludge)	days	90	
Min solids Concentration when Removed from Beds	percent	75	
Effluent Pumping [e]		Pumps located in Plant #1	
No. of Pumps	--	2	
Type	--	Fairbanks Morse; Centrifugal Type	
Capacity	gpm	2@1,000; Rated 80' Head	

TABLE 5-5.
CSDWRP
UNIT PROCESS DESIGN CRITERIA

[a] Calculated Value

[b] Assumed, Desired Value or from Plant Data

[c] Design Criteria

[d] C_L @ Ave. Flow = operating oxygen concentration

C_{walt} = oxygen concentration for water at given temperature and altitude

C_{S20} = oxygen concentration for water 20°C

[e] The operators have reported vortexing problems with the effluent pumps. Modifications such as deepening the pond area, where the pump suctions are located, may be required to eliminate this problem. This will also increase the effective storate capacity in the effluent pond.

Table 5-6. Summary of Plant Capacity Study

	Plant 1	Plant 3	Total
Date of Construction	1957	1980	---
Original Design Capacity, mgd	2.75	1.25	4.0
Actual Capacity, mgd	2.61	1.25	3.86

Subsequently, several plant improvements were designed and built in 1992. Flow to Plant 2 was discontinued at this time. As a result of these improvements, Plant 3 design capacity was increased to 4.0 mgd, increasing the total plant capacity (Plant 1 + Plant 3) to 6.75 mgd. This capacity includes 0.75 mgd for treatment of diverted raw sewage flows from the Camrosa Water District, leaving the remainder of the capacity (i.e. 6 mgd) available for the CSD.

Evaluation of CSDWRP Unit Process Criteria

Unit processes are evaluated based upon the actual facility sizes and compared with the nominal design capacities of:

- 2.75 mgd for Plant 1;
- 4.00 mgd for Plant 3.

Influent Pumps. The plant has 2 influent pumps rated at a capacity of 3,800 gpm each, a combined capacity of 7,600 gpm or 11 mgd. The influent pumps will be sufficient for future flows as future flow to the influent pumps is only expected to be 1.8 mgd (1,250 gpm). The majority of plant flow reaches the headworks by force main.

Primary Clarifiers. Primary clarifiers were evaluated using a desired overflow rate of 2200 gpd/sq. ft at peak flow. Figures 5-2 and 5-3 show that based upon this criterion, the average unit process capacities of Plants 1 and 3 are 4.32 and 6.48 mgd respectively, as shown in Table 5-7. These exceed the nominal design capacities of these plants as shown in Figures 5-2 and 5-3 for Plants 1 and 3, respectively.

It is assumed that removals across the primary clarifiers will be 30% BOD and 60% suspended solids at these loadings. This should be verified based on the actual plant data since it has a major impact upon the capacity evaluation of the secondary treatment process.

Table 5-7. Primary Clarifier Capacities

Plant	Evaluated Average Capacity, mgd	Nominal Design Capacity. Mgd
1	4.32	2.75
3	6.48	4.0

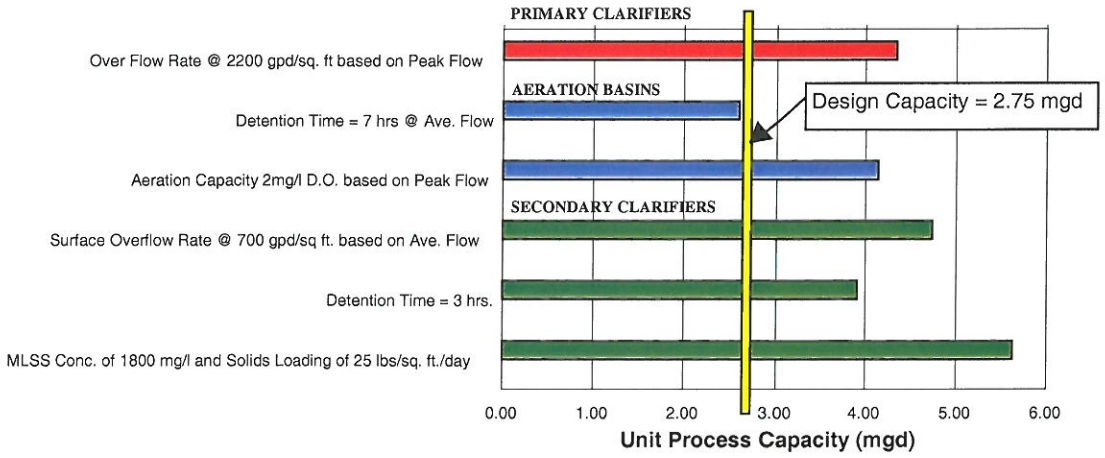


Figure 5-2. Unit Process Average Capacity Plant #1

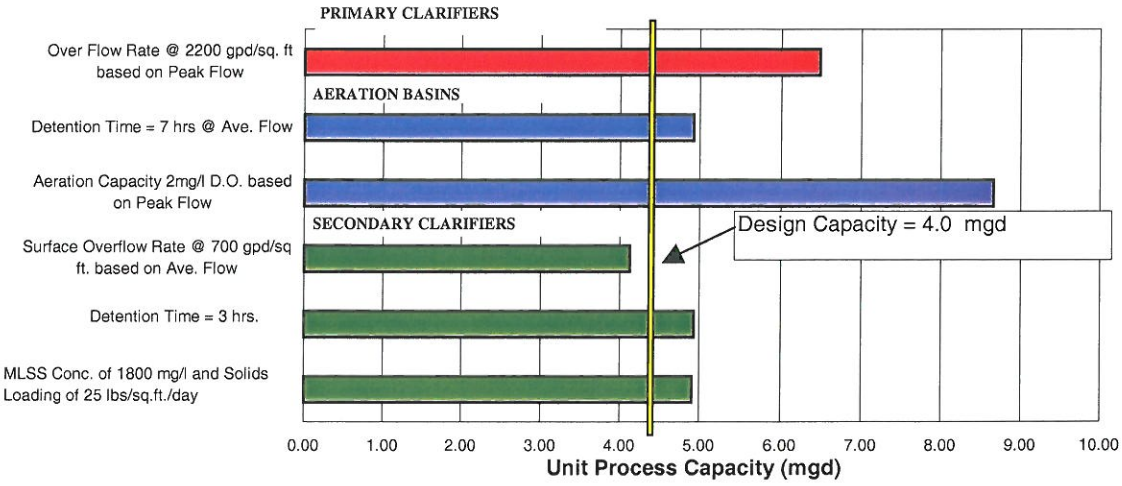


Figure 5-3. Unit Process Average Capacity Plant #3

Aeration Basins. As shown in Chapter 3 of this report, the 90 percentile influent BOD concentration is 250 mg/l. The capacity of secondary treatment processes is dependent upon influent waste BOD strength and primary treatment removal

efficiency. As pointed out above, it is assumed that removals across the primary treatment will be 30 % BOD and 60% suspended solids.

A desired detention time of 7 hours at average flow (ADWF) is common for plants intended for BOD removal and nitrification. It is noted that the City's plant currently nitrifies the wastewater. Based upon these criteria (BOD removal and nitrification), the unit process capacities of Plants 1and 3 shown in Figures 5-2 and 5-3 are:

- Plant 1 2.61 mgd
- Plant 3 4.92 mgd

Based upon an expected BOD removal of 175 mg/l in the secondary treatment process, the air required for peak flows at Plants 1 and 3 is 3790 and 3992 cfm, respectively. Air requirements fall below their actual blower capacities (assuming that 1 blower will be on a stand-by basis) of 5,700 cfm for Plant 1 and 8,400 cfm for Plant 3. Average unit process capacities based on the available blower capacities, therefore, are:

- Plant 1 4.13 mgd
- Plant 3 8.66 mgd

Overall, considering both the aeration basin size and capacity of the existing blowers, the treatment capacity of this unit process is:

- Plant 1 2.61 mgd
- Plant 3 4.92 mgd

Table 5-8 describes the overall capacities of the aeration basins and aeration systems for Plants 1 and 3.

With respect to these capacities, the following is noted:

- Plant 1 capacity of 2.61 mgd is, for all practical purposes, equal to the nominal design capacity of 2.75 mgd
- Plant 3 has a capacity of 4.00 mgd, which is equal to the nominal design capacity of 4.00 mgd. This would be expected since the plant was recently evaluated and expanded to this capacity.

Table 5-8. Overall Capacity of Aeration Basins and Aeration Systems

Plant	Evaluated Average Capacity, mgd	Nominal Design Capacity, mgd
1	2.61	2.75
3	4.00	4.0

Secondary Clarifiers. Secondary clarifiers were evaluated using a desired surface overflow rate (SOR) of 700 gpd/sf at average flow (ADWF). Based upon this criteria, which is commonly used for activated sludge plants, the unit process capacities of Plants 1 and 3 at average flow are as follows:

- Plant 1 4.73 mgd
- Plant 3 4.12 mgd

Secondary clarifiers at Plants 1 and 3 exceed their design capacities based upon this criterion and as seen in Figures 5-2 and 5-3. Using a desired detention time of 3 hours at ADWF in the secondary clarifiers, the unit process capacities of Plants 1 and 3 exceed their design capacities.

Assuming a mixed liquor suspended solids concentration of 1800 mg/l (based upon actual concentrations maintained at CSDWRF) and 100% recycled flow (i.e. 100% of Q_{ave}), the solids loading rates at average flow for Plants 1 and 3 are 12.2 and 20.4 lbs/day/sq. ft respectively, significantly less than the commonly used value of 25 lbs/day/sq. ft. As seen in Figures 5-1 and 5-2 using the solids loading rate of 25 lbs/day/sq. ft as criterion, unit process capacities for Plants 1 and 3 are as follows:

- Plant 1 5.63 mgd
- Plant 3 4.90 mgd

Based upon solids loading criteria, both plants perform well within their design capacities. However, if the mixed liquor suspended solid concentration is increased to 2000 -2500 mg/l, and if nitrification becomes a permit requirement for year round compliance, the capacities of the secondary clarifiers would be reduced proportionately. For example, if the MLSS concentration is increased by 10 percent, the corresponding clarifier capacity is reduced by 10 percent.

Overall, considering the factors of detention time, surface settling rate, and solids loading, the capacities of this unit process based on secondary clarification alone, are summarized in Table 5-9.

Table 5-9. Secondary Clarifier Capacity

Plant	Evaluated Average Capacity, mgd	Nominal Design Capacity, mgd
1	4.73	2.75
3	4.12	4.0

With increased mixed liquor suspended solids concentration of about 2,000-2,500 mg/l, common in nitrification systems, the capacities of this unit process, however, will be much closer to their nominal design capacities.

Anaerobic Digester. At 250 mg/l suspended solids concentration in the plant influent, the total primary sludge production from Plants 1 and 3 combined is 8,434 lbs/day at design capacity of 6.75 mgd. Using a sludge concentration of 4%, based upon current plant data and intermittent withdrawal from the primary clarifiers, the sludge to be processed is 3,384 ft^3/day.

Based upon a desired detention time of 15 days in the anaerobic digester, the unit process capacity for this unit process is 7.58 mgd, exceeding the design capacity of the water reclamation plant of 6.75 mgd, as shown in Figure 5-4.

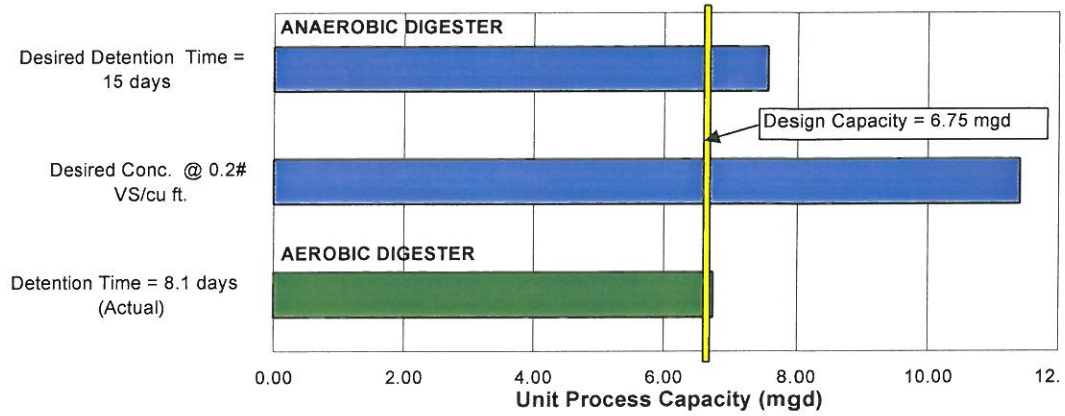


Figure 5-4. Solids Handling Unit Process Capacity

The volatile fraction of the primary sludge is estimated to be 80% of the total primary sludge, or 6747 lbs/day. Based upon 0.2 lbs volatile solids/ cu. ft. loading criterion, the unit process capacity of the anaerobic digesters is 11.40 mgd, as seen in Figure 5-4. Based on the above, the capacity of the anaerobic digesters is approximately 7.50 mgd.

Aerobic Digester. The aerobic digester, combined with the pre-aerobic digester, provides a detention time of approximately 8.2 days assuming waste activated sludge concentration of 5,000 mg/l in the secondary clarifier underflow (actual concentration based on plant data).

Chlorine Contact Basin. A detention time of 55 minutes is available for a peak flow of 17 mgd (6.75 mgd x 2.5). At the current flow of approximately 3.8 mgd (9.5 mgd at peak), the existing tanks are providing approximately 100 minutes of detention time at peak flow. Based on the actual plant data, this is achieving effluent quality with 2.2 MPN.

However, if NPDES requirements change to require filtration (Title 22), the detention time requirement may be 120 minutes at peak flow. In this case, the capacity of the

However, if NPDES requirements change to require filtration (Title 22), the detention time requirement may be 120 minutes at peak flow. In this case, the capacity of the existing chlorine contact basins would only be 3.1 mgd, average. Additional basin volume to be required at that time will be 103,000 ft^3 to handle an average flow of 6.75 mgd and its associated peaking factor of 2.5. Alternatively, chlorine dosage can be increased in the existing tankage to obtain the desired Ct value (about 450). Should the pending Title 22 regulations (discussed in Chapter 4 of this report) be adopted in the future, this may be an option for the CSD, with approval from DHS and the Regional Water Quality Control Board. Our recommendation is based on 120 minutes detention time, since the proposed Title 22 regulations are pending at this time.

Assessment of Plant 2

Plant 2 was constructed in 1964. The 1989 plant capacity study[7] indicated that Plant 2 had a nominal capacity of 1.0 mgd, compared to its original design capacity of 2.0 mgd. As part of improvements made to Plants 1 and 3 in 1992, Plant 2 was decommissioned.

Concrete tanks and interconnecting piping remain; however, influent and effluent piping has been plugged, and all mechanical and electrical equipment has been removed or taken out of service. The assessment of Plant 2 was conducted for the purpose of determining potential capacity, should process capacity beyond Plants 1 and 3 be needed. Plant 2 processes were evaluated in the same fashion as that described for Plants 1 and 3. Plant 2 process capacities are presented on Table 5-10.

Table 5-10. Plant 2 Process Capacity Assessment

Process	Parameter Process Evaluated Based on:	Rated Capacity, mgd
Primary Clarifiers	Overflow rate = 2,200 gpd/sf	3.11
Aeration Basins	7-hour detention time	1.29
Secondary Clarifiers	Overflow rate = 700 gpd/sf	1.98
	Detention time = 3 hours	1.35
	Solids loading rate = 25 lb/day/sf	2.35

Summary of Plant Evaluation

This chapter presented the evaluation of the CSDWRP, comprised of two separate treatment trains, known as Plants 1 and 3. This chapter also presented a similar evaluation of Plant 2, no longer in service. This evaluation involved the hydraulics as well as the treatment capacities of each key unit process at the three plants based on the available information.

Capacities of the major interconnecting piping and channels were evaluated based on hydraulic calculations. No hydraulic bottlenecks were identified. The treatment capacity of

each unit process at the plants was then evaluated. This was based on commonly used design criteria, Parsons ES experience in designing numerous similar facilities, and actual operational experience at the Camarillo facilities. Based on this, it was determined that the capacities of the two operating plants are:

- Plant 1 2.75 mgd
- Plant 3 4.0 mgd

The results of all the key unit process evaluations are presented graphically in Figures 5-1 and 5-2, for Plants 1 and 3. It is emphasized that Plant 2 has been abandoned and that associated aeration blowers, electrical service, and other equipment has been removed from the plant. Treating sewage at Plant 2 (1.29 mgd) would require extensive plant improvements and the addition of major equipment, which currently does not exist. In addition, diversion of flow to Plant 2, and discharge of treated effluent from Plant 2, is not possible at this time due to physical modifications made to remove Plant 2 from service.

The available treatment capacity at Plants 1 and 3 is 6.75 mgd on an annual average dry weather flow basis, which will be adequate to meet Year 2010 projected needs of 4.76 mgd as developed in Chapter 3 of this Master Plan.

PLANT IMPROVEMENTS

Plant improvements, as identified, fall into two categories: 1) short term; and 2) long term.

Short Term Improvements

Short term improvements will improve the reliability and operability of the existing facilities. These are under design at the time of this report, and will be in place by the end of 1999. These are summarized below:

- Construction of a grit removal line from the force main at the Reclamation Plant. The staff suspects that one reason why the grit quantity produced from the aerated grit chambers is less than would be typically expected is because a lot of grit is settling near the vertical leg of the force main at the Reclamation Plant. The grit removal line will remove the settled grit, keep the force main clean and provide a means to remove additional grit.

- Repair the hydrogen sulfide corrosion damage to the concrete in the primary splitter structure. Concrete in the primary splitter structure shows extensive corrosion damage. Some suitable protective coating/lining is necessary to restore concrete to its original condition and prevent future damage.

- Installation of two WAS pumps, one WAS flow meter and one RAS flow meter in Plant 1. Currently, no positive means exist at Plant 1 to control and measure RAS and WAS. This makes operational control and optimization of Plant 1 difficult.

- Construct weirs or other flow regulating devices at the effluent end of the aeration basins. Currently there is no positive way to distribute flow evenly from the aeration basins to the final clarifiers. Effluent weirs or some other flow-regulating devices would provide a sure and positive means of equal flow distribution.

- Replace existing pre-aerobic digester submersible pumps with centrifugal pumps at ground level. Maintenance of the submersible pumps is becoming difficult. Installation of centrifugal pumps at ground level would facilitate accessibility and maintenance.

- Replace/correct utility water pump control system. Utility water pumps are not turning on and off automatically to maintain a set-pressure. The control system should be looked at carefully and repaired so that the pumps turn on and off automatically based on a pre-set pressure or other parameter.

- Install one 15 mgd plant effluent pump. During a heavy rain event and resultant flooding of the site (1997/1998 rainy season), the effluent cannot always flow by gravity to the creek and therefore pumping is required. Currently, no permanent pumping system exists to accomplish this and portable pumps need to be brought in. Installation of a permanent pump will alleviate this problem.

Long Term Improvements

Long term improvements address some of the capacity issues as well as future regulatory requirements as identified in this Master Plan.

As presented in Chapter 4 of this Master Plan, future anticipated regulatory requirements and how the existing plants can meet them is an important issue. As presented in that chapter, the future requirements could require the removal of turbidity (less than 2 NTU), total inorganic nitrogen (less than 10 mg/l), and coliforms (less than 2.2/100 ml). This will happen only if the beneficial use of the receiving stream (Conejo Creek) downstream of the CSDWRP point of discharge is confirmed to be non-restricted body contact recreation and/or a potential groundwater recharge and a source of drinking water supply. The CSD believes it is not likely that this will occur in the foreseeable future since there is no evidence that these beneficial uses are currently taking place.

To meet these requirements, however, the following facilities would be required:

- Partial denitrification (retrofits); the CSD is currently operating the plants to achieve nitrification, and can continue to nitrify at the design capacity of 6.75 mgd; but cannot denitrify without plant process improvements.
- Tertiary filters (new)
- Chlorine contact tanks (expansion to provide 2 hours contact time @ peak flow, typically mandated for Title 22 plants)

Our preliminary analysis indicates that the existing aeration basins at each plant are of adequate size for retrofitting with nitrification and denitrification facilities. To achieve denitrification at each plant, a portion of the aeration basins (approximately 20 percent) may have to be dedicated for denitrification by converting it into an anoxic selector. In addition, mixed liquor recycle pumping to the selector may have to be added. Other strategies such as step feed and multi-anoxic selectors (one selector following each feed point) are also common since they can more easily be adapted to the existing plants, where tankage is limited. A detailed analysis would be needed to determine the best operational strategy to accomplish denitrification, should this be required.

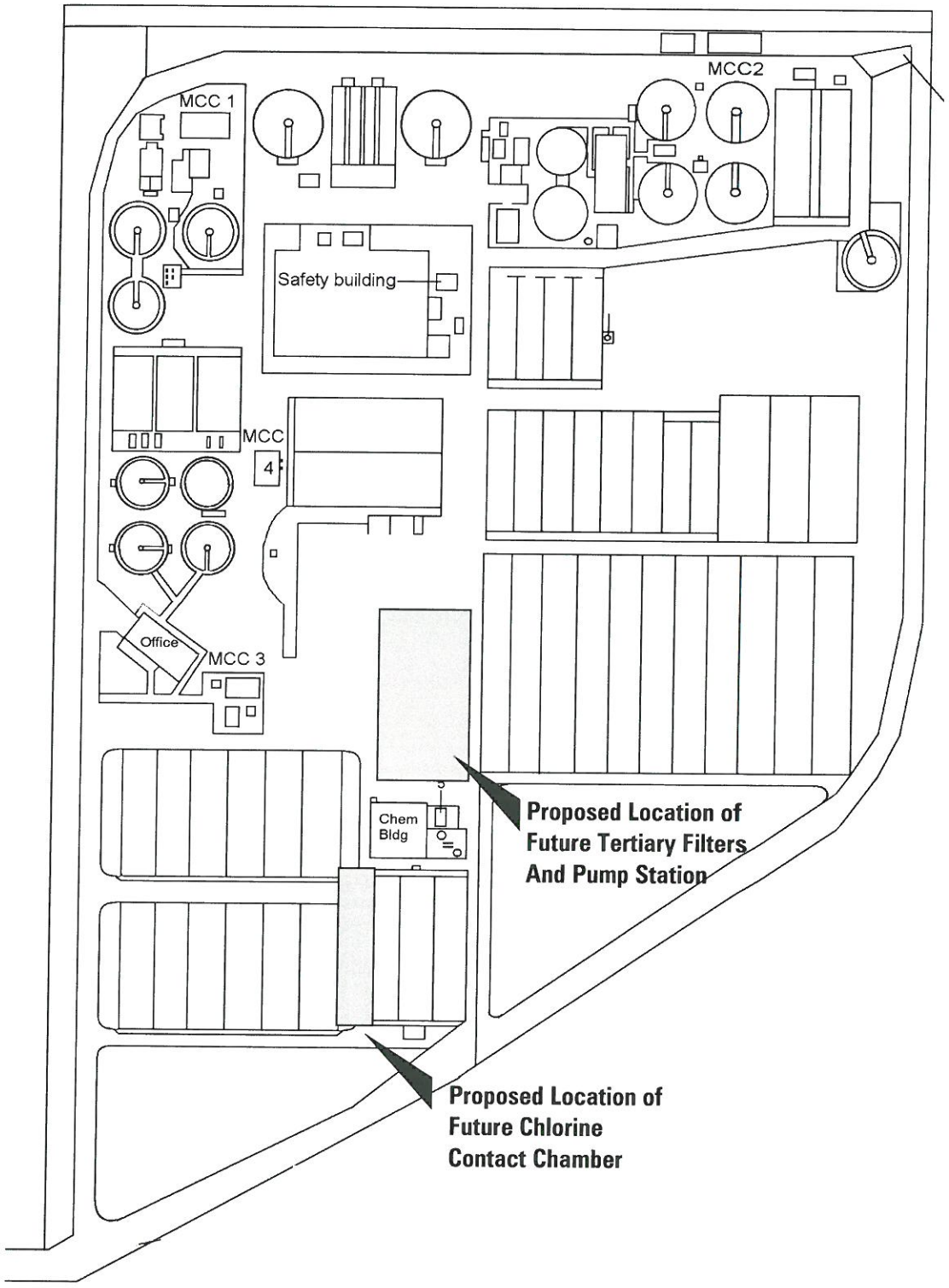
The addition of tertiary filters will likely require a pump station ahead of the filters in order for the filters to "fit" within the existing hydraulic profile. Figure 5-5 shows a preliminary location and footprint for construction of a pump station, filters, and expansion of the chlorine contact chambers at the existing plant site. One sludge bed will need to be taken out of service as part of this expansion of the chlorine tank. The State Department of Health Services (DOHS) mandates the design criteria of the tertiary filters (5 gpm/ft^2 at peak flow), which has been used for preliminary sizing. Assuming a hydraulic loading of 5gpm/ ft^2 for peak diurnal flow, the area required for a peak flow of 16.9 mgd (i.e. 6.75 mgd x 2.5) is 2350 sq. ft. Similarly, the Health Department also typically dictates the sizing of the chlorine contact tank (2 hours contact time at peak flow), which is the basis of preliminary evaluation of this unit process. These criteria should be confirmed before the actual design of these facilities and unit processes is undertaken.

Disinfection. In addition, it should be noted that several treatment plants in the metropolitan areas in the U.S. are switching to the use of sodium hypochlorite for disinfection and sodium bisulfite or calcium thiosulfate for dechlorination. These liquid chemicals are safer to handle and do not pose undue risks associated with the use of gaseous chlorine and gaseous sulfur dioxide, which are being currently used at Camarillo. Other technologies being used in lieu of the gaseous chemicals include ultraviolet radiation (UV), which can replace both chlorination and dechlorination. Recommendations on this issue are not within the scope of this Master Plan. Each project and each site is unique and there are no universal recommendations that apply to each project and site. However, it must be noted that the CSD currently has adequate scrubbing facilities to neutralize chlorine and sulfur dioxide in the event of a leak. Thus, the decision to abandon these facilities in favor of UV or sodium hypochlorite and bisulfite will likely be based on non-engineering factors such as public safety and owner preference.

