Draft

COLLEGE LAKE INTEGRATED RESOURCES MANAGEMENT PROJECT

Environmental Impact Report

Prepared for
Pajaro Valley Water Management Agency

April 2019

COLLEGE LAKE INTEGRATED RESOURCES MANAGEMENT PROJECT

Environmental Impact Report

Prepared for
Pajaro Valley Water Management Agency

April 2019

180 Grand Avenue
Suite 1050
Oakland, CA 94612
510.839.5066
www.esassoc.com

ESA

Bend
Camarillo
Delray Beach
Destin
Irvine
Los Angeles
Miami
Oakland
Orlando
Pasadena
Petaluma
Portland
Sacramento
San Diego
San Francisco
Santa Monica
Sarasota
Seattle
Sunrise
Tampa

160822

OUR COMMITMENT TO SUSTAINABILITY | ESA helps a variety of public and private sector clients plan and prepare for climate change and emerging regulations that limit GHG emissions. ESA is a registered assessor with the California Climate Action Registry, a Climate Leader, and founding reporter for the Climate Registry. ESA is also a corporate member of the U.S. Green Building Council and the Business Council on Climate Change (BC3). Internally, ESA has adopted a Sustainability Vision and Policy Statement and a plan to reduce waste and energy within our operations. This document was produced using recycled paper.

TABLE OF CONTENTS

College Lake Integrated Resources Management Project Draft EIR

Page

Page

Appendices

List of Figures

Page

List of Figures (continued)

Page

List of Figures (continued)

List of Tables

Page

List of Tables (continued)

Page

List of Tables (continued)

ACRONYMS AND ABBREVIATIONS

1-D	one-dimensional
2-D	two-dimensional
2014 BMP Update PEIR	2014 Basin Management Plan Program Environmental Impact Report
2017 Basin Plan	Water Quality Control Plan for the Central Costal Basin
µg/m3	micrograms per meters cubed
µmhos/cm	micromhos per centimeter
AB	Assembly Bill
AB32	California Global Warming Solutions Act
ADT	average daily traffic
Af	Acre-Feet
AFY	acre-foot (feet) per year
amsl	above mean sea level
AMP	Adaptive Management Plan
APN	Assessor Parcel Number
AQMP	Air Quality Management Plan
ARMR	Archaeological Resource Management Report
ASR	Aquifer Storage and Recovery
BAAQMD	Bay Area Air Quality Management District
BMP	Basin Management Plan
Btu	British thermal unit
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CalEEMod	California Emissions Estimator Model
CalEPA	California Environmental Protection Agency
California Register	California Register of Historical Resources
Caltrans	California Department of Transportation
CAP	Climate Action Plan
CARB	California Air Resources Board
CAS	Climate Action Strategy
cbec	cbec eco engineering, inc.
CCAMP	Central Coast Ambient Monitoring Program

CCC	California Coastal Commission
CCR	California Code of Regulations
CCRWQCB	Central Coast Regional Water Quality Control Board
CDFG	California Department of Fish and Game
CDFW	California Department of Fish and Wildlife
CDMG	California Division of Mines and Geology
CDS	Coastal Distribution System
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
cfs	cubic foot (feet) per second
CGP	Construction General Permit
CGS	California Geologic Survey
CH_4	methane
CHRIS	California Historical Resources Information System
CNDDB	California Natural Diversity Data Base
CNEL	community noise equivalent level
CNPS	California Native Plant Society
CO	carbon monoxide
CO_2	carbon dioxide
CO2e	carbon dioxide equivalent
CPUC	California Public Utilities Commission
CRA	Critical Riffle Analysis
CRF	California red-legged frog
CRMMP	Cultural Resources Mitigation and Monitoring Program
CUPA	Certified Unified Program Agency
CWA	Clean Water Act
CY	cubic yards
dB	decibels
dBA	A-weighted decibels
DEIR	Draft Environmental Impact Report
DPM	diesel particulate matter
DPS	distinct population segment
DSOD	Division of Safety of Dams
DTSC	Department of Toxic Substances Control
DWR	(California) Department of Water Resources

DWZ	Delivered Water Zone
EAP	Energy Action Plan
EC	electrical conductivity
EFH	Essential Fish Habitat
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EMFAC2014	Emission Factor 2014
EMP	Emergency Management Plan
ESU	evolutionarily significant unit
ET	evapotranspiration
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FESA	Federal Endangered Species Act
FGC	Fish and Game Code
FHWA	Federal Highway Administration
FIRM	flood insurance rate maps
FMMP	Farmland Mapping and Monitoring Program
FMP	Fisheries Management Plan
FOIA	Freedom of Information Act
Ft	foot (feet)
g	grams
g/L	grams per liter
GHG	greenhouse gas
GIS	geographic information system
gpm	gallons per minute
GWP	global warming potential
HAP	hazardous air pollutants
HASP	Health and Safety Plan
HEC-RAS	Hydrologic Engineering Center's River Analysis System
HDD	horizontal directional drilling
HMBP	Hazardous Materials Business Plan
Hz	hertz
in/sec	inches per second
Kc	coefficient
KEC	Kittleson Environmental Consulting
kWh	kilowatt hour

LCP	Local Coastal Program
Ldn	day-night noise level
Leq	average equivalent sound level
L_{max}	instantaneous maximum noise level
LOS	Level of Service
LUP	Land Use Plan
LUST	leaking underground storage tank
m	meters
M	Richter magnitude
MBARD	Monterey Bay Air Resources District
MBTA	Migratory Bird Treaty Act
MCE	maximum credible earthquake
MCL	maximum containment level
MG	million gallons
mg/L	milligram per liter
mgd	million gallons per day
mg-N/L	milligrams nitrogen per liter
MLD	Most Likely Descendant
MND	Mitigated Negative Declaration
mmhos/cm	millimhos per centimeter
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
mph	miles per hour
MPWMD	Monterey Peninsula Water Management District
MSA	Magnuson-Stevens Fishery Conservation and Management Act
MSL	mean sea level
MTBE	methyl tert-butyl ether
N_2O	nitrous oxide
NA	not applicable
NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission
National Register	National Register of Historic Places
NAVD88	North American Vertical Datum of 1988
NCCAB	North Central Coast Air Basin
NFIP	National Flood Insurance Program
NHPA	National Historic Preservation Act

NMFS	National Marine Fisheries Service
NO	nitric oxide
NO_2	nitrogen dioxide
NO3	nitrate
NOA	naturally occurring asbestos
NOAA	National Oceanic and Atmospheric Administration
NOD	Notice of Determination
NOP	Notice of Preparation
NO_X	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NPS	non-point source
NRCS	Natural Resources Conservation Service
NTU	Nephelometric Turbidity Units
NWIC	Northwest Information Center
O3	ozone
OPR	Governor’s Office of Planning and Research (California)
PEIR	Programmatic Environmental Impact Report
PFC	perfluorocarbon
PG&E	Pacific Gas and Electric
PM	Particulate matter
PM_{10}	Inhalable particulate matter
$PM_{2.5}$	Fine particulate matter
POD	Point of Diversion
POU	Place of Use
ppb	Parts per billion
ppm	Parts per million
PPV	peak particle velocity
PRC	Public Resources Code
PRMS	Precipitation Runoff Modeling System
Project	proposed College Lake Integrated Resources Management Project
PSMCSD	Pajaro/Sunny Mesa Community Services District
PVHM	Pajaro Valley Hydrologic Model
PVIGSM	Pajaro Valley Integrated Groundwater Surface Water Model
PV Water	Pajaro Valley Water Management Agency
Q	Quaternary alluvium
Qb	Basin deposits

QCM	quantified conceptual model
Qfl	Flood plain deposits
Qof	Holocene-aged older floodplain deposits
Qtw	Watsonville terrace deposits
Qwf	Pleistocene-aged fluvial facies
Qyf	Holocene-aged younger floodplain deposits
RCD	Resource Conservation District (Santa Cruz County)
RD 2049	Reclamation District 2049
RMS	root mean square
ROG	reactive organic gases
RWF	Recycled Water Facility (Watsonville)
RWQCB	Regional Water Quality Control Board
SAA	Streambed Alteration Agreement
SAAQS	State Ambient Air Quality Standards
Santa Cruz Land Trust	Land Trust of Santa Cruz County
SAR	sodium adsorption ratio
SC	specific constituents
S-CCC	South-central Coast California
Scoping Plan	Climate Change Scoping Plan
SCWD	Soquel Creek Water District
SDWA	Safe Drinking Water Act
SF	square foot (feet)
SF_6	sulfur hexafluoride
SGMA	Sustainable Groundwater Management Act
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SLF	Sacred Lands File
SLO APCD	San Luis Obispo County Air Pollution Control District
SMP	Soil Management Plan
SO_2	sulfur dioxide
SR	State Route
State Water Board	State Water Resources Control Board
STLC	soluble threshold limit concentrations
SWPPP	Stormwater Pollution Prevention Plan
TACs	toxic air contaminants
TBA	tertiary butyl alcohol

TCLP	Toxic Characteristic Leaching Procedure
TDS	total dissolved solids
the Board	PV Water's Board of Directors
TMDL	total maximum daily loads
TU	turbidity units
UBC	Uniform Building Code
Unified Program	Unified Hazardous Waste and Hazardous Materials Management Regulatory Program
USACE	United States Army Corps of Engineers
USC	United States Code
USDA	United States Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
USSCS	United States Soil and Conservation Service
WDR	Waste Discharge Requirements
WIN	Wireless Irrigation Network
WPT	Western pond turtle
WRDA	Water Resources Department Act
WSE	water surface elevation
WTP	Water Treatment Plant
WWTF	City of Watsonville Wastewater Treatment Facility
WY	water year
Zone 7	Santa Cruz County Flood Control and Water Conservation District Zone 7
ZVF	Zayante-Vergeles Fault

This page intentionally left blank

SUMMARY

S.1 Introduction

This environmental impact report (EIR) has been prepared by the Pajaro Valley Water Management Agency (PV Water) in conformance with the provisions of the California Environmental Quality Act (CEQA) and the CEQA *Guidelines*. PV Water serves as the lead agency for development of the EIR for the proposed College Lake Integrated Resources Management Project (Project), with input and coordination provided by other agencies and local jurisdictions. PV Water has determined that the Project could cause significant environmental impacts, and that preparation of an EIR is warranted. Pursuant to CEQA *Guidelines* Section 15161, this is a project-level EIR. PV Water has prepared this EIR to provide information about the Project's potential effects on the environment to the public and responsible and trustee agencies reviewing the Project. This EIR describes the potential environmental impacts that could result from implementation of the Project, identifies mitigation measures for reducing impacts to less-than-significant levels where feasible, and evaluates alternatives to the Project.

S.2 Background

PV Water was formed in 1984 by the Pajaro Valley Water Management Agency Act, for the primary purpose of managing groundwater resources and supplemental water supplies in its service area. In the coastal areas and throughout much of the Pajaro Valley Groundwater Basin, overdraft conditions[1] have caused groundwater levels to drop below sea level, creating a landward pressure gradient that causes seawater to move inland. Seawater intrusion has elevated the chloride concentrations in groundwater up to two and a half miles inland from the coast, in some areas contaminating the groundwater to the point that it is unsuitable for agricultural irrigation and domestic (potable) uses without treatment. PV Water's objective is to manage local groundwater resources to reduce, and eventually halt, long-term overdraft of the groundwater basin, while ensuring sufficient water supplies for present and anticipated needs. To achieve this objective, PV Water has prepared and periodically updates a basin-wide groundwater management plan (the Basin Management Plan [BMP]), which serves as the guiding document for its major projects and programs. Most recently, PV Water approved the BMP Update and certified the *Environmental Impact Report for the Basin Management Plan Update* in 2014 (2014 BMP Update PEIR).

1 Overdraft occurs when the amount of groundwater withdrawn from a basin exceeds the volume of freshwater replenishing the basin.

The Project represents the largest single source of surface water proposed as part of the BMP Update.

S.3 Project Objectives

The primary purposes of the Project are to help balance the Pajaro Valley Groundwater Basin, prevent further seawater intrusion, and meet water supply needs in the Pajaro Valley by developing College Lake as a water storage and supply source for agricultural irrigation. The following objectives were included in the 2014 BMP Update PEIR:

- Prevent seawater intrusion, long-term groundwater overdraft, land subsidence, and water quality degradation;
- Manage existing and supplemental water supplies to control overdraft and provide for present and future water needs;
- Create a reliable, long-term water supply, which has been identified as an important cornerstone of the long-term economic vitality of the Pajaro Valley;
- Develop water conservation programs; and
- Recommend a program that is cost effective and environmentally sound.

In addition, the Board of Directors adopted the following project-specific objectives for the Project:

- Design and implement reliable facilities to help achieve sustainable groundwater management of the Pajaro Valley Groundwater Subbasin by 2040, taking into account potential future hydrologic changes, including those associated with climate change.[2]
- Substantially contribute to the Pajaro Valley's water supply needs in a timely manner, consistent with the Basin Management Plan Update implementation goals.
- Use locally controlled surface water for agricultural purposes to offset groundwater pumping in a manner consistent with habitat preservation and enhancement, and in coordination with resource agencies, the public, and other stakeholders.
- Make efficient use of, and leverage federal, state, and local investments in, existing Agency infrastructure.

2 Sustainable groundwater management is defined under the SGMA as management and use of groundwater in a manner that can be maintained during the planning and implementation horizon without causing undesirable results (Water Code, § 10721, subd. (v)).

S.4 Project Description

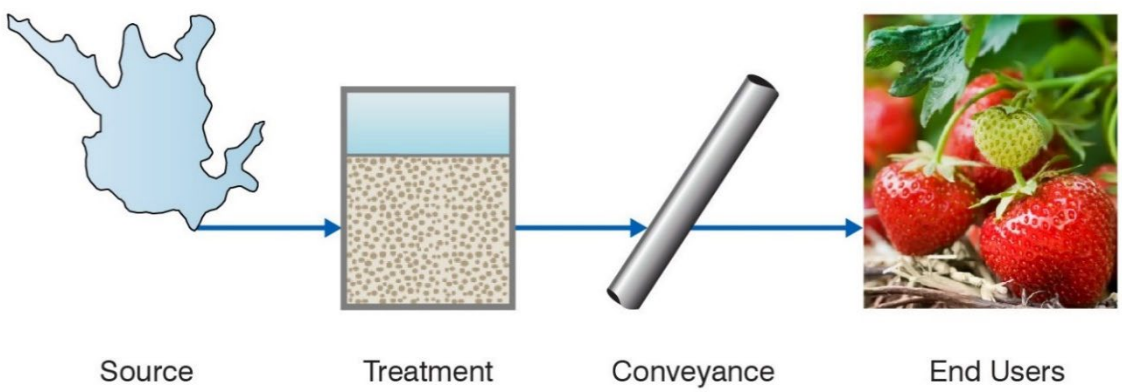
S.4.1 Project Location and Proposed Components

Chapter 2 of this EIR presents the Project Description. The essential function of the Project, depicted in **Figure S-1**, is to store water in and divert water from College Lake for treatment, transmission, and distribution for agricultural irrigation. College Lake is located in unincorporated Santa Cruz County northeast of the Watsonville city limits, north of Holohan Road and west of State Route (SR) 152. **Figure S-2** shows the location of College Lake and the other components of the Project, described below:

- **Weir Structure and Intake Pump Station.** The Project includes a weir structure and intake pump station facility. The concrete weir structure would be equipped with a mechanically adjustable weir and would be designed and operated to accommodate release of bypass flows and to facilitate fish passage between Salsipuedes Creek and College Lake. The screened intake and pump station would divert surface water from College Lake and deliver raw (untreated) water impounded behind the weir to a Water Treatment Plant (WTP).

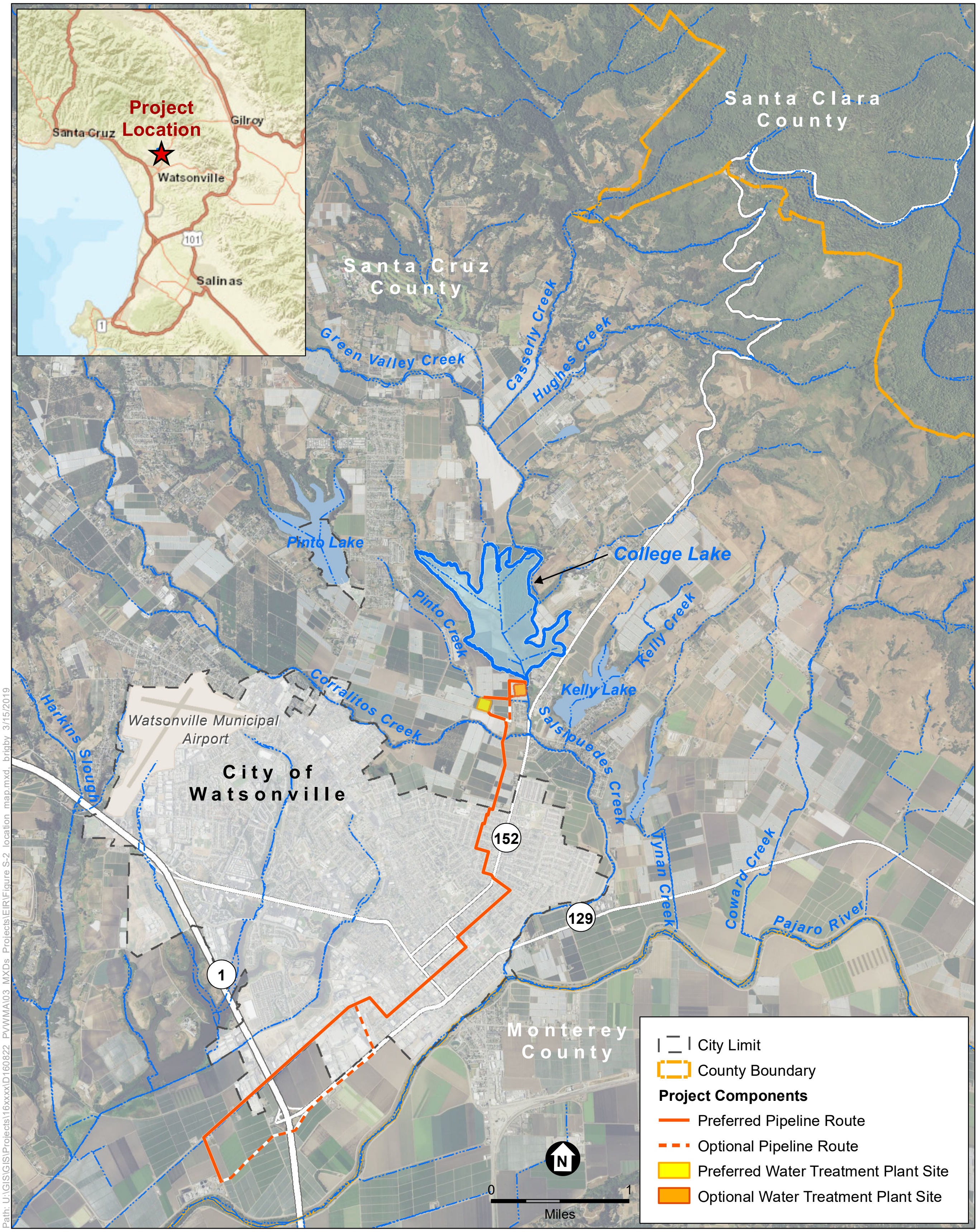
- **Water Treatment Plant.** The WTP would remove sediment, filter and disinfect the water diverted from College Lake. PV Water's preferred WTP site is north of Holohan Road between Laken Drive and Grimmer Road. An optional WTP site is also described and evaluated in the EIR. The WTP would contain sedimentation basins and solids drying beds, filtration and disinfection systems, and an effluent pump station.

- **College Lake Pipeline.** The Project would include an approximately 5.5-mile-long, 24-inch-diameter pipeline from the proposed WTP to the Coastal Distribution System and the Recycled Water Facility. At the State Route 1 crossing, PV Water's preferred pipeline alignment is in West Beach Street; an optional pipeline alignment at the SR 1 crossing is also identified and evaluated in the EIR.



SOURCE: PV Water, Proposed College Lake Integrated Resources Management Project, NOP Scoping Meeting Presentation, December 12, 2017.

Figure S-1
College Lake Integrated Resources Management Project Components



SOURCE: Carollo Engineers, 2017; ESRI World Imagery, 7/23/2016; ESA

College Lake Integrated Resources Management Project

Figure S-2
Project Location Map

ESA

S.4.2 Construction

Construction is expected to begin in 2022 and last about 18 months, and would be initiated following project approval, procurement of property rights, issuance of permits, and completion of design. Details (e.g., construction techniques, hours, work force, equipment, staging areas, traffic routing) are presented in Section 2.6 of Chapter 2.

