5.15 Water Resources

This section provides a discussion of the existing water resources near the CPV Vaca Station (CPVVS) site and assesses the potential effects of project construction and operations on water resources. Specifically, this chapter discusses the CPVVS and its potential effects in the following areas:

- Water supply and quality
- Disposal of waste water
- Compliance with state water policies
- Stormwater discharge
- Flooding

Section 5.15.1 discusses the existing hydrologic environment. Potential environmental effects of the CPVVS construction and operation on water resources are discussed in Section 5.15.2. A discussion of cumulative project effects is presented in Section 5.15.3. Section 5.15.4 discusses proposed mitigation measures that will prevent significant impacts. Section 5.15.5 presents applicable laws, ordinances, regulations and standards (LORS) related to water resources. Section 5.15.6 describes permits that relate to water resources, lists contacts with relevant regulatory agencies, and presents a schedule for obtaining permits. References cited are listed in Section 5.15.7.

5.15.1 Affected Environment

5.15.1.1 Water Features, Rainfall, and Drainage

The nearest water body to the project site is Old Alamo Creek, which flows along the northern boundary of the City of Vacaville's (City) Easterly Wastewater Treatment Plant (EWTP), which is adjacent to the northern boundary of the CPVVS. The EWTP discharges to Old Alamo Creek, tributary to Alamo Creek, tributary to Ulatis Creek, which flows southeast into Cache Slough and continues southeast flowing into the Sacramento River and ultimately draining into San Francisco Bay (Figure 5.15-1).

The Ulatis Creek Watershed is the primary watershed in the project area and includes the Alamo Creek sub-watershed. It is composed of many smaller creeks, including Alamo, Ulatis, Horse, Gibson Canyon, Sweeney, and McCune creeks (Ulatis Resource Conservation District, 2002) and covers about 150 square miles within the northwestern portion of Solano County. New Alamo Creek is an engineered earthen channel designed to convey flood flows from just above Leisure Town Road to the confluence with Ulatis Creek. Cache Slough begins at the terminus of Ulatis Creek, about 5.5 miles downstream of the confluence of New Alamo and Ulatis Creeks. The Cache Slough channel morphology changes dramatically downstream of the confluence with Ulatis Creek, widening from about 300 to 1,500 feet because of tributaries entering from the north and east. Cache Slough, being a tributary to the Sacramento-San Joaquin Delta, is tidally influenced; therefore, flows from Ulatis Creek and other creeks entering Cache Slough are affected by the Delta's tidal gradient (State Water Resources Control Board [SWRCB], 2007).

Beneficial uses for Alamo and Ulatis Creeks and Cache Slough are not specifically identified in the Central Valley Region 5 Basin Plan, but the beneficial uses of any specifically identified water body generally apply to its tributary streams. Ulatis Creek and Cache Slough are located within the legal boundaries of the Sacramento-San Joaquin Delta. Beneficial uses of Delta waterways include municipal and domestic supply (MUN), agricultural supply (AGR), industrial service supply (IND), industrial process supply (PRO), water contact recreation (REC-1), non-contact water recreation (REC-2), warm freshwater habitat (WARM), cold freshwater habitat (COLD), migration of aquatic organisms (MIGR), spawning, reproduction, and/or early development (SPWN), wildlife habitat (WILD), and navigation (NAV). The MUN, COLD, MIGR, and SPWN beneficial uses have been de-designated for Old Alamo Creek per the U.S. Environmental Protection Agency (EPA) approval on August 7, 2006 (SWRCB, 2007).

Solano County lies in the lower west side of the Sacramento Valley. The area includes low hills and steep mountainous uplands with elevations up to 2,819 feet, which are part of the Coast range. The area also includes land on floor of the Sacramento Valley that is generally level, with some gently sloping alluvial plains and marshes.

Most of the county, particularly in the east and north, is characterized by hot, dry summers and cool winters. The areas to the south and west are influenced by the Pacific Ocean, having cool, humid summers and moderate winters. In the summer, there is a steady marine wind that blows up the Carquinez Strait. Average annual precipitation ranges from 16 inches in some parts of the county to as much as 30 inches in the mountainous areas. About 95 percent of the total precipitation falls in October through April. The average length of the growing season is 240-300 days.

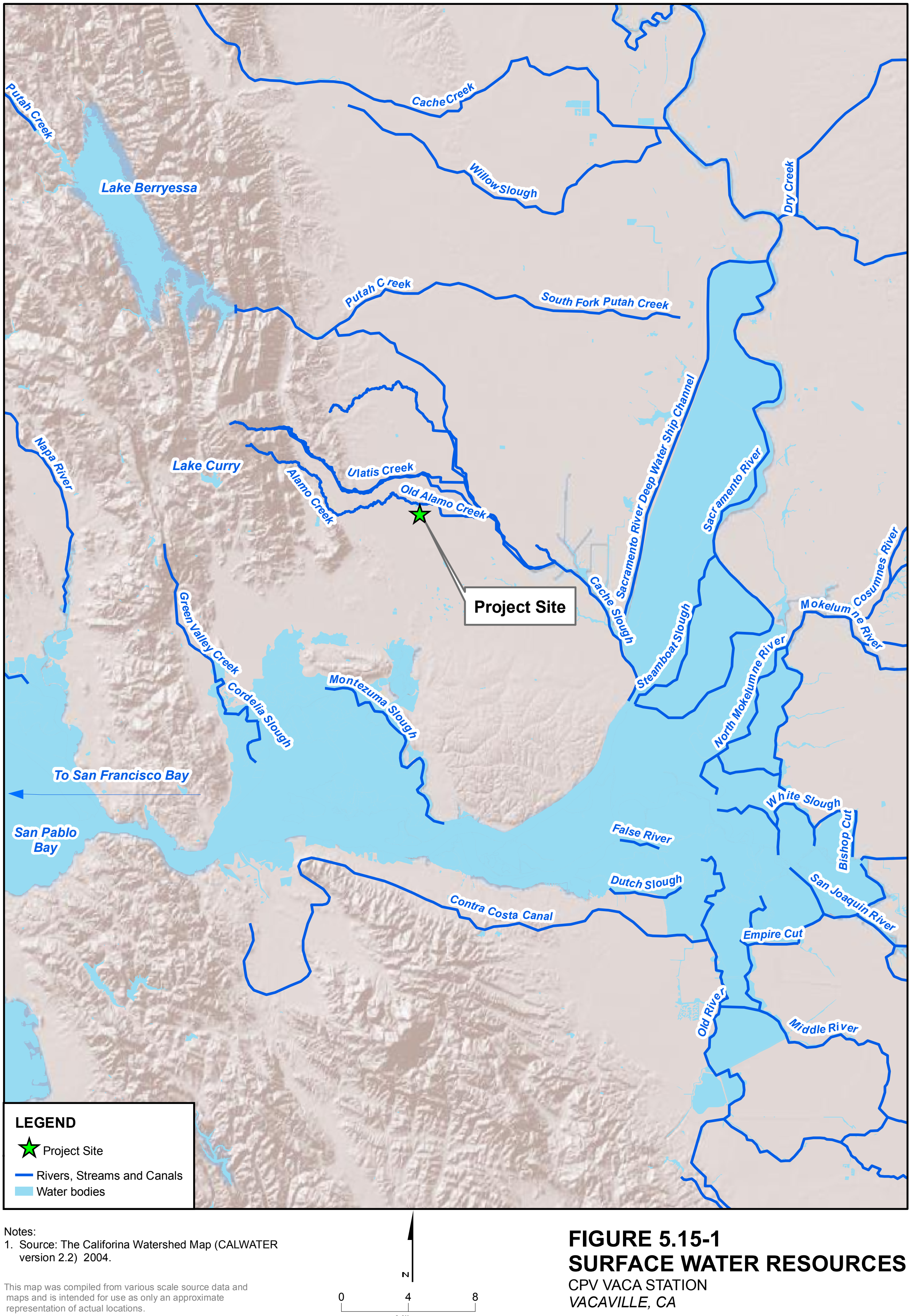
Table 5.15-1 provides average historical rainfall from the meteorological station at the Vacaville weather station.

