City of San José

San José/Santa Clara Water Pollution
Control Plant Master Plan

TASK NO. 2
PROJECT MEMORANDUM NO. 1
DESCRIPTION OF EXISTING FACILITIES

FINAL DRAFT
February 2009

2700 YGNACIO VALLEY ROAD • SUITE 300 • WALNUT CREEK, CALIFORNIA 94598 • (925) 932-1710 • FAX (925) 930-0208

CITY OF SAN JOSÉ

SAN JOSÉ/SANTA CLARA WATER POLLUTION CONTROL PLANT MASTER PLAN

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DESCRIPTION OF EXISTING FACILITIES

1.0 INTRODUCTION

The purpose of this project memorandum (PM) is to provide a general description of existing facilities at the San José/Santa Clara Water Pollution Control Plant (WPCP). This PM is key to the development of the San José/Santa Clara Water Pollution Control Plant Master Plan (Master Plan) as it defines the baseline facilities on which the Master Plan improvements and/or expansions to the facilities are built. More detailed information is developed on design and standby criteria and capacity in PMs 3.4 and 3.5.

A significant source document for this PM is the Infrastructure Condition Assessment Final Report developed by CH2M Hill in May 2007.

1.1 Existing Service Area Characteristics

The Association of Bay Area Governments (ABAG) is the official comprehensive planning agency for the San Francisco Bay region, which includes Santa Clara County and the WPCP. The WPCP provides tertiary treatment of domestic, industrial, and commercial wastewater from San José, Santa Clara, Campbell, Los Gatos, Monte Sereno, Cupertino, Milpitas, Saratoga, and other special districts. In total, the existing service area covers roughly 300 square miles and serves approximately 2 million people, 1.4 million residents and 600,000 workers. Table 1 lists the contributory communities and the allocated WPCP permitted capacity for each. The allocated capacity is for average dry weather influent flow (ADWIF). ADWIF is the maximum average daily flow of the five weekday period between the months of June and October, per the National Pollutant Discharge Elimination System (NPDES) permit.

Table 1 Tributary Agencies' Allocated ADWIF Capacity - 2007
San José/Santa Clara Water Pollution Control Plant Master Plan
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Agency	2007 Allocated ADWIF Capacity (mgd)
San José	109.60
Santa Clara	20.98
West Valley Sanitation District	12.05
Cupertino Sanitary District	8.60
City of Milpitas	13.50
County Sanitation District 2-3	1.52
Burbank Sanitary District	0.40
Sunol Sanitary District	0.35
Total	**167.0**

Source: City of San José, 2007.

1.2 Existing Discharge Requirements

The current WPCP ADWIF design capacity is 167 million gallons per day (mgd) of wastewater with a peak hourly flow capacity of 271 mgd. In 2007, the average annual influent flow was 113 mgd. The outfall channel is an earthen ditch that connects to the Artesian Slough where the treated WPCP water is discharged. The San Francisco Bay Regional Water Quality Control Board (RWQCB) established a flow trigger in the permit for the WPCP limiting average dry weather effluent flow to the outfall channel to 120 mgd. The South Bay Water Recycling (SBWR) Program provides 11 mgd of recycled water to various local users. The average dry weather effluent flow in 2007 was 102 mgd.

The NPDES permit program requires that all point sources discharging into waters of the US meet certain criteria listed in issued permits. The current standards set forth by the RWQCB for the WPCP follow the permit issued in September 2003. Additional water quality requirements that pertain to recycled water per Title 22 are discussed in PM 4.1. Table 2 shows the effluent flow limitations imposed for the specific constituents identified in the NPDES permit.

Table 2 Effluent Flow Limitations (NPDES Permit)
San José/Santa Clara Water Pollution Control Plant Master Plan
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Constituent	Monthly Average (mg/L)	Daily Maximum (mg/L)
Carbonaceous Biochemical Oxygen Demand (CBOD)	10	20
Ammonia-Nitrogen	3	8
Total Suspended Solids (TSS)	10	20
Oil and Grease	5	10
Settleable Matter (mg/L-hr)	0.1	0.2

Source: San Francisco Bay Regional Water Quality Control Board, 2003.

Before the NDPES permit is re-issued to the WPCP, a Reasonable Potential Analysis (RPA) is performed to evaluate the water quality criteria for which the WPCP will be required to monitor. The method for determining the RPA involves identifying the observed maximum pollutant concentration in the effluent for each constituent in comparison to the receiving water quality. The RPA results contribute to the establishment of the effluent values in the updated NDPES permit. A RPA report associated with the WPCP's NPDES permit renewal was released in March 2008. Since the NPDES permit is typically issued every five years, a new permit is expected to be adopted in late 2008. A preliminary Draft Permit was issued in August 2008 but will not be final until approximately December 2008. A summary of updated water quality criteria and their maximum effluent concentration (MEC) values are shown in Table 3. No changes are proposed for the average dry weather effluent flow (ADWEF) limitation.

Table 3	Summary of the Reasonable Potential Analysis[1] San José/Santa Clara Water Pollution Control Plant Master Plan City of San José				
Constituent	**Applicable Water Quality Criterion (µg/L)**	**Maximum Effluent Concentration (µg/L)**	**Maximum Observed Ambient Background Concentration (µg/L)**	**Reasonable Potential?**	**Trigger for Reasonable Potential**
Copper	13	9.54[2]	8.59[2]	No	NA[2]
Mercury[3]	0.051	0.0049	0.07	NA	NA
Nickel	27	12.3[2]	15.8[2]	No	NA[2]
Cyanide	1.0	63[4]	0.4[4]	Yes	Effluent[4]
Dioxin-TEQ[5]	1.4E-08	DNQ[6] 4.24E-10	2.59E-07	Qualified	Background
Heptachlor	0.00021	0.038	0.000022	Yes	Effluent
Tributyltin[7]	0.0074	0.013	0.003	Qualified	Effluent

Notes:

NA = Not Applicable.

(1) City of San José, 2008.

(2) Although reasonable potential is not triggered for copper and nickel, effluent limits are anticipated under the site-specific objectives for these parameters.

(3) Mercury requirements will not be included in the renewed NPDES permit because they are included in the mercury watershed permit, but are included in this table for completeness.

(4) Reasonable potential for cyanide is triggered by data conducted using a modified Environmental Protection Agency (EPA) method. This special study was part of the South Bay dischargers work with the Regional Board to develop a shallow water cyanide policy. It is expected that these data will not be used beyond the triggering of reasonable potential due to their research nature. The cyanide concentration that the Metcalf Energy Center reported to the RWQCB's Electronic Reporting System (ERS) using routine EPA-approved effluent monitoring for NPDES compliance is 5 µg/L, which also triggers reasonable potential.

(5) No water quality criteria have been adopted for dioxin- Toxin Equivalent (TEQ), however the RWQCB's practice in recent permits has been to use the criteria for 2,3,7,8-TCDD. The Cities do not agree that this is an appropriate way to conduct the reasonable potential analysis.

(6) Detect not quantified.

(7) No water quality criteria have been adopted for tributyltin, however the RWQCB has used EPA guidance for this constituents in recent permits.

2.0 TREATMENT PLANT LOCATION AND LAYOUT

2.1 Location

The WPCP is located at the southern end of the San Francisco Bay. Approximately 5 miles north of Santa Clara, the WPCP is north of State Route 237 (Alviso-Milpitas Road), west of Interstate 880 (Nimitz Freeway), and is immediately east of the Alviso community. Figure 1

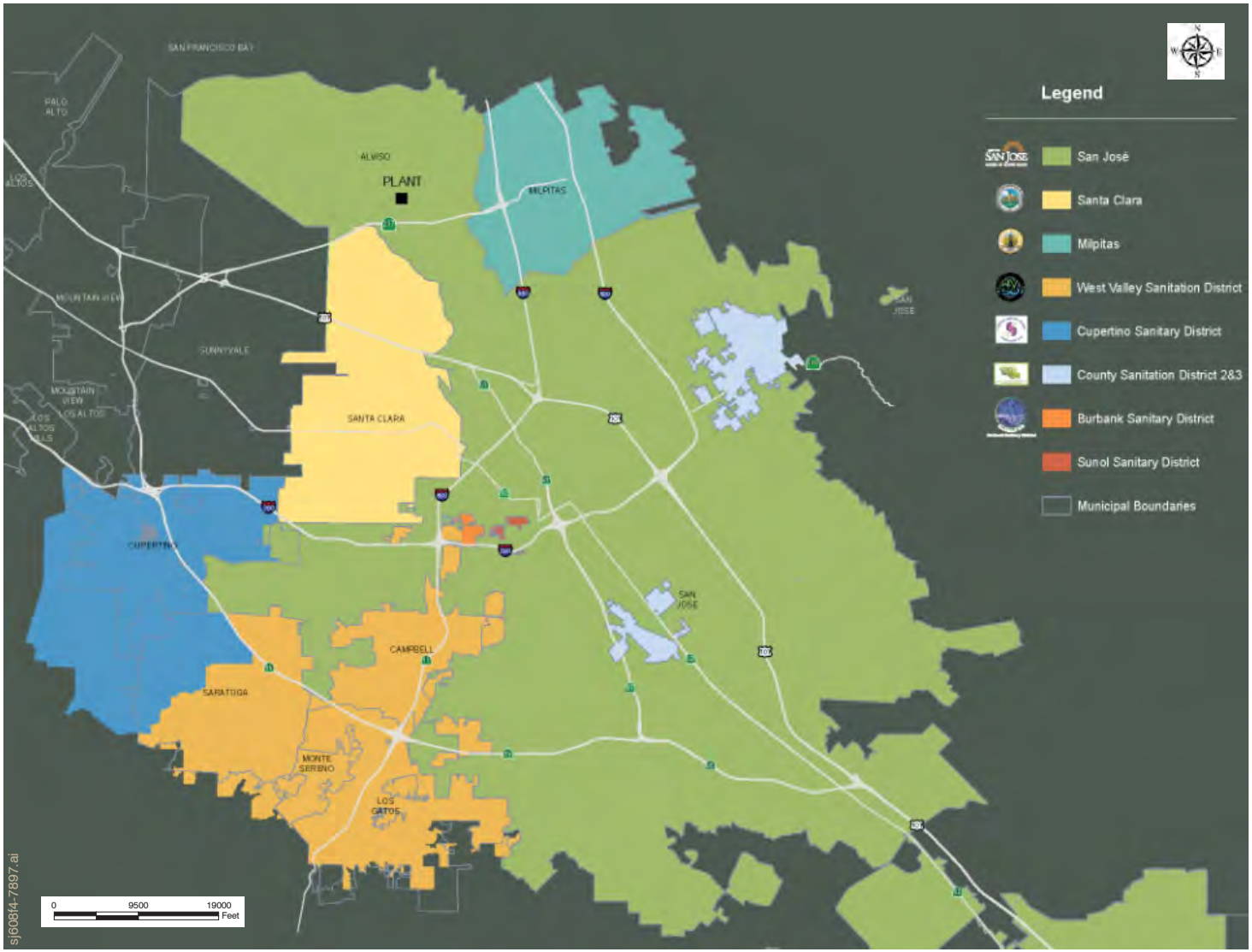

Figure 1
JURISDICTIONAL BOUNDARIES AND TRIBUTARY AGENCIES
SAN JOSÉ/SANTA CLARA WPCP MASTER PLAN
CITY OF SAN JOSÉ

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shows the existing WPCP service area. The WPCP location is shown in Figure 2. In Figure 3, a general vicinity map includes the main process area, biosolids lagoons and drying beds, Salt Pond A18, and the Alviso community.