Plant 2 Status. In the progress meeting on June 15, 1999, a question was raised as to what the CSD should do with Plant 2 since it has been abandoned.

More specifically, the issues are:

1. Should Plant 2 be demolished so that the space can be better utilized?



PARSONS ENGINEERING SCIENCE	City of Camarillo Wastewater System Master Plan	Treatment Plant and Future Filter Layout	FIGURE 5-5

2. Should it continue to be abandoned and left as is (status quo)?

3. Should it be brought on line again since it has a treatment capacity of about 1.2 mgd (will require installation of new blowers and other plant piping modifications)?

These issues should be addressed in the context of available treatment capacity at Plants 1 and 3 and treatment needs. In this Chapter, it has been concluded that the combined available treatment capacity of Plant 1 and 3 is 6.75 mgd. This is more than the required projected capacity for Year 2010 and Year 2020 (4.76 mgd and 6.0 mgd respectively). Thus there appears to be no justification for Option 3, which is to bring Plant 2 back on line, particularly in light of the direction that the CSD and Camrosa Water District are heading with respect to the CSD's buy-back of Camrosa WD's 0.75 mgd capacity at the CSDWRP. It is noted that CSD and Camrosa WD are working towards provision for mutual short-term raw sewage diversion to either treatment plant during major plant maintenance conditions.

With no projected need for Plant 2, consideration should then be given to Option 1 or Option 2 (i.e. demolish or leave in place). The demolition of a plant such as Plant 2 can cost over half a million dollars. The decision should, therefore, be based on the availability of funds with the CSD and the need for vacated space. Currently, there does not appear to be any dire need for this space unless future regulatory requirements necessitate the addition of some unit processes beyond those considered in this master planning effort. These may include desalination of the effluent, removals of nitrogen and phosphorous to much lower levels than are currently in the horizon area wide or both. These requirements appear unlikely at the present time.

Based strictly on economics, we recommend that the CSD keep Plant 2 "as is." Should the CSD service area grow faster than currently projected, keeping Plant 2 provides the option to meet additional treatment needs in the future at a relatively low capital cost. This attractive cost alternative must be weighted against operator preference and operation and maintenance complexities associated with operating three separate treatment plants. However, the need for extra space should be periodically assessed, and the decision with respect to Plant 2 revisited based upon the changing needs.

Operational Considerations

It appears from the plant water quality data that the CSD is meeting the NPDES requirements, which would indicate that the plants are being operated quite well. The operators did indicate, however, that they encounter the growth of filaments quite frequently, which requires close attention to operation. They also mentioned denitrification and "rising sludge" as a problem, which is common in nitrifying plants such as the CSDWRP. Usually, a permanent reliable solution to such problems involves physical modifications such as the

addition of anoxic or anaerobic selectors ahead of the aeration basins. Operationally, the addition of chlorine to RAS also helps in the control of filaments. The CSD is adding chlorine to RAS, on an as needed basis, at 5 lbs/1,000 lbs of mixed liquor solids, which has been helpful, but has not completely eliminated the problem. Consideration should be given to increasing the chlorine dose to 10-15 lbs/1,000 lbs, if the problem continues to persist. The best operational strategy is to monitor SVI as well as examine the filaments under the microscope on a daily basis and to take corrective action (i.e. RAS chlorination) as soon as the problem begins to appear, not after the problem has persisted for days. The chlorine dosage can ultimately be decreased to around 5 lbs as a maintenance dosage after the problem has disappeared.

With respect to the "rising sludge" caused by denitrification, a good operational strategy is to aim at a DO level of at least 1.0 mg/l at the end of the aeration basin. This should assist in preventing denitrification of the nitrified mixed liquor.

There are several other operational strategies which have been quite effective in the control of filaments. These include increasing sludge wastage, increasing aeration and DO concentration and changing from step feeding to plug flow, to name a few. These operational strategies, in a practical situation, can only be selected by careful identification of the filaments and pilot testing of a possible solution on full scale, which is not within the scope of this master planning effort.

By and large, the plants in Camarillo are being operated quite well with no NPDES violations.

Another issue, which surfaced during discussions with the CSD staff, deals with the generation of hydrogen sulfide in the force mains feeding the plant headworks and the resultant odors and corrosion encountered in this unit process. A project currently under design (miscellaneous improvements project), includes, among other items, the lining of the headworks walls, which show signs of significant corrosion. This project will correct the corrosion concerns at the headworks, but will not alleviate the odor problems being experienced. Thus, a permanent solution to this problem may involve the evaluation of the force main hydraulics and biology to ensure that the conditions, which are allowing the formation of hydrogen sulfide, are mitigated. Typically, this involves an analysis of sulfides in the force main at several points and development of an optimum solution to the generation of this chemical. The addition of a suitable iron salt (e.g. ferric chloride) in force mains has been found to precipitate sulfides and thus prevent corrosion, which results from the oxidation of sulfide at the headworks as it comes in contact with air. Other means include the prevention of hydrogen sulfide generation by the addition of oxidants such as chlorine, hydrogen peroxide, potassium or sodium nitrate and sometimes liquid oxygen in the force main. Each project is unique and requires careful and thorough analysis as the implementation of a suitable remedial measure can be quite time consuming and expensive.

In a nutshell, corrosion control strategies can, in a practical situation, involve one or more solutions – prevention of hydrogen sulfide generation by the addition of oxidants, precipitation of hydrogen sulfide by the iron salt addition at a pump station, to the force main,

or upstream in a gravity sewer. Installation of protective linings on the corroded or corrosion prone surfaces can be implemented, but again, will not solve the odor problem. No single solution can be universally applied to every practical situation. A thorough analysis of Camarillo collection system, from corrosion standpoint, and remediation/prevention of this problem is not within the scope of this master planning effort. However, it is recommended that the CSD undertake such a study to better define the problem and to identify improvement projects to mitigate the corrosion and odor problems at the headworks.

Chapter 6

SUMMARY AND RECOMMENDATIONS

This chapter summarizes the recommendations for the CSD's wastewater system, including collection system and wastewater treatment system, through the planning period (Year 2010).

Collection System

The gravity collection system was evaluated using the CSD's sewer model, and the force mains and pumping stations were hydraulically evaluated by manual calculation.

Existing Gravity Sewer System. Based on the evaluation of the collection system and results of the gravity sewer model runs, there are no identified major deficiencies with the existing collection system. Noted deficiencies in the existing collection system are all minor, meaning that those sewers are flowing over the design capacity during peak flow conditions daily, but do not surcharge. The only improvements identified, which need to be addressed, are the replacement and/or lining of existing sewer manholes on the 30-inch diameter Flynn Road trunk sewer. We recommend that these improvements be scheduled as soon as possible (Year 2000), to ensure continued reliable service of the collection system, and to ensure worker safety during maintenance of this trunk sewer.

Future Gravity Sewer System. Similar to the results of the existing gravity sewer system analysis, all deficiencies are minor, with the exception of two gravity sewers:

1) the 15" Ponderosa Drive sewer (ID 7003600), at the downstream end of the two parallel Rosewood Avenue sewers (parallel 8" and 12" sewers); and
2) the 18" Pleasant Valley Road sewer (ID 0010100) which leads into Pumping Station 3.

It is recommended that both these reaches of the collection system be monitored and in or around Year 2005, and metered to determine actual flows and peaking factors in the area. Sewer replacements or enlargements can be adequately assessed for this area at that time.

New sewers for Ponderosa Corridor, McGrath, Adamson, and Village of the Park areas should be designed per the City's standards. It is assumed that much of the new sewers in these areas will be installed by the Developers. New sewers in these undeveloped areas should be capable of conveying sewage by gravity, and pipe diameters of 8-inch should be sufficient for these areas to tie in to the existing 10-inch and larger trunk sewers.

Force Mains and Pumping Stations. The force mains and pumping stations are all of sufficient capacity through the Year 2010 and beyond. The only deficiency known in

the force main system is the low velocity conditions of the 30-inch force main at the headworks to the CSDWRP. This issue is discussed in the near-term deficiencies as part of the treatment system evaluation.

Wastewater Treatment System

The City is in the process of implementing short-term improvements to the treatment facility, as outlined in Chapter 5 of this report. In order for the CSD to meet future wastewater flow demands, based on existing NPDES permit requirements and treatment standards, no further improvements are warranted at the plant through the planning period (Year 2010).

The CSD's NPDES Permit is due for renewal in Year 2002. Specific permit requirements in Year 2002 cannot be foreseen at this time; thus, this master plan update focuses on the existing treatment requirements stipulated in the existing NPDES permit. Should tertiary treatment become a requirement in the future, the CSD will need to amend this master plan and address the new treatment standards specifically. At that time, an assessment of required capital improvements for filtration and other improvements should be undertaken. This future assessment is particularly important in light of the pending Title 22 regulations regarding tertiary treatment.

Plant 2. It is recommended that the CSD keep Plant 2 "as is." Should the CSD service area grow faster than currently projected, keeping Plant 2 provides the option to meet additional treatment needs in the future at a relatively low capital cost. This attractive cost alternative must be weighted against operator preference and operation and maintenance complexities associated with operating three separate treatment plants, and the significant work required to place Plant 2 back in service. However, the need for extra space should be periodically assessed, and the decision with respect to Plant 2 revisited based upon the changing needs.

Also, the hydraulic detention times and velocities in the 30-inch force main are the main cause of odor and corrosion problems being experienced at the headworks. A thorough analysis of CSD's collection system, from a corrosion standpoint, and remediation/prevention of this problem is not within the scope of this master planning effort. However, it is recommended that the CSD undertake such a study to better define the problem and to identify improvement projects to mitigate the corrosion and odor problems at the headworks.

Operational Improvements. CSD staff mentioned that operational improvements could be made with regards to control of rising sludge in the treatment process. Several recommendations were made in Chapter 5 in this regard. Such operational improvements should be implemented and, if successful, incorporated into CSD's standard operating procedures for the CSDWRP.

Biosolids. The direction and development of the proposed Kern County ban and regulation of biosolids application needs to be carefully tracked by CSD staff, as the proposed biosolids ordinance will have a significant impact on the CSD biosolids management and operations in the near future. It is recommended that CSD staff implement a biosolids management study as soon as possible to evaluate the feasibility of alternative management/disposal alternatives available to the CSD.

SEWERAGE SYSTEM DATA

The sewerage system (or sewage collection system) is composed of manholes and the pipelines connecting them together and can be thought of as a tree with the base of the trunk located at the last manhole at the bottom of the drainage area. Each sewer pipe and its associated upstream manhole can be thought of as a part of a tree limb. When two or more sewer pipes radiate outward from the same manhole, the situation is analogous to a branch in a tree limb. Similar to tree limbs; sewer pipelines get larger in diameter the closer each pipe reach is to the bottom of the drainage area. See the sections below titled "Manhole Records" and "Pipeline Records" for more details of how to work with the two basic types of data.

The GIS database includes an electronic model of the sewerage system which allows the user to interactively explore what would happen if any of the sewerage data were changed. This allows the user to explore with a minimum of effort the impact of proposed new developments or changes to the physical sewerage facilities. Such an exploration allows the user to easily determine the impacts of a change all the way from the point of change down to the outlet of the drainage basin. This is a calculation which is rarely made in actual practice because of the complexity of the calculation and the large number of calculations which must be made. See the section below titled "Sewage Model Data" for a more detailed explanation of the model and how it works.

Object Numbering Scheme

Experience elsewhere shows it is very helpful to users of the information if major portions of the service area to be modeled are assigned common unique identifiers. This practice groups data by area; users soon learn to associate each identifier with its area and users can spot obvious busts in data more easily.

As a matter of convenience, the sewage system drainage area has been divided into ten sub-drainage areas as follows:

Area	Description
x0	Trunk sewerage system.
x1	South of Freeway, Wastewater Treatment Plant west to the north-south railroad right-of-way near Lewis Road.
x2	South of Freeway, Railroad right-of-way west to Los Posas Road.
x3	Airport Property.
x4	South of Freeway, Los Posas Road west to Beardsley Wash, except airport property.
x5	North of Freeway, Calleguas Creek west to railroad right-of-way near Lewis Road.

x6 North of Freeway, railroad right-of-way west to the drainage boundary located approximately along Ponderosa Road and Loma Drive.

x7 North of Freeway, drainage boundary (Ponderosa Road and Loma Drive) west to the drainage boundary located just west of Avocado Place.

x8 North of Freeway, drainage boundary (west of Avocado Place) west to Beardsley Wash.

x9 All area east of wastewater treatment plant, north and south of Freeway.

"M" replaces "x" in the object numbering scheme for Manholes or "S" for Sewage Pipelines. These leading characters precede a six- (6) digit number which uniquely identifies each object. At system creation, the objects were numbered by 10's to allow room to add more objects between existing objects without having to change existing object ids.

This organization scheme has the advantages of: (a) placing the largest diameter trunk sewers near the front of the report where this information will receive appropriate attention, (b) supporting the model requirement that numbering is always lower as sewage moves toward the treatment plant, and (c) placing the predominately private sewer area in Camarillo Springs at the end of the report.
See Note 1.

Manhole Records

This table is used to hold information about each manhole. Other types of pipe reach upstream ending points such as clean outs, lamp holes, plugs, etc. are shown on the GIS maps with the same symbol as manholes, but the database allows designation of their true type.

Manhole identification numbers are arbitrary – that is, any number can be used which will uniquely identify a manhole. As a matter of convention, the upstream manhole has the same identification number as the associated downstream sewer pipe except that manhole ids start with the letter "M" while sewer pipe ids start with the letter "S." In effect, this convention reduces the number of unique id numbers in use and thereby simplifies the task of working with manhole and sewer id numbers.

The sewer model imposes the only restriction to manhole numbering. For the model to make its calculations it must be able to figure out which direction is upstream; therefore, every manhole upstream from another manhole must have a higher identification number. Using this simple rule the model can find its way up and downstream to make calculations as necessary. The sewer system was initially numbered by tens (10, 20, 30, etc.) to allow the addition of new objects between existing objects without having to change large amounts of existing data.
See Note 2.

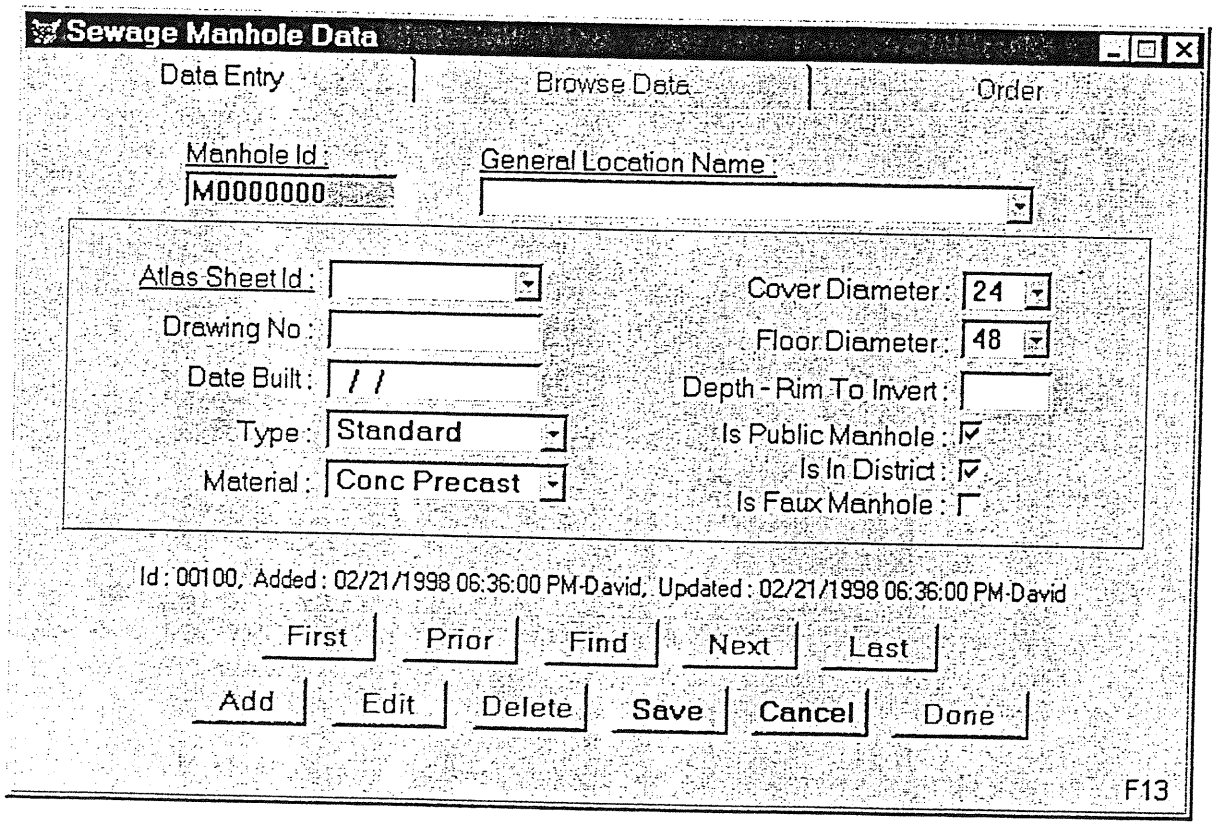
Object Numbering Scheme

See this topic under the introduction titled "Sewerage System Data" for a more complete discussion of the numbering scheme in use.

ADDING A NEW MANHOLE RECORD – To add a new record:

1. If the manhole form is not already on the computer monitor, place it there by pulling down the "Data" menu to "Sewer" and then down the secondary menu to "Manholes" and releasing the mouse button. If the form is already open, select it by pulling down the "Window" menu to "Sewage Manhole Data" and releasing the mouse button.

2. Once the form is present and active (it can be identified by the phrase "Sewage Manhole Data" in the title bar and "F13" in the lower right corner), click the "Add" button near the bottom left corner of the form. The data fields of the form will be emptied of prior data and readied for the user to fill in all available information for the new record. Note the fields are pink instead of blue as the focus proceeds through the form. The empty form should look like the one below:



3. As individual pieces of data are entered, the program checks the entry for compliance with established business rules. If any error is encountered, the program will notify the user via a message in a dialog box. Most messages are advisory, requiring the user to click an "OK" button; some messages require the user to make a choice among several buttons and clicking upon it. See note 3.

4. When all available data has been entered, click on the "Save" button to save the data just entered into the form. When save is requested, the program checks the data in the form to see if all required data is present. Any missing data is signaled to the user via a message in a dialog box. Upon completion of the save operation, notice the focus returns to its usual blue color.

5. Clicking the "Cancel" button will cause the program to throw away any of the changed information entered for this record; none of the discarded information will be retained in the database.

LOCATING AN EXISTING MANHOLE RECORD – To locate an existing record:

1. Place the Manhole Data form on the computer monitor as described above under "Adding a New Record."

2. Set the proper order for the table by clicking on the "Order" tab of the form and selecting the desired order from the list of available data orders.

3. Click on the "Browse Data" tab of the form and use the arrow keys or the slider to move through the list of available records until the desired record is in view. Click on the desired record so at least one field of the record is highlighted.

4. Click on the "Data Entry" tab of the form.

As an alternative to this process, you may wish to use the "Find" process as described in the general introduction to navigation through a data table.

EDITING AN EXISTING MANHOLE RECORD – To edit the data for an existing record:

1. Place the Manhole Data form on the computer monitor as described above under "Adding a New Record" and locate the record of interest as described above under "Locating an Existing Record."

2. Click on the "Edit" button near the bottom of the form. Notice the field with the focus turns pink instead of the usual blue.

3. Make all changes to the data as necessary. The program checks any data entered for compliance with established business rules and signals any problems via dialog boxes.

4. When all changes to the data have been completed, click on the "Save" button to save the changes to the database. Notice the field having the focus returns to its usual blue.

DELETING AN EXISTING MANHOLE RECORD – To delete an existing record:

1. Place the Manhole Data form on the computer monitor as described above under "Adding a New Record" and locate the record of interest as described above under "Locating an Existing Record."

2. Click on the "Delete" button near the bottom of the form.

3. You will be asked if you are certain you wish to delete the record. Clicking "Yes" allows the delete to proceed and the record is permanently removed from the database. Deleted records can not be recovered. Clicking "No" cancels the delete request and the database is unchanged.

EXITING THE FORM – To exit the form click on the "Done" button near the bottom right of the form or the close box in the upper right corner. The form will be cleared from the computer monitor and the program is ready to process another user action.

Pipeline Records

This table is used to hold information about each sewage pipeline. Sewer pipeline identification numbers are arbitrary – that is, any number can be used which will uniquely identify a sewer pipeline. As a matter of convention, the sewer pipe has the same identification number as the associated upstream manhole except that sewer pipeline ids start with the letter "S" while manhole ids start with the letter "M." In effect, this convention reduces the number of unique id numbers in use and thereby simplifies the task of working with manhole and sewer id numbers.

The sewer model imposes the only restriction to sewer pipeline numbering. For the model to make its calculations it must be able to figure out which direction is upstream; therefore, every sewer pipeline upstream from another pipe must have a higher identification number. Using this simple rule the model can find its way up and downstream to make calculations as necessary. The sewer system was initially numbered by tens (10, 20, 30, etc.) to allow the addition of new objects between existing objects without having to change large amounts of existing data.
See note 4.

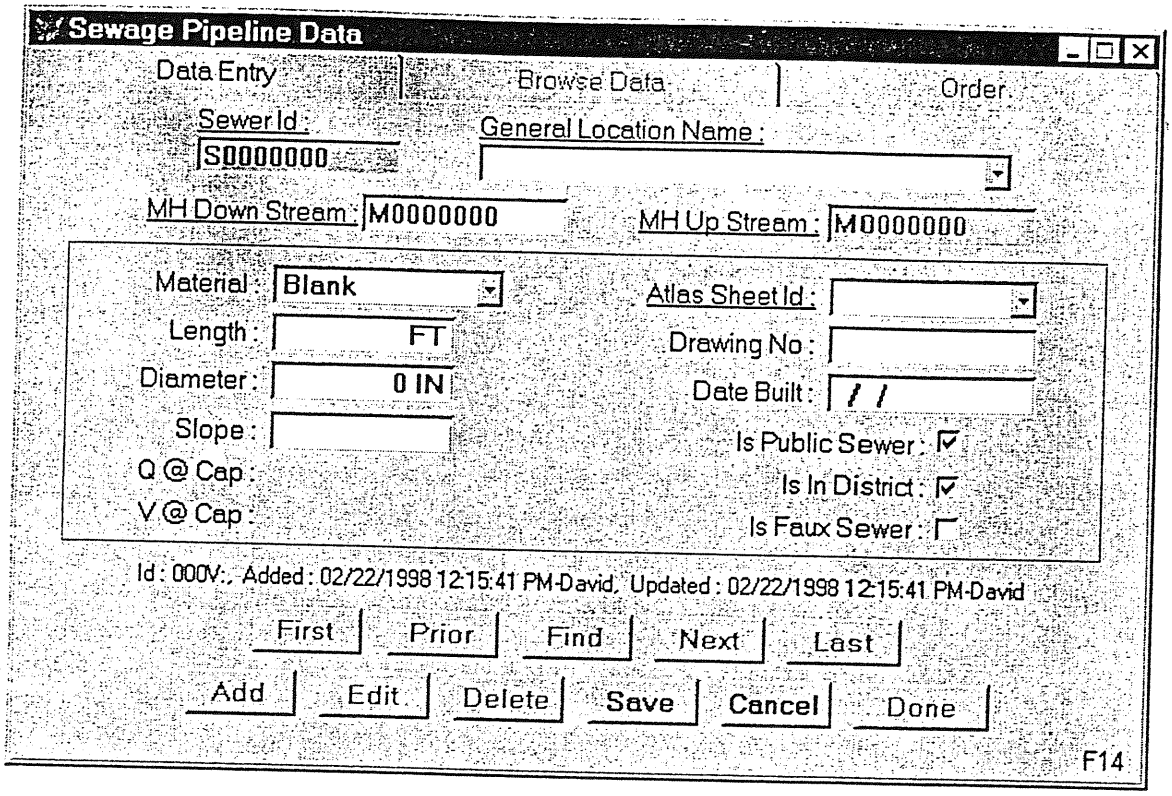
Object Numbering Scheme

See this topic under the introduction titled "Sewerage System Data" for a more complete discussion of the numbering scheme in use.

ADDING A NEW SEWAGE PIPELINE RECORD – To add a new record:
See note 5.

1. If the sewer form is not already on the computer monitor, place it there by pulling down the "Data" menu to "Sewer" and then down the secondary menu to "Pipelines" and releasing the mouse button. If the form is already open, select it by pulling down the "Window" menu to "Sewage Pipeline Data" and releasing the mouse button.

2. Once the form is present and active (it can be identified by the phrase "Sewage Pipeline Data" in the title bar and "F14" in the lower right corner), click the "Add" button near the bottom left corner of the form. The data fields of the form will be emptied of prior data and readied for the user to fill in all available information for the new record. Note the fields are pink instead of blue as the focus proceeds through the form. The empty form should look like the one below:



3. As individual pieces of data are entered, the program checks the entry for compliance with established business rules. If any error is encountered, the program will notify the user via a message in a dialog box. Most messages are advisory, requiring the user to click an "OK" button; some messages require the user to make a choice among several buttons and clicking upon it.

4. When all available data has been entered, click on the "Save" button to save the data just entered into the form. When save is requested, the program checks the data in the form to see if all required data is present. Any missing data is signaled to the user via a message in a dialog box. Upon completion of the save operation, notice the focus returns to its usual blue color.

5. Clicking the "Cancel" button will cause the program to throw away any of the changed information entered for this record; none of the discarded information will be retained in the database.

LOCATING AN EXISTING SEWAGE PIPELINE RECORD – To locate an existing record:

1. Place the Sewage Pipeline Data form on the computer monitor as described above under "Adding a New Record."

2. Set the proper order for the table by clicking on the "Order" tab of the form and selecting the desired order from the list of available data orders.