TABLE 5.15-1
Rainfall near the Proposed Project Site (1914-2005)

Precipitation	Annual	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average	26.0	5.7	4.5	3.3	1.5	3.4	1.6	1.2	0.1	0.3	1.2	3.2	5.1
Maximum	48.9	16.7	15.1	10.7	6.4	7.7	7.0	5.4	2.5	0.9	8.2	8.9	18.4
Minimum	8.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3

Source: Western Regional Climate Center (WRCC), 2006.

The mean annual precipitation (January 1948 to December 2006) is 26.02 inches per year. The minimum and maximum annual precipitation for the period of record is 8.13 inches and 48.90 inches, respectively.



Notes:
1. Source: The Califorina Watershed Map (CALWATER version 2.2) 2004.

This map was compiled from various scale source data and maps and is intended for use as only an approximate representation of actual locations.

FIGURE 5.15-1
SURFACE WATER RESOURCES
CPV VACA STATION
VACAVILLE, CA

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5.15.1.2 Groundwater

The CPVVS site is within the Sacramento Valley Groundwater Basin, Solano subbasin (Figure 5.15-2). The Solano Subbasin lies in the southwest portion of the Sacramento Basin and the northern portion of the Sacramento-San Joaquin Delta. Elevation varies from 120 feet in the northwest corner to sea level in the south. Subbasin boundaries are defined by Putah Creek on the north, the Sacramento River on the east, the North Mokelumne River on the southeast, and the San Joaquin River on the south. Primary waterways in and bordering the basin include the Sacramento, Mokelumne, and San Joaquin rivers; the Sacramento River Deep Water Ship Channel; and Putah Creek (California Department of Water Resources [DWR], 2004).

The primary water-bearing formations comprising the Solano subbasin are sedimentary continental deposits of Late Tertiary (Pliocene) to Quaternary (recent) age. Fresh water-bearing units include younger alluvium, older alluvium, and the Tehama Formation. Saline water-bearing sedimentary units underlie the Tehama formation and are generally considered the saline water boundary (DWR, 2004).

Flood basin deposits occur along the eastern margin of the subbasin. These deposits consist primarily of silts and clays, and may be locally interbedded with stream channel deposits of the Sacramento River. In the Delta, flood basin deposits contain a significant percentage of organic material (peat), and are sometimes mapped as peaty mud. The flood basin deposits have low permeability and generally yield low quantities of water to wells. Recent stream channel deposits consist of unconsolidated silt, fine- to medium-grained sand, gravel, and in some cases cobbles deposited in and adjacent to active streams in the subbasin (DWR, 2004).

Groundwater levels were measured at what we now consider to be natural, predevelopment levels in 1912 by the U. S. Geological Survey (USGS). At that time the general direction of groundwater flow in the subbasin was from the northwest to southeast. From 1912 to 1932, below-average precipitation result in lower groundwater levels throughout the basin. Groundwater levels continued to decline through the 1950s because of increased agricultural use and development, when surface water delivery from the Solano Project slowed the descent and slightly turned the declining trend around. Since that time, the subbasin has been impacted by drought periods in the 1970s and 1980s but has recovered during years of high precipitation (DWR, 2004).

Groundwater quality is generally considered to be of good quality and usable for both domestic and agricultural purposes. Chemical water types within the basin are generally classified as magnesium bicarbonate in the central and northern areas, sodium bicarbonate in the southern and eastern areas, and calcium magnesium or magnesium calcium bicarbonate around Dixon. Total dissolved solids (TDS) range from between 250 and 500 parts per million (ppm) in the northwest and eastern portion of the basin and are found at levels higher than 500 ppm in the central and southern areas. Additional chemical concentrations include chloride, sulfate, boron, iron, and manganese. Impairments include high concentrations of bicarbonates found in the southern portion of the basin (DWR, 2004).

5.15.1.3 Flooding Potential

The CPVVS footprint including the utility lines lies entirely outside the 500-year floodplain (Zone X) as defined by the Federal Emergency Management Agency (FEMA, 1996) (Figure 5.15-3).

5.15.1.4 Water Supply

This section describes the quantity of water required, the sources of the water supply, water treatment requirements, and water quality of the source and treated water.