2.2 Layout

Figure 3 shows where the WPCP itself is situated on the nearly 2,700 acre site. The Operational Area covers approximately 150 acres. The biosolids lagoons and drying beds (Residual Sludge Management [RSM] area) are located northeast and east from the Operational Area, respectively. A detailed main process area map is shown in Figure 4.

2.3 Treatment Facilities

Detailed process design criteria, unit size, type, and capacity for major unit operations is shown in the appendix of this PM. Additional information for each major unit operation is provided in Sections 3.0 and 4.0.

3.0 LIQUID STREAM TREATMENT

A simplified process schematic is shown in Figure 5. The liquid stream treatment includes preliminary, primary, secondary, tertiary, and disinfection treatment processes, recycling and discharge to the San Francisco Bay. The liquids stream treatment elements are discussed in the following sections.

3.1 Preliminary Treatment

3.1.1 Inlet Control and Overflow Structures, and Bar Screens

The inlet control structure receives untreated sewage from two 36-inch (Milpitas) lines, one 66-inch (Santa Clara) line, and one 84-inch (San José) line. Influent can then be routed to Headworks 1 and/or Headworks 2. Headworks 1 has solely been used in the past, but Headworks 2 is in the process of coming online. Headworks 2 was built to handle wet weather flows when the capacity of Headworks 1 is exceeded. Headworks 1 and 2 can operate simultaneously. Headworks 2 conveys flow through three bar screens. Headworks 1 directs flow to each of the four bar screen channels, controlled by sluice gates at the head of each channel. For Headworks 1 and 2, after flow passes through the bar screens, it then goes through grit removal.

3.1.2 Aerated Grit Chambers and Detritors

The influent flow in Headworks 2 flows from the bar screens into three vortex grit tanks to remove rags, grit, debris, and large objects. The vortex grit system relies on a mechanically induced vortex generated in the tank to capture grit solids in the center hopper of the circular tank. Three recessed impeller grit pumps discharge the collected grit slurry to three classifiers where inorganic grit is separated from water and organic material.

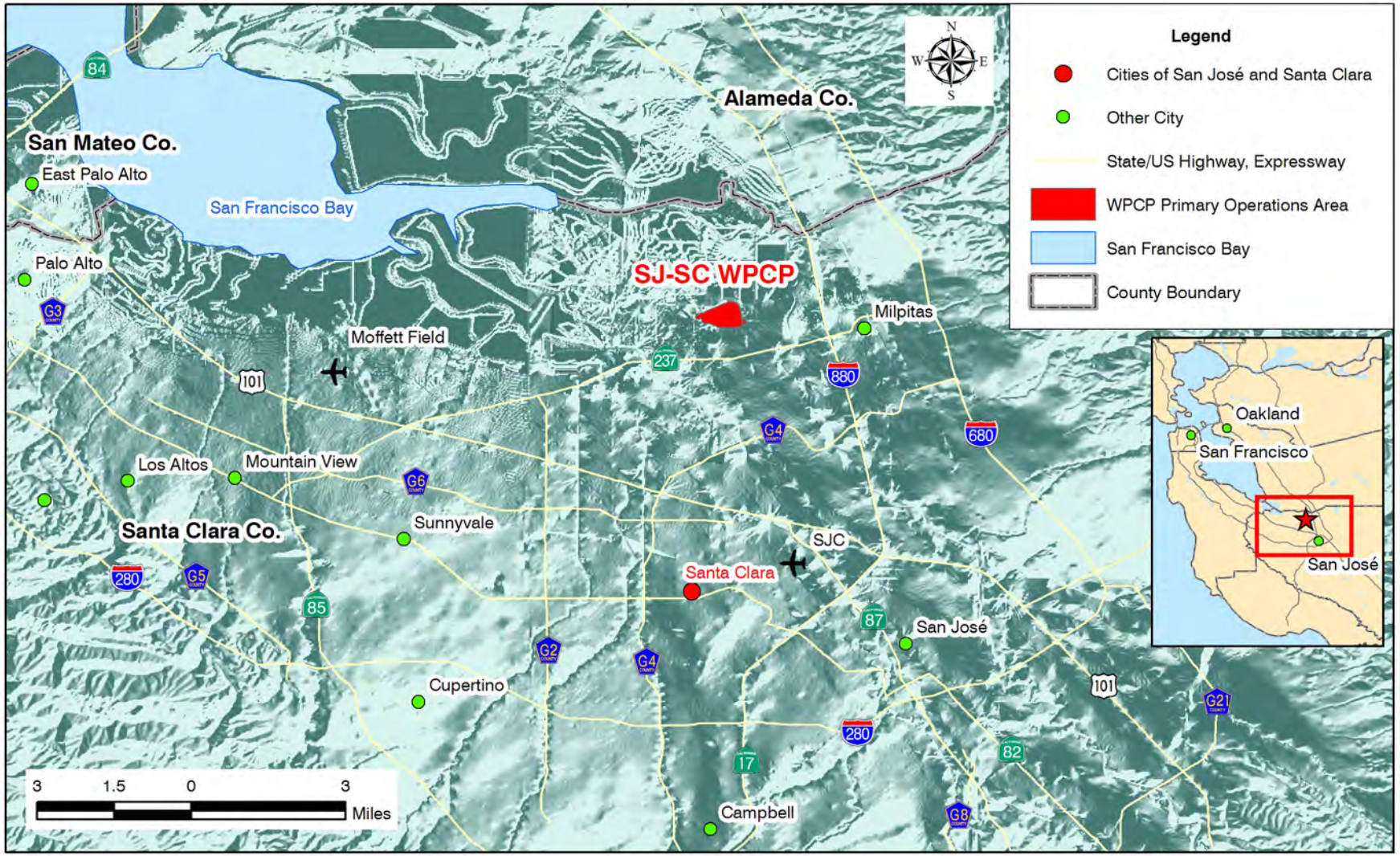

Figure 2
WPCP PLANT LOCATION
SAN JOSÉ/SANTA CLARA WPCP MASTER PLAN
CITY OF SAN JOSÉ

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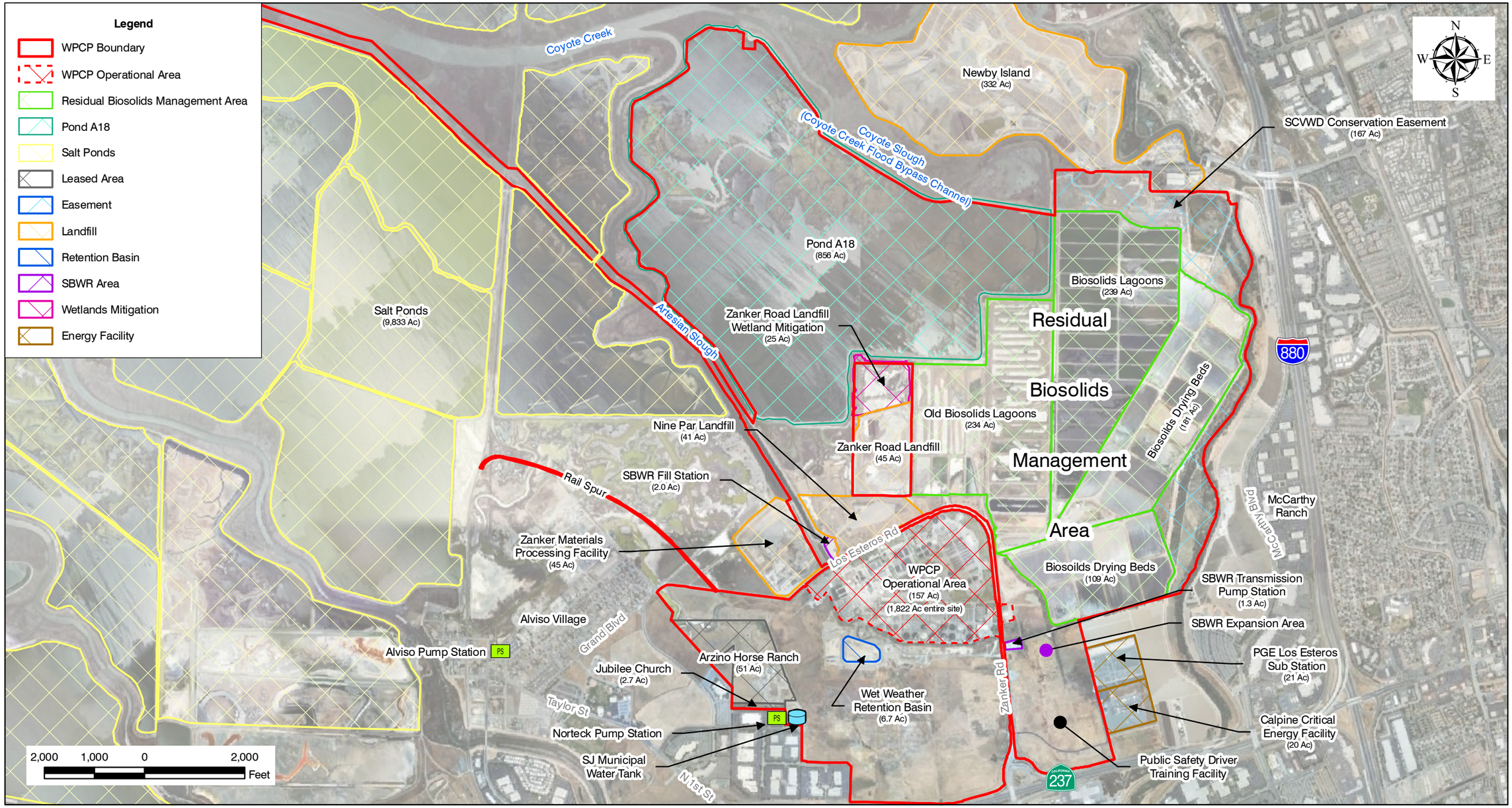

Figure 3
WPCP LAYOUT
SAN JOSÉ/SANTA CLARA WPCP MASTER PLAN
CITY OF SAN JOSÉ

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ID	Description
Liquid Treatment	
1	Inlet Control Structure
2	Headworks 2
3	Influent Overflow Junction Structure
4	Bar Screens
5	Aerated Grit Chambers
6	Wet Well
7	Grit Detritors
8	Primary Treatment East
9	Primary Treatment West
10	BNR 1 Clarifiers A-1 to A-13
11	BNR 1 Clarifiers B-1 to B-13
12	Aeration Building
13	Primary Effluent Pump Station
14	Blower Generation Building (40)
15	Secondary Blower Building
16	Biological Nutrient Removel (BNR) 1
17	BNR 2 Aeration Basins
18	BNR 2 Clarifiers A-1 to A-8
19	BNR 2 Clarifiers B-1 to B-8
20	Ammonia System
21	Tertiary Blower Building
22	Filtration Influent Pump Building
23	Filtration Treatment
24	Backwash Equalization
25	Backwash Treatment
26	Treated Backwash Pump Station
27	Hypochlorite and Bisulfite Facility
28	Chorline Contact
29	Disinfection Building
Solids Treatment	
30	Sludge Control Building
31	Sludge Concentrators
32	Digestors 1 to 8
33	Digestors 9 to 16
34	Digestor Gas Storage
35	Digested Sludge Export Pump Station
Support Facilities/Energy	
36	Administration Building
37	Classrooms
38	Environmental Services Building
39	Machine Shop
40	Maintenance Shop
41	HVAC Shop
42	Paint Shop
43	Rail Spur
44	Training Trailer
45	Storage
46	Training Center
47	Vehicle Services
48	Warehouse
49	Water Storage
50	Woodshop
51	Diesel Fuel
52	Electrical Sub-Station No. 1
53	Electrical Sub-Station No. 2
54	Pump and Engine Building

