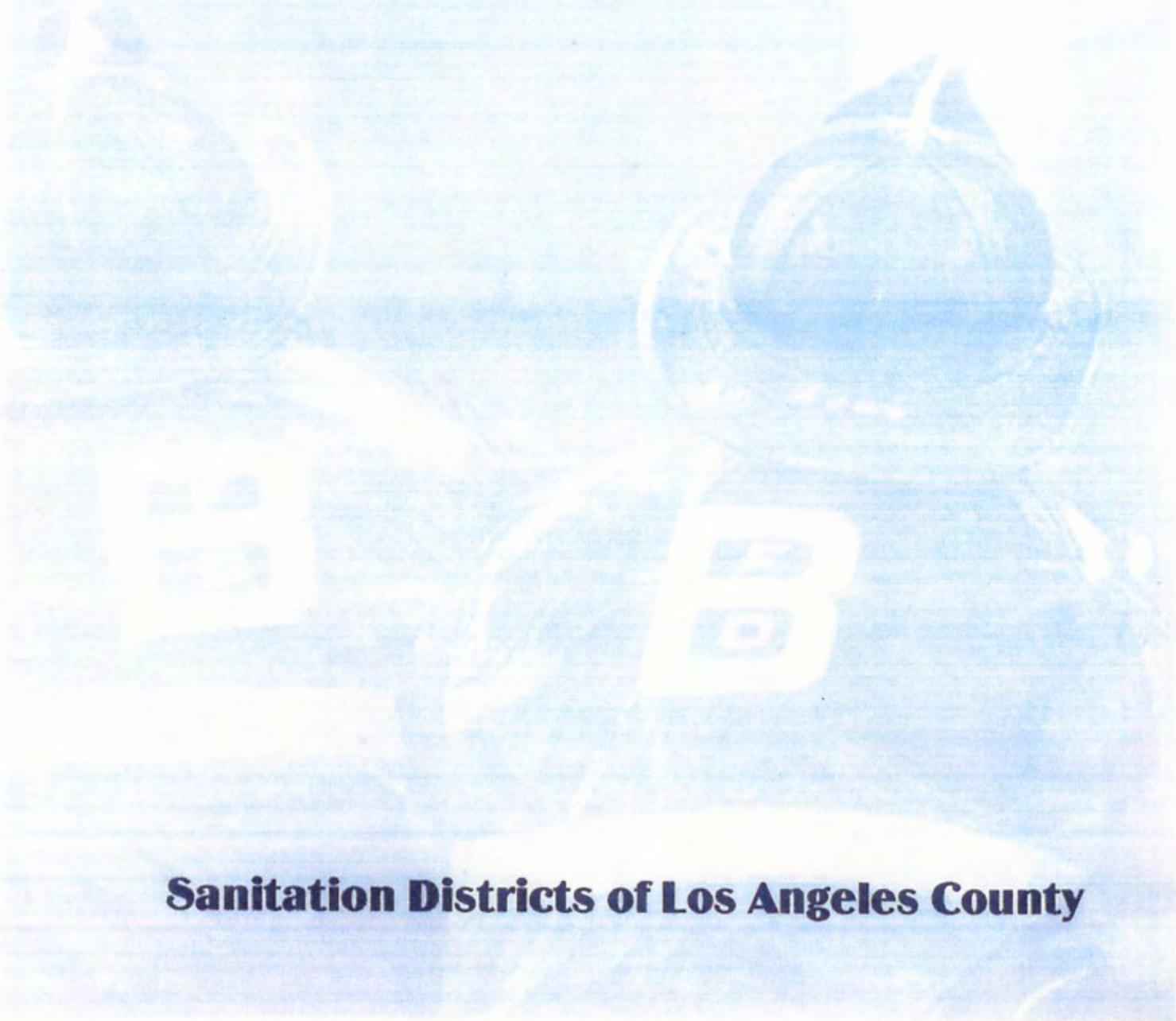
PROTOCOL FOR THE USE OF RECLAIMED WATER FOR FIRE-FIGHTING



Sanitation Districts of Los Angeles County

PROTOCOL FOR THE USE OF RECLAIMED WATER FOR FIRE-FIGHTING

Introduction

The Sanitation Districts of Los Angeles County (Districts) operate 11 wastewater treatment facilities throughout its service area. Seven of these facilities are Water Reclamation Plants (WRPs) that utilize a three-stage treatment process (primary sedimentation, secondary biological oxidation and clarification, and tertiary filtration and disinfection) to produce an extremely high quality effluent that is approved for many nonpotable applications, including structural and nonstructural fire-fighting.

For years, tertiary-treated reclaimed water has been supplied from the Districts' WRPs to a number of reuse sites for fire protection, always in conjunction with a beneficial, consumptive use of the water (i.e., irrigation, cooling towers, etc). It is extremely important that reclaimed water continue to be supplied as fire flows. In many existing and future reclaimed water use sites, the fire suppression system is tied into primary source of water, whether its for irrigation or industrial processes, because of fire requirements for storage and gravity flow. For example,

- The fire system at Bonelli County Regional Park is connected to a five million gallon irrigation reservoir located at an elevation to ensure gravity flow during power outages.
- The fire system at the Puente Hills Gas-to-Energy (PERG) power plant facility is connected to the cooling tower reservoir, which is, in turn, supplied by a 500,000 gallon reclaimed water storage tank that also serves that Landfill and its fire system.
- Rose Hill Memorial Park's SkyRose Chapel has its interior fire suppression system connected to the cemetery's one million gallon irrigation tank located at an elevation to ensure gravity flow.
- In addition, the City of Burbank has supplied reclaimed water fire service to its Nature Center, the nearby Odyssey Restaurant and the Burbank Fire Department's helipad, all from a reclaimed water storage tank at an elevation to ensure gravity flow.

Therefore, in these cases, a separate potable fire service is not physically possible, unless the entire reuse site is converted back to using potable water. To abandon the successful use of reclaimed water and to return to using increasingly scarce potable water is in direct conflict with the mandate of the State Legislature. Not only has the Legislature set a goal of one million acre-feet of water reuse by the year 2010, but has declared the use of potable water for nonpotable applications to be a "waste" and a violation of the State Constitution (see Water Code citations in Appendix A).

Health and safety concerns over the exposure of firefighters to the reclaimed water have been expressed by fire department personnel, not only in Los Angeles County, but in other states and countries as well. The goal of this report is to adequately address these concerns by detailing the regulatory oversight of the use of tertiary-treated reclaimed water, the quality of the reclaimed water being produced by the Districts' WRPs and the precautions necessary to protect the drinking water supply.

Regulatory Approval

The State Department of Health Services (DHS) is the regulatory agency with the authority to regulate the use of reclaimed water, while being fully protective of public health. Such regulations are contained in the State of California's Water Recycling Criteria (commonly referred to as "Title 22"), last revised on December 2, 2000. Reclaimed (recycled) water has been approved by DHS for use in both structural and nonstructural fire fighting, depending on the level of treatment. The following are the relevant sections from the California Code of Regulations, Title 22, Division 4, Chapter 3:

Section 60307. Use of Recycled Water for Other Purposes

(a) Recycled water used for the following shall be disinfected tertiary recycled water:

(4) Structural fire fighting.

(b) Recycled water used for the following uses shall be at least disinfected secondary-23 recycled water:

(2) Nonstructural fire fighting.

Reclaimed Water Quality and Safety

Tertiary-treated reclaimed water, such as that produced by the Districts' WRPs, is required to meet State and Federal drinking water standards. Appendix B contains reclaimed water quality for the Districts' tertiary WRPs for calendar year 2002, along with either the corresponding drinking water standard or water reuse permit limitation for comparison. Reclaimed water from the Districts' facilities meets these standards on a consistent basis.

The WRPs are able to do this because plant operation is fairly constant and effluent quality does not fluctuate significantly. In order to demonstrate this, three basic parameters that are indicative of plant operation and final effluent quality, suspended solids, biochemical oxygen demand (BOD) and turbidity, were examined for each of the WRPs over a five year period from January 1, 1998 through December 31, 2002. The results of this analysis are presented for these constituents in Tables 1-3 below and graphically in Appendices C-E, respectively. The tables contain statistical data for each parameter: mean (average), maximum and minimum values, median (half of samples greater than and half less than this value) and the 99th and 95th percentiles (99% and 95% of the samples are at or below these values, respectively). The graphs for suspended solids and BOD also contain data for the concentrations of these constituents in the raw sewage entering the WRPs.

Average removal of suspended solids in the Districts' WRPs is greater than 99%, with average final effluent concentrations being 20-40 times lower than the daily maximum limit, and with even the maximum values recorded being between 3 and 11 times lower than the limit.

Table 1: Final Effluent Suspended Solids (mg/L)

WRP	Mean	Max.	Min.	Median	99th Perc	95th Perc.
San Jose Creek East	< 1	4	< 1	1	3	2
San Jose Creek West	< 1	6	< 1	1	3	2
Long Beach	< 2	6	< 1	2	4	3
Los Coyotes	< 1	4	< 1	1	2	2
Pomona	< 2	8	< 1	1	4	3
Whittier Narrows	< 1	6	< 1	1	3	2
Valencia	< 2	6	< 1	2	4	4
Saugus	< 2	12	< 1	2	4	3
Note: Final effluent daily maximum limit = 45 mg/L.						

Average removal of BOD in the Districts' WRPs is greater than 97%, with average final effluent concentrations being 5-20 times lower than the daily maximum limit, and with every maximum value recorded being lower than the limit. It should be noted that the vast majority of higher than average BOD values occur during rainfall events, when runoff into the sewer system puts additional strain on the treatment process.

Table 2: Final Effluent Biochemical Oxygen Demand (mg/L)

WRP	Mean	Max.	Min.	Median	99th Perc.	95th Perc.
San Jose Creek East	< 5	15	1	4	14	11
San Jose Creek West	< 6	17	1	5	13	10
Long Beach	< 8	27	1	7	23	18
Los Coyotes	< 5	16	1	4	12	9
Pomona [1]	< 5	> 25 (14)	1	4	12	10
Whittier Narrows	< 2	10	< 1	2	5	4
Valencia [2]	< 8	44 (33)	1	7	30	18
Saugus	< 9	36	1	8	30	18

Note: Final effluent daily maximum limit = 45 mg/L.
1. If single outlier value for Pomona is removed, the maximum would be 14 mg/L.
2. If single outlier value for Valencia is removed, the maximum would be 33 mg/L.

The final effluent turbidity limit is 2 NTU, not 2.0. This is important to note since the Districts' test for turbidity is accurate to one decimal place, meaning that turbidity values up to 2.5 NTU are not exceedences of this limit. Therefore, over the five-year period being examined, only seven days had turbidity levels exceeding the limit. Of these, five occurred during the heavy rainfall of the 1998 El Niño episode that resulted in increased plant flows leading to stressed treatment processes and the elevated turbidities. What this means is that only two out of 14,509 turbidity samples (0.01%) were exceedences due to the treatment process and not some external/natural force.

Table 3: Final Effluent Turbidity (NTU)

WRP	Mean	Max.	Min.	Median	99th Perc.	95th Perc.
San Jose Creek East	1.2	3.4	0.5	1.1	2.3	1.8
San Jose Creek West	1.2	2.5	0.6	1.1	2.1	1.8
Long Beach	1.3	2.3	0.6	1.3	2.1	1.8
Los Coyotes	1.0	2.4	0.5	1.0	1.8	1.6
Pomona [1]	1.3	8.3 (3.8)	0.5	1.3	2.2	1.9
Whittier Narrows	1.0	2.4	0.4	1.0	1.9	1.6
Valencia	1.2	2.7	0.4	1.1	2.1	1.8
Saugus [2]	1.1	6.0 (2.4)	0.3	1.1	1.9	1.6

Note: Final effluent daily average operating limit = 2 NTU.
1. If single outlier value for Pomona is removed, the maximum would be 3.8 NTU.
2. If single outlier value for Saugus is removed, the maximum would be 2.4 NTU.

As for microorganisms, the tertiary-treated reclaimed water is also deemed to be essentially "pathogen-free" by the State DHS and has also been approved for such high human contact uses as food crop irrigation [Title 22 §60304(a)(1)], full-body contact [§60305(a)] and groundwater recharge (indirect potable reuse) [§60320]. Long-term monitoring and extensive research by the Districts have demonstrated that tertiary-treated reclaimed water does not contain detectable numbers of viable bacteria, virus or protozoan parasites (i.e., *Giardia* and *Cryptosporidium*).

Daily bacteriological results, consisting of total coliform counts taken over the same five-year period of January 1, 1998 through December 31, 2002 are presented in Tables 4 and graphically in Appendix F. Total coliform bacteria are used as an "indicator" organism, because they exist in huge numbers in raw sewage and are millions of times more plentiful than "pathogenic," or disease-causing bacteria. Reducing total coliform bacteria from the millions down to non-detectable levels ensures that pathogenic bacteria are completely eliminated. The most stringent limits for effluent total coliform are a 7-day median of 2.2 organisms per 100 mL, with no sample exceeding 23 per 100 mL in any sample. For all of the Districts' tertiary WRPs, only 13.1% of the 14,564 samples had any detectable coliform bacteria, only 0.4% had more than 2 coliform bacteria per 100 mL and only 0.03% (four samples) were above the daily maximum limit of 23 per 100 mL.

Table 4: Final Effluent Total Coliform

WRP	No. of Samples	Maximum	Median	Positives		No. > 2/100 mL	
		Organisms / 100 mL		No.	%	No.	%
San Jose Creek East	1826	3	< 1	209	11.4	1	0.1
San Jose Creek West	1826	18	< 1	321	17.6	5	0.3
Long Beach	1826	13	< 1	227	12.4	6	0.3
Los Coyotes	1826	22	< 1	291	15.9	6	0.3
Pomona	1797	28	< 1	325	18.1	16	0.9
Whittier Narrows	1811	42	< 1	281	15.5	9	0.5
Valencia	1826	5	< 1	147	8.1	4	0.2
Saugus	1826	40	< 1	104	5.7	8	0.4

A complete summary of the historic record of virus sampling for all of the Districts' tertiary WRPs from 1979 to samples completed through March 2003 is presented in Appendix G. This monitoring program has yielded only two positive samples (one each at the Saugus and Valencia WRPs) in 1,182 samples (328,642 gallons) taken and analyzed. To illustrate this virtual absence of detectable virus, if one were to directly consume two liters of reclaimed water per day (which, of course, is not allowed), the chance of being exposed to a single virus is roughly once every 850 years.