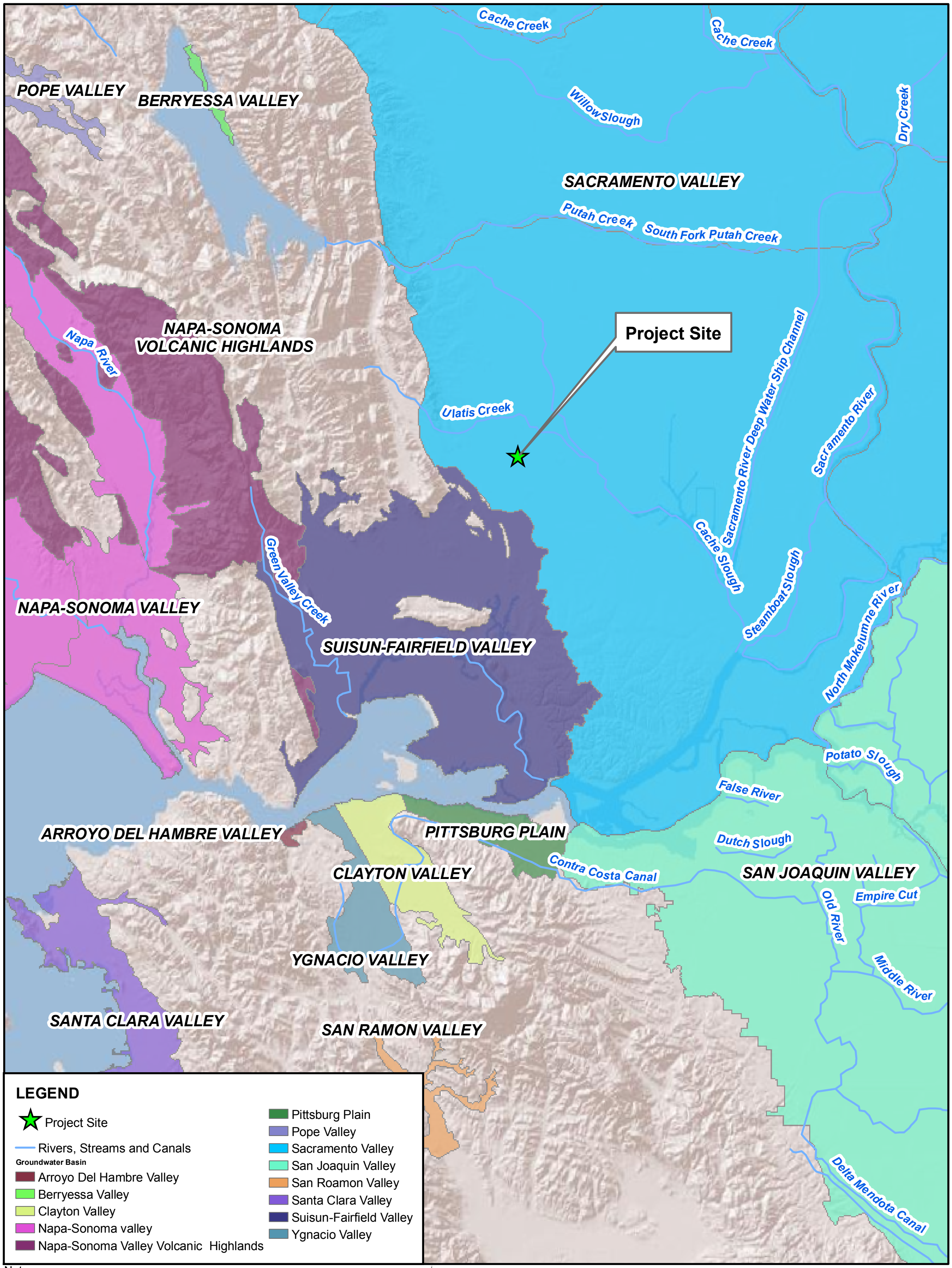
5.15.1.4.1 Process Water

The CPVVS will construct a new diameter pipeline in the utility corridor connecting the CPVVS and the EWTP. This line will provide secondary-treated recycled water. Potable water and sanitary sewer connections also will be provided through connections in this utility corridor to the treatment plant. Consistent with California Energy Commission goals and policies, only reclaimed water will be used for power plant cooling. There are no other current users of the EWTP's secondary treated water supply, which averages 6.5 mgd. Due to the high level of reliability of water from the EWTP, no backup water supply is required or planned for this project at this time.

The EWTP will supply secondary-treated water supply to the site, which the CPVVS will treat to tertiary treatment standards as required by California Title 22 regulations. Phosphate removal will be incorporated into the tertiary treatment process to meet phosphate limits in the circulating water. The proposed tertiary treatment process is continuous, upflow sand filtration (per CA Title 22). Ferric chloride (or another coagulant such as alum) will be added to the filtration process for phosphate removal (as a precipitated salt of iron or aluminum). The filter backwash wastewater stream from this process will be approximately 10 percent of the feedwater flow to the tertiary treatment system. This backwash will be very similar to the secondary-treated water in quality except for the following items: (1) an increase in Total Suspended Solids (TSS) including precipitated iron (as ferric hydroxide and as ferric phosphate) and precipitated phosphate (as ferric phosphate), (2) a decrease in alkalinity, an increase in chloride, (3) a possible small decrease in BOD and total organic carbon (TOC), and (4) a small pH reduction. Discussions are ongoing with EWTP to arrange for the filter backwash stream to be returned to the EWTP headworks.

Table 5.15-2 lists water quality (average – mg/L unless noted) for the EWTP (source), the tertiary treatment system wastewater quality and the tertiary treated water quality. This tertiary-treated supply will be forwarded to the filtered water/fire water storage tank. This tank will provide makeup water to the circulating water cooling system and the service water system.