Figure 4
OPERATIONAL AREA LAYOUT
SAN JOSE/SANTA CLARA WPCP MASTER PLAN
CITY OF SAN JOSÉ

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Tuesday, June 14, 2011

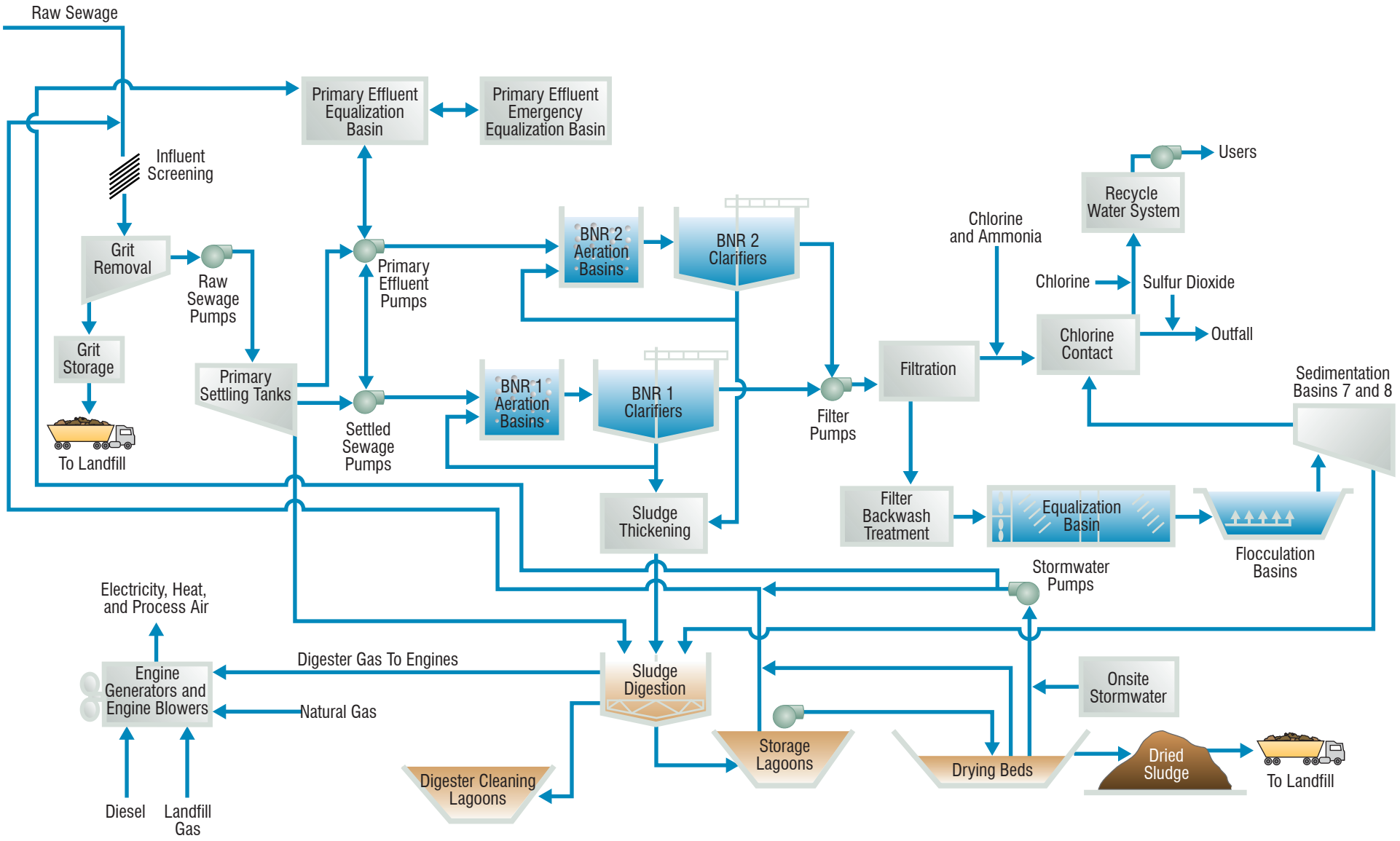

Figure 5
WPCP PROCESS FLOW SCHEMATIC
SAN JOSE/SANTA CLARA WPCP MASTER PLAN
CITY OF SAN JOSÉ

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Each classifier also has two cyclones (one duty and one standby) to further dewater the grit material prior to disposal.

Headworks 1 conveys flow from the bar screen channels to the detritor grit tanks or the aerated grit chambers. The aerated grit chambers contain two parallel chambers where low-density organic material is suspended while denser grit settles to the bottom. Settled grit is removed using recessed-impeller pumps. The detritor tanks contain two parallel tanks that also perform the same function, however the tank geometry is different and the tanks are not aerated. Grit slurry from the aerated grit chambers and detritor tanks are pumped to four duty/standby parallel grit classifiers where inorganic grit is separated from water and organic material. Each classifier also has a cyclone to further dewater the grit material prior to disposal. From Headworks 1 and 2 flow is conveyed to downstream processes through the Raw Sewage Flow Distribution Structure and/or the Raw Water Pump Station No. 1. Flow must be pumped to the primary settling tanks.

3.2 Primary Treatment

3.2.1 Raw Sewage Pump Station and Engine Building Cogeneration Systems

From Headworks 1, flow draining to the Raw Sewage Flow Distribution Structure, is conveyed to the primary settling tanks (west and/or east) by the Raw Sewage Pump Station No. 1 located in the Pump and Engine (P&E) Building. Wastewater from Headworks 2 typically conveys by gravity through the Raw Sewage Flow Distribution Structure directly to either west or east primary settling tanks. Flow from Headworks 2 can also be pumped by Raw Water Pump Station 2 to Biological Nutrient Removal (BNR) system 2.

The P&E Building houses five cogeneration engines and a No. 2 water system that collects and pumps groundwater using a hydro-pneumatic system. Water can be stored in an outdoor tank located just south of the building.

The P&E Building includes a main floor, three separate basement areas, and two connected mezzanine levels. The main floor contains seven vertically mounted centrifugal raw sewage pumps, two office areas, two maintenance shops, two engine generator rooms, and three areas containing electrical equipment. The west basement houses three raw sewage pumps; whereas the east basement houses heat exchangers, oil recovery tanks, and pumps for the engine generator cooling systems.

3.2.2 East and West Primary Settling Tanks

Flow from the Raw Sewage Pump Station No. 1 and the Raw Sewage Flow Distribution Structure is routed to the east and west primary settling tanks. The east primary settling tanks include a set of 18 tanks operating in parallel. All the tanks use chain and flight scrapers to collect settled sludge and floating scum. Rotating scum troughs at the end of each tank receive and convey the floating scum to the scum pump station. Meanwhile, the

west primary settling tanks consist of six clarifiers, each is equipped with one main drive, one sludge collector mechanism, and two rotating scum collectors. The west primary settling tanks have been out of service and recently put back online. The clarified effluent flows from the primary settling tanks and is conveyed through an 84-inch underground pipeline to either the Primary Effluent Pump Station (PEPS) or the Settled Sewage Pump Station (SSPS). Primary effluent from the west settling tanks and A Battery from the east settling tanks usually flow to PEPS. Primary effluent from the B Battery from the east settling tanks usually flow to SSPS. Primary sludge is conveyed to the digesters.

3.2.3 Primary Effluent Pump Station

The PEPS receives primary effluent from the primary settling tanks via an 84-inch pipe. The PEPS can also send and receive primary effluent from the primary effluent equalization basin, located at the RSM facilities. The PEPS can send primary effluent to the BNR 1 and BNR 2 aeration basins, but normally sends flow to the BNR 2 aeration basins. Four vertical turbine pumps convey flow to the given destinations.

3.2.4 Primary Effluent Equalization Basin

The primary effluent equalization basin is located across Zanker Road opposite the primary treatment area. The basin is used for temporary storage during the day to equalize and reduce peak flows and loads to the BNR 1 and BNR 2 aeration basins due to diurnal fluctuations.

3.2.5 Primary Effluent Emergency Equalization Basin

The primary effluent emergency equalization basin, or also referred to as the wet weather retention basin, is located adjacent to the primary effluent equalization basin. It is an unlined basin that provides extra storage capacity on an emergency basis.

3.2.6 Settled Sewage Pump Station

The settled sewage pumps also receive primary effluent from the primary settling tanks. These pumps can convey primary effluent to the BNR 1 and BNR 2 aeration basins, but normally conveys flow to the BNR 1 aeration basins.

3.2.7 Scum Pump Station and Handling Facilities

Two scum pump stations collect scum from the primary settling tanks and convey it to the scum handling building. The scum handling building includes a septage receiving station, two scum thickeners, and an odor control scrubber.

3.3 Biological Nutrient Removal System

The BNR system consists of aeration basins and clarifiers that in the past have been referred to as the secondary treatment system but is now known as BNR 1, and aeration

basins and clarifiers that have formerly been called the nitrification treatment system that is now called BNR 2. These two treatment trains operate in parallel to provide secondary treatment for the WPCP. BNR 2 was originally designed to operate in series with BNR 1, however, the WPCP has not operated in this mode since 2000. The process description provided in this section is based on parallel operation of BNR 1 and BNR 2.

The aeration basins have the same process configuration, each consists of four zones operated in anaerobic, aerobic, anoxic, and aerobic. Primary effluent is introduced into the anaerobic and anoxic zones while return sludge is typically introduced only in the anaerobic zone. In addition to BOD and TSS removal, this configuration also achieves ammonia, nitrate, and some phosphorus removal. The aerobic zones utilize fine-bubble membrane diffusers while the anaerobic and anoxic zones utilize coarse-bubble diffusers for maintaining sufficient mixing.

3.3.1 BNR 1

3.3.1.1 Aeration Basins

The BNR 1 aeration basins receive effluent flow from the settled sewage pumps and consist of two batteries (Battery A and Battery B) that operate in a two-pass configuration to provide plug flow treatment. Each battery contains 8 rectangular reinforced concrete tanks. Primary effluent, return activated sludge (RAS), and mixed liquor flows in each aeration basin is controlled through the use of motorized valves. From the aeration basins, flow travels to the clarifiers.

3.3.1.2 Clarifiers

Mixed liquor from the aeration basins is distributed to each of the two batteries of clarifiers (Battery A and Battery B) via the aerated channels. Each battery consists of eleven 98-foot diameter clarifiers and two 140-foot diameter clarifiers, all of which are approximately 12 feet deep. Clarifiers 1 through 8 are considered to be main clarifiers and clarifiers 9 through 13 are remote clarifiers. Settled sludge is withdrawn using vacuum-type rotating collectors. RAS is sent back to the aeration basins, and waste activated sludge (WAS) is sent to sludge thickening. Scum is sent to Newby Island Landfill. Clarified effluent is metered using parshall flumes. The clarified effluent goes to the filter influent pump station (FIPS). From the FIPS, flow goes to the filters.