3. Click on the "Browse Data" tab of the form and use the arrow keys or the slider to move through the list of available records until the desired record is in view. Click on the desired record so at least one field of the record is highlighted.

4. Click on the "Data Entry" tab of the form.

As an alternative to this process, you may wish to use the "Find" process as described in the general introduction to navigation through a data table.

EDITING AN EXISTING SEWAGE PIPELINE RECORD – To edit the data for an existing record:

1. Place the Sewage Pipeline Data form on the computer monitor as described above under "Adding a New Record" and locate the record of interest as described above under "Locating an Existing Record."

2. Click on the "Edit" button near the bottom of the form. Notice the field with the focus turns pink instead of the usual blue.

3. Make all changes to the data as necessary. The program checks any data entered for compliance with established business rules and signals any problems via dialog boxes.

4. When all changes to the data have been completed, click on the "Save" button to save the changes to the database. Notice the field having the focus returns to its usual blue.

DELETING AN EXISTING SEWAGE PIPELINE RECORD – To delete an existing record:

1. Place the Sewage Pipeline Data form on the computer monitor as described above under "Adding a New Record" and locate the record of interest as described above under "Locating an Existing Record."

2. Click on the "Delete" button near the bottom of the form.

3. You will be asked if you are certain you wish to delete the record. Clicking "Yes" allows the delete to proceed and the record is permanently removed from the database. Deleted records can not be recovered. Clicking "No" cancels the delete request and the database is unchanged.

EXITING THE FORM – To exit the form click on the "Done" button near the bottom right of the form or the close box in the upper right corner. The form will be cleared from the computer monitor and the program is ready to process another user action.

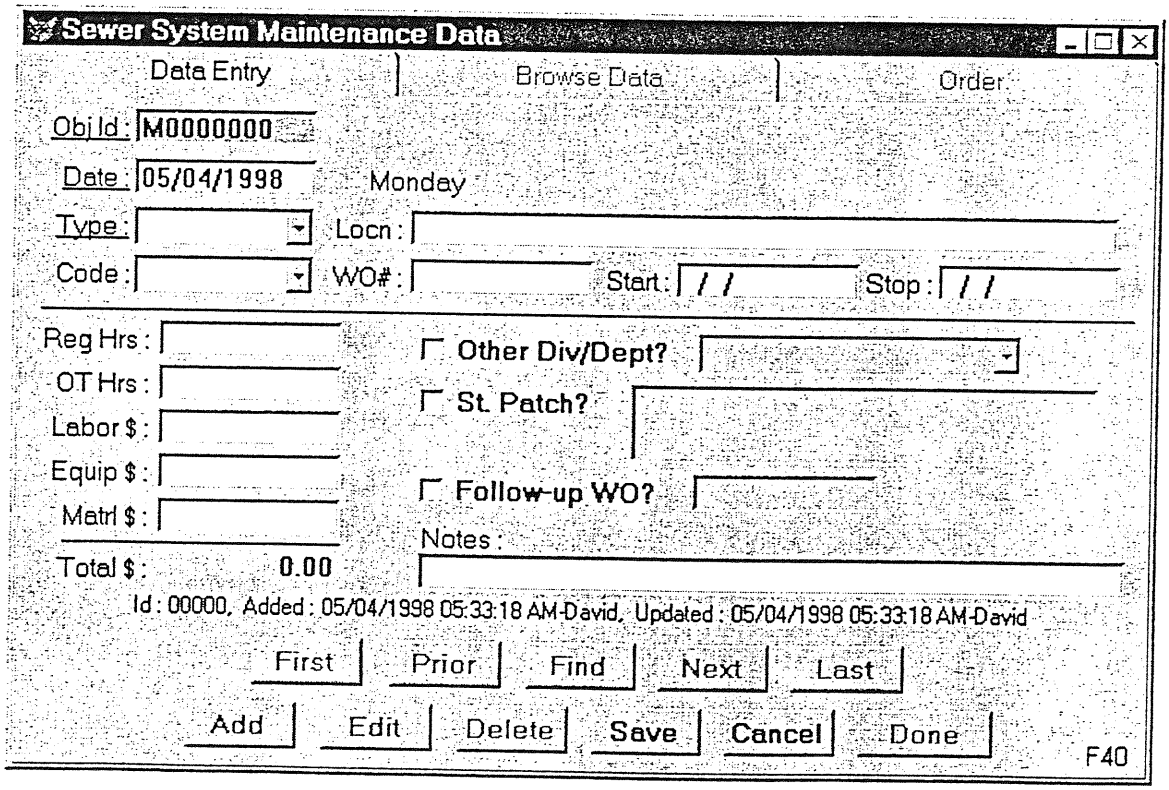
Maintenance Records

This table contains records for all maintenance performed on the sewer system. The table has the same format as the table used for water and storm drain maintenance records; however, the records are kept in three separate tables to limit access control to authorized users of each type of data.

ADDING A NEW SEWER MAINTENANCE RECORD – To add a new record:

1. If the maintenance form is not already on the computer monitor, place it there by pulling down the "Data" menu to "Sewer," a sub-menu will appear. Then pull down the resulting sub-menu to "Maintenance" and release the mouse button. If the form is already open, select it by pulling down the "Window" menu to "Sewer System Maintenance Data" and releasing the mouse button.

2. Once the form is present and active (it can be identified by the phrase "Sewer System Maintenance Data" in the title bar and "F40" in the lower right corner), click the "Add" button near the bottom left corner of the form. The data fields of the form will be emptied of prior data and readied for the user to fill in all available information for the new record. Note the fields are pink instead of blue as the focus proceeds through the form. The empty form should look like the one below:



3. As individual pieces of data are entered, the program checks the entry for compliance with established business rules. If any error is encountered, the program will notify the user via a message in a dialog box. Most messages are advisory, requiring the user to click an "OK" button; some messages require the user to make a choice among several buttons and clicking upon it.

4. When all available data has been entered, click on the "Save" button to save the data just entered into the form. When save is requested, the program checks the data in the form to see if all required data is present. Any missing data is signaled to the user via a message in a dialog box. Upon completion of the save operation, notice the focus returns to its usual blue color.

5. Clicking the "Cancel" button will cause the program to throw away any of the changed information entered for this record; none of the discarded information will be retained in the database.

LOCATING AN EXISTING SEWER MAINTENANCE RECORD – To locate an existing record:

1. Place the sewer maintenance data form on the computer monitor as described above under "Adding a New Record."

2. Set the proper order for the table by clicking on the "Order" tab of the form and selecting the desired order from the list of available data orders.

3. Click on the "Browse Data" tab of the form and use the arrow keys or the slider to move through the list of available records until the desired record is in view. Click on the desired record so at least one field of the record is highlighted.

4. Click on the "Data Entry" tab of the form.

As an alternative to this process, you may wish to use the "Find" process as described in the general introduction to navigation through a data table.

EDITING AN EXISTING SEWER MAINTENANCE RECORD – To edit the data for an existing record:

1. Place the sewer maintenance data form on the computer monitor as described above under "Adding a New Record" and locate the record of interest as described above under "Locating an Existing Record."

2. Click on the "Edit" button near the bottom of the form. Notice the field with the focus turns pink instead of the usual blue.

3. Make all changes to the data as necessary. The program checks any data entered for compliance with established business rules and signals any problems via dialog boxes.

4. When all changes to the data have been completed, click on the "Save" button to save the changes to the database. Notice the field having the focus returns to its usual blue.

DELETING AN EXISTING RECORD – To delete an existing record:

1. Place the sewer maintenance data form on the computer monitor as described above under "Adding a New Record" and locate the record of interest as described above under "Locating an Existing Record."

2. Click on the "Delete" button near the bottom of the form.

3. You will be asked if you are certain you wish to delete the record. Clicking "Yes" allows the delete to proceed and the record is permanently removed from the database. Deleted records can not be recovered. Clicking "No" cancels the delete request and the database is unchanged.

EXITING THE FORM – To exit the form click on the "Done" button near the bottom right of the form or the close box in the upper right corner. The form will be cleared from the computer monitor and the program is ready to process another user action.

SEWERAGE MODEL

Sewage Model Description

Introduction

There are many areas which have had sanitary sewer systems in operation for long periods of time. When each section of the system was built, it was designed to meet the requirements of the anticipated land use at that time for the tributary area. Subsequent to the construction of many of these sewage pipelines for residential and agricultural improvements, the zoning conditions have been modified, allowing the development of larger industrial, commercial and business centers and an increase in the number of multiple family dwellings. Many residential areas have expanded well beyond the limits ever considered possible at the time of original sewer system development.

In general, areas may be allowed to grow and develop without any major modifications being made to the already existing sewerage system. Thus, in some portions of a system, the sewers may carry quantities of sewage above the carrying capacity of the pipe, causing an overloaded condition. The deficiency of such a sewerage system can become even more critical as the remaining portions of an area develop under existing or proposed new zoning conditions.

The objective of this sewerage model is to completely analyze the existing sanitary sewer system in all areas so the following primary factors may be determined:

1. Identification of those portions of a sewerage system which are, or will become, overloaded, based upon the maximum development permitted by existing zoning regulations.

2. Establishment of basic data so that a master sewer reconstruction plan and schedule can be developed. Such data should provide for easy updating as changes are proposed or occur in zoning or development patterns.

3. Provide estimates of cost of sewer reconstruction necessary to assure adequate capacity.

4. Assure each new development pays the full cost of its impacts on the existing system so new development is not subsidized by existing users of the sewerage system.

A computer model has been devised to accomplish this capacity investigation in the shortest possible time with data and results which are easily updateable. The basic concepts used in this model were developed by the County of Los Angeles Public Works Department in the early-1960's and were placed into the public domain. The basic engineering calculation formulas and methods have remained unchanged, but the computer hardware and software have been revised many times to accommodate the rapid growth in computing power. Investigations, which once required significant calculation time on a mainframe computer, can now be completed in a few seconds on a desktop personal computer. Results only available as punched cards, which were listed to form a report, can now be displayed visually via a colored map shown on a computer screen or on a printed page.

This model makes the basic calculations quickly and easily, but the results must be analyzed by a professional engineer for reasonableness and applicability. The printed reports and colored maps prepared by the model are only a small part of the information needed to design a comprehensive sewerage system rehabilitation program covering many years.

Sewer Capacity Assumptions

The design of sanitary sewers is based upon several variables and assumptions; hence, it is necessary to provide considerable reserve capacity to cover a wide range of conditions. The Camarillo Sanitary District sewer design manual recognizes this when it requires the peak flow design capacity of pipes 15 inches and smaller be determined as one hundred percent of capacity is reached on the basis of the pipe flowing half full.

Larger pipes, in general, serve greater land areas, and as the tributary area to a sewer increases in size, the ratio of momentary maximum peak flow rates to average daily flow rates decreases and the need for reserve capacity also decreases. Therefore, the Camarillo sewer design manual specifies that for pipes 18 inches and larger in diameter, the design capacity (100 percent of capacity) is determined on the basis of the pipe flowing at a depth equal to three-fourths of the pipe diameter.

In this model, a sewage pipeline is considered overloaded when the flow, either anticipated or actual, is greater than the design capacity of the pipe. When such situations occur, the model calculates what sewage pipeline diameter, if laid on the same grade and alignment as the existing pipe, would be necessary to accommodate the anticipated or actual flow without overloading.

The model does not have the ability to deal with inverted sewer siphons or force mains. It is suggested both of these situations can be handled by indicating a pipe reach with a steep slope. This causes the model to indicate a high capacity and keeps the reach from showing up on the reconstruction schedule. Each siphon or force main within the sewage drainage area should be analyzed separately by conventional methods.

Capacity Formula

The design capacity of each sewer pipeline reach is computed by using a combination of the Chezy Equation and Kutter formula:

$$Q = A * \frac{(41.66 + (0.00281/s) + (1.811/n))}{(1 + (41.66 + 0.00281/s) * (n/(r)^{**}1/2)} * (rs)^{**}1/2$$

Where: s is the slope of the pipe,
r is the hydraulic radius,
n is the roughness coefficient, and
A is the cross sectional area of the stream of sewage carried in the pipe.

Roughness Coefficient

The Camarillo sewage design manual specifies a Manning's "n" of 0.013 for hydraulic design.

Flow Coefficients

The Camarillo sewerage design manual provides "... flow rates shall be determined by the design engineer based on good engineering practice." Accordingly, the model uses a rate of 300 gallons per equivalent residential unit (ERU) per day.

Peaking Factor

Peak sewage flow rates are obtained by using the peaking factor obtained from Plate 10 of the Camarillo sewage design manual.

Pipe Carrying Capacity Calculations

When a sewage pipeline diameter and slope are known, those values are used to calculate the pipes carrying capacity expressed in cubic feet per second (cfs). Because the model may have incomplete data available and it is desirable to complete the calculations anyway, missing pipe diameters are assumed to be eight inches (8") as this is the smallest permitted size and represents the most conservative condition. When the actual or design pipe slope is unknown, a slope of 0.40% is assumed. The result of this calculation is a number which is 100% of the pipe's carrying capacity.

Anticipated Flow Calculations

The amount of flow anticipated to be carried in each sewage pipeline reach is determined by multiplying the number of ERU's shown as being connected along the pipe reach and multiplying it by the flow coefficient of 300 gallons per ERU per day and converting the result to a quantity expressed in cfs. This flow is applied at the top of the pipe reach even though the actual connections may occur all along the pipe because this will create the most demanding situation.

An important feature of the program is the ability to accept an injected flow. There are three basic uses for this feature, the first being to incorporate the flow from an adjacent city, a point source such as a pump station, significant building or the point of connection for a future development. The injected flow is specified as a peak flow in cfs. This feature may also be used to specify flow from a development where flows are known to differ from the 300-gal/ERU/day coefficient used if ERU's were specified. An injected flow is assumed to act at the top of a pipe reach no matter where it actually occurs along the pipe because this will create the most demanding condition.

The sewage flow contributed along each pipe reach is combined with the sewage flow entering the upstream manhole from all other sources. The resulting flow is expressed in cfs, but is most easily compared to other flow situations if it is converted to a percentage of pipe carrying capacity. For example, an anticipated flow of 0.25 cfs in a pipe with a capacity of 0.50 cfs is said to have an anticipated flow of 50% of the pipe carrying capacity. This method of expression makes it easy to compare differing pipe situations on a common basis.

Provision is also made for a constant flow to be withdrawn from a pipe reach to simulate the action of a leak, a sewer dam diverting flow to another pipe or a small pump station removing a constant amount of flow. This extracted flow is specified as a peak quantity in cfs. The extracted flow is assumed to act at the bottom manhole of a pipe reach no matter where it actually occurs along the pipe because this will create the most demanding situation.

Resize Overloaded Pipes

When the anticipated flow exceeds the pipe carrying capacity, the program automatically calculates what pipe size would be necessary on the same line and grade as the existing pipe to carry the anticipated flow without exceeding the new pipe's carrying capacity. The replacement pipe size is noted for use in a report of overloaded situations which should be corrected as part of a sewer system rehabilitation program.

Measured Flow Calculations

Flow measurements may be taken at various key manholes throughout the study area. The actual location of the measured flow is marked by an * in any printed reports. Actual flow measurements are indicated on screen by the date of the measurement. Measured flow values proportioned from another location do not have a measurement date.

The measured flow is proportioned by the program back upstream through the sewer system based upon a proportion derived from the anticipated flow quantities. The proportioning continues throughout the entire system or until another measured flow is encountered. When a new measured flow is encountered, the old proportion is dropped and a new one is established and allocated upstream to the rest of the system or until another flow measurement is encountered.

Just as with anticipated flow, measured flow is most easily compared to other flow situations if it is converted to a percentage of pipe carrying capacity. For example, a measured flow of 0.40 cfs in a pipe with a capacity of 0.50 cfs is said to have a measured flow of 80% of the pipe carrying capacity. This method of expression makes it easy to compare differing pipe situations on a common basis.

Reconstruction Cost Estimates

When an overloaded condition exists, the model calculates the required replacement pipe size and makes an estimate of the cost of constructing the replacement pipe based upon the user supplied estimated cost of pipe construction per foot of length. If the actual pipe size that is required is omitted from the list of reconstruction sizes and costs, the model will assume that size does not exist and will go on to the next larger size in the reconstruction cost estimate list.

This feature can be used to advantage. For example, if the existing pipe is really a water pipe size (say 14 or 16 inches) and the agency is following a program to replace overloaded reaches with only standard sewer pipe sizes, simply leave the water pipe sizes and associated costs out of the reconstruction pipe cost list.

Reconstruction Priorities

It is likely there will be more reconstruction demand than available funding. Therefore, it is helpful to have a reconstruction priority system to help guide attention to the most critical needs. The priority system contained in the model ranges from 1 (the most critical need) to 5, the minor overloaded situation which will probably not require reconstruction for some time.

The rating system is based upon how anticipated flows and measured flows compare to pipe carrying capacity as follows:

For pipes up to and including15 inches:

Priority	Anticipated Flow	Measured Flow
1	200% +	150% +
2	200% + 150% to 199%	100% to 149% 150% +
3	200% + 150% to 199% 100% to 149%	Less Than 100% 100% to 149% 150% +
4	150% to 199% 100% to 149%	Less Than 100% 100% to 149%
5	100% to 149%	Less Than 100%

For pipes over 15 inches:

Priority	Anticipated Flow	Measured Flow
1	125% +	115% +
2	125% + 115% to 124%	100% to 114% 115% +
3	125% + 115% to 124% 100% to 114%	Less Than 100% 100% to 114% 115% +
4	115% to 124% 100% to 114%	Less Than 100% 100% to 114%
5	100% to 114%	Less Than 100%

Sewage pipelines in priorities 1 and 2 should be scheduled for reconstruction as soon as possible because of their high theoretical anticipated flows and high measured flows. Priorities 3, 4, and 5, despite their high theoretical anticipated flows, do not warrant immediate reconstruction, as measured flows indicate the sewers are not presently overloaded. These sewers should be given first consideration in any future investigation or when the construction now might be more economical due to proposed surface improvements that might cause construction difficulties in the future.

Instances where the measured flow is considerably higher than anticipated should be reexamined prior to publishing any final results as in some cases the measurement may be found to be in error or the anticipated flow must be adjusted to reflect the actual development in the area.

Reconstruction Cost Records

This table contains two types of records – reconstruction pipe sizes and reconstruction costs. The reconstruction pipe size record can be identified by the id "SEWERCOST*" in its record id and fields to specify up to 21 pipes sizes which ma be used during the reconstruction cost estimating process. Note the asterisk in the last position of the record id. This record may be edited to change the sizes of pipe available for use in reconstruction, but may not be deleted. To eliminate the use of any pipe size, simply remove that size from the list. If a pipe size is eliminated from the list, be certain to adjust each of the reconstruction cost records. Failure to do so will result in unpredictable reconstruction cost estimating results.

The pipe sizes entered here are used as the labels on each field of the cost records. When the model can not find a new pipe size large enough to carry the flow without overload, the model uses a pipe with diameter of 999 inches. Typically this will be a large enough value to attract the users attention to the result. When this occurs, the data used to calculate the anticipated flow should be reviewed first for obvious errors such as a misplaced decimal point. If the problem continues, the list of available diameters should be reviewed to assure it contains large enough sizes.

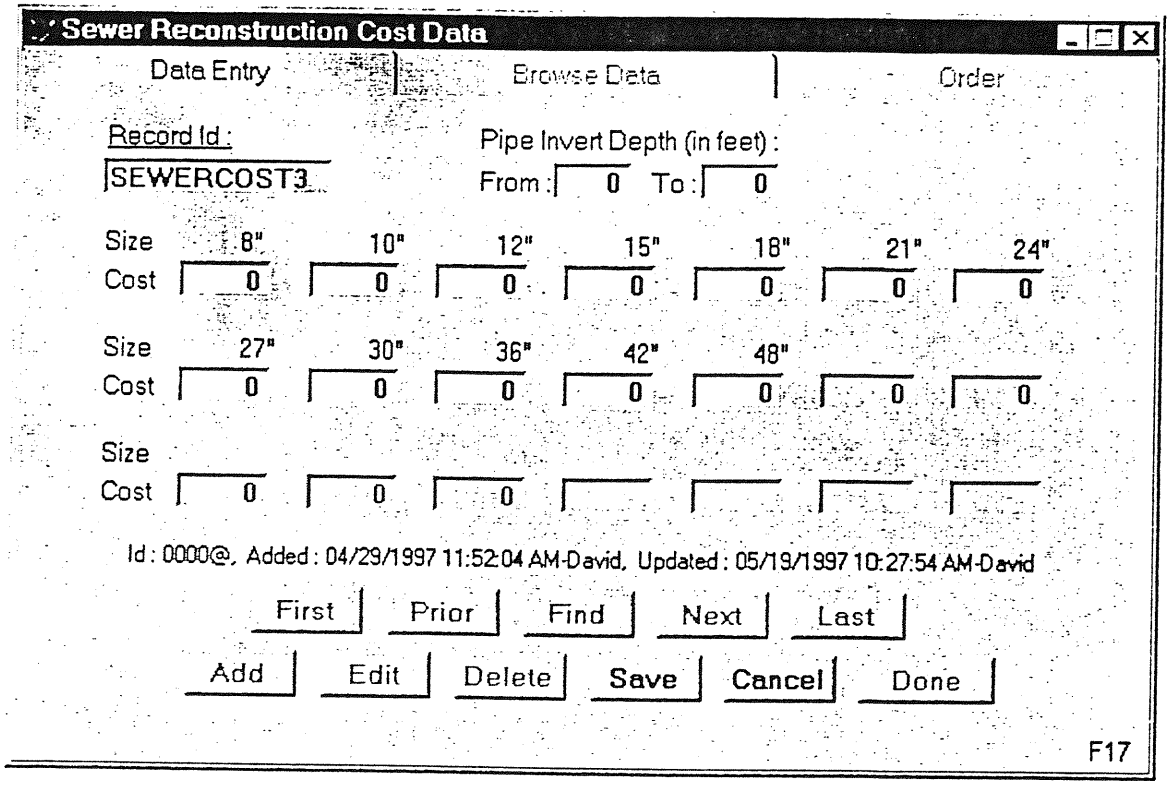
Up to ten records containing costs for various ranges of depth from the top of the manhole ring to the pipe invert are allowed. These records may be identified by the record id "SEWERCOSTx" where "x" may vary from 0 through 9. The sewer model uses these records to build an array of costs for each available pipe diameter and pipe depth range. When the model can not find a cost estimate for the diameter and depth needed, it assigns a default cost of $1,000 per foot. Typically this will be a large enough value to attract the users attention to the result. When this occurs, the depth of manhole date at each end of the sewer reach in question should be reviewed first for obvious errors such as a misplaced decimal point. If the problem continues, the list of available depth ranges should be reviewed to assure it contains large enough sizes.

When a new record pipe depth range record is added, the program automatically searches for the next available number (0 to 9) and assigns it to the new record id. Care should be taken to assure the depth ranges do not overlap. The cost estimating routine will use the costs in the first depth range encountered.
See note 6.

ADDING A NEW RECONSTRUCTION COST RECORD – To add a new record:

1. If the reconstruction cost form is not already on the computer monitor, place it there by pulling down the "Data" menu to "Sewer," a sub-menu will appear. Then pull down the resulting sub-menu to "Sewage Model;" finally pull down the last sub-menu to "Reconstruction Costs" and release the mouse button. If the form is already open, select it by pulling down the "Window" menu to "Sewer Reconstruction Cost Data" and releasing the mouse button.

2. Once the form is present and active (it can be identified by the phrase "Sewer Reconstruction Cost Data" in the title bar and "F17" in the lower right corner), click the "Add" button near the bottom left corner of the form. The data fields of the form will be emptied of prior data and readied for the user to fill in all available information for the new record. Note the fields are pink instead of blue as the focus proceeds through the form. The empty form should look like the one below:



3. As individual pieces of data are entered, the program checks the entry for compliance with established business rules. If any error is encountered, the program will notify the user via a message in a dialog box. Most messages are advisory, requiring the user to click an "OK" button; some messages require the user to make a choice among several buttons and clicking upon it.

4. When all available data has been entered, click on the "Save" button to save the data just entered into the form. When save is requested, the program checks the data in the form to see if all required data is present. Any missing data is signaled to the user via a message in a dialog box. Upon completion of the save operation, notice the focus returns to its usual blue color.

   Clicking the "Cancel" button will cause the program to throw away any of the changed information entered for this record; none of the discarded information will be retained in the database.

LOCATING AN EXISTING RECONSTRUCTION COST RECORD – To locate an existing record:

1. Place the Reconstruction Cost Data form on the computer monitor as described above under "Adding a New Record."

2. Set the proper order for the table by clicking on the "Order" tab of the form and selecting the desired order from the list of available data orders.

3. Click on the "Browse Data" tab of the form and use the arrow keys or the slider to move through the list of available records until the desired record is in view. Click on the desired record so at least one field of the record is highlighted.

4. Click on the "Data Entry" tab of the form.

As an alternative to this process, you may wish to use the "Find" process as described in the general introduction to navigation through a data table.

EDITING AN EXISTING RECONSTRUCTION COST RECORD – To edit the data for an existing record:

1. Place the Reconstruction Cost Data form on the computer monitor as described above under "Adding a New Record" and locate the record of interest as described above under "Locating an Existing Record."

2. Click on the "Edit" button near the bottom of the form. Notice the field with the focus turns pink instead of the usual blue.

3. Make all changes to the data as necessary. The program checks any data entered for compliance with established business rules and signals any problems via dialog boxes.

4. When all changes to the data have been completed, click on the "Save" button to save the changes to the database. Notice the field having the focus returns to its usual blue.

DELETING AN EXISTING RECORD – To delete an existing record:

1. Place the Reconstruction Cost Data form on the computer monitor as described above under "Adding a New Record" and locate the record of interest as described above under "Locating an Existing Record."

2. Click on the "Delete" button near the bottom of the form.

3. You will be asked if you are certain you wish to delete the record. Clicking "Yes" allows the delete to proceed and the record is permanently removed from the database. Deleted records can not be recovered. Clicking "No" cancels the delete request and the database is unchanged.