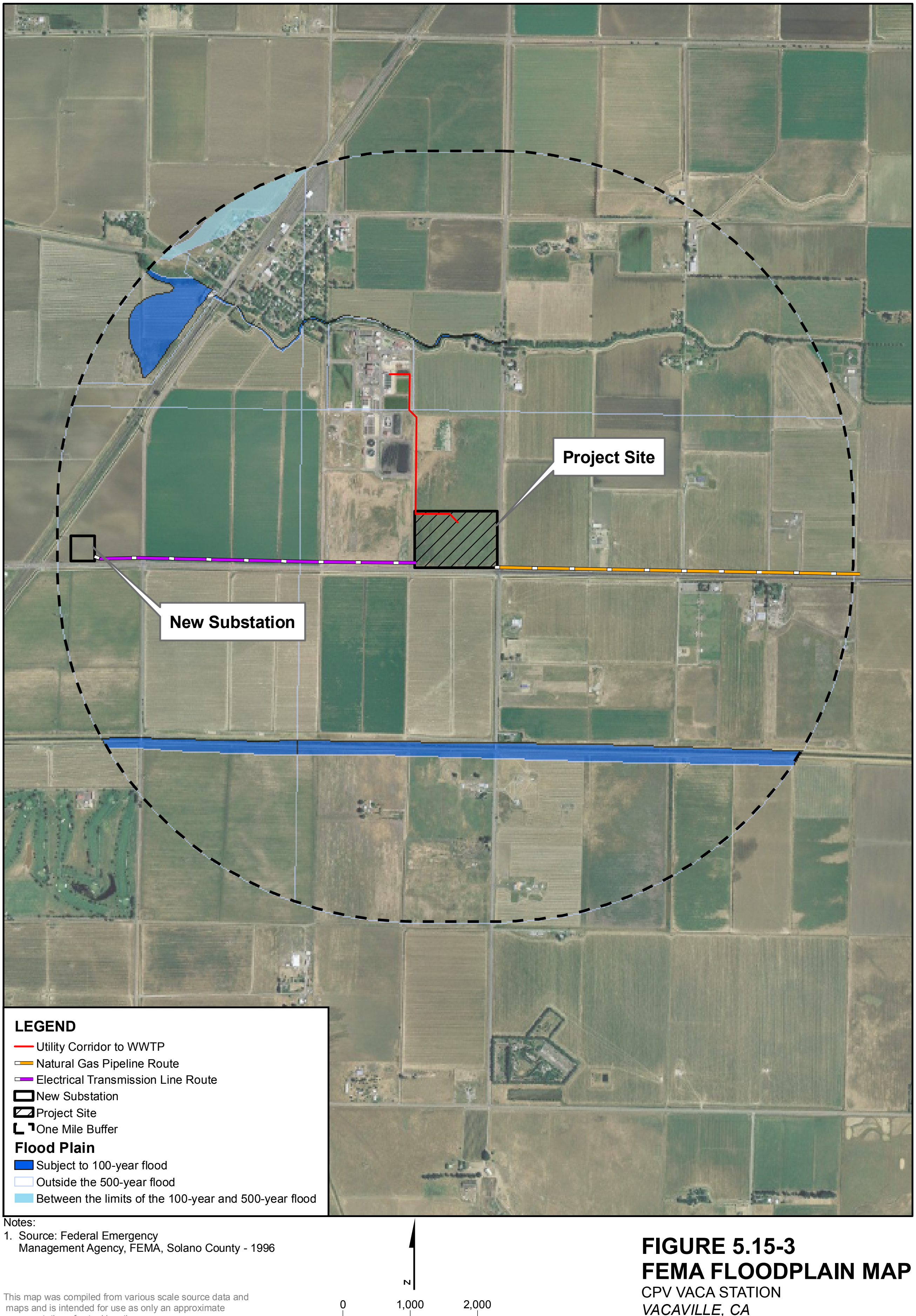
Demineralized water will be required for steam cycle makeup, combustion turbine generator (CTG) wash water, and chemical cleaning and solution makeup operations. First-pass reverse osmosis (RO) product water will be used for CTG evaporative cooler makeup. The makeup demineralized water system (MDS) will include filtration pretreatment, a two-pass RO system, and an electrodeionization system (EDI) for polishing. The EDI product water will be fed to the demineralized water storage tank. Distillate from the zero liquid discharge (ZLD) system will be used as partial makeup for the MDS under most operating conditions. The balance of the makeup will be from the filtered water storage tank.



Notes:
1. Source: The Dept. of Water Resources, Groundwater Basin Map, 2004.

This map was compiled from various scale source data and maps and is intended for use as only an approximate representation of actual locations.

FIGURE 5.15-2
GROUNDWATER RESOURCES
CPV VACA STATION
VACAVILLE, CA



Notes:
1. Source: Federal Emergency Management Agency, FEMA, Solano County - 1996

This map was compiled from various scale source data and maps and is intended for use as only an approximate representation of actual locations.

FIGURE 5.15-3
FEMA FLOODPLAIN MAP
CPV VACA STATION
VACAVILLE, CA

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TABLE 5.15-2
Water Quality from EWTP (source), Tertiary Treatment System Wastewater Quality, and Tertiary Treated Water Quality

Location or Destination	**EWTP Supply Quality**		**Tertiary Treatment System Wastewater Quality**	**Tertiary Treated Water Quality**
Flow, gpm (annual average plant condition)	2,254.1		225.4	2028.7
Constituent				
(Average - mg/L, unless noted)	**(as ion)**	**(as $CaCO_3$)**	**(as $CaCO_3$)**	**(as $CaCO_3$)**
Sodium	146.6	319.6	338	338
Potassium	16.0	20.5	20.5	20.5
Calcium	33	82.5	82.5	82.5
Magnesium	24	98.9	98.9	98.9
Ammonium (as NH_4+)	0.103	0.286	0.3	0.3
Barium	0.017	0.012	0.012	0.012
Strontium				
Alkalinity (Total)		196		
P-Alkalinity	0	0		
M-Alkalinity	239	196	182	182
Hydroxide	0	0	0	0
Chloride	146	205.9	246.8	246.8
Sulfate	81.1	84.3	84.3	84.3
Nitrate (as NO_3)	27.0	21.9	21.9	21.9
Nitrite (as NO_2)				
Orthophosphate (as PO_4)	7.36	11.6	3.2	3.2
Fluoride	0.8	2.13	2.13	2.13
	(as Substance)		**(as Substance**	**(as Substance)**
pH	7.1 – 8.3			
TSS	18.4		55	<1
Silica (Total)				
Silica (Reactive)	35		35	35
BOD	4		3.2	3.2
Total Residual Cl_2				
Boron	0.41		0.41	0.41
MBAs				
TDS (Measured)	682			
TDS (Calculated)	756		731	731
Total Petroleum Hydrocarbons				
Oil & Grease	<5		<5	<5
Total Organic Carbon (TOC)	12		9.6	9.6
Total P (as P)				
Total N (as N)				
Cyanide	0.0015		0.0015	0.0015
Perchlorate				

