

## 4.7 HYDROLOGY AND WATER QUALITY

### 4.7.1 INTRODUCTION

This section addresses the potential for the Proposed Project to cause impacts related to drainage and water quality. Following an overview of the drainage and water quality setting in **Subsection 4.7.2** and the relevant regulatory setting in **Subsection 4.7.3**, project-related impacts and recommended mitigation measures are presented in **Subsection 4.7.4**.

### 4.7.2 ENVIRONMENTAL SETTING

#### Surface Water

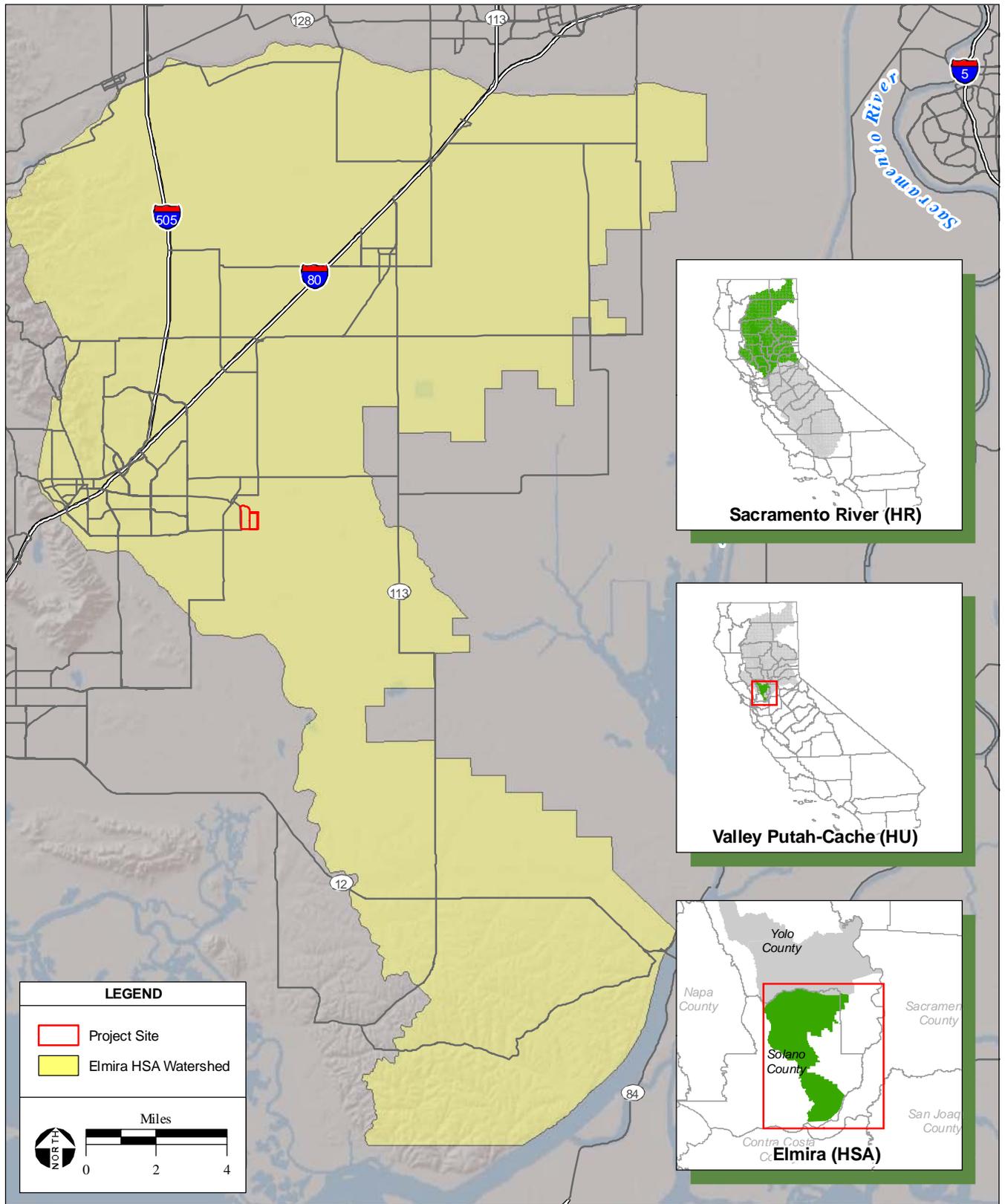
##### *Regional*

The City of Vacaville (City) lies within the Sacramento River Hydraulic Region. The Sacramento River Hydraulic Region covers approximately 17.4 million acres (27,200 square miles). The region includes all or large portions of Modoc, Siskiyou, Lassen, Shasta, Tehama, Glenn, Plumas, Butte, Colusa, Sutter, Yuba, Sierra, Nevada, Placer, Sacramento, El Dorado, Yolo, Solano, Lake, and Napa counties. Small areas of Alpine and Amador counties are also within the region. Geographically, the region extends south from the Modoc Plateau and Cascade Range at the Oregon border to the Sacramento-San Joaquin Delta (Delta). The Sacramento Valley, which forms the core of the region, is bounded to the east by the crest of the Sierra Nevada and southern Cascades and to the west by the crest of the Coast Range and Klamath Mountains. Other significant features include major river systems such as the Sacramento River, the longest river system in California. Major tributaries of the Sacramento River system include the Pit, Feather, Yuba, Bear and American rivers (DWR, 2004).

The City is located approximately 13 miles north of the Sacramento River and Sacramento-San Joaquin Delta in the Elmira Hydrologic Subarea (HSA) of the Valley Putah-Cache Hydrologic Unit (CRA,2009) (**Figure 4.7-1**). The Elmira HSA does not contain any major surface water resources, such as a river or portions of the delta; however, it does contain several creeks, drainages, sloughs, and marshes that drain towards the Sacramento River which forms the southern border of the HSA.