The Districts have been investigating the protozoans *Giardia* and *Cryptosporidium* since 1995. The cysts and oocysts, respectively, of both organisms (their form when outside the host organism's body) are large enough to be seen with a microscope. Very small numbers of *Giardia* and *Cryptosporidium* have been found in reclaimed water; however, morphological and vital-stain microscopic analyses have found that over 97% of the *Giardia* cysts were confirmed as non-viable. Furthermore, the levels of possibly viable *Giardia* cysts remaining were at or below the levels found in surface water supplies. Follow-up live-animal tests performed by Tufts University using Districts' reclaimed water confirmed that any remaining *Giardia* cysts were non-infective and suggested that very few, if any, *Giardia* cysts leaving the treatment plant are capable of causing disease. Currently, the Districts are in the process of determining the viability of any *Cryptosporidium* oocysts remaining in the final effluent.

Treatment Plant Reliability

To insure that its WRPs meet all applicable requirements, produce high quality effluent and completely inactivate microorganisms that might leave the treatment facilities (e.g., viruses, bacteria, protozoan cysts), numerous measures have been employed by the Districts.

- The WRPs are operated by highly qualified and experienced plant operators, with the Plant Supervisors and Superintendents being state certified at Grade IV or V (V being the highest possible level), with 20-30 years experience. It is this extensive experience that allows for all of the Districts' tertiary treatment facilities to maintain a consistently high effluent quality during normal operation and for rapid, appropriate and effective responses to extraordinary or emergency situations that threaten effluent quality.

- Real-time monitoring of critical parameters, a comprehensive alarm system and 24-hour oversight by plant operators (either on-site or at a neighboring WRP) are in effect. Setpoints and time delays for the various alarms are determined by the operational experience obtained at each plant and are occasionally changed as changing operational conditions dictate.

- Conversion all of Districts' WRPs to the computerized Distributed Control System to allow for full control of the treatment process from a computer terminal and to allow for early identification of treatment process or effluent water quality trends. Problems in the treatment process that are identified early can be corrected much more readily than if the conditions are allowed to degrade to the alarm point.

- Turbidity alarms for secondary, filter and final effluent are set at various levels and with different delay periods depending on the operational needs of each of the plants. Each alarm allows for potential effluent quality problems to be identified at several critical points in the overall treatment process.

- A set of procedures is in place for addressing alarm conditions, notifying supervisors and taking corrective actions, although the specific actions must be determined after analyzing the alarm condition. Such corrective actions that benefit the tertiary treatment process may actually occur at other points in the overall treatment process. Typically, degradation of water quality first manifests itself in the secondary treatment process; therefore, the plant operators have several hours before effluent that may not meet the discharge or reuse criteria leaves the plant.

- Preventive maintenance is performed to insure that all critical equipment, even that which is not in everyday use, is available for service when needed.

- General emergency procedures are in place for dealing with storm events, earthquakes, power failures, fires and other disasters, all of which have occurred at one time or another.

- Public health and environmental effects are minimized by (a) diverting effluent that does not meet water reclamation requirements away from such uses by shutting down pumps or notifying affected parties, (b) diverting inadequately treated effluent back to the sewer system for treatment downstream, or (c) if all else fails, discharging partially treated effluent to the river, rather than risk raw sewage spills. Certain conditions that are monitored real-time and that could even *potentially* result in a violation would initiate an immediate shutdown of all deliveries of reclaimed water from direct, nonpotable reuse. Specifically, these conditions are color in the effluent, a filter bypass or a severe, consistent increase in filter effluent turbidity (as evaluated at the time by the plant operators and supervisors).

Fire Engine Post-fire Procedures

Fire hydrants supplied with reclaimed water must be clearly identified by purple paint, signs, tags, stencils or other such labeling. Therefore, firefighters who connect up to a fire hydrant supplied with reclaimed water will be made aware of the source water.

Since fire engines could possibly use their 500-gallon on-board tank to distribute drinking water during civil emergencies, this tank must, as an additional safety precaution, be disinfected following the use of reclaimed water for fire fighting. The following procedure has been adopted and used by the City of Burbank Fire Department and was approved of by the State DHS in a letter to the City dated June 20, 1996:

1. Fire personnel must not drink the reclaimed water.
2. Drain all reclaimed water from the pumper tanks.
3. Rinse all fittings, hose and tank with potable (drinking) water.
4. Fill tanks with chlorinated water using one gallon of chlorine bleach (5-¼% sodium hypochlorite) from an unopened container per 500 gallons of water.
5. Hold for at least 30 minutes.
6. Drain chlorinated tank (if draining to storm drain, dechlorinate first with 0.4 pound of sodium sulfite or 0.3 pound of sodium thiosulfate per 500 gallons).
7. Refill pumper tank with potable water.

If another fire emergency prevents the full disinfection time of 30 minutes, as a minimum requirement, the tank must be drained of all reclaimed water before connecting to a potable hydrant.

It must be emphasized that these cleaning and disinfection procedures are not strictly reclaimed water requirements, but must be followed whenever ***any nonpotable water source has been used by the pumper to fight a fire***. Such other sources include, but are not limited to, swimming pools, natural or manmade waterways, ornamental lakes and irrigation ponds or canals.

Firefighter Turn-out Coats

Tertiary-treated effluent is colorless, odorless and tasteless as it leaves the treatment plant. In the previously discussed cases where the fire suppression system is integrated with the irrigation system or industrial process, the reclaimed water is constantly being used and replaced, so that it is not allowed to stagnate and produce odors (as any water supply would do if left in a tank or pipeline too long). Reclaimed water use is not expected to impart any more of an odor on the turn-out coats than potable water supplies, and would have much less of an impact in this area than either the use of other nonpotable water sources used for fire-fighting (e.g., irrigation ponds) or the various materials that might be burning (e.g., rubber tires, chemicals, etc.).

Fire Sprinkler Systems in Buildings

It is recommended that fire sprinkler systems in buildings that are to be supplied with reclaimed water be of the "dry" variety. That is, the pipelines in the building that supply the sprinkler heads are empty until sensors detect the presence of a fire, actuating a valve outside the building that connects the reclaimed water supply system to the sprinkler system. Thus, the sprinkler system is only charged when it is needed, if ever. Following activation and the suppression of the fire, the system is drained and then reset. This avoids any problems with reclaimed water sitting in sprinkler system pipes for extended periods of time, most notably a slime growth that tends to clog the pipes. A dry system also eliminates concerns about microbially induced corrosion (MIC) in the fire suppression piping system or other problems with the sprinkler heads.

Recommendations

Based on the information contained in this report, the Districts make the following recommendations:

1. The County of Los Angeles Fire Department should formally approve the use of tertiary-treated reclaimed water for all fire-fighting applications, based on the reclaimed water meeting drinking water standards, being pathogen-free, being of a consistent quality, being mandated by State legislation and being adequately regulated by the State Department of Health Services for this use.

2. The Fire Department should adopt, as a standard operating procedure, the post-fire tank cleaning procedures outlined in this report, whenever any water is used that does not originate in a potable water fire system.

3. A copy of this report should be made available to every fire station.

4. Building fire-suppression systems that are to be connected to a reclaimed water supply should be of the "dry" variety, and not charged with reclaimed water until a fire is detected in the building.

5. If independent verification of the information contained in this document is desired by the Fire Department, the names and qualifications of two, well-known water reuse experts are included as Appendices H and I. The Districts will work with either expert selected by the Fire Department.

APPENDIX A
CALIFORNIA WATER CODE CITATIONS

13550. (a) The Legislature hereby finds and declares that the use of potable domestic water for nonpotable uses, including, but not limited to, cemeteries, golf courses, parks, highway landscaped areas, and industrial and irrigation uses, is a waste or an unreasonable use of the water within the meaning of Section 2 of Article X of the California Constitution if recycled water is available which meets all of the following conditions, as determined by the state board, after notice to any person or entity who may be ordered to use recycled water or to cease using potable water and a hearing held pursuant to Article 2 (commencing with Section 648) of Chapter 1.5 of Division 3 of Title 23 of the California Code of Regulations:

13551. A person or public agency, including a state agency, city, county, city and county, district, or any other political subdivision of the state, shall not use water from any source of quality suitable for potable domestic use for nonpotable uses, including cemeteries, golf courses, parks, highway landscaped areas, and industrial and irrigation uses if suitable recycled water is available as provided in Section 13550; however, any use of recycled water in lieu of water suitable for potable domestic use shall, to the extent of the recycled water so used, be deemed to constitute a reasonable beneficial use of that water and the use of recycled water shall not cause any loss or diminution of any existing water right.

13552. The amendments to Sections 13550 and 13551 of the Water Code made during the first year of the 1991-92 Regular Session are not intended to alter any rights, remedies, or obligations which may exist prior to January 1, 1992, pursuant to, but not limited to, those sections or Chapter 8.5 (commencing with Section 1501) of Part 1 of Division 1 of the Public Utilities Code.

13552.2. (a) The Legislature hereby finds and declares that the use of potable domestic water for the irrigation of residential landscaping is a waste or an unreasonable use of water within the meaning of Section 2 of Article X of the California Constitution if recycled water, for this use, is available to the residents and meets the requirements set forth in Section 13550, as determined by the state board after notice and a hearing.

(b) The state board may require a public agency or person subject to this section to submit information that the state board determines may be relevant in making the determination required in subdivision (a).

13552.6. (a) The Legislature hereby finds and declares that the use of potable domestic water for floor trap priming, cooling towers, and air-conditioning devices is a waste or an unreasonable use of water within the meaning of Section 2 of Article X of the California Constitution if recycled water, for these uses, is available to the user, and the water meets the requirements set forth in Section 13550, as determined by the state board after notice and a hearing.

(b) The state board may require a public agency or person subject to this section to submit information that the state board determines may be relevant in making the determination required in subdivision (a).

13553. (a) The Legislature hereby finds and declares that the use of potable domestic water for toilet and urinal flushing in structures is a waste or an unreasonable use of water within the meaning of Section 2 of Article X of the California Constitution if recycled water, for these uses, is available to the user and meets the requirements set forth in Section 13550, as determined by the state board after notice and a hearing.

(b) The state board may require a public agency or person subject to this section to furnish whatever information may be relevant to making the determination required in subdivision (a).

(c) For the purposes of this section and Section 13554, "structure" or "structures" means commercial, retail, and office buildings, theaters, auditoriums, schools, hotels, apartments, barracks, dormitories, jails, prisons, and reformatories, and other structures as determined by the State Department of Health Services.

(d) Nothing in this section or Section 13554 applies to a pilot program adopted pursuant to Section 13553.1.

APPENDIX B

RECLAIMED WATER QUALITY TABLES
2002

SAN JOSE CREEK EAST WATER RECLAMATION PLANT
Final Effluent Quality - 2002

Constituent	Units	Limit	Mean	Maximum	Minimum
pH		6.0-9.0	6.94	7.2	6.5
Turbidity	NTU	2	1.0	2.1	0.5
Total Coliform	org./100 mL	23	< 1	3	< 1
Temperature	deg. F	100	78	85	70
Suspended Solids	mg/L	45	< 1	2	< 1
Settleable Solids	ml/L	0.1	< 0.1	< 0.1	< 0.1
Total Dissolved Solids	mg/L	750	642	706	527
Total COD	mg/L		26	39	16
Total BOD	mg/L	45	< 3	8	< 2
Total Organic Carbon	mg/L		7.58	9.59	0.79
Ammonia Nitrogen	mg/L		8.1	12.4	3.44
Organic Nitrogen	mg/L		1.5	1.7	1.2
Nitrate Nitrogen	mg/L	10	3.4	5.01	2.13
Nitrite Nitrogen	mg/L		< 0.46	1.09	< 0.01
Phosphate (PO4)	mg/L		< 2.2	4.7	< 0.5
Fluoride	mg/L	1.6	0.48	0.85	0.36
Cyanide	mg/L		< 0.02	0.218	< 0.005
Chloride	mg/L	250	151	172	113
Sulfate	mg/L	250	133	154	85.4
Total Alkalinity	mg/L		184	207	162
Total Hardness	mg/L		217	247	203
Calcium	mg/L		56.5	61.3	50.7
Magnesium	mg/L		19.6	20.9	18.2
Antimony	mg/L		< 0.0008	0.0018	0.0005
Arsenic	mg/L	0.05	< 0.001	0.0014	< 0.001
Barium	mg/L	1	0.037	0.039	0.032
Beryllium	mg/L		< 0.0005	< 0.0005	< 0.0005
Boron	mg/L	1.5	0.52	0.59	0.46
Cadmium	ug/L	5	< 0.4	< 0.4	< 0.4
Total Chromium	mg/L	0.05	< 0.01	< 0.01	< 0.01
Copper	mg/L	1.3	< 0.010	0.031	< 0.008
Iron	mg/L	0.3	0.08	0.09	0.07
Lead	mg/L	0.015	< 0.002	0.004	< 0.002
Manganese	mg/L	0.05	0.03	0.03	< 0.005
Mercury	ug/L	2	< 0.05	< 0.10	< 0.04
Nickel	mg/L	0.1	< 0.02	< 0.02	< 0.02
Potassium	mg/L		15.4	17.1	14.3
Selenium	mg/L	0.05	< 0.001	< 0.001	< 0.001
Silver	ug/L	10	< 0.2	< 0.400	0.105
Sodium	mg/L		134	142	124
Thallium	mg/L		< 0.001	< 0.001	< 0.001
Zinc	mg/L	5	0.05	0.07	0.04
TICH	ug/L		0.01	0.01	0.01
Phenols	mg/L		< 0.007	< 0.007	< 0.006
Detergents (MBAS)	mg/L	0.5	0.4	0.8	0.2
Oil and Grease	mg/L	15	< 4	< 4	< 4
Sodium Adsorption Ratio			3.75	3.87	3.63
Conductivity	umhos/cm		1098	1186	1013