3.3.1.3 Secondary Blower, Blower and Generator, and Aeration Buildings

The Secondary Blower Building (SBB) houses six engine-driven aeration blowers. Ambient air is fed to the blowers through a large plenum that runs down the center of the building. The Blower and Generator Building houses three aeration blowers that are driven by 4,000-horsepower (hp) electric motors and three 3,900-hp (2,800 kilowatts [kW]) cogeneration engines. Fuel, compressed air, cooling, and lube oil systems are in the basement to support the engines in each building. The two Aeration Buildings house electrical switchgear on the ground level floors.

3.3.2 BNR 2

3.3.2.1 Aeration Basins

BNR 2 aeration basins receive primary effluent from the PEPS. The aeration basins include two batteries (Battery A and Battery B), each with eight rectangular tanks. The tanks are fed via influent channels from the PEPS. Flow travels from the aeration basins to the clarifiers.

3.3.2.2 Clarifiers

Mixed liquor from the aeration basins is distributed to the clarifiers via aerated channels that run down the center of the batteries. The clarifiers include two batteries (Battery A and Battery B) with each battery containing eight circular clarifiers 140 feet in diameter and 16 feet deep. Installed influent gates control flow to the clarifiers. The two influent channels are connected by a rarely used underground conduit that is isolated using wooden gates. The mixed liquor is fed to the clarifiers through peripheral launders. Telescoping valves are installed in the influent launders to collect floating scum. Skirt plates are installed inside the clarifiers along the influent launders to prevent short-circuiting. Concentric effluent launders are located just inside the influent launders. Clarified effluent flows over V-notch weirs into the launders that are connected to common effluent lines and is metered using parshall flumes. Settled sludge is withdrawn using vacuum-type rotating collectors. Return nitrification sludge (RNS) is sent back to the aeration basins, and waste nitrification sludge (WNS) is sent to sludge thickening. Scum is routed to a scum pump station that conveys the material to sludge thickening. The clarifier effluent goes to either the FIPS and/or the Supplemental Filter Influent Pump Station (SFIPS), and subsequently the filters.

3.3.2.3 Tertiary Blower Building

The tertiary blower building houses aeration blowers for the aeration basins, a control room, RAS/RNS and WAS/WNS pumps, process water pumps, and various support facilities, such as locker rooms and storage rooms. Five aeration blowers are installed in two separate rooms at ground level. Control panels for the blowers are installed in the control room.

3.4 Filtration

3.4.1 Filter Influent Pump Station and Supplemental Filter Influent Pump Station

The FIPS feeds effluent from the BNR 1 clarifiers to the filters using four large and one small vertical turbine pumps. Two water pumps, the pump controls, and firewater pumps, as well as associated controls, are located in the basement of the building. The SFIPS operates in parallel to the FIPS, and feeds BNR 2 clarifier effluent to the filters using two pumps. The pumps discharge to a common header that conveys the flow to the filters.

3.4.2 Filtration

The filters provide further removal of the BOD and suspended solids remaining after BNR 1 and 2 treatment by filtration through a dual media filter. The filtration building is divided into A Battery and B Battery. Each battery contains eight filters. Each filter contains two filter cells. Each dual media filter bed consists of a tile under drain system installed on the filter floor. The dual media filter has layers of silica gravel, silica sand and two layers of anthracite coal, all supported by the under drain system. Alum can be added as a filter aid if necessary and mixed with the filter influent in each battery upon entering the filter influent conduit. Filters are located above the chlorine contact tanks and are open to the atmosphere. Filtered water is conveyed by gravity to the chlorine contact tanks.

Three filter backwash pumps and filter scour pumps are located in an open gallery of the filter building. Filtered water is used to backwash the filters. Used filter backwash is directed to the backwash flow equalization and flocculation/sedimentation basins.

3.4.3 Chlorine Contact Tanks

Four serpentine chlorine contact tanks are located directly below the filters in the filtration building. The filtered water is first chlorinated and flows by gravity through the contact tanks. Four overflow weirs are located on the outlet of the chlorine contact tanks, three northern weirs convey flow to the outfall, and the other weir is used to divert flow to the recycled water Transmission Pump Station (TPS). Additional chlorine is added to the diverted flow for recycled water. The remainder flow is dechlorinated and is conveyed by gravity to the outfall.

3.4.4 Backwash Equalization and Treatment

Used filter backwash is discharged to the backwash equalization basin. The backwash equalization basin is a concrete tank located east of the filters. The tank is equipped with two low-speed vertical mechanical mixers that keep backwash solids in suspension. The filter backwash then flows to two parallel trains each consisting of oscillating mechanical flocculation followed by sedimentation basins (Numbers 7 and 8 located near the west primary settling tanks) equipped with flight and chain sludge removal mechanisms. Clarified effluent is collected and flows by gravity to the treated backwash pump station. Settled sludge is withdrawn and transferred to the anaerobic digestion process.

3.4.5 Treated Backwash Pump Station

The treated backwash pump station consists of a wet well that collects treated backwash water and four vertical turbine pumps that transfer flows to the chlorine contact tanks (Numbers 1 and 2). Traveling screens are provided to remove remaining solids.

3.5 Outfall

3.5.1 Outfall Channel

Filter effluent is discharged through the chlorine tanks, over the chlorine tanks' effluent weirs, and through the chlorinated filtered effluent channel to the outfall pipe. It then flows to the Artesian Slough and finally over a weir and into the San Francisco Bay. The outfall channel is an earthen ditch that connects to the Alviso Slough. An unpaved access road runs along the eastern edge of the channel. A flow meter is installed on the pipe that discharges into the channel to measure treated effluent discharged to the San Francisco Bay. Surface aerators are installed along the channel to periodically increase the dissolved oxygen content of the treated effluent as required to meet discharge permit requirements.

A boat ramp is located at the end of the road that is used by WPCP personnel, the U.S. Fish and Wildlife Service (USFWS), and the California Department of Fish and Game (CDFG) to access the slough and South San Francisco Bay. A footbridge is located near the end of the channel. Sampling and monitoring equipment installed on the bridge make final assessments of water quality.

3.5.2 Sulfur Dioxide Building

The sulfur dioxide building is a one-room building located near the end of the outfall channel. The building houses process water pumps, sulfonators, and chlorine residual analyzers. This system is used to remove chlorine residual detected in the outfall channel. Sulfur dioxide solution is made in this building and is injected into the mid-point of the channel.

3.5.3 Recycled Water Transmission Pump Station

The TPS conveys recycled water to the South Bay Water Recycling (SBWR) distribution system. Filtered and disinfected water is fed to the pump station via a pipeline that is routed around the south side of the WPCP. Six vertical turbine pumps of varying sizes are installed in a wet well at the TPS. The six pump sizes are two 17-mgd 1,000-hp pumps with constant speed drives, two 15-mgd 900-hp pumps with variable speed drives, and two 5-mgd 350-hp pumps with variable speed drives. The discharge pressure varies from 110 to 145 pounds per square inch gauge (psig). Electrical equipment, a control room, and a small laboratory are housed in a building located to the east of the TPS. Heat from the electrical equipment is vented to the outside, and a chiller is installed outside the building to keep the equipment cool. The laboratory contains two chlorine residual analyzers and a small wet chemistry area.

4.0 SOLID STREAM TREATMENT

4.1 Screening

The bar screens and grit removal tanks are located in the Headworks 1 and 2 area, and these two unit processes collect screenings, grit, and other debris from the influent. The material is then disposed of at the grit storage facility before it is moved to the landfill.

4.2 Sludge Thickening

4.2.1 Sludge Thickeners

Dissolved air flotation (DAF) units receive and thicken waste solids from the BNR 1 and BNR 2 clarifiers. The DAF process is comprised of 16 rectangular concrete tanks with chain and flight mechanisms to collect floating and settled sludge. Typically, the west tanks (Numbers 1-12) receive WAS from BNR 1, while the east tanks (Numbers 13-16) receive WNS from BNR 2. Thickened sludge from the system typically has a total solids concentration of 3.5 to 4.0 percent. The thickened sludge then is conveyed to the digesters.

4.2.2 Sludge Control Building

The sludge control building houses flow pressurization pumps, receivers, compressors, and other equipment associated with the DAF process. Four gas compressors are installed in a separate room. Motors for two of the units are installed outside the room, with drive shafts penetrating through the wall. The building also houses a gas blending and compression system that delivers a mixture of digester gas, landfill gas, and natural gas to engines throughout the WPCP.

4.3 Sludge Digestion

4.3.1 Anaerobic Digesters

The anaerobic digesters receive thickened primary sludge from the primary settling tanks, thickened secondary sludge from the DAF process, and sludge from the filter backwash treatment process. The system uses a conventional high-rate, mesophilic anaerobic digestion process to reduce volatile solids and kill pathogens in the sludge. Volatile solids are converted by a biological process into digester gas that is composed primarily of methane and carbon dioxide. The digested sludge is conveyed to the digested sludge export pump station.

There are 16 cylindrical tank anaerobic digesters with floating covers, gas-mixing systems, and pumped heating loops. Each digester has a separate heating system installed at ground level outside the respective digester. The heating loops include shell-in-tube heat exchangers that transfer heat generated from the cogeneration engines to the digesting sludge.

Underground piping galleries are constructed throughout the digester facility. The galleries contain piping for primary sludge, thickened sludge, digested sludge, hot water supply and return, and digester gas, as well as various ancillary piping systems.

4.3.2 Digested Sludge Export Pump Station

The digested sludge export pump station (DSEPS) conveys digested sludge from the anaerobic digesters to the RSM facilities, which consist primarily of lagoons and drying beds.

The DSEPS includes three recessed-impeller centrifugal pumps installed in a room adjacent to a concrete wet well. The wet well is an aboveground structure that receives digested sludge from all of the digesters. The wet well is covered and has vent pipes with flame arrestors. There is also an overflow system built into the wet well. The pumps discharge into a single common discharge line that is routed to the RSM facilities.

4.4 Digester Gas System

4.4.1 Gas Collection and Conveyance

Gas produced in the anaerobic digesters is collected and conveyed to the gas storage, blending, and compression systems using a network of pipes installed in tunnels throughout the digester complex. Each digester is equipped with gas collection piping that includes flame arrestors, pressure relief valves, moisture traps, and isolation valves. Flexible hoses are provided to allow for movement of the floating covers.

4.4.2 Gas Storage

Digester gas is stored in a steel tank that has a floating cover. The tank equalizes gas production to better match consumption by engines. It is located near the scum handing facilities.

4.5 Residual Solids Management

4.5.1 Storage Lagoons

Digested solids are pumped to storage lagoons for further stabilization and storage via the DSEPS. There are seventy four lagoons in total. Six to seven of the lagoons are filled every year. An aerobic water cap is maintained on top of the settled sludge to contain odors. The settled solids are further stabilized by facultative bacteria in the lagoons, and the water level is controlled in the lagoons by supernatant channels. Excess water flows into the supernatant channel and flows by gravity to the inlet control structure. After about four years, settled solids are dredged from the lagoons and pumped to the drying beds.

4.5.2 Drying Beds

The drying beds consist of earthen depressions. Settled solids are conveyed to the beds where they are actively dried for about 2 to 3 months. There are twenty drying beds. Decanted water from drying beds 9 to 20 is captured and conveyed by the supernatant channel via gravity to the inlet control structure. Decanted water from drying beds 1-8 is pumped via the stormwater pump station to the supernatant channels, where the flow then travels via gravity back to the inlet control structure, or to the primary effluent equalization basin. The material in the beds is turned periodically using mobile equipment to speed the drying process.