##### *Local*

As shown in **Figure 3-2a**, the project site is located south of Old Alamo Creek, a portion of the original alignment of Alamo Creek. The Daley Canal, operated by the Solano Irrigation District, is located between the south bank of Alamo Creek and the project boundary. Alamo Creek is a component of the Vaca Mountains drainage system that feeds the Ulatis Creek watershed and the Cache Slough system of the Sacramento River. Alamo Creek originates from the natural drainages of the eastern slope of the Vaca Mountains. Approximately three miles north of Interstate 80 (I-80), Alamo creek flows out of the Vaca Mountains and flows south through the City of Vacaville. Approximately one mile south of I-80,



SOURCE: California Interagency Watershed Map of 1999; AES, 2009

Vacaville EWWTP Tertiary Project DEIR / 209508 ■

**Figure 4.7-1**

Elmira Hydrologic Subarea Watershed

within the City, the creek flow is directed into a man-made channel called New Alamo Creek and changes to an east/northeast direction.

Approximately 2.5 miles west of the project site, Alamo Creek has been diverted from the natural creek channel to a constructed channel (New Alamo Creek) that extends from the southeast corner of the City joining Ulatis Creek near the intersection of Fry Road and SR-113. From the diversion, the original channel traverses through Vacaville and the south side of Elmira before passing by the northern boundary of the project site. Downstream of the project site, Old Alamo Creek has been modified and straightened to follow parcel boundaries until discharging into New Alamo Creek approximately 2 miles southeast of the project site (City of Vacaville, 1998).

Upstream of the project site and downstream of the diversion, flow within Old Alamo Creek is minimal during most of the year except during major rain events and during the summer months when the Solano Irrigation District and Main Prairie Irrigation District uses the creek for collection of irrigation tail water and delivery of irrigation water to downstream users. The watershed upstream of the project site encompasses approximately 1,600 acres of mostly agricultural land.

Downstream of the EWWTP, flow within Old Alamo Creek is primarily treated effluent discharged from the EWWTP combined with run-off from adjacent agricultural fields. The EWWTP discharges into the creek from an outfall located just north of the northeast corner of the EWWTP site (refer to **Figure 3-4**).

Downstream spillways and irrigation ditches add flow to Old Alamo Creek downstream of the outfall of the WWTP.

### ***Flooding***

Regional flooding in the area is associated with the topping of the banks of the various creeks that drain the Vaca Mountains. In the 1960s, the Soil Conservation Service (SCS) developed various improvements to the downstream watershed to provide a 10-year level of flood protection to the watershed downstream of the urban city area. Improvements included realigning and widening existing creek channels and the construction of new channels (such as New Alamo Creek) and several miles of levees. Based on the increase in impervious surfaces from continual urban development within the City, the downstream eastern rural areas have experienced a majority of the localized flooding events. Exacerbating the increase in impervious surfaces, agricultural practices in the eastern rural areas of the City have become more intensive, reducing the availability of overland runoff storage (City of Vacaville, 1998).

The improvements to Alamo Creek completed by the SCS drastically reduced flooding in Old Alamo Creek by reducing the tributary watershed. Old Alamo Creek experiences flooding upstream and downstream, however flooding has only occurred once on a portion of the EWWTP site since these improvements were completed. During the 2005 New Years Eve 500 year storm event, drainage ditches in the vicinity were overwhelmed by the storm intensity and overflow spread onto the contractor staging area on the site. The grade in this area was raised as part of the completion details for the expansion

project (South Plant) so that the area will no longer be subject to flooding. The project site is located in an area designated Zone X on the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) number 06095C0282E effective May 4, 2009 (**Figure 4.7-2**). Zone X is defined as “(a)reas determined to be outside the 0.2 percent annual chance floodplain,” (FEMA, 2009). The closest floodplain follows the banks of the Old Alamo Creek directly north of the project site. The floodplain does not overlap the project site.