SAN JOSE CREEK WEST WATER RECLAMATION PLANT
Final Effluent Quality - 2002

Constituent	Units	Limit	Mean	Maximum	Minimum
pH		6.0-9.0	7.09	7.4	6.7
Turbidity	NTU	2	1.0	2.0	0.6
Total Coliform	org./100 mL	23	< 1	3	< 1
Temperature	deg. F	100	78	86	71
Suspended Solids	mg/L	15	< 1	4	< 1
Settleable Solids	ml/L	0.1	< 0.1	< 0.1	< 0.1
Total Dissolved Solids	mg/L	750	555	672	472
Total COD	mg/L		28	40	19
Total BOD	mg/L	20	< 6	17	< 2
Total Organic Carbon	mg/L		8.9	20.6	0.79
Ammonia Nitrogen	mg/L		10.1	14.5	6.1
Organic Nitrogen	mg/L		1.7	2.2	1.4
Nitrate Nitrogen	mg/L	10	2.98	5.14	1.21
Nitrite Nitrogen	mg/L		< 0.78	1.42	< 0.01
Phosphate (PO4)	mg/L		6.4	7.8	3.8
Fluoride	mg/L	1.6	0.73	0.91	0.41
Cyanide	mg/L		< 0.010	0.017	< 0.01
Chloride	mg/L	250	118	163	103
Sulfate	mg/L	250	102	125	90.7
Total Alkalinity	mg/L		210	219	191
Total Hardness	mg/L		203	212	193
Calcium	mg/L		54.1	57.6	57.4
Magnesium	mg/L		16.4	17.2	15.5
Antimony	mg/L		< 0.0007	0.0014	< 0.0005
Arsenic	mg/L	0.05	0.0010	0.0018	0.001
Barium	mg/L	1	0.032	0.038	0.024
Beryllium	mg/L		< 0.0005	< 0.0005	< 0.0005
Boron	mg/L	1.5	0.57	0.69	0.5
Cadmium	ug/L	5	< 0.4	< 0.4	< 0.4
Total Chromium	mg/L	0.05	< 0.01	< 0.01	< 0.01
Copper	mg/L	1.3	< 0.01	0.024	< 0.008
Iron	mg/L	0.3	< 0.05	0.07	< 0.05
Lead	mg/L	0.015	< 0.002	0.003	< 0.002
Manganese	mg/L	0.05	< 0.010	0.040	0.005
Mercury	ug/L	2	< 0.05	< 0.10	< 0.04
Nickel	mg/L	0.1	< 0.02	0.03	< 0.002
Potassium	mg/L		13.6	14.4	12.7
Selenium	mg/L	0.05	< 0.001	0.001	< 0.001
Silver	ug/L	10	< 1.98	< 25	0.096
Sodium	mg/L		107	116	99.1
Thallium	mg/L		< 0.001	< 0.003	< 0.001
Zinc	mg/L	5	0.07	0.09	0.04
TICH	ug/L		0.01	0.01	0.01
Phenols	mg/L		< 0.007	0.009	< 0.006
Detergents (MBAS)	mg/L	0.5	0.3	0.7	0.1
Oil and Grease	mg/L	15	< 4.0	< 5	< 4
Sodium Adsorption Ratio			3.06	3.08	3.03

LONG BEACH WATER RECLAMATION PLANT
Final Effluent Quality - 2002

Constituent	Units	Limit	Mean	Maximum	Minimum
pH		6.0-9.0	7.32	7.7	6.5
Turbidity	NTU	2	1.1	1.9	0.6
Total Coliform	org./100 mL	23	< 1	3	< 1
Temperature	deg. F	100	77	83	71
Suspended Solids	mg/L	45	< 1	4	< 1
Settleable Solids	ml/L	0.1	< 0.1	< 0.1	< 0.1
Total Dissolved Solids	mg/L	1000	628	708	576
Total COD	mg/L		26	45	15
Total BOD	mg/L	45	4	11	2
Ammonia Nitrogen	mg/L		8.0	11.9	5.1
Organic Nitrogen	mg/L		< 1.53	3.51	< 0.2
Nitrate Nitrogen	mg/L	10	3.4	6.0	0.2
Nitrite Nitrogen	mg/L		0.66	1.77	0.22
Phosphate (PO4)	mg/L		< 3.4	7.1	< 0.5
Fluoride	mg/L	1.6	0.71	0.80	0.66
Cyanide	mg/L		< 0.010	< 0.010	< 0.010
Chloride	mg/L	250	131	144	118
Sulfate	mg/L	250	118	168	87.2
Total Alkalinity	mg/L		220	283	131
Total Hardness	mg/L		179	204	154
Calcium	mg/L		46.1	52.0	42.2
Magnesium	mg/L		11.4	14.0	9.94
Antimony	mg/L		< 0.0006	0.0012	< 0.0004
Arsenic	mg/L	0.05	0.0035	0.0052	0.0018
Barium	mg/L	1	0.038	0.050	0.030
Beryllium	mg/L		< 0.0005	< 0.0005	< 0.0004
Boron	mg/L	1.5	0.53	0.061	0.43
Cadmium	ug/L	5	< 0.4	< 0.4	< 0.4
Total Chromium	mg/L	0.05	< 0.01	< 0.01	< 0.01
Copper	mg/L	1.3	< 0.008	< 0.008	< 0.008
Iron	mg/L	0.3	0.08	0.08	0.07
Lead	mg/L	0.015	< 0.002	0.002	< 0.002
Manganese	mg/L	0.05	0.02	0.03	0.01
Mercury	ug/L	2	< 0.04	< 0.10	< 0.04
Nickel	mg/L	0.1	< 0.02	< 0.02	0.02
Selenium	mg/L	0.05	< 0.0010	< 0.0010	< 0.0010
Silicon (SiO2)	mg/L		19.2	19.9	18.6
Silver	ug/L	10	0.137	0.224	0.065
Sodium	mg/L		154	178	138
Thallium	mg/L		< 0.001	< 0.001	< 0.001
Zinc	mg/L	5	0.06	0.08	0.04
TICH	ug/L		0.01	0.01	0.01
Phenols	mg/L		< 0.013	< 0.025	< 0.006
Detergents (MBAS)	mg/L	0.5	0.39	0.64	0.24
Oil and Grease	mg/L	10	< 4	< 4	< 4
Sodium Adsorption Ratio			5.22	6.24	4.2
Conductivity	umhos/cm		1105	1356	665

LOS COYOTES WATER RECLAMATION PLANT
Final Effluent Quality - 2002

Constituent	Units	Limit	Mean	Maximum	Minimum
pH		6.0-9.0	7.16	7.6	6.3
Turbidity	NTU	2	0.8	2.2	0.5
Total Coliform	org./100 mL	23	< 1	2	< 1
Temperature	deg. F	100	78	84	71
Suspended Solids	mg/L	45	< 1	3	< 1
Settleable Solids	ml/L	0.1	< 0.1	< 0.1	< 0.1
Total Dissolved Solids	mg/L	1000	850	944	748
Total COD	mg/L		32	67	13
Total BOD	mg/L	45	3	10	1
Ammonia Nitrogen	mg/L		5.51	8.6	2.8
Organic Nitrogen	mg/L		1.6	2.5	0.35
Nitrate Nitrogen	mg/L	10	4.17	7.63	2.27
Nitrite Nitrogen	mg/L		< 0.56	0.88	< 0.20
Phosphate (PO4)	mg/L		< 1.7	4.6	< 0.5
Fluoride	mg/L	1.6	0.54	0.77	0.45
Cyanide	mg/L		< 0.011	< 0.018	< 0.005
Chloride	mg/L	250	226	266	194
Sulfate	mg/L	250	149	168	135
Total Alkalinity	mg/L		220	283	131
Total Hardness	mg/L		255	269	246
Calcium	mg/L		73.8	76.7	70.9
Magnesium	mg/L		18.6	18.9	18.3
Antimony	mg/L		0.0012	0.0020	0.0007
Arsenic	mg/L	0.05	< 0.0011	0.0015	< 0.0010
Barium	mg/L	1	0.037	0.046	0.026
Beryllium	mg/L		< 0.0005	< 0.0005	< 0.0005
Boron	mg/L	1.5	0.64	0.74	0.53
Cadmium	ug/L	5	< 0.4	< 0.4	< 0.4
Total Chromium	mg/L	0.05	< 0.01	< 0.01	< 0.01
Copper	mg/L	1.3	< 0.008	< 0.008	< 0.008
Iron	mg/L	0.3	0.23	0.31	0.19
Lead	mg/L	0.015	< 0.002	0.004	< 0.002
Manganese	mg/L	0.05	0.04	0.06	0.02
Mercury	ug/L	2	< 0.05	< 0.10	< 0.04
Nickel	mg/L	0.1	< 0.02	< 0.06	< 0.02
Selenium	mg/L	0.05	< 0.0010	< 0.0010	< 0.0010
Silicon (SiO2)	mg/L		21.6	24.2	19.3
Silver	ug/L	10	< 0.161	< 0.360	< 0.067
Sodium	mg/L		201	213	191
Thallium	mg/L		< 0.001	< 0.001	< 0.001
Zinc	mg/L	5	0.07	0.13	0.05
TICH	ug/L		0.01	0.02	0.01
Phenols	mg/L		< 0.017	< 0.025	< 0.006
Detergents (MBAS)	mg/L	0.5	0.30	0.40	0.1
Oil and Grease	mg/L	15	< 4	< 5	< 4
Sodium Adsorption Ratio			5.41	5.78	5.15
Conductivity	umhos/cm		1484	1678	1130

POMONA WATER RECLAMATION PLANT
Final Effluent Quality - 2002

Constituent	Units	Limit	Mean	Maximum	Minimum
pH		6.0-9.0	7.34	7.7	6.8
Turbidity	NTU	2	1.4	2.3	0.8
Total Coliform	org./100 mL	23	< 1	6	< 1
Temperature	deg. F	100	76	84	67
Suspended Solids	mg/L	45	< 1	5	< 1
Settleable Solids	ml/L	0.1	< 0.1	< 0.1	< 0.1
Total Dissolved Solids	mg/L	750	546	573	489
Total COD	mg/L		33	48	22
Total BOD	mg/L	45	< 4	10	< 2
Total Organic Carbon	mg/L		9.3	11.8	6.4
Ammonia Nitrogen	mg/L		13.9	19.3	7.35
Organic Nitrogen	mg/L		2.0	4.8	0.7
Nitrate Nitrogen	mg/L	10	1.11	4.9	0.1
Nitrite Nitrogen	mg/L		1.89	3.75	0.22
Phosphate (PO4)	mg/L		2.3	4.5	0.9
Fluoride	mg/L	1.6	0.37	0.45	0.31
Cyanide	mg/L		< 0.010	< 0.01	< 0.005
Chloride	mg/L	150	139	158	117
Sulfate	mg/L	300	69	86	58
Total Alkalinity	mg/L		230	273	205
Total Hardness	mg/L		203	211	193
Calcium	mg/L		57.2	60.2	51.6
Magnesium	mg/L		14.4	16.7	12.7
Antimony	mg/L		< 0.0007	0.0013	< 0.005
Arsenic	mg/L	0.05	< 0.0013	0.0024	< 0.001
Barium	mg/L	1	0.032	0.037	0.027
Beryllium	mg/L		< 0.0005	< 0.0005	< 0.0005
Boron	mg/L	1.0	0.47	0.61	0.43
Cadmium	ug/L	5	< 0.4	< 0.4	< 0.4
Total Chromium	mg/L	0.05	< 0.01	< 0.01	< 0.01
Copper	mg/L	1.3	< 0.009	0.014	< 0.008
Iron	mg/L	0.3	< 0.05	< 0.05	< 0.05
Lead	mg/L	0.015	< 0.002	0.002	< 0.002
Manganese	mg/L	0.05	< 0.009	0.01	< 0.005
Mercury	ug/L	2	< 0.1	< 0.10	< 0.104
Nickel	mg/L	0.1	< 0.02	< 0.02	< 0.02
Potassium	mg/L		12.3	13.7	11.3
Selenium	mg/L	0.05	< 0.001	< 0.001	< 0.001
Silicon (SiO2)	mg/L		21.6	22.3	20.8
Silver	ug/L	10	< 1.47	< 12.700	0.24
Sodium	mg/L		110	119	102
Thallium	mg/L		< 0.001	< 0.001	< 0.001
Zinc	mg/L	5	0.06	0.08	0.05
TICH	ug/L		0.01	0.01	0.01
Phenols	mg/L		< 0.007	0.008	< 0.006
Detergents (MBAS)	mg/L	0.5	0.14	0.30	0.07
Oil and Grease	mg/L	10	< 4	< 5	< 4
Sodium Adsorption Ratio			3.27	3.41	3.13
Conductivity	umhos/cm		1077	1157	1010

Note: Chloride limit is set lower due to possible reclaimed water impacts on groundwater during irrigation.

WHITTIER NARROWS WATER RECLAMATION PLANT
Final Effluent Quality - 2002

Constituent	Units	Limit	Mean	Maximum	Minimum
pH		6.0-9.0	7.31	7.5	7.1
Turbidity	NTU	2	0.9	1.5	0.5
Total Coliform	org./100 mL	23	< 1	2	< 1
Temperature	deg. F	100	77	84	70
Suspended Solids	mg/L	45	< 1	2	< 1
Settleable Solids	ml/L	0.1	< 0.1	< 0.1	< 0.1
Total Dissolved Solids	mg/L	600	552	571	524
Total COD	mg/L		22	40	13
Total BOD	mg/L	45	< 2	3	< 2
Total Organic Carbon	mg/L		7.13	10.0	3.6
Ammonia Nitrogen	mg/L		0.7	1.06	0.3
Organic Nitrogen	mg/L		2.52	4.84	1.75
Nitrate Nitrogen	mg/L	10	5.25	6.59	3.5
Nitrite Nitrogen	mg/L		0.05	0.16	0.02
Phosphate (PO4)	mg/L		< 3.45	21.0	< 0.5
Fluoride	mg/L	1.6	0.66	0.77	0.56
Cyanide	mg/L		< 0.010	< 0.010	< 0.005
Chloride	mg/L	100	97.2	107.2	46
Sulfate	mg/L	150	104	115	91
Total Alkalinity	mg/L		170	184	155
Total Hardness	mg/L		191	221	163
Calcium	mg/L		49.1	54.2	46.5
Magnesium	mg/L		15.0	15.5	14.3
Antimony	mg/L		< 0.0007	0.0021	< 0.0005
Arsenic	mg/L	0.05	< 0.0013	0.0027	< 0.0010
Barium	mg/L	1	0.033	0.042	0.014
Beryllium	mg/L		< 0.0005	< 0.0005	< 0.0005
Boron	mg/L	1.5	0.44	0.50	0.36
Cadmium	ug/L	5	< 0.4	< 0.7	< 0.4
Total Chromium	mg/L	0.05	< 0.01	< 0.01	< 0.01
Copper	mg/L	1.3	< 0.004	< 0.008	< 0.0018
Iron	mg/L	0.3	< 0.05	0.06	< 0.05
Lead	mg/L	0.015	< 0.002	0.003	< 0.002
Manganese	mg/L	0.05	< 0.007	0.010	< 0.005
Mercury	ug/L	2	< 0.05	< 0.10	< 0.04
Nickel	mg/L	0.1	< 0.014	< 0.02	< 0.02
Potassium	mg/L		13.0	14.3	11.9
Selenium	mg/L	0.05	< 0.0007	0.0015	< 0.0010
Silver	ug/L	10	< 0.088	< 0.487	< 0.0004
Sodium	mg/L		117	122	112
Thallium	mg/L		< 0.001	< 0.001	< 0.001
Zinc	mg/L	5	0.07	0.09	0.06
TICH	ug/L		0.01	0.01	0.01
Phenols	mg/L		< 0.006	< 0.006	< 0.006
Detergents (MBAS)	mg/L	0.5	< 0.08	< 0.10	0.04
Oil and Grease	mg/L	10	< 4	< 5	< 4
Sodium Adsorption Ratio			3.68	3.73	3.62
Conductivity	umhos/cm		933	1000	858