TABLE 5.15-2
Water Quality from EWTP (source), Tertiary Treatment System Wastewater Quality, and Tertiary Treated Water Quality

Location or Destination	EWTP Supply Quality	Tertiary Treatment System Wastewater Quality	Tertiary Treated Water Quality
Aluminum (Total)			
Antimony (Total)	0.0004	0.0004	0.0004
Arsenic (Total)	0.0013	0.0013	0.0013
Beryllium (Total)	0.0038	0.0038	0.0038
Cadmium (Total)	0.0001	0.0001	0.0001
Chromium III (Total)	0.0010	0.001	0.001
Chromium Vi (Total)	0.0002	0.0002	0.0002
Copper (Total)	0.0112	0.0112	0.0112
Iron (Total)	0.22	15.1	15.1
Iron (Dissolved)		<0.1	<0.1
Lead (Total)	0.00085	0.00085	0.00085
Manganese (Total)	0.0091	0.0091	0.0091
Manganese (Dissolved)			
Mercury (Total)	0.0000059	0.0000059	0.0000059
Nickel (Total)	0.0040	0.0040	0.0040
Selenium	0.0012	0.0012	0.0012
Silver	0.0001	0.0001	0.0001
Thallium (Total)	0.0001	0.0001	0.0001
Uranium (Total)			
Zinc	0.0560	0.0560	0.0560

Note: Sodium added to balance ions

As described in Section 2.0, on an annual average basis, recycled water use would be about 2,254 gallons per minute (gpm) (average use assuming the Siemens option), or about 1,185 million gallons per year (3,636 acre-feet), assuming full-time operation at 8,760 hours per year. Water used for makeup in the circulating water system will be fed directly from the Filtered Water Storage Tank. The Filtered Water Storage Tank will provide approximately 14 hours of operational storage (based on annual average plant conditions) in the event there is a disruption in the supply. Water supply reliability is ensured by the EWTP recycled water storage facilities. A will-serve letter from the City of Vacaville indicating that this amount will be available to the project is included in Appendix 2I. There will be approximately five cycles of concentration of the combined cooling tower makeup, which consists of the plant filtered water supply and the various recovered water and wastewater stream.

The steam turbine cycle heat rejection system will consist of a de-aerating steam surface condenser, cooling tower, and cooling water (circulating water) system. The heat rejection system will receive exhaust steam from the low-pressure steam turbine and condense it to water (condensate) for reuse. A surface condenser is a shell-and-tube heat exchanger; the steam condenses on the shell side, and the cooling water flows through the tubes, making one or more passes. The condenser will be designed to operate at a pressure of approximately 3 inches of mercury, absolute at an ambient temperature of 99°F. It will transfer approximately 1,680 MMBtu/hr from condensing steam to cooling water.

The cooling water will circulate through a counter-flow 12-cell mechanical draft cooling tower that uses electric motor-driven fans to move air in a direction opposite the flow of the cascading water. The heat removed in the condenser will be discharged to the atmosphere by heating the air and evaporating some of the cooling water. High-efficiency drift eliminators will reduce drift (the fine mist of water droplets entrained in the warm air leaving the cooling tower) to 0.0005 percent of the circulating water flow.

This project is estimated to have an overall annual availability of more than 95 percent. A water balance schematic process flow diagram is included in Section 2.0, Figure 2.1-5. Table 2.1-1 shows water use characteristics keyed to the process flow diagram for (1) the average annual case (75.6 ºF dry bulb temperature and 64 percent relative humidity) and (2) the summer maximum case (105.6 ºF and 11 percent relative humidity). Both cases assume evaporative cooling in operation and duct burning not in operation. The tables show water usage for the Siemens SGT6 5000F because its water usage is higher than for the GE 7FA. Complete water balance tables, including additional cases assuming other temperature, humidity, and operating regimes, are found in Appendix 2B.

The product water from the demineralizer system would be stored in a bolted, carbon steel, field-erected, factory-epoxy-coated, demineralized water tank. The tank would be sized for 200,000 gallons, which is nominally 3 days of plant demineralized water usage at the summer maximum condition (with duct firing) or 4 days at the annual average condition without duct firing.

The plant will return wastewater from the on-site tertiary treatment system to the EWTP headworks. No other process wastewaters will be discharged from the site. These wastewaters will either be recycled for plant use or will be processed through the ZLD system.

The use of reclaimed water for process water and cooling is consistent with state standards and policies, including the SWRCB Resolution 75-58, which encourages use of reclaimed water for combined-cycle power plant cooling and California Water Code Sections 13550-13556, which discourage the use of potable water for non-potable purposes.

5.15.1.4.2 Domestic and Sanitary Water Use

Potable water will be used for drinking, eye washes, and safety showers. Fire protection water and service water and will be provided from the City of Vacaville's potable water system.

5.15.1.5 Wastewater Collection, Treatment, Discharge, and Disposal

General plant drains will collect containment area washdown and drainage from facility equipment and sample drains. Water from these areas will be collected in a system of floor drains, hub drains, sumps, and piping and routed to the wastewater collection system. Drains that potentially could contain oil or grease will first be routed through an oil/water separator. Water from the plant wastewater collection system will be recovered for use as part of the cooling tower makeup.

Wastewater from combustion turbine water washes, crystallizer purges, and some chemical cleaning wastewaters will be collected in holding tanks or sumps and will be trucked offsite for disposal at an approved wastewater disposal facility. The secondary wastewater collection system will collect sanitary wastewater from sinks, toilets, showers, and other sanitary facilities, and discharge it via the facility's sanitary sewer collector system.

5.15.1.6 Stormwater

Stormwater will be collected in storm drains on site and conveyed to a stormwater retention pond located along the eastern portion of the project site. Appendix 5.15A shows the project drainage plan and stormwater calculations used to size the stormwater retention pond. No stormwater will be discharged from the project site.