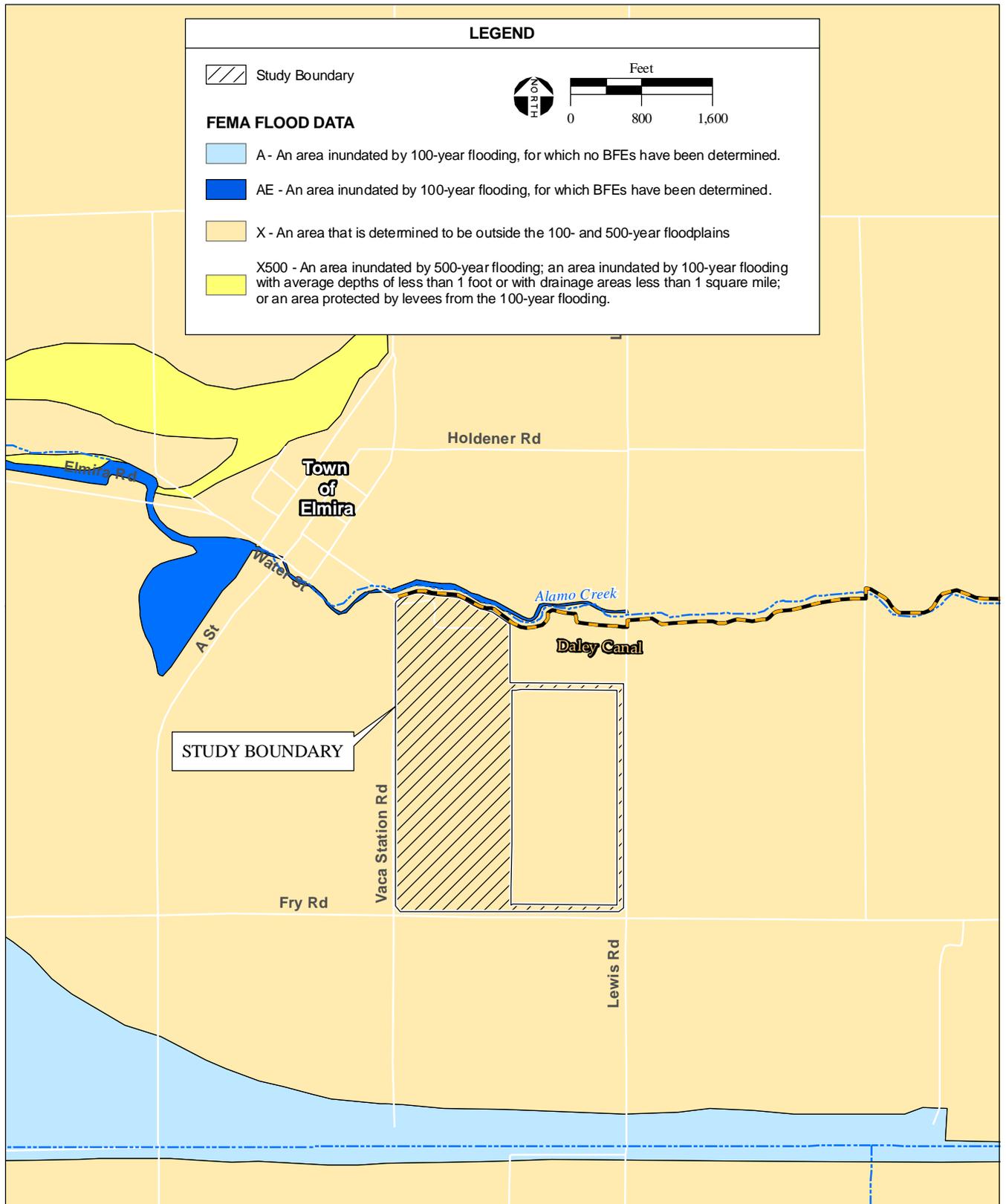
### ***Drainage and Storm Water***

Regionally, drainage is provided by the Alamo Creek and Ulatis Creek watersheds which discharge into the Cache Slough system. Approximately 30 acres of the project site contains the existing facilities of the EWWTP. A drainage system is located within the EWWTP to divert stormwater from impermeable surfaces to the on-site storm water detention basins (west basin). Storm water captured in the basins percolates into the groundwater or is pumped to the southern headworks of the EWWTP for treatment. The areas along the southwestern, southern and eastern borders of the project study area drain via roadside ditches that direct runoff southeast to an agricultural drainage that ultimately discharges to Alamo Creek.

### ***Surface Water Quality***

The Sacramento River watershed provides water for a variety of uses, including municipal, agricultural, and recreational water supply, as well as providing important fish and wildlife habitat. Water quality in the Sacramento River watershed is effected by a myriad of sources including soil erosion, wastewater treatment discharge, stormwater runoff, agricultural runoff, recreation activities, mining activities, and plants and animals. The Sacramento River is listed as impaired under the 303(d) list for mercury, unknown toxicity and diazinon (CVRWQCB, 2002).

Old Alamo and New Alamo Creeks were originally assigned beneficial uses in the Central Valley Regional Water Quality Control Board’s Water Quality Control Plan (Basin Plan) equivalent to those of the Sacramento-San Joaquin Delta (municipal, freshwater habitat for cold species, migration of aquatic organisms, and spawning). Based on recommendations from the State Water Resources Control Board (SWRQB) a Use Attainability Analysis (UAA) was completed for Old Alamo Creek. Based on the surrounding land uses and hydrologic properties, the beneficial uses of Old Alamo Creek were de-designated and the Basin Plan was amended in 2006. However, the beneficial uses of New Alamo Creek remained equivalent to those of the Sacramento-San Joaquin Delta. Because Old Alamo Creek discharges into New Alamo Creek, discharges into Old Alamo Creek were still required to maintain the beneficial uses equivalent to those of the Sacramento-San Joaquin Delta. An additional UAA was performed, which concluded that the beneficial use of New Alamo and Ulatis Creeks as municipal sources was neither existing nor attainable and is not reasonably expected in the future. However, because of the direct connection to the Cache Slough and delta, the SWRCB recommended to maintain



**Figure 4.7-2**  
FEMA Flood Zones

the municipal designation for New Alamo and Ulatis Creeks, thereby requiring the same considerations for water quality within Old Alamo Creek (City of Vacaville, 2009b).