VALENCIA WATER RECLAMATION PLANT
Final Effluent Quality - 2002

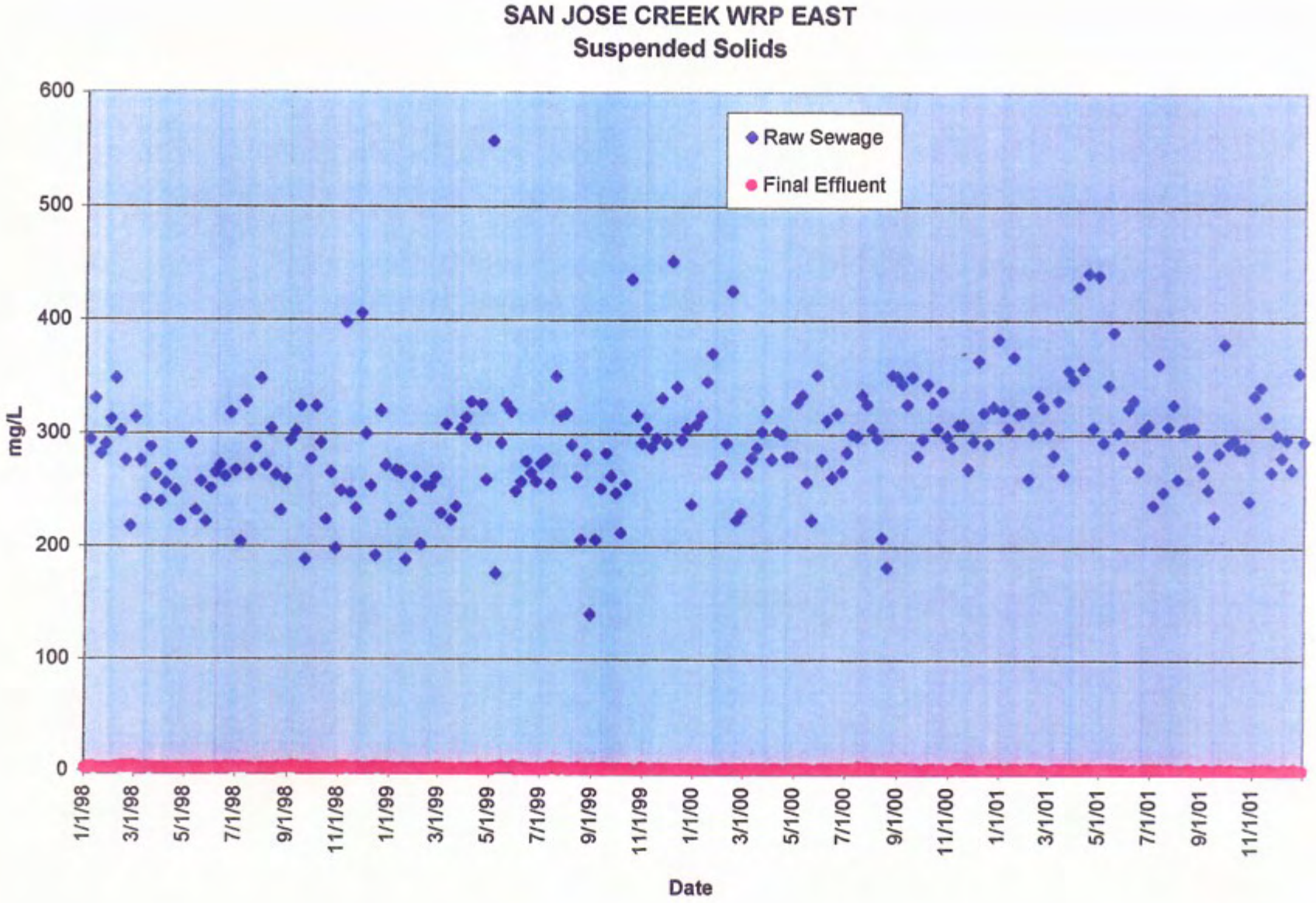
Constituent	Units	Limit	Mean	Maximum	Minimum
pH		6.0-9.0	7.22	8.2	6.9
Turbidity	NTU	2	1.4	2.7	0.7
Total Coliform	org./100 mL	23	< 1	2	< 1
Temperature	deg. F	100	76	83	69
Suspended Solids	mg/L	45	3	5	1
Settleable Solids	ml/L	0.1	< 0.1	< 0.1	< 0.1
Total Dissolved Solids	mg/L	1000	802	853	698
Total COD	mg/L		30	49	22
Total BOD	mg/L	45	9	17	2
Ammonia Nitrogen	mg/L		22.1	26.9	17.1
Organic Nitrogen	mg/L		0.8	1.1	0.3
Nitrate Nitrogen	mg/L	10	1.86	4.61	0.1
Nitrite Nitrogen	mg/L		2.89	3.78	1.96
Phosphate (PO4)	mg/L		< 0.5	< 0.5	< 0.5
Fluoride	mg/L	1.6	0.37	0.48	0.29
Cyanide	mg/L		< 0.01	< 0.014	< 0.005
Chloride	mg/L	300	187	208	165
Sulfate	mg/L	450	175	205	140
Total Alkalinity	mg/L		256	295	182
Total Hardness	mg/L		254	294	173
Calcium	mg/L		60.2	65.8	55.3
Magnesium	mg/L		23.0	24.0	21.9
Antimony	mg/L		0.0014	0.0037	0.0007
Arsenic	mg/L	0.05	< 0.001	0.0013	< 0.001
Barium	mg/L	1	0.02	0.018	0.012
Beryllium	mg/L		< 0.0005	< 0.0005	< 0.0004
Boron	mg/L	1.5	0.83	0.93	0.74
Cadmium	ug/L	5	< 0.4	< 0.4	< 0.4
Total Chromium	mg/L	0.05	< 0.01	< 0.01	< 0.01
Copper	mg/L	1.3	< 0.008	0.008	< 0.008
Iron	mg/L	0.3	0.10	0.11	0.09
Lead	mg/L	0.015	0.002	0.002	0.001
Manganese	mg/L	0.05	0.019	0.020	0.005
Mercury	ug/L	2	< 0.10	0.10	< 0.04
Nickel	mg/L	0.1	< 0.02	< 0.02	< 0.02
Selenium	mg/L	0.05	< 0.001	0.001	0.001
Silver	ug/L	10	< 0.14	< 0.350	< 0.065
Sodium	mg/L		174	178	165
Thallium	mg/L		< 0.001	< 0.001	< 0.001
Zinc	mg/L	5	0.03	0.06	0.02
TICH	ug/L		0.01	0.01	0.01
Phenols	mg/L		< 0.014	< 0.025	< 0.006
Detergents (MBAS)	mg/L	0.5	0.11	0.20	0.10
Oil and Grease	mg/L	10	< 5	< 5	< 4
Sodium Adsorption Ratio			4.59	5.08	3.87
Conductivity	umhos/cm		1472	1621	947

SAUGUS WATER RECLAMATION PLANT
Final Effluent Quality - 2002

Constituent	Units	Limit	Mean	Maximum	Minimum
pH		6.0-9.0	7.37	7.7	7.1
Turbidity	NTU	2	1.2	2.9	0.7
Total Coliform	org./100 mL	23	< 1	2	< 1
Temperature	deg. F	100	73	86	69
Suspended Solids	mg/L	45	2	5	1
Settleable Solids	ml/L	0.1	< 0.1	< 0.1	< 0.1
Total Dissolved Solids	mg/L	1000	720	803	634
Total COD	mg/L		37	56	23
Total BOD	mg/L	45	5	11	2
Ammonia Nitrogen	mg/L		14.64	22.1	7.21
Organic Nitrogen	mg/L		1.9	3.7	0.7
Nitrate Nitrogen	mg/L	10	2.35	5.50	0.15
Nitrite Nitrogen	mg/L		1.73	3.22	0.21
Phosphate (PO4)	mg/L		< 0.6	1.0	< 0.5
Fluoride	mg/L	1.6	0.30	0.49	0.23
Cyanide	mg/L		< 0.009	< 0.010	< 0.005
Chloride	mg/L	300	172	190	153
Sulfate	mg/L	450	134	168	103
Total Alkalinity	mg/L		220	317	123
Total Hardness	mg/L		206	297	122
Calcium	mg/L		43.0	44.4	39.9
Magnesium	mg/L		19.6	20.2	18.9
Antimony	mg/L		< 0.0006	0.0017	< 0.005
Arsenic	mg/L	0.05	< 0.0011	0.0013	< 0.00
Barium	mg/L	1	0.014	0.02	0.008
Beryllium	mg/L		< 0.0005	< 0.0005	< 0.0005
Boron	mg/L	1.5	0.82	1.04	0.71
Cadmium	ug/L	5	< 0.4	< 0.4	< 0.04
Total Chromium	mg/L	0.05	< 0.01	< 0.01	< 0.01
Copper	mg/L	1.3	< 0.013	0.047	< 0.0058
Iron	mg/L	0.3	0.09	0.10	0.07
Lead	mg/L	0.015	< 0.002	< 0.002	< 0.002
Manganese	mg/L	0.05	< 0.015	0.020	< 0.005
Mercury	ug/L	2	< 0.04	< 0.10	< 0.04
Nickel	mg/L	0.1	< 0.02	< 0.02	< 0.02
Selenium	mg/L	0.05	< 0.001	0.001	< 0.001
Silver	ug/L	10	< 1.14	< 12.56	< 0.03
Sodium	mg/L		168	171	164
Thallium	mg/L		< 0.001	< 0.001	< 0.001
Zinc	mg/L	5	0.03	0.06	0.02
TICH	ug/L		< 0.01	0.01	< 0.01
Phenols	mg/L		< 0.006	< 0.007	< 0.005
Detergents (MBAS)	mg/L	0.5	0.22	0.47	0.10
Oil and Grease	mg/L	10	< 5	< 5	< 4
Sodium Adsorption Ratio			4.77	5.5	3.03
Conductivity	umhos/cm		1347	1595	909

APPENDIX C

GRAPHS OF FINAL EFFLUENT SUSPENDED SOLIDS 1998-2002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Raw Sewage
Final Effluent
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200
100
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5/1/98
7/1/98
9/1/98
11/1/98
1/1/99
3/1/99
5/1/99
7/1/99
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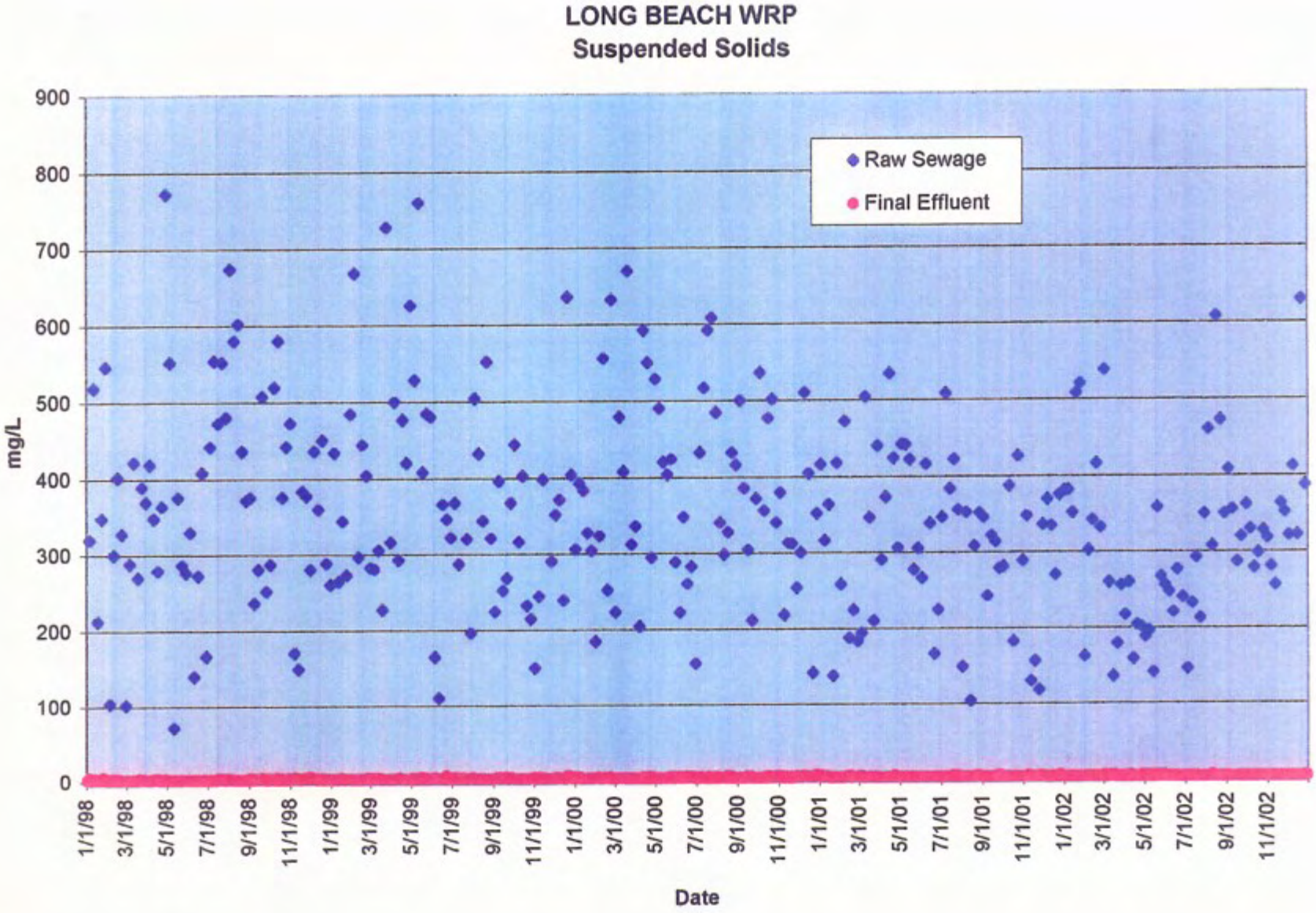
5/1/01
7/1/01
9/1/01
11/1/01
Date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Suspended Solids
Raw Sewage
Final Effluent
mg/L
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800
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600
500
400
300
200
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3/1/98
5/1/98
7/1/98
9/1/98
11/1/98
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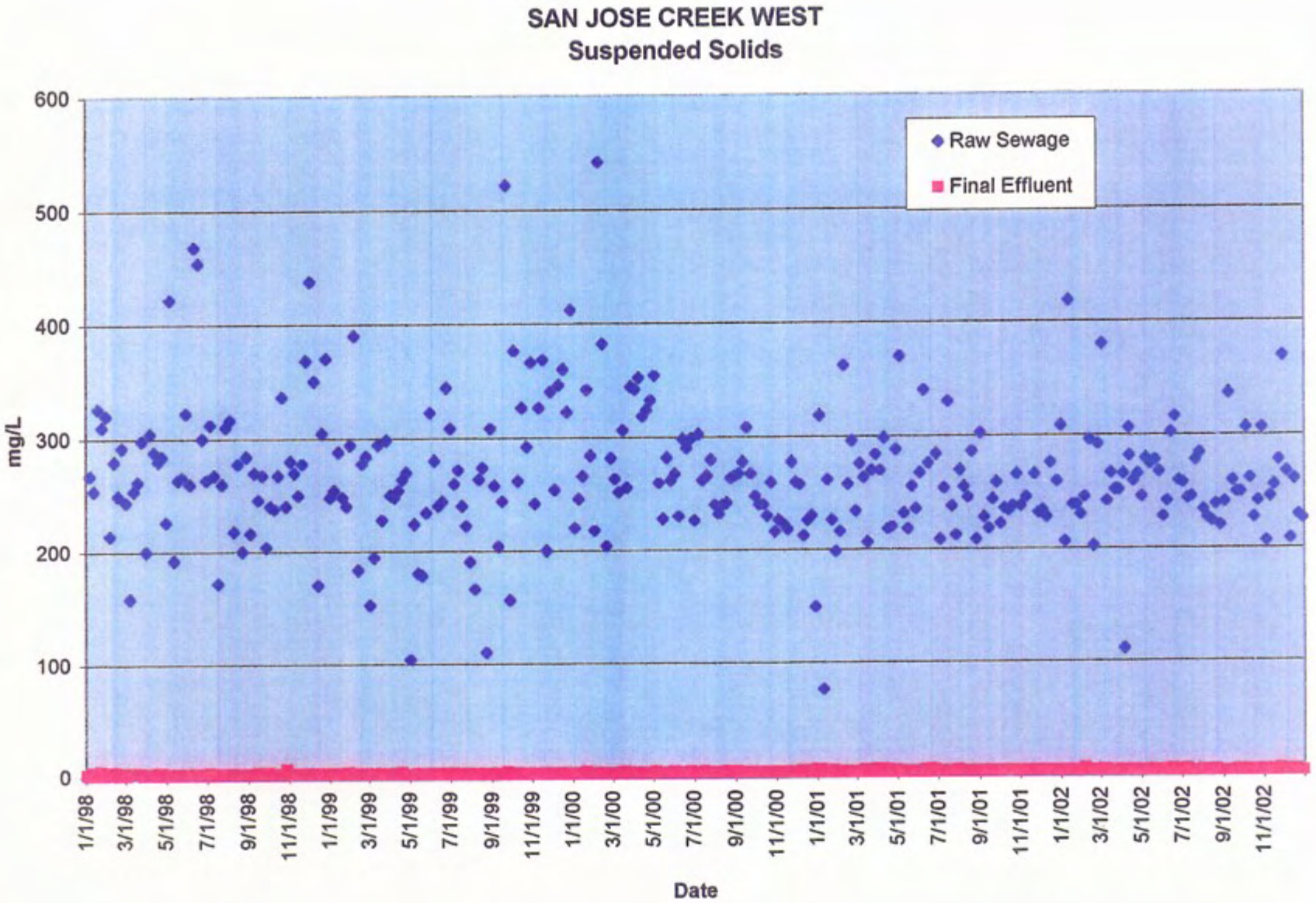
11/1/02
Date