5.15.1.7 Construction

During construction, approximately 24 acres of land associated with the plant will be disturbed. Surface water impacts are anticipated to be related primarily to short-term construction activity and would consist of increased turbidity due to erosion of newly excavated or placed soils. Activities such as grading can potentially destroy habitat and increase rates of erosion during construction. In addition, construction materials could contaminate runoff or groundwater if not properly stored and used. Compliance with engineering and construction specifications, following approved grading and drainage plans, and adhering to proper material handling procedures will ensure effective mitigation of these short-term impacts. Best management practices (BMPs) for erosion control will be implemented. Additionally, erosion and sediment controls, surface water pollution prevention measures, and other BMPs will be developed and implemented for both construction and operational phases. These plans will be prepared in accordance with local agency requirements and the National Pollutant Discharge Elimination System (NPDES) construction permit issued by the SWRCB, as described in Section 5.15.4.

To qualify for the NPDES statewide General Permit for Storm Water Discharges Associated with Construction Activity (General Construction Permit), prior to construction CPVVS will be required to develop a SWPPP to prevent the offsite migration of sediment and other pollutants, and to reduce the effects of runoff from the construction site to offsite areas.

5.15.2 Environmental Analysis

Project effects on water resources can be evaluated relative to significance criteria derived from the California Environmental Quality Act (CEQA) Appendix G checklist. Under CEQA, the project is considered to have a potentially significant effect on water resources if it would:

- Substantially alter the existing drainage pattern of the site or area, including the alteration of the course of a stream or river, in a manner which will result in substantial erosion or siltation on- or offsite, or in flooding on- or offsite.
- Create or contribute runoff water which will exceed the capacity of existing or planned stormwater drainage systems, or provide substantial additional sources of polluted runoff.

- Violate any water quality standards or waste discharge requirements, or otherwise substantially degrade water quality.
- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there will be a net deficit in aquifer volume or a lowering of the local groundwater table level (for example, the production rate of pre-existing nearby wells will drop to a level which will not support existing land uses or planned uses for which permits have been granted).
- Place within a 100-year flood hazard area structures that will impede or redirect flood flows.
- Cause inundation by seiche, tsunami, or mudflow.

5.15.2.1 Wastewater Collection, Treatment, Discharge, and Disposal

The plant will return wastewater from the on-site tertiary treatment system to the EWTP headworks. All other wastewaters will either be recycled for plant use or will be processed through the ZLD system. Impacts related to wastewater collection, treatment, discharge, and disposal will be less than significant.

5.15.2.2 Stormwater Runoff and Drainage

Currently, there is no existing structure on the proposed site, nor a stormwater system other than percolation into the existing soils or runoff into existing culverts. Appendix 5.15A contains the Preliminary Stormwater Management Design for the project, which includes stormwater calculations and the pre- and post-development drainage plans. Stormwater from the equipment drains will go to the oily water separator for treatment and will be recovered for use as part of the cooling tower makeup. All other stormwater from the site will drain into the retention pond that will be built as part of the project, therefore there will be no discharge of stormwater to any nearby waterways, and impacts due to stormwater runoff and drainage will not occur.

5.15.2.2.1 Construction Effects on Water Quality

Potential water supply impacts from construction will be limited to surface water runoff during excavation and construction. Such construction impacts are small and will be controlled through implementing a Stormwater Pollution Prevention Plan (SWPPP) and associated BMPs, and practicing proper housekeeping at the construction site. The site grading and drainage will be designed to comply with all applicable LORS. The general site grading will establish a working surface for construction and plant operating areas, and will provide positive drainage from buildings and structures, as well as adequate ground coverage for subsurface utilities.

Successful implementation of the SWPPP will ensure that construction impacts on water resources are mitigated to a less-than-significant level. SWPPP procedures include submitting a Notice of Intent (NOI) to the Central Valley Regional Water Quality Control Board (RWQCB) and developing the SWPPP prior to the start of construction activities.

Water used for dust control and soil compaction during construction will not result in discharge. During the construction period, sanitary waste will be collected in portable toilets (no discharge) supplied by a licensed contractor for collection and disposal at an appropriate receiving facility. Equipment wash water will be collected and disposed of offsite. With the implementation of the SWPPP and BMPs, described in Section 5.15.4, construction effects on water quality will be less than significant.

5.15.2.2.2 Water Supply during Construction

During construction of the project, water will be required primarily for dust suppression (12 hours/day, for approximately 16 months. Because of the short duration of construction activities and the relatively limited water requirements (an average of approximately 100 gpm and approximately 400 gpm for 1 hour for dust control and soil compaction, at peak use) of the construction phase of the project, no significant adverse impacts on water supply are expected to result. The average water use for construction would be 224 million gallons per year.

5.15.2.3 Groundwater

The CPVVS would make no direct use of groundwater resources and would have no effect on groundwater quantity or quality.

5.15.2.4 Flooding Potential

The CPVVS footprint including the utility lines lies entirely outside the 500 year floodplain and project implementation will not result in any structures that will impede or redirect flood flows, nor cause indundatinon by seiche, tsunami, or mudflow and therefore will have no impacts to water resources.

5.15.2.5 Water Supply for Irrigation

The proposed CPVVS will be using the existing EWTP discharge stream for cooling and plant processes, which will decrease the amount of water discharging into Old Alamo Creek. Although water supplies directly downstream of the EWTP may locally decrease during peak power plant use, there are no downstream users that depend on water from Old Alamo Creek for irrigation purposes. Old Alamo Creek is used primarily as a drain for the EWTP, which ultimately drains into the Sacramento-San Joaquin Delta. Farmers in the area receive irrigation water from various irrigation districts, including Solano Irrigation District, which distribute water received from Lake Berryessa. The CPVVS will not compete with irrigation uses for recycled water from the EWTP and for these reasons, the CPVVS will not cause significant impacts to water supplies for irrigation.

5.15.3 Cumulative Effects

A cumulative impact refers to a proposed project's incremental effect together with other closely related past, present, and reasonably foreseeable future projects whose impacts may compound or increase the incremental effect of the proposed project (Public Resources Code § 21083; California Code of Regulations, title 14, § 15064(h), 15065I, 15130, and 15355).