S.4.3 Operations

As part of Project development, PV Water estimated College Lake watershed inflows, outflows and lake water levels; determined flows required for fish passage; and modeled water budgets for existing, future with-project, and future cumulative conditions. Key aspects of proposed operations include the following:

- ***Proposed Fish Passage and Bypass of Casserly Creek During Operations***. The Project includes proposed minimum flows and lake levels for adult and smolt steelhead passage between December 15th and May 31st.
- ***Proposed Weir Operations***. PV Water would manage the adjustable weir to avoid exacerbating flood risk. During the wet season prior to the last anticipated major precipitation event of the year, the proposed weir would remain at 60.1 feet NAVD88 (the same elevation as an existing weir that would be demolished as part of the Project). The proposed weir would not be raised to 62.5 feet NAVD88 until after the last anticipated major precipitation event of the season, such that the College Lake water surface elevation is not expected to exceed approximately 62.5 feet NAVD88 after that point in the season.
- ***Water Supply Extractions***. Depending on water year type, monthly demand was estimated at anywhere from 14 acre-feet to 470 acre-feet. Water supply diversions would occur after minimum lake levels and fish passage flows have been achieved. Water pumped from College Lake would be treated at the proposed WTP, and pumped through the College Lake pipeline for irrigation use. On average, the Project would generally supply approximately1,800 to 2,300 acre-feet per year (AFY) of water to growers in the Pajaro Valley; the maximum potential yield for the Project based on the water right application submitted by PV Water to the State Water Resources Control Board is 3,000 AFY.
- ***Adaptive Management***. The Project includes development and implementation of an adaptive management plan to help operate the lake and maintain seasonally-inundated areas in a manner that preserves water storage capacity while promoting wildlife habitat functions. Initial development of the Adaptive Management Plan would occur during environmental permitting.

S.4.4 Maintenance

PV Water staff would conduct maintenance activities on Project components and within College Lake as needed. The amount and type of maintenance needed would vary by year. Routine maintenance activities in select areas of College Lake would include disking and mowing, and sediment and debris removal. Refer to Section 2.7 of Chapter 2 for more information on proposed operations and maintenance.

S.5 Summary of Project Impacts and Mitigation Measures

Chapter 3 of this EIR presents the environmental impacts analyses for several resource areas consistent with Appendix G of the CEQA *Guidelines*. For each resource area, the impact analysis describes the environmental and regulatory setting, identifies significance criteria used in the analysis, evaluates potential physical effects of the Project on both a project and cumulative basis, and provides feasible mitigation measures that would reduce the severity of significant impacts.

Table S-1 summarizes all impacts identified for the Project in this EIR, lists the significance determination for each impact, and presents the full text of the mitigation measures identified to avoid, reduce, or otherwise lessen significant impacts. As shown in the table, although a majority of the impacts were determined to be less than significant or could be mitigated to less-than-significant levels, implementation of the Project was determined to result in significant and unavoidable impacts in the areas of agricultural resources (conversion of Important Farmland) and construction noise.

S.6 Alternatives to the Proposed Project

Chapter 5 presents the CEQA alternatives analysis for the Project. This chapter describes the methodology used to screen and select feasible alternatives that could avoid or substantially lessen the significant impacts identified for the Project while still meeting most of the Project objectives. In addition to the water treatment plant location and College Lake pipeline alignment options described and evaluated in detail in Chapters 2 and 3 of the EIR, the alternatives selected for evaluation in Chapter 5 include:

1. **No Project.** This alternative describes conditions that would generally be expected to occur without implementation of the Project.

2. **Farmland Preservation – Lake Deepening Alternative**. This alternative involves deepening parts of the lake basin and depositing the excavated materials in the southwestern portion of the basin. This alternative would effectively reduce the areal extent of the wetted area of College Lake compared to the Project, resulting in a reduction in the conversion of Important Farmland.

There are trade-offs, in terms of environmental impacts, between the Farmland Preservation-Lake Deepening Alternative and the Project. The Farmland Preservation-Lake Deepening Alternative would reduce the conversion of Important Farmland, a significant and unavoidable impact even with implementation of Mitigation Measures LU-1a (Promote Farming), LU-1b (Compensate for Conversion of Important Farmland), and LU-1c (Replacement of Topsoil). However, the Farmland Preservation-Lake Deepening Alternative would worsen impacts associated with biological resources, flooding, air quality, and cultural resources. In particular, the magnitude of impacts to state and federally protected wetlands would require a substantially larger area of compensatory mitigation to reduce the impact, complicating permitting; and there would be an increase in water surface elevations during the 10- and 100-year flood events compared to the Project. Refer to Chapter 5, *Alternatives*, for more information.

TABLE S-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES[3]

IMPACT	Significance Determination	Mitigation Measure
Land Use and Agricultural Resources, EIR Section 3.2		
Impact LU-1: The Project would convert Important Farmland to non-agricultural use and could involve changes in the existing environment which, due to their location or nature, could result in conversion of Important Farmland to non-agricultural use.	SUM	**Mitigation Measure LU-1a: Promote Farming** To reduce the amount of Farmland of Statewide Importance and Unique Farmland converted to other uses and in coordination with affected landowners, PV Water shall adopt practices to promote farming within the areas depicted with red hatching on Figure 3.2-4 of the College Lake Integrated Resources Management Project EIR. Such practices may include, but are not limited to, the following: • Maintain, improve and potentially expand tile drain systems. • If controlling land by easement, establish terms that require land owners to cultivate crops or otherwise productively use the land for agricultural purposes at least once every five years, hydrologic conditions permitting. • If acquiring land outright, enter into lease arrangements for the land to be cultivated or otherwise productively used for agricultural purposes at least once every five years, hydrologic conditions permitting. **Mitigation Measure LU-1b: Compensate for Conversion of Important Farmland** *Track Conversion of Important Farmland.* PV Water shall review California Department of Conservation's Farmland Mapping and Monitoring Program farmland designations for College Lake annually beginning with the first year of construction and continuing for five years of Project operation. PV Water shall identify Prime Farmland, Farmland of Statewide Importance, and Unique Farmland referred to herein as Important Farmland that is within the College Lake basin below elevation 63 feet NAVD88 that converts due to water management operations. *Establish Memorandum of Understand for Agricultural Easement Fund.* PV Water shall enter into a Memorandum of Understanding with the Santa Cruz Land Trust or similar entity. The Memorandum of Understanding shall include details regarding an Agricultural Easement Fund to be paid by PV Water and the timing of acquisition of agricultural easements for the purpose of offsetting impacts on Important Farmland caused by the Project. Acceptance of this fee by the Santa Cruz Land Trust or similar entity shall serve as an acknowledgment and commitment to: (1) secure agricultural easements to offset the conversion of Important Farmland caused by the Project; and (2) provide documentation to PV Water describing the project(s) funded by the mitigation fee. If there is any remaining unspent portion of the Agricultural Easement Fund following implementation, PV Water shall be entitled to a refund in that amount. To qualify under this mitigation measure, the specific agricultural easement acquisition projects must preserve acreage of farmland of an equal or greater Farmland Mapping and Monitoring Program designation value within the PV Water service area to offset the permanent conversion of Important Farmland by the Project. *Contribute to Agricultural Easement Fund.* PV Water shall initially designate funds to secure easements for up to 6 acres of Prime Farmland to offset impacts associated with the water treatment plant. In addition, for Prime Farmland, Farmland of Statewide Importance, or Unique Farmland within the lake basin that the Department of Conservation converts to non-agricultural designations after the Project has operated for a period of one year, PV Water shall designate for the Agricultural Easement Fund an amount to cover the costs associated with acquisition of agricultural easements of equivalent value. *Directly Fund Agricultural Easements.* As an alternative approach to establishing a memorandum of understanding for, and contributing to an agricultural easement fund, PV Water could elect to directly fund the purchase of agricultural easements for Important Farmland in the Pajaro Valley.

[3] Text that has been revised in adopted mitigation measures is indicated with underlining where text has been added, and ~~strikethrough~~ where text has been deleted.

SUM = Significant and Unavoidable with Mitigation LSM = Less than Significant with Mitigation LS = Less than Significant NI = No Impact

TABLE S-1 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

IMPACT	Significance Determination	Mitigation Measure
Land Use and Agricultural Resources, EIR Section 3.2 (cont.)		
Impact LU-1 (cont.)		**Mitigation Measure LU-1c: Replacement of Topsoil** In agricultural areas, PV Water shall require contractors to stockpile topsoil at Project sites during Project grading and reapply it in situ after construction to promote vegetative growth. In agricultural areas temporarily disturbed by construction and where excavation occurs, the following measures shall apply: • Strip 18 inches of topsoil from the area excavated unless otherwise stipulated by landowner. The topsoil shall be stored separately from subsoil and other construction materials. • Clearly mark topsoil signs, and store topsoil separately from other excavated and imported materials in such a manner that the topsoil is not damaged, mixed, or covered by subsoil or surface rocks, and so that it is not continually disturbed. • Stockpile topsoil on the same property from which it was stripped and return topsoil to same property from which it was stripped.
Impact LU-2: The Project could conflict with a Williamson Act contract, or conflict with an applicable land use plan, policy, or regulation of an agency with jurisdiction over the Project adopted for the purpose of avoiding or mitigating an environmental effect.	LS	No mitigation required.
Impact C-LU-1: The Project, in combination with past, present, and probable future projects in the Project area, would have a cumulatively considerable impact on the conversion of Important Farmland to non-agricultural use.	SUM	**Mitigation Measure LU-1a: Promote Farming** (refer to Impact LU-1) **Mitigation Measure LU-1b: Compensate for Conversion of Important Farmland** (refer to Impact LU-1)
Surface Water, Groundwater, and Water Quality, EIR Section 3.3		
Impact HYD-1: Project construction could violate water quality standards and/or waste discharge requirements, or otherwise substantially degrade surface or ground water quality.	LSM	**Mitigation Measure BR-1b: Frac-out Contingency Plan** (refer to Impact BR-1) **Mitigation Measure HYD-1: Implement Dewatering Best Management Practices for In-Water Construction** For in-water construction during pipeline installation activities, PV Water shall require its contractor(s) to prepare a Dewatering Plan. The Dewatering Plan shall identify best management practices that ensure construction activities at Salsipuedes and Pinto Creeks meet water quality objectives. This work shall be timed to take place as flows are receding and only after instream measures to reduce downstream turbidity are in place. In addition, PV Water shall require its contractors to implement the measures below, and water quality protection measures required by the RWQCB. 1. All work performed in-water shall be completed in a manner that meets the water quality objectives to ensure the protection of beneficial uses as specified in the 2017 Basin Plan. 2. All dewatering and diversion methods shall be installed such that natural flow is maintained upstream and downstream of the Project area.

SUM = Significant and Unavoidable with Mitigation LSM = Less than Significant with Mitigation LS = Less than Significant NI = No Impact

TABLE S-1 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

IMPACT	Significance Determination	Mitigation Measure
Surface Water, Groundwater, and Water Quality, EIR Section 3.3 (cont.)		
Impact HYD-1 (cont.)		3. Any temporary dams or diversion shall be installed such that the diversion does not cause sedimentation, siltation, or erosion upstream or downstream of the Project area. 4. Screened pumps shall be used in accordance with CDFW's fish screening criteria and in accordance with the NMFS Fish Screening Criteria for Anadromous Salmonids and the Addendum for Juvenile Fish Screen Criteria for Pump Intakes. 5. Cofferdams shall remain in place and functional throughout the in-stream construction. 6. Disturbance of protected riparian vegetation shall be limited or avoided entirely.
Impact HYD-2: Project operations could adversely affect surface water quality.	LSM	**Mitigation Measure HYD-2a. Water Quality Adaptive Management for College Lake** To learn about potential impacts of the Project on College Lake water quality and the quality of downstream water bodies, PV Water shall monitor College Lake water for indications of Cyanobacteria blooms. When the proposed weir crest is elevated to 62.5 feet NAVD88, PV Water shall monitor College Lake water temperature within the water column to establish whether a thermocline develops. PV Water shall use results of this monitoring to support the development of the Adaptive Management Plan (refer to Section 2.7) that establishes management actions to minimize the conditions that can contribute to algal blooms, including cyanobacteria blooms, such that this impact is mitigated. **Mitigation Measure HYD-2b. Scour Analysis for Pinto Creek Crossing** To reduce Project impacts on erosion and sedimentation, PV Water shall evaluate the potential for scour and channel bank erosion due to the Pinto Creek pipeline crossing. The analysis shall recommend a design depth for the pipeline crossing that avoids scour, estimated using standard engineering methods. PV Water shall implement the pipeline depth that avoids scour in final project design.
Impact HYD-3: The Project could cause localized temporary or seasonal changes in shallow groundwater levels, but would not degrade groundwater quality or decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin.	LS	No mitigation required.
Impact HYD-4: The Project would alter drainage patterns, changing erosion and sedimentation patterns in College Lake and downstream water bodies.	LSM	**Mitigation Measure HYD-2b. Scour Analysis for Pinto Creek Crossing** (refer to Impact HYD-2)
Impact HYD-5: The Project would not substantially increase the rate or amount of surface runoff, but would impede or redirect flood flows and alter the seasonality of surface runoff.	LS	**Mitigation Measure HYD-3: Avoid Flooding at Pajaro Dunes During Pumped Flow Events** PV Water shall not pump flow exceeding fish passage requirements into Salsipuedes Creek until receiving approval from the Santa Cruz County Flood Control District indicating that pumped flow can occur without lagoon breaching, based on current water surface elevation conditions in Pajaro Lagoon. The threshold water surface elevations described in the Santa Cruz County Flood Control District current lagoon breaching permits from the U.S. Army Corps of Engineers, the Central Coast Regional Water Quality Control Board, and the California Department of Fish and Wildlife will be used to assess whether pumped flows would require lagoon breaching. PV Water pumped flows shall not result in lagoon water surface elevations exceeding the threshold elevation identified in the lagoon breaching permits.

SUM = Significant and Unavoidable with Mitigation LSM = Less than Significant with Mitigation LS = Less than Significant NI = No Impact

TABLE S-1 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

IMPACT	Significance Determination	Mitigation Measure
Surface Water, Groundwater, and Water Quality, EIR Section 3.3 (cont.)		
Impact HYD-6: The Project could conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan.	LSM	**Mitigation Measure BR-1b: Frac-out Contingency Plan** (refer to Impact BR-1) **Mitigation Measure HYD-1: Implement Dewatering Best Management Practices for In-Water Construction** (refer to Impact HYD-1) **Mitigation Measure HYD-2a: Water Quality Adaptive Management for College Lake** (refer to Impact HYD-2) **Mitigation Measure HYD-2b: Scour Analysis for Pinto Creek Crossing** (refer to Impact HYD-2)
Impact C-HYD-1: The Project, in combination with past, present, and probable future projects in the Project area, would not result in significant adverse cumulative hydrology impacts.	LS	No mitigation required.
Impact C-HYD-2: The Project, in combination with past, present, and probable future projects in the Project area, would not result in significant adverse cumulative water quality impacts.	LS	No mitigation required.
Biological Resources, EIR Section 3.4		
Impact BR-1: Construction of Project components could result in a substantial adverse effect on special-status species.	LSM	**Mitigation Measure BR-1a: Fish Relocations.** Prior to, or concurrent with, draining of College Lake and/or dewatering of the construction site, special-status and other native fish species shall be captured and relocated by a qualified fisheries biologist. The following measures shall be taken to minimize harm and mortality to steelhead and other native fish resulting from fish relocation and dewatering activities: 1) Fish relocation shall be performed by a qualified fisheries biologist, with all necessary state and federal authorizations. Captured fish shall be moved to the nearest appropriate site outside of the work area. A record of relocation activities shall be maintained and include the date of capture and relocation, the method of capture, the location of the relocation site in relation to the Project site, and the number and species of fish captured and relocated; 2) Electrofishing shall be conducted by properly trained personnel following *NOAA Guidelines for Electrofishing Waters Containing Salmonids Listed under the Endangered Species Act*, June 2000. 3) Prior to capturing fish, the most appropriate release location(s) shall be determined. 4) The most efficient method for capturing fish shall be determined by the biologist. Complex stream habitat generally requires the use of electrofishing equipment, whereas in outlet pools, fish may be concentrated by pumping-down the pool and then seining or dip-netting fish. 5) Handling of salmonids shall be minimized. However, when handling is necessary, hands or nets shall be wetted prior to touching fish. 6) Captured fish shall be held in cool, shaded, aerated water in a container with a lid. Aeration shall be provided with a battery-powered external bubbler. Fish shall be protected from jostling and noise, and shall not be removed from this container until time of release.

SUM = Significant and Unavoidable with Mitigation LSM = Less than Significant with Mitigation LS = Less than Significant NI = No Impact

TABLE S-1 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

IMPACT	Significance Determination	Mitigation Measure
Biological Resources, EIR Section 3.4 (cont.)		
Impact BR-1 (cont.)		7) Air and water temperatures shall be measured periodically. A thermometer shall be placed in holding containers and, if necessary, periodically conduct partial water changes to maintain a stable water temperature. If water temperature reaches or exceeds 18 degrees Celsius, fish shall be released and rescue operations ceased, if feasible. 8) Overcrowding in containers shall be avoided by having at least two containers and segregating young-of-year fish from larger age-classes to avoid predation. If fish are abundant, the capturing of fish and amphibians shall cease periodically and shall be released at the predetermined locations. Species and year-class of fish shall be visually estimated at time of release. The number of fish captured shall be counted and recorded. Anesthetization or measuring fish shall be avoided unless requested by appropriate resource agencies (NMFS, CDFW). Fish relocation activities are typically restricted to the period of June 15 through November 1. However, draining of College Lake may have to commence prior to June 1 to ensure the lake is fully drained prior to the start of construction. If lake draining commences prior to June 1 (as it regularly does under existing conditions), fish relocations would be timed accordingly. Given that steelhead present at the time of draining are likely to be smolts attempting to reach the ocean, pre-June 1 relocations concurrent with lake draining would ensure suitable downstream passage conditions and timing for relocated smolts. **Mitigation Measure BR-1b: Frac-out Contingency Plan.** If HDD installation is implemented, PV Water shall require the contractor to retain a licensed geotechnical engineer to develop a Frac-out Contingency Plan. PV Water would submit the Frac-out Contingency Plan to the appropriate resource agencies (CDFW, RWQCB, USACE, USFWS, and NMFS) for review prior to the start of construction of any pipeline that would use HDD installation to avoid surface waters. The Frac-out Contingency Plan shall be implemented where HDD installation under a waterway will occur to avoid, minimize, or mitigate for potential Project impacts during HDD installation, as specified in the Frac-out Contingency Plan. The Frac-out Contingency Plan shall include, at a minimum: 1) Measures describing training of construction personnel about monitoring procedures, equipment, materials and procedures in place for the prevention, containment, clean-up (such as creating a containment area and using a pump, using a vacuum truck, etc.), and disposal of released bentonite slurry, and agency notification protocols; 2) Methods for preventing frac-out including maintaining pressure in the borehole to avoid exceeding the strength of the overlying soil. 3) Methods for detecting an accidental release of bentonite slurry that include: (a) monitoring by a minimum of one biological monitor throughout drilling operations to ensure swift response if a frac-out occurs; (b) continuous monitoring of drilling pressures to ensure they do not exceed those needed to penetrate the formation; (c) continuous monitoring of slurry returns at the exit and entry pits to determine if slurry circulation has been lost; and (d) continuous monitoring by spotters to follow the progress of the drill bit during the pilot hole operation, and reaming and pull back operations. 4) Protocols that the contractor would follow if there is a loss of circulation or other indicator of a release of slurry. 5) Cleanup and disposal procedures and equipment the contractor would use if a frac-out occurs. 6) If a frac-out occurs, the contractor shall immediately halt work, implement the measures outlined in Item 5 of the Frac-out Contingency Plan to contain, clean-up, and dispose of the bentonite slurry, and, if the frac-out occurs in the water channel, notify and consult with the staffs of the agencies listed above before HDD activities can begin again. PV Water shall require the contractor to implement Frac-out Contingency Plan to ensure that measures are implemented to prevent frac-out and if a frac-out occurs, implement measures to contain, clean-up, and dispose of the bentonite slurry.