SAN JOSE CREEK WEST
Suspended Solids
Raw Sewage
Final Effluent
mg/L
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500
400
300
200
100
0
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3/1/98
5/1/98
7/1/98
9/1/98
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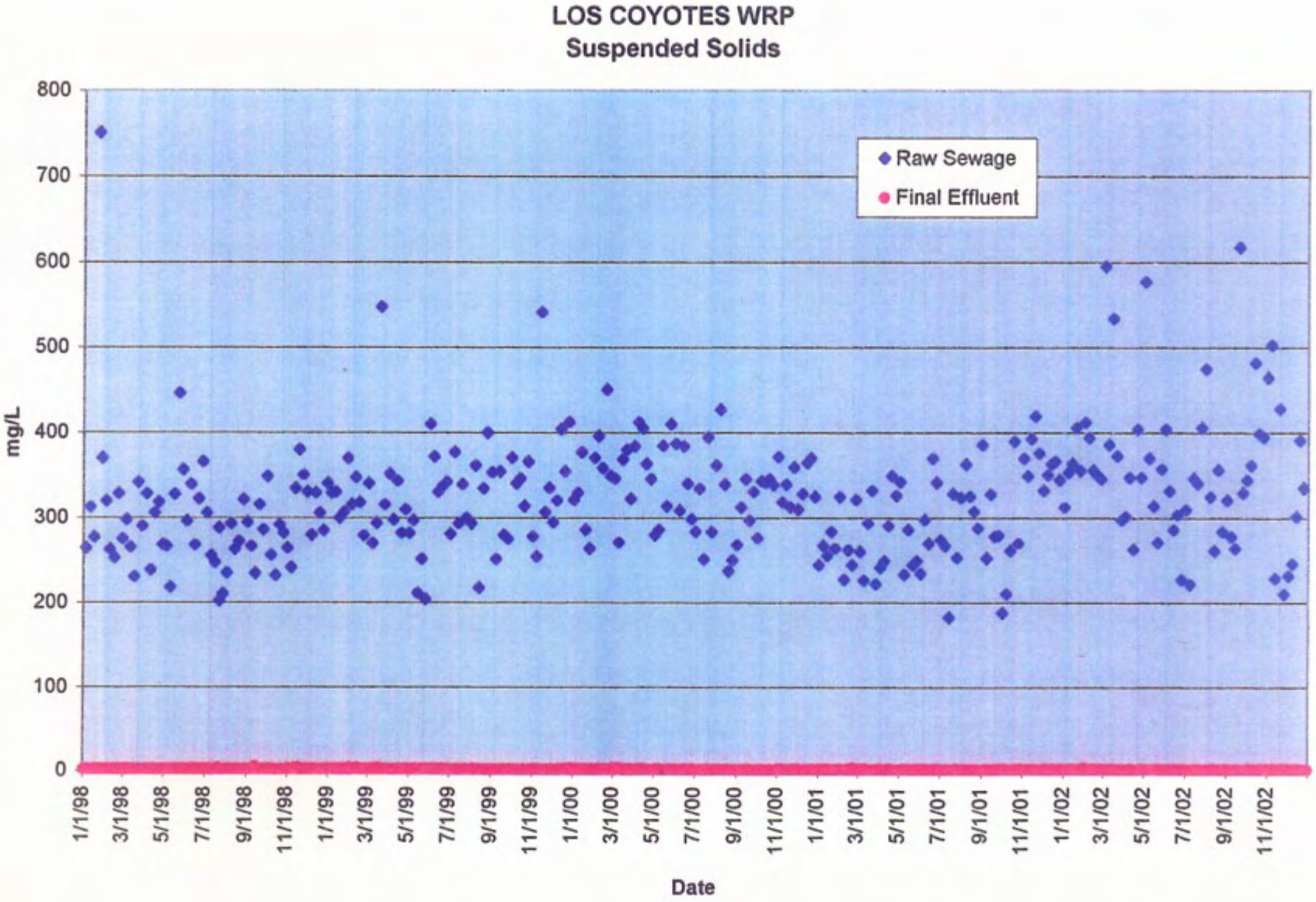
11/1/02
Date


LOS COYOTES WRP
Suspended Solids
Raw Sewage
Final Effluent
mg/L
800
700
600
500
400
300
200
100
0
1/1/98
3/1/98
5/1/98
7/1/98
9/1/98
11/1/98
1/1/99
3/1/99
5/1/99
7/1/99
9/1/99
11/1/99
1/1/00
3/1/00
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7/1/00
9/1/00
11/1/00
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3/1/01
5/1/01
7/1/01
9/1/01
11/1/01
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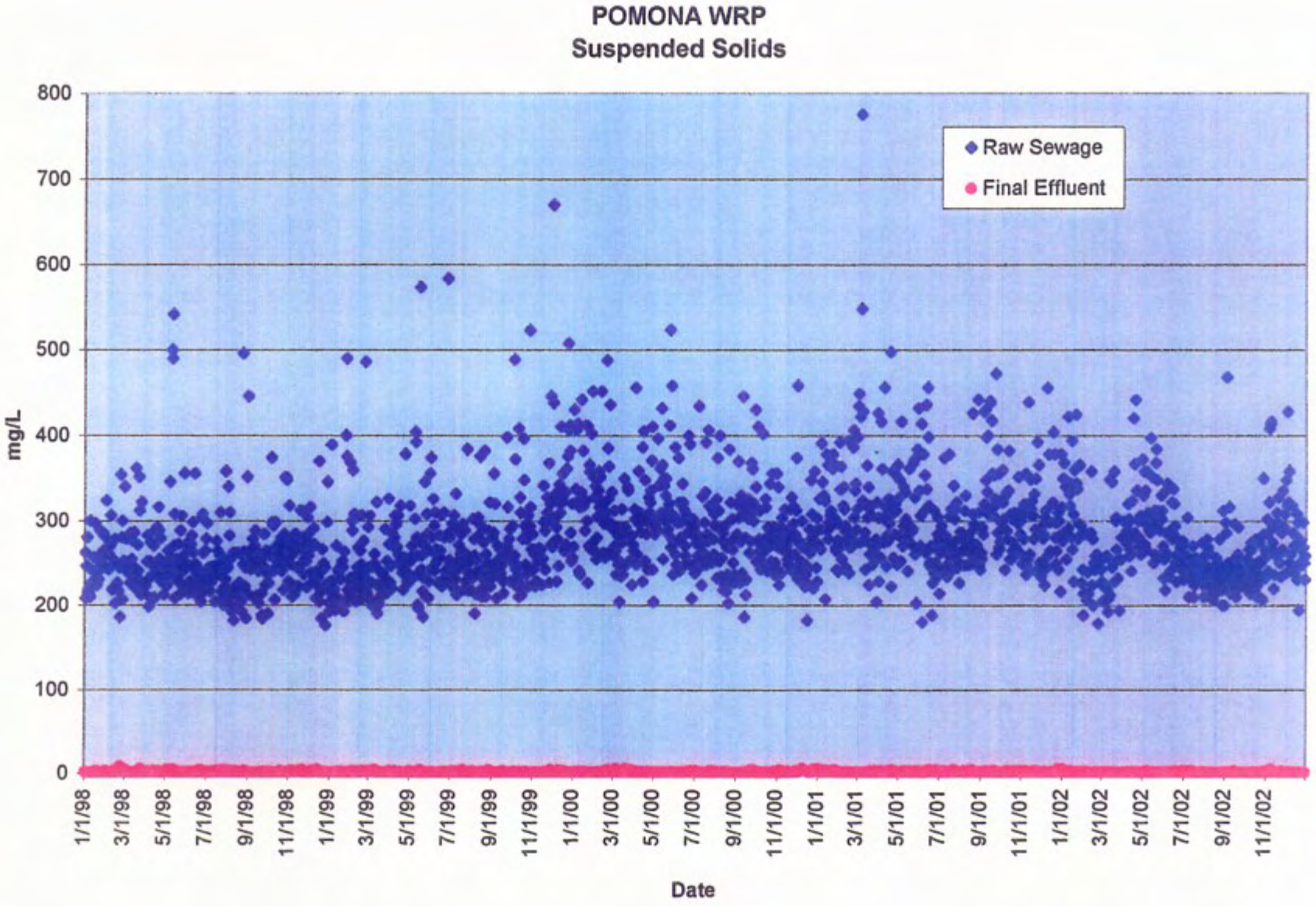
3/1/02
5/1/02
7/1/02
9/1/02
11/1/02
Date


POMONA WRP
Suspended Solids
Raw Sewage
Final Effluent
mg/L
800
700
600
500
400
300
200
100
0
1/1/98
3/1/98
5/1/98
7/1/98
9/1/98
11/1/98
1/1/99
3/1/99
5/1/99
7/1/99
9/1/99
11/1/99
1/1/00
3/1/00
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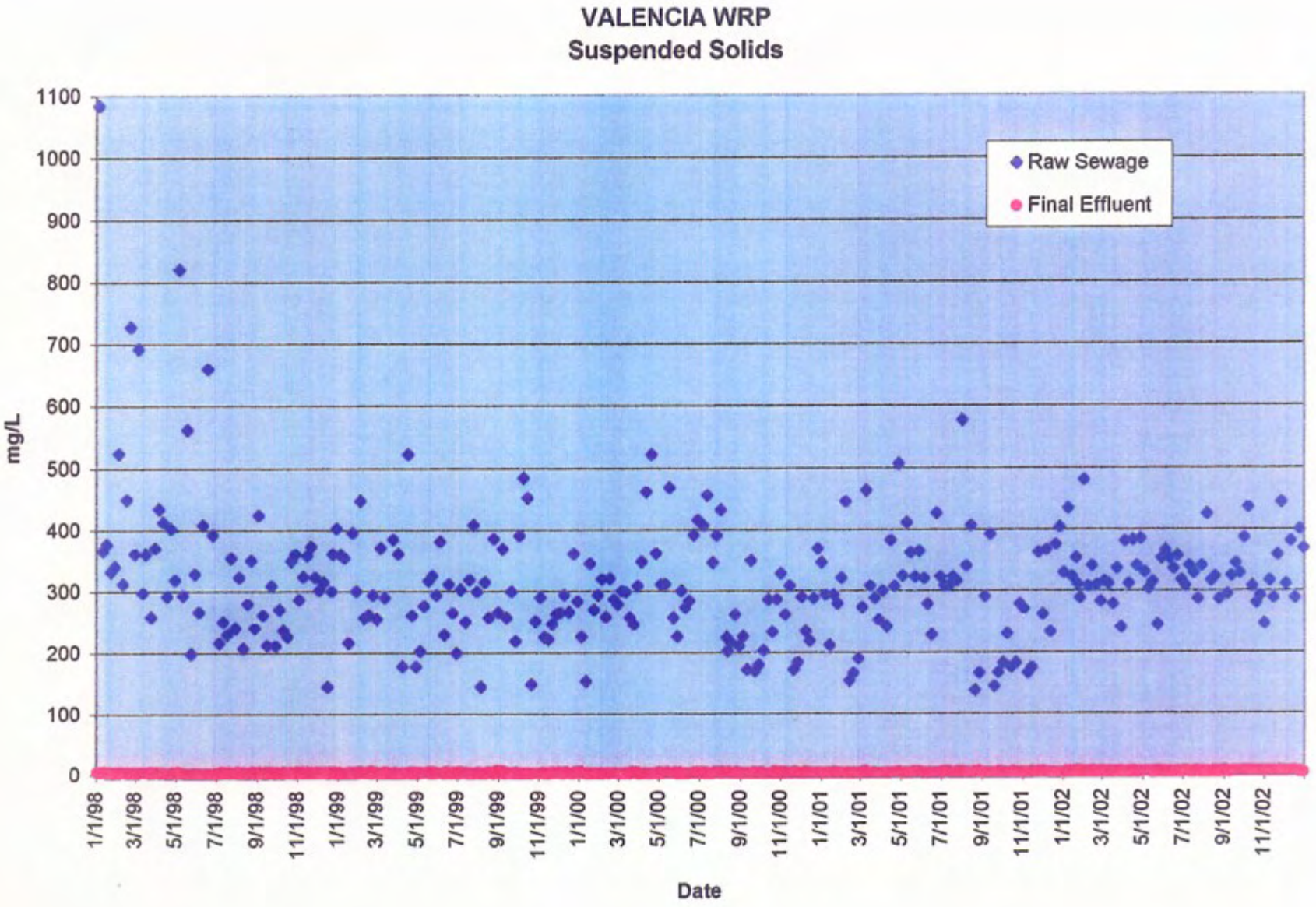
11/1/00
1/1/01
3/1/01
5/1/01
7/1/01
9/1/01
11/1/01
1/1/02
3/1/02
5/1/02
7/1/02
9/1/02
11/1/02
Date