4.5.3 Digester Cleaning Lagoons

The digester cleaning lagoons currently used to store materials removed during digester cleaning are located north of the WPCP adjacent to the landfill. These lagoons receive digester cleaning materials due to their proximity to the digesters. Each anaerobic digester is cleaned about once every four years. On average, material cleaned from four digesters is placed in these lagoons.

4.5.4 Flood Protection Levees

Three levees protect the WPCP from flooding, and they are located along the Guadalupe River, Coyote Creek, and Salt Pond A18. The various elevations are shown in Figure 6. The City of San José owns Salt Pond A18, in addition to the south and east levee segments located between Salt Pond A18 and the RSM facilities. The USFWS owns the west levee separating Salt Pond A18 from Artesian Slough, while the Santa Clara Valley Water District (SCVWD) owns the north levee between Salt Pond A18 and Coyote Slough (also called the Coyote Creek Flood Control Bypass Channel). In addition to these levees, there are berms located around the WPCP.

5.0 SUPPORTING FACILITIES

5.1 Disinfection

5.1.1 Ammonia System

The ammonia system includes storage tanks and metering pumps used to inject aqueous ammonia solution into filtered water as needed to prevent breakpoint chlorination in the chlorine contact channels. Two polyethylene storage tanks are installed in a concrete spill containment basin, and each tank has a vent scrubber to control fugitive emissions. Five diaphragm-metering pumps are installed adjacent to the storage tanks in the spill containment basin.

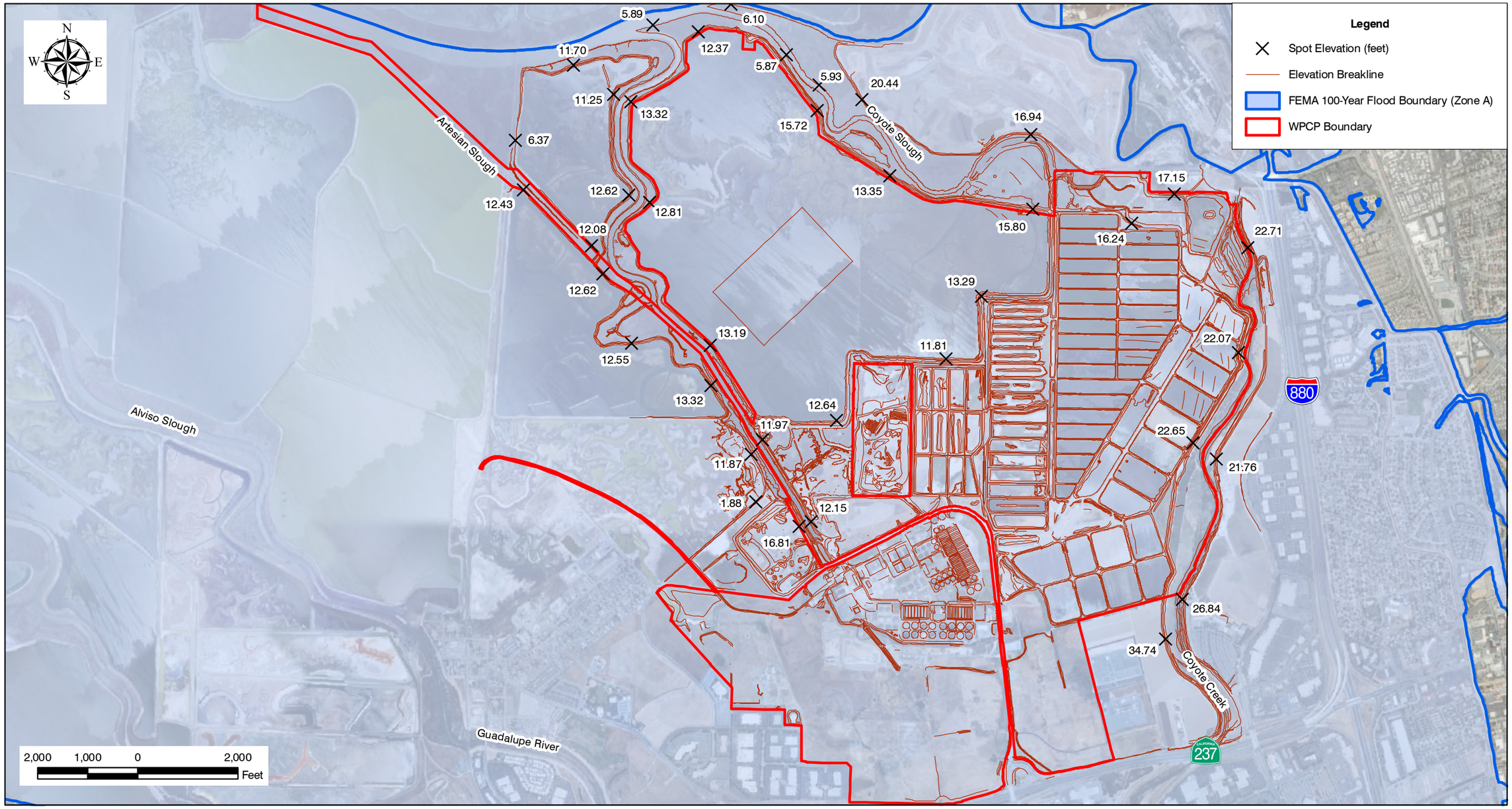

Figure 6
WPCP SITE ELEVATIONS MAP
SAN JOSÉ/SANTA CLARA WPCP MASTER PLAN
CITY OF SAN JOSÉ

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Tuesday, September 02, 2008

5.1.2 Sodium Hypochlorite and Sodium Bisulfite System

The sodium hypochlorite and sodium bisulfite systems are comprised of tanks and a chemical metering system located just west of the filters. Sodium hypochlorite solution is injected into filter backwash water to prevent biofouling in the filters, while the sodium bisulfite system is used as a backup to the sulfur dioxide dechlorination system.

5.1.3 Rail Spur

The rail spur is used to park up to four rail cars that can each hold up to 90 tons of sulfur dioxide or chlorine. Chlorine is used as a disinfectant in the chlorine contact channels, and sulfur dioxide is used to reduce chlorine residual in the outfall. Gaseous chlorine and sulfur dioxide are drawn from the rail cars and conveyed to the Disinfection Building and Sulfur Dioxide Building, respectively. A canopy provides protection to the rail cars from weather conditions.

5.1.4 Disinfection Building

The Disinfection Building houses a series of evaporators and chlorinators used to generate a chlorine solution. Chlorine solution is conveyed from the facility to the filters and chlorine contact channels where it is used for disinfection.

5.1.5 Sulfur Dioxide Building

The Sulfur Dioxide Building is located on the western side of the WPCP, near the rail spur. This building is currently not in use.

5.2 Stormwater

5.2.1 Stormwater Pump Station

The stormwater pump station pumps onsite stormwater and decant from drying beds 1 - 8 to the supernatant channels, which then flow via gravity to the inlet control structure, or to the primary equalization basin. It is designed to use three self-priming centrifugal pumps, however one pump has been removed. Stormwater is collected in an open channel that is connected to the wet well of the stormwater pump station.

5.3 Administration Building, Classrooms, and Training Center

The Administration Building is located on the north side of the WPCP along Los Esteros Road and houses the administrative and engineering office as well as the central control room.

The classrooms are located on the north side of the WPCP along Los Esteros Road in portable buildings. These rooms are used for training activities.

The Training Center is located on the north side of the WPCP along Los Esteros Road. These rooms are used for training activities.

5.3.1 Environmental Services Building

The Environmental Services Building is located on the eastern edge of the WPCP along Zanker Road and houses the WPCP laboratories. The building is currently being rehabilitated and will be occupied upon completion.

5.4 Maintenance Shops and Facilities

The Plant Storage Facility is located on the southeast side of the facility across Zanker Road from the warehouse. It is used when storage space is not available in the warehouse.

The Maintenance Shop is located adjacent to the sludge concentration processing area. It houses workshops, tools storage, and office facilities.

The Vehicle Services Facility is located adjacent to the Maintenance Shop and serves all the facility vehicles.

The HVAC Shop is located adjacent to the Maintenance Shop and serves as the central location for the facilities HVAC specialists.

The Electrical Shop is located adjacent to the Tertiary Blower Building and serves as the central location for the WPCP's electrical specialists.

The Machine Shop is located between BNR 1 and 2 and serves the entire WPCP.

The Paint Shop is located on the southern edge of the WPCP adjacent to the digesters and serves the entire WPCP.

The Wood Shop is located adjacent to the headworks and the Primary P&E Building

Storm water facilities exist throughout the site. Storm water is collected on the site, consolidated with supernatant from the drying beds, and pumped by the supernatant pump station into a 30-inch pipe that goes to the headworks through the inlet control structure.

5.4.1 Security

The site is surrounded by fencing and gates with barbed wire, and access is restricted by security guards. The perimeter fence and access gates limit access to the Operational Area and RSM facilities. Security cameras were recently installed in several locations throughout the WPCP. The chlorine and sulfur dioxide systems are protected by a second layer of precautionary fencing and security measures.

5.5 Electrical /Instrumentation/Control System

Power import from Pacific Gas and Electric (PG&E) is via two 115 kV overhead lines to two 115 kV substations. In each 115 kV substation, two step-down10/16/20 mVA transformers provide 4.16 kV power to the WPCP for power distribution. There are four distribution substations. From these four substations, underground feeders transport 4.16 kV power to the twenty four unit substations at the various facilities for utilization. At the utilization level, three voltage levels are provided, 4.16 kV for the main pump motors, 480 V and 120/208 V for the smaller pumps via step-down transformers connected to motor control centers. Protective relays and circuit breakers are installed at all feeders for overload and short-circuit protection.

Substation No. 1 is located on the southwest corner of the WPCP adjacent to the Filtration Building. Similarly, Substation No. 2 is located on the east side of the WPCP adjacent to the secondary treatment process area along Zanker Road. Main Switchgears M1 and M2 are sole source of power delivery and located on the northwest side of the WPCP adjacent to the Training Center. There are approximately 23 indoor and outdoor metal-clad and metal-enclosed switchgears throughout the WPCP. The MVA class of these switchgears consist of 75 MVA, 250 MVA and 350 MVA.

There are approximately 24 unit substations throughout the WPCP. A unit substation typically consists of an incoming primary section, such as a 5kV rated fused load interrupter switch, a transformer (oil filled or dry type and rated at 4.16kV to 480V), and an outgoing secondary section. The outgoing section includes a 480V switchgear with draw-out low voltage power circuit breakers.

The incoming services or feeders to a MCC is from a 480V low voltage power circuit breaker that is part of the outgoing secondary section of a unit substation. There are over fifty MCCs at the WPCP and most have a bus bracing rating of either 42,000 or 65,000 Amperes symmetrical.

The Instrumentation and Controls (I&C) Shop is located adjacent to the Filtration Treatment Building and serves as the central location for the WPCP I&C specialists.

5.6 Cogeneration System

The cogeneration system includes five reciprocating engine-generator sets (three 800 kW units and two1750 kW units) in the P&E building and three reciprocating engine-generator sets (three 2800kW units) in Building 40. Together, the engine-generators are capable of producing 14,150 KW or approximately 14 megawatts (MW). Normally the engine-generator sets are used to meet full demand at the WPCP. This is accomplished by using one or two 800 kW engine-generator sets as necessary, one 1,750 kW engine-generator set, and two 2,800 kW engine-generator sets, resulting in a total output of approximately 8,350 kW. One or two units are typically on standby. When demand is greater than 8,350 kW, the engine-

generator sets are used to keep the import of purchased PG&E power below 1 MW to the extent possible especially during peak demand hours. Waste heat recovered from the engine-generator sets is used for heating the anaerobic digesters to maintain them at 98-100^{o}F. It is also used for space heating in the P&E building.