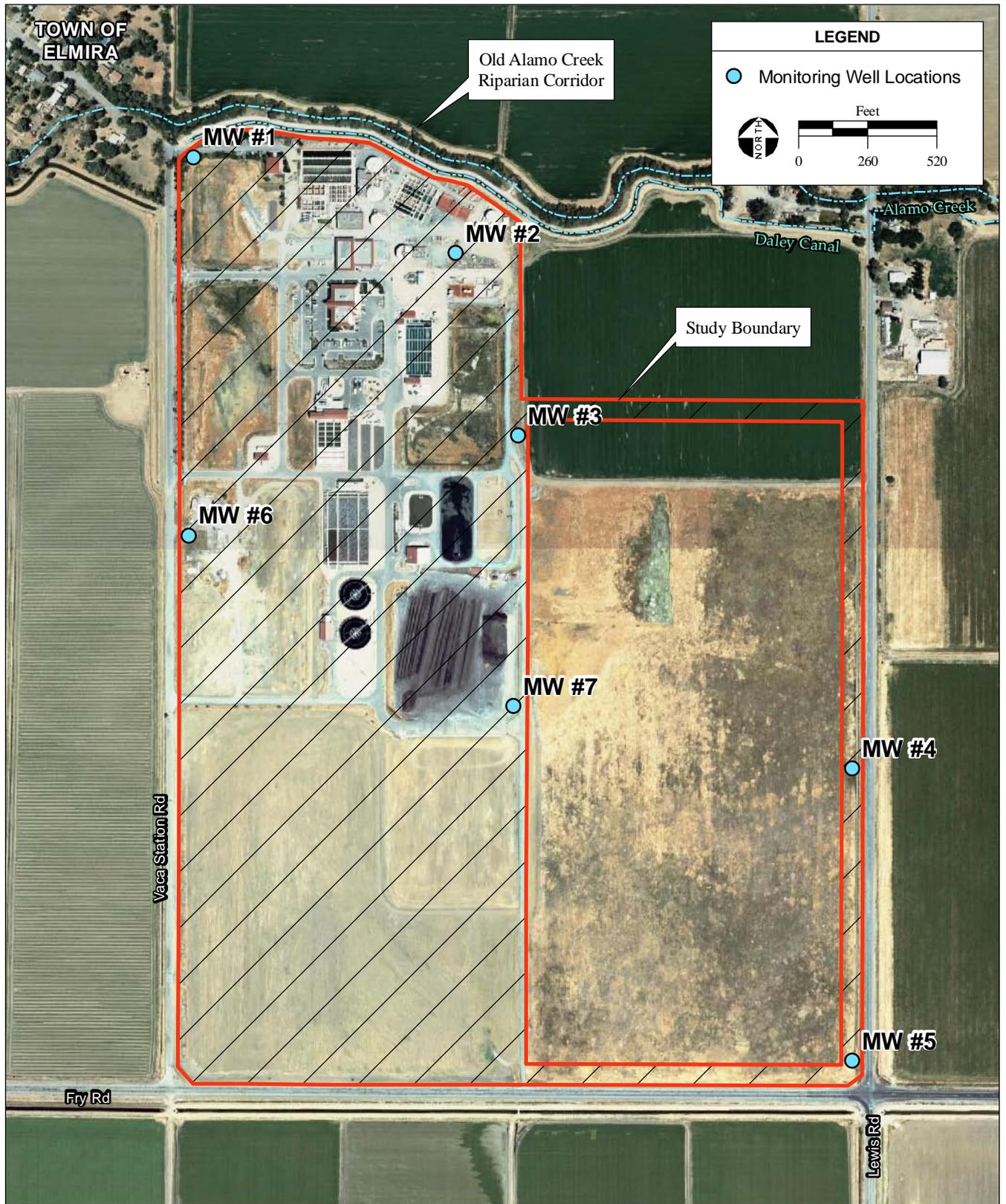
Because of the final decision to incorporate the municipal beneficial use for New Alamo Creek (and subsequent compliance required for discharges into Old Alamo Creek), the existing discharge quality of the effluent from the EWWTP is unable to meet the final effluent limitations of the current Waste Discharge Requirements (WDRs) issued in 2008. Currently, the primary and secondary effluents may be blended prior to discharge if necessary. The updated WDRs require the elimination of blending and the discharge of primary treated. Long-term objectives associated with meeting the beneficial uses of receiving water requires better reduction of nitrate levels, ammonia, pH control, total coliform, and BOD compared to existing treatment capacities.

### Groundwater

The project site is located within Solano Groundwater Subbasin, within the larger Sacramento Valley Groundwater Basin, as delineated in the California Department of Water Resources (DWR) Bulletin 118 (DWR, 2004). Groundwater levels in the main water bearing formation of Solano Subbasin are generally between 60 feet above and 130 below ground surface level (DWR, 2004). DWR well data (Monitoring well 06N01E31A001M located 0.5 miles south of the project site) indicates that average groundwater levels dramatically increased between 1960 and 1980 by roughly 25 feet. Between 1980 and 2006, groundwater levels in the project area have fluctuated around an average of 10 feet below ground surface elevation (DWR, 2009). Recharge of the groundwater basin occurs from surface water and precipitation infiltration.

In accordance with National Pollutant Discharge Elimination System (NPDES) Permit NO. CA0077691, groundwater quality is monitored via seven monitoring wells located throughout the City owned property. **Figure 4.7-3** shows the locations of the seven monitoring wells. All of the wells monitor perched groundwater which occurs at shallow depths and has the highest potential to be influenced by EWWTP activities. The results of this monitoring are reported quarterly to the Regional Water Quality Control Board (RWQCB). Best management practices (BMP's) are in place, as required by the NPDES Permit, to address any impacts to perched groundwater identified during monitoring. The groundwater parameters which are monitored onsite are listed below:

- Depth to Groundwater;
- Groundwater Elevation;
- pH;
- Electrical Conductivity;
- TDS;
- Fecal Coliform;
- Nitrate; and
- Ammonia.



SOURCE: West Yost Associates, 2009; DigitalGlobe aerial photograph, 6/2007; AES 2010

Vacaville EWWTP Tertiary Project DEIR / 209508 ■

**Figure 4.7-3**  
EWWTP Monitoring Well Locations

### Groundwater Quality

Groundwater quality in the Solano Subbasin is generally of good quality typically meeting requirements for municipal and agricultural uses (DWR, 2004). The chemical type of the groundwater from Dixon to the western boundary of the basin is calcium bicarbonate. Total dissolved solids levels (TDS) range from 250 to 500 parts per million (ppm) (California recommended secondary standard for taste relating to TDS is 500 ppm). Boron concentrations are typically found below 0.75 ppm, indicating good water quality.

The Basin Plan has designated beneficial uses of groundwater resources in the region as municipal, agricultural irrigation supply, industrial process, and service supply. Based on these beneficial uses, the Basin Plan established the groundwater limitations identified in **Table 4.7-1**, as well as the general limitation of affecting taste, imparting odor, increasing toxicity, or altering color that would create a nuisance or impair designated beneficial uses.