VALENCIA WRP
Suspended Solids
Raw Sewage
Final Effluent
mg/L
1100
1000
900
800
700
600
500
400
300
200
100
0
1/1/98
3/1/98
5/1/98
7/1/98
9/1/98
11/1/98
1/1/99
3/1/99
5/1/99
7/1/99
9/1/99
11/1/99
1/1/00
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11/1/00
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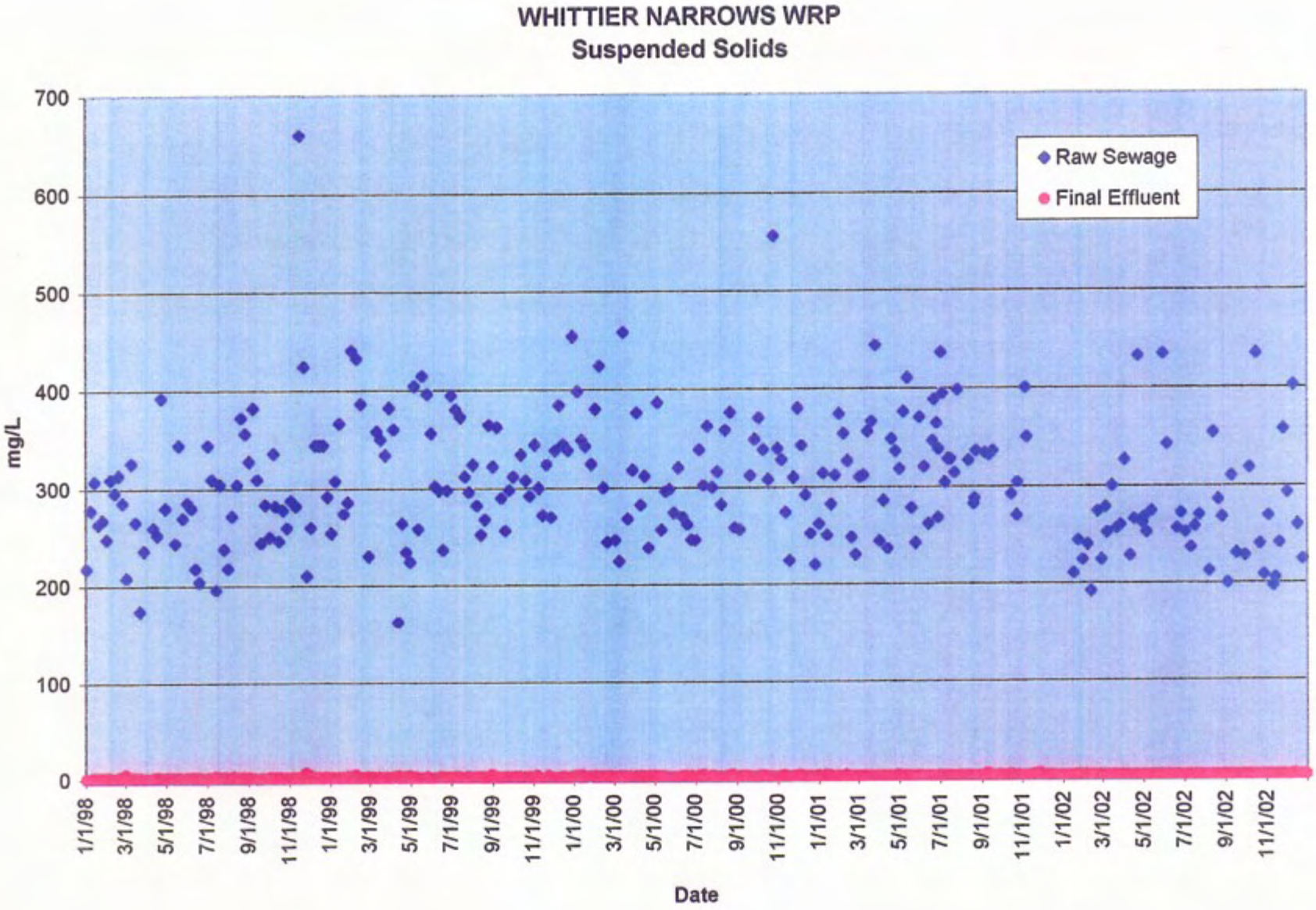
7/1/01
9/1/01
11/1/01
1/1/02
3/1/02
5/1/02
7/1/02
9/1/02
11/1/02
Date


WHITTIER NARROWS WRP
Suspended Solids
Raw Sewage
Final Effluent
mg/L
700
600
500
400
300
200
100
0
1/1/98
3/1/98
5/1/98
7/1/98
9/1/98
11/1/98
1/1/99
3/1/99
5/1/99
7/1/99
9/1/99
11/1/99
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3/1/01
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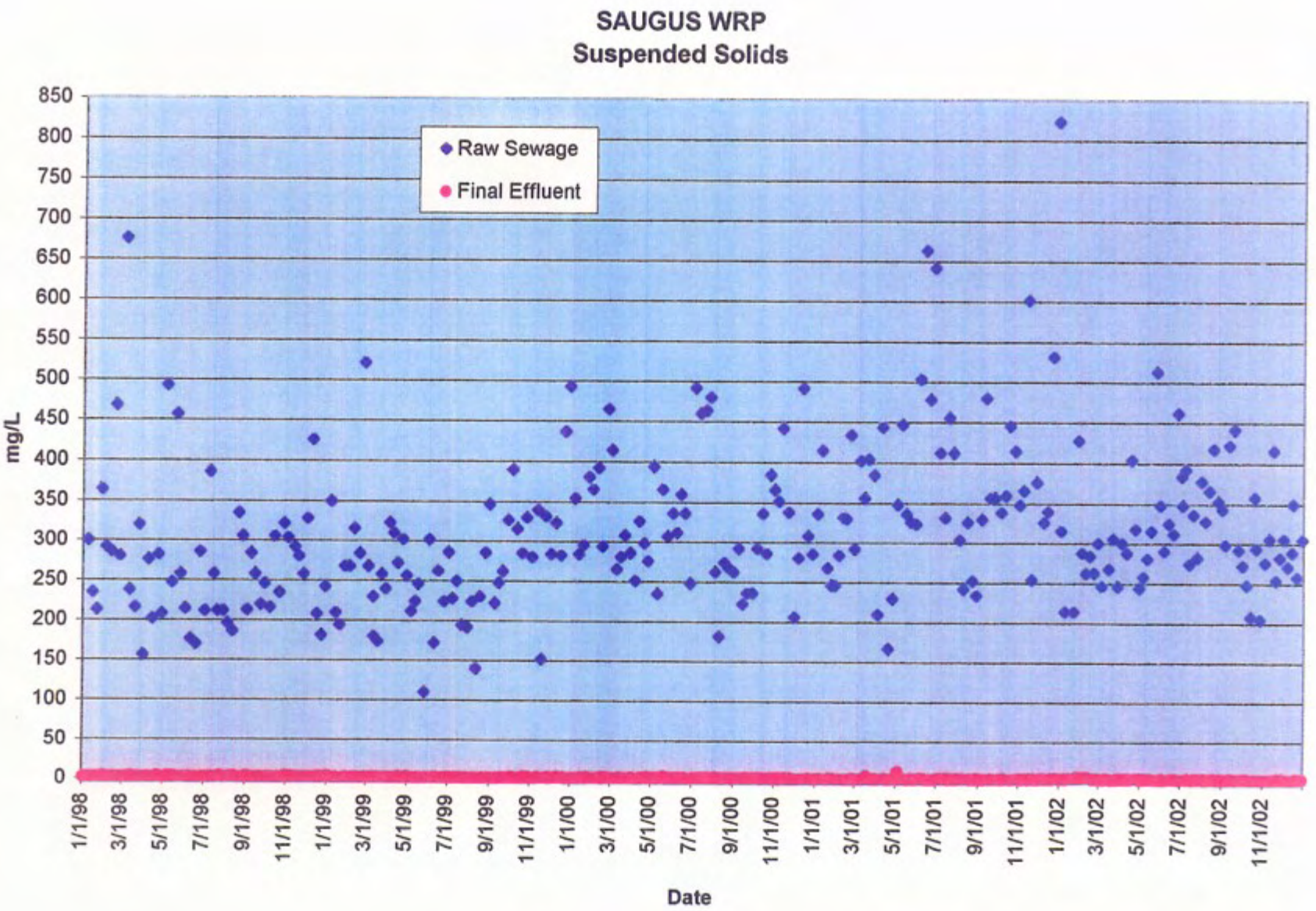
7/1/01
9/1/01
11/1/01
1/1/02
3/1/02
5/1/02
7/1/02
9/1/02
11/1/02
Date


SAUGUS WRP
Suspended Solids
Raw Sewage
Final Effluent
mg/L
850
800
750
700
650
600
550
500
450
400
350
300
250
200
150
100
50
0
1/1/98
3/1/98
5/1/98
7/1/98
9/1/98
11/1/98
1/1/99
3/1/99
5/1/99
7/1/99
9/1/99
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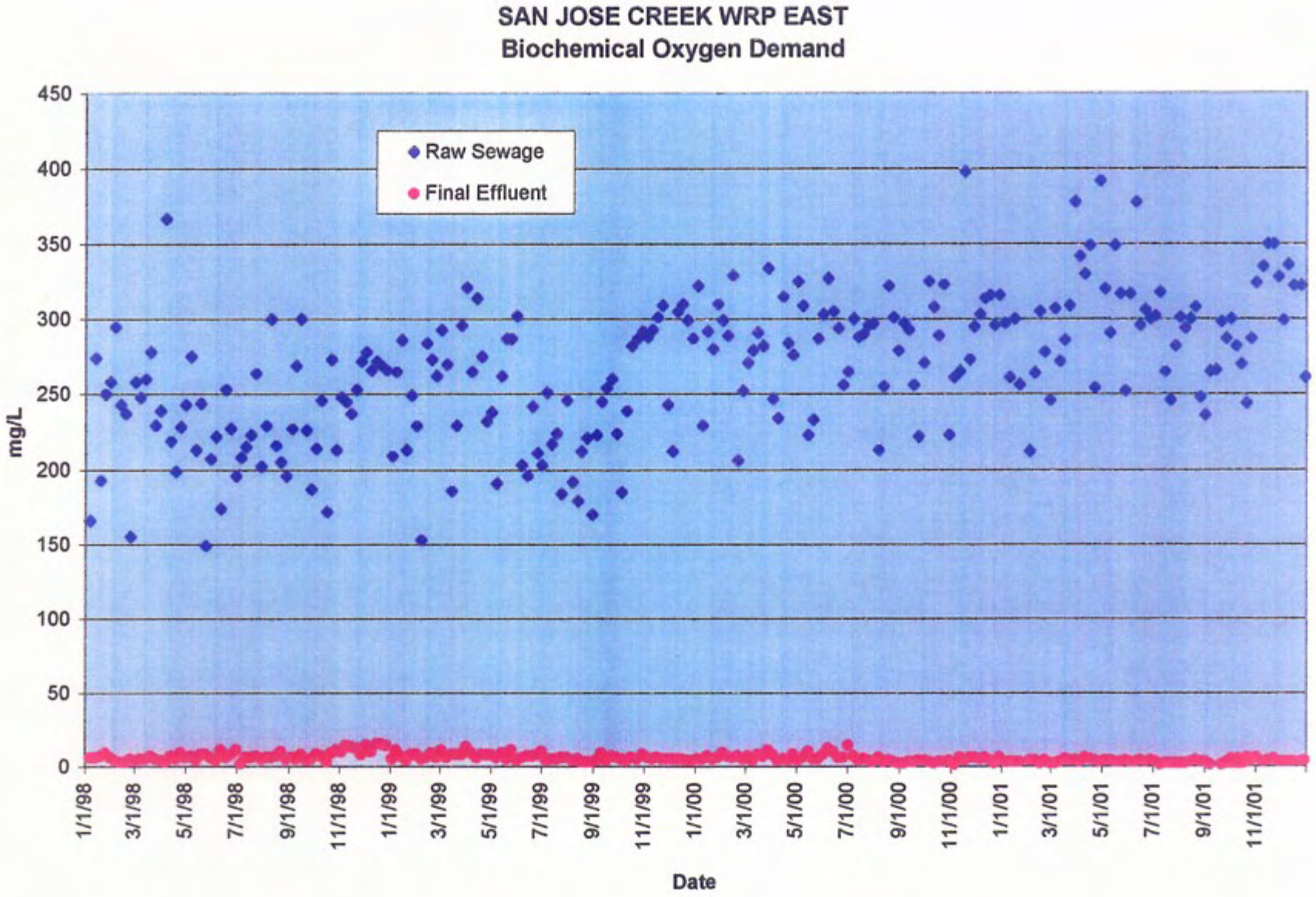
5/1/00
7/1/00
9/1/00
11/1/00
1/1/01
3/1/01
5/1/01
7/1/01
9/1/01
11/1/01
1/1/02
3/1/02
5/1/02
7/1/02
9/1/02
11/1/02
Date