REFERENCES

REFERENCES

1. CH2M Hill, 2007. Infrastructure Condition Assessment Final Report.
2. City of San José, 2007. Tributary Agencies' Available Plant Capacity.
3. City of San José, 2008. Reasonable Potential Analysis.
4. San Francisco Bay Regional Water Quality Control Board, 2003. Order No. R2 2003-0085/NPDES Permit No. CA 0037842: Waste Discharge Requirements for Cities of San Jose and Santa Clara Water Pollution Control Plant, Santa Clara County.

APPENDIX - UNIT SIZES, DESIGN CRITERIA, AND CAPACITIES

APPENDIX - UNIT SIZES, DESIGN CRITERIA, AND CAPACITIES

Unit Sizes, Design Criteria and Capacities San José/Santa Clara Water Pollution Control Plant Master Plan City of San José			
Parameter	**Units**	**Value**	**Comments and Source**
Liquids Treatment			
Emergency Overflow Basin			
Basin Volume	MG	8.3	Carollo, 2003
Bar Screens			
Unit Size & Type			
Screening Type		Climber	Carollo, 2003
Number of Screens (Headworks 2)		3	Carollo, 2003
Bar Spacing	inches	5/8	Carollo, 2003
Channel Width	ft	8	Carollo, 2003
Maximum Depth	ft	8	Carollo, 2003
Design Criteria			
PHWWF Clear Screen Velocity	fps	3	Carollo, 2003
Unit Size & Type			
Screening Type		Climber	San José O&M Manual (online)
Number of Screens (Headworks 1)		4	Malcolm Pirnie, 2001
Bar Spacing	inches	3/4	San José O&M Manual (online)
Channel Width	ft	8	Malcolm Pirnie, 2001
Maximum Depth	ft	4.5	Malcolm Pirnie, 2001
Design Criteria			
PHWWF Clear Screen Velocity	fps	3	Carollo, 2003
Grit Removal			
Unit Size & Type			
Type (Headworks 2)		Vortex	Carollo, 2003
Number		3	Carollo, 2003
Diameter	ft	24	San José O&M Manual (online)

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Parameter	Units	Value	Comments and Source
Design Criteria			
Design Average Grit Production Rate	cf/MG	1.0	Carollo, 2003
Design Peak Grit Production Rate	cf/MG	2.0	Carollo, 2003
Unit Size and Type			
Type (Headworks 1)		Aerated	Malcolm Pirnie, 2001
Number		2	San José O&M Manual (online)
Length	ft	47	San José O&M Manual (online)
Width	ft	22	San José O&M Manual (online)
Air Requirement	cfm	350	San José O&M Manual (online)
Design Criteria			
Surface Overflow Rate	gpd/sf	33,900	Calculated based on tank geometry and original rated capacity
Unit Size and Type			
Number		2	Malcolm Pirnie, 2001
Type (Headworks 1)		Detritor	Malcolm Pirnie, 2001
Length	ft	55	San José O&M Manual (online)
Width	ft	55	San José O&M Manual (online)
Depth	ft	11.25	San José O&M Manual (online)
Design Criteria			
Surface Overflow Rate	gpd/sf	33,900	Calculated based on tank geometry and original rated capacity
Raw Sewage Pump Station #1			
Pump Type		Small Raw Sewage Pumps 1, 2, 3, 4, Vertical Centrifugal	San José O&M Manual (online) San José Review Comments
Number of Pumps		4	Malcolm Pirnie, 2001

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Parameter	Units	Value	Comments and Source
Original Nameplate Capacity, each	mgd	34 @ 23 ft TDH	Malcolm Pirnie, 2001 San José Review Comments
Power, each	hp	200	San José O&M Manual (online)
Pump Type		Raw Sewage Pumps 5 & 6, Horizontal Mixed Flow Centrifugal	San José O&M Manual (online) San José Review Comments
Number of Pumps		2	Malcolm Pirnie, 2001
Original Nameplate Capacity, each	mgd	100 @ 16.5 ft TDH	Malcolm Pirnie, 2001 San José Review Comments
Power, each	hp	400	San José O&M Manual (online)
Pump Type		Raw Sewage Pump 7, Horizontal Mixed Flow Centrifugal	San José O&M Manual (online) San José Review Comments
Number of Pumps		1	Malcolm Pirnie, 2001
Original Nameplate Capacity, each	mgd	120	San José Review Comments
Raw Sewage Pump Station #2			
Pump IDs		Raw Sewage Pump No 8, 9, and 10	San José O&M Manual (online)
Number of Pumps		3	Carollo, 2003
Original Nameplate Capacity, each	mgd	80 @ 37-48 ft TDH	Carollo, 2003
Power, each	hp	500	San José O&M Manual (online)
Gravity Flow Capacity to RSPS #1	mgd	60	Carollo, 2003
East Primary Treatment			
<u>Unit Size & Type</u>			
Primary Tank Identification Numbers		A1-A4 & B1-B4	San José O&M Manual (online)
Number of Tanks		8	San José O&M Manual (online)
Length (each)	ft	166	San José O&M Manual (online)
Width (each)	ft	41	San José O&M Manual (online)

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Parameter	Units	Value	Comments and Source
Depth (each)	ft	8	San José O&M Manual (online)
Total Surface Area	sf	54,448	Calculated
Primary Tank Identification Numbers		A5-A9 & B5-B9	San José O&M Manual (online)
Number of Tanks		10	San José O&M Manual (online)
Length (each)	ft	208	San José O&M Manual (online)
Width (each)	ft	39.5	San José O&M Manual (online)
Depth (each)	ft	7.92	San José O&M Manual (online)
Total Surface Area	sf	82,160	Calculated
Design Criteria			
ADMMF Overflow Rate	gpd/sf	1,200	Brown & Caldwell, 1960
Primary Sludge Pumping			
Pump IDs		A1 & A2	San José O&M Manual (online)
Clarifier Sludge is Pumped From		A1-A4	San José O&M Manual (online)
Number of Pumps		2	San José O&M Manual (online)
Original Nameplate Capacity, each	gpm	250 @ 50 psi TDH	San José O&M Manual (online)
Power, each	hp	15	San José O&M Manual (online)
Pump IDs		A5-A9	San José O&M Manual (online)
Clarifier Sludge is Pumped From		A5-A9	San José O&M Manual (online)
Number of Pumps		5	San José O&M Manual (online)
Original Nameplate Capacity, each	gpm	100 @ 52 psi TDH	San José O&M Manual (online)
Power, each	hp	15	San José O&M Manual (online)
Pump IDs		B1 & B2	San José O&M Manual (online)

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Parameter	Units	Value	Comments and Source
Clarifier Sludge is Pumped From		B1-B4	San José O&M Manual (online)
Number of Pumps		2	San José O&M Manual (online)
Original Nameplate Capacity, each	gpm	250 @ 50 psi TDH	San José O&M Manual (online)
Power, each	hp	15	San José O&M Manual (online)
Pump IDs		B5-B9	San José O&M Manual (online)
Clarifier Sludge is Pumped From		B5-B9	San José O&M Manual (online)
Number of Pumps		5	San José O&M Manual (online)
Original Nameplate Capacity, each	gpm	100 @ 52 psi TDH	San José O&M Manual (online)
Power, each	hp	15	San José O&M Manual (online)
West Primary Treatment			
<u>Unit Size & Type</u>			
Primary Tank Identification Numbers		1-6	San José O&M Manual (online)
Number of Tanks		6	San José O&M Manual (online)
Length (each)	ft	134	San José O&M Manual (online)
Width (each)	ft	50	San José O&M Manual (online)
Depth (each)	ft	10	San José O&M Manual (online)
Total Surface Area	sf	40,200	San José O&M Manual (online)
<u>Design Criteria</u>			
ADMMF Overflow Rate	gpd/sf	1,100	Hyde and Sullivan Engineers, 1964
Primary Sludge Pumping			
Pump IDs		2RSP1, 2RSP2, 2RSP3	San José O&M Manual (online)
Clarifier Sludge is Pumped From		1-6	San José O&M Manual (online)

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Parameter	Units	Value	Comments and Source
Number of Pumps		3	San José O&M Manual (online)
Original Nameplate Capacity, each	gpm	250 @ 50 psi TDH	San José O&M Manual (online)
Power, each	hp	15	San José O&M Manual (online)
Primary Effluent Pump Station			
Number of Pumps, type		4, Vertical Turbine	CH2M Hill, 1984 San José Review Comments
Original Nameplate Capacity, each	mgd	45	CH2M Hill, 1984
Power, each	hp	300	San José O&M Manual (online)
Settled Sewage Pump Station			
Number of Pumps		4	CH2M Hill, 1984
Original Nameplate Capacity, each	mgd	62 @ 25 ft TDH	CH2M Hill, 1984 San José Review Comments
Power, each	hp	350	San José O&M Manual (online)
Primary Effluent Equalization Basin			
Basin Volume	MG	16	CH2M Hill, 1984
BNR 1			
Blowers			
Number of Blowers		6	San José Review Comments
Blower Type		3 six cylinder, 3 eight cylinder	San José Review Comments
Original Nameplate Capacity, each	cfm	3 at 60,000 @ 8 psi, 2 at 41,000 @ 8 psi, 1 at 47,000 @ 8 psi	San José Review Comments
BNR 1 - Battery A			
Aeration Basins			
Aeration IDs		A1-A8	WPCP Process Schematics
Number of Aeration Basins		8	CH2M Hill, 1984
Volume per Basin	MG	2.75	CH2M Hill, 1984
Sidewater Depth	ft	14.5	San José O&M Manual (online)
Clarifiers			
Clarifier IDs (Main)		A1-A8	WPCP Process Schematics

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Parameter	Units	Value	Comments and Source
Number of Clarifiers		8	CH2M Hill, 1984
Type		Peripheral Feed, Center Overflow	San José O&M Manual (online)
Diameter	ft	98	CH2M Hill, 1984
Sidewater Depth	ft	12	San José Review Comments
Clarifier IDs (Remote)		A9-A11	WPCP Process Schematics
Number of Clarifiers		3	CH2M Hill, 1984
Type		Peripheral Feed, Peripheral Overflow	San José O&M Manual (online)
Diameter	ft	98	CH2M Hill, 1984
Sidewater Depth	ft	12	San José Review Comments
Clarifier IDs (Remote)		A12-A13	WPCP Process Schematics
Number of Clarifiers		2	CH2M Hill, 1984
Type		Peripheral Feed, Peripheral Overflow	San José O&M Manual (online)
Diameter	ft	140	CH2M Hill, 1984
Sidewater Depth	ft	12	San José Review Comments
Original Design Criteria			
PHWWF Overflow Rate	gpd/sf	930	San José O&M Manual (online)
Average Week Overflow Rate	gpd/sf	800	San José O&M Manual (online)
Max Peak Hour Solids Loading Rate	ppd/sf	34.5	San José O&M Manual (online)
Average Week Solids Loading Rate	ppd/sf	28.7	San José O&M Manual (online)
RAS Pumping			
Pump IDs		A-1, A-2, A-3	San José O&M Manual (online)
Number of Pumps		3	San José O&M Manual (online)
Original Nameplate Capacity, each	mgd	26 @ 16 ft TDH	San José O&M Manual (online)
Power, each	hp	100	San José O&M Manual (online)
Pump IDs		A-4, A-5	San José O&M Manual (online)