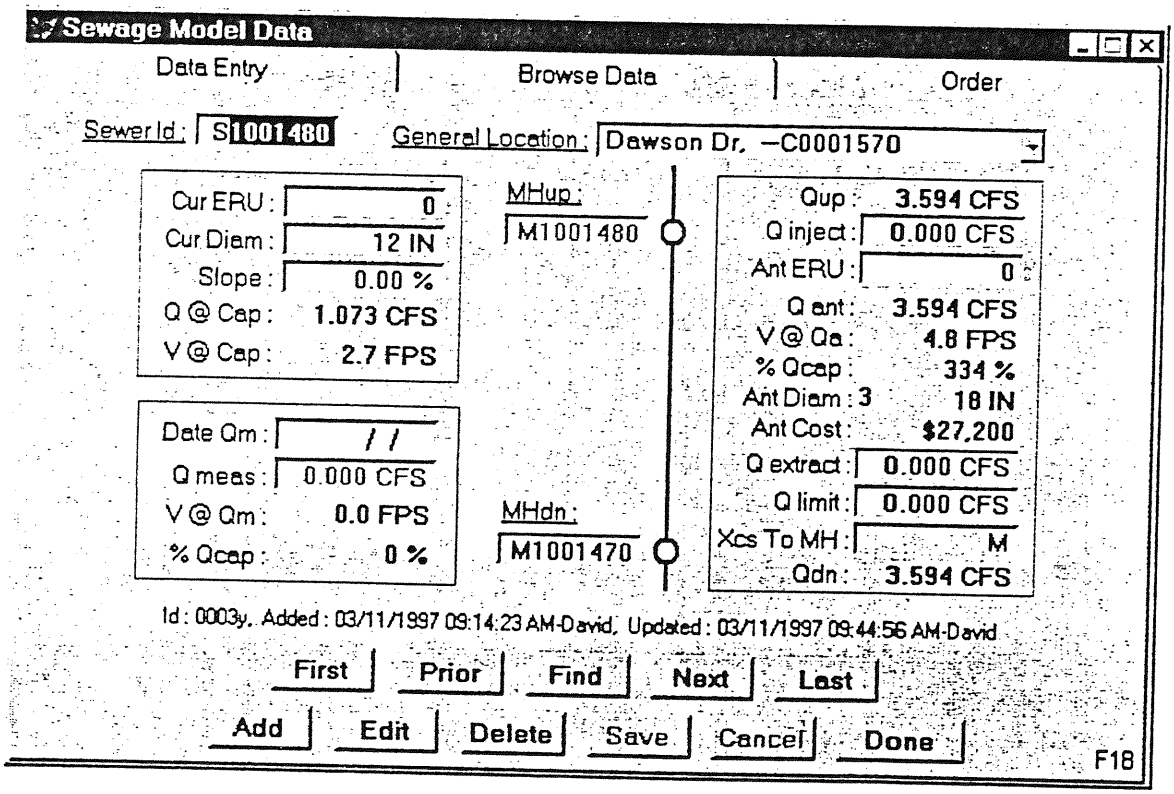
The Reconstruction Cost record with the id "SEWERCOST*" is required by the program and therefore can not be deleted. Trying to delete the record will result in a warning message in a dialog box.

EXITING THE FORM – To exit the form click on the "Done" button near the bottom right of the form or the close box in the upper right corner. The form will be cleared from the computer monitor and the program is ready to process another user action.

Maintain Sewage Model

The sewage model data consists of approximately 25 data fields in addition to the standard sewer pipeline data described elsewhere. The extra fields are stored in the sewer table along with the basic sewer pipeline data. An example of the data for a typical sewage model record is shown below. The top line of data on the form shows the sewer id and its general location by street name and lowest door number in the block. When a sewer pipeline starts in one block and finishes in another block, the general location is considered to be the block which contains the largest portion of the sewer length.

The top left box contains design information about the current sewer pipe – the actual number of ERUs served along this pipe, the pipe diameter and slope. The quantity (Qcap) and velocity of flow (Vcap) at 100% of capacity are calculated as described elsewhere in the sewer model description based upon the indicated diameter and slope. If the diameter is empty, a pipe diameter of 8 inches is used. If the pipe slope is empty, a slope of 0.40% is used. These values were selected because they will generally produce the most conservative results consistent with design standard minimums. Any missing data should be researched and filled in so the calculations will be as accurate as possible.



The box in the lower left portion of the form contains data associated with measured sewage flow at the outlet of the upstream manhole. If no date of measurement is present, the quantity of flow shown (Qmeas) is the result of proportioning a flow measurement from some other location down stream. If a Qmeas date is present, the flow value is the actual measured flow. Besides providing a signal to identify actual measurement data, the measurement date gives the user an idea of the age of the flow data. Out of date measurements will present an inaccurate view of the data. Using the Qmeas indicated, the Vmeas is calculated as well as the percentage of Qcap for the existing pipe.

The middle of the form shows a pipe and the id numbers of the up and down stream manholes. Note the upstream manhole always has the same numeric portion of the id number as the pipe.

The box on the right side of the form contains the basic anticipated flow data and a summary of the anticipated flow calculations based upon the data indicated. The data is arranged to be read from top to bottom. Qup is the quantity of flow entering the up-stream manhole from all up stream sources. Qinject is the quantity of flow coming from a point source such as a new development, or a facility where the unit flows are know to vary from the standard coefficient of 300 gal/ERU/day. Qinject is considered to act at the up stream manhole no matter where it actually enters the reach of sewer pipeline. Finally, the number of ERUs expected at full build out along this reach of sewer pipeline is shown.

Using these three pieces of information, the anticipated flow (Qant) which must be carried by the pipe reach is calculated. Based upon Qant, the velocity of flow at Qant and the percentage of Qcap are calculated and displayed. If the percentage of Qcap is over 100, the pipe is considered overloaded and the model automatically calculates the first available larger pipe size which would be needed to carry the flow without overload. The resulting larger size is shown as the anticipated diameter. Next to the new diameter is the reconstruction priority determined as described in the sewerage model introduction.

Next, is the anticipated cost of the pipeline reconstruction based upon its depth and the costs per foot of pipe length. If no pipe length is given, the model uses 1,000 feet. This is long enough to result in an answer which will generally attract a users attention. See the reports section for a discussion of how to print a report of all suggested reconstruction needs.

Qextract is the opposite of Qinject. Any flow entered here is considered to be removed at the bottom of the pipe reach no matter where the removal actually takes place. The Qlimit feature allows modeling of the sewer dams used to split high flows between two outlets from a single manhole. Flow is considered to go through the outlet without the dam until the specified flow is reached, then all additional flow is considered to go out the alternate outlet. When a Qlimit value is entered, the manhole id where any excess flow is routed must be entered. At the receiving manhole, the excess flow is handled as a Qinject value.

Finally, the quantity passed to the up stream manhole of the next pipe reach down stream is determined. This value is combined with values from other flows into the manhole from other pipelines and becomes the Qup of that manhole. The calculation process is repeated again for the new sewer pipeline.

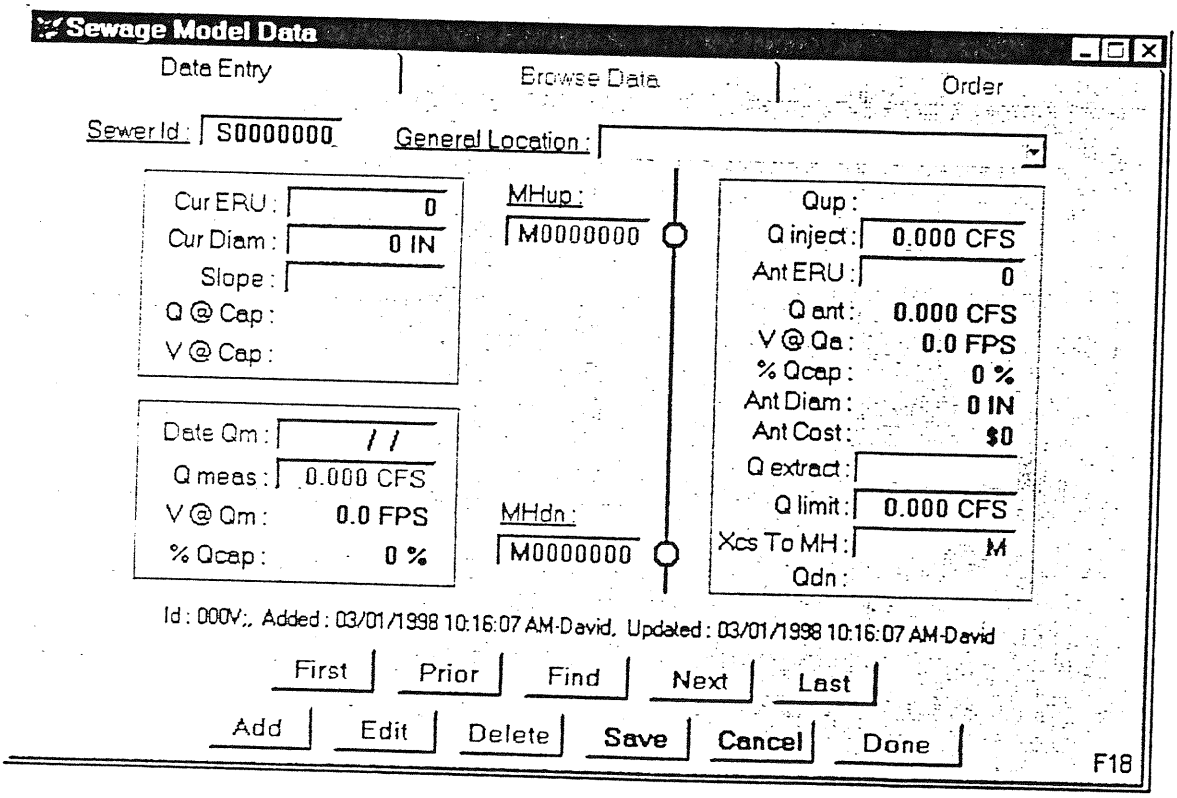
It should be noted the model is fully interactive, i.e. the business rules for changes to individual data values are evaluated when the focus is moved to the next field and changes to computed values are made when the "Save" button is clicked.

ADDING A NEW SEWAGE MODEL RECORD – To add a new record:

1. If the Sewage Model form is not already on the computer monitor, place it there by pulling down the "Data" menu to "Sewer," a sub-menu will appear. Then pull down

the resulting sub-menu to "Sewage Model;" finally pull down the last sub-menu to "Maintain Model" and release the mouse button. If the form is already open, select it by pulling down the "Window" menu to "Sewage Model Data" and releasing the mouse button.

2. Once the form is present and active (it can be identified by the phrase "Sewer Reconstruction Cost Data" in the title bar and "F17" in the lower right corner), click the "Add" button near the bottom left corner of the form. The data fields of the form will be emptied of prior data and readied for the user to fill in all available information for the new record. Note the fields are pink instead of blue as the focus proceeds through the form. The empty form should look like the one below:



3. As individual pieces of data are entered, the program checks the entry for compliance with established business rules. If any error is encountered, the program will notify the user via a message in a dialog box. Most messages are advisory, requiring the user to click an "OK" button; some messages require the user to make a choice among several buttons and clicking upon it.

4. When all available data has been entered, click on the "Save" button to save the data just entered into the form. When save is requested, the program checks the data in the form to see if all required data is present. Any missing data is signaled to the user via a message in a dialog box. Upon completion of the save operation, notice the focus returns to its usual blue color.

   Clicking the "Cancel" button will cause the program to throw away any of the changed information entered for this record; none of the discarded information will be retained in the database.

LOCATING AN EXISTING SEWAGE MODEL RECORD – To locate an existing record:

1. Place the Sewage Model Data form on the computer monitor as described above under "Adding a New Record."

2. Set the proper order for the table by clicking on the "Order" tab of the form and selecting the desired order from the list of available data orders.

3. Click on the "Browse Data" tab of the form and use the arrow keys or the slider to move through the list of available records until the desired record is in view. Click on the desired record so at least one field of the record is highlighted.

4. Click on the "Data Entry" tab of the form.

As an alternative to this process, you may wish to use the "Find" process as described in the general introduction to navigation through a data table.

EDITING AN EXISTING SEWAGE MODEL RECORD – To edit the data for an existing record:

1. Place the Sewage Model Data form on the computer monitor as described above under "Adding a New Record" and locate the record of interest as described above under "Locating an Existing Record."

2. Click on the "Edit" button near the bottom of the form. Notice the field with the focus turns pink instead of the usual blue.

3. Make all changes to the data as necessary. The program checks any data entered for compliance with established business rules and signals any problems via dialog boxes.

4. When all changes to the data have been completed, click on the "Save" button to save the changes to the database. Notice the field having the focus returns to its usual blue
   See note 7.
   See note 8.

DELETING AN EXISTING RECORD – To delete an existing record:

1. Place the Sewage Model Data form on the computer monitor as described above under "Adding a New Record" and locate the record of interest as described above under "Locating an Existing Record."

2. Click on the "Delete" button near the bottom of the form.

3. You will be asked if you are certain you wish to delete the record. Clicking "Yes" allows the delete to proceed and the record is permanently removed from the database. Deleted records can not be recovered. Clicking "No" cancels the delete request and the database is unchanged.

EXITING THE FORM – To exit the form click on the "Done" button near the bottom right of the form or the close box in the upper right corner. The form will be cleared from the computer monitor and the program is ready to process another user action.

Run Sewage Model

The sewage model responds as changes are made to the data for any sewage pipe by interactively recalculating results as far up or downstream as indicated necessary by the data being changed. This calculation appears to take two seconds or less from the farthest sewage pipeline all the way to the treatment plant on a 200-megahertz computer. Re-computing times on slower machines may be somewhat longer depending upon the processor speed. The interactive calculation results have been checked and are believed to be operating properly; however, there is always the possibility of some invalid combination of data never before encountered.

If any interactive calculation results appear to be unrealistic, the first "test" would be to run this module. This module recalculates all the values for all the pipes in the entire sewage collection system without regard for whether the recalculation is unnecessary. This assures the calculated answers for all sewage pipelines are as accurate as the model can calculate. If the results of both calculation methods are the same then the results are as accurate as the model can calculate.

To launch this module, pull down the "Data" menu to "Sewer," a sub-menu will appear. Then pull down the resulting sub-menu to "Sewage Model;" finally pull down the last sub-menu to "Run Sewage Model" and release the mouse button. This module first calls the module to "Check Model Structure" to verify all data is in the correct relationship. The progress thermometer described below is displayed. If all model data checks out, the actual calculation process is started. Again, a thermometer is displayed to keep the user advised as to calculation progress. The calculations are complete when the thermometer disappears.

Check Model Structure

The sewage modeling calculations require a few specific data values to be in certain relationships to other specific data values. This module checks to see that the data relationships meet all the required rules for the model to successfully complete its calculations. Any rule violations are presented to the user via a message in a dialog box. The rules are:

1. Every sewer pipeline must have a manhole with the same numeric id (last seven digits).

2. Every sewer pipeline id must have one and only one upstream manhole with same numeric id.

3. Every downstream manhole id, except for id M0000001, must have at least one sewer pipeline with same numeric id.

4. Every sewer pipeline with a flow limiting quantity must reference a faux manhole so the model knows where to route flows in excess of the limit.

A progress thermometer is presented to keep the user informed as the checking process is underway. A message is presented for each data rule violation encountered. If any data rule violations are encountered, sewage model calculations are disabled because the calculation results will be inaccurate. If no data rule violations are encountered, a message is presented to the user noting the successful completion of the data checking routines.

See note 9.
See note 10.

Addendum:

1. To start using the model, go to the Data pull down menu and to the sewer submenu. Here you will see the different fields that you may enter. To add manhole or sewer information, go to the Manhole Records or Sewer Records. To add flows to the model, go to Sewage Model and the Maintain Model sub menu. You may run the model or check the model structure in the Sewage Model field as well.
2. Every manhole that is identified in the sewer records must also be listed in the manhole records. If there is an unidentified manhole, the model will fail to run. Should there be manholes missing from the manhole records table, add the manhole records as described below.
3. Manhole Id, General Location Name, and Atlas Sheet ID must be input or else errors will occur in the Manhole Records Field. You will not be able to perform any other functions until these fields are complete. Click on the arrow next to the field to choose from a list of general location name or atlas sheet ID.
4. Each pipeline must have a unique sewer ID number or the model will fail to run.
5. Input of new pipelines must be done through the sewer model pipeline field (as opposed to in ArcView) described below. All attribute fields must be filled in as noted below. Note the sewer ID number assigned to the new pipeline, and add the new line to the sewer pipeline shape file (GIS graphical representation) in ArcView, only after inputting new pipe in the model database. The shape file then must be joined to the model database to give the graphical pipeline attributes.
6. Reconstruction reports will show costs of Sxx,000 per foot if the pipes are inputted without a length attribute. Fill in the length field to determine the cost per foot.
7. Changes to the sewage model data (e.g. changing Q_{inject}) must be made through the Edit Sewage Model Data field (as opposed to in ArcView). Errors may occur when editing the database through the ArcView GIS system, as ArcView is not able to regulate the sewer model rules.
8. Flow values must be in numeric form and in the correct units (cfs). The model will not run with asterisks or other non-numeric symbols in the flow fields.
9. It is important to only run one copy of the model at a time, either from the same machine or on a network server. The model is not intended for multiple users at this time.
10. To change password or user name, use the Utilities pull down menu. Note that there is no way to re-retrieve a forgotten password.

State of California
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LOS ANGELES REGION

ORDER NO. 96-042

NPDES NO. CA0053597

WASTE DISCHARGE REQUIREMENTS
FOR
CAMARILLO SANITARY DISTRICT
(Water Reclamation Plant)

The California Regional Water Quality Control Board (RWQCB), Los Angeles Region (Regional Board), finds:

1. Camarillo Sanitary District (hereinafter CSD or Discharger) discharges treated wastewater from the Water Reclamation Plant (WRP) under waste discharge requirements contained in Order No. 90-057 (NPDES No. CA0053597), adopted by this Regional Board on May 21, 1990.

2. CSD has filed a Report of Waste Discharge (ROWD) and has applied for renewal of its waste discharge requirements and National Pollutant Discharge Elimination System (NPDES) permit.

3. CSD, located at 150 East Howard Road, Camarillo, California, is a secondary wastewater treatment plant with a design capacity of 6.75 million gallons per day (mgd). Treatment consists of comminution, primary sedimentation, activated sludge treatment, secondary clarification, chlorination and dechlorination. Primary sludge is anaerobically digested and waste activated sludge is thickened and aerobically digested. Sewage solids separated from the wastewater are dried in sludge drying beds and transported off site. The majority of the sludge is trucked to the Yakima Compost Company, in Buttonwillow, California. A small fraction is disposed of at the Santa Clara Landfill.

   Figures 1 and 2 show the location of the plant and the schematic of wastewater flow.

4. CSD discharges secondary treated wastewater into Conejo Creek, through Discharge Serial No. 001 (Latitude 34° 11' 40", Longitude 119° 00' 00"). Conejo Creek is tributary to Calleguas Creek, a water of the United States, above the Calleguas Creek estuary and Mugu Lagoon, and is part of the Calleguas Creek Watershed Management Area.

May 9, 1996
Revised: May 28, 1996

5. The ROWD describes the 1995 discharge as follows:

Constituent	Unit	Annual Average	Lowest Monthly Avg.	Highest Monthly Avg.
Flow	mgd	4.27	4.001	5.322
pH	pH units	—	6.0	6.9
Temperature	°F	70	65.2	70.8
BOD	mg/L	5.5	3.3	11.8
Total Dissolved Solids	mg/L	839	717	935
Suspended solids	mg/L	7.3	4.8	14.3
Settleable solids	mL/L	< 0.1	< 0.1	< 0.1

6. The U.S. Environmental Protection Agency (USEPA) and the Regional Board have classified this discharge as a major discharge.

7. A portion of the treated effluent is reclaimed for farmland surface irrigation and is regulated under Order No. 87-132, adopted by this Board on September 28, 1987.

8. The Board adopted a revised Water Quality Control Plan for the Coastal Watersheds of Los Angeles and Ventura Counties on June 13, 1994. The Basin Plan contains beneficial uses and water quality objectives for Calleguas Creek, its tributaries, and for Ventura Central Ground Water Basins.

9. The beneficial uses of the receiving waters are:

(Conejo Creek - Hydrologic Unit 403.12)
- potential: municipal and domestic supply;
- existing: industrial service supply, industrial process supply, agricultural supply, ground water recharge, contact and non-contact water recreation, warm freshwater habitat, and wildlife habitat;

(Calleguas Creek - Hydro Unit 403.12)
- potential: municipal and domestic supply;
- existing: industrial service supply, industrial process supply, agricultural supply, ground water recharge, contact and non-contact water recreation, warm freshwater habitat, and wildlife habitat;

(Calleguas Creek - Hydro Unit 403.11)
- potential: municipal and domestic supply;
- existing: agricultural supply, groundwater recharge, freshwater replenishment, contact and non-contact water recreation, warm freshwater habitat, cold freshwater habitat, wildlife habitat, rare, threatened or endangered species, and wetland habitat;

(Calleguas Creek Estuary - Hydro Unit 403.11)
- potential: navigation, water contact recreation;

- existing: non-contact water recreation, commercial and sport fishing, estuarine habitat, wildlife habitat, rare, threatened or endangered species, migration of aquatic organisms, spawning, reproduction, and/or early development, and wetland habitat;

(Mugu Lagoon - Hydro Unit 403.11)
- potential: water contact recreation;
- existing: navigation, non-contact water recreation, commercial and sport fishing, estuarine habitat, marine habitat, wildlife habitat, preservation of biological habitats, rare, threatened or endangered species, migration of aquatic organisms, spawning, reproduction, and/or early development, shellfish harvesting, and wetland habitat.

10. The 1996 State Water Resources Control Board's (SWRCB) Water Quality Assessment (WQA) identified the water quality conditions of water bodies in the state. Within the Calleguas Creek Watershed the following water bodies are classified as impaired waterbodies: Mugu Lagoon, tributaries from duck ponds to Mugu lagoon, Calleguas Creek (Estuary to Arroyo Las Posas), Revolon Slough and Beardsley Channel/Wash, Conejo Creek/ Arroyo Conejo North Fork, Arroyo Las Posas, and Arroyo Simi. Impaired waters do not support beneficial uses.

    Water quality problems associated with this watershed are: sedimentation, pesticides, nitrogen, nitrate and nitrite, algae, total dissolved solids (TDS), chloride, sulfate, ammonia, metals, and organic chemicals. Known and/or suspected pollution sources include: urban and agricultural runoff, septic tanks, abandoned wells, seawater intrusion, mining operations, and storm water.

11. In 1995, the chloride concentrations of the final effluent ranged from 143 mg/L to 192 mg/L (annual average 161 mg/L). The daily maximum chloride limit in Order 90-057 is 150 mg/L. On March 26, 1990, the Board adopted Resolution No. 90-004, which stated that because of the long term drought in California, the Board would temporarily not enforce the chloride limit where violations were primarily due to increased chloride concentrations in imported water. The Discharger has requested continued coverage under Resolution No. 90-004.

12. The Basin Plan designates a beneficial use of contact recreation in the downstream areas; however, CSD submitted a report entitled *Conejo and Calleguas Creeks- Water Contact Recreation Study* in October of 1990. The report concludes that this beneficial use does not exist at the present time.

13. CSD filed a Notice of Intent (NOI) and implements a storm water pollution prevention plan (SWPPP), to comply with the general NPDES permit for storm water discharges associated with industrial activity. Those storm water requirements shall be incorporated into this Order.

14. Pursuant to 40 CFR Part 403, the CSD developed and have implemented a ISOPIA approved industrial wastewater pretreatment program.

15. The requirements contained in this Order are based on the Basin Plan, other Federal and State plans, policies, guidelines, and best engineering judgement, and, as they are met, will be in conformance with the goals of the aforementioned water quality control plans and will protect and maintain existing beneficial uses of the receiving water.

16. The Discharger's monitoring data during 1990-1995 consistently showed high effluent quality. As a measure of plant performance, effluent quality performance goals are listed in this Order. This approach requires the Discharger to measure its treatment efficiency, while recognizing normal variations in treatment plant operations, influent quality, and sampling and analytical techniques. However, this approach does not address substantial changes in plant operations that may occur in the future and could affect the quality of the treated effluent. As such, the performance goals may be modified by the Executive Officer, if warranted. The listed effluent performance goals are not an enforceable limitation or standard.

17. The issuance of waste discharge requirements for this discharge is exempt from the provisions of Chapter 3 (commencing with Section 21100) of Division 13 of the Public Resources Code (California Environmental Quality Act) in accordance with Water Code Section 13389.

The Regional Board has notified the discharger and interested agencies and persons of its intent to issue waste discharge requirements for this discharge and has provided them with an opportunity to submit their written views and recommendations.

The Regional Board, in a public hearing, heard and considered all comments pertaining to the discharge and to the tentative requirements.

This Order shall serve as a National Pollutant Discharge Elimination System permit pursuant to Section 402 of the Federal Clean Water Act or amendments thereto, and shall take effect at the end of ten days from the date of its adoption, provided the Regional Administrator, ISOPIA, has no objections.

IT IS HEREBY ORDERED that Camarillo Sanitary District, in order to meet the provisions contained in Division 7 of the California Water Code and regulations adopted thereunder, and the provisions of the Federal Clean Water Act and regulations and guidelines adopted thereunder, shall comply with the following:

I. DISCHARGE LIMITATIONS

A. Effluent Limitations

1. Waste discharged shall be limited to treated municipal wastewater only, as proposed. This limitation does not apply to storm water discharged from the plant in accordance with the SWPPP.