APPENDIX D

GRAPHS OF FINAL EFFLUENT BOD
1998-2002


SAN JOSE CREEK WRP EAST
Biochemical Oxygen Demand
Raw Sewage
Final Effluent
mg/L
450
400
350
300
250
200
150
100
50
0
1/1/98
3/1/98
5/1/98
7/1/98
9/1/98
11/1/98
1/1/99
3/1/99
5/1/99
7/1/99
9/1/99
11/1/99
1/1/00
3/1/00
5/1/00
7/1/00
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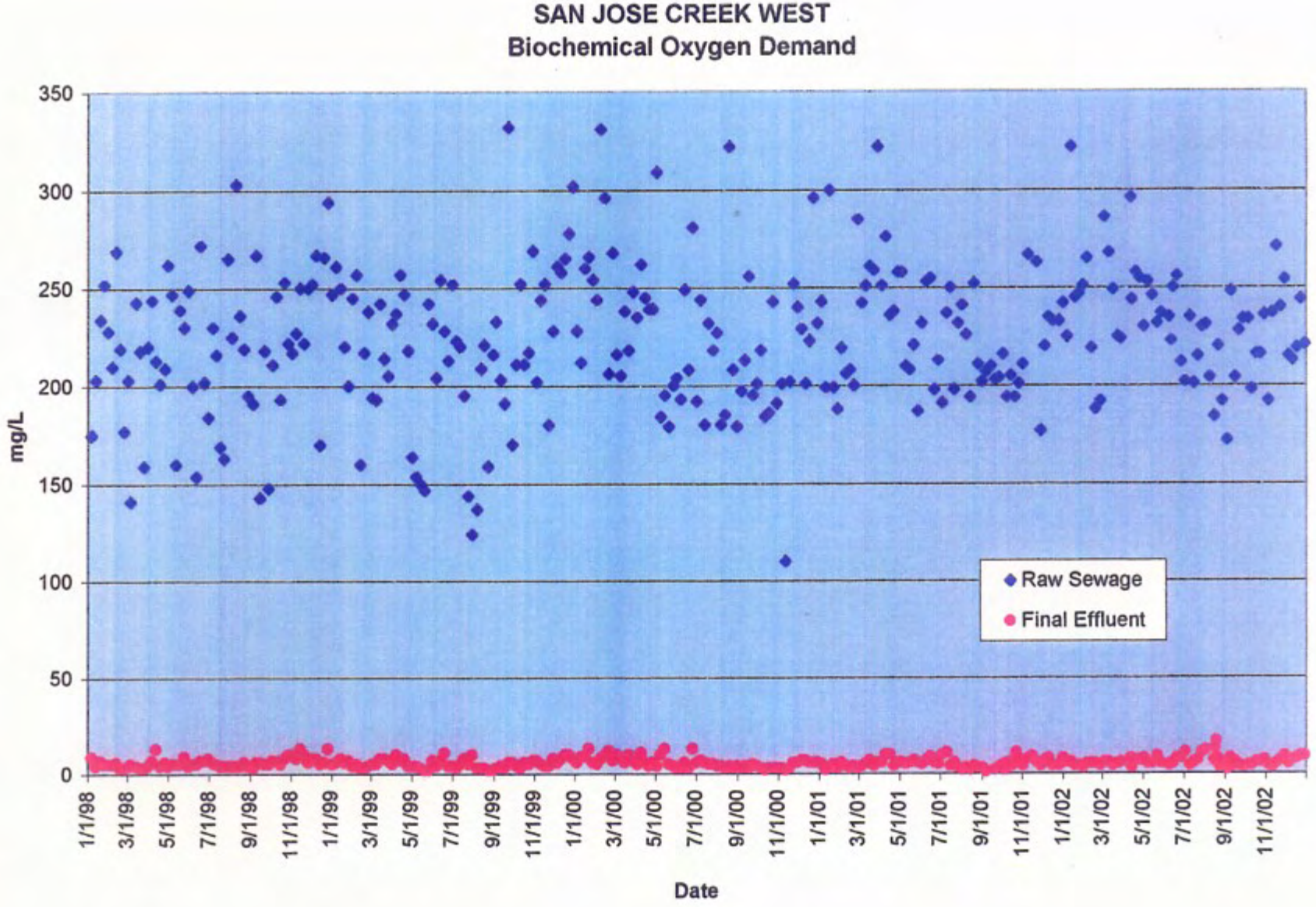
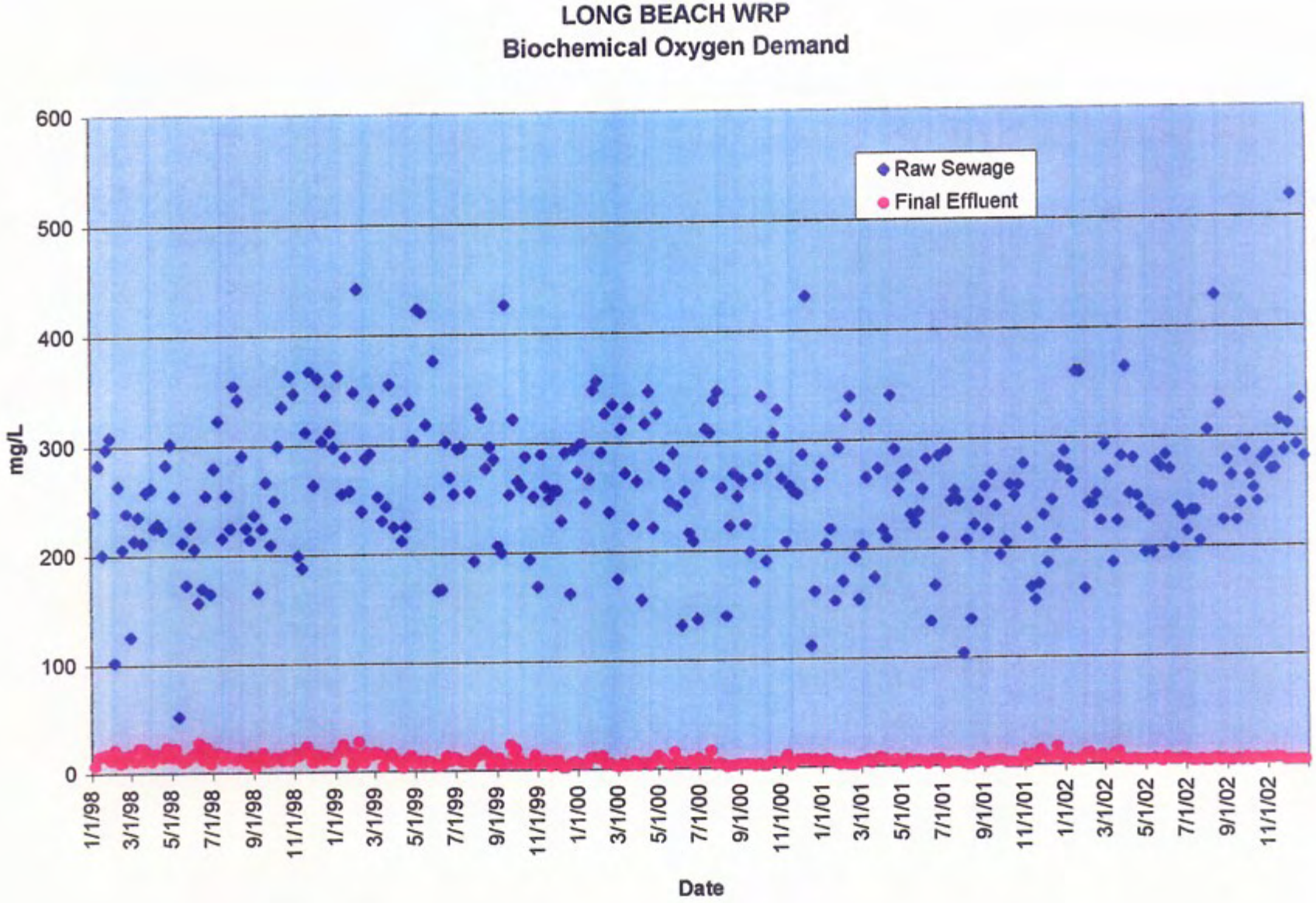
1/1/01
3/1/01
5/1/01
7/1/01
9/1/01
11/1/01
Date


SAN JOSE CREEK WEST
Biochemical Oxygen Demand
mg/L
350
300
250
200
150
100
50
0
1/1/98
3/1/98
5/1/98
7/1/98
9/1/98
11/1/98
1/1/99
3/1/99
5/1/99
7/1/99
9/1/99
11/1/99
1/1/00
3/1/00
5/1/00
7/1/00
9/1/00
11/1/00
1/1/01
3/1/01
5/1/01
7/1/01
9/1/01
11/1/01
1/1/02
3/1/02
5/1/02
7/1/02
9/1/02
11/1/02
Date
Raw Sewage
Final Effluent


LONG BEACH WRP
Biochemical Oxygen Demand
Raw Sewage
Final Effluent
mg/L
600
500
400
300
200
100
0
1/1/98
3/1/98
5/1/98
7/1/98
9/1/98
11/1/98
1/1/99
3/1/99
5/1/99
7/1/99
9/1/99
11/1/99
1/1/00
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5/1/00
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9/1/00
11/1/00
1/1/01
3/1/01
5/1/01
7/1/01
9/1/01
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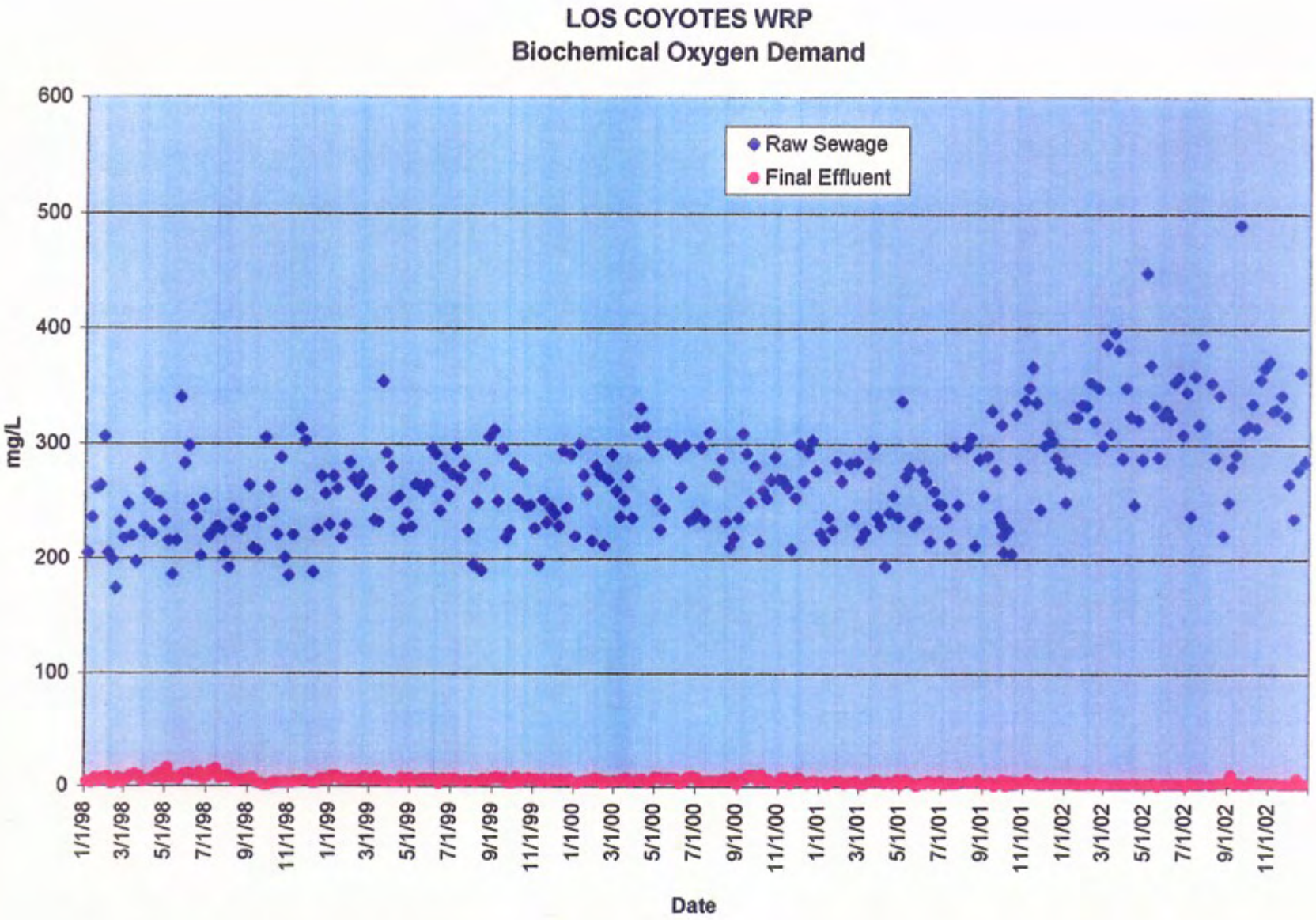
1/1/02
3/1/02
5/1/02
7/1/02
9/1/02
11/1/02
Date


LOS COYOTES WRP
Biochemical Oxygen Demand
Raw Sewage
Final Effluent
mg/L
600
500
400
300
200
100
0
1/1/98
3/1/98
5/1/98
7/1/98
9/1/98
11/1/98
1/1/99
3/1/99
5/1/99
7/1/99
9/1/99
11/1/99
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7/1/01
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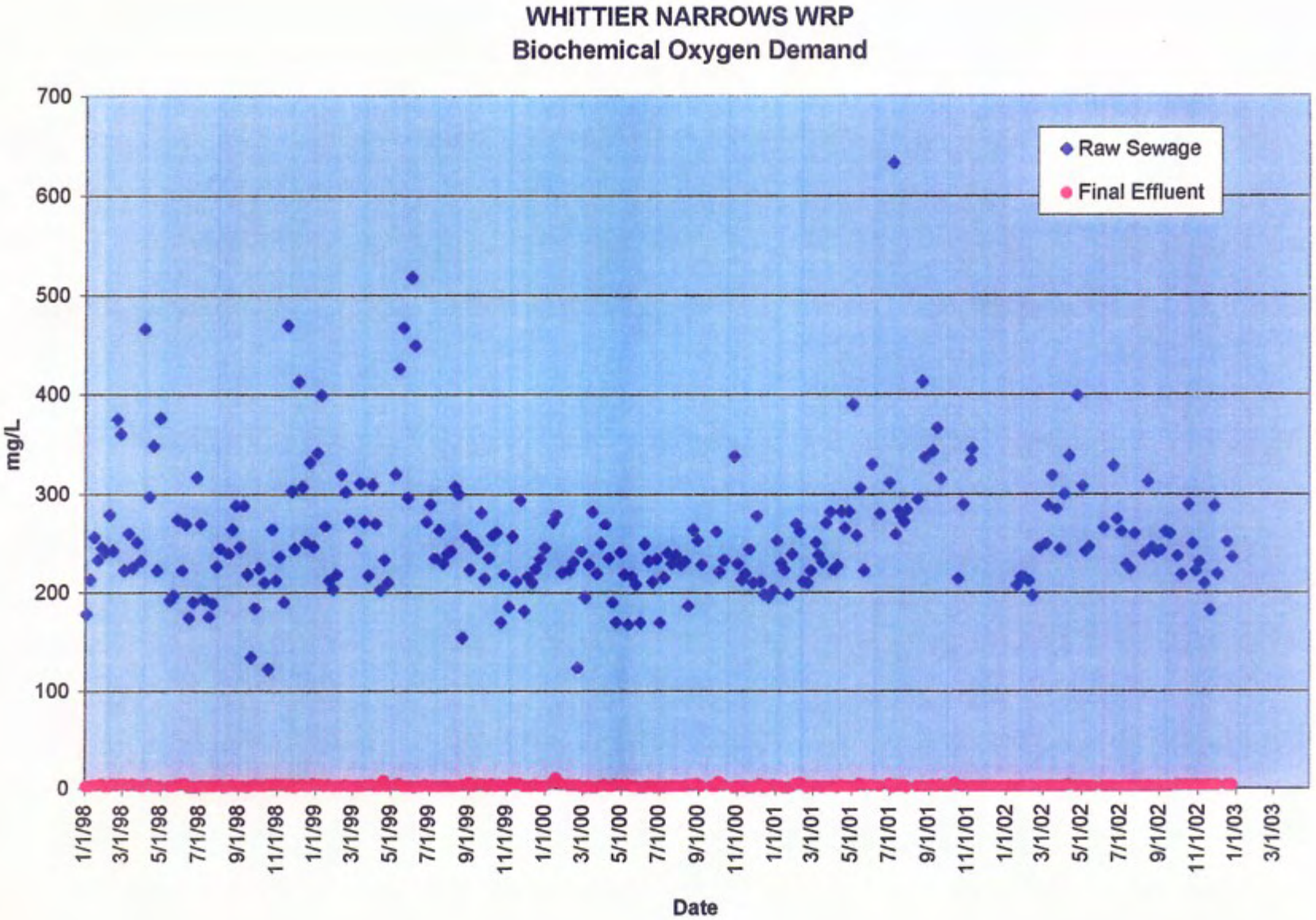
7/1/02
9/1/02
11/1/02
Date