SUM = Significant and Unavoidable with Mitigation LSM = Less than Significant with Mitigation LS = Less than Significant NI = No Impact

TABLE S-1 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

IMPACT	Significance Determination	Mitigation Measure
Biological Resources, EIR Section 3.4 (cont.)		
Impact BR-1 (cont.)		**Mitigation Measure BIO-1c (Revised):** Where construction impacts ~~t~~on mixed riparian or willow riparian forest occur, revegetation and restoration measures will be developed as part of a revegetation plan approved by CDFW, RWQCB, and if applicable, USACE and/or California Coastal Commission, pursuant to regulatory agency permitting. The revegetation plan will include specific plans for the revegetation of impacted riparian forest, and for restoration of nearby creek riparian habitat, as appropriate. Upon approval by ~~Santa Cruz County and other~~ applicable agencies, PV Water ~~the PVWMA~~ may choose to coordinate with the Natural Resources Conservation Service ~~(NRCS)~~ and the Santa Cruz County Resource Conservation District (RCD) to develop and implement the required riparian revegetation, including providing funds to the RCD for their implementation of the revegetation. Revegetation measures will include the use of locally obtained plant materials, detailed descriptions of installation methods, after-installation care, weed control measures, success criteria, and corrective measures if the success criteria are not met. Temporarily impacted areas will be restored to pre-construction conditions with equivalent or greater habitat quality. Revegetation will include a 3:1 replacement ratio of the acreage of riparian habitat lost and for all trees lost as result of the Project to account for the reduced habitat values of smaller trees compared with mature vegetation. Success criteria for replanting will be less than 20 percent mortality of individual species annually ~~yearly~~ for 5 years. Replanting will be conducted each year that plantings exceed 20 percent ~~%~~ mortality, such that 80 percent ~~%~~ plant survival is maintained each year of the 5-year monitoring period. Cover provided by invasive, non-native plant species shall not exceed 5 percent ~~%~~ during each year of the 5-year monitoring period. **Mitigation Measure BIO-1d (Revised):** Where construction impacts ~~t~~on open water (creeks, streams, jurisdictional ditches), seasonal wetlands, or coastal freshwater marsh occurs, revegetation and restoration measures will be developed as part of a revegetation plan approved by CDFW, RWQCB, USACE, ~~and/or~~ California Coastal Commission, and/or Santa Cruz County, pursuant to regulatory agency permitting. Upon approval by ~~Santa Cruz County and other~~ applicable agencies, PV Water ~~the PVWMA~~ may choose to coordinate with the Natural Resources Conservation Service ~~(NRCS)~~ and the Santa Cruz County R~~esource Conservation District (~~RCD~~)~~ to develop and implement the required wetland revegetation and restoration, including providing funds to the RCD for their implementation of the revegetation and restoration. The revegetation plan will include specific plans for the revegetation of impacted ~~coastal marsh~~ wetlands, and for restoration of nearby wetland habitat, as appropriate. Revegetation measures will include the use of locally obtained plant materials, detailed descriptions of installation methods, after-installation care, weed control measures, success criteria, and corrective measures if the success criteria are not met. Temporarily impacted areas will be restored to pre-construction conditions with equivalent or greater habitat quality. Revegetation will include a 3:1 replacement ratio (or an equivalent habitat replacement strategy as agreed upon by PV Water ~~PVWMA~~ and regulatory agencies) for impacted wetlands. If natural recovery is a viable strategy, then a wetland plant cover exceeding 50 percent ~~%~~ should be attained after two growing seasons. Mitigation may occur via restoration, creation, or preservation of wetlands or waters. Mitigation will occur at a site acceptable to permitting agencies and pursuant to the Project's permit requirements. If the compensatory mitigation includes restoration, enhancement, or creation of wetlands or waters, a qualified biologist will monitor the designated wetland mitigation area for a minimum of five years to ascertain if the wetland mitigation is successful. Annual reports will be submitted to permitting agencies by December 31 of each monitoring year, describing the results of the monitoring and any remedial actions needed to achieve a minimum 3:1 habitat replacement ratio or equivalent for permanent impacts ~~t~~on wetlands ~~and other waters~~. **Mitigation Measure BR-1c: Avoid and Minimize Impacts on Special-status Bat Species.** A qualified biologist who is experienced with bat surveying techniques, behavior, roosting habitat, and identification of local bat species shall be consulted prior to initiation of construction activities to conduct a preconstruction habitat assessment to characterize potential bat habitat and identify active roost sites. The preconstruction habitat assessment shall be conducted within 100 feet of construction activities conducted in and around riparian habitat.

SUM = Significant and Unavoidable with Mitigation LSM = Less than Significant with Mitigation LS = Less than Significant NI = No Impact

TABLE S-1 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

<table>
<tr><th>IMPACT</th><th>Significance Determination</th><th>Mitigation Measure</th></tr>
<tr><td colspan="3">Biological Resources, EIR Section 3.4 (cont.)</td></tr>
<tr><td>Impact BR-1 (cont.)</td><td></td><td>Should potential roosting habitat or potentially active bat roosts be identified during the habitat assessment in trees and/or structures to be disturbed under the Project, the following measures shall be implemented:
1. Removal or disturbance of trees or structures (e.g. the existing weir and intake pump station) identified as potential bat roosting habitat or active roosts shall occur when bats are active, approximately between the periods of March 1 to April 15 and August 15 to October 15, to the extent feasible. These dates avoid bat maternity roosting season (approximately April 15 to August 31) and periods of winter torpor (approximately October 15 to February 28).
2. If removal or disturbance of trees and structures identified as potential bat roosting habitat or active roosts during the periods when bats are active is not feasible, a qualified biologist would conduct pre-construction surveys within 14 days prior to disturbance to further evaluate bat activity within the potential habitat or roost site.
a. If active bat roosts are not identified in potential habitat during preconstruction surveys, no further action is required prior to removal of- or disturbance to trees and structures within the preconstruction survey area.
b. If active bat roosts or evidence of roosting is identified during pre-construction surveys, the qualified biologist shall determine, if possible, the type of roost and species.
i. If special-status bat species or maternity or hibernation roosts are detected during these surveys, appropriate species- and roost-specific avoidance and protection measures shall be developed by the qualified biologist in coordination with CDFW. Such measures may include postponing the removal of structures or trees, or establishing exclusionary work buffers while the roost is active. A minimum 100-foot no disturbance buffer shall be established around special-status species, maternity, or hibernation roosts until the qualified biologist determines they are no longer active. The size of the no-disturbance buffer may be adjusted by the qualified biologist, in coordination with CDFW, depending on the species present, roost type, existing screening around the roost site (such as dense vegetation or a building), as well as the type of construction activity that would occur around the roost site, and if construction would not alter the behavior of the adult or young in a way that would cause injury or death to those individuals.
Under no circumstances shall active maternity roosts be disturbed until the roost disbands at the completion of the maternity roosting season or otherwise becomes inactive, as determined by the qualified biologist.
ii. If a non-maternity or hibernation roost (e.g., bachelor daytime roost) is identified, disturbance to- or removal of trees or structures may occur under the supervision of a qualified biologist as described under measure 3).
3. The qualified biologist shall be present during tree and structure disturbance or removal if active non-maternity or hibernation bat roosts or potential roosting habitat are present. Trees and structures with active non-maternity or hibernation roosts or potential habitat shall be disturbed or removed only under clear weather conditions when precipitation is not forecast for three days and when nighttime temperatures are at least 50 degrees Fahrenheit, and when wind speeds are less than 15 mph.
a. Trimming or removal of trees with active (non-maternity or hibernation) or potentially active roost sites shall follow a two-step removal process:
i. On the first day of tree removal and under supervision of the qualified biologist, branches and limbs not containing cavities or fissures in which bats could roost, shall be cut only using hand tools (e.g., chainsaws).
ii. On the following day and under the supervision of the qualified biologist, the remainder of the tree may be removed, either using hand tools or other equipment (e.g. excavator or backhoe).</td></tr>
</table>

SUM = Significant and Unavoidable with Mitigation LSM = Less than Significant with Mitigation LS = Less than Significant NI = No Impact

TABLE S-1 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

IMPACT	Significance Determination	Mitigation Measure
Biological Resources, EIR Section 3.4 (cont.)		
Impact BR-1 (cont.)		iii. All felled trees shall remain on the ground for at least 24 hours prior to chipping, off-site removal, or other processing to allow any bats to escape, or be inspected once felled by the qualified biologist to ensure no bats remain within the tree and/or branches. b. Disturbance to or removal of structures containing or suspected to contain active bat (non-maternity or hibernation) or potentially active bat roosts shall be done in the evening and after bats have emerged from the roost to forage. Structures shall be partially dismantled to significantly change the roost conditions, causing bats to abandon and not return to the roost. Removal would be completed the subsequent day. 4. Bat roosts that begin during construction are presumed to be unaffected as long as a similar type of construction continues, and no buffer would be necessary. Direct impacts on bat roosts or take of individual bats would be avoided. **Mitigation Measure BR-1d: Avoidance and Minimization Measures for San Francisco Dusky-Footed Woodrat.** The following measures shall be implemented to avoid and minimize impacts on San Francisco dusky-footed woodrat: 1. A qualified wildlife biologist shall conduct preconstruction surveys for San Francisco dusky-footed woodrat in the Salsipuedes Creek riparian corridor within the existing and proposed weir structure and intake pump station work area. The surveys shall be conducted within 14 days prior to the start of construction in suitable habitat and shall identify any woodrat nests located within 50 feet of anticipated construction disturbance areas. 2. If woodrat nests are found during the preconstruction surveys, the wildlife biologist shall conduct additional surveys throughout the duration of construction activities at the Project site to identify any newly constructed woodrat nests. 3. If nests are observed outside of the construction area, the qualified biologist shall demarcate a minimum 50-foot buffer area with orange construction fencing and require that all construction activities and disturbance remain outside of the fencing. 4. Active woodrat nests located within the anticipated construction disturbance areas shall be relocated. Nests shall be relocated outside of the peak breeding season as feasible to minimize disturbance to young woodrats. Woodrat breeding season is December to September with peak breeding in mid-spring. Relocation of woodrats and/or their nests shall be conducted by the qualified wildlife biologist as follows: a. Clear understory vegetation from around the nest using hand tools. b. After all vegetative cover has been cleared around the nest, the biologist shall gently disturb the nest to encourage the woodrat(s) to abandon the nest and seek cover in adjacent habitat. c. Once the woodrats have left the nest, the biologist shall carefully relocate the nest sticks to suitable habitat outside of the construction disturbance area, piling the sticks at the base of trees or large shrubs if available. If multiple nests are relocated, the stick piles shall be placed at least 25 feet from one another. d. The qualified biologist supervising woodrat nest relocation shall ensure potential health hazards to the biologists moving nests are addressed to minimize the risk of contracting diseases associated with woodrats and woodrat nests. These include hantavirus, Lyme disease, and plague. The biologists that relocate nests shall take the following precautionary safety measures: i. Wear a Cal/OSHA-certified facial respirator to reduce inhalation of potential disease causing organisms. ii. Wear a white Tyvec protective suit to provide a barrier for ticks and fleas and facilitate their detection and removal and use gloves.

SUM = Significant and Unavoidable with Mitigation LSM = Less than Significant with Mitigation LS = Less than Significant NI = No Impact

TABLE S-1 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

IMPACT	Significance Determination	Mitigation Measure
Biological Resources, EIR Section 3.4 (cont.)		
Impact BR-1 (cont.)		e. If young woodrats are encountered during dismantling of the nest, nest material shall be replaced and a 50-foot no-disturbance buffer shall be established around the active nest. The buffer shall remain in place until the young woodrats have matured enough to disperse on their own accord and the nest is no longer active. Nesting substrate shall then be collected and relocated to suitable habitat outside of the Project area.
Impact BR-2: Construction of Project components would result in a substantial adverse effect on riparian habitat or other sensitive natural community or on state or federally protected wetlands or waters through direct removal, filling, hydrological interruption, or other means.	LSM	**Mitigation Measure BIO-1e (Revised).** Where construction and/or facilities are placed within a riparian or wetland development setback area (as defined in the Santa Cruz County Municipal Code), indirect impacts ~~t~~on adjacent riparian and wetland vegetation will be minimized. Where feasible, buffer plantings of native trees and shrubs will be installed between the facility and the adjacent wetland or riparian resource to provide a vegetated buffer. A buffer planting plan will be prepared as part of a revegetation plan approved by CDFW, RWQCB, USACE, and/or California Coastal Commission, pursuant to regulatory agency permitting. The buffer planting plan will include specific revegetation measures, including the use of locally obtained plant materials, detailed descriptions of installation methods, after-installation care, weed control measures, success criteria, and corrective measures if the success criteria are not met. **Mitigation Measure BR-1b: Frac-out Contingency Plan** (refer to Impact BR-1) **Mitigation Measure BIO-1c (Revised)** (refer to Impact BR-1) **Mitigation Measure BIO-1d (Revised)** (refer to Impact BR-1)
Impact BR-3: Construction of Project components could interfere substantially with the movement of any native resident or migratory wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.	LS	No mitigation required.
Impact BR-4: Project operations could result in a substantial adverse effect on riparian habitat or other sensitive natural community or on state or federally protected wetlands or waters through direct removal, filling, hydrological interruption, or other means.	LS	No mitigation required.
Impact BR-5: Project operations could result in a substantial adverse effect on terrestrial special-status species.	LSM	**Mitigation Measure BIO-2i: Nesting Bird Surveys (Revised):** Prior to any project construction or maintenance activities, the project proponent will take the following steps to avoid direct losses of nests, eggs, and nestlings and indirect impacts ~~t~~on avian breeding success: • If construction or maintenance activities occur only during the non-breeding season, between August 31 and February 1, no surveys will be required.

SUM = Significant and Unavoidable with Mitigation LSM = Less than Significant with Mitigation LS = Less than Significant NI = No Impact

TABLE S-1 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

IMPACT	Significance Determination	Mitigation Measure
Biological Resources, EIR Section 3.4 (cont.)		
Impact BR-5 (cont.)		• During the breeding bird season (February 1 through August 31), a qualified biologist will survey construction or maintenance areas in the vicinity of the Project site for nesting raptors and passerine birds not more than 14 days prior to any ground-disturbing activity or vegetation removal. • Surveys will include all potential habitats within 500 feet (for raptors) of activities and all onsite vegetation including bare ground within 250 feet of activities (for all other species). • If results are positive for nesting birds, avoidance procedures will be adopted, if necessary, on a case-by-case basis. These may include implementation of buffer areas (minimum 50-foot buffer for passerines and 250-foot minimum buffer for raptors) or seasonal avoidance. **Mitigation Measure BIO-2j: CRF~~T~~ (Revised):** The following measures for avoidance and minimization of adverse impacts ~~t~~on California Red-Legged Frog (*Rana draytonii*) (CRF) during construction and maintenance of the Project ~~BMP projects~~ are those typically employed for construction activities that may result in short-term impacts ~~t~~on individuals and their habitat. The focus of these measures is on scheduling activities at certain times of year, keeping the disturbance footprint to a minimum, and monitoring. Consultation with the USFWS will be conducted and a Biological Opinion developed for each BMP Update component that requires a USACE Section 404 Wetland Permit. Ongoing and future CRF studies in the Project area may result in site-specific conditions that would be integrated into the future project-level BMP component designs, permitting and operations. CRF-1 through CRF-9 would apply only to Project locations identified as CRF-habitat. CRF-1. PV Water~~The Agency~~ will annually submit the name(s) and credentials of biologists who would conduct activities specified in the following measures. No project activities would ~~will~~ begin until the Agency receives approval from the Service that the biologist(s) is qualified to conduct the work. CRF-2. A USFWS -approved biologist will survey the ~~work~~ construction or maintenance site 48 hours prior to the onset of activities. If CRF, tadpoles, or eggs are found, the approved biologist will determine the closest appropriate relocation site. The approved biologist will be allowed sufficient time to move them from the work site before work activities begin. Only USFWS -approved biologists will participate in activities associated with the capture, handling, and moving of CRF. CRF-3. Before any construction or maintenance activities begin on a project, a USFWS -approved biologist will conduct a training session for all construction personnel. At a minimum, the training will include a description of the CRF and its habitat, the importance of the CRF and its habitat, general measures that are being implemented to conserve the CRF as they relate to the Project, and the boundaries within which the Project may be accomplished. Brochures, books and briefings may be used in the training session, provided that a qualified person is on hand to answer any questions. CRF-4. A USFWS-approved biologist will be present at the ~~work~~ construction or maintenance site until such time as all removal of CRF, instruction of workers, and disturbance of habitat have been completed. After this time, the biologist will designate a person to monitor on-site compliance with all minimization measures and any future staff training. The USFWS-approved biologist will ensure that this individual receives training outlined in measure WPT-2 and in the identification of CRF. The monitor and the USFWS-approved biologist will have the authority to stop work if CRF are in harm's way. CRF-5. The number of access routes, number and size of staging areas, and the total area of the activity will be limited to the minimum necessary to achieve the project goal. Routes and boundaries will be clearly demarcated, and these areas will be outside of riparian and wetland areas to the extent practicable.

SUM = Significant and Unavoidable with Mitigation LSM = Less than Significant with Mitigation LS = Less than Significant NI = No Impact

TABLE S-1 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

IMPACT	Significance Determination	Mitigation Measure
Biological Resources, EIR Section 3.4 (cont.)		
Impact BR-5 (cont.)		CRF-6. ~~Work~~ Construction and maintenance activities will be completed between April 1 and November 1 to the extent practicable. Should the Agency demonstrate a need to conduct activities outside this period, the Agency may conduct such activities after obtaining ~~the Service's~~USFWS approval. CRF-7. If a construction or maintenance ~~work~~ site is to be temporarily dewatered by pumping, and would take place within or adjacent to suitable CRF habitat, intakes will be completely screened with wire mesh not larger than five millimeters ~~(mm)~~ to prevent CRF from entering the pump system where applicable. Water will be released or pumped downstream at an appropriate rate to maintain downstream flows during construction. Upon completion of construction or maintenance activities, any barriers to flow will be removed in a manner that would allow flow to resume with the least disturbance to the substrate. CRF-8. The Declining Amphibian Populations Task Force's Fieldwork Code of Practice will be followed to minimize the possible spread of chytrid fungus or other amphibian pathogens and parasites. CRF-9: Implement Mitigation Measure HWQ-1~~3.10-1~~ through HWQ-4~~3.10-4~~ in Section 3.3, Surface Water, Groundwater, and Water Quality~~3.10, Hydrology and Water Quality~~. **Mitigation Measure BIO-2k: WPT (Revised):** The following measures for avoidance and minimization of adverse impacts ~~t~~on western pond turtle (*Actinemys marmorata*) (WPT) during construction and maintenance of the Project ~~BMP project elements~~ are those typically employed for construction activities that may result in short-term impacts ~~t~~on individuals and their habitat. The focus of these measures is on keeping the disturbance footprint to a minimum and aggressive monitoring of WPTs before vegetation removal and during the construction and revegetation phase. WPT-1. PV Water~~The Agency~~ will annually submit the name(s) and credentials of biologists who would conduct activities specified in the following measures. No project activities will begin until proponents have received approval from CDFW that the biologist(s) is qualified to conduct the work. WPT-2. A CDFW-approved biologist will survey the work site 48 hours prior to the onset of construction or maintenance activities. If WPT adults, juveniles or eggs are found, the approved biologist will determine the closest appropriate relocation site. The approved biologist will be allowed sufficient time to move them from the work site before work activities begin. Only CDFW-approved biologists will participate in activities associated with the capture, handling, and moving of WPT. WPT-3. Before any construction or maintenance activities begin on a project, a CDFW-approved biologist will conduct a training session for all construction personnel. At a minimum, the training will include a description of the WPT and its habitat, the importance of the WPT and its habitat, general measures that are being implemented to conserve the WPT as they relate to the project, and the boundaries within which the project may be accomplished. Brochures, books and briefings may be used in the training session, provided that a qualified person is on hand to answer any questions. WPT-4. A CDFW-approved biologist will be present at the construction or maintenance ~~work~~ site until such time as all removal of WPT, instruction of workers, and disturbance of habitat have been completed. WPT-5. The number of access routes, number and size of staging areas, and the total area of the activity will be limited to the project plans. Routes and boundaries will be clearly demarcated. Where impacts occur in these staging areas and access routes, restoration will occur as identified in the general best management practices ~~BMP~~ measures above.

SUM = Significant and Unavoidable with Mitigation LSM = Less than Significant with Mitigation LS = Less than Significant NI = No Impact

TABLE S-1 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

IMPACT	Significance Determination	Mitigation Measure
Biological Resources, EIR Section 3.4 (cont.)		
Impact BR-6: Project operations could result in a substantial adverse effect on special-status fish species.	LSM	**Mitigation Measure BR-2: Invasive Fish Species Control Plan.** PV Water shall develop an Invasive Fish Species Control Plan. PV Water would submit the plan to the appropriate resource agencies (CDFW, USFWS, and NMFS) for approval within one year of Project implementation. The Fish Species Control Plan shall be implemented at College Lake within two years of Project implementation. The Fish Species Control Plan shall include, at a minimum: 1. Measures describing PV Water's methods of draining College Lake to the greatest extent feasible; 2. Measures describing PV Water's methods, equipment, and timing of invasive species eradication efforts to be conducted in association with lake drawdown efforts; 3. Measures describing the frequency at which invasive species control efforts are to be implemented.
Impact BR-7: Project operations could interfere substantially with the movement of native resident or migratory wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.	LS	No mitigation required.
Impact BR-8: Implementation of the Project could conflict with local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.	LS	No mitigation required.
C-BR-1: The Project, in combination with past, present, and probable future projects in the Project area, could result in significant adverse impacts on special-status species, sensitive natural communities and wetlands, wildlife corridors or nursery sites, or conflicts with local plans and policies.	LS	No mitigation required.
Air Quality and Greenhouse Gases, EIR Section 3.5		
Impact AIR-1: Construction and operational activities associated with the Project could generate criteria air pollutant emissions that would conflict with implementation of the Clean Air Plan.	LS	No mitigation required.
Impact AIR-2: The Project could expose sensitive receptors to substantial levels of pollutants.	LS	No mitigation required.