2. The discharge of an effluent from Discharge Serial No. 001 with constituents in excess of the following limits is prohibited:

a. Conventional and nonconventional pollutants:

Constituents	Units	Discharge Limitations 30-Day Average [1/]	7-Day Average [1/]	Daily Maximum [2/]
BOD_5 (20°C)	mg/L	20	30	45
	lbs/day[3/]	1,130	1,690	2,530
Suspended Solids	mg/L	15	40	45
	lbs/day[3/]	840	2,250	2,530
Oil and Grease	mg/L	10	----	15
	lbs/day[3/]	560	----	840
Settleable Solids	mL/L	0.1	----	0.3
Total Dissolved Solids	mg/L	850	----	850
	lbs/day[3/]	47,850	----	47,850
Total Nitrogen	mg/L	30	----	40
	lbs/day[3/]	1,690	----	2,250
Sulfate	mg/L	250	----	250
	lbs/day[3/]	14,070	----	14,070
Chloride[4/]	mg/L	150	----	150
	lbs/day[3/]	8,440	----	8,440
Boron	mg/L	1.0	----	1.0
	lbs/day[3/]	56	----	104
Fluoride	mg/L	1.4	----	1.4
	lbs/day[3/]	110	----	110
Total residual chlorine	mg/L	----	----	0.1
Detergents (as MBAS)	mg/L	0.5	----	0.5
	lbs/day[3/]	28	----	28

1/ As defined in Standard Provisions, Attachment N.

2/ Except for grab samples, the daily maximum effluent concentration limit shall apply to flow-weighted 24-hour composite samples.

3/ Based on the plant design flow rate of 6.75 mgd. During events such as storms in which the flow exceeds the design capacity, the mass discharge rate limitations will be tabulated using the concentration limits and the actual flow rates.

4/ In accordance with the Resolution 90-004, the chloride limitation shall not be considered to be violated unless the effluent concentrations of chlorides exceed 250 mg/L or water supply concentrations plus 85 mg/L, whichever is less.

b. Toxic pollutants:

Constituent	Units	Discharge Limitations 30-day Average 5/
Arsenic	µg/L	50 6/
	lbs/day 3/	2.8
Barium	mg/L	1 6/
	lbs/day 3/	56
Cadmium	µg/L	5 6/
	lbs/day 3/	0.28
Chromium (VI) 7/	µg/L	50 6/
	lbs/day 3/	2.8
Copper	mg/L	1
	lbs/day	56
Iron	µg/L	300 6/
	lbs/day 3/	17
Lead	µg/L	50 6/
	lbs/day 3/	2.8
Mercury	µg/L	2 6/
	lbs/day 3/	0.11
Selenium	µg/L	50 6/
	lbs/day 3/	2.8
Silver	µg/L	100 6/
	lbs/day 3/	5.6
Zinc	mg/L	5 6/
	lbs/day 3/	281

Constituent	Units	Discharge Limitations 30-day Average [5]
Chlorinated hydrocarbons:		
Endrin[8]	µg/L lbs/day [3]	2 0.11
Lindane	µg/L lbs/day [3]	0.2 0.01
Chlordane	µg/L lbs/day [3]	0.1 0.005
Methoxychlor	µg/L lbs/day [3]	40 2.2
Toxaphene	µg/L lbs/day [3]	3 0.17
Chlorophenoxys:		
2,4-D	µg/L lbs/day [3]	70 3.9
2,4,5-TP (Silvex)	µg/L lbs/day [3]	50 2.8
Antimony	µg/L lbs/day [3]	6 [6] 0.34
Nickel	µg/L lbs/day [3]	100 [6] 5.6
Cyanide[9]	µg/L lbs/day [3]	5.2 0.29
Halomethanes[10]	µg/L lbs/day [3]	100 5.6
Tetrachloroethylene	µg/L lbs/day [3]	5 0.28
1,4-Dichlorobenzene	µg/L lbs/day [3]	5 0.28

5/ Compliance may be determined from a single analysis or from the average of the initial analysis and three additional analyses taken one week apart once the results of the initial analysis are obtained.

6/ Based on total recoverable metals. These limits may be modified to total dissolved metals if the Discharger requests and has conducted a study on the water-effect ratio (WER) according to ISOPIA guidance document and/or state protocols, if applicable.

7/ The Discharger may, at his option, meet this limitation as total chromium.

8/ ENDRIN shall mean the sum of endrin and endrin aldehyde.

9/ The recovery of free cyanide from metal complexes must be comparable to that achieved by Standard Methods 412 F, G, and H (Standard Methods for the Examination of Water and Wastewater; Joint Editorial Board, American Public Health Association, American Water Works Association, and Water Pollution Control Federation [Water Environment Federation]; most recent edition).

10/ HALOMETHANES shall mean the sum of bromoform, chloroform, bromomethane, chloromethane, chlorodibromomethane, and dichlorobromomethane.

3. Radioactivity of the wastes discharged shall not exceed the limits specified in Title 22, Chapter 15, Article 5, Section 64443, of the California Code of Regulations, or subsequent revisions.

4. The arithmetic mean of BOD_5 (20°C) and suspended solids values, by weight, for effluent samples collected in a period of 30 consecutive calendar days shall not exceed 15 percent of the arithmetic mean of values, by weight, for influent samples collected at approximately the same time during the same period.

5. The wastes discharged to water courses shall at all times be adequately disinfected. For the purpose of this requirement, the wastes shall be considered adequately disinfected if the median number of coliform organisms at some point in the treatment process does not exceed 2.2 per 100 milliliters, and the number of coliform organisms does not exceed 23 per 100 milliliters in more than one sample within any 30-day period. The median value shall be determined from the bacteriological results of the last seven (7) days for which analysis have been completed. Samples shall be collected at a time when wastewater flow and characteristics are most demanding on treatment facilities and disinfection processes.

6. Acute Toxicity Limitation:

   a. The acute toxicity of the effluent shall be such that the average survival in the undiluted effluent for any three (3) consecutive 96-hour static or continuous flow bioassay tests shall be at least 90%, with no single test less than 70% survival.

   b. If the discharge consistently exceeds the acute toxicity limitation, a toxicity investigation evaluation (TIE) is required. The TIE shall include all reasonable

steps to identify the source(s) of toxicity. Once the source of toxicity is identified, the Discharger shall take all reasonable steps necessary to reduce toxicity to the required level.

II. Effluent Quality Performance Goals

The performance goals are based upon the actual performance of the discharge facility and are specified here only as an indication of the efficiency of the treatment facility. They are not considered as limitations or standards for the regulation of the treatment facility.

The Regional Board believes that the discharger should make every reasonable effort to maintain the following effluent quality performance goals (EQPGs). If the discharger consistently meets EQPGs, a request to the Executive Officer for monitoring relief for these parameters is warranted and may be included with a quarterly monitoring report. Any exceedance of any EQPG shall be reported to the Regional Board in the following quarterly report. If the exceedance of any particular goal persists during two succeeding quarterly monitoring periods, the Discharger shall submit with the second quarterly monitoring report a description of the exceedance, cause(s) of the exceedance, and any proposed corrective measures, if necessary.

The Executive Officer may modify any of the performance goals if the Discharger requests and has demonstrated that the change is warranted.

		Effluent Quality Performance Goals	
		30-day	Daily
Constituent	Units	Average	Maximum
BOD_5 20°C	mg/L	14.3[11/]	—
Suspended solids	mg/L	7.8[11/]	—
Arsenic	µg/L	—	18.2 [11/]
Barium	mg/L	—	0.46 [11/]
Copper	mg/L	—	0.11 [11/]
Nickel	µg/L	—	45 [11/]
Silver	µg/L	—	37 [11/]
Zinc	mg/L	—	0.37 [11/]
Chloroform	µg/L	—	95 [11/]
Bromodichloromethane	µg/L	—	38 [11/]
Dibromochloromethane	µg/L	—	18 [11/]
Remaining priority pollutants	µg/L	—	PQL[12/]

11/ Numerical effluent quality performance goals were derived statistically using effluent performance data for the period of 1990 through 1994. Effluent values (X_i) are assumed to be lognormally distributed. The use of logarithmic transformation equation, $Y_i = Ln\ (X_i)$, results in effluent values (Y_i) that are normally distributed. Effluent quality performance goals are determined by the equation:

$$X_{.95} = \exp\ [u_n + (z_{.95})\ (\sigma_n)]$$

where $X_{.95}$ = discharge effluent quality performance goal at the 95th percentile of the normal distribution.

u_n = mean of the distribution of the average of n values transformed.

$Z_{.95}$ = z-value from the Table of Areas under the Standard Normal Curve: equal to 1.645 at 95 percent.

σ_n = standard deviation of the distribution of the average of n values transformed.

Exp is an exponential to the base "e" value = 2.7183

12/ PQL (Practical Quantitation Limit) shall be determined by multiplying the ISOPIA published method detection limit (MDL) (Attachment 1) or the Discharger's MDL approved by the Executive Officer with the factor five (5) for carcinogens and ten (10) for non-carcinogens.

III. RECEIVING WATER REQUIREMENTS

A. Receiving Water Limitations

1. The temperature of the receiving water at any time or place and within any given 24-hour period shall not be increased by more than 5°F (or above 70°F if the ambient receiving water temperature is less than 60°F) as a result of the waste discharged.

2. The pH of the receiving water shall not be depressed below 6.5 or raised above 8.5 as a result of wastes discharged. Ambient pH levels shall not be changed more than 0.5 units from natural conditions as a result of wastes discharged.

3. The dissolved oxygen in the receiving water shall not be depressed below 5 mg/L as a result of the wastes discharged.

4. The residual chlorine in the receiving water shall not exceed 0.1 mg/L as a result of the wastes discharged.

5. The wastes discharged shall not contain substances that result in increases in the BOD which adversely affect beneficial uses of the receiving water.

6. The wastes discharged shall not contain biostimulatory substances in concentrations that promote aquatic growth to the extent that such growth causes nuisance or adversely affects beneficial uses of the receiving waters.

7. The wastes discharged shall not cause the receiving waters to contain any substance in concentrations that adversely affect any designated beneficial use.

8. The wastes discharged shall not degrade surface water communities and populations, including vertebrate, invertebrate, and plant species.

9. The wastes discharged shall not result in problems due to breeding of mosquitos, gnats, black flies, midges, or other pests.

10. The wastes discharged shall not result in visible floating particulates, foams, and oil and grease in the receiving water.

11. The wastes discharged shall not contain any individual pesticide or combination of pesticides in concentrations that adversely affect beneficial uses of the receiving waters. The wastes discharged shall not cause a significant increase in pesticide concentration found in bottom sediments or aquatic life.

12. The wastes discharged shall not alter the natural taste, odor, and color of fish, shellfish, or other surface water resources used for human consumption.

13. In order to protect aquatic life, ammonia in receiving water shall not exceed concentrations specified in Tables 3-2 and 3-4 of the Basin Plan (Attachment 2) as a result of the wastes discharged, subject to the following conditions:

The Discharger will have up to 8 years following the adoption of the Basin Plan (i) to make the necessary adjustments/improvements to meet these objectives; or (ii) to conduct studies leading to an approved, less restrictive, site specific objective for ammonia. If it is determined that there is an immediate threat or impairment of beneficial uses due to ammonia, the objectives in Tables 3-2 and 3-4 of Attachment 2 shall apply and the timing of compliance will be determined on a case-by-case basis.

14. In order to protect underlying groundwater basins, ammonia shall not be present at levels that, when oxidized, to nitrate, pose a threat to groundwater.

B. Receiving Water Quality Objective

There shall be no chronic toxicity in ambient waters as a result of wastes discharged.

If the chronic toxicity in the receiving water downstream of the discharge point consistently exceeds 1.0 TU_c in a critical life stage test, the Discharger shall determine if the cause of the exceedance is the wastes discharged. If it is determined that the wastes discharged caused the exceedance, the Discharger shall conduct a toxicity identification evaluation (TIE). The TIE shall include all reasonable steps to identify the sources of toxicity. Once the sources are identified, the Discharger shall take all reasonable steps to reduce toxicity to meet the objective.

IV. SLUDGE REQUIREMENTS

For biosolids management, the Discharger must comply with all requirements of 40 CFR Parts 257, 258, 501, and 503, including all monitoring, recordkeeping, and reporting requirements.

Since the State of California, hence the Regional Board, has not been delegated the authority to implement the sludge program, enforcement of the sludge requirements contained in this Order and permit shall be the sole responsibility of ISOPIA.

V. PRETREATMENT REQUIREMENTS

1. This Order includes the discharger's pretreatment program as previously submitted to this Regional Board. Any change to the program shall be reported to the Regional Board and ISOPIA in writing and shall not become effective until approved by the Executive Officer and the ISOPIA Regional Administrator.

2. The Discharger shall implement and enforce its approved pretreatment program. The Discharger shall be responsible and liable for the performance of all pretreatment requirements contained in Federal Regulations 40 CFR Part 403 including subsequent regulatory revisions thereof. Where Part 403 or subsequent revision places mandatory actions upon the Districts as Control Authority but does not specify a timetable for completion of the actions, the Discharger shall complete the required actions within six months from the effective date of this Order or the effective date of Part 403 revisions, whichever comes later. For violations of pretreatment requirements, the Discharger shall be subject to enforcement actions, penalties, fines, and other remedies by the Regional Board, ISOPIA, or other appropriate parties, as provided in the Clean Water Act. The Regional Board or ISOPIA may initiate enforcement action against an industrial user for non-compliance with acceptable standards and requirements as provided in the Clean Water Act and/or the California Water Code.

3. The Discharger shall enforce the requirements promulgated under Sections 307(b), 307(c), 307(d), and 402(b) of the Federal Clean Water Act. The discharger shall cause industrial users subject to the Federal Categorical Standards to achieve compliance no later than the date specified in those requirements or, in the case of a new industrial user, upon commencement of the discharge.

4. The Discharger shall perform the pretreatment functions as required in Federal Regulations 40 CFR Part 403 including, but not limited to:

   a. Implement the necessary legal authorities as provided in 40 CFR 403.8(f)(1);

   b. Enforce the pretreatment requirements under 40 CFR 403.5 and 403.6;

   c. Implement the programmatic functions as provided in 40 CFR 403.8(f)(2); and

d. Provide the requisite funding of personnel to implement the pretreatment program as provided in 40 CFR 403.8(f)(3).

5. The Discharger shall submit annually a report to the Regional Board, the State Board, and the Environmental Protection Agency, Region 9, describing the discharger's pretreatment activities over the previous twelve months. In the event the discharger is not in compliance with any conditions or requirements of this permit, then the discharger will also include the reasons for non-compliance and state how and when the discharger shall comply with such conditions and requirements. This annual report is due on March 1 of each year and shall contain, but not be limited to, the information required in the attached "Requirements for Pretreatment Annual Report." (Attachment 3), or any approved revised version thereof.

VI. REQUIREMENTS AND PROVISIONS

1. Discharge of wastes to any point other than specifically described in this Order and permit is prohibited and constitutes a violation thereof.

2. The Discharger shall comply with all applicable effluent limitations, national standards of performance, toxic and pretreatment effluent standards, and all federal regulations established pursuant to Sections 301, 302, 303(d), 304, 306, 307, 316 and 405 of the Clean Water Act and amendments thereto.

3. This Order includes the attached Monitoring and Reporting Program (Attachment T). If there is any conflict between provisions stated in the Monitoring and Reporting Program and the Standard Provisions, those provisions stated in the Monitoring and Reporting Program prevail.

4. This Order includes the attached "Standard Provisions and General Monitoring and Reporting Requirements" (Standard Provisions, Attachment N). If there is any conflict between provisions stated hereinbefore and the attached "Standard Provisions", those provisions attached hereinbefore prevail.

5. This Order includes the attached "Storm Water Pollution Prevention Plan" (Attachment A).

6. The Discharger shall provide standby or emergency power facilities and/or storage capacity or other means so that in the event of plant upset or outage due to power failure or other cause, discharge of raw or inadequately treated sewage does not occur.

7. The Discharger shall protect the facility from inundation which could occur as a result of a flood having a predicted frequency of once in 100 years.

8. This Order may be modified, revoked, and reissued or terminated in accordance with the provisions of 40 CFR Parts 122.44, 122.62, 122.63, 122.64, 125.62, and 125.64.

VII. EXPIRATION DATE

This Order expires on May 10, 2001.

The Discharger must file a Report of Waste Discharge in accordance with Title 23, California Code of Regulations, not later than 180 days in advance of the expiration date as application for issuance of new waste discharge requirements.

VIII. RESCISSION

Order No. 90-057, adopted by this Board on May 21, 1990, is hereby rescinded.

I, Robert P. Ghirelli, Executive Officer, do hereby certify that the foregoing is a full, true and correct copy of an Order adopted by the California Regional Water Quality Control Board, Los Angeles Region on June 10, 1996.

Robert P. Ghirelli

ROBERT P. GHIRELLI, D.Env.
Executive Officer

/ AVC-A

FIGURE 1

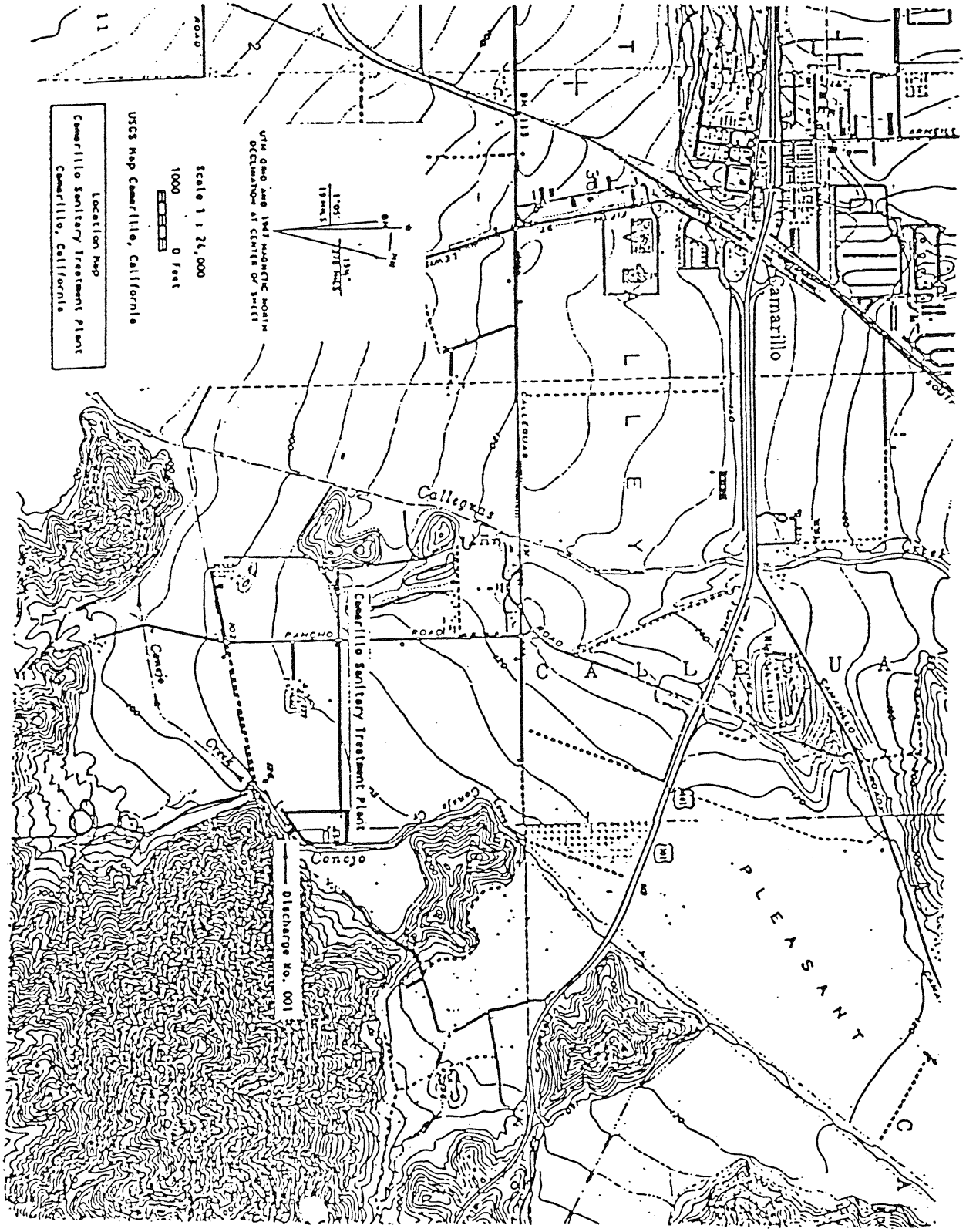
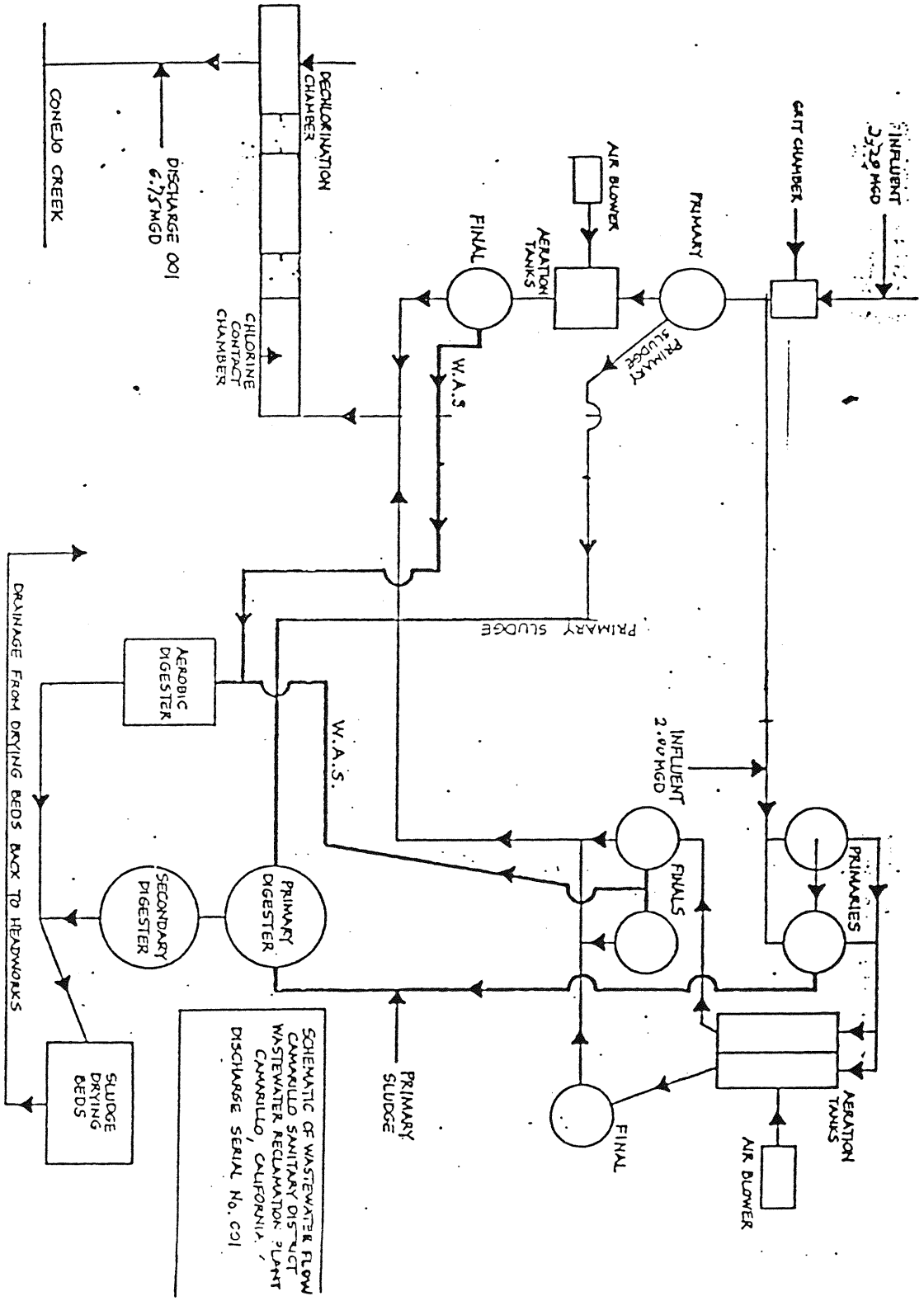

Location Map
Camarillo Sanitary Treatment Plant
Camarillo, California
USGS Map Camarillo, California
Scale 1 : 24,000
1000 0 Feet
Camarillo
Calleguas
Camarillo Sanitary Treatment Plant
Conejo
Discharge No. 001
PLEASANT
CALLEGUAS

FIGURE 2


INFLUENT
GRIT CHAMBER
AIR BLOWER
PRIMARY
AERATION TANKS
FINAL
W.A.S.
PRIMARY SLUDGE
CHLORINE CONTACT CHAMBER
DECHLORINATION CHAMBER
DISCHARGE 001
CONEJO CREEK
PRIMARY SLUDGE
AEROBIC DIGESTER
W.A.S.
INFLUENT
FINALS
PRIMARIES
SECONDARY DIGESTER
PRIMARY DIGESTER
DRAINAGE FROM DRYING BEDS BACK TO HEADWORKS
SLUDGE DRYING BEDS
PRIMARY SLUDGE
FINAL
AERATION TANKS
AIR BLOWER
SCHEMATIC OF WASTEWATER FLOW
CAMARILLO SANITARY DISTRICT
WASTEWATER RECLAMATION PLANT
CAMARILLO, CALIFORNIA
DISCHARGE SERIAL No. 001

ATTACHMENT T

State of California
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LOS ANGELES REGION

MONITORING AND REPORTING PROGRAM NO. CI - 1278
FOR
CAMARILLO SANITARY DISTRICT
(NPDES NO. CA0053597)

I. REPORTING REQUIREMENTS

The Discharger shall implement this monitoring program on the effective date of this Order. All monthly monitoring reports shall be submitted by the fifteenth day of the second month following each monthly sampling period, addressed to the Regional Board, Attention: Technical Support Unit. The first monitoring report under this Program is due by September 15, 1996, and will cover the monitoring period of July 1996. Weekly effluent analyses shall be performed on different weekdays during each month. Quarterly monitoring shall be performed during the months of February, May, August, and November. Semiannual monitoring shall be performed during the months of February and August. Annual monitoring shall be performed during the month of August.