**TABLE 4.7-1. BASIN PLAN GROUNDWATER LIMITATIONS**

Parameter	Limitation
Fecal Coliform	2.2 MPN/100ml <sup>1</sup>
Ammonia	1.5 mg/l
Total Dissolved Solids	450 mg/l
Nitrate and Nitrite (as N)	10 mg/l
pH	6.5-8.5
Note: <sup>1</sup> Most Probable Number, median results over 7-day period Source: City of Vacaville, 2009b.	

The unlined emergency storage ponds were identified as an area of concern within the City's previous NPDES permit (Order No. R5-01-044) as effluent could percolate into the groundwater potentially leading to groundwater deterioration. The City conducted groundwater quality investigations concluding that impacts due to the storage basins were minimal (City of Vacaville, 2009b). The RWQCB contends within the current WDRs that discharges to Old Alamo Creek impact shallow groundwater quality beneath the project site. Currently, the existing treatment process cannot meet the WDRs that also address groundwater quality (City of Vacaville, 2009b).

### 4.7.3 REGULATORY CONTEXT

#### Federal

##### *Clean Water Act*

The Clean Water Act (CWA) (33 USC § 1251-1376), as amended by the Water Quality Act of 1987, is the major federal legislation governing water quality. The objective of the CWA is "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." Important sections of the Act are as follows:

- Sections 303 and 304 provide for water quality standards, criteria, and guidelines.
- Section 401 (Water Quality Certification) requires an applicant for any federal permit that proposes an activity, which may result in a discharge to waters of the United States to obtain certification from the state that the discharge will comply with other provisions of the Act.
- Section 402 establishes the NPDES, a permitting system for the discharge of any pollutant (except for dredged or fill material) into waters of the United States. This permit program is administered by the State Water Resources Control Board (SWRCB) and is discussed in detail below.
- Section 404 establishes a permit program for the discharge of dredged or fill material into waters of the United States. This permit program is jointly administered by the United States Army Corps of Engineers (USACE) and the United States Environmental Protection Agency (USEPA).

### ***Federal Anti-degradation Policy***

The federal antidegradation policy is designed to protect water quality and water resources. The policy directs states to adopt a statewide policy that includes the following primary provisions: (1) existing instream uses and the water quality necessary to protect those uses shall be maintained and protected; (2) where existing water quality is better than necessary to support fishing and swimming conditions, that quality shall be maintained and protected unless the state finds that allowing lower water quality is necessary for important local economic or social development; and (3) where high-quality waters constitute an outstanding national resource, such as waters of national and state parks, wildlife refuges, and waters of exceptional recreational or ecological significance, that water quality shall be maintained and protected.

### ***Safe Drinking Water Act***

Under the Safe Drinking Water Act (SDWA) (Public Law 93-523), passed in 1974, USEPA regulates contaminants of concern to domestic water supply. Contaminants of concern relevant to domestic water supply are defined as those that pose a public health threat or that alter the aesthetic acceptability of the water. These types of contaminants are regulated by USEPA primary and secondary Maximum Contaminant Levels (MCLs). MCLs and the process for setting these standards are reviewed triennially. Amendments to the SDWA enacted in 1986 established an accelerated schedule for setting drinking water MCLs.

### ***Federal Emergency Management Agency***

Sacramento County and the City are participants in the National Flood Insurance Program (NFIP), a Federal program administered by the Federal Emergency Management Agency (FEMA). Participants in the NFIP must satisfy certain mandated floodplain management criteria. The National Flood Insurance Act of 1968 adopted a desired level of protection that would protect developments from floodwater damage associated with an Intermediate Regional Flood (IRF), a flood which is defined as a flood having

an average frequency of occurrence on the order of once in 100 years, although such a flood may occur in any given year.

### **State**

#### ***Porter-Cologne Water Quality Act***

The Porter-Cologne Water Quality Control Act (California Water Code Section 13000 et seq.) provides the basis for water quality regulation within California. The Act requires a "Report of Waste Discharge" for any discharge of waste (liquid, solid, or otherwise) to land or surface waters that may impair a beneficial use of surface or groundwater of the state. The Central Valley Regional Water Quality Control Board (CVRWQCB) implements waste discharge requirements identified in the Report.

#### ***State Water Resources Control Board and Regional Water Quality Control Board***

The SWRCB administers water rights, water pollution control, and water quality functions throughout the state, while the Regional Water Quality Control Boards conduct planning, permitting, and enforcement activities. The Proposed Project area lies within the jurisdiction of the CVRWQCB.

#### ***Water Quality Control Plan for the Sacramento River and San Joaquin River Basins***

The CVRWQCB uses planning, permitting, and enforcement authorities to meet this responsibility, and has adopted the Fourth Edition of the Water Quality Control Plan (Basin Plan) for the Sacramento River and San Joaquin River Basins (CVRWQCB, 2007) to implement plans, policies, and provisions for water quality management. The Basin Plan was prepared in compliance with the federal CWA and the State Porter-Cologne Water Quality Control Act. The Basin Plan establishes beneficial uses for major surface waters and their tributaries, water quality objectives that are intended to protect the beneficial uses, and implementation programs to meet stated objectives.

#### ***NPDES Program - Construction Activity***

The NPDES program regulates municipal and industrial storm water discharges under the requirements of the CWA. California is authorized to implement a state industrial storm water discharge permitting program, with the SWRCB as the permitting agency.