SUM = Significant and Unavoidable with Mitigation LSM = Less than Significant with Mitigation LS = Less than Significant NI = No Impact

TABLE S-1 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

IMPACT	Significance Determination	Mitigation Measure
Air Quality and Greenhouse Gases, EIR Section 3.5 (cont.)		
Impact AIR-3: The Project could create objectionable odors that would affect a substantial number of people.	LS	No mitigation required.
Impact AIR-4: The Project could lead to an increase of GHG emissions that are associated with global climate change; however, not at a cumulatively considerable level.	LS	No mitigation required.
Impact AIR-5: The Project would not conflict with the Executive Order B-30-15 Emissions Reduction Goal.	LS	No mitigation required.
Impact C-AIR-1: The Project, in combination with past, present, and probable future projects in the Project area, would not result in significant adverse cumulative air quality or greenhouse gas impacts.	LS	No mitigation required.
Geology and Soils, EIR Section 3.6		
Impact GEO-1: The Project could directly or indirectly cause potential substantial adverse effects, including risk of loss, injury, or death involving an exacerbation of existing risks related to earthquake rupture, strong seismic ground shaking, seismic related ground failure including liquefaction, and landslides.	LS	**Mitigation Measure GS-1 (Revised).** Future construction of proposed BMP Update facilities shall be designed in accordance with design recommendations of geotechnical reports and in compliance with applicable policies and appropriate engineering investigation practices necessary to reduce the potential detrimental effects of ground shaking and liquefaction. Construction shall be in accordance with applicable requirements ~~City and County ordinances and policies~~ regarding mitigation of seismic and geologic hazards, and appropriate geotechnical studies shall be conducted.
Impact GEO-2: The Project could result in substantial soil erosion.	LS	**Mitigation Measure GS-2 (Revised).** Construction of future BMP Update facilities shall include preparation and implementation of erosion control plans to minimize erosion and inadvertent transport of sediments into water bodies during installation of facilities. Measures shall include, but not be limited to: limiting the area of ground disturbance and vegetation removal at any one time during construction; conducting work prior to the rainy season if possible and protecting disturbed areas during the rainy season; installing bales or other appropriate barriers adjacent to water bodies to prevent transport of sediments into sloughs and water courses; immediately revegetating disturbed areas; and other Best Management Practices during construction to protect water quality. All grading and construction shall conform to applicable requirements. ~~of the Santa Cruz County Grading Ordinance. To the extent possible, grading activities in non-cropped areas shall be limited to the period between April 15 and October 31.~~

SUM = Significant and Unavoidable with Mitigation LSM = Less than Significant with Mitigation LS = Less than Significant NI = No Impact

TABLE S-1 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

IMPACT	Significance Determination	Mitigation Measure
Geology and Soils, EIR Section 3.6 (cont.)		
Impact GEO-3: The Project could be located on a geologic unit or soil that becomes unstable as a result of the Project or that could potentially result in landslide, lateral spreading, subsidence, liquefaction, or collapse for reasons caused or exacerbated by the Project.	LS	**Mitigation Measure GS-3 (Revised).** All diversion and pipeline facilities shall be designed and engineered in accordance with recommendations of a geotechnical report and appropriate engineering designs to reduce the potential detrimental effects of expansive soils, corrosivity, and/or other identified soils constraints. A licensed geotechnical engineer shall prepare recommendations applicable to foundation design, earthwork, and site preparation prior to or during the project design phase. Recommendations will address mitigation of site- specific, adverse soil and bedrock conditions that could hinder development. Project engineers shall implement the recommendations. Geotechnical design and design criteria will comply with applicable codes and requirements of the California Building Code ~~with California additions~~ (CCR Title 24)~~, applicable City and County construction and grading ordinances~~.
Impact GEO-4: The Project could be located on expansive soil, creating or exacerbating substantial risks to life and property.	LS	No mitigation required.
Impact GEO-5: The Project could directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.	LSM	**Mitigation Measure GEO-1: Inadvertent Discovery of Paleontological Resources** If construction or other Project personnel discover any potential fossils during construction, work at the discovery location shall cease in a 50-foot radius of the discovery until a qualified paleontologist meeting the Society of Vertebrate Paleontology standards has assessed the discovery and made recommendations as to the appropriate treatment. If the find is deemed significant, it shall be salvaged following the standards of the Society of Vertebrate Paleontology and curated with a certified repository. Following a discovery, the qualified paleontologist shall also provide PV Water with recommendations regarding future paleontological monitoring, if deemed warranted.
Impact C-GEO-1: The Project, in combination with past, present, and probable future projects in the Project area, could have cumulatively considerable impacts on a unique paleontological resource.	LSM	**Mitigation Measure GEO-1: Inadvertent Discovery of Paleontological Resources** (refer to Impact GEO-5)
Hazards and Hazardous Materials, EIR Section 3.7		
Impact HAZ-1: Project construction and operation could result in a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.	LS	No mitigation required.
Impact HAZ-2: Project construction and operation could result in reasonably foreseeable conditions involving the release of hazardous materials to the environment.	LS	No mitigation required.

SUM = Significant and Unavoidable with Mitigation LSM = Less than Significant with Mitigation LS = Less than Significant NI = No Impact

TABLE S-1 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

IMPACT	Significance Determination	Mitigation Measure
Hazards and Hazardous Materials, EIR Section 3.7 (cont.)		
Impact HAZ-3: Project construction and operation could release hazardous emissions or handle acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.	LS	No mitigation required.
Impact HAZ 4: The Project could be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5.	LSM	**Mitigation Measure HM-2 (Revised).** Prior to initiation of earthwork activities on properties along the College Lake pipeline alignment not sampled as part of adopted Mitigation Measure HM-1, ~~During the design phase of the proposed pipeline alignment from College Lake to Coastal Distribution System (CDS), PVWMA~~ PV Water shall perform a Phase I Environmental Site Assessment for the alignment to determine the potential for encountering hazardous materials contamination in soils to be excavated and identify appropriate recommendations. Appropriate health and safety measures shall be identified as needed for worker safety, soil handling, and disposal of contaminated soils. **Mitigation Measure HAZ-1a: Health and Safety Plan (HASP)** Using information from the soil testing performed as part of adopted Mitigation Measure HM-1 and from the Phase I Environmental Site Assessment performed as part of adopted Mitigation Measure HM-2, the construction contractor(s) shall prepare and implement a site-specific HASP in accordance with 29 CFR 1910.120 to protect construction workers and the public during all excavation and grading activities. The HASP shall include, but is not limited to, the following elements: 1. Designation of a trained, experienced site safety and health supervisor who has the responsibility and authority to develop and implement the site HASP; 2. A summary of all potential risks to construction workers and maximum exposure limits for all known and reasonably foreseeable site chemicals based on the most recent data collection and reporting; 3. Specified personal protective equipment and decontamination procedures, if needed; 4. Emergency procedures, including route to the nearest hospital; and 5. Procedures to be followed in the event that evidence of potential soil or groundwater contamination (such as soil staining, noxious odors, debris or buried storage containers) is encountered. These procedures shall be in accordance with hazardous waste operations regulations and specifically include, but are not limited to, the following: immediately stopping work in the vicinity of unknown discovered or suspected hazardous materials release and notifying the Santa Cruz County CUPA (415-473-7085).

SUM = Significant and Unavoidable with Mitigation   LSM = Less than Significant with Mitigation   LS = Less than Significant   NI = No Impact

TABLE S-1 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

IMPACT	Significance Determination	Mitigation Measure
Hazards and Hazardous Materials, EIR Section 3.7 (cont.)		
Impact HAZ 4 (cont.)		**Mitigation Measure HAZ-1b: Soil Management Plan (SMP)** Using information from the soil testing performed as part of adopted Mitigation Measure HM-1 and from the Phase I Environmental Site Assessment performed as part of adopted Mitigation Measure HM-2, PV Water or its contractor shall develop and implement a SMP that includes a materials disposal plan specifying how the construction contractor shall remove, handle, transport, and dispose of all excavated material in a safe, appropriate, and lawful manner. The plan shall identify protocols for training workers to recognize potential soil contamination (such as soil staining, noxious odors, debris or buried storage containers), soil testing and disposal by a qualified contractor in the event that contamination is identified, and identification of approved disposal sites (e.g., approved landfill or reuse site). Contract specifications shall mandate approval of the SMP by PV Water as well as full compliance with all applicable local, state, and federal regulations related to the identification, transportation, and disposal of hazardous materials
Impact HAZ-5: Project construction and operation could impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.	LSM	**Mitigation Measure TRA-1b: Construction Traffic Control/Traffic Management Plan** (refer to Impact TRA-1)
Impact C-HAZ-1: The Project, in combination with past, present, and probable future projects in the Project area, would not result in significant adverse cumulative hazards and hazardous materials impacts.	LS	No mitigation required.
Noise and Vibration, EIR Section 3.8		
Impact NOI-1: Construction of the Project would result in a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project in excess of standards established in the local general plans or noise ordinances.	SU	**Mitigation Measure NOI-1a: Construction Noise Reduction Plan** PV Water shall develop and implement a Construction Noise Reduction Plan prior to initiating construction at the weir structure and intake pump station, the preferred WTP site, College Lake pipeline (trench construction) and trenchless construction activities near SR 152 and Walker Street. A disturbance coordinator shall be designated for the Project to implement the provisions of the plan. At a minimum, the Construction Noise Reduction Plan shall implement the following measures: • Distribute to the potentially affected residences and other sensitive receptors within 200 feet of the Project construction site boundaries notice including a “hotline” telephone number, which shall be attended during active construction working hours, for use by the public to register complaints. The notice shall identify the noise disturbance coordinator who would be responsible for responding to any local complaints about construction noise. The disturbance coordinator would determine the reason for the noise complaints and institute actions warranted to correct the problem, if any. All complaints shall be logged noting date, time, complainant’s name, nature of complaint, and any corrective action taken. The notice shall also include the construction schedule.

SUM = Significant and Unavoidable with Mitigation LSM = Less than Significant with Mitigation LS = Less than Significant NI = No Impact

TABLE S-1 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

IMPACT	Significance Determination	Mitigation Measure
Noise and Vibration, EIR Section 3.8 (cont.)		
Impact NOI-1 (cont.)		• All construction equipment shall have intake and exhaust mufflers recommended by the manufacturers thereof. • The use of impact and vibratory pile drivers is limited to the daytime and evening hours permissible under the County of Santa Cruz noise ordinance. All impact pile driving activities shall be restricted to the hours of 8:00 a.m. to 10:00 p.m. • Maintain maximum physical separation, as far as practicable, between noise sources (construction equipment) and sensitive noise receptors. Separation may be achieved by locating stationary equipment (such as generators) in areas that would minimize noise impacts on the community. • Impact tools (e.g., jack hammers, pavement breakers) used during construction activities shall be hydraulically or electrically powered to avoid noise associated with compressed air exhaust from pneumatically powered tools to the extent feasible. Where use of pneumatic tools is unavoidable, an exhaust muffler on the compressed air exhaust shall be used. • Use construction noise barriers such as paneled noise shields, blankets, and/or enclosures adjacent to noisy stationary and off-road equipment. Noise control shields, blankets and/or enclosures shall be made featuring a solid panel and a weather-protected, sound-absorptive material on the construction-activity side of the noise shield. This measure does not apply to pipeline construction. **Mitigation Measure NOI-1b: Off-site Accommodations for Substantially Affected Nighttime Receptors** PV Water shall offer to provide temporary hotel accommodations for all residences within 200 feet of where trenchless construction activities would occur at the SR 152 and Walker Street crossings. The accommodations shall be provided for the duration of nighttime drilling activities. PV Water shall provide accommodations reasonably similar to those of the impacted residents (e.g., in terms of number of beds).
Impact NOI-2: Operation of the Project could result in a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project in excess of standards established in the local general plan or noise ordinance.	LS	No mitigation required.
Impact NOI-3: Project construction would generate excessive groundborne vibration.	LSM	**Mitigation Measure NOI-2: Vibration Monitoring Plan** Prior to construction, PV Water shall require the pipeline construction contractor to develop a Vibration Monitoring Plan in coordination with a structural engineer, geotechnical engineer, and construction contractor if trenchless construction methods are used at the following intersections: East Lake Avenue/Palm Avenue/Hushbeck Avenue, East Beach Street/Lincoln Street, and 2nd Street/Walker Street. The Vibration Monitoring Plan shall include the following elements: • To mitigate vibration, the Vibration Monitoring Plan shall include measures such that surrounding buildings will be exposed to less than 0.25 in/sec PPV for historic or potentially historic buildings to prevent building damage. Measures may include restricting the use of vibratory pile driving and drill rigs from operating within 13 and 19 feet from historic structures, respectively. • With permission of applicable property owners, conduct a pre-construction survey of buildings and other sensitive structures within the area of potential effects due to vibration-generating activities. Respond to any claims by inspecting the affected property promptly, but in no case more than five working days after the claim was filed. Any new cracks or other changes in structure will be compared to preconstruction conditions and a determination made as to whether the Project could have caused such damage. In the event that the Project is demonstrated to have caused any damage, such damage will be repaired to the pre-existing conditions.

SUM = Significant and Unavoidable with Mitigation LSM = Less than Significant with Mitigation LS = Less than Significant NI = No Impact

TABLE S-1 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

IMPACT	Significance Determination	Mitigation Measure
Transportation and Traffic, EIR Section 3.9		
Impact C-NOI-1: The Project, in combination with past, present, and probable future projects in the Project area, would have a cumulatively considerable impact associated with construction noise.	SU	**Mitigation Measure NOI-1a: Construction Noise Reduction Plan** (refer to Impact NOI-1) **Mitigation Measure NOI-1b: Off-site Accommodations for Substantially affected Nighttime receptors** (refer to Impact NOI-1) **Mitigation Measure NOI-2: Vibration Monitoring Plan** (refer to Impact NOI-3)
Impact TRA-1: Construction of the Project would have temporary and intermittent effects on traffic and transportation conditions in the Project area.	LSM	**Mitigation Measure TRA-1a: Encroachment Permits** PV Water shall require the construction contractor to obtain any necessary road encroachment permits from the appropriate local jurisdiction (i.e., City of Watsonville, Santa Cruz County) prior to constructing each Project component and shall comply with the conditions of approval attached to all Project permits and approvals. **Mitigation Measure TRA-1b: Construction Traffic Control/Traffic Management Plan** PV Water shall require the construction contractor to prepare a Construction Traffic Control/Traffic Management Plan and submit it to the appropriate local jurisdiction (i.e., City of Watsonville, Santa Cruz County) for review and approval prior to construction. The plan shall be prepared in accordance with professional engineering standards and may include, but not be limited to, the following elements as appropriate: • Identify hours of construction for each Project component. • Schedule truck trips outside of peak morning and evening commute hours when feasible to minimize adverse impacts on traffic flow if agencies with jurisdiction over the affected roads identify highly congested roadway segments during their review of the encroachment permit applications. Haul routes that minimize truck traffic on local roadways and residential streets shall be used. • Develop circulation and detour plans to minimize impacts on local street circulation. This may include the use of signing and flagging to guide vehicles, bicyclists, and pedestrians through and/or around the construction zone. • Control and monitor construction vehicle movements by enforcing current standard construction specifications as defined by the appropriate local jurisdiction (i.e., City of Watsonville, Santa Cruz County) through periodic onsite inspections by the construction contractor. • Install traffic control devices where traffic conditions warrant, as specified in the applicable jurisdiction's standards (e.g., the *California Manual of Uniform Traffic Controls for Construction and Maintenance Work Zones*). • Perform construction that crosses on-street and off-street bikeways, sidewalks, and other walkways in a manner that allows for safe access for bicyclists and pedestrians. Alternatively, provide safe detours to reroute affected bicycle/pedestrian traffic. • Consult with the Santa Cruz Metro at least one month prior to construction to coordinate bus stop relocations (as necessary) and to reduce potential interruption of transit service. • Comply with roadside safety protocols to reduce the risk of accidents, as defined in the *Caltrans Division of Construction Code of Safe Practices* and the *California Manual of Uniform Traffic Controls for Construction and Maintenance Work Zones*. Provide "Road Work Ahead" warning signs and speed control (including signs informing drivers of state-legislated double fines for speed infractions in a construction zone) to achieve required speed reductions for safe traffic flow through the work zone. • Store all equipment and materials in designated contractor staging areas.

SUM = Significant and Unavoidable with Mitigation LSM = Less than Significant with Mitigation LS = Less than Significant NI = No Impact

TABLE S-1 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

IMPACT	Significance Determination	Mitigation Measure
Transportation and Traffic, EIR Section 3.9 (cont.)		
Impact TRA-1 (cont.)		• Encourage construction crews to park at staging areas to limit lane closures in the public rights-of-way. • Include a plan and implementation process for notifications and a process for communication with affected residents and businesses prior to the start of construction. Advance public notification shall include posting of notices and appropriate signage of construction activities at least one week in advance. The written notification shall include the construction schedule, the exact location and duration of activities within each street (i.e., which lanes and access point/driveways would be blocked on which days and for how long), and a toll-free telephone number for receiving questions or complaints. • Include a plan and implementation process to coordinate all construction activities with emergency service providers in the area at least one month in advance. Emergency service providers shall be notified of the timing, location, and duration of construction activities. All roads shall remain passable to emergency service vehicles at all times. • Include a plan and implementation process to coordinate all construction activities with the Pajaro Valley Unified School District at least two months in advance. The Pajaro Valley Unified School District shall be notified of the timing, location, and duration of construction activities. PV Water shall coordinate with the Pajaro Valley Unified School District to identify peak circulation periods at schools along the College Lake pipeline alignment (i.e., the arrival and departure of students), and require their contractor to avoid construction and lane closures during those periods, if feasible. The construction contractor for each Project component shall be required to ensure that construction of the Project component does not inhibit vehicle, bicycle, pedestrian, and/or school bus service through inclusion of such provisions in the construction contract. The assignment of temporary crossing guards at designated intersections may be needed to enhance pedestrian safety during Project construction. • Identify all roadway locations where special construction techniques (e.g., trenchless pipeline installation or night construction) will be used to minimize impacts on traffic flow. Require all open trenches and pits be covered with metal plates at the end of each workday to accommodate traffic and access.
Impact TRA-2: Construction of the Project would temporarily disrupt circulation patterns near sensitive land uses (schools, hospitals, fire stations, police stations, and other emergency providers).	LSM	**Mitigation Measure TRA-1b: Construction Traffic Control/Traffic Management Plan** (refer to Impact TRA-1)
Impact TRA-3: Construction of the Project would have temporary effects on alternative transportation or alternative transportation facilities in the Project area.	LSM	**Mitigation Measure TRA-1b: Construction Traffic Control/Traffic Management Plan** (refer to Impact TRA-1)
Impact TRA-4: Construction of the Project could temporarily increase the potential for accidents on Project area roadways.	LSM	**Mitigation Measure TRA-1b: Construction Traffic Control/Traffic Management Plan** (refer to Impact TRA-1)
Impact TRA-5: Construction of the Project could increase wear-and-tear on the designated haul routes used by construction vehicles to access the Project sites.	LS	No mitigation required.

SUM = Significant and Unavoidable with Mitigation LSM = Less than Significant with Mitigation LS = Less than Significant NI = No Impact

TABLE S-1 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

IMPACT	Significance Determination	Mitigation Measure
Transportation and Traffic, EIR Section 3.9 (cont.)		
Impact C-TRA-1: The Project, in combination with past, present, and probable future projects in the Project area, would have cumulatively considerable impacts on transportation and traffic.	LSM	**Mitigation Measure TRA-1a: Encroachment Permits** (refer to Impact TRA-1) **Mitigation Measure TRA-1b: Construction Traffic Control/Traffic Management Plan** (refer to Impact TRA-1)
Cultural Resources, EIR Section 3.10		
Impact CUL-1: The Project could cause a substantial adverse change in the significance of a historical resource pursuant to CEQA *Guidelines* Section 15064.5.	LSM	**Mitigation Measure NOI-2: Vibration Monitoring Plan** (refer to Impact NOI-3)
Impact CUL-2: The Project could cause a substantial adverse change in the significance of an archaeological resource, including those determined to be a historical resource defined in Section 15064.5 or a unique archaeological resource defined in Public Resources Code 21083.2.	LSM	**Mitigation Measure CUL-1a: Retention of a Qualified Archaeologist** Prior to start of any ground-disturbing activities (i.e., demolition, pavement removal, pot-holing or auguring, boring, drilling, grubbing, vegetation removal, brush clearance, weed abatement, grading, excavation, trenching, or any other activity that has potential to disturb soil), PV Water shall retain a qualified archaeologist meeting the Secretary of the Interior's Professional Qualifications Standards for archaeology (codified in 36 CFR Part 61; 48 FR 44738-44739) to oversee and ensure that all mitigation related to archaeological resources is carried out. **Mitigation Measure CUL-1b: Pre-Construction Phase I Cultural Resources Survey** Prior to the start of any ground-disturbing activity, the qualified archaeologist shall conduct a pre-construction Phase I Cultural Resources Survey of all areas that have not been previously surveyed within the last five years. The survey shall document resources potentially qualifying as historical resources or unique archaeological resources under CEQA. The qualified archaeologist shall document the results of the survey in a Phase I Cultural Resources Survey Report that follows Archaeological Resource Management Reports (ARMR): Recommended Contents and Format. The qualified archaeologist shall also prepare Department of Parks and Recreation 523 forms for resources encountered during the survey, which shall be appended to the report. If historic architectural resources are encountered that could potentially be impacted by the Project, the qualified archaeologist shall consult with a Qualified Architectural Historian meeting the Secretary of the Interior's Professional Qualifications Standards for architectural history (codified in 36 CFR Part 61; 48 FR 44738-44739). The qualified archaeologist shall submit the draft Phase I Cultural Resources Survey Report to PV Water at least 90 days prior to the start of ground disturbance. The qualified archaeologist shall submit the final Phase I Cultural Resources Survey Report to the Northwest Information Center. In the event resources potentially qualifying as historical resources or unique archaeological resources under CEQA are identified during the survey, avoidance and preservation in place shall be the preferred manner of mitigating impacts to the resources. Preservation in place maintains the important relationship between artifacts and their archaeological context and also serves to avoid conflict with traditional and religious values of groups who may ascribe meaning to the resource. Preservation in place may be accomplished by, but is not limited to, avoidance, incorporating the resource into open space, capping, or deeding the site into a permanent conservation easement. If avoidance of archaeological resources is determined by PV Water to be infeasible in light of factors such as the nature of the find, Project design, costs, and other considerations, then the portion of the resource within the Area of Direct Impact shall be subject to presence/absence testing and if potentially significant deposits are identified, the resource shall be evaluated for significance under all four National Register/California