The analysis shall specify the USEPA analytical method used and its Method Detection Limit (MDL). For the purpose of reporting compliance with effluent limitations, performance goals, receiving water limitations, analytical data shall be reported with an actual numerical value or "nondetected (ND)" with the MDL indicated for the analytical method used. The maximum allowed MDLs are those published by the USEPA (MDLs for priority pollutants are listed in Attachment 1). The Discharger shall not use a MDL higher than that published by the USEPA unless the Discharger can demonstrate that a practical detection limit is not attainable and obtains approval for a higher MDL from the Executive Officer.

The Discharger shall submit an annual report containing a discussion of the previous year's effluent and receiving water monitoring data, as well as graphical and tabular summaries of the data. This annual report is due by April 1st of the year following data collection.

The Discharger shall inform the Regional Board well in advance of any construction activity proposed that can potentially affect compliance with applicable requirements.

II. REGIONAL MONITORING PROGRAM

1. Pursuant to the Code of Federal Regulations [40 CFR §122.41 (j) and §122.48 (b)], the monitoring program for a discharger receiving a National Pollutant

Discharge Elimination System (NPDES) permit must determine compliance with NPDES permit terms and conditions, and demonstrate that State water quality standards are met.

2. Since compliance monitoring focuses on the effects of the point source discharge, it is not designed to assess impacts from other sources of pollution (e.g.non-point source runoff, aerial fallout) nor to evaluate the current status of important ecological resources on a regional basis.

3. A watershed-wide Regional Monitoring Program will be created for the Calleguas Creek Watershed to determine: compliance with effluent and receiving water limits, trends in surface water quality, impacts to beneficial uses, data needs for modeling contaminants of concern, and potential impacts to ground water.

4. The Discharger will participate in the Regional Monitoring Program by monitoring receiving water stations listed in Section V.A. and taking part in a watershed-wide quality control program.

III. INFLUENT MONITORING

(Footnotes on pages T-7 to T-9)

Influent monitoring is required to:

- determine compliance with NPDES permit conditions and water quality standards.
- assess treatment plant performance.
- assess the effectiveness of the pretreatment program.

Sampling stations shall be established at each point of inflow to the sewage treatment plant and shall be located upstream of any in-plant return flows and where representative samples of the influent can be obtained. The date and time of sampling shall be reported with the analytical values determined.

Samples for influent BOD_5 (20°C) and suspended solids shall be obtained on the same day that effluent BOD_5 (20°C) and suspended solids samples are obtained in order to demonstrate percent removal.

The following shall constitute the influent monitoring program:

Constituent	Units	Type of Sample	Minimum Frequency of Analysis
Flow	mgd	recorder/totalizer	daily
Suspended solids	mg/L	24-hour composite	weekly
BOD_5 (20°C)	mg/L	24-hour composite	weekly
Chloride	mg/L	24-hour composite	semiannually
Chromium[2]	µg/L	24-hour composite	semiannually

Additionally, all monitoring under the approved pretreatment program, as previously submitted to this Regional Board, shall remain in force.

IV. EFFLUENT MONITORING

(Footnotes on pages T-7 to T-9)

Effluent monitoring is required to:

- determine compliance with NPDES permit conditions.
- identify operational problems and improve plant performance.
- assess the effectiveness of the pretreatment program.
- provide information on wastewater characteristics and flows for use in interpreting water quality and biological data.

An effluent sampling station shall be established for each point of discharge and shall be located downstream of any in-plant return flows where representative samples of the effluent (after receiving all treatment) may be obtained. Effluent samples may be obtained at a single station provided that station is representative of the effluent quality at all discharge points. Any changes in sampling station locations shall be approved by the Executive Officer.

The following shall constitute the effluent monitoring program:

Constituent	Unit	Type of Sample	Minimum Frequency of Analysis
Total waste flow	mgd	recorder	continuous[1]
Turbidity[3]	NTU	recorder	continuous[1]
Total residual chlorine	mg/L	recorder	continuous[1]
Total coliform[3]	MPN/100 mL	grab	daily
Suspended solids	mg/L	24-hour composite	weekly
Temperature	°F	grab	weekly
pH	pH units	grab	weekly
Settleable solids	mL/L	grab	weekly
BOD_5 (20°C)	mg/L	24-hour composite	weekly[4]
Dissolved oxygen	mg/L	24-hour composite	weekly
Total dissolved solids	mg/L	24-hour composite	monthly
Sulfate	mg/L	24-hour composite	monthly
Chloride	mg/L	24-hour composite	monthly
Ammonia Nitrogen	mg/L	24-hour composite	monthly
Nitrate Nitrogen	mg/L	24-hour composite	monthly
Nitrite Nitrogen	mg/L	24-hour composite	monthly
Organic Nitrogen	mg/L	24-hour composite	monthly
Total Nitrogen	mg/L	24-hour composite	monthly
Total phosphate	mg/L	24-hour composite	monthly

Constituent	Unit	Type of Sample	Minimum Frequency of Analysis
Boron	mg/L	24-hour composite	monthly
Oil and grease	mg/L	grab	quarterly
Chronic toxicity[5]	TU_c	24-hour composite	quarterly
Acute Toxicity[11]	% Survival	24-hour composite	quarterly

Additionally, all monitoring under the approved pretreatment program, as previously submitted to this Regional Board, shall remain in force.

V. RECEIVING WATER MONITORING REQUIREMENTS

(Footnotes on pages T-7 through T-9)

A. Receiving water stations shall be established at the following locations:

Station No.	Description
W-15	Calleguas Creek, immediately downstream of its confluence with Conejo Creek (approximately Latitude 34° 11' 23", Longitude 119° 01' 06").
W-16	Conejo Creek, downstream of its intersection with Santa Rosa Road, approximately 2 miles upstream of intersection with Hwy 101 [Near Camrosa Water District Headquarters], (approximately Latitude 34° 13' 23", Longitude 118° 58' 48").

LOCATION WAS CHANGED TO END OF ADOLFO RD.

B. The following shall constitute the receiving water monitoring program:

1. The following analyses shall be conducted on samples obtained at Stations W-15 and W-16:

Constituent	Units	Minimum Frequency of Analysis
Flow	cfs	monthly
Temperature	°F	monthly
pH	pH units	monthly
BOD_5 (20°C)	mg/L	monthly
Dissolved oxygen	mg/L	monthly
Chloride	mg/L	monthly
Turbidity	NTU	monthly
Residual chlorine	mg/L	monthly
Total coliform	MPN/100 mL	monthly
Settleable solids	mL/L	monthly
Nitrate nitrogen	mg/L	monthly
Nitrite nitrogen	mg/L	monthly
Ammonia nitrogen	mg/L	monthly

Constituent	Units	Minimum Frequency of Analysis
Organic nitrogen	mg/L	monthly
Total nitrogen	mg/L	monthly
Total Surfactants	mg/L	quarterly
Total phosphate	mg/L	quarterly
Suspended solids	mg/L	quarterly
Total dissolved solids	mg/L	quarterly
Oil and Grease	mg/L	quarterly
Sulfate	mg/L	quarterly
Boron	mg/L	quarterly
Hardness	mg/L	quarterly
Chronic toxicity[5]	TU_c	quarterly
Arsenic	mg/L	semi-annually
Cadmium	mg/L	semi-annually
Chromium	mg/L	semi-annually
Copper	mg/L	semi-annually
Nickel	mg/L	semi-annually
Lead	mg/L	semi-annually
Zinc	mg/L	semi-annually
Chlorinated Pesticides	mg/L	semi-annually
N and P Pesticides	mg/L	semi-annually
BNA	mg/L	semi-annually
Total Petroleum Hydrocarbon	μg/L	semi-annually

2. In the event of a spill or bypass of raw or partially treated sewage into Arroyo Conejo, total and fecal coliform analyses shall be made on grab samples collected at all potentially affected downstream receiving water area and at least one unaffected upstream receiving water area. Coliform samples shall be collected on the date of the spill or bypass, if possible, and daily on each of the following four days.

3. At the time of sampling, the following observations shall be made at all the stations and the times of the observations shall be noted:

    a) Measurement of flow
    b) Odor of water
    c) Color of Water
    d) Occurrence of significant storm runoff (flowing into the river)
    e) Presence of floating solids (Type)
    f) Presence of any sludge banks or deposits, grease, oil, foam, or visible solids of waste origin
    g) Wind conditions
    h) Presence of any aquatic plant growth, sessile or floating
    i) Any unusual occurrence

4. The time, date, and weather conditions (including air temperature) at the time of sampling shall be reported.

5. The color of the effluent shall be contrasted with that of the receiving water and reported descriptively.

6. Sampling may be rescheduled at stations W-15 and W-16, if weather and flow conditions would endanger personnel collecting receiving water samples. The monthly monitoring report shall note such occasions.

7. The results of receiving water monitoring and observations shall be submitted with the effluent monitoring reports. A standardized receiving water observation form is under development by the Regional Board staff.

VI. GROUNDWATER MONITORING

amended by Ltr. of 3/6/98 - see following sheet

The Discharger shall determine the areas of gain and loss to the groundwater aquifer from the point of discharge to the Calleguas Creek Estuary within two years from the date of permit issuance.

VII. STORM WATER MONITORING AND REPORTING

Upon adoption of this Monitoring and Reporting Program, the Discharger shall file a notice of termination (NOT) with State Board, for the General Storm Water NPDES permit associated with industrial activity, since such requirements have been incorporated into this Order. The Discharger shall implement the attached Storm Water Monitoring and Reporting Program (Attachment T-2).

VIII. COMPLIANCE WITH DAILY AVERAGE, INSTANTANEOUS MAXIMUM, AND 30-DAY AVERAGE LIMITS

A. If the result of any analysis exceeds the 30-day average limit, the frequency of analysis shall be increased to weekly within one week of knowledge of the test result. Weekly testing shall continue for at least 4 consecutive weeks and until compliance with the 30-day average limit is demonstrated, after which the frequency shall revert to as previously designated.

B. If the result of any analysis exceeds the daily average limit, the frequency of analysis shall be increased to daily within one week of knowledge of the test result. Daily testing shall continue for at least 4 consecutive days and until compliance with the daily average or instantaneous maximum limit is demonstrated, after which the frequency shall revert to as previously designated.

4. The time, date, and weather conditions (including air temperature) at the time of sampling shall be reported.

5. The color of the effluent shall be contrasted with that of the receiving water and reported descriptively.

6. Sampling may be rescheduled at stations W-15 and W-16, if weather and flow conditions would endanger personnel collecting receiving water samples. The monthly monitoring report shall note such occasions.

7. The results of receiving water monitoring and observations shall be submitted with the effluent monitoring reports. A standardized receiving water observation form is under development by the Regional Board staff.

VI. GROUNDWATER MONITORING

The Discharger shall determine the areas of gain and loss to the groundwater aquifer from the point of discharge to the Calleguas Creek Estuary. This shall be accomplished as part of the Groundwater Element of the Calleguas Creek Characterization Study (CCCS) and shall be completed by May 1, 2000. (amended 3/6/98.)

VII. STORM WATER MONITORING AND REPORTING

Upon adoption of this Monitoring and Reporting Program, the Discharger shall file a notice of termination (NOT) with State Board, for the General Storm Water NPDES permit associated with industrial activity, since such requirements have been incorporated into this Order. The Discharger shall implement the attached Storm Water Monitoring and Reporting Program (Attachment T-2).

VIII. COMPLIANCE WITH DAILY AVERAGE, INSTANTANEOUS MAXIMUM, AND 30-DAY AVERAGE LIMITS

A. If the result of any analysis exceeds the 30-day average limit, the frequency of analysis shall be increased to weekly within one week of knowledge of the test result. Weekly testing shall continue for at least 4 consecutive weeks and until compliance with the 30-day average limit is demonstrated, after which the frequency shall revert to as previously designated.

B. If the result of any analysis exceeds the daily average limit, the frequency of analysis shall be increased to daily within one week of knowledge of the test result. Daily testing shall continue for at least 4 consecutive days and until compliance with the daily average or instantaneous maximum limit is demonstrated, after which the frequency shall revert to as previously designated.

IX. QUALITY CONTROL PROGRAM

This Discharger, in cooperation with the other discharger in the watershed, shall develop and submit a quality control program for approval by the Executive Officer no later than six months from the date of permit issuance. The program shall be implemented no later than one year from the date of permit issuance.

X. HAULING REPORTS

In the event that other wastes (besides sludge) associated with wastewater treatment are transported offsite during the reporting period, the following shall be reported:

1) Type(s) of waste and quantity of each type;
2) Name and either the address or the State registration number for each hauler of wastes used (or the method of transport, if other than hauling); and,
3) Address or specific location of the final point(s) of deposal for each type of waste.

If no wastes are transported offsite during the reporting period, a statement to that effect shall be submitted.

XI. FOOTNOTES

1/ Where continuous monitoring of a constituent is required, the following shall be reported:

Total waste flow - Total daily flow and peak daily flow (24-hour basis);

Total chlorine residual - maximum daily value (24-hour basis);

Turbidity - maximum daily value, total amount of time each day that turbidity exceeded five (5) turbidity units, the flow-proportioned average daily value and the monthly mean value.

2/ For Cr(VI) analysis, the appropriate sampling and analytical method must be used.

3/ Coliform and turbidity samples shall be obtained at some point in the treatment process at a time when wastewater flow and characteristics are most demanding on the treatment facilities, filtration, and disinfection procedures.

4/ If any result of weekly BOD analysis yields 90% or greater of the 30-day average limit, the frequency of analyses shall be increased to daily within one week of knowledge of the test result for at least one month and compliance with the 7-day and 30-day average BOD limits is demonstrated; after which the frequency shall revert to weekly.

5/ Initial screening shall be conducted using a minimum of three test species with approved test protocols to determine the most sensitive test organism for chronic toxicity testing. The initial screening process shall be conducted for a minimum of three months, but not to exceed five months, to account for potential variability of the effluent/ receiving water. If possible, the test species used during the screening process should include a fish, an invertebrate, and an aquatic plant.

Upon approval of the Executive Officer, and after the initial screening period, chronic toxicity testing may be limited to the most sensitive test species. However, the initial screening process shall be repeated annually, with a minimum of three test species with approved test protocols, to ensure use of the most sensitive species for chronic toxicity testing.

Dilution and control waters for the effluent should be obtained from an unaffected area of the receiving waters. Standard dilution water may be used if the above source exhibits toxicity greater than 1.0 TU_c. The sensitivity of the test organisms to a reference toxicant shall be determined concurrently with each batch of bioassay tests and reported with the test results.

Chronic Toxicity shall be expressed and reported as toxic units, where:

$$TU_c = 100/NOEC$$

The No Observable Effect Concentration (NOEC) is expressed as the maximum percent effluent/ receiving water that causes no observable effect on a test organism, as determined by the result of a critical life stage toxicity test.

Except with prior approval from the Regional Board Executive Officer, ammonia shall not be removed from bioassay samples. The wastewater used for the toxicity test shall be analyzed for ammonia, and the result, along with an interpretation, shall be submitted with the toxicity data. If the test result is greater than the permit limitation, parallel tests or 100% effluent without ammonia removal and 100% effluent with ammonia removed shall be conducted.

6/ By methods specified in "Methods for Measuring the Acute Toxicity of Effluent to Freshwater and Marine Organisms" (March 1985, EPA/600/4-85/013). Submission of bioassay results should include the information noted on pages 45 through 49 of the "Methods" where appropriate. The fathead minnow (Pimephales promelas) shall be used as the test species.

Except with prior approval from the Regional Board Executive Officer, ammonia shall not be removed from bioassay samples. The wastewater used for the toxicity test shall be analyzed for ammonia, and the result, along with an interpretation, shall be submitted with the toxicity data. If the test result is greater than the permit limitation, parallel tests or 100% effluent without ammonia removal and 100% effluent with ammonia removed shall be conducted.

7/ Samples for the receiving water nitrogen series (nitrite, nitrate, ammonia-N, and organic nitrogen) shall be obtained at the same time that temperature and pH are recorded in order to calculate unionized ammonia.

Ordered by: Robert P. Ghirelli
ROBERT P. GHIRELLI, D.Env.
Executive Officer

Date: June 10, 1996
/AVC-A

ATTACHMENT 1

USEPA METHOD DETECTION LIMIT

USEPA PRIORITY POLLUTANTS (µg/l)	EPA	
	METHOD	MDL
VOLATILE COMPOUNDS		
Acrolein	603	0.6
Acrylonitrile	603	0.5
Benzene	602	0.2
Bromoform	601	0.2
Bromodichloromethane	601	0.1
Carbon Tetrachloride	601	0.12
Chlorobenzene	602	0.2
Chlorodibromomethane	601	0.09
Chloroethane	601	0.52
Chloroform	601	0.05
Chloromethane	601	0.08
Dibromochloromethane	601	0.09
Dichlorobromomethane	601	0.09
Ethylbenzene	602	0.2
Methylene Chloride	601	0.25
Methyl Bromide	601	1.15
Methyl Chloride	601	0.08
Tetrachloroethylene	601	0.03
Toluene	602	0.2
Trichloroethylene	601	0.12
Vinyl Chloride	601	0.18
1,1-Dichloroethane	601	0.07
1,1-Dichloroethylene	601	0.13
1,1,1-Trichloroethane	601	0.03
1,1,2-Trichloroethane	601	0.02
1,1,2,2-Tetrachloroethane	601	0.03
1,2-Dichloroethane	601	0.03
1,2-Dichloropropane	601	0.04
1,2-Trans-Dichloroethylene	601	0.1
1,3-Dichloropropylene	601	0.34
2-Chloroethylvinyl Ether	601	0.13
ACID COMPOUNDS		
2-Chlorophenol	625	3.3
P-Chloro-M-Cresol		
Pentachlorophenol	625	3.6
Phenol	625	1.5
2-Nitrophenol	625	3.6
2,4-Dichlorophenol	625	2.7
2,4-Dimethylphenol	625	2.7
2,4-Dinitrophenol	625	42
2,4,6-Trichlorophenol	625	2.7
4-Nitrophenol	625	2.4
4,6-Dinitro-O-Cresol		

USEPA PRIORITY POLLUTANTS (µg/l)	EPA	
	METHOD	MDL
4,6-Dinitro-2-Methylphenol	625	24
4-Methylphenol (p-cresol)		
3-Methyl-4-Chlorophenol	625	3
BASE/NEUTRAL COMPOUNDS		
Acenaphthene	625	1.9
Benzidine	625	4.4
Bis(2-Chloroethoxy)Methane	625	5.3
Bis(2-Chloroethyl)Ether	625	5.7
Bis(2-Chloroisopropyl)Ether	625	5.7
Bis(2-Ethylhexyl)Phthalate	625	2.5
Bis(Chloromethyl)Ether		
Butyl Benzyl Phthalate	625	2.5
Diethyl Phthalate	625	2.2
Dimethyl Phthalate	625	1.6
Di-N-Butyl Phthalate	625	2.5
Di-N-Octyl Phthalate	625	2.5
Fluoranthene	625	2.2
Hexachlorobenzene	625	1.9
Hexachlorobutadiene	625	0.9
Hexachlorocyclopentadiene		
Hexachloroethane	625	1.6
Isophorone	625	2.2
Naphthalene	625	1.6
Nitrobenzene	625	1.9
N-Nitrosodimethylamine	625	0.15
N-Nitrosodi-N-Propylamine		
N-Nitrosodiphenylamine	625	1.9
Total PAHS		
Acenaphthylene	625	1.9
Anthracene	625	1.9
Benzo(A)Anthracene	625	7.8
Dibenzo(A,H)Anthracene	625	2.5
Benzo(B)Fluoranthene	625	4.8
Benzo(K)Fluoranthene	625	2.5
Benzo(GHI)Perylene	625	4.1
Benzo(A)Pyrene	625	2.5
Chrysene	625	2.5
Fluorene	625	1.9
Indeno(1,2,3-CD)Pyrene	625	3.7
Phenanthrene	625	5.4
Pyrene	625	1.9
1,2-Dichlorobenzene	625	1.9
1,2-Diphenylhydrazine		
1,2,4-Trichlorobenzene	625	1.9
1,3-Dichlorobenzene	625	1.9
1,4-Dichlorobenzene	625	4.4
2-Chloronaphthalene	625	1.9
2,4-Dinitrotoluene	625	5.7
2,6-Dinitrotoluene	625	1.9

TOXICS-PRIORITY POLLUTANTS (µg/l)	EPA	
	METHOD	MDL
3,3-Dichlorobenzidine	625	16.5
4-BromoPhenyl Phenyl Ether	625	1.9
4-ChloroPhenyl Phenyl Ether	625	4.2
PESTICIDES AND PCBs		
4,4'-DDD	625	2.8
4,4'-DDE	625	5.6
4,4'-DDT	625	4.7
Aldrin	608	0.004
Alpha-BHC	608	0.003
Alpha-Endosulfan	608	0.014
Beta-BHC	608	0.006
Beta-Endosulfan	608	0.004
Chlordane	608	0.014
Delta-BHC	608	0.009
Dieldrin	608	0.002
Endosulfan Sulfate	608	0.066
Endrin	608	0.006
Endrin Aldehyde	608	0.023
Gamma-BHC (Lindane)	608	0.004
Heptachlor	608	0.003
Heptachlor Epoxide	608	0.083
Total PCBs	608	65
PCB-1016		
PCB-1221		
PCB-1232		
PCB-1242	608	0.065
PCB-1248		
PCB-1254		
PCB-1260		
Toxaphene	608	240
METALS AND CYANIDE		
Antimony	7062	1
Arsenic	3114B	2
Barium	208.2	2
Berrylium	210.2	0.2
Cadmium	200.7	4
Chromium	200.7	7
Cobalt	219.2	1
Copper	200.7	6
Lead	239.1	100
Mercury	245.1	0.2
Nickel	200.7	15
Selenium	3114B	2
Silver	272.1	0.2
Thallium	279.2	1
Zinc	200.7	2
Cyanide		

USEPA PRIORITY POLLUTANTS (µg/l)	EPA	
	METHOD	MDL
MISCELLANEOUS		
2,3,7,8-Tetrachlorodibenzo-P-Dioxin		
Asbestos		
Ethylene Dibromide		
1,2-Dibromo-3-Chloropropane		
2,4,5-TP		
Simazine		
2,4-D		
Methoxychlor		
1,1,2-Trichloro-1,2,2-Trifluroethane		
Trichlorofluromethane		
Xylene		
Bentazon		
Carbofuran		
Barium		
Molinate		
Atrazine		
Monochlorobenzene		
1,2-Cis-Dichloroethylene		
Thiobencarb		
Glyphosate		
Acetone		
Molybdenum	246.2	1
Vanadium	286.2	4
Aluminum	202.2	3

Table 3-2. One-hour Average Concentration for Ammonia[1,2] for Waters Designated as WARM (Salmonids or Other Sensitive Coldwater Species Absent).

pH	Temperature, -C				
	0	5	10	15	20
Un-Ionized ammonia (mg/liter NH_3)					
6.50	0.0091	0.0129	0.0182	0.026	0.036
6.75	0.0149	0.021	0.030	0.042	0.059
7.00	0.023	0.033	0.046	0.066	0.093
7.25	0.034	0.048	0.068	0.095	0.135
7.50	0.045	0.064	0.091	0.128	0.181
7.75	0.056	0.080	0.113	0.159	0.22
8.00	0.065	0.092	0.130	0.184	0.26
8.25	0.065	0.092	0.130	0.184	0.26
8.50	0.065	0.092	0.130	0.184	0.26
8.75	0.065	0.092	0.130	0.184	0.26
9.00	0.065	0.092	0.130	0.184	0.26
Total ammonia (mg/liter NH_3)					
6.50	35	33	31	30	29
6.75	32	30	28	27	27
7.00	28	26	25	24	23
7.25	23	22	20	19.7	19.2
7.50	17.4	16.3	15.5	14.9	14.6
7.75	12.2	11.4	10.9	10.5	10.3
8.00	8.0	7.5	7.1	6.9	6.8
8.25	4.5	4.2	4.1	4.0	3.9
8.50	2.6	2.4	2.3	2.3	2.3
8.75	1.47	1.40	1.37	1.38	1.42
9.00	0.86	0.83	0.83	0.86	0.91

1 To convert these values to mg/liter N, multiply by 0.822 .

2 Source: USEPA, 1986

Table 3-4. Four-day Average Concentration for Ammonia[1,2] for Waters Designated as WARM (Salmonids or Other Sensitive Coldwater Species Absent).

pH	Temperature, °C						
	0	5	10	15	20	25	30
Un-Ionized ammonia (mg/liter NH_3)							
6.50	0.0008	0.0011	0.0016	0.0022	0.0031	0.0031	0.0031
6.75	0.0014	0.0020	0.0028	0.0039	0.0055	0.0055	0.0055
7.00	0.0025	0.0035	0.0049	0.0070	0.0099	0.0099	0.0099
7.25	0.0044	0.0062	0.0088	0.0124	0.0175	0.0175	0.0175
7.00	0.0078	0.0111	0.0156	0.022	0.031	0031	0.031
7.75	0.0129	0.0182	0.026	0.036	0.051	0.051	0.051
8.00	0.0149	0.021	0.030	0.042	0.059	0.059	0.059
8.25	0.0149	0.021	0.030	0.042	0.059	0.059	0.059
8.50	0.0149	0.021	0.030	0.042	0.059	0.059	0.059
8.75	0.0149	0.021	0.030	0.042	0.059	0.059	0.059
9.00	0.0149	0.021	0.030	0.042	0.059	0.059	0.059
Total ammonia (mg/liter NH_3)							
6.50	3.0	2.8	2.7	2.5	2.5	1.73	1.23
6.75	3.0	2.8	2.7	2.6	2.5	1.74	1.23
7.00	3.0	2.8	2.7	2.6	2.5	1.74	1.23
7.25	3.0	2.8	2.7	2.6	2.5	1.75	1.24
7.50	3.0	2.8	2.7	2.6	2.5	1.76	1.25
7.75	2.8	2.6	2.5	2.4	2.3	1.65	1.18
8.00	1.82	1.70	1.62	1.57	1.55	1.10	0.79
8.25	1.03	0.97	0.93	0.90	0.90	0.64	0.47
8.50	0.58	0.55	0.53	0.53	0.53	0.39	0.29
8.75	0.34	0.32	0.31	0.31	0.32	0.24	0.190
9.00	0.195	0.189	0.189	0.195	0.21	0.163	0.133

1 To convert these values to mg/liter N, multiply by 0.822.

2 Source: USEPA, 1992

ATTACHMENT A

STORM WATER POLLUTION PREVENTION PLAN

1. The discharger shall develop and implement a storm water pollution prevention plan (SWPPP) within 60 days of the Waste Discharge Requirements Order date. The SWPPP shall be designed to comply with BAT/BCT and be certified in accordance with the signatory requirements of Standard Provision B.17. A copy of the SWPPP shall be retained onsite and made available upon request of a representative of the Regional Board and/or local stormwater management agency (local agency) which receives the storm water discharge.