The CPVVS would have little or no adverse impact on water quality, availability, or stormwater runoff/erosion. The use of best management practices to control stormwater drainage during all phases of the project will ensure that the CPVVS will have no significant adverse impact on water quality during construction or operation. Therefore, the project would be very unlikely to cause cumulative impacts, when its effects are considered in combination with those of other projects.

5.15.4 Mitigation Measures

This section presents mitigation measures proposed to reduce impacts on water resources in areas affected by the project. The mitigation measures proposed are prescribed by stormwater and erosion control management programs mandated under the NPDES permitting system. Under the General NPDES Permit for Construction, for example, various specific measures are prescribed, and a program of monitoring is required. The programs are at least 90 percent effective, have been in place for several years, as mandated by the Clean Water Act (CWA), and have proven effective.

To qualify for the NPDES statewide General Permit for Storm Water Discharges Associated with Construction Activity (General Construction Permit), prior to construction CPVVS will be required to develop a SWPPP to prevent the offsite migration of sediment and other pollutants, and to reduce the effects of runoff from the construction site to offsite areas. Successful implementation of the SWPPP will ensure that construction impacts to water resources are mitigated to a less-than-significant level. SWPPP procedures include submitting a Notice of Intent (NOI) to the Central Valley Regional Water Quality Control Board (RWQCB) and developing the SWPPP prior to the start of construction activities.

As part of the SWPPP, the following mitigation measures will be included:

- Implement BMPs designed to minimize soil erosion and sediment transport during construction of the plant site. Design appropriate erosion and sediment controls for slopes, catch basins, culverts, stream channels, and other areas prone to erosion.
- Conduct operations at the plant site in accordance with the EPA's Storm Water Phase I Final Rule (for construction activities disturbing 1 acre or more). Design and implement the BMPs to prevent or control pollutants potentially associated with the operation of the plant from entering stormwater sewers.
- Perform refueling and maintenance of mobile construction equipment only in designated lined and/or bermed areas located away from stream channels. Prepare and implement spill contingency plans in areas where they are appropriate.
- Prepare and submit a SWPPP to ensure quality of discharged stormwater. Obtain concurrence with the Central Valley RWQCB for the SWPPP.

5.15.5 Laws, Ordinances, Regulations, and Standards

Federal, state, and local LORS applicable to water resources and anticipated compliance are discussed in this section and summarized in Table 5.15-3.

5.15.5.1 Federal LORS

In California, discharges of wastewater and stormwater into surface waters are regulated by the SWRCB and RWQCBs under the Clean Water Act and the Porter-Cologne Water Quality Control Act. Relevant NPDES permits for stormwater quality management are discussed below under state and local LORS.

TABLE 5.15-3
Laws, Ordinances, Regulations, and Standards for Water Resources

LORS	Requirements/Applicability	Administering Agency	AFC Section Explaining Conformance
Federal			
Clean Water Act/Water Pollution Control Act. P.L. 92-500, 1972; amended by Water Quality Act of 1987, P.L. 100-4 (33 USC 466 et seq.); NPDES (CWA, Section 402)	Prohibits discharge of pollutants to receiving waters unless the discharge is in compliance with an NPDES permit. Applies to all point-source discharges, including stormwater runoff from construction (including demolition). Applies to non-point sources through municipal NPDES permits.	Central Valley RWQCB	Compliance with existing statewide NPDES permit for construction and industrial stormwater. Compliance with existing Waste Discharge Requirement implemented by the EWTP (Section 5.15.5.1).
State			
Federal Clean Water Act (implemented by State of California)	Implements and enforces the federal NPDES permit program.	Central Valley RWQCB	NPDES permits for construction (including demolition) and industrial stormwater prior to construction and plant operation (Sections 5.15.5.2.2 and 5.15.5.2.3).
Porter-Cologne Water Quality Control Act	Controls discharge of wastewater to surface water and groundwater of California.	Central Valley RWQCB	CPVVS will discharge industrial and sanitary wastewater to the City of Vacaville EWTP (Section 5.15.5.2.2).
California State Constitution, Article X, Section 2	Prohibits waste or unreasonable use of water.	Central Valley RWQCB	The CPVVS will use only reclaimed water for power plant process and cooling (Chapter 2, Section 2.1.8).
California Water Code, Section 13550	States that use of potable water for non-potable purposes is an unreasonable use of water.	Central Valley RWQCB	The CPVVS will use only reclaimed water for power plant process and cooling (Chapter 2, Section 2.1.8).
State Water Board Resolution 75-58	Encourages use of wastewater for power plant cooling.	Central Valley RWQCB	The CPVVS will use only reclaimed water for power plant process and cooling (Chapter 2, Section 2.1.8).
Local			
The City of Vacaville and the City of Dixon Stormwater Management Plan (SWMP)	Regulates stormwater pollution prevention for the City of Vacaville.	Central Valley RWQCB	The project will comply with the SWMP by implementing state stormwater pollution prevention requirements listed above. (Section 5.15.5.2.1).

5.15.5.2 State LORS

5.15.5.2.1 Municipal Stormwater NPDES Permit

Pursuant to the Clean Water Act, a Municipal Stormwater NPDES Permit (No. CA0077601, Order No. R5-2008-005) was adopted by the Regional Water Quality Control Board 25 April 2008 and becomes effective on 14 June 2008. This Municipal Permit was issued pursuant to the EPA Phase I Municipal Program and requires the development and implementation of a program addressing stormwater runoff pollution issues in development planning for public and private projects. CPVVS will discharge wastewater into the EWTP sanitary sewer system. Permit details are discussed below under local regulations.

5.15.5.2.2 Industrial Stormwater NPDES Permit

The SWRCB implements regulations under the federal Clean Water Act requiring that point source discharges of stormwater (which is a flow of rainfall runoff in some kind of discrete conveyance such as a pipe, ditch, channel, or swale) associated with industrial activity that discharges either directly to surface waters or indirectly through municipal separate storm sewers must be regulated by an NPDES permit (SWRCB, 1997). The SWRCB has issued Waste Discharge Requirements (WDRs) for discharges of stormwater associated with industrial activities (SWRCB Order 97-03-DWQ), excluding construction activities.