SUM = Significant and Unavoidable with Mitigation LSM = Less than Significant with Mitigation LS = Less than Significant NI = No Impact

TABLE S-1 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

IMPACT	Significance Determination	Mitigation Measure
Cultural Resources, EIR Section 3.10 (cont.)		
Impact CUL-2 (cont.)		Register Criteria (A/1-D/4). If a resource is found to be significant (i.e., meets the definition for historical resource in CEQA *Guidelines* Section 15064.5(a) or unique archaeological resource in Public Resources Code Section 21083.2(g)), the qualified archaeologist shall develop an Archaeological Data Recovery and Treatment Plan for the resource. When assessing significance and developing treatment for resources that are Native American in origin, the qualified archaeologist and PV Water shall consult with the appropriate Native American representatives. **Mitigation Measure CUL-1c: Development of a Cultural Resources Monitoring and Mitigation Program** The qualified archaeologist shall prepare a Cultural Resources Mitigation and Monitoring Program (CRMMP) based on the final approved Project design plans. The CRMMP shall be submitted to PV Water at least 60 days prior to the start of any ground-disturbing activities. The CRMMP shall include: • *Provisions for Archaeological Monitoring.* The CRMMP shall outline the archaeological monitor(s) responsibilities and requirements (refer to Mitigation Measure CUL-1f). The qualified archaeologist, in consultation with PV Water, shall have the ability to modify monitoring frequencies (i.e., either increase, decrease, or discontinue entirely) at all locations described below, based on soil observations (if it is determined that the likelihood of encountering intact significant resources is low due to disturbances or soil types, monitoring may be decreased or cease entirely) or discoveries (discovery of archaeological resources may warrant increased frequency of monitoring). – Full-time archaeological monitoring shall be required during all ground disturbance in the following locations: ▪ Areas shaded purple and green on Figure 3.10-1 of the College Lake Integrated Resources Management Project EIR that are within agricultural fields (i.e., not within paved roadway right-of-ways) ▪ The area along Maple Street/2nd Street between Main Street and Union Street within the City of Watsonville ▪ Within 100 feet of Environmentally Sensitive Areas established through implementation of Mitigation Measure CUL-1e. – Part-time archaeological monitoring consisting of one 8-hour day per week shall be conducted during ground disturbance in the following locations (as noted above, the frequency of monitoring may be modified if conditions warrant): ▪ Areas shaded purple on Figure 3.10-1 of the College Lake Integrated Resources Management Project EIR that are within paved roadway right-of-ways (i.e., not within agricultural fields), with the exception of area along Maple Street/2nd Street between Main Street and Union Street, which requires full-time monitoring as outlined above ▪ Areas shaded orange on Figure 3.10-1 of the College Lake Integrated Resources Management Project EIR that are within agricultural fields (i.e., not within paved roadway right-of-ways) – Part-time archaeological monitoring consisting of one 4-hour day per week shall be conducted during ground disturbance in the following locations (as noted above, the frequency of monitoring may be modified if conditions warrant): ▪ Areas shaded orange on Figure 3.10-1 of the College Lake Integrated Resources Management Project EIR that are within paved roadway right-of-ways (i.e., not within agricultural fields) • *Procedures for Discovery of Archaeological Resources.* Procedures to be implemented in the event of an archaeological discovery shall be fully defined in the CRMMP, and shall include stop-work and protective measures, notification protocols, procedures for significance assessments, and appropriate treatment measures, and shall address procedures for when an archaeological monitor is present, and when one is not present. The CRMMP shall state avoidance or preservation in place is the preferred manner of mitigating impacts to historical resources and unique archaeological resources, but shall provide procedures to follow should PV Water determine that avoidance is infeasible in light of factors such as the nature of the find, Project design, costs, and other considerations. See also Mitigation Measure CUL-1h.

SUM = Significant and Unavoidable with Mitigation   LSM = Less than Significant with Mitigation   LS = Less than Significant   NI = No Impact

TABLE S-1 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

IMPACT	Significance Determination	Mitigation Measure
Cultural Resources, EIR Section 3.10 (cont.)		
Impact CUL-2 (cont.)		If, based on the recommendation of the qualified archaeologist, it is determined that a discovered archaeological resource constitutes a historical resource or unique archaeological resource pursuant to CEQA and data recovery through excavation is the only feasible mitigation available, an Archaeological Resources Data Recovery and Treatment Plan shall be prepared and implemented by the qualified archaeologist in coordination with PV Water that provides for the adequate recovery of the scientifically consequential information contained in the archaeological resource. PV Water, or its designee, will consult with appropriate Native American representatives in determining treatment of resources that are Native American in origin to ensure cultural values ascribed to the resource, beyond those that are scientifically important, are considered. • *Procedures for Discovery of Human Remains and Associated Funerary Objects.* The CRMMP shall outline the protocols and procedures to be followed in the event that human remains and associated funerary objects are encountered during construction. These shall include stop-work and protective measures, notification protocols, and compliance with California Health and Safety Code Section 7050.5 and Public Resources Code Section 5097.98 (refer to Mitigation Measure CUL-2). • *Reporting Requirements.* The CRMMP shall outline provisions for weekly, monthly, and final reporting. The qualified archaeologist shall prepare weekly status reports detailing activities and locations observed (including maps) and summarizing any discoveries for the duration of monitoring to be submitted to PV Water via e-mail for each week in which monitoring activities occur. Monthly progress reports summarizing monitoring efforts shall be prepared and submitted to PV Water for the duration of ground disturbance. The qualified archaeologist shall prepare a draft Archaeological Resources Monitoring Report and submit it to PV Water within 60 days after completion of the monitoring program or of treatment for significant discoveries should treatment extend beyond the cessation of monitoring. The final Archaeological Resources Monitoring Report shall be submitted to PV Water within 30 days of receipt of PV Water comments. The qualified archaeologist shall also submit the final Archaeological Resources Monitoring Report to the Northwest Information Center. If human remains are encountered, a confidential report documenting all activities shall be submitted to the California Native American Heritage Commission within 90 days after completion of any treatment (refer to Mitigation Measure CUL-2). • *Curation Requirements.* Disposition of Native American archaeological materials shall be determined through consultation between Native American representatives, the qualified archaeologist, and PV Water. Disposition of human remains and associated funerary objects shall be determined through consultation between the Most Likely Descendant, landowner, and PV Water (refer to Mitigation Measure CUL 2). Any historic-period archaeological materials that are not Native American in origin shall be curated at a repository accredited by the American Association of Museums that meets the standards outlined in 36 CFR 79.9. If no accredited repository accepts the collection, then it may be curated at a non-accredited repository as long as it meets the minimum standards set forth by 36 CFR 79.9. If neither an accredited nor a non-accredited repository accepts the collection, then it may be offered to a public, non-profit institution with a research interest in the materials, or donated to a local school or historical society in the area for educational purposes, to be determined by the qualified archaeologist in consultation with PV Water. • *Protocols for Native American Monitoring and Input.* The CRMMP shall outline the role and responsibilities of Native American Tribal representatives. It shall include communication protocols, an opportunity and timelines for review of cultural resources documents related to discoveries that are Native American in origin, and provisions for Native American monitoring. The CRMMP shall include provisions for full-time Native American monitoring of ground disturbance in the purple and green shaded areas shown on Figure 3.10-1 of the College Lake Integrated Resources Management Project EIR within agricultural fields (i.e., not within paved roadway right-of-ways), as well as during any subsurface investigation and data recovery for discovered resources that are Native American in origin (refer to Mitigation Measures CUL-1g).

SUM = Significant and Unavoidable with Mitigation LSM = Less than Significant with Mitigation LS = Less than Significant NI = No Impact

TABLE S-1 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

IMPACT	Significance Determination	Mitigation Measure
Cultural Resources, EIR Section 3.10 (cont.)		
Impact CUL-2 (cont.)		**Mitigation Measure CUL-1d: Construction Worker Cultural Resources Sensitivity Training Program** A worker cultural resources sensitivity training program shall be implemented for the Project. Prior to any ground-disturbing activity, an initial sensitivity training session shall be provided by the qualified archaeologist to all project employees, contractors, subcontractors, and other professionals prior to their involvement in any ground-disturbing activities, with subsequent training sessions occurring on a monthly basis to accommodate new personnel becoming involved in the Project (subsequent sessions can be coordinated with other Worker Environmental Awareness Program or safety training that may be required). Construction personnel shall be informed of the sensitivity of the Project area and given a tutorial providing information on how to identify the types of resources that may be encountered. They shall be instructed on the proper procedures to be enacted in the event of an inadvertent discovery of archaeological resources or human remains, confidentiality of discoveries, and safety precautions to be taken when working with cultural resources monitors. PV Water shall make it a requirement that construction personnel are made available for and attend training sessions and retain documentation demonstrating attendance. **Mitigation Measure CUL-1e: Designation of Environmentally Sensitive Areas** Prior to the start of ground disturbance, the portion of the boundary of CA-SCR-44/H nearest Project-related activities shall be marked as an Environmentally Sensitive Area. This area shall not be marked as an archaeological resource, but shall be designated as an “exclusion zone” on Project plans and protective fencing in order to discourage unauthorized disturbance or collection of artifacts. The qualified archaeologist, or his/her designee, shall periodically inspect this area for the duration of Project activities in the vicinity to ensure that protective fencing remains intact and no incursions into the exclusion zone have occurred. Upon completion of all Project-related activities in the vicinity, all protective fencing and signage shall be removed. **Mitigation Measure CUL-1f: Archaeological Monitoring** Project-related ground disturbance shall be subject to archaeological monitoring as outlined in Mitigation Measure CUL-1c. The archaeological monitor(s) shall be familiar with the types of resources that could be encountered and shall work under the direct supervision of the qualified archaeologist. The archaeological monitor(s) shall keep daily logs detailing the types of activities and soils observed, and any discoveries. Archaeological monitor(s) shall have the authority to halt and re-direct ground disturbing activities in the event of a discovery until it has been assessed for significance and treatment implemented, if necessary, based on the recommendations of the qualified archaeologist in coordination with PV Water, and the Native American representatives in the event the resource is Native American in origin, and in accordance with the protocols and procedures outlined in the CRMMP (refer to Mitigation Measure CUL-1c). The qualified archaeologist shall have the authority to modify monitoring frequencies based on soil observations and/or discoveries. **Mitigation Measure CUL-1g: Native American Monitoring** Prior to the start of any ground-disturbing activity, PV Water shall retain a qualified Native American monitor to provide monitoring services as outlined in Mitigation Measure CUL-1c. The Native American monitor shall be from a Tribe that is culturally and geographically affiliated with the Project area (according to the California Native American Heritage Commission contact list for this project). If resources of Native American origin are discovered, the Native American monitor shall provide monitoring services in accordance with protocols and procedures outlined in the CRMMP (refer to Mitigation Measure CUL-1c).

SUM = Significant and Unavoidable with Mitigation LSM = Less than Significant with Mitigation LS = Less than Significant NI = No Impact

TABLE S-1 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

IMPACT	Significance Determination	Mitigation Measure
Cultural Resources, EIR Section 3.10 (cont.)		
Impact CUL-2 (cont.)		**Mitigation Measure CUL-1h: Inadvertent Discovery of Archaeological Resources** In the event that archaeological resources are encountered during ground disturbance, all activity in the vicinity of the find shall cease (within 100 feet), and the protocols and procedures for discoveries outlined in the CRMMP shall be implemented (refer to Mitigation Measure CUL-1c). The discovery shall be evaluated for potential significance by the qualified archaeologist. If the qualified archaeologist determines that the resource may be significant, the qualified archaeologist shall develop an appropriate treatment plan for the resource in accordance with the CRMMP (refer to Mitigation Measure CUL-1c). When assessing significance and developing treatment for resources that are Native American in origin, the qualified archaeologist and PV Water shall consult with the appropriate Native American representatives. The qualified archaeologist shall also determine if work may proceed in other parts of the Project area while treatment for cultural resources is being carried out, and whether additional archaeological and/or Native American monitoring is warranted. **Mitigation Measure CUL-1i: Long-Term Monitoring of CA-SCR-44/H and CA-SCR-150** PV Water shall retain a qualified archaeologist to conduct quarterly inspections of the portions of CA-SCR-44/H and CA-SCR-150 that overlap with the proposed lake storage area to ensure that raised lake water levels are not resulting in site erosion. If erosion or other indirect impacts are noted, PV Water shall work with the qualified archaeologist to develop a plan to protect the site(s) from further damage, or a plan to conduct data recovery of the affected portion(s) if protective measures are determined by PV Water to be infeasible. Quarterly inspections shall be conducted for two years; after which time they shall be reduced to semi-annual inspections for an additional three years. If after five years no erosion or other indirect impacts are noted, the long-term monitoring program shall be discontinued. After each inspection, the qualified archaeologist shall prepare a technical memorandum documenting the results of the inspection with photographs. Memoranda shall be submitted to PV Water within 30 days of the completion of each inspection.
Impact CUL-3: The Project could disturb human remains, including those interred outside of formal cemeteries.	LSM	**Mitigation Measure CUL-2: Inadvertent Discovery of Human Remains** If human remains are encountered, then PV Water shall halt work in the vicinity (within 100 feet) of the discovery and contact the County Coroner in accordance with Public Resources Code Section 5097.98 and Health and Safety Code Section 7050.5. If the County Coroner determines the remains are Native American, then the Coroner shall notify the California Native American Heritage Commission in accordance with Health and Safety Code subdivision 7050.5(c), and Public Resources Code Section 5097.98. The California Native American Heritage Commission shall designate a Most Likely Descendant for the remains pursuant to Public Resources Code Section 5097.98. Until the landowner has conferred with the Most Likely Descendant, the contractor shall ensure the immediate vicinity where the discovery occurred is not disturbed by further activity, is adequately protected according to generally accepted cultural or archaeological standards or practices, and that further activities take into account the possibility of multiple burials. If human remains are encountered, the qualified archaeologist, in consultation with the Most Likely Descendant shall prepare a confidential report documenting all activities and it shall be submitted to the California Native American Heritage Commission within 90 days after completion of any treatment

SUM = Significant and Unavoidable with Mitigation   LSM = Less than Significant with Mitigation   LS = Less than Significant   NI = No Impact

TABLE S-1 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

IMPACT	Significance Determination	Mitigation Measure
Cultural Resources, EIR Section 3.10 (cont.)		
Impact C-CUL-1: The Project, in combination with past, present, and probable future projects in the Project area, could have cumulatively considerable impacts on cultural resources.	LSM	**Mitigation Measures NOI-2: Vibration Monitoring Plan** (refer to Impact NOI-4) **Mitigation Measure CUL-1a: Retention of a Qualified Archaeologist** (refer to Impact CUL-2) **Mitigation Measure CUL-1b: Pre-Construction Phase I Cultural Resources Survey** (refer to Impact CUL-2) **Mitigation Measure CUL-1c: Development of a Cultural Resources Monitoring and Mitigation Program** (refer to Impact CUL-2) **Mitigation Measure CUL-1d: Construction Worker Cultural Resources Sensitivity Training Program** (refer to Impact CUL-2) **Mitigation Measure CUL-1e: Designation of Environmentally Sensitive Areas** (refer to Impact CUL-2) **Mitigation Measure CUL-1f: Archaeological Monitoring** (refer to Impact CUL-2) **Mitigation Measure CUL-1g: Native American Monitoring** (refer to Impact CUL-2) **Mitigation Measure CUL-1h: Inadvertent Discovery of Archaeological Resources** (refer to Impact CUL-2) **Mitigation Measure CUL-1i: Long-Term Monitoring of CA-SCR-44/H and CA-SCR-150** (refer to Impact CUL-2) **Mitigation Measure CUL-2: Inadvertent Discovery of Human Remains** (refer to Impact CUL-3)
Tribal Cultural Resources, EIR Section 3.11		
Impact TCR-1: The Project would not result in a substantial adverse change in the significance of a tribal cultural resource.	NI	No mitigation required.
Impact TCR-2: The Project would not result in a substantial adverse change in the significance of a tribal cultural resource.	NI	No mitigation required.
Tribal Cultural Resources, EIR Section 3.11 (cont.)		
Impact C-TCR-1: The Project, in combination with past, present, and probable future projects in the Project area, would not result in significant adverse cumulative tribal cultural resources impacts.	NI	No mitigation required.
Energy, Utilities, Public Services, and Recreation, EIR Section 3.12		
Impact EUP-1: Implementation of the Project could result in wasteful, inefficient, or unnecessary consumption of energy during Project construction or operation, or conflict with or obstruct a state or local plan for renewable energy or energy efficiency.	LS	No mitigation required.

SUM = Significant and Unavoidable with Mitigation   LSM = Less than Significant with Mitigation   LS = Less than Significant   NI = No Impact

TABLE S-1 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

IMPACT	Significance Determination	Mitigation Measure
Energy, Utilities, Public Services, and Recreation, EIR Section 3.12 (cont.)		
Impact EUP-2: Project construction and operation could result in a substantial adverse effect related to generating solid waste in excess of state or local standards, or in excess of the capacity of local infrastructure, or otherwise impairing the attainment of solid waste reduction goals.	LS	No mitigation required.
Impact EUP-3: The Project would comply with federal, state, and local management and reduction statutes and regulations related to solid waste.	LS	No mitigation required.
Impact EUP-4: The Project could result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, or increase the demand for new or increased staff and/or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for public services including, fire protection, police protection, schools, or other public facilities.	LS	No mitigation required.
Impact EUP-5: The Project could increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.	LS	No mitigation required.
Impact C-EUP-1: The Project, in combination with past, present, and probable future projects in the Project area, would not result in significant adverse cumulative energy impacts.	LS	No mitigation required.
Impact C-EUP-2: The Project, in combination with past, present, and probable future projects in the Project area, would not result in significant adverse cumulative utilities impacts.	LS	No mitigation required.

SUM = Significant and Unavoidable with Mitigation LSM = Less than Significant with Mitigation LS = Less than Significant NI = No Impact

TABLE S-1 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

IMPACT	Significance Determination	Mitigation Measure
Energy, Utilities, Public Services, and Recreation, EIR Section 3.12 (cont.)		
Impact C-EUP-3: The Project, in combination with past, present, and probable future projects in the Project area, would not result in significant adverse cumulative public services impacts.	LS	No mitigation required.
Impact C-EUP-4: The Project, in combination with past, present, and probable future projects in the Project area, would not result in significant adverse cumulative recreational impacts.	LS	No mitigation required.
Aesthetics Resources, EIR Section 3.13		
Impact AES-1: Implementation of the Project could have a substantial adverse effect on scenic vistas.	LSM	**Mitigation Measure AES-1a: Aboveground Facility Treatment** PV Water shall paint or otherwise treat aboveground facilities using low-glare paint that blends with predominant color(s) of the surrounding terrain, unless colors otherwise specified by regulatory agencies. Concrete structures need not be painted. **Mitigation Measure AES-1b: Landscaping** For the preferred WTP site, PV Water shall shift the site plan northward in order to preserve orchard trees along Holohan Road and several orchard trees northeast of 116 Holohan Road, to the extent feasible and in accordance with PV Water security requirements. Where preservation of orchard trees along Holohan Road is not feasible (e.g., due to the access road and the College Lake pipeline), PV Water shall use landscaping to reduce textural contrasts and enhance visual integration of the WTP with its surroundings. Landscaping shall include shrubs and other vegetation typical of the surrounding area. For the optional WTP site, PV Water shall use landscaping to reduce textural contrasts and enhance visual integration of the WTP with its surroundings when viewed from SR 152. Landscaping shall include shrubs and other vegetation typical of the surrounding area.
Impact AES-2: Implementation of the Project could substantially damage scenic resources.	LS	No mitigation required.
Impact AES-3: Implementation of the Project could degrade the existing visual character or quality of public views of the sites in non-urbanized areas.	LSM	**Mitigation Measures AES-1a: Aboveground Facility Treatment** (refer to Impact AES-1) **Mitigation Measure AES-1b: Landscaping** (refer to Impact AES-1)
Impact AES-4: Project components could introduce significant new sources of light or glare.	LSM	**Mitigation Measure AES-2: Construction Lighting** PV Water shall require contractors to direct nighttime lighting used during construction away from residential areas, use the minimum amount of night lighting necessary for construction and safety, and shield and hood outdoor lighting to prevent light spillover effects during Project construction.

SUM = Significant and Unavoidable with Mitigation   LSM = Less than Significant with Mitigation   LS = Less than Significant   NI = No Impact

TABLE S-1 (CONTINUED)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

IMPACT	Significance Determination	Mitigation Measure
Aesthetics Resources, EIR Section 3.13 (cont.)		
Impact C-AES-1: The Project, in combination with past, present, and probable future projects in the Project area, would not result in significant adverse cumulative aesthetic impacts.	LS	No mitigation required.

SUM = Significant and Unavoidable with Mitigation LSM = Less than Significant with Mitigation LS = Less than Significant NI = No Impact

CHAPTER 1
Introduction

1.1 Purpose of this Environmental Impact Report

This environmental impact report (EIR) has been prepared by the Pajaro Valley Water Management Agency (PV Water) in conformance with the provisions of the California Environmental Quality Act[1] (CEQA) and the CEQA *Guidelines*.[2] PV Water serves as the lead agency for development of the EIR for the proposed College Lake Integrated Resources Management Project (Project), with input and coordination provided by other agencies and local jurisdictions. The lead agency is the public agency that has principal responsibility for carrying out or approving a project. CEQA requires the preparation of an EIR when a project could have significant impacts on the physical environment. PV Water determined that the Project, for which PV Water is the project sponsor, could cause significant environmental impacts, and that preparation of an EIR was warranted.