2. The Regional Board and/or local agency may notify the discharger when the SWPPP does not meet one or more of the minimum requirements. Within 30 days of notice, the discharger shall submit a time schedule to the Regional Board and/or local agency in which the changes will be made to meet the minimum requirements. After making the required changes, the discharger shall provide written certification that the changes have been made.

3. The discharger shall amend the SWPPP whenever there is a change in construction, operation, and/or maintenance which may effect the discharge of significant quantities of pollutants to surface water, ground waters, and/or the local agency's storm drain system. The SWPPP should also be amended if it has not achieved the general objectives of controlling pollutants in stormwater discharges.

4. The SWPPP shall provide a description of potential sources which may be expected to add significant quantities of pollutants to storm water discharges, or which may result in non-storm water discharges from the facility. The SWPPP shall include, at a minimum, the following items:

   a. A topographic map (or other map if a topographic map is unavailable), extending one-quarter mile beyond the property boundaries of the facility, showing: the facility, surface water bodies (including springs and wells), and the discharge point where the facility's storm water discharges to a municipal storm drain system or other water body. The requirements of this paragraph may be included in the site map required under the following paragraph if appropriate.

b. A site map showing:

i. The storm water conveyance and discharge structures;

ii. An outline of the storm water drainage areas for each storm water discharge point;

iii. Paved areas and buildings;

iv. Areas of pollutant contact, actual or potential;

v. Location of existing storm water structural control measures (i.e., berms, coverings, etc.);

vi. Surface water locations;

vii. Areas of existing and potential soil erosion; and,

viii. Vehicle service areas.

c. A narrative description of the following:

i. Significant materials that have been treated, stored, disposed, spilled, or leaked in significant quantities in storm water discharge after November 19, 1988;

ii. Materials, equipment, and vehicle management practices employed to minimize contact of significant materials with storm water discharge;

iii. Material loading, unloading, and access areas;

iv. Existing structural and non-structural control measures (if any) to reduce pollutants in storm water discharge;

v. Industrial storm water discharge treatment facilities (if any);

vi. Methods of onsite storage and disposal of significant materials;

vii. Outdoor storage, manufacturing, and processing activities including activities that generate significant quantities of dust or particulates.

d. A list of pollutants that have a reasonable potential to be present in storm water discharge in significant quantities, and an estimate of the annual quantities of these pollutants in storm water discharge.

e. An estimate of the size of the facility (in acres or square feet), and the percent of the facility that has impervious areas (i.e., pavement, buildings, etc.).

f. A list of significant spills or leaks of toxic or hazardous pollutants to storm water that have occurred after November 19, 1988. This shall include:

i. Toxic chemicals (listed in 40 CFR 372) that have been discharged to storm water as reported on EPA Form R;

ii. Oil or hazardous substances in excess of reportable quantities (see 40 CFR 110, 117 or 302).

g. A summary of existing sampling data (if any) describing pollutants in storm water discharge.

5. The SWPPP shall describe the storm water management controls appropriate for the facility. The appropriate controls shall reflect identified potential sources of pollutants at the facility. The description of the storm water management controls shall include:

a. Storm Water Pollution Prevention Personnel. Identify specific individuals (and job titles) who are responsible for developing, implementing, and revising the Plan.

b. Preventive Maintenance. Preventive maintenance involves inspection and maintenance of storm water conveyance system devices (i.e., oil/water separators, catch basins, etc.) and inspection and testing of plant equipment and systems that could fail and result in discharges of pollutants to storm water.

c. Good Housekeeping. Good housekeeping requires the maintenance of clean, and orderly facility areas that discharge storm water. Material handling areas shall be inspected and cleaned to reduce the potential for pollutants to enter the storm water conveyance system.

d. Spill Prevention and Response. Identification of areas where significant materials can spill into or otherwise enter the storm water conveyance systems and their accompanying drainage points. Specific material handling procedures, storage requirements, clean up equipment and procedures should be identified, as appropriate. Internal reporting procedures for spills of significant materials shall be established.

e. Storm Water Management Practices. Storm water management practices are practices other than those which control the source of pollutants. They include measures such as installing oil and grit separators, diverting storm water into retention basins, etc. Based on assessment of the potential of various sources to contribute pollutants to storm water discharges in significant quantities, additional storm water management practices to remove pollutants from storm water discharge shall be implemented.

f. Sediment and Erosion Prevention. The SWPPP shall identify measures to limit erosion around the storm water drainage and discharge points.

g. Employee Training. Employee training programs shall inform all personnel responsible for implementing the SWPPP. Training should address spill response, good housekeeping, and material management practices. Periodic dates for training should be identified.

h. Inspections. All inspections shall be done by trained personnel. A tracking or follow-up procedure shall be used to ensure appropriate response has been taken in response to an inspection. Inspections and maintenance activities shall be documented and recorded. Inspection records shall be retained for five years.

6. An annual facility inspection shall be conducted to verify that all elements of the SWPPP (i.e., site map, potential pollutant sources, structural and non-structural controls to reduce pollutants in industrial storm water discharge, etc.) are accurate. Observations that require a response (and the appropriate response to the observation) shall be retained as part of the Plan.

7. This SWPPP may incorporate, by reference, the appropriate elements of other program requirements (i.e., Spill Prevention Control and Countermeasures (SPCC) plans under Section 311 of the CWA, Best Management Programs under 40 CFR 125.100, etc.).

8. The SWPPP is considered a report that shall be available to the public under Section 308(b) of the CWA.

9. The SWPPP shall include the signature and title of the person responsible for preparation of the SWPPP and include the date of initial preparation and each amendment, thereto.

State of California
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LOS ANGELES REGION

ATTACHMENT T-2

STORMWATER MONITORING AND REPORTING PROGRAM

[Note: Based on State Board Order No. 91-13-DWQ as amended by Order No. 92-12-DWQ]

A. OBJECTIVES

The monitoring program shall document the elimination or reduction of specific pollutants resulting from the implementation of the Storm Water Pollution Prevention Plan (SWPPP). The monitoring program shall be developed and amended, when necessary, to meet the following objectives:

1. Ensure that stormwater discharges are in compliance with the Discharge Prohibitions, Effluent Limitations, and/or Receiving Water Limitations specified in the NPDES permit, State Board Order No. 91-13-DWQ as amended, and 40 CFR Part 423.

2. Ensure practices at the facility to control pollutants in stormwater discharges are evaluated and revised to meet changing conditions.

3. Aid in the implementation of the Storm Water Pollution Prevention Plan.

4. Measure the effectiveness of best management practices (BMPs) in removing pollutants in stormwater discharge.

B. STORMWATER MONITORING PROGRAM

The following shall consist the stormwater monitoring program:

1. Annual Site Inspection

a. Conduct a minimum annual inspection of the facility site to identify areas contributing to a stormwater discharge associated with industrial activity and to evaluate whether measures to reduce pollutant loadings identified in the SWPPP are adequate and properly implemented or whether additional control measures are needed. A record of the annual inspection must include the date of the inspection, the individual(s) who performed the inspection, and the observations.

b. Certify, based on the annual site inspection, that the facility is in compliance with State Board Order No. 91-13-DWQ as amended and its SWPPP. The certification and inspection records must be signed and certified in accordance with Standard Provisions B.17, page N-5; and Section E.11, page N-14, respectively. Any noncompliance shall be reported in accordance with Section C.3 of this monitoring and reporting program.

2. Dry Season Observations

At least twice during the dry season (May through September), the Discharger shall observe and/or test for the presence of non-storm water discharges at all stormwater discharge locations. At minimum, the Discharger shall conduct visual observations of flows to determine the presence of stains, sludges, odors, and other abnormal conditions. Dye tests, TV line surveys, and/or analysis and validation of accurate piping schematics may be conducted, if appropriate. Records shall be maintained of the description of the method used, date of testing, locations observed, and test results.

3. Wet Season Visual Observations

During the wet season (October through April), the Discharger shall conduct visual observations of all storm water discharge locations during the first hour of one storm event per month that produces significant stormwater discharge[1] to observe the presence of floating and suspended materials, oil and grease, discolorations, turbidity, odor, etc.

4. Sample Locations

Samples shall be collected from all locations where storm water is discharged. Samples must represent the quality and quantity of stormwater discharged from the facility. If a facility discharges storm water at multiple locations, the discharger may sample a reduced number of locations if it is established and documented in the monitoring program that stormwater discharges from different locations are substantially identical.

[1] "Significant stormwater discharge" is a continuous discharge of stormwater for approximately one hour or more.

5. Sampling Procedure

Sampling shall consist of a grab sample from a storm event that produces significant stormwater discharge that is preceded by at least three (3) working days of dry weather. The grab sample should be taken during the first thirty minutes of the discharge. If collection of the grab sample during the first 30 minutes is impractical, the grab sample can be taken as soon as practicable thereafter, and the Discharger shall explain in the annual monitoring report why the grab sample could not be taken in the first 30 minutes. The Discharger may select alternative monitoring procedures (e.g., composite sampling) provided the Discharger has submitted the proposed procedures and justification to the Regional Board prior to use. Unless otherwise instructed by the Regional Board, the Discharger may use the alternative monitoring procedures submitted.

6. Sampling and Analysis

During the wet season (October through April), the Discharger (unless exempted per Section B.8 below) shall collect and analyze samples of stormwater discharge from at least two storm events during each wet season which produce significant stormwater discharge.

The Discharger shall establish sampling stations where representative samples of stormwater discharges can be obtained. For each stormwater outfall, the following shall be performed:

a. Estimate or calculate the volume of stormwater discharged from each outfall;

b. Obtain representative samples from each outfall and analyzed for:

   i. pH, total suspended solids (TSS), specific conductance, and total organic carbon (TOC). Oil and grease (O&G) may be substituted for TOC;

   ii. All heavy metals with effluent limitations in the NPDES permit; and

   iii. Toxic chemicals and other pollutants that are stored in the facility.

7. Toxic Pollutant Analysis Reduction

If toxic chemicals or other pollutants are not detected in significant quantities after two consecutive sampling events, the facility may eliminate that toxic chemical or pollutant from future sampling events. The Discharger may analyze for alternative representative parameters (e.g., whole effluent toxicity) as a substitute for the toxic chemicals and other pollutants identified in Section B.6.b.ii and B.6.b.iii, provided the Discharger submits the alternative monitoring procedures and justification to the Regional Board prior to use. Unless otherwise instructed by the Regional Board, the Discharger may use the alternative monitoring procedures submitted.

8. Sampling and Analysis Exemptions

The Discharger is not required to collect and analyze samples in accordance with Section B.6.b. if the Discharger certifies that the facility meets all of the conditions set forth below in Section B.8.a, if the Discharger obtains the local agency certification described in Section B.8.b, or if the Discharger obtains a Regional Board exemption as described in Section B.8.d. If the Discharger is not required to comply with Section B.6.b monitoring requirements, the Discharger is still required to comply with all other monitoring program and reporting requirements.

a. Self-Certification

The certification must state that areas of industrial activity are not exposed to storm water, including manufacturing, processing, and material handling areas and areas where material handling equipment, raw materials, intermediate products, final products, waste materials, byproducts, and industrial machinery are stored. Exposure includes both direct contact with storm water and the possible release of industrial pollutants into storm water (e.g., spills or leaks). In order to demonstrate that these areas are not exposed to storm water, the following minimum conditions must be met:

i. All illicit (unpermitted) connections to the storm drainage system are eliminated;

ii. All materials must be completely contained at all times;

iii. All unhoused equipment associated with industrial activity is not exposed to storm water; and

iv. All emissions from stacks or air exhaust systems and emission of dust or particulates do not contribute significant quantities of pollutants to storm water discharge.

b. Certification by Local Agency

A local agency which has jurisdiction over the storm sewer system or other water course which receives storm water discharge from the Discharger's facility has certified in writing that the Discharger has developed and implemented an effective Storm Water Pollution Prevention Plan and should not be required to collect and analyze stormwater samples for pollutants.

c. Submittal of Sampling Exemption Certifications

The Discharger must submit sampling exemption certifications to the Regional Board by August 1 for the following wet season. Unless otherwise instructed by the Regional Board, the Dischargers who file a sampling exemption certification are exempt from Section B.6.b.

d. Exemptions by Regional Water Board

The Regional Board may grant an exemption to Section B.6.b monitoring requirements if it determines that the Discharger has developed and implemented an effective Storm Water Pollution Prevention Plan and should not be required to collect and analyze storm water samples for pollutants.

9. Visual Observation and Sample Collection Exceptions

a. When the Discharger is unable to collect any of the required samples or perform visual observations due to adverse climatic conditions (drought, extended freeze, dangerous weather conditions, etc.), a description of why the sampling or visual

observations could not be conducted, including documentation of all significant stormwater discharge events, must be submitted along with the annual monitoring report.

b. The Discharger is required to collect samples and perform visual observations only if significant stormwater discharges commence during scheduled facility operating hours[2], or within two hours following scheduled facility operating hours. The Discharger is required to perform visual observations only within daylight hours. If the Discharger does not collect samples or perform visual observations during a significant stormwater discharge due to these exceptions, the Discharger shall include documentation in the annual monitoring report.

10. Standard Methods

All sampling and sample preservation shall be in accordance with the current edition of "Standard Methods for the Examination of Water and Wastewater" (American Public Health Association). All monitoring instruments and equipment shall be calibrated and maintained in accordance with manufacturers' specifications to ensure accurate measurements. All analyses must be conducted according to test procedures under 40 CFR Part 136. All metals shall be reported as total metals. All analyses shall be conducted at a laboratory certified for such analyses by the State Department of Health Services or approved by the Executive Officer.

C. RECORD KEEPING AND REPORTING REQUIREMENTS

1. Records

Records of all stormwater monitoring information and copies of all reports required shall be retained for a period of at least five years from the date of the sample, observation, measurement, or report.

[2] "Scheduled facility operating hours" are the time periods when the facility is staffed to conduct any function related to industrial activity, including routine maintenance, but excluding time periods where only emergency response, security, and/or janitorial services are performed.

These records shall include:

a. The date, place, and time of site inspections, sampling, visual observations, and/or measurements;

b. The individual(s) who performed the site inspections, sampling, visual observations, and/or measurements;

c. Flow measurements or estimates (if required);

d. The date and time of analyses;

e. The individual(s) who performed the analyses;

f. The analytical techniques or methods used and the results of such analyses;

g. Quality assurance/quality control results;

h. Dry season observations and wet season visual observation records (see Sections B.6.b & c);

i. Visual observation and sample collection exception records (see Section B.9);

j. All calibration and maintenance records of on-site instruments used; and

k. All original strip chart recordings for continuous monitoring instrumentation.

2. Annual Report

By July 1 of each year, the Discharger shall submit an annual report on the Stormwater Monitoring Program to the Executive Officer of the Regional Board, and to the local agency (if requested).

The report shall include a summary of visual observations and sampling results, the certification required in Section B.6.a.ii, and information as required in Section B.12. The report shall be signed and certified in accordance with Standard Provisions B.17, page N-5; and Section E.11, page N-14. The first annual report is due on July 1, 1995.

3. Noncompliance Reporting

The Dischargers who cannot certify compliance in accordance with Section C.2 above and/or who have had other instances of noncompliance must notify the Regional Board and/or, upon request, the local agency that receives the stormwater drainage. The notifications shall identify the type(s) of noncompliance, describe the actions necessary to achieve compliance, and include a time schedule, subject to the modifications by the Regional Board, indicating when compliance will be achieved. Noncompliance notifications must be submitted within 30 days of identification of noncompliance.

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD

LOS ANGELES REGION

REQUIREMENTS FOR PRETREATMENT ANNUAL REPORT

1. A summary of analytical results from representative, flow-proportioned, the 24-hour composite sampling of the influent and effluent for those pollutants the Environmental Protection Agency (EPA) has identified under section 307(a) of the Federal Clean Water Act which are known or suspected to be discharged by industrial users. The discharger is not required to sample and analyze for asbestos until EPA promulgates an applicable analytical technique under Federal Regulation 40 CFR Part 136. Sludge shall be sampled during the same 24-hour period and analyzed for the same pollutants as the influent and effluent sampling and analysis. The sludge analyzed shall be a composite sample of a minimum of twelve discrete samples taken at equal time intervals over the 24-hour period. Wastewater and sludge sampling and analysis shall be performed a minimum of semiannually. The discharger shall also provide any influent, effluent or sludge monitoring data for nonpriority pollutants which the discharger believes may be causing or contributing to interference, pass through or adversely impacting sludge quality. Sampling and analysis shall be performed in accordance with the techniques prescribed in 40 CFR part 136 and amendments thereto.

2. A discussion of Upset, Interference, or Pass Through incidents, if any, at the treatment plant which the discharger knows or suspects were caused by industrial users of the system. The discussion shall include the reasons why the incidents occurred, the corrective actions taken and, if known, the name and address of the industrial user(s) responsible. The discussion shall also include a review of the applicable pollutant limitations to determine whether any additional limitations, or changes to existing requirements, may be necessary to prevent Pass Through, Interference or noncompliance with sludge disposal requirements.

3. The cumulative number of industrial users that the discharger has notified regarding Baseline Monitoring Reports and the cumulative number of industrial user responses.

4. An updated list of the discharger's industrial users including their names and addresses, or a list of deletions and additions keyed to a previously submitted list. The discharger shall provide a brief explanation for each deletion. The list shall identify the industrial users subject to Federal Categorical Standards by specifying which set(s) of standards are applicable.

The list shall indicate which categorical industries, or specific pollutants from each industry; are subject to local limitations that are more stringent than the Federal Categorical Standards. The discharger shall also list the noncategorical industrial user that are subject only to local discharge limitations. The discharger shall characterize the compliance status of each industrial user by employing the following descriptions:

a. In compliance with Baseline Monitoring Report requirements (where applicable);

b. Consistently achieving compliance;

c. Inconsistently achieving compliance;

d. Significantly violated applicable pretreatment requirements as defined by 40 CFR 403.8(f)(2)(vii).;

e. On a compliance schedule to achieve compliance (include the date final compliance is required);

f. Not achieving compliance and not on a compliance schedule;

g. The discharger does not know the industrial user's compliance status.

A report describing the compliance status of any industrial user characterized by the descriptions in items c through g above shall be submitted quarterly from the annual report date to the Regional Board, State Board, and EPA Region 9. The report shall identify the specific compliance status of each such industrial user. This quarterly reporting requirement shall commence upon issuance of this permit.

5. A summary of the inspection and sampling activities conducted by the discharger during the past year to gather information and data regarding industrial users. The summary shall include:

a. The names and addresses of the industrial users subject to surveillance by the discharger and an explanation of whether they were inspected, sampled, or both and the frequency of these activities at each user; and

b. The conclusions or results from the inspection or sampling of each industrial user.

6. A summary of the compliance and enforcement activities during the past year. The summary shall include the names and addresses of the industrial users affected by the following actions:

a. Warning letters or notices of violation regarding the industrial users apparent noncompliance with Federal Categorical Standards or local discharge limitations. For each industrial user identify whether the apparent violation concerned the Federal Categorical Standards or local discharge limitations;

b. Administrative Orders regarding the industrial users' noncompliance with Federal Categorical Standards or local discharge limitations. For each industrial user identify whether the violation concerned the Federal Categorical Standards or local discharge limitations;

c. Civil actions regarding the Industrial users' noncompliance with Federal Categorical Standards or local discharge limitations. For each industrial user identify whether the violation concerned the Federal Categorical Standards or local discharge limitations;

d. Criminal actions regarding the industrial users' noncompliance with Federal Categorical Standards or local discharge limitations. For each industrial user identify whether the violation concerned the Federal Categorical Standards or local discharge limitations;

e. Assessment of monetary penalties. For each industrial user identify the amount of the penalties;

f. Restriction of flow to the treatment plant; or

g. Disconnection from discharge to the treatment plant.

7. A description of any significant changes in operating the pretreatment program which differ from the information in the discharger's Approved Pretreatment Program including, but not limited to changes concerning: the program's administrative structure; local industrial discharge limitations; monitoring program or monitoring frequencies; legal authority or enforcement policy; funding mechanisms; resource requirements; or staffing levels.

8. A summary of the annual pretreatment budget, including the cost of pretreatment program functions and equipment purchases.

9. A summary of public participation activities to involve and inform the public.

10. A description of any changes in sludge disposal methods and a discussion of any concerns not described elsewhere in the report.

11. Triplicate signed copies of these reports shall be submitted to the Regional Board, State Board, and EPA Regional Administrator at the following addresses:

PRETREATMENT PROGRAM COORDINATOR
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LOS ANGELES REGION
101 Centre Plaza Drive
Monterey Park, CA. 91754-2156

STATE WATER RESOURCES CONTROL BOARD
Division of Water Quality
Regulatory Section
P.O. Box 944213
Sacramento, CA. 94244-2130

REGIONAL ADMINISTRATOR
U.S. ENVIRONMENTAL PROTECTION AGENCY
Region 9 ATTN: W-3
215 Fremont Street
San Francisco, CA. 94105

NPDES Rec. Water

STATE OF CALIFORNIA
GEORGE DEUKMEJIAN, *Governor*

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD—
LOS ANGELES REGION

107 SOUTH BROADWAY, SUITE 4027
LOS ANGELES, CALIFORNIA 90012-4596
(213) 620-4460

October 14, 1987

Mr. John Bressan
Director of Community Services
Camarillo Sanitary District
601 Carmen Drive
Camarillo, CA 93010

WASTE DISCHARGE REQUIREMENTS - CAMARILLO WATER RECLAMATION PLANT
(FILE NO. 54-181; CI NO. 6187)

Reference is made to our letter dated August 20, 1987 which transmitted a draft of tentative requirements for the subject facility.

Pursuant to Division 7 of the California Water Code, this California Regional Water Quality Control Board, at a public meeting held on September 28, 1987, reviewed these tentative requirements, considered all factors in the case, and adopted Order No. 87-132 (copy attached) relative to this waste discharge.

Also attached is a copy of specifications for technical reports to be submitted by you. Your first monitoring report is due by January 15, 1988. Please reference all technical monitoring reports required by this Order to our Compliance File No. 6187.

We would appreciate it if you would not combine other reports, such as progress reports or technical reports, with your monitoring reports, but would submit each type of report as a separate document.

If you have any questions, please call Bryan Choi at (213) 620-5465.

J.E. ROSS
Senior Water Resource
Control Engineer

BC:sml

cc: See attached mailing list

Enclosures

Camarillo Sanitary District
Camarillo Water Reclamation Plant
Mailing List

Mr. Archie Matthews, State Water Resources Control Board, Division of Water Quality
Department of Water Resources
Department of Health Services, Sanitary Engineering Section, Santa Barbara
Ventura County Department of Public Works, Water and Sanitation Division
Ventura County Department of Environmental Health Services
Ventura County Department of Public Works, Flood Control and Drainage Division
Ventura County Planning Commission
United Water Conservation District
Department of Fish and Game, Region 5
Camrosa County Water District

State of California
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD, LOS ANGELES REGION

ORDER NO. 87-132

WATER RECLAMATION REQUIREMENTS

FOR

CAMARILLO SANITARY DISTRICT
(Water Reclamation Plant)
(File No. 54-181)

54-181

The California Regional Water Quality Control Board, Los Angeles finds:

1. Camarillo Sanitary District reclaims wastewater for reuse . Reclamation Plant under requirements contained in Order No adopted by this Board on October 22, 1979.

2. Camarillo Sanitary District (hereinafter referred to as "Reclaimer") operates a Water Reclamation Plant at 150 East Howard Road, Camarillo, California, with a design capacity of 6.75 million gallons per day (mgd) and an average flow of 3.60 mgd (1986). All or a portion of the treated municipal wastewater is stored in a reservoir and used for irrigation of farmland or landscape irrigation in a nearby cemetery.

3. Treatment consists of primary sedimentation, activated sludge biological treatment, secondary sedimentation, chlorination and dechlorination.

4. Sludge is treated by both aerobic and anaerobic digestion and is dried on sand beds. The dried sludge is hauled to a sod farm and a legal disposal site in approximately equal amounts.

5. The treated wastewater may also be discharged to Conejo Creek under separate waste discharge requirements and National Pollutant Discharge Elimination System permit (NPDES Permit No. CA0053597) adopted by this Board.

6. A review of the current requirements has been conducted by Board staff in accordance with California Administrative Code, Title 23, Chapter 3, Subchapter 9, Article 2, Section 2232.2.

7. The areas of the holding reservoir, irrigation, reuse, and the sludge disposal site are located within the Santa Clara River Basin, Oxnard Plain Hydrologic Subunit.

8. The Board adopted a revised Water Quality Control Plan for Santa Clara River Basin on March 27, 1978. The Water Quality Control Plan contains water quality objectives for ground water in the Oxnard Plain Hydrologic Subunit. The requirements contained in this Order, as they are met, will be in conformance with the goals of the Water Quality Control Plan.

9. Ground water in the semiperched zone of Pleasant Valley Hydrologic Subarea within the Oxnard Plain Subunit is beneficially used for industrial service supply and agricultural supply.