The City must comply with the requirements of the most recent version of the NPDES permit for Discharges of Storm Water Runoff associated with Construction Activity (currently Order No. 99-08-DWQ). The SWRCB is currently in the process of updating the General Construction permit, which is expected to go into effect on July 1, 2010 (Construction General Permit, Order No. 2009-0009-DWQ). This permit regulates discharges from construction sites that disturb one acre or more of total land area. By law, all storm water discharges associated with construction activity where clearing, grading, and excavation results in soil disturbance must comply with the provisions of this NPDES permit. The permitting process requires the development and implementation of an effective Storm Water Pollution Prevention Plan (SWPPP). The project applicant must submit a Notice of Intent to the SWRCB to be

covered by a NPDES permit and prepare the SWPPP prior to the beginning of construction. The SWPPP must include BMPs to reduce pollutants and any more stringent controls necessary to meet water quality standards. Dischargers must also comply with water quality objectives as defined in the Central Valley Basin Plan. If Basin Plan objectives are exceeded, corrective measures would be required.

Implementation of the SWPPP starts with the commencement of construction and continues through completion of the project. Upon completion of the project, the applicant must submit a Notice of Termination to the SWRCB to indicate that construction is completed.

### ***NPDES Permit – Stormwater Drainage***

Stormwater drainage at the EWWTP is regulated under NPDES General Permit No. CAS000004, titled *Waste Discharge Requirements for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems*. The General Permit effectively prohibits the discharge of materials other than stormwater that are not authorized. As required by the General permit, the City has developed and implemented a Storm Water Management Plan (SWMP) which describes BMPs, measurable goals, and timetables for the Minimum Control Measures: public education, public participation, illicit discharge detection and elimination, construction site storm water runoff control, post construction storm water management, and pollution prevention/good housekeeping for municipal operations. In addition, the City has included provisions for urban storm water quality management and discharge control within its municipal code, discussed in more detail below.

### ***NPDES Permit-Disposal of Treated Effluent***

The City was granted a NPDES permit (No. CA0077691) with updated WDRs in April of 2008 for the discharge of wastewater into Old Alamo Creek. The permit is intended to implement the Water Quality Control Plan, established by the RWQCB (RWQCB, 2008) and meet the beneficial uses of Old and New Alamo Creeks as discussed in **Section 4.7.2**. The City's NPDES Permit includes discharge limitations specified to limit water quality impacts to Old Alamo Creek and the Sacramento River watershed. The WDRs include effluent limitations, receiving water limitations, elimination of blending, groundwater limitations, and compliance schedules. Refer to **Section 3.3.3** for further details of the City's NPDES permit.

### ***State Nondegradation Policy***

In 1968, as required under the federal antidegradation policy described previously, the State Water Board adopted a nondegradation policy aimed at maintaining high quality for waters in California. The nondegradation policy states that the disposal of wastes into state waters shall be regulated to achieve the highest water quality consistent with maximum benefit to the people of the state and to promote the peace, health, safety, and welfare of the people of the state. The policy provides as follows:

- a. Where the existing quality of water is better than required under existing water quality control plans, such quality would be maintained until it has been demonstrated that any change would be

consistent with maximum benefit to the people of the state and would not unreasonably affect present and anticipated beneficial uses of such water.

- b. Any activity which produces waste or increases the volume or concentration of waste and which discharges to existing high-quality waters would be required to meet waste discharge requirements which would ensure (1) pollution or nuisance would not occur and (2) the highest water quality consistent with the maximum benefit to the people of the state would be maintained.

### ***California Toxics Rule***

In May 2000, the State Water Board adopted and USEPA approved the California Toxics Rule (CTR), which establishes numeric water quality criteria for approximately 130 priority pollutant trace metals and organic compounds. The State Water Board subsequently adopted its State Implementation Policy (SIP) of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries. The SIP outlines procedures for NPDES permitting for toxic pollutant objectives that have been adopted in Basin Plans and in the CTR.

### **Local**

#### ***City of Vacaville General Plan (1990)***

The City's General Plan (General Plan) seeks to preserve and enhance creeks and their associated watershed. The General Plan's conservation strategy focuses on the protection of creeks and drainage areas by incorporating creeks into recreational areas and preserving the creeks to enhance the City's visual characteristics, drainage capabilities, and wildlife habitats, while balancing preservation with protection of private property. The following General Plan guiding and implementation policies are applicable to the Proposed Project.

#### ***Conservation Element***

The following General Plan guiding and implementation policies associated with hydrological resources are applicable to the Proposed Project.

#### *Guiding Policies*

**8.1-G1:** Preserve and enhance Vacaville's creeks for their value in providing visual amenity, drainage, and wildlife habitat.

**8.1-G4:** Preserve and protect water resource areas, including the Alamo, Encinosa, Gibson, and Ulatis Creek Watersheds.

#### *Implementing Policies*

**8.1-I5:** Protect existing stream channels by requiring buffering or landscaped setbacks and storm runoff interception.

### ***Safety Element***

The following General Plan guiding and implementation policies associated with flooding are applicable to the Proposed Project.

#### *Guiding Policies*

**9.2-G1:** Locate development outside mapped flood-prone areas unless mitigation of flood risk is assured.

**9.2-G3:** The additional runoff caused by development shall be mitigated.

#### *Implementing Policies*

**9.2-I2:** Evaluate storm-drainage needs for each project in the context of demand and capacity when the drainage area is fully developed. Continue to require Development Impact Fees for new development to construct planned regional drainage detention basins to accommodate increased flow. In the Alamo Creek watershed upstream of Peabody Road, which includes Alamo, Laguna and Encinosa creeks, require post-development 10-year and 100-year peak flows to be reduced to 90 percent of predevelopment levels. For the remainder of the study area, for development involving new connections to the creeks, peak flows shall not exceed predevelopment levels for 10- and 100-year peak flow.