The Project would consist of construction and operation of a weir structure and intake pump station and water treatment plant and demolition of an existing weir and pump station at the south side of College Lake in unincorporated Santa Cruz County, California; and construction and operation of a 5.5-mile long pipeline in unincorporated Santa Cruz County and the City of Watsonville to convey treated water to agricultural users in the Pajaro Valley. The Project location and components are described in Chapter 2, *Project Description*.

Pursuant to CEQA *Guidelines* Section 15161, this is a project-level EIR, defined as an EIR that examines the physical environmental impacts of a specific development project. PV Water has prepared this EIR to provide the public and responsible and trustee agencies reviewing the Project with information about the Project's potential effects on the environment. This EIR describes the potential environmental impacts that could result from implementation of the Project, identifies mitigation measures for reducing impacts to a less-than-significant level where feasible, and evaluates alternatives to the Project.

[1] Public Resources Code Sections 21000 *et seq*.
[2] California Code of Regulations, Title 14, Division 6, Chapter 3, Sections 15000 *et seq*.

1.2 Environmental Review Process

The environmental review process for the Project includes multiple steps: publication of a Notice of Preparation (NOP), public scoping period, publication of a Draft EIR, public and agency review of the Draft EIR, publication of responses to public and agency comments on the Draft EIR, and certification of the Final EIR. Each of these steps involves public outreach, as described below. Additional public outreach for the Project is described in Section 1.3.

1.2.1 Notice of Preparation

In accordance with Sections 15063 and 15082 of the CEQA *Guidelines*, on November 28, 2017, PV Water distributed an NOP to responsible and other public agencies and interested parties to begin the formal CEQA scoping process for the Project. The NOP informed agencies and the public about the Project and PV Water's decision to prepare an EIR, and included a request for comments on environmental issues that should be addressed in the EIR. PV Water also distributed a Public Notice of the Availability of the NOP and Notice of Public Scoping Meeting to additional public agencies, interested parties, and landowners/occupants located near the Project, which was posted on PV Water's website and placed in the legal classified section of the *Register-Pajaronian* on November 28, 2017.

PV Water held two public scoping meetings at 3:00 p.m. and 7:00 p.m. on Tuesday, December 12, 2017, in the Community Room at the City of Watsonville Civic Plaza (275 Main Street, Fourth Floor, Watsonville) to receive comments on the scope of the EIR. PV Water extended the public comment period from the required 30 calendar days to 38 calendar days to account for holidays. The public comment period ended on January 5, 2018. **Appendix NOP** presents the NOP and written comments received during the scoping period. PV Water has considered all comments pertaining to the scope and content of the EIR made by the public and agencies in preparing this EIR.

1.2.2 Draft EIR

This Draft EIR has been prepared in accordance with CEQA and the CEQA *Guidelines*. It provides an analysis of the Project-specific physical environmental impacts of construction and operation of the Project, and the Project's contribution to the environmental impacts of foreseeable cumulative development.

The CEQA *Guidelines* encourage public participation in the planning and environmental review process. Publication of this Draft EIR marks the beginning of a comment period, during which the Draft EIR will be available to local, state and federal agencies, interested organizations and individuals for review. The Draft EIR is available for public review on PV Water's web page (https://www.pvwater.org/college-lake-project). CDs and paper copies are also available at PV Water's offices at 36 Brennan Street, Watsonville.[3]

---

[3] Paper copies are also available for review at Watsonville Public Library, Watsonville Public Library, Freedom Branch, and Monterey County Library, Pajaro Branch.

Written comments on the Draft EIR may be submitted by 5:00 p.m. on June 7, 2019, to:

Pajaro Valley Water Management Agency
ATTN: Brian Lockwood, General Manager
36 Brennan Street
Watsonville, CA 95076

During the Draft EIR public comment period, PV Water will hold a public meeting on the Draft EIR. Written comments on the Draft EIR may be submitted at that meeting or may be sent by electronic mail to: eir@pvwater.org by 5:00 p.m. June 7, 2019.

1.2.3 Final EIR

Following the close of the Draft EIR public comment period, PV Water will prepare and publish a document entitled "Responses to Comments," which will contain a copy of all comments received on this Draft EIR and written responses to all substantive comments. The document may also contain specific changes and revisions to the Draft EIR. This Draft EIR, together with the Responses to Comments document, will constitute the Final EIR. In an advertised public meeting, the Board of Directors will consider whether to certify the Final EIR as adequate and in compliance with CEQA.

1.2.4 Mitigation Monitoring and Reporting Program

PV Water will use the information in the certified Final EIR in its deliberations on whether to approve, modify, or deny the Project or aspects of the Project. If PV Water approves the Project, it will adopt CEQA findings that identify the Project-related impacts and the mitigation measures or alternatives that have been adopted to reduce significant impacts. A Mitigation Monitoring and Reporting Program must be adopted by PV Water as part of the adoption of the CEQA findings. The Mitigation Monitoring and Reporting Program lists the mitigation measures included in the Project as identified in the Final EIR, entities responsible for carrying out the measures, timing of implementation of the measures, and associated reporting requirements. If significant and unavoidable impacts would occur even with implementation of all identified mitigation measures, PV Water must adopt as a condition of Project approval a Statement of Overriding Considerations documenting how the benefits of Project implementation outweigh its significant and unavoidable impacts on the environment.

1.3 Other Public Outreach

In addition to the EIR public scoping meetings held on December 12, 2017, PV Water hosted a College Lake Community Meeting on September 29, 2016, with presentations relating to hydrology, wildlife, flood control, the state of the groundwater basin, and Reclamation District 2049. On July 10, 2017, PV Water also held a public meeting to inform community members about the Project. The Board of Directors meets monthly in meetings that are open for the public to attend. Staff provide monthly updates to the Board on the progress of Basin Management Plan implementation, including activities associated with the Project. In addition, staff have provided regular updates to groups such as the Santa Cruz County Farm Bureau, the Community Water

Dialogue, Rotary, and others. Staff have also organized meetings, or been invited to present at meetings, to provide updates to the California Water Commission, the Santa Cruz County Zone 7 Flood Control and Water Conservation District, the City of Watsonville, the Pajaro Valley Unified School District, the Pajaro Valley Public Cemetery District, Reclamation District 2049, the Santa Cruz Mid-County Groundwater Agency, and individual stakeholders.

1.4 Organization of the EIR

This EIR is organized as follows:

- **Chapter S, *Summary*.** This chapter summarizes the Project, identifies significant environmental impacts and mitigation measures, and describes the alternatives considered in this EIR. It also identifies areas of controversy and issues to be resolved.
- **Chapter 1, *Introduction*.** This chapter describes the purpose and organization of the EIR, as well as the environmental review process and additional public outreach efforts.
- **Chapter 2, *Project Description*.** This chapter describes the Project (including Project background and Project objectives), summarizes Project components, and provides information about Project construction and operation. The chapter also lists permits and approvals relevant to the construction and operation of the Project.
- **Chapter 3, *Environmental Setting, Impacts, and Mitigation Measures*.** This chapter is subdivided into sections for each environmental resource topic analyzed. Each section describes the environmental and regulatory setting, the criteria used to determine impact significance, and the approach to the analysis for that resource topic. It then presents analyses of potential environmental impacts as well as mitigation measures that have been developed to address significant and potentially significant impacts. Each section also includes an evaluation of cumulative impacts with respect to that resource topic.
- **Chapter 4, *Other CEQA Considerations*.** This chapter identifies the significant environmental effects that cannot be avoided if the Project is implemented, and describes significant irreversible impacts.
- **Chapter 5, *Alternatives*.** This chapter describes the alternatives to the Project and compares their impacts to those of the Project. This chapter also summarizes the alternatives that were considered but eliminated from further analysis.
- **Chapter 6, *Report Preparers*.** This chapter lists the authors of this EIR.

Technical and supporting information for the EIR are included as appendices to the EIR.

CHAPTER 2
Project Description

2.1 Project Background

2.1.1 Pajaro Valley Water Management Agency

Pajaro Valley Water Management Agency (PV Water) was formed in 1984 by the Pajaro Valley Water Management Agency Act, for the primary purpose of managing groundwater resources and supplemental water supplies in its service area. The 2014 Sustainable Groundwater Management Act designated PV Water as the exclusive Groundwater Sustainability Agency within its service area (Water Code Section 10723), and in 2015 the Board of Directors (the Board) agreed that PV Water would be this Groundwater Sustainability Agency. PV Water's service area encompasses approximately 70,000 acres in the Pajaro Valley, located in southern Santa Cruz County, northern Monterey County, and a small portion of San Benito County. Seawater intrusion in the Pajaro Valley Groundwater Basin was first documented in 1953. In the coastal areas and throughout much of the Pajaro Valley Groundwater Basin, overdraft conditions[1] have caused groundwater levels to drop below sea level, creating a landward pressure gradient that causes seawater to move inland. Seawater intrusion has elevated the chloride concentrations in groundwater up to two and a half miles inland from the coast, in some areas contaminating the groundwater to the point that it is unsuitable for agricultural irrigation and domestic (potable) uses without treatment. Section 2.3, Need for the Project, describes overdraft and seawater intrusion conditions in the basin in greater detail.

PV Water was created to manage existing and supplemental water supplies for its service area. Its objective is to manage local groundwater resources to reduce, and eventually halt, long-term overdraft of the groundwater basin while ensuring sufficient water supplies for present and anticipated needs. To achieve this objective, PV Water has prepared and periodically updates a basin-wide groundwater management plan, the Basin Management Plan (BMP), which serves as the guiding document for its major projects and programs. The BMP preparation process includes engaging the public, forming a stakeholder committee, reviewing existing groundwater basin conditions, evaluating the results of implemented projects to reduce overdraft and seawater intrusion, as well as identifying additional projects and management strategies to achieve its stated goals and testing the strategies with the Pajaro Valley Hydrologic Model.

1 Overdraft occurs when the amount of groundwater withdrawn from a basin exceeds the volume of freshwater replenishing the basin.

2.1.2 Basin Management Planning

2.1.2.1 Previous Basin Management Planning Efforts

PV Water prepared its first BMP in the 1990s. The "1993 BMP" identified a preferred alternative that called for importing a surface water supply to the region from the federal Central Valley Project to substantially augment the use of local surface water supplies. A program environmental impact report (1993 BMP PEIR) was prepared for the 1993 BMP to analyze, at a program-level, these concepts.[2]

A redraft of the BMP was prepared in 2000 but its completion was delayed to allow additional analyses of local water supply options, which were then incorporated into the 2002 Revised BMP. The 2002 Revised BMP EIR provided a program-level analysis of the environmental impacts of two alternatives, and a project-level analysis of local projects. The final strategy of the 2002 Revised BMP adopted by the Board was called the Modified BMP 2000 Alternative and included the following major projects and programs: Harkins Slough Managed Aquifer Recharge and Recovery Facility (Harkins Slough Facility), Coastal Distribution System (CDS), 54-Inch Import Water Project with Out-of-Basin Banking, Recycled Water Project, and Conservation and Watershed Management Programs. Subsequently, PV Water constructed the Harkins Slough Facility, a significant portion of the CDS, supplemental wells, and, in cooperation with the City of Watsonville, the Recycled Water Facility (RWF). Section 2.1.3, below, briefly describes these facilities.

While the implementation of the existing Harkins Slough Facility, the RWF, supplemental wells, and the CDS has helped to reduce the magnitude of the groundwater overdraft and resulting seawater intrusion problems, these problems still persist. In 2005, PV Water contracted with the United States Geological Survey to cooperatively develop a robust, regional hydrologic model to simulate the use and movement of water within the groundwater basin. Based on the hydrologic modeling results, PV Water has established a target of reducing groundwater pumping in the Pajaro Valley Groundwater Basin by 12,100 acre-feet per year (AFY).[3]

2.1.2.2 Basin Management Plan Update

In 2010, PV Water formed the 21-member Ad Hoc BMP Committee as a means for the Pajaro Valley community to help guide the Board in the development of an updated BMP (BMP Update) focused on implementing locally controlled solutions (e.g., additional conservation, surface water supplies, and/or reductions in groundwater pumping). The BMP Update planning process began with the development of a comprehensive list of supplemental water supply projects, including some identified in previous BMPs, that could help meet the goals of stopping seawater intrusion and basin overdraft. Potential projects (44 in total) were identified, screened, ranked, and prioritized for feasibility, cost, and other factors. Based on this analysis, seven projects were

[2] In early 2010, the Board removed the Import Pipeline Project from further consideration for a variety of reasons, including feasibility, cost, and a decision to focus on locally controlled projects.

[3] One acre-foot equals about 326,000 gallons, or enough water to cover an acre of land one foot deep.

recommended by the BMP Committee, and ultimately selected by the Board for inclusion in the BMP Update portfolio. These projects are:

- Conservation;
- Increased Recycled Water Storage at the RWF;
- Increased Recycled Water Deliveries;
- Harkins Slough Recharge Facilities Upgrades;
- Watsonville Slough with Recharge Basins;
- College Lake with Inland Pipeline to Coastal Distribution System (this project was subsequently renamed the College Lake Integrated Resources Management Project); and
- Murphy Crossing with Recharge Basins.

2.1.2.3 2014 Program Environmental Impact Report

To address the potential environmental impacts of the BMP Update components, PV Water prepared the *Final Environmental Impact Report for the Basin Management Plan Update* (State Clearinghouse #2000062030, referred to herein as 2014 BMP Update PEIR), which evaluated the environmental impacts of the seven components at a program level of detail.[4] A program EIR is prepared for a group of potential actions that can be characterized as one large project, such as the BMP Update (California Environmental Quality Act [CEQA] *Guidelines* Section 15168). A program EIR is a first-tier environmental document that assesses and documents the broad environmental impacts of a program with the understanding that a more detailed site-specific review may be required to assess future projects implemented under the program. The 2014 BMP Update PEIR evaluated the BMP Update components based on conceptual information available at that time, and established a framework for "tiered" or project-level environmental documents that would be prepared in accordance with the overall program.

The Board certified the 2014 BMP Update PEIR on April 16, 2014 (Resolution 2014-04). The Board then approved the BMP Update and made findings pursuant to CEQA, including a statement of overriding considerations, and adopted a mitigation monitoring and reporting program for the BMP Update (Resolution 2014-05).

2.1.2.4 Sustainable Groundwater Management Act

The Sustainable Groundwater Management Act (SGMA) was signed into law in September 2014, after the 2014 BMP Update PEIR was certified.[5] SGMA defines sustainable groundwater management as the "management and use of groundwater in a manner that be maintained during the planning and implementation horizon without causing undesirable results." "Undesirable

4 The *Final Environmental Impact Report for the Basin Management Plan Update* is available online at https://www.pvwater.org/bmp-update. (PV Water, *Final Environmental Impact Report for the Basin Management Plan Update*, February 2014.)

5 California Department of Water Resources, SGMA Groundwater Management, 2019. Available online at https://water.ca.gov/Programs/Groundwater-Management/SGMA-Groundwater-Management. Accessed on April 10, 2019.

Results" are defined in SGMA and may be summarized as any of the following effects caused by groundwater conditions occurring throughout the basin:

- Chronic lowering of groundwater levels indicating a significant and unreasonable depletion of supply;
- Significant and unreasonable reduction of groundwater storage;
- Significant and unreasonable seawater intrusion;
- Significant and unreasonable degraded water quality;
- Significant and unreasonable land subsidence; and/or
- Surface water depletions that have significant and unreasonable adverse impacts on the beneficial uses of surface water.[6]

SGMA requires critically over drafted, high priority basins like the Pajaro Valley Groundwater Basin[7] to be managed under a Groundwater Sustainability Plan by January 31, 2020, and to achieve sustainability by 2040. SGMA also:

- Empowers local agencies to manage groundwater basins sustainably;
- Establishes basic requirements for Groundwater Sustainability Plans; and
- Provides for a review, evaluation and assessment of Groundwater Sustainability Plans by DWR (See Water Code sections 10733-10733.8) and intervention by the State Water Board if the applicable requirements of SGMA have not been met (see Water Code sections 10735-10735.8).

SGMA places the responsibility of sustainable groundwater management on Groundwater Sustainability Agencies, which can be any local agency that has water supply, water management, or land use responsibilities within a groundwater basin, or a combination of such agencies overlying a basin. SGMA designated PV Water as the exclusive local agency to manage groundwater within its statutory boundaries (Water Code Section 10723) and the Board voted to be the Groundwater Sustainability Agency for the Pajaro Valley Groundwater Basin in August 2015. In September 2015, PV Water submitted a formation notice to the California Department of Water Resources and the Department posted this notice.[8,9] In 2016, PV Water submitted the BMP Update and associated documents as an Alternative to a Groundwater Sustainability Plan.[10]

---

6 California Department of Water Resources, Sustainable Groundwater Management Act and Related Statutory Provisions from SB1168 (Pavley), AB1739 (Dickinson), and SB1319 (Pavley) as Chaptered], effective January 1, 2016.

7 Officially, the basin is referred to as the Pajaro Valley Groundwater Subbasin 3-002.01 (Corralitos Basin, Pajaro Valley Subbasin).

8 PV Water, Sustainable Groundwater Management, 2019. Available online at https://www.pvwater.org/sgm. Accessed on April 10, 2019.

9 California Department of Water Resources, All posted Groundwater Sustainability Agency Notices, last modified October 8, 2015. Available online at http://sgma.water.ca.gov/portal/gsa/all. Accessed on April 10, 2019.

10 California Department of Water Resources, SGMA Portal, Alternatives. Pajaro Valley Water Management Agency, last modified October 8, 2015. Available online at https://sgma.water.ca.gov/portal/alternative/print/22. Accessed on April 10, 2019.

2.1.3 Existing PV Water Facilities and Operations

PV Water currently operates several facilities to help manage the Pajaro Valley Groundwater Basin, including the following:

- ***Coastal Distribution System.*** The CDS is a distribution system used to deliver supplemental water supplies (described below) to farms in coastal areas in portions of Santa Cruz and Monterey counties within the PV Water service area. The area served by the CDS is referred to as the Delivered Water Zone. Water delivered through the CDS replaces groundwater that would otherwise be pumped from coastal wells. In this sense, this delivered water provides "in–lieu-recharge" to the groundwater basin.
- ***Harkins Slough Managed Aquifer Recharge and Recovery Facility.*** PV Water uses the Harkins Slough Facility to divert wet-weather flows from Harkins Slough to storage in the surficial aquifers of the San Andreas Terrace, located near the coast. PV Water uses various wells to monitor (groundwater elevations and quality) and recover this stored water, and to deliver the water pumped from storage to coastal farms through the CDS.
- ***Watsonville Area Recycled Water Treatment Facility.*** The RWF was constructed and is operated in partnership with the City of Watsonville. Located at the Watsonville Wastewater Treatment Facility, the RWF was designed to produce and distribute about 4,000 AFY of disinfected recycled water through the CDS.[11],[12] The recycled water is mixed with "blend"[13] water from Harkins Slough, water from supplemental wells operated by PV Water, and water from the City of Watsonville's potable water system to dilute the concentrations of salts naturally occurring in the recycled water. PV Water takes these actions with the goal of achieving the water quality objectives established by the Projects and Facility Operations Committee, and to increase the quantity of the CDS supply.
- ***Supplemental Wells***. In addition to the wells associated with the Harkins Slough Facility, PV Water operates several other supplemental water supply wells to dilute the concentrations of salts naturally occurring in the recycled water and to increase the quantity of the CDS supply.

2.1.4 Current College Lake Operations

2.1.4.1 Local Hydrology and Hydraulics[14]

College Lake is a seasonal lake that forms in a topographic depression along the Zayante-Vergeles Fault zone. College Lake receives inflows from several tributaries (including Green Valley, Casserly, and Hughes Creeks, shown on **Figure 2-1**) and drains into Salsipuedes Creek, which is a tributary to the Pajaro River. Salsipuedes Creek receives an average of 4,700 AFY of surface water inflow from the College Lake watershed. The College Lake watershed consists of approximately 11,000 acres of range, rural residential, and crop lands. Approximately 2,000 feet

---

[11] The Watsonville Wastewater Treatment Facility and RWF are now collectively referred to as the Water Resources Center.

[12] The recycled water is treated to meet requirements for agricultural irrigation use in Title 22 of the California Government Code.

[13] This blending of water improves the overall quality of the delivered water by reducing the concentrations of salts.

[14] Information in Sections 2.1.4.1 and 2.1.4.2 is derived from PV Water, *Final Basin Management Plan Update*, February 2014; Resource Conservation District of Santa Cruz County (RCD-SCC), *College Lake Multi-Objective Management Report Final Report*, prepared by cbec, November 14, 2014; and Letter from D. Peixoto, Lakeside Organic Gardens, LLC, to Mary Banister, PV Water, regarding College Lake farming operations, May 12, 2014.

downstream of College Lake, surface water enters Salsipuedes Creek from Corralitos Creek. At times during the west season, the flow direction in the reach of Salsipuedes Creek between College Lake and the creek's confluence with Corralitos Creek can reverse. When these conditions occur, surface water can flow from Salsipuedes Creek into College Lake. Flow magnitudes and directions in this reach of Salsipuedes Creek are controlled by several factors, including the water level of College Lake, the flow rate in Corralitos Creek, the flow rate in Salsipuedes Creek downstream of the Corralitos Creek confluence, and the elevation of the existing weir at the College Lake outlet (headwall elevation of 60.1 feet North American Vertical Datum of 1988 [NAVD88]). During wet years, surface water overflowing from Pinto Lake flows through a drainage channel (called Pinto Creek) into this reach of Salsipuedes Creek between College Lake and the creek's confluence with Corralitos Creek.