The EWTP is covered under the General Storm Water Permit, Water Quality Order No. 91-13-DWQ (as amended by Water Quality Order No. 92-12-DWQ), General Permit No. CASOOGOOI for discharge of stormwater associated with industrial activities. The City has implemented a stormwater pollution prevention plan and sampling/monitoring program for the facility. Additionally, the City has implemented and is maintaining an EPA-approved pretreatment program in conformance with 40 CFR Part 403, which establishes National Pretreatment Standards to control pollutants that pass through or interfere with treatment processes in Publicly Owned Treatment Works (POTWs) or that may contaminate sewage sludge. This regulation applies for a number for specific polluters, including entities that are applying for NPDES permits, such as the City. The Central Valley RWQCB requires a NOI to be filed prior to any stormwater discharge from industrial activities, and that the SWPPP be implemented and maintained onsite.

5.15.5.2.3 Construction Stormwater NPDES Permit

The federal Clean Water Act effectively prohibits discharges of stormwater from construction sites unless the discharge is in compliance with an NPDES permit. The SWRCB is the permitting authority in California and has adopted a statewide General Permit for Stormwater Discharges Associated with Construction Activity (SWRCB Water Quality Order No. 99-08-DWQ; SWRCB, 1999) that applies to projects resulting in 1 acre or more of soil disturbance. The proposed project would result in disturbance of more than 1 acre of soil. Therefore, the project will require the preparation of a construction SWPPP that would specify site management activities to be implemented during site development. These management activities will include construction stormwater BMPs, dewatering runoff controls, and construction equipment decontamination. The Central Valley RWQCB requires a NOI to be filed prior to any stormwater discharge from construction activities, and that the SWPPP be implemented and maintained onsite. A Construction Drainage Erosion and Sediment Control Plan/SWPPP will be completed prior to the beginning of construction activities.

5.15.5.3 Local LORS

5.15.5.3.1 Municipal Code

The City of Vacaville Municipal Plan Chapter 13.08 regulates and controls the quality and quantity of the waste discharged into the city's system by any discharger to prevent the introduction of pollutants in waste discharges which would adversely affect the sewer system, the operation of the treatment facilities, the quality of the effluent from the treatment plant, **and** the **quality of the receiving waters**. Regulations apply to the city of Vacaville and to persons outside the city who are, by contract or agreement with the city, users of the city sewer system and treatment works. The director of public works of the city administers, implement, and enforce the provisions of this chapter per City Ordinance 1097 (part), 1981.

5.15.5.3.2 Stormwater Management Plan

The City of Vacaville and City of Dixon have a prepared a stormwater management plan (SWMP) that is based on the EPA's stormwater regulations and the SWRCB General Permit for stormwater discharge. The SWMP objectives are to reduce the discharge of pollutants to stormwater to the "maximum extent practicable," protect water quality, and satisfy the appropriate water quality requirements of the Clean Water Act.(City of Vacaville and City of Dixon, 2003). By complying with the federal and state stormwater regulations listed above, the CPVVS project will be in compliance with the SWMP. A copy of this plan is provided in Appendix 5.15B. The City of Vacaville Public Works Department is responsible for stormwater management review for city-permitted projects.

5.15.6 Permits and Permit Schedule

Agency contacts and required permits are listed in Table 5.15-4.

TABLE 5.15-4
Permits and Permit Schedule for Water Resources

Permit	Agency	Schedule
Application of Service for Potable Water	City of Vacaville Public Works Department 6040 Vaca Station Road Elmira, CA 95625 (707) 469-6400 Contact: David Tompkins or Deb Galway	Will-serve letter received
Industrial Wastewater Discharge Permit	City of Vacaville Public Works Department 6040 Vaca Station Road Elmira, CA 95625 (707) 469-6400 Contact: Contact: David Tompkins or Deb Galway	Applications and fees shall be filed with the city at least 90 days prior to connecting to or contributing to the treatment works. All permit applications and related correspondence shall be signed by a duly authorized representative of the user.
National Pollution Discharge Elimination System General Permit for Construction and Operation	Central Valley RWQCB 11020 Sun Center Dr., #200 Rancho Cordova, CA 95670-6114 (916) 464-3291 Contact: Jacque Kelly FAX: (916) 464-4645	Submit NOI to use the permit at least 30 days in advance of use, prepare SWPPP for construction and SWPPP for operation.

5.15.7 References

California Department of Water Resources (DWR). 2004. Sacramento Valley Groundwater Basin, Solano Subbasin. Bulletin No. 118.

City of Vacaville and City of Dixon. 2003. *Stormwater Management Plan*. Fiscal years 2003-2004 through 2007-2008.

Federal Emergency Management Agency (FEMA). 1996. Flood Insurance Rate Map: Solano County.

State Water Resources Control Board (SWRCB). 1997. Waste Discharge Requirements for Discharges of Storm Water Runoff Associated with Industrial Activities excluding Construction Activities, General Permit No. CAS000001. Adopted April 17.

State Water Resources Control Board (SWRCB). 1999. Waste Discharge Requirements for Discharges of Storm Water Runoff Associated with Construction Activity, General Permit No. CAS000002. Adopted August 19.

State Water Resources Control Board Central Valley Region 5 Basin Plans. 2007. Alamo Creek, Ulatis Creek and Cache Slough, Solano County. CEQA Scoping Meeting. Evaluating water quality standards for the protection of human health in Alamo and Ulatis creeks and Cache Slough, Solano County. Information Document 2007.

State Water Resources Control Board. 2007. http://swrcb2.swrcb.ca.gov/centralvalley/water_issues/basin_plans/alamocreek.shtml website accessed May 18, 2008.

Ulatis Resource Conservation District 2002. http://www.carcd.org/wisp/ulatis/index.htm Website accessed May 18, 2008.

Vacaville Easterly Wastewater Treatment Plant NPDES Self Monitoring Program Abstract Monitoring Study Type: City/County/Municipal - NPDES, Monitoring Program Region: Central California Coast http://gis.ca.gov/catalog/BrowseRecord.epl?id=899 Website accessed May 20, 2008

Western Regional Climate Center (WRCC). 2008. Vacaville, California. Online Information: http://www.wrcc.dri.edu/cgi-bin/cliMONtpre.pl?cavaca. Website accessed May 18, 2008.