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Parameter	Units	Value	Comments and Source
Number of Pumps		2	San José O&M Manual (online)
Original Nameplate Capacity, each	mgd	20 @ 16 ft TDH	San José O&M Manual (online)
Power, each	hp	150	San José O&M Manual (online)
Pump IDs		A-6	San José O&M Manual (online)
Number of Pumps		1	San José O&M Manual (online)
Original Nameplate Capacity, each	mgd	8.6 @ 15 ft TDH	San José O&M Manual (online)
Power, each	hp	40	San José O&M Manual (online)
WAS Pumping			
Pump IDs		1A, 2A	San José O&M Manual (online)
Number of Pumps		4	San José O&M Manual (online)
Original Nameplate Capacity, each	mgd	2.5 @ 30 ft TDH	San José O&M Manual (online)
Power, each	hp	20	San José O&M Manual (online)
BNR 1 - Battery B			
Aeration IDs		B1-B8	WPCP Process Schematics
Number of Aeration Basins		8	CH2M Hill, 1984
Volume per Basin	MG	2.75	CH2M Hill, 1984
Sidewater Depth	ft	14.5	San José O&M Manual (online)
Clarifiers			
Clarifier IDs (Main)		B1-B8	WPCP Process Schematics
Number of Clarifiers		8	CH2M Hill, 1984
Type		Peripheral Feed, Center Overflow	San José O&M Manual (online)
Diameter	ft	98	CH2M Hill, 1984
Sidewater Depth	ft	14.75	San José O&M Manual (online)
Clarifier IDs (Remote)		B9-B11	WPCP Process Schematics
Number of Clarifiers		3	CH2M Hill, 1984

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Parameter	Units	Value	Comments and Source
Type		Peripheral Feed, Peripheral Overflow	San José O&M Manual (online)
Diameter	ft	98	CH2M Hill, 1984
Sidewater Depth	ft	14.75	San José O&M Manual (online)
Clarifier IDs (Remote)		B12-B13	WPCP Process Schematics
Number of Clarifiers		2	CH2M Hill, 1984
Type		Peripheral Feed, Peripheral Overflow	San José O&M Manual (online)
Diameter	ft	140	CH2M Hill, 1984
Sidewater Depth	ft	12.4	San José O&M Manual (online)
<u>Design Criteria</u>			
PHWWF Overflow Rate	gpd/sf	930 880	San José O&M Manual (online) City of San José, 1998
Average Week Overflow Rate	gpd/sf	800	San José O&M Manual (online)
Max Peak Hour Solids Loading Rate	ppd/sf	34.5	San José O&M Manual (online)
Average Week Solids Loading Rate	ppd/sf	28.7	San José O&M Manual (online)
<u>RAS Pumping</u>			
Pump IDs		B-1, B-2, B-3	San José O&M Manual (online)
Number of Pumps		3	San José O&M Manual (online)
Original Nameplate Capacity, each	mgd	26 @ 16 ft TDH	San José O&M Manual (online)
Power, each	hp	100	San José O&M Manual (online)
Pump IDs		B-4, B-5	San José O&M Manual (online)
Number of Pumps		2	San José O&M Manual (online)
Original Nameplate Capacity, each	mgd	20 @ 16 ft TDH	San José O&M Manual (online)
Power, each	hp	150	San José O&M Manual (online)

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Parameter	Units	Value	Comments and Source
Pump IDs		B-6	San José O&M Manual (online)
Number of Pumps		1	San José O&M Manual (online)
Original Nameplate Capacity, each	mgd	8.6 @ 15 ft TDH	San José O&M Manual (online)
Power, each	hp	40	San José O&M Manual (online)
WAS Pumping			
Pump IDs		1B, 2B	San José O&M Manual (online)
Number of Pumps		4	San José O&M Manual (online)
Original Nameplate Capacity, each	mgd	2.5 @ 30 ft TDH	San José O&M Manual (online)
Power, each	hp	20	San José O&M Manual (online)
BNR 2			
Blowers			
Blower IDs		PAB-1 to PAB-5	San José O&M Manual (online)
Number of Blowers		5	San José O&M Manual (online)
Blower Type		Centrifugal	San José O&M Manual (online)
Original Nameplate Capacity, each	scfm	50,000 @ 7.5 psig	San José O&M Manual (online)
Motor Power, each	hp	2,250	San José O&M Manual (online)
BNR 2 - Battery A			
Aeration Basins			
Aeration IDs		A1-A8	WPCP Process Schematics
Number of Aeration Basins		8	San José O&M Manual (online)
Volume per Basin	MG	1.5	San José O&M Manual (online)
Sidewater Depth	ft	15	San José O&M Manual (online)
Clarifiers			
Clarifier IDs		A1-A8	WPCP Process Schematics
Number of Clarifiers		8	San José O&M Manual (online)

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Parameter	Units	Value	Comments and Source
Type		Peripheral Feed Peripheral Overflow	
Diameter	ft	140	San José O&M Manual (online)
Sidewater Depth	ft	12.4	San José O&M Manual (online)
Design Criteria			
PHWWF Overflow Rate	gpd/sf	810	City of San José, 1998
RNS Pumping			San José O&M Manual (online)
Pump ID		1A, 2A	
Number of Pumps		2	San José O&M Manual (online)
Original Nameplate Capacity, each	mgd	36	San José O&M Manual (online)
Power, each	hp	200	San José O&M Manual (online)
WNS Pumping			
Pump ID		1A - 3A	
Number of Pumps		2	San José O&M Manual (online)
Original Nameplate Capacity, each	mgd	0.25	San José O&M Manual (online)
Power, each	hp	5	San José O&M Manual (online)
Number of Pumps		1	San José O&M Manual (online)
Original Nameplate Capacity, each	mgd	1.4	San José O&M Manual (online)
Power, each	hp	25	San José O&M Manual (online)
BNR 2 - Battery B			
Aeration Basins			
Aeration IDs		B1-B8	WPCP Process Schematics
Number of Aeration Basins		8	San José O&M Manual (online)
Volume per Basin	MG	1.5	San José O&M Manual (online)

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Parameter	Units	Value	Comments and Source
Sidewater Depth	ft	15	San José O&M Manual (online)
Clarifiers			
Clarifier IDs		B1-B8	WPCP Process Schematics
Number of Clarifiers		8	San José O&M Manual (online)
Type		Peripheral Feed Peripheral Overflow	
Diameter	ft	140	San José O&M Manual (online)
Sidewater Depth	ft	12.4	San José O&M Manual (online)
Design Criteria			
PHWWF Overflow Rate	gpd/sf	810	City of San José, 1998
RNS Pumping			
Pump ID		1B, 2B	San José O&M Manual (online)
Number of Pumps		2	San José O&M Manual (online)
Original Nameplate Capacity, each	mgd	36	San José O&M Manual (online)
Power, each	hp	200	San José O&M Manual (online)
WNS Pumping			
Pump ID		1B - 3B	
Number of Pumps		2	San José O&M Manual (online)
Original Nameplate Capacity, each	mgd	0.25	San José O&M Manual (online)
Power, each	hp	5	San José O&M Manual (online)
Number of Pumps		1	San José O&M Manual (online)
Original Nameplate Capacity, each	mgd	1.4	San José O&M Manual (online)
Power, each	hp	25	San José O&M Manual (online)
Filter Influent Pump Station			
Pump IDs		6-FIP-1 through 6-FIP-4	San José O&M Manual (online)

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Parameter	Units	Value	Comments and Source
Number of Pumps		4	San José O&M Manual (online)
Original Nameplate Capacity, each	mgd	85 @ 20 ft TDH	San José O&M Manual (online)
Power, each	hp	400	San José O&M Manual (online)
Pump ID		6-FIP-5	San José O&M Manual (online)
Number of Pumps		1	San José O&M Manual (online)
Original Nameplate Capacity, each	mgd	65 @ 27.5 ft TDH	San José O&M Manual (online)
Power, each	hp	400	San José O&M Manual (online)
Supplemental Filter Influent Pump Station			
Number of Pumps		2	Carollo, 2003
Original Nameplate Capacity, each	mgd	50 @ 33 ft TDH	Carollo, 2003
Power, each	hp	400	Carollo, 2003
Pump IDs		50-PMP-201, 50-PMP-202	San José O&M Manual (online)
Filtration			
<u>Unit Size & Type</u>			
Filter Media Type	Media Type	Sand and anthracite	San José Review Comments
Number of Batteries		2 - A and B Recycled water taken from Battery B only	San José O&M Manual (online)
Filters per Battery		8	San José O&M Manual (online)
Cells per Filter		2	San José O&M Manual (online)
Cell Length	ft	46	San José O&M Manual (online)
Cell Width	ft	15	San José O&M Manual (online)
Battery A filter Surface Area	sf	11,040	San José O&M Manual (online)
Battery B filter Surface Area	sf	11,040	San José O&M Manual (online)

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Parameter	Units	Value	Comments and Source
Total Filter Surface Area	sf	22,080	San José O&M Manual (online)
Underdrain Type		Ceramic Block	San José Review Comments
Surface Wash Pumps			
Number		4	San José O&M Manual (online)
Original Nameplate Capacity	gpm	1,000 @ 250 feet TDH	San José O&M Manual (online)
Power	hp	100	San José O&M Manual (online)
Capacity			
PHWWF	mgd	223	San José O&M Manual (online)
ADWF	mgd	158	San José O&M Manual (online)
Design Criteria			San José O&M Manual (online)
Hydraulic Loading Rate (non-recycled water applications), Filters 1-4, 9-16	gpm/sf	7 5.7	San José O&M Manual (online) City of San José, 1998
Peak Hydraulic Loading Rate (Title 22), Filters 5-8	gpm/sf	5	San José O&M Manual (online)
Max Headloss per Filter prior to Backwashing	ft	10	San José O&M Manual (online)
Filter Backwash Treatment			
Number of Equalization Basin		1	CH2M Hill, 1984
Length	ft	115	San José O&M Manual (online)
Width	ft	60	San José O&M Manual (online)
Nominal Depth	ft	7.16 - 12.63	San José O&M Manual (online)
Equalization Basin Volume	MG	0.139	CH2M Hill, 1984
Number of Flocculation Basins		2	CH2M Hill, 1984
Volume per Flocculation Basin	MG	0.115	CH2M Hill, 1984

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Parameter	**Units**	**Value**	**Comments and Source**
Number of Sedimentation Basins		2	CH2M Hill, 1984
Area per Sedimentation Basin	sf	6,290	CH2M Hill, 1984
Filter Backwash Pumps			
Pump IDs		Filter Backwash Pumps 1-3	San José O&M Manual (online)
Number of Pumps		3	San José O&M Manual (online)
Original Nameplate Capacity, each	gpm	18,000 @ 53 ft TDH	San José O&M Manual (online)
Power, each	hp	400	San José O&M Manual (online)
Chlorination			
Unit Size & Type			
Chlorination Type		Chlorine Gas	San José O&M Manual (online)
Number of Chlorine Contact Basins		4	CH2M Hill, 1984
Volume per Basin	MG	1.5	San José O&M Manual (online)
Total Volume	MG	6	San José O&M Manual (online)
Capacity			
PHWWF Capacity	mgd	160	San José O&M Manual (online)
Design Criteria			
Original Target Residual Chlorine Dose	mg/L	8	San José O&M Manual (online)
Original Design Modal Contact Time	min	54 @ 160 mgd	San José O&M Manual (online)
Chemical Feed Systems			
Hypochlorite			
Number of Feed Pumps		2	San José O&M Manual (online)
Original Nameplate Capacity	gph	1.7 - 17 @ 90 psig	San José O&M Manual (online)