### ***City of Vacaville Municipal Code***

Division 14.26 of the City's Municipal Code provides regulations for Urban Stormwater Quality Management and Discharge Control. The purpose and intent of this division is to ensure the general welfare of the citizens of the City of Vacaville and protect water bodies by reducing pollutants in stormwater discharges to the maximum extent practicable and by prohibiting non-stormwater discharges to the storm drain system. The code includes several discharge prohibitions, including prohibiting discharges in violation of industrial or construction activity NPDES Storm Water Discharge Permits, which are enforced by a series of regulations and requirements.

## **4.7.4 IMPACTS AND MITIGATION MEASURES**

### **Method of Analysis**

This section identifies any impacts to hydrology and water quality that could occur from construction, operation, and/or maintenance of the Proposed Project. An examination of the project site, project components, and published information regarding the water resources in the project area was conducted to determine impacts to hydrology and water quality. Because the objective of the Proposed Project is to improve the quality of treated effluent that is discharged to Old Alamo Creek, long-term water quality impacts are inherently beneficial. Therefore, the impact analysis in this section is primarily focused on short-term impacts associated with construction and stormwater drainage. Where it was concluded that impacts to hydrology and water quality resulting from the Proposed Project would exceed the significance

thresholds listed below, mitigation measures have been recommended to reduce impacts to less-than-significant levels.

### Thresholds of Significance

Criteria for determining the significance of impacts to hydrology and water quality have been developed based on Appendix G of the California Environmental Quality Act's (CEQA) *Guidelines* and relevant agency thresholds. Impacts to hydrology and water quality would be considered significant if the Proposed Project would:

- violate any water quality standards or waste discharge requirements;
- substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table;
- substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial pollution on-site or off-site;
- substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on-site or off-site;
- create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff;
- otherwise substantially degrade water quality;
- place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map;
- place within a 100-year flood hazard area structures that would impede or redirect flood flows; or
- expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam or inundation by seiche, tsunami, or mudflow.

## Project Specific Impacts and Mitigation Measures

### Impact

#### 4.7-1 Construction activities may substantially degrade surface water and/or groundwater quality.

Construction related earth disturbing activities associated with the Proposed Project would involve land clearing and soil disturbances, which could leave disturbed areas and stockpiled soils exposed to winter rainfall and could increase erosion and sediment discharge into surface water features. In addition, construction equipment and materials have the potential to leak, thereby discharging additional pollutants. Pollutants potentially include particulate matter, sediment, oils and greases and construction supplies such as concrete, paints and adhesives. Currently, all stormwater run-off from the EWWTP is contained within the stormwater detention basins and either percolates into the groundwater or is pumped through the EWWTP for treatment; however, temporary changes to drainage patterns resulting from construction activities could result in discharge of these pollutants into surface waterways, including roadside ditches, causing an exceedance of water quality objectives, which could adversely impact beneficial uses of downstream water resources.

The mitigation measures below require the Proposed Project to comply with the California General NPDES Permit for construction activities. Although the City is exempt from having to obtain a grading permit under the Vacaville Municipal Code, the project also must comply with the grading standards. With compliance with the grading standards of the Vacaville Municipal Code and implementation of the proposed mitigation, impacts to surface water and groundwater quality from construction activities would be considered less-than-significant. **Less than Significant.**

**Mitigation Measure 4.7-1a.** The City shall comply with the SWRCB NPDES General Permit for Discharges of Storm Water Runoff Associated with Construction Activity (General Permit). The SWRCB requires that all construction sites have adequate control measures to reduce the discharge of sediment and other pollutants to streams to ensure compliance with Section 303 of the Clean Water Act. To comply with the NPDES permit, the applicant will file a Notice of Intent with the SWRCB and prepare a SWPPP prior to construction, which includes a detailed, site-specific listing of the potential sources of stormwater pollution; pollution prevention measures (erosion and sediment control measures and measures to control non-stormwater discharges and hazardous spills) to include a description of the type and location of erosion and sediment control BMPs to be implemented at the project site, and a BMP monitoring and maintenance schedule to determine the amount of pollutants leaving the Proposed Project site. A copy of the SWPPP must be current and remain on the project site. Control measures are required prior to and throughout the rainy season. Water quality BMPs identified in the SWPPP could include but are not limited to the following:

## 4.7 Hydrology and Water Quality

- Temporary erosion control measures (such as silt fences, staked straw bales, and temporary revegetation) shall be employed for disturbed areas. No disturbed surfaces will be left without erosion control measures in place during the winter and spring months.
- Sediment shall be retained onsite by a system of sediment basins, traps, or other appropriate measures.
- A spill prevention and countermeasure plan shall be developed which would identify proper storage, collection, and disposal measures for potential pollutants (such as fuel, fertilizers, pesticides, etc.) used onsite. The plan would also require the proper storage, handling, use, and disposal of petroleum products.
- Construction activities shall be scheduled to minimize land disturbance during peak runoff periods and to the immediate area required for construction. Soil conservation practices shall be completed during the fall or late winter to reduce erosion during spring runoff. Existing vegetation will be retained where possible. To the extent feasible, grading activities shall be limited to the immediate area required for construction.
- Surface water runoff shall be controlled by directing flowing water away from critical areas and by reducing runoff velocity. Diversion structures such as terraces, dikes, and ditches shall collect and direct runoff water around vulnerable areas to prepared drainage outlets. Surface roughening, berms, check dams, hay bales, or similar devices shall be used to reduce runoff velocity and erosion.
- Sediment shall be contained when conditions are too extreme for treatment by surface protection. Temporary sediment traps, filter fabric fences, inlet protectors, vegetative filters and buffers, or settling basins shall be used to detain runoff water long enough for sediment particles to settle out. Store, cover, and isolate construction materials, including topsoil and chemicals, to prevent runoff losses and contamination of groundwater.
- Topsoil removed during construction shall be carefully stored and treated as an important resource. Berms shall be placed around topsoil stockpiles to prevent runoff during storm events.
- Establish fuel and vehicle maintenance areas away from all drainage courses and design these areas to control runoff.
- Disturbed areas shall be revegetated after completion of construction activities.
- All necessary permits and approvals shall be obtained.