The existing weir and associated pump station operated by Reclamation District 2049 (RD 2049) are located at the outlet of College Lake, which is at its south end.[15] Under existing conditions, flooding in and around College Lake occurs in association with wet weather events; during the wet season, water surface elevations regularly exceed the elevation of the existing weir (refer to Figure 3.3-2 in Section 3.2, Surface Water, Groundwater, and Water Quality). The purpose of the weir is to prevent water that is pumped from College Lake into Salsipuedes Creek from flowing back into the lake. (The existing weir leaks, which allows some water to flow in either direction through the weir, depending on hydrological conditions.) At the initiation of this pumping, the elevation of the weir is raised by approximately 2 feet with sandbags to prevent water discharged from the pumps into Salsipuedes Creek from flowing back into College Lake. The channel bed elevation on the south side of the existing weir is approximately 57 feet NAVD88. On the north side of the existing weir, the elevation of the channel bed is approximately 49 feet NAVD88.[16] When College Lake's water surface elevation is at the existing weir elevation of 60.1 feet NAVD88 (that is, prior to pumping), approximately 228 acres of the lake basin is inundated, and about 1,150 AF of water are in the lake.[17]

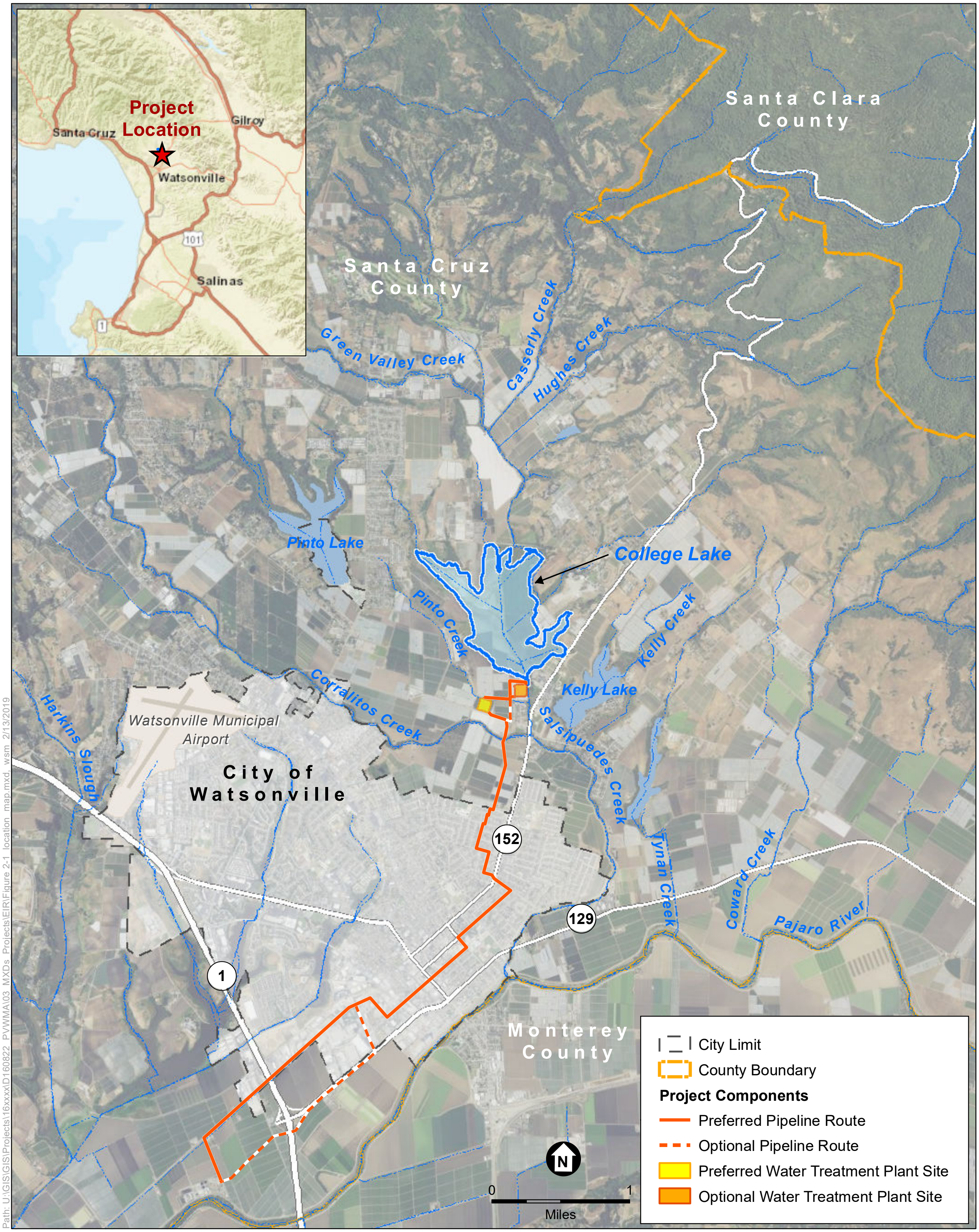
2.1.4.2 Current Pumping and Farming Operations

Under existing conditions, all pumping to drain College Lake is conducted by RD 2049. RD 2049 conducts this pumping to allow farming in the lakebed; no water currently is pumped out of the lake for water supply purposes. To allow summer farming in the lakebed, RD 2049 pumps water out of College Lake in the spring, usually beginning in mid-March, with each year's starting date depending on spring rain patterns. RD 2049 uses two unmetered pumps to pump water from the lake into Salsipuedes Creek. Pumping the water to drain the lake for farming generally takes 30 to 40 days. Intermittent pumping continues after this date as needed to keep the farmed areas in the

[15] Reclamation District 2049 was formed in 1920 and was granted express legal authority under State law (California Water Code Section 50000 et. seq.) to pump water from College Lake to reclaim the land for agricultural production.

[16] Elevations of the deepest part of the channel (thalweg). Channel elevation north of the weir last recorded in 2012. Channel elevation south of the weir last recorded in 2017.

[17] cbec, *College Lake Integrated Resources Management Project Hydrologic and Hydraulic Modeling Technical Memorandum*, Figure 4, Stage-Storage and Stage-Surface Area Curves, November 2018.



Path: U:\GIS\GIS\Projects\16xxxx\D160822_PVWMA\03_MXDs_Projects\EIR\Figure 2-1_location_map.mxd, wsm 2/13/2019

SOURCE: Carollo Engineers, 2017; ESRI World Imagery, 7/23/2016; ESA

College Lake Integrated Resources Management Project

Figure 2-1
Project Location Map

ESA

lakebed dry.[18] Once tractors are able to turn the land at the bottom of College Lake (normally approximately May 30), it takes about one month to prepare the land for planting, so planting normally begins between July 1 and 7. Most of the crops grown in the College Lake lakebed take 60 to 90 days to grow, so crops planted on July 7 are normally harvested between September 7 and October 7. [19] Farming operations can be threatened and adversely affected by late summer or early fall rains that cause inflows into the lakebed to exceed the rates at which water can be pumped from the lakebed. The sandbags on the existing weir are usually removed by October 31.[20]

2.1.4.3 Existing Biological Resources

As indicated in the preceding text, College Lake is a managed, seasonal lake. Farmed wetland, farmed upland, riparian forest, seasonal wetland, open water and freshwater emergent wetland habitats occur throughout the lake basin (refer to Section 3.4, Biological Resources). The habitats in and around College Lake support a diverse assemblage of bird and other wildlife species. Casserly Creek and two of its tributaries, Banks Creek and Gaffey Creek, are known to support the state and federally listed south-central California coast steelhead (*Oncorhynchus mykiss*). College Lake also provides winter and spring rearing habitat for juvenile steelhead. Refer to Section 3.4, Biological Resources, in Chapter 3 for more information.[21]

2.2 Project Location

The proposed College Lake Integrated Resources Management Project (College Lake Project or Project) includes components that would be located in portions of the City of Watsonville and unincorporated Santa Cruz County (refer to Figure 2-1). The locations of the following Project components and related construction staging areas are collectively referred to as the “Project sites”. Refer to Section 2.5 for descriptions of the Project components of the College Lake Project.

- ***College Lake Water Storage Area.*** College Lake is located in unincorporated Santa Cruz County approximately one-mile northeast of the Watsonville city limits, north of Holohan Road and west of State Route (SR) 152. **Appendix PD-1** lists by Assessor Parcel Number (APN) the properties located within the proposed College Lake water storage area. (With respect to potential adverse effects on agricultural land associated with development and operation of the Project, refer to the discussion in Section 3.2, Land Use and Agricultural Resources.)

- ***Weir Structure and Intake Pump Station.*** The proposed weir structure and intake pump station facility would be located in Salsipuedes Creek at the College Lake outlet, which is at

[18] The pumping rate has been estimated to range from 10 to 22 cubic feet per second based on observed change in lake water surface elevation at the existing pump house in 2012 and 2013. The actual pumping rate depends on the number of pumps running and the difference between the water surface elevations upstream and downstream of the weir; generally, the pumping rate is higher when the water surface elevations on either side of the existing weir are similar and drops as the lake level drops. (RCD-SCC, *College Lake Multi-Objective Management Project Final Report*, prepared by cbec, November 14, 2014.)

[19] Letter from D. Peixoto, Lakeside Organic Gardens, LLC, to Mary Banister, PV Water, regarding College Lake farming operations, May 12, 2014.

[20] RCD-SCC, *College Lake Multi-Objective Management Report Final Report*, prepared by cbec, November 14, 2014.

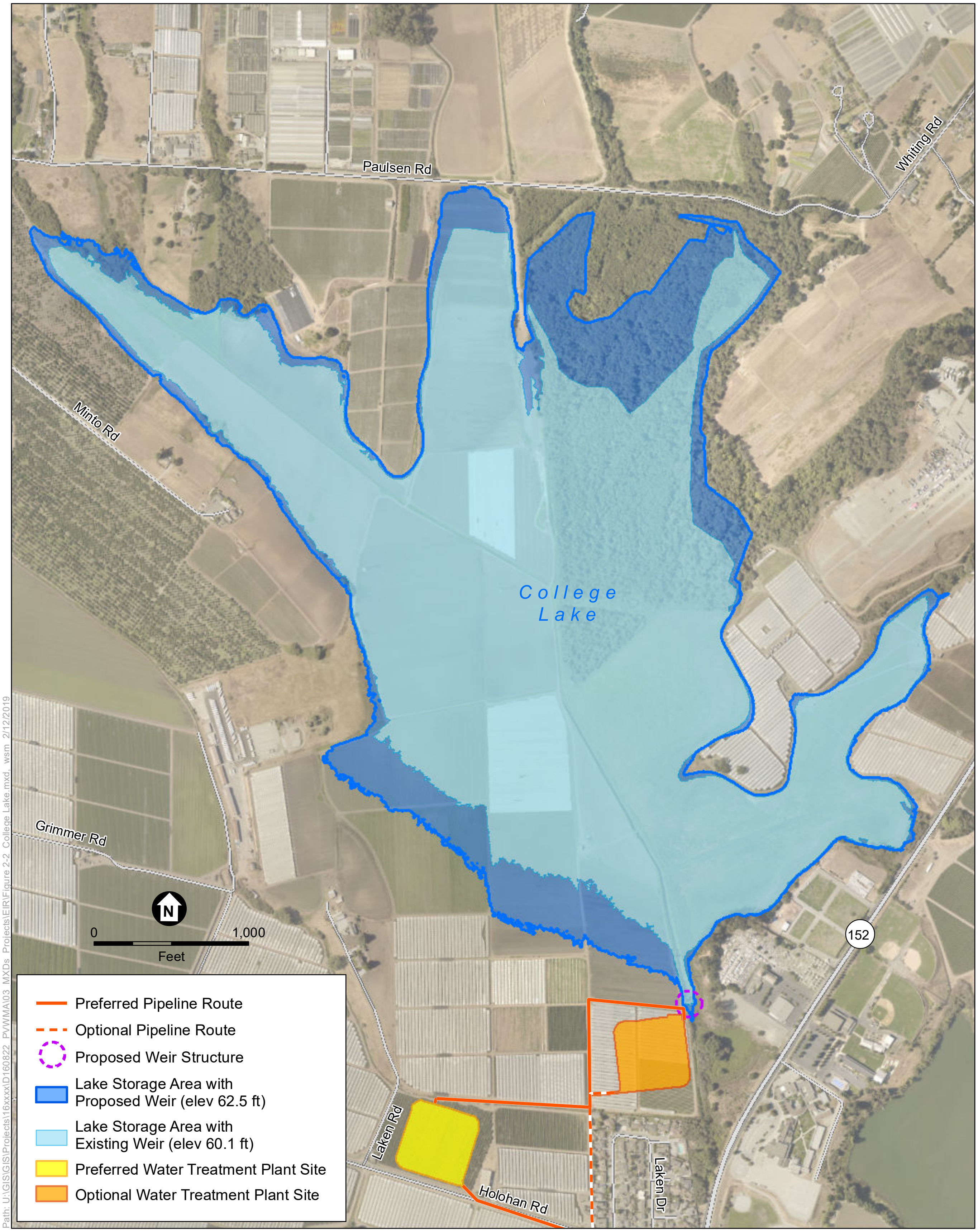
[21] Refer also to Table BIO-1 in Appendix BIO for a list of special-status species with potential to occur in the College Lake study area.

the south end of the lake near the location of the existing weir (**Figure 2-2**)[22]. The proposed sites for the weir structure, intake pump station, and associated pipeline are within portions of APNs 051-441-24, 051-441-28, 051-441-01, and 051-101-47.

- ***Water Treatment Plant.*** The proposed water treatment plant (WTP) would be located at one of two possible locations (refer to Figure 2-2). The preferred WTP site is north of Holohan Road between Laken Drive and Grimmer Road, southwest of College Lake (within APN 051-101-47). The optional WTP site is west of the proposed weir structure (within APN 051-441-24). Although the preferred site was chosen due to geotechnical concerns regarding the optional site, both sites are described and evaluated in equal detail in this document.
- ***College Lake Pipeline.*** The proposed College Lake pipeline would extend from the proposed WTP to the CDS and the RWF. The proposed alignment traverses portions of unincorporated Santa Cruz County and the City of Watsonville (refer to **Figures 2-3a through 2-3e**). The College Lake pipeline alignment follows existing developed road rights-of-way and agricultural land. At the SR 1 crossing, PV Water's preferred pipeline alignment is in West Beach Street; however, an optional pipeline segment is included at this location (shown on Figures 2-3d and 2-3e) because the number and location of existing utilities in this segment of West Beach Street could complicate or preclude pipeline construction in this street. This optional pipeline segment is described and analyzed in this EIR at an equal level of detail as the preferred alignment.
- ***Point of Diversion and Place of Use.*** As part of the Project, PV Water has filed an application (A032881) for a new water-right permit and a request for release from the priority of water right Application A018334 under Water Code Section 10504 with the State Water Resources Control Board. The application is for a permit to appropriate up to 3,000 AFY of water in College Lake. The proposed point of diversion would be located near the existing weir. **Figure 2-4** depicts the proposed place of use (the "College Lake Project Use Area"), which would be the areas where the appropriated water would be used.

PV Water would obtain rights to access and use the Project sites.

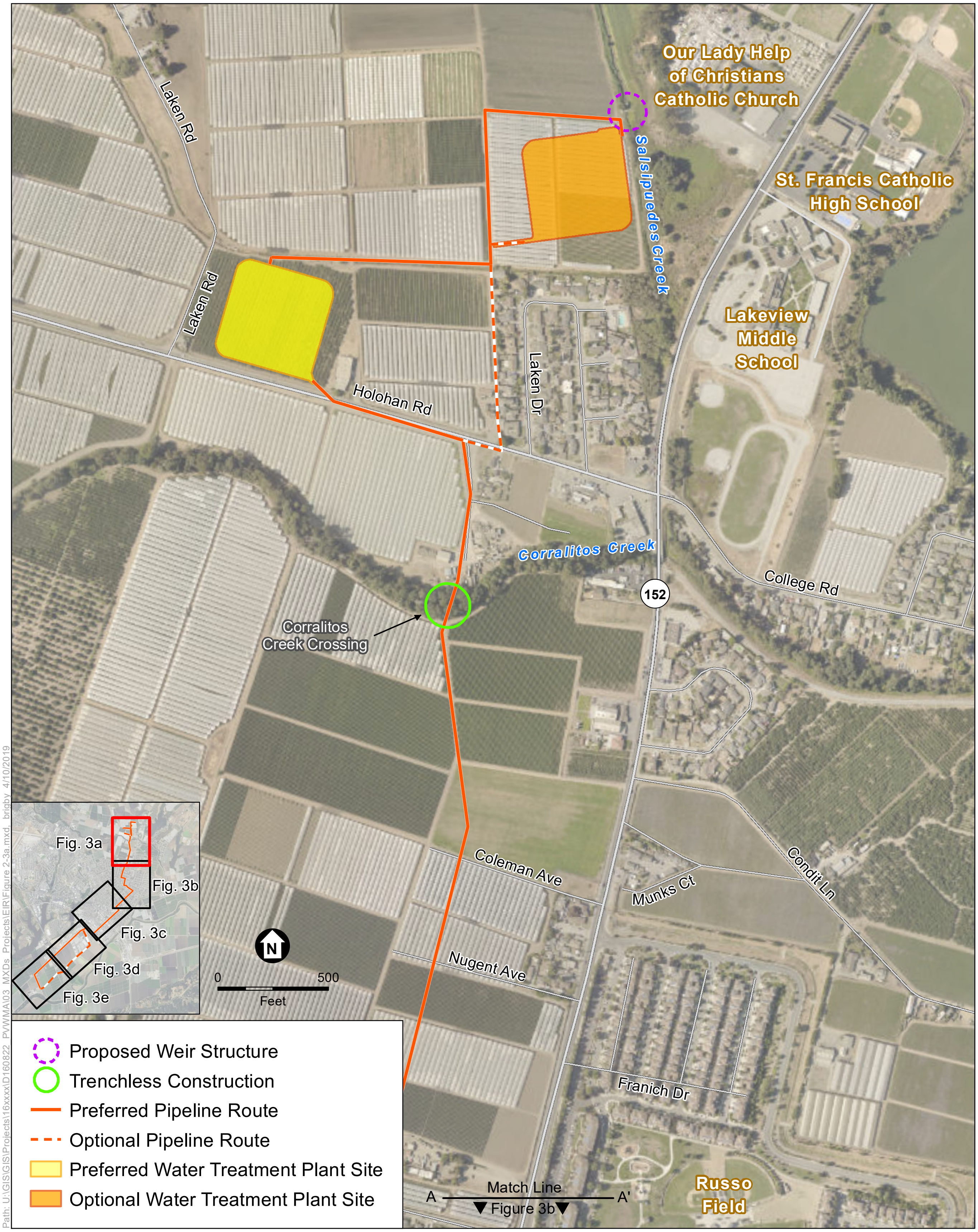
[22] The elevation contours shown on figures depicting the College Lake basin are based on elevation data collected in 2010 using LiDAR (light detection and ranging) technology. The Association of Monterey Bay Area Governments commissioned the collection of the elevation data, which after collection was quality-controlled in accordance with U.S. Geological Survey standards. Evaluation of the LiDAR elevation data indicated that its accuracy varied due to the presence of vegetation, in some cases overestimating the ground surface elevation by up to 5 feet. Correction of the LiDAR data to address this overestimation was made based on 308 individual point comparisons of LiDAR results to ground survey data collected by cbec in 2012. The elevation data along with supplemental ground survey data were then used by cbec to develop the digital elevation model of the College Lake area. The elevation contours shown on figures in this EIR were generated using statistical methods based on the 2012 digital elevation model. Therefore, while the data shown is based on the most recent elevation information available, it may not represent current elevation conditions due to the date and variable accuracy of the data collection (RCD-SCC, *College Lake Multi-Objective Management Project Final Report*, prepared by cbec, November 14, 2014).