WHITTIER NARROWS WRP
Biochemical Oxygen Demand
Raw Sewage
Final Effluent
mg/L
700
600
500
400
300
200
100
0
1/1/98
3/1/98
5/1/98
7/1/98
9/1/98
11/1/98
1/1/99
3/1/99
5/1/99
7/1/99
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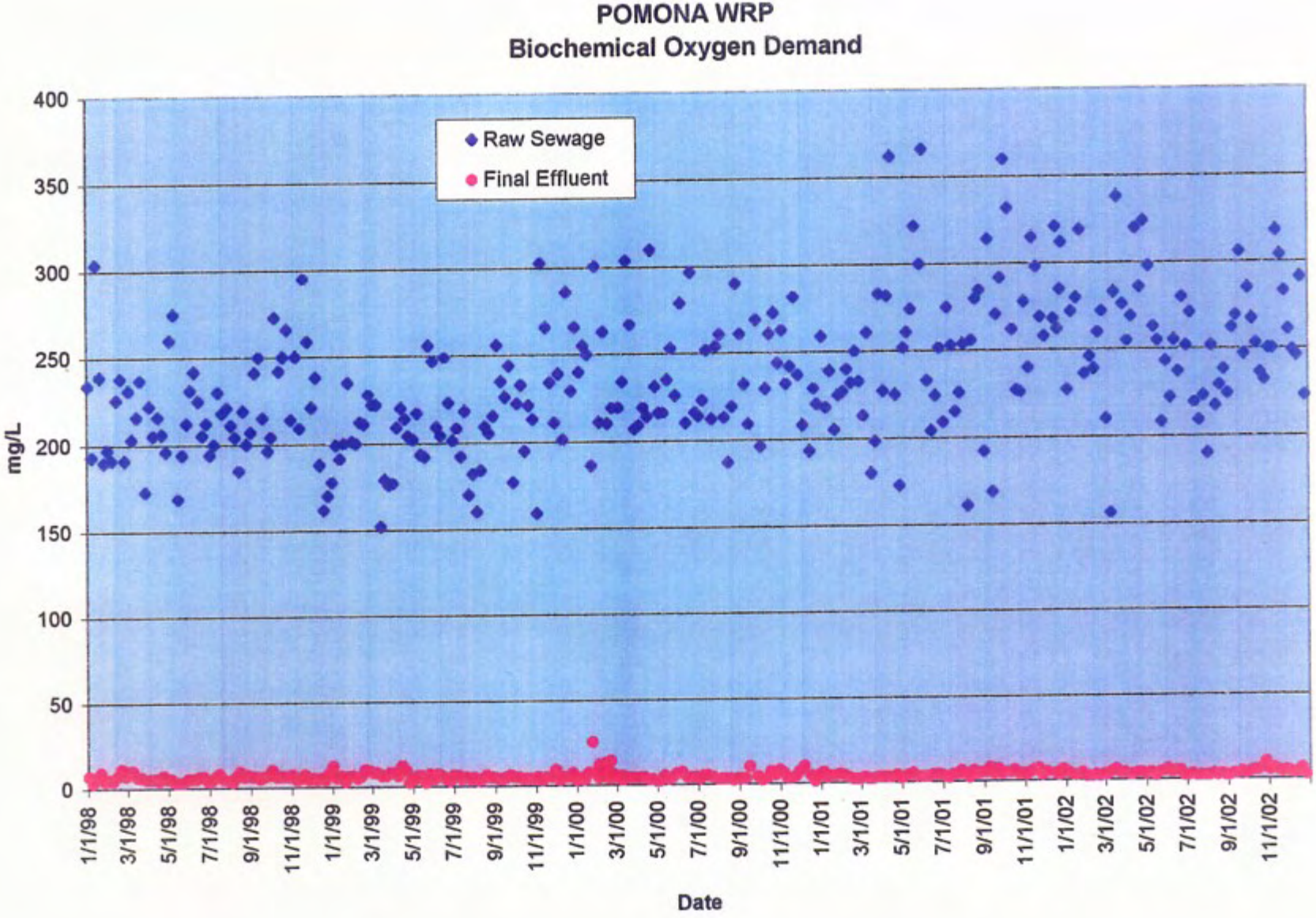
1/1/03
3/1/03
Date


POMONA WRP
Biochemical Oxygen Demand
Raw Sewage
Final Effluent
mg/L
400
350
300
250
200
150
100
50
0
1/1/98
3/1/98
5/1/98
7/1/98
9/1/98
11/1/98
1/1/99
3/1/99
5/1/99
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9/1/01
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1/1/02
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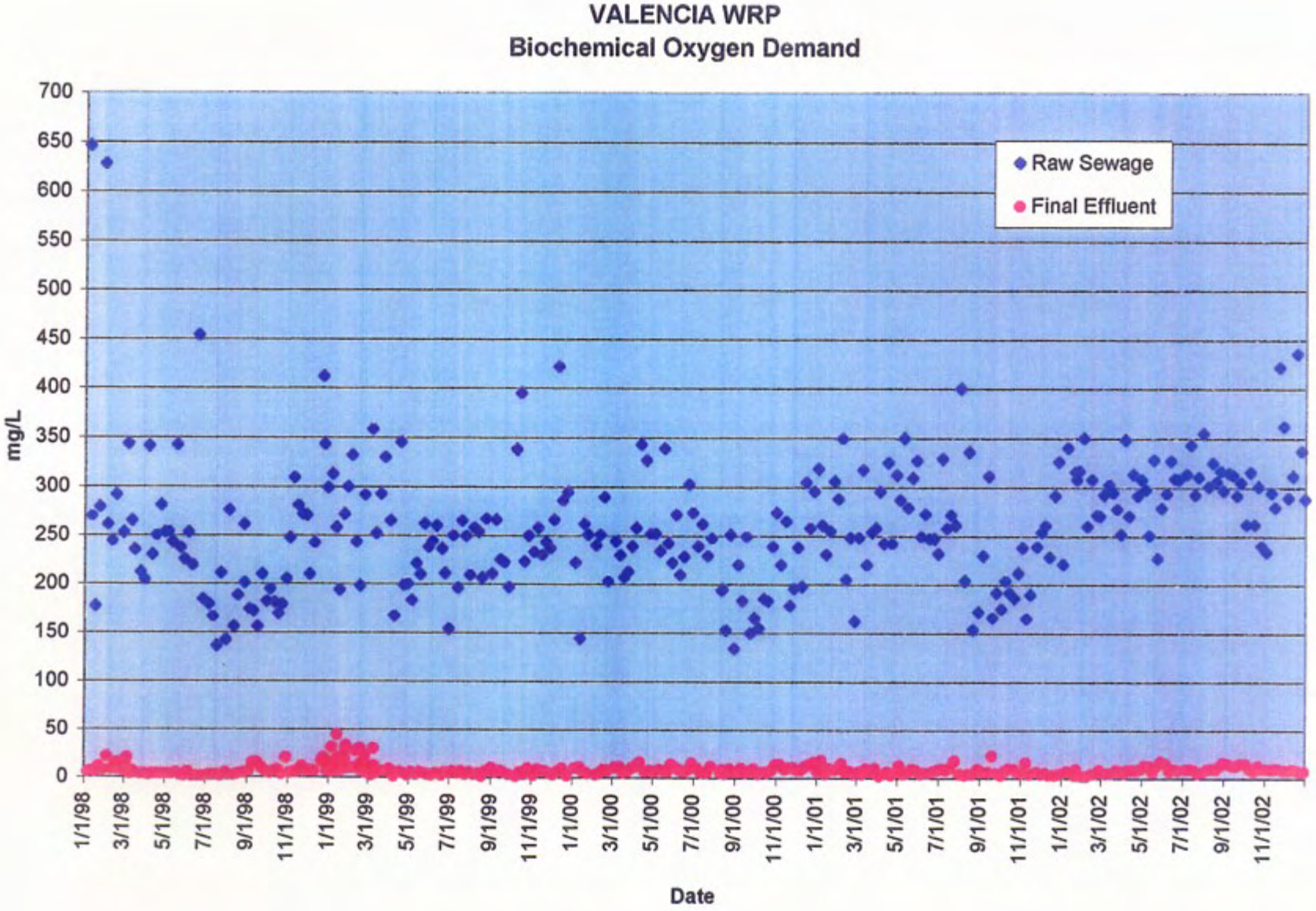
9/1/02
11/1/02
Date


VALENCIA WRP
Biochemical Oxygen Demand
Raw Sewage
Final Effluent
mg/L
700
650
600
550
500
450
400
350
300
250
200
150
100
50
0
1/1/98
3/1/98
5/1/98
7/1/98
9/1/98
11/1/98
1/1/99
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5/1/99
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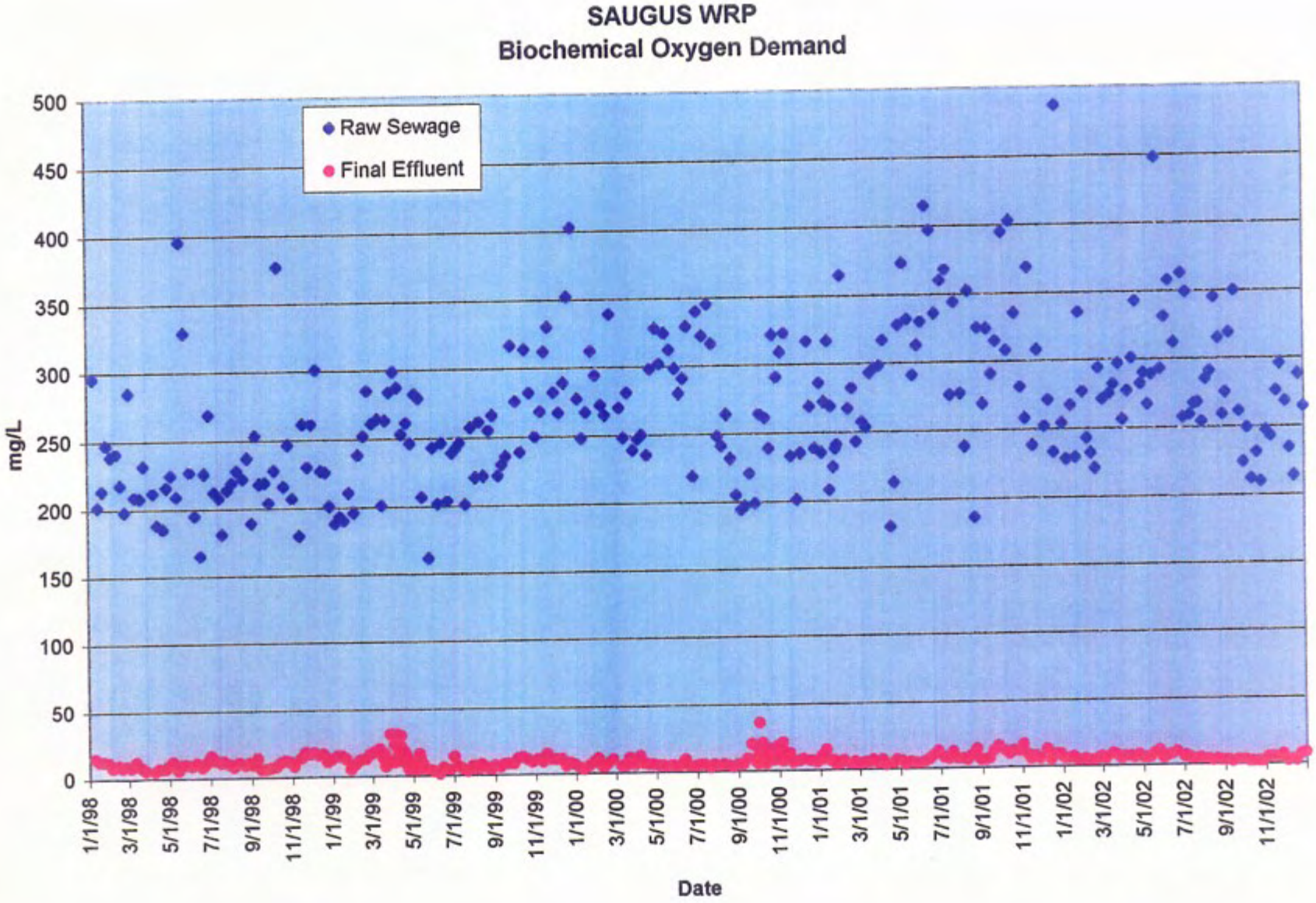
11/1/02
Date


SAUGUS WRP
Biochemical Oxygen Demand
Raw Sewage
Final Effluent
mg/L
500
450
400
350
300
250
200
150
100
50
0
1/1/98
3/1/98
5/1/98
7/1/98
9/1/98
11/1/98
1/1/99
3/1/99
5/1/99
7/1/99
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7/1/01
9/1/01
11/1/01
1/1/02
3/1/02
5/1/02
7/1/02
9/1/02
11/1/02
Date