10. Section 13523 of the California Water Code provides that a Regional Board, after consulting with and receiving the recommendations of the State Department of Health Services and after any necessary hearing, shall, if it determines such action to be necessary to protect the public health, safety, or welfare, prescribe water reclamation requirements for water which is used or proposed to be used as reclaimed water. Section 13523 further provides that such requirements shall include, or be in conformance with, the statewide reclamation criteria.

11. The use of reclaimed water for impoundments or for irrigation could affect the public health, safety, or welfare; requirements for such use are therefore necessary in accordance with Section 13523 of the Water Code.

12. This project involves an existing facility and as such is exempt from the provisions of the California Environmental Quality Act in accordance with Title 14, California Administrative Code, Chapter 3 Section 15301.

The Board has notified the Reclaimer and interested agencies and persons of its intent to revise the water reclamation requirements for this discharge and has provided them with an opportunity to submit their written views and recommendations.

The Board in a public meeting heard and considered all comments pertaining to the discharge and to the tentative requirements.

IT IS HEREBY ORDERED, that Camarillo Sanitary District shall comply with the following:

A. Reclaimed Water Limitations

1. Reclaimed water shall be limited to treated municipal wastewater only, as proposed.

2. Reclaimed water shall not contain constituents in excess of the following limits:

Constituent	Unit	Maximum Limit
Total dissolved solids	mg/l	1,200
Chloride	mg/l	175
Sulfate	mg/l	600
Boron	mg/l	1.0

3. The pH of reclaimed water shall at all times be within the range 6.0 to 9.0.

4. Reclaimed water shall not contain trace constituents or other substances in concentrations exceeding the limits contained in the current edition of the California Department of Health Services Drinking Water Standards.

5. Radioactivity shall not exceed the limits specified in Title 22, Chapter 15, Article 5, Section 64441 and 64443, California Administrative Code, or subsequent revisions.

6. Reclaimed water shall not cause the nitrogen content in the receiving ground water to exceed the objectives in the Water Quality Control Plan.

7. Reclaimed water used for agricultural supply shall not contain concentrations of chemical constituents in amounts that adversely affect such beneficial use.

B. Specification for Use of Reclaimed Wastewater

1. Reclaimed water used for surface or spray irrigation of fodder, fiber, and seed crops shall have a level of quality no less than that of primary effluent.

   Primary effluent is the effluent from a wastewater treatment process which provides removal of sewage solids so that it contains not more than 0.5 milliliter per liter per hour of settleable solids as determined by an approved laboratory method.

2. Reclaimed water used for the spray irrigation of food crops shall be at all times an adequately disinfected, oxidized, coagulated, clarified, filtered wastewater. The wastewater shall be considered adequately disinfected if at some location in the treatment process the median number of coliform organisms does not exceed 2.2 per 100 milliliters and the number of coliform organisms does not exceed 23 per 100 milliliters in more than one sample within any 30-day period. The median value shall be determined from the bacterial results of the last 7 days for which analyses have been completed.

An oxidized wastewater means wastewater in which the organic matter has been stabilized, is nonputrescible, and contains dissolved oxygen. For the purpose of these requirements, an oxidized wastewater shall be equivalent to secondary effluent with 30-day average BOD_5 20°C and suspended solids not exceeding 30 mg/l.

A filtered wastewater means an oxidized, coagulated, clarified wastewater which has been passed through natural undisturbed soils or filter media, such as sand or diatomaceous earth, so that the turbidity as determined by an approved laboratory method does not exceed an average operating turbidity of 2 turbidity units and does not exceed 5 turbidity units more than 5 percent of the time during any 24-hour period.

3. Reclaimed water used for surface irrigation of food crops shall be at all times an adequately disinfected, oxidized wastewater. The wastewater shall be considered adequately disinfected if at some location in the treatment process the median number of coliform organisms does not exceed 2.2 per 100 milliliters, as determined from the bacteriological results of the last 7 days for which analyses have been completed. Orchard and vineyards may be surface irrigated with reclaimed water that has the quality at least equivalent to that of primary effluent provided that no fruit is harvested that has come in contact with the irrigating water or the ground.

4. Exceptions to the quality requirements for reclaimed water used for irrigation of food crops may be considered on an individual case basis where the reclaimed water is to be used to irrigate a food crop which must undergo extensive commercial, physical or chemical processing sufficient to destroy pathogenic agents before it is suitable for human consumption.

5. Reclaimed water used for the irrigation of pasture to which milking cows or goats have access shall be at all times an adequately disinfected, oxidized wastewater. The wastewater shall be considered adequately disinfected if at some location in the treatment process the median number of coliform organisms does not exceed 23 per 100 milliliters, as determined from the bacteriological results of the last 7 days for which analyses have been completed.

6. Reclaimed water used for the irrigation of golf courses, cemeteries, freeway landscapes, and landscapes in other areas where the public has similar access or exposure shall be at all times an adequately disinfected, oxidized wastewater. The wastewater shall be considered adequately disinfected if the median number of coliform organisms in the effluent does not exceed 23 per 100 milliliters, as determined from the bacteriological results of the last 7 days for which analyses have been completed, and the number

of coliform organisms does not exceed 240 per 100 milliliters in any two consecutive samples.

7. Reclaimed water used for the irrigation of parks, playgrounds, schoolyards, and other areas where the public has similar access or exposure shall be at all times an adequately disinfected, oxidized, coagulated, clarified, filtered wastewater or a wastewater treated by a sequence of unit processes that will assure an equivalent degree of treatment and reliability. The wastewater shall be considered adequately disinfected if the median number of coliform organisms in the effluent does not exceed 2.2 per 100 milliliters as determined from the bacteriological results of the last 7 days for which analysis have been completed, and the number of coliform organisms does not exceed 23 per 100 milliliters in any sample.

8. Reclaimed water used for irrigation shall not be allowed to run off into recreational lakes unless it meets the criteria for such lakes.

9. Reclaimed water used as a source of supply in a nonrestricted recreational impoundment shall be at all times an adequately disinfected, oxidized, coagulated, clarified, filtered wastewater. The wastewater shall be considered adequately disinfected if at some location in the treatment process the median number of coliform organisms does not exceed 2.2 per 100 milliliters and the number of coliform organisms does not exceed 23 per 100 milliliters in more than one sample within any 30-day period. The median value shall be determined from the bacteriological results of the last 7 days for which analyses have been completed.

10. Reclaimed water used as a source of supply in a restricted recreational impoundment shall be at all times an adequately disinfected, oxidized wastewater. The wastewater shall be considered adequately disinfected if at some location in the treatment process the median number of coliform organisms does not exceed 2.2 per 100 milliliters, as determined from the bacteriological results of the last 7 days for which analyses have been completed.

11. Reclaimed water used as a source of supply in a landscape impoundment shall be at all times an adequately disinfected, oxidized wastewater. The wastewater shall be considered adequately disinfected if at some location in the treatment process the median number of coliform organisms does not exceed 23 per 100 milliliters, as determined from the bacteriological results of the last 7 days for which analyses have been completed.

12. Reclaimed water shall be retained on the areas of use and shall not be allowed to escape as surface flow except as provided for in a National Pollutant Discharge Elimination System permit. For the purpose of this requirement, however, minor amount of irrigation return water of secondary quality or better from peripheral areas shall not be considered a violation of this Order provided the discharge meets the requirements contained in a National Pollutant Discharge Elimination System for the Camarillo Sanitary District.

13. Reclaimed water shall not be directly used for uses other than those enumerated above until requirements for these uses have been established by this Board in accordance with Section 13523 of the California Water Code, unless the Board waives such requirements or finds that the requirements contained herein are applicable to these uses.

14. Reclaimed water uses shall meet the requirements specified in the "Guidelines for Use of Reclaimed Water" issued by the State Department of Health Services.

15. Reclaimed water shall be applied at such a rate and volume as not to exceed vegetative demand and soil moisture conditions. Special precautions must be taken to prevent clogging of spray nozzles, to prevent overwatering and to exclude the production of runoff. Pipelines shall be maintained so as to prevent leaks.

C. General Requirements

1. The discharge or use of raw or inadequately treated sewage at any time is prohibited.

2. Reclaimed water shall not be used for irrigation during periods of extended rainfall and/or runoff.

3. No part of any irrigation or percolation system shall be closer than 100 feet from any potable water well.

4. Standby or emergency power facilities and/or sufficient capacity shall be provided for reclaimed water storage during rainfall or in the event of plant upsets or outages, and at time when spray irrigation cannot be practiced.

5. Reclaimed water use or disposal shall not result in earth movement in geologically unstable areas.

6. Any offsite disposal of sewage or sludge shall be only at a legal point of disposal. For purposes of these requirements, a legal point of disposal is one for which requirements have been established by a California Regional Water Quality Control Board and which is in full compliance therewith. Any sewage or sludge handling shall be in a manner as to prevent its reaching surface waters or watercourses.

7. Adequate facilities shall be provided to protect the sewage treatment and reclamation facilities from damage by storm flows and runoff.

8. Adequate freeboard shall be maintained in reclaimed water storage ponds to ensure that direct rainfall will not cause overtopping.

9. Neither treatment of waste nor any reclaimed water use or disposal shall cause pollution or nuisance.

10. Water reclamation and reuse or disposal shall not result in problems due to breeding of mosquitoes, gnats, midges, or other pests.

11. Reclaimed water use or disposal shall not impart tastes, odors, color, foaming, or other objectionable characteristics to receiving ground waters.

12. Reclaimed water use or disposal which could affect receiving ground waters shall not contain any substance in concentrations toxic to human, animal, or plant life.

13. Odors of sewage origin shall not cause a nuisance.

14. All new or modified construction, sludge drying and storage areas, and sewage ponds shall be protected against 100-year, 50-year, and 25-year floods, respectively.

D. Provisions

1. A copy of these requirements shall be maintained at the reclamation facility so as to be available at all times to operating personnel.

2. In the event of any change in name, ownership, or control of these waste treatment and reclamation facilities, the Reclaimer shall notify this Board of such change and shall notify the succeeding owner or operator of the existence of this Order by letter, copy of which shall be forwarded to the Board.

3. In accordance with Section 13522.5 of the Water Code and Section 60323 of the Wastewater Reclamation Criteria, the Reclaimer shall file an engineering report, prepared by a properly qualified engineer registered in California, of any material change or proposed change in character, location or volume of the reclaimed water or its uses to the Board and State Department of Health Services.

4. The Reclaimer shall file with the Board technical reports on self monitoring work performed according to the detailed specifications contained in the Monitoring and Reporting Programs, as directed by the Executive Officer.

5. The Reclaimer shall notify this Board by telephone within 24 hours of any violations of reclaimed water use conditions or any adverse conditions as a result of the use of reclaimed water from this facility; written confirmation shall follow within one week.

6. The Reclaimer shall notify Board staff by telephone immediately of any confirmed coliform counts that could cause a violation of the 7-day median limit, including the date(s) thereof. This information shall be confirmed in the next monitoring report; in addition, for any actual coliform limit violations that occurred, the report shall also include the reasons for the high coliform results, the steps being taken to correct the problem (including dates thereof), and the steps being taken to prevent a recurrence.

7. These requirements do not exempt the Reclaimer from compliance with any other laws, regulations, or ordinances which may be applicable; they do not legalize this reclamation facility, and they leave unaffected any further restraint on the use of reclaimed water at this site which may be contained on other statutes or required by other agencies.

8. The Reclaimer shall be responsible to insure that all users of reclaimed water comply with the specifications and requirements for such use.

9. This Order does not alleviate the responsibility of the Reclaimer to obtain other necessary local, state, and federal permits to construct facilities necessary for compliance with this Order; nor does this Order prevent imposition of additional standards, requirements, or conditions by any other regulatory agency. Expansion of this facility from its current capacity shall be contingent upon issuance of all necessary permits, including a conditional use permit.

10. Supervisors and operators of this publicly owned wastewater treatment plant shall possess a certificate of appropriate grade as specified in California Administrative Code, Title 23, Chapter 3, Subchapter 14, Section 2455 and 2460.

11. The Reclaimer shall provide to each user of reclaimed water from this facility a copy of these requirements, to be maintained at the user's facility as to be available at all times to operating personnel.

12. For any extension of the reclaimed water system, the Reclaimer shall submit a report detailing the extension for the approval of the Executive Officer. Following construction, as built drawings shall be submitted to the Executive Officer for approval prior to use of reclaimed water.

13. The Reclaimer shall submit to the Board within 60 days of the adoption of this Order, a fail-safe procedure for approval by the Executive Officer.

14. The Reclaimer shall file a written report with this Board within 90 days after the average dry-weather waste flow for any month equals or exceeds 90 percent of the design capacity of the water treatment and/or disposal facilities. The report shall detail provisions to cope with flows in excess of that figure.

15. Order No. 79-159 adopted by this Board on October 22, 1979, is hereby rescinded.

I, Robert P. Ghirelli, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Los Angeles Region, on September 28, 1987.

Robert P. Ghirelli

ROBERT P. GHIRELLI, D.Env.
Executive Officer

BC:sml

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LOS ANGELES REGION

MONITORING AND REPORTING PROGRAM NO. 6187
FOR

CAMARILLO SANITARY DISTRICT
(Water Reclamation Plant)
(File No. 54-181)

The Reclaimer shall implement this monitoring program within 60 days of the effective date of this Order.

Monitoring reports shall be submitted by the dates in the following schedule:

Reporting Period	Report Due
January - March	April 15
April - June	July 15
July - September	October 15
October - December	January 15

The first monitoring report under this program shall be submitted by Janaury 15, 1988.

Values aobtained for the NPDES monitoring report during periods of surface discharge may be reported here in lieu of duplicate testing, if representative. However, values obtained for this monitoring report (non-NPDES) shall be reported separately from NPDES monitoring reports. Quarterly monitoring shall be performed during the months of February, May, August, and November. The reports for January quarters shall also include the results of the annual analyses.

If no water was delivered for reuse on any day(s), during the reporting period the report shall so state.

By January 30 of each year beginning January 1988, the Reclaimer shall submit an annual report to the board. The report shall contain both tabular and graphical summaries of the monitoring data obtained during the previous year. In addition, the Reclaimer shall discuss the compliance record and the corrective actions taken or planned which may be needed to bring the discharge into full compliance with the requirements.

Each monitoring report must affirm in writing that:

> All analyses were conducted at a laboratory certified for such analyses by the State Water Resources Control Board or approved by the Executive Officer and in accordance with current EPA guideline procedures, or as specified in the Monitoring Program.

For any analysis performed for which no procedure is specified in the EPA guidelines or in this Monitoring Program, the constituent or parameter analyzed and the method or procedure used must be specified in the report.

Section I amended Jan. 6, 1999. New pages follow page T-5.

I. Reclaimed Water Monitoring

A sampling station shall be established where representative samples of reclaimed water can be obtained. Reclaimed water samples may be obtained at a single station provided that station is representative of the quality at all discharge points. Each sampling station shall be identified. The following shall constitute the reclaimed water monitoring program:

Constituent	Units	Type of Sample	Minimum Frequency of Analysis
Total flow[1]	gallons	continuous	----
Turbidity[2]	NTU	continuous	----
BOD_5 20°C	mg/l	24-hr. composite	daily
Suspended solids	mg/l	24-hr. composite	daily
Coliform group[3]	MPN/100ml	grab	daily
pH	pH units	grab	daily
Settleable solids	ml/l	grab	daily
Total dissolved solids	mg/l	24-hr composite	monthly
Chloride	mg/l	24-hr composite	monthly
Sulfate	mg/l	24-hr composite	monthly
Boron	mg/l	24-hr composite	monthly
Arsenic	mg/l	24-hr composite	annually
Barium	mg/l	24-hr composite	annually
Cadmium	mg/l	24-hr composite	annually
Chromium	mg/l	24-hr composite	annually
Lead	mg/l	24-hr composite	annually
Mercury	mg/l	24-hr composite	annually

[1] Shall report the daily volume of reclaimed water and the monthly volume used at each site.

[2] Required only for applications having a turbidity limit. The average value recorded each day and amount of time that 5NTU was exceeded each day shall be reported. Turbidity samples may be obtained anywhere in the treatment process subsequent to the filtration procedure.

[3] Samples shall be obtained at some point in the treatment process at a time when wastewater flow and characteristics are most demanding on the treatment facility and disinfection procedures. The location(s) of the sampling point(s) and any changes thereto must be approved by the Executive Officer, and proposed changes shall not be made until such approval has been granted. Coliform values obtained must meet the strictest requirements specified for all uses during periods of multiple use, unless separate coliform analyses are obtained at each particular point of use.

Constituent	Units	Type of Sample	Minimum Frequency of Analysis
Selenium	mg/l	24-hr composite	annually
Silver	mg/l	24-hr composite	annually
Cyanide	mg/l	24-hr composite	annually
Nitrate	mg/l	24-hr composite	quarterly
Fluoride	mg/l	24-hr composite	annually
Radioactivity	pCi/l	-----	annually
Total identifiable chlorinated hydrocarbon	mg/l	grab	quarterly

II. Ground Water Monitoring

Two monitoring wells shall be established as underground receiving water sampling stations designated as follows:

(1) Control Well - No. 1N/20W - 602
(2) Monitoring Well - No. 1N/20W - 6R4

The following shall constitute the underground monitoring program:

Constituent	Units	Type of Sample	Minimum Frequency of Analysis
Total dissolved solids	mg/l	grab	annually
Total nitrogen	mg/l	grab	annually
Chloride	mg/l	grab	annually
Sulfate	mg/l	grab	annually

III. Hauling

In the event wastes are hauled to a different disposal site, the name and address of the hauler of the waste shall be reported in each monitoring report along with type(s) and quantities hauled during the reporting period and the location of the final point of disposal. If no wastes are hauled during the reporting period a statement to that effect shall be submitted.

General Provisions for Sampling and Analysis

All sampling, sample preservation, and analyses shall be performed in accordance with the latest edition of "Guidelines Establishing Test Procedures for Analysis of Pollutants", promulgated by the United States Environmental Protection Agency.

All chemical, bacteriological, and bioassay analyses shall be conducted at a laboratory certified for such analyses by the State Water Resources Control Board in accordance with Section 13176 of the Water Code.

d. In the case of municipal, state or other public facility, by either a principal executive officer, ranking elected official, or other duly authorized employee.

Each report shall contain the following completed declaration:

" I declare under penalty of perjury that the foregoing is true and correct.

Executed on the _____ day of _____ at _____.

_____(Signature)

_____(Title)"

Robert P. Ghirelli

ROBERT P. GHIRELLI, D.Env.
Executive Officer

Date: September 28, 1987

California Regional Water Quality Control Board

Los Angeles Region

H. Hickox
tary for
nmental
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Internet Address: http://www.swrcb.ca.gov/~rwqcb4
101 Centre Plaza Drive, Monterey Park, California 91754-2156
Phone (323) 266-7500 • FAX (323) 266-7600

Gray Davis
Governor

January 6, 1999

Mr. Douglas Frost, Jr.
Sanitary Superintendent
Camarillo Sanitary District
P.O. Box 37
Camarillo, CA 93011-0037

MONITORING AND REPORTING PROGRAM REVISION, RECLAIMED WATER MONITORING - CAMARILLO SANITARY DISTRICT WATER RECLAMATION PLANT (FILE NO. 54-181, CI NO. 6187)

Dear Mr. Frost:

Reference is made to your letter dated November 9, 1998, requesting a reduction of the sampling frequencies from daily to weekly for biochemical oxygen demand, pH, suspended and settable solids. We have reviewed your request and revised your Monitoring and Reporting Program. Please replace the old Monitoring and Reporting Program, Section I with the new Section I enclosed. You are required to comply with all other sections of the Monitoring and Reporting Program CI-6178 issued on September 28, 1987.

When submitting monitoring or technical reports to the Regional Board, as required by your "Monitoring and Reporting Program," please send them ATTN: Data and Information Management Unit and include a reference to "Compliance File No. 6187", which will assure that the reports are directed to the appropriate file and staff. Also, please do not combine other reports with your monitoring reports. Submit each type of report as a separate document.

If you have any questions regarding this matter, please call Ms. Rebecca Nevarez at (323) 266-7571.

Sincerely,

Dennis A. Dickerson

DENNIS A. DICKERSON
Executive Officer

Enclosure

cc: See attached mailing list

MAILING LIST

Environmental Protection Agency, Region 9, Permits Branch (WTR-5)
NOAA, National Marine Fisheries Service
Department of Interior, U.S. Fish and Wildlife Service
Mr. Jim Kassel, Division of Water Quality, State Water Resources Control Board
Mr. Jorge Leon, Office of Chief Counsel, State Water Resources Control Board
Department of Fish and Game, Region 5
California Department of Parks and Recreation
California Coastal Commission, South Coast Region
Ventura County Planning Commission
Ventura County Department of Environmental Heath
Ventura County Department Health Services
Ventura County Department of Public Works, Flood Control and Drainage
Ventura Regional Sanitation District
Calleguas Municipal Water District
Camrosa Water District
Mr. Robert Westdyke, Assistant District Manager, Camarillo Sanitary District

State of California
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LOS ANGELES REGION

MONITORING AND REPORTING PROGRAM NO. CI - 6187
SECTION I

For

CAMARILLO SANITARY DISTRICT
WATER RECLAMATION PLANT
(FILE NO. 54-181)

I. Reclaimed Water Monitoring

A sampling station shall be established for each point of discharge and shall be located where representative samples of the reclaimed water can be obtained. Reclaimed water samples may be obtained at a single station provided that station is representative of the quality at all discharge points. Each sampling station shall be identified. The following shall constitute the reclaimed water monitoring program:

Constituent	Units	Type of Sample	Minimum Frequency of Analysis
Total Flow [1]	gallons	recorder	continuous
Turbidity [2]	NTU	recorder	continuous
Total and fecal coliform [3]	MPN/100 mL	grab	daily
pH	pH units	grab	weekly
Settleable Solids	mL/L	grab	weekly
Suspended Solids	mg/L	24-hr. composite	weekly
BOD_5 20°C	mg/L	24-hr. composite	weekly
Total dissolved solids	mg/L	24-hr. composite	monthly
Chloride	mg/L	24-hr. composite	monthly
Sulfate	mg/L	24-hr. composite	monthly
Boron	mg/L	24-hr. composite	monthly

[1] Shall report the daily volume of reclaimed water and the monthly volume used at each site.

[2] Required only for applications having a turbidity limit. The average value recorded each day and total amount of time each day that turbidity exceeded 5 NTU shall be reported. Turbidity samples may be obtained anywhere in the treatment process subsequent to the filtration procedure.

[3] Samples shall be obtained at some point in the treatment process at a time when wastewater flow and characteristics are most demanding on the treatment facility and disinfection procedures. The location(s) of the sampling point(s) and any changes thereto must be approved by the Executive Officer, and proposed changes shall not be made until such approval has been granted. Coliform values obtained must meet the strictest requirements specified for all uses during periods of multiple use, unless separate coliform analyses are obtained at each particular point of use.

Constituent	Units	Type of Sample	Minimum Frequency of Analysis
Total identifiable chlorinated hydrocarbons	mg/L	grab	quarterly
Nitrate	mg/L	24-hr. composite	quarterly
Arsenic	mg/L	24-hr. composite	annually
Barium	mg/L	24-hr. composite	annually
Cadmium	mg/L	24-hr. composite	annually
Chromium	mg/L	24-hr. composite	annually
Lead	mg/L	24-hr. composite	annually
Mercury	mg/L	24-hr. composite	annually
Selenium	mg/L	24-hr. composite	annually
Silver	mg/L	24-hr. composite	annually
Cyanide	mg/L	24-hr. composite	annually
Fluoride	mg/L	24-hr. composite	annually
Radioactivity	pCi/L	-----	annually

Ordered by:

Dennis A. Dickerson

DENNIS A. DICKERSON
Executive Officer

Date: January 6, 1999

State of California
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LOS ANGELES REGION

MONITORING AND REPORTING PROGRAM NO. CI - 6187
SECTION I

For

CAMARILLO SANITARY DISTRICT
WATER RECLAMATION PLANT
(FILE NO. 54-181)

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Suspended Solids	mg/L	24-hr. composite	weekly
BOD_5 20°C	mg/L	24-hr. composite	weekly
Total dissolved solids	mg/L	24-hr. composite	monthly
Chloride	mg/L	24-hr. composite	monthly
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Camarillo Sanitary District, Water Reclamation Plant
Monitoring and Reporting Program, Section I

File No. 54-181
CI-6187

Constituent	Units	Type of Sample	Minimum Frequency of Analysis
Total identifiable chlorinated hydrocarbons	mg/L	grab	quarterly
Nitrate	mg/L	24-hr. composite	quarterly
Arsenic	mg/L	24-hr. composite	annually
Barium	mg/L	24-hr. composite	annually
Cadmium	mg/L	24-hr. composite	annually
Chromium	mg/L	24-hr. composite	annually
Lead	mg/L	24-hr. composite	annually
Mercury	mg/L	24-hr. composite	annually
Selenium	mg/L	24-hr. composite	annually
Silver	mg/L	24-hr. composite	annually
Cyanide	mg/L	24-hr. composite	annually
Fluoride	mg/L	24-hr. composite	annually
Radioactivity	pCi/L	-----	annually

Ordered by:

Dennis A. Dickerson

DENNIS A. DICKERSON
Executive Officer

Date: January 6, 1999

REFERENCES

1. City of Camarillo Department of Planning and Community Development; City of Camarillo General Plan, 1994 (updated June 1996)

2. City of Camarillo Department of Planning and Community Development; Monthly Report; January 1999.

3. The Keese Company, Hilton, Farnkopf & Hobson, A Water and Wastewater Rate and Fee Study, June 1998.

4. City of Camarillo Sanitary District, Draft Manual of Design, Construction Standards and Standard Plans, Updated March 1999.

5. Camarillo Sanitary District, Camarillo Sanitary District Water Reclamation Plant Daily Test Data, Aug - December 1998

6. Regional Water Quality Control Board, Water Quality Control Plan, Los Angeles Region, June 13, 1994.

7. Parsons Engineering Science, Inc., Water System Master Plan Update, City of Camarillo, October 1999.

8. James M. Montgomery Consulting Engineers, Capacity Study of the Camarillo Sanitary District Water Reclamation Plant, May, 1989.