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Parameter	Units	Value	Comments and Source
Power, each	hp	1.5	San José O&M Manual (online)
Number of Storage Tanks		2	San José O&M Manual (online)
Total Volume, each	gal	12,000	San José O&M Manual (online)
Sodium Bisulfite			
Number of Feed Pumps		2	San José O&M Manual (online)
Original Nameplate Capacity	gph	1.7 - 17	San José O&M Manual (online)
Power, each	hp	1.5	San José Review Comments
Number of Storage Tanks		2	San José O&M Manual (online)
Total Volume, each	gal	7,500	San José O&M Manual (online)
Chlorine Tanks			
Number of Tank Cars		2	San José O&M Manual (online)
Car Volume, each	tons	90	San José O&M Manual (online)
Chlorine Evaporators			
Number of Evaporators		10	San José O&M Manual (online)
Original Nameplate Capacity, each	ppd	785	San José O&M Manual (online)
Chlorinator			
Number of Chlorinators		12	San José Review Comments
Original Nameplate Capacity, each	ppd	8,000	San José O&M Manual (online)
Ammonia			
Number of Feed Pumps		5	San José O&M Manual (online)
Original Nameplate Capacity	gph	0.7 - 70 @ 90 psig	San José O&M Manual (online)
Power, each	hp	1.5	San José O&M Manual (online)
Number of Storage Tanks		2	San José O&M Manual (online)

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Parameter	Units	Value	Comments and Source
Storage Volume, each	gal	9200	San José O&M Manual (online)
Solids Handling			
DAF Thickening			
Unit Size & Type			
East DAF IDs		1-6	San José O&M Manual (online)
West DAF IDs		7-16	San José O&M Manual (online)
Total Number of DAFs		16	San José O&M Manual (online)
Surface Area, each	sf	1640	San José O&M Manual (online)
Original Design Criteria			
Hydraulic Loading Rate	gpm/sf	3.4	Hyde and Sullivan Engineers, 1964
Detention Time	hrs	0.23	CH2M Hill, 1983
Anaerobic Digestion			
Digesters			
Total Number of Digesters		16	San José O&M Manual (online)
Number		13	San José O&M Manual (online)
Diameter	ft	110	San José O&M Manual (online)
Average Side Water Depth	ft	34.2	San José O&M Manual (online)
Volume, each	cf	325,000	San José Review Comments
Number		3	San José O&M Manual (online)
Diameter	ft	100	San José O&M Manual (online)
Average Side Water Depth	ft	25	San José O&M Manual (online)
Volume, each	cf	196,300	San José Review Comments
Sludge Temperature	Degrees, Fahrenheit	98°	San José Review Comments

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Parameter	Units	Value	Comments and Source
Original Design Criteria			
Solids Retention Time @ Mean Peak Week	days	16.4	CH2M Hill, 1983
Dry Solids Loading Rate @ Mean Peak Week	ppd	657,000	CH2M Hill, 1983
Volatile Solids Loading Rate @ Mean Peak Week	ppd	460,000	CH2M Hill, 1983
Heat Exchangers			
Number per Digester		1	San José O&M Manual (online)
Type		Tube Heat Exchange	San José Review Comments
Total Number		16	San José O&M Manual (online)
Original Nameplate Capacity	gpm	900 gpm heated sludge and 180 to 250 gpm of heated water	San José O&M Manual (online)
Heating Capacity	BTU/hr	2,226,000	San José O&M Manual (online)
Hot Water Recirculation Pumps			
Number per Digester		1	San José O&M Manual (online)
Total Number		16	San José O&M Manual (online)
Pump ID's		P-HW-32-1 to 32-16	San José O&M Manual (online)
Original Nameplate Capacity	gpm	180 gpm @ 23 feet TDH	San José O&M Manual (online)
Power	hp	1.5	San José O&M Manual (online)
Sludge Recirculation Pumps			
Number per Digester		1	San José O&M Manual (online)
Total Number		16	San José O&M Manual (online)
Pump ID's		P-AD-2-1 to 2-16	San José O&M Manual (online)

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Parameter	Units	Value	Comments and Source
Original Nameplate Capacity	gpm	900 gpm @ 18 feet TDH	San José O&M Manual (online)
Power	hp	20 to 30	San José O&M Manual (online)
Digested Sludge Transfer Pumps			
Number		11	San José O&M Manual (online)
Original Nameplate Capacity	gpm	1,000 @ 25 ft	San José O&M Manual (online)
Power	hp	20 to 30	San José O&M Manual (online)
Digester Gas Mixing Compressor			
Number per Digester		1	San José O&M Manual (online)
Total Number		16	San José O&M Manual (online)
Pump ID's		C-GC-59-1 to 59-16	San José O&M Manual (online)
Original Nameplate Capacity	scfm	200 scfm @ 21 psig	San José O&M Manual (online)
Power	hp	30	San José O&M Manual (online)
Digester Gas Storage Tank			
Number		1	San José O&M Manual (online)
Original Nameplate Capacity	cf	86,000	San José O&M Manual (online)
Diameter	ft	75	San José O&M Manual (online)
Sidewall Depth	ft	45	San José O&M Manual (online)
Digested Sludge Export Pump Station			
Number of Pumps		3	San José O&M Manual (online)
Pump IDs		P-AD-12-1 to 12-3	
Original Nameplate Capacity	gpm	1,500 @ 122 ft TDH	San José O&M Manual (online)
Total Power	hp	150	San José O&M Manual (online)

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Parameter	Units	Value	Comments and Source
Storage Lagoons			
Unit Size & Type			
Total Number of Lagoons		74	San José O&M Manual (online)
Number of Active Lagoons		28	San José O&M Manual (online)
Total Surface Area	acres	650	San José O&M Manual (online)
Capacity			
Total Storage Capacity	cf	190,000,000	San José O&M Manual (online)
Total Solids Capacity	tons	524	Calculated based on design criteria and area.
Design Criteria			
Solids Loading Rate	lbs TS/ 1000 sf	37	John Carollo Engineers, 1985
Drying Beds			
Unit Size & Type			
Number of Drying Beds		20	John Carollo Engineers, 1985
Depth	ft	4	John Carollo Engineers, 1985
Total Area	acres	236	John Carollo Engineers, 1985
Design Criteria			
Average Net Seasonal Evaporation	inches	40	John Carollo Engineers, 1985
Initial Sludge Concentration	% TS	7	John Carollo Engineers, 1985
Final Sludge Concentration	% TS	50	John Carollo Engineers, 1985
Sludge Production Rate	tons/ season	50,000	John Carollo Engineers, 1985
North Lagoons Supernatant Pump			
Number of Pumps		1	San José O&M Manual (online)
Original Nameplate Capacity	gpm	800 @ 48 TDH	San José O&M Manual (online)

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Parameter	Units	Value	Comments and Source
Recycled Water Transmission Pump Station			
Pump IDs		TPS-P-RCW-04 TPS-P-RCW-09	San José O&M Manual (online)
Number of Feed Pumps		2	San José O&M Manual (online)
Original Nameplate Capacity	gpm	10,210	San José O&M Manual (online)
Power, each	hp	1000	San José O&M Manual (online)
Pump IDs		TPS-P-RCW-05 TPS-P-RCW-08	San José O&M Manual (online)
Number of Feed Pumps		2	San José O&M Manual (online)
Original Nameplate Capacity	gpm	7920	San José O&M Manual (online)
Power, each	hp	900	San José O&M Manual (online)
Pump IDs		TPS-P-RCW-06 TPS-P-RCW-07	San José O&M Manual (online)
Number of Feed Pumps		2	San José O&M Manual (online)
Original Nameplate Capacity	gpm	2780	San José O&M Manual (online)
Power, each	hp	350	San José O&M Manual (online)
Utility Water Systems			
<u>W1 Booster Pumps</u>			
Location		Filtration Building Basement	San José O&M Manual (online)
Number of Pumps		3	San José O&M Manual (online)
Original Nameplate Capacity, each	gpm	300 @ 180 ft TDH	San José O&M Manual (online)
Power, each	hp	40	San José O&M Manual (online)
<u>2W Pumps</u>			
Location		Primary Service Building	San José O&M Manual (online)
Number of Pumps		3	San José O&M Manual (online)

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Parameter	Units	Value	Comments and Source
Original Nameplate Capacity	gpm	400 @ 162 ft TDH	San José O&M Manual (online)
Power, each	hp	40	San José O&M Manual (online)
W2 Water Well Pumps			
Pump IDs		No. 2 Water Well Pump 1	San José O&M Manual (online)
Location		East of Digester No. 3	San José O&M Manual (online)
Number of Pumps		1	San José O&M Manual (online)
Original Nameplate Capacity	gpm	300 @ 150 ft TDH	San José O&M Manual (online)
Power, each	hp	75	San José O&M Manual (online)
Pump IDs		No. 2 Water Well Pump 2	San José O&M Manual (online)
Location		Southwest of Digester No. 3	San José O&M Manual (online)
Number of Pumps		1	San José O&M Manual (online)
Original Nameplate Capacity	gpm	1000 @ 200 ft TDH	San José O&M Manual (online)
Power, each	hp	25	San José O&M Manual (online)
Pump IDs		No. 2 Water Well Pump 3	San José O&M Manual (online)
Location		Across Zanker Road from South Plant Entrance	San José O&M Manual (online)
Number of Pumps		1	San José O&M Manual (online)
Original Nameplate Capacity	gpm	500 @ 280 ft TDH	San José O&M Manual (online)
Power, each	hp	50	San José O&M Manual (online)
W3 Booster Pumps			
Location		Nitrification Building Basement	San José O&M Manual (online)
Number of Pumps		3	San José O&M Manual (online)
Pump IDs		No. 3 Water Process Pumps	San José O&M Manual (online)

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Parameter	Units	Value	Comments and Source
Location		Chlorination Building Basement	San José O&M Manual (online)
Number of Pumps		2	San José O&M Manual (online)
Original Nameplate Capacity	gpm	12,000 @ 65 ft TDH	San José O&M Manual (online)
Power, each	hp	250	San José O&M Manual (online)

Notes:
NA = Not Available.
hp = horsepower.
sf = square feet.
ft = feet.
gpm = gallons per minute.
mgd = million gallons per day.
TS = total solids.
cf = cubic feet.
ppd = pounds per day.
hrs = hours.
gal = gallons.
gph = gallons per hour.
psi = pounds per square inch.
psig = pounds per square inch gauge.
fps = feet per second.
min = minutes.
MG = million gallons.
mg/L = milligrams per liter.
TDH = total design head.
scfm = standard cubic feet per minute.
mm = millimeters.
PHWWF - peak hour wet weather flow.
ADMMF - average day maximum month flow.
ADWF = average dry weather flow.
SRT = solids retention time.
MLSS = mixed liquor suspended solids.
RAS = return activated sludge.
WAS = waste activated sludge.
RNS = return nitrification sludge.
WNS = waste nitrification sludge.
TWAS = thickened waste activated sludge.
DAF = dissolved air floatation.
RSPS = Return Sludge Pump Station.

APPENDIX REFERENCES

APPENDIX REFERENCES

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