- Provide sanitary facilities for construction workers.

**Mitigation Measure 4.7-1b.** The City shall incorporate the grading standards outlined within Chapter 14.19.244 of the Land Use and Development Code into project construction.

### Impact

#### **4.7-2 Implementation of the Proposed Project would not violate any water quality standards or waste discharge requirements or otherwise substantially degrade water quality.**

As discussed in **Section 3.0**, the purpose of the Proposed Project is to increase the quality of treated effluent discharged to Old Alamo Creek to meet the 2008 NPDES Permit waste discharge requirements for ammonia, nitrate, elimination of blending, and Title 22 recycled water requirements. Implementation of the Proposed Project would improve water quality and would result in compliance with waste discharge requirements. Additionally, implementation of the Proposed Project increase the quality of effluent discharged to Old Alamo Creek to support beneficial uses of the downstream water resources. **Beneficial Impact.**

### Impact

#### **4.7-3 Implementation of the Proposed Project would not result in run-off quantities that could result in substantial erosion or siltation on-site or off-site, result in flooding on-site or off-site, or exceed the capacity of stormwater drainage systems.**

As shown in **Figure 3-2**, a majority of the area that contains the treatment plant has impervious surfaces and development that would result in minimal impacts to stormwater conveyance and treatment at the EWWTP. The Proposed Project would result in an increase of impermeable surfaces on the site of approximately one acre. A majority of the new impervious surfaces include concrete lining of the existing storm water detention basin and emergency storage basin. These facilities would not increase storm water run-off as rainfall would be contained within the basins and all contained storage will be pumped back to the headworks of the plant to be treated. The new impervious surfaces associated with the new secondary clarifier and filters would result in a minimal increase in stormwater generation. As discussed above, the site currently directs stormwater to the existing west pond, where collected stormwater is pumped to the headworks of the EWWTP for treatment. The southern area of the West Pond would be converted from an existing storm water basin to large equalization basin. The remainder of the pond would continue to be utilized for stormwater detention providing more than adequate storage capacity to accommodate runoff from the existing site and proposed impermeable surfaces (City of Vacaville, 2009b). After implementation of the Proposed Project, stormwater would continue to be collected and treated onsite. Based on an analysis of the needs for emergency storage, only a portion of the West Pond would be used for flow equalization. Therefore, implementation of the Proposed

Project would not result in an increase in storm water runoff that could result in flooding or exceed the capacity of existing storm water facilities. **Less than Significant.**

### Impact

- 4.7-4 Development of the Proposed Project would not place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map, place within a 100-year flood hazard area structures that would impede or redirect flood flows; or expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam or inundation by seiche, tsunami, or mudflow.**

As shown in **Figure 4.7-2**, the project site is located outside of the floodplain of Old Alamo Creek. Because the Proposed Project would not increase the capacity of the EWWTP, implementation would not result in an increase in discharge to Old Alamo Creek and would not interfere with floodplain management. Stormwater is collected, contained, and treated on-site. Stormwater flows have been included within the design, storage, treatment, and discharge capacities of the EWWTP and associated facilities. Additionally, there are no water bodies or unstable soil types within or adjacent to the project site that could lead to inundation from by seiche, tsunami, or mudflow. **No impact.**

### Impact

- 4.7-5 Implementation of the Proposed Project would not degrade groundwater quality nor substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table.**

The Proposed Project would line the existing equalization and emergency storage basins with concrete to reduce the potential for infiltration of influent and effluent into groundwater, thus reducing the EWWTP's potential effect on groundwater quality in the area. Since the project would not add or withdraw groundwater, significant losses of ground water supply and flows are not expected. Development of the Proposed Project would slightly increase the amount of impervious surfaces on the project site, which would prevent infiltration of water into the soil, potentially affecting groundwater recharge. However, the loss of pervious surface is minimal compared to the overall size of the groundwater subbasin.

Due the fact that groundwater levels in the project area are heavily influenced by deep percolation from local waterways and the vast expanse of pervious agricultural land that surrounds the project site and that existing wells would continue to provide water quality information pursuant to the requirements of the NPDES Permit, it is not anticipated that any change to groundwater would result from the proposed lining of the emergency storage basin,

west pond, and biosolids lagoon. Implementation of the Proposed Project would not result in a new deficit in aquifer volume nor degrade groundwater quality. **Less than Significant.**

### Cumulative Impacts

#### Impact

#### 4.7-6 The Proposed Project in combination with future growth and development within the City and project vicinity could result in cumulative impacts to hydrology and water quality.

The Proposed Project and potential cumulative projects in the vicinity of the project site, including growth resulting from build-out of the City's General Plan and proposed development of the power plant adjacent to the project site, would be required to comply with the general NPDES permit of the SWRCB, which is intended to reduce the potential for cumulative impacts to water quality during construction. Cumulatively considerable projects that would discharge stormwater runoff would be required to comply with NPDES discharge permits from the CVRWQCB and would be subject to subsequent environmental review. Therefore, impacts on cumulative construction related water quality effects would be less than significant.

The Proposed Project would not increase connections to the municipal water system or result in off-site discharges of stormwater. Additionally, the Proposed Project would increase water quality of treated effluent discharge to Old Alamo Creek. The Proposed Project when considered with other potential development in the area would not result in adverse cumulative impacts to surface water quality or groundwater supplies and quality.

Each of the cumulative development projects and the Proposed Project would be subject to local, state, and federal regulations designed to minimize cumulative impacts. Mitigation measures for the Proposed Project in combination with compliance with City, state, and federal regulations, are expected to reduce cumulatively considerable impacts to a less than significant level. **Less than Significant.**