SOURCE: Carollo Engineers, 2017; ESRI World Imagery, 7/23/2016; ESA

College Lake Integrated Resources Management Project

Figure 2-2
College Lake

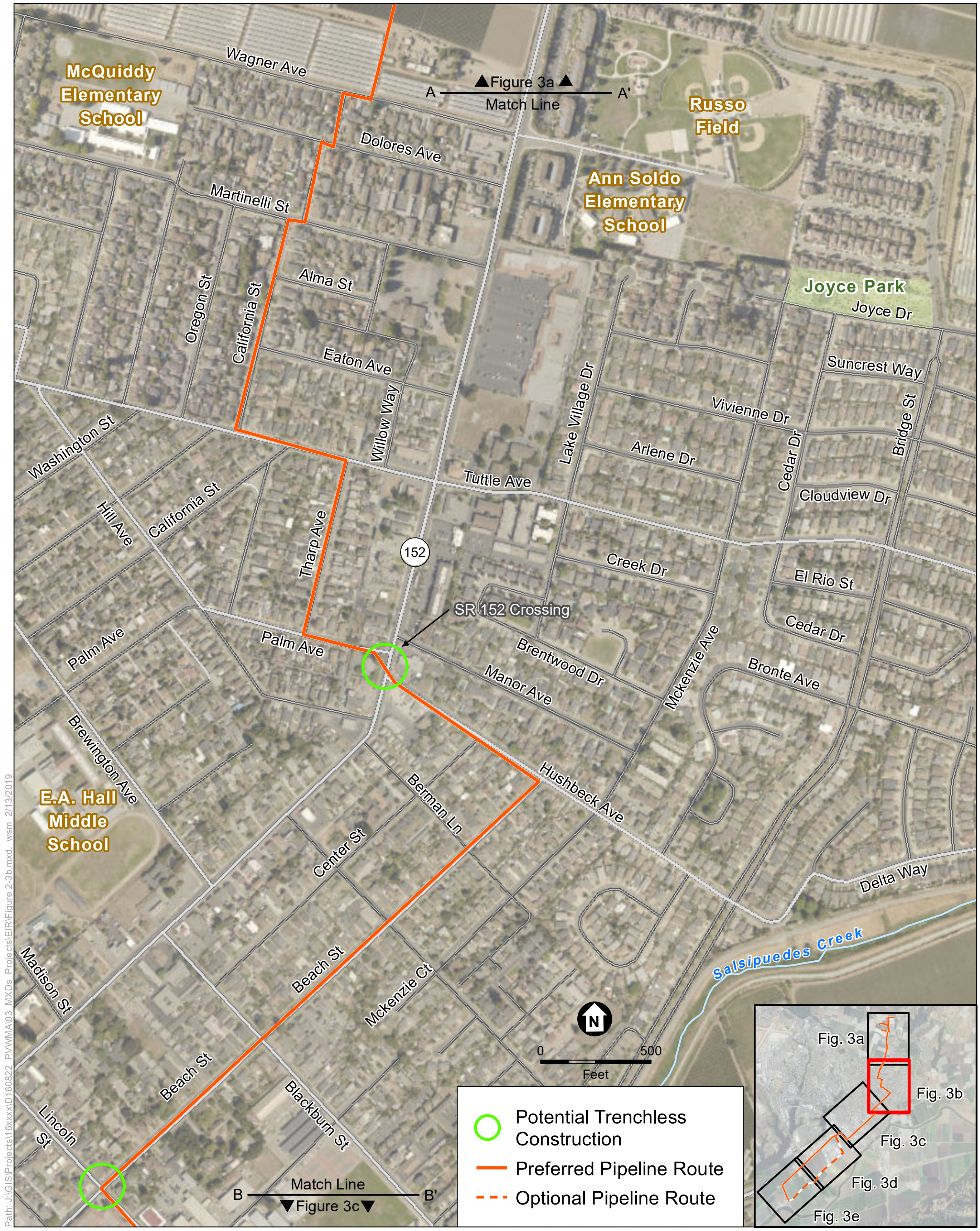


SOURCE: Carollo Engineers, 2017; ESRI World Imagery, 7/23/2016; ESA

College Lake Integrated Resources Management Project

Figure 2-3a
Pipeline Alignment

ESA

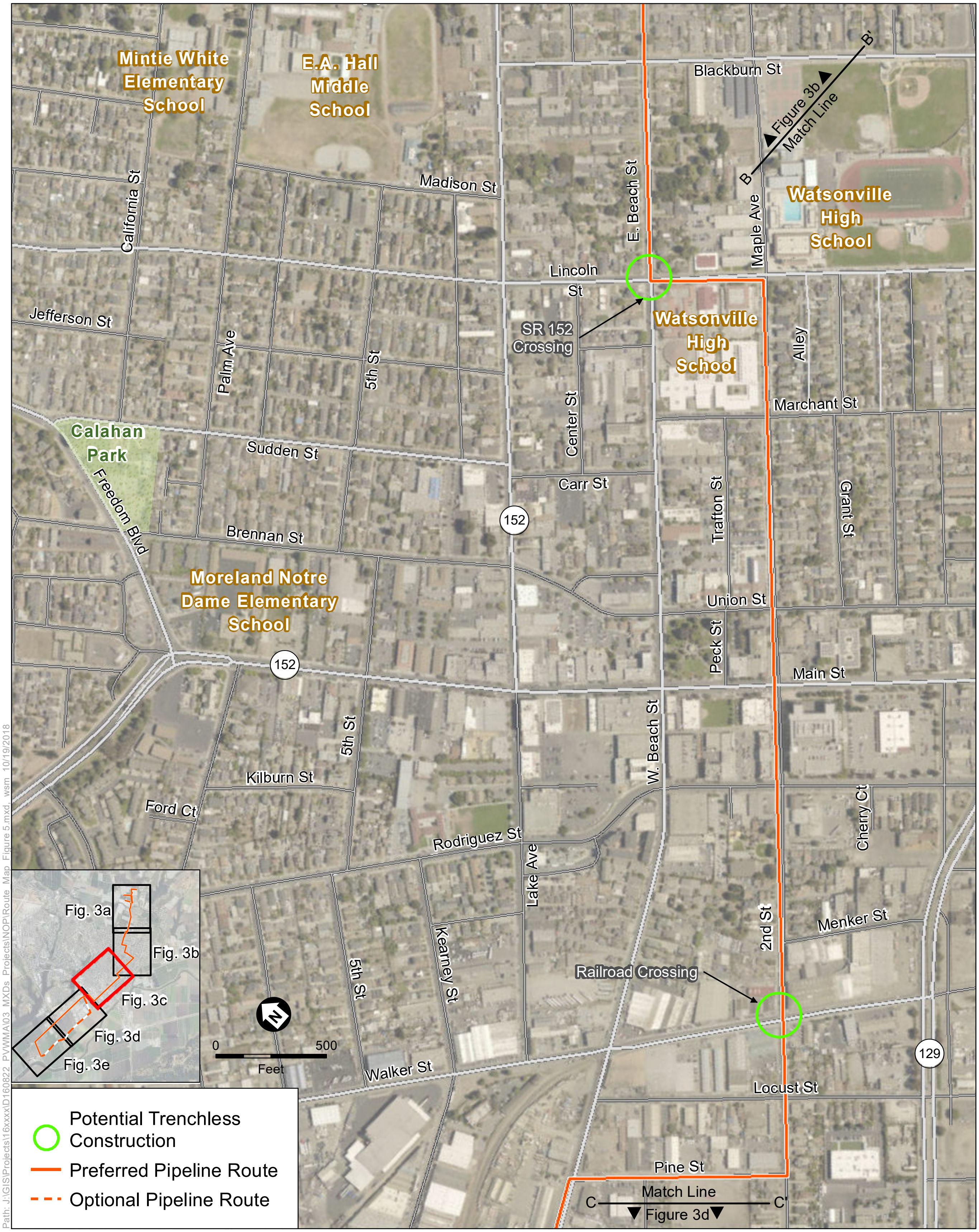


SOURCE: Carollo Engineers, 2017; ESRI World Imagery, 7/23/2016; ESA

College Lake Integrated Resources Management Project

Figure 2-3b
Pipeline Alignment

ESA

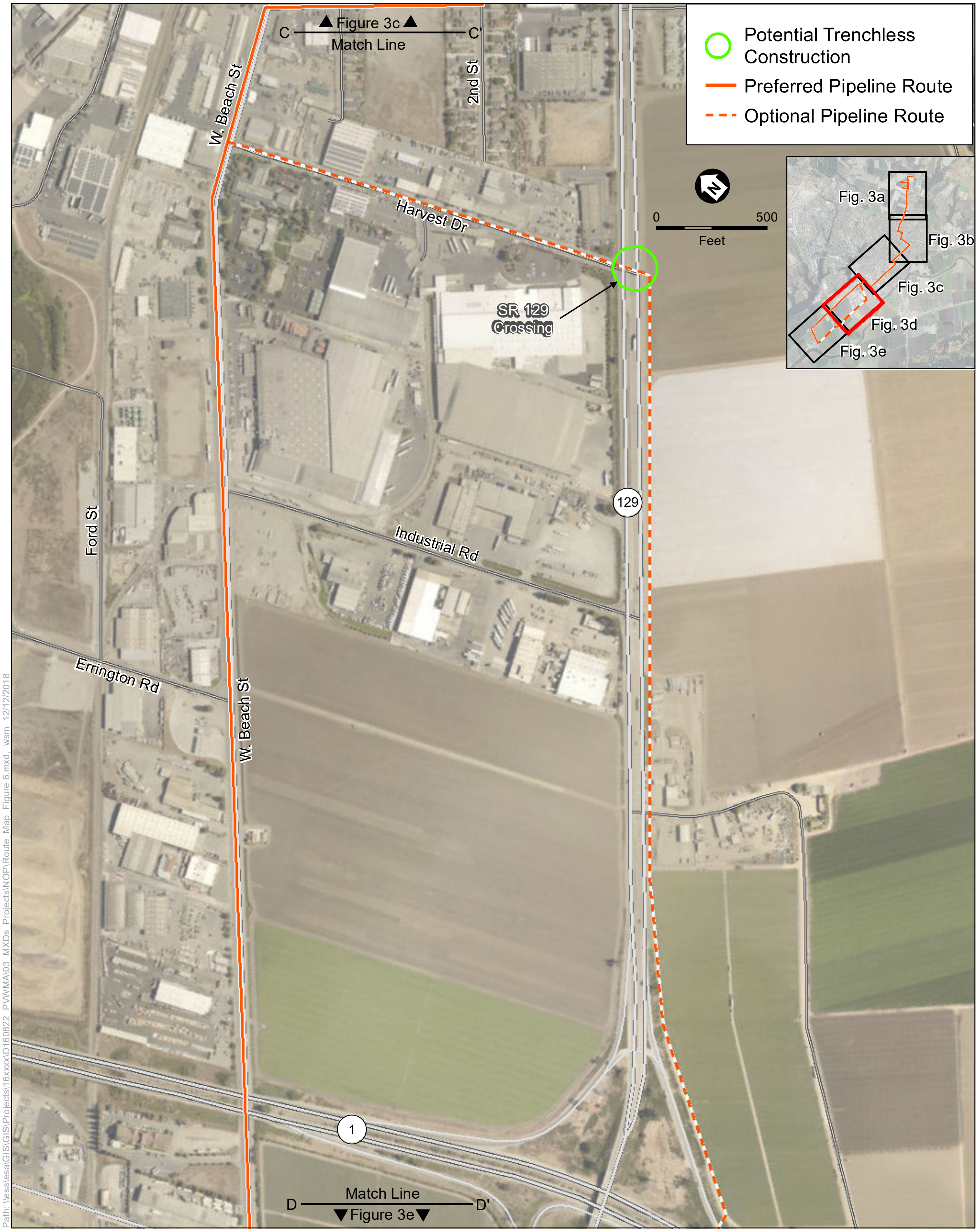


SOURCE: Carollo Engineers, 2017; ESRI World Imagery, 7/23/2016; ESA

College Lake Integrated Resources Management Project

Figure 2-3c
Pipeline Alignment

ESA

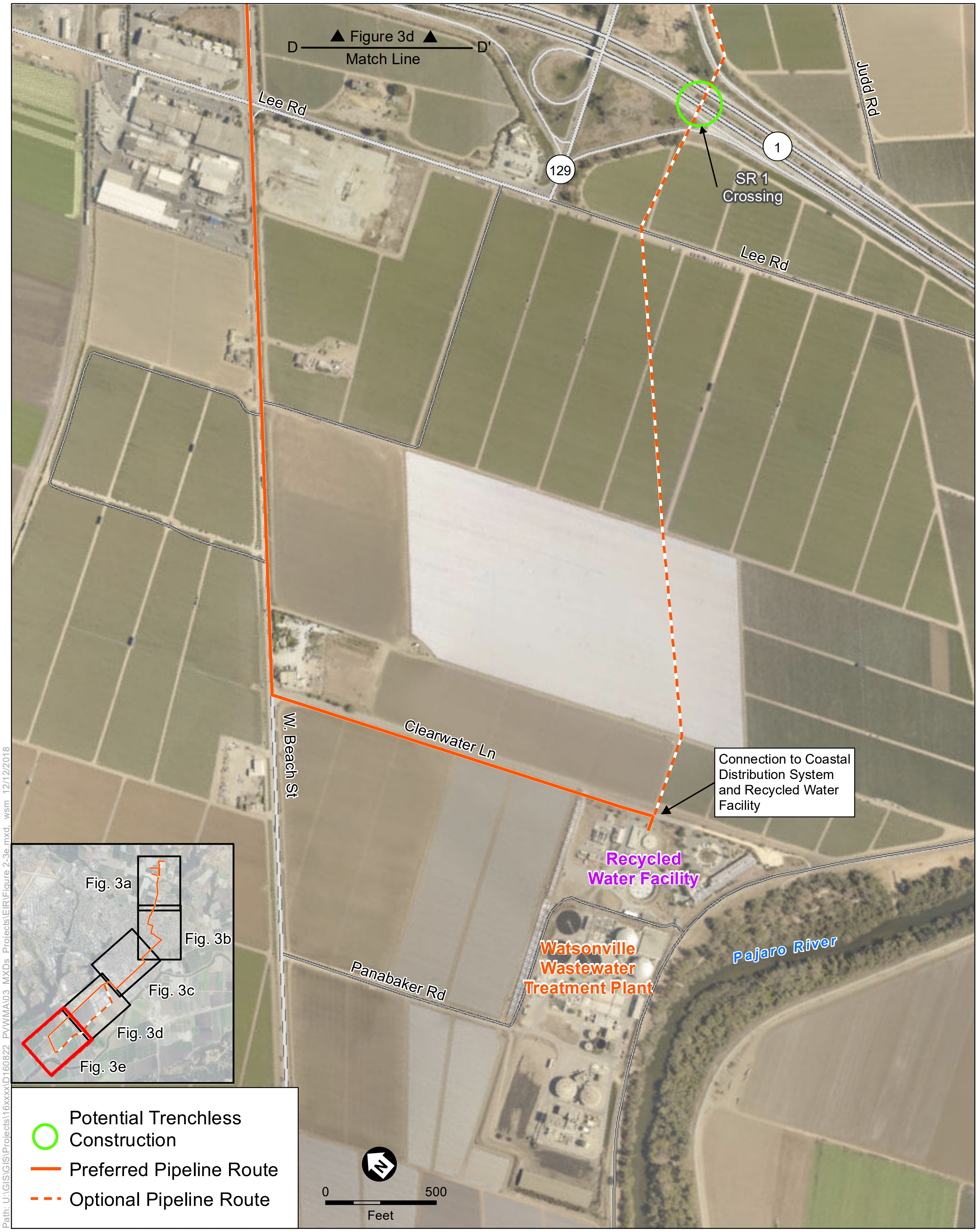


SOURCE: Carollo Engineers, 2017; ESRI World Imagery, 7/23/2016; ESA

College Lake Integrated Resources Management Project

Figure 2-3d
Pipeline Alignment

ESA

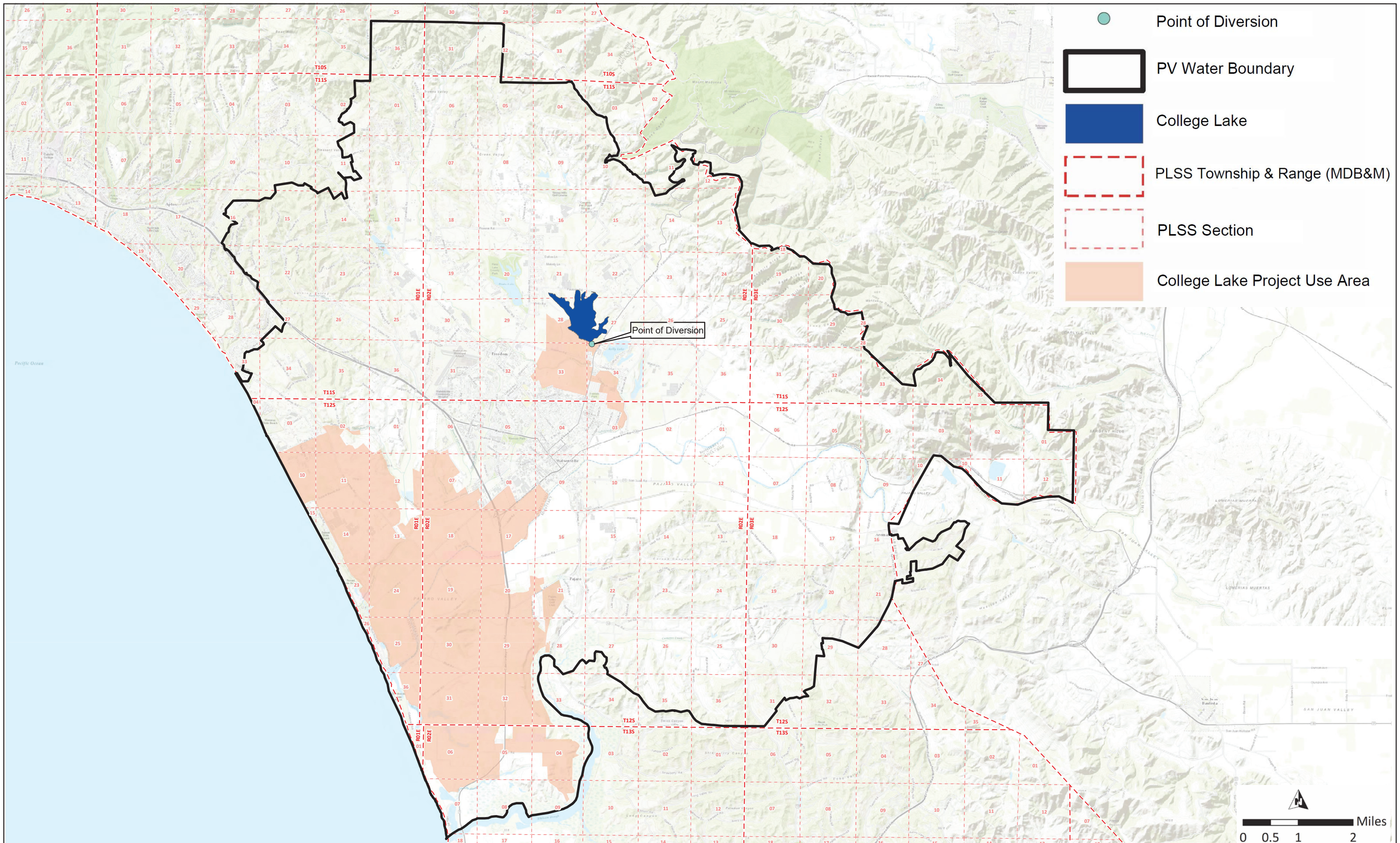


SOURCE: Corollo Engineers, 2017; ESRI World Imagery, 7/23/2016; ESA

College Lake Integrated Resources Management Project

Figure 2-3e
Pipeline Alignment

ESA



Notes:
1. The Point of Diversion is in Salsipuedes Creek.
2. The proposed place of use includes parcels served by the existing Coastal Distribution System (CDS), parcels that may be served by an expanded CDS, and parcels near the College Lake pipeline.
3. PLSS - Public Land Survey System; MDB&M - Mount Diablo Baseline and Meridian

D160822

SOURCE: California State Plane, Zone 3, NAD 83, Horizontal Datum, Feet;
CA Department of Pesticide Regulation; Carollo Engineers, 2017.

College Lake Integrated Resources Management Project

Figure 2-4
Place of Use

ESA

2.3 Need for the Project

Land use within the Pajaro Valley is primarily agricultural, with crop values estimated at approximately $900,000,000 annually.[23] Approximately 95 percent of the water used in the Pajaro Valley is pumped groundwater. In the Pajaro Valley Groundwater Basin, groundwater levels have declined as a result of long-term groundwater overdraft. These overdraft conditions have caused groundwater levels within the basin to drop below sea level (refer to **Figure 2-5**), creating a landward pressure gradient that causes seawater to flow inland and mix with fresh groundwater. As seawater encroaches into the fresh groundwater basin, water quality degrades, limiting its use for irrigation and domestic purposes. Intrusion into freshwater aquifers also results in a loss of freshwater storage capacity. Seawater intrusion creates progressive increases in the concentrations of chloride, boron, magnesium, and other constituents in groundwater; chloride is used as an indicator constituent of seawater intrusion.

As shown on **Figure 2-6**, the extent of seawater intrusion has increased in the coastal part of the basin. Numerous wells in the coastal area have had substantial increases in chloride concentrations over the last few decades, indicating that the volume of freshwater displaced in the intruded area continues to increase. **Figure 2-7** depicts water demands in Pajaro Valley between 2000 and 2017, as well as rainfall totals by calendar year. Although total demands and agricultural groundwater pumping amounts were lower in 2016-2018 than in previous years, the total amounts of groundwater pumping continue to exceed to total amounts of groundwater recharge, so the cumulative groundwater overdraft and seawater intrusion rates continue to increase. These conditions are not expected to improve without reductions in coastal groundwater pumping[24] and development and delivery of supplemental water supplies.

Historical, existing, and future conditions of the groundwater basin within PV Water’s service area were modeled utilizing the Pajaro Valley Hydrologic Model.[25] This modeling confirms that projects built and implemented by PV Water to date have reduced, but have not eliminated, the seawater intrusion and the groundwater overdraft problems. The basin 30-year average annual deficit is estimated to be approximately 12,100 AFY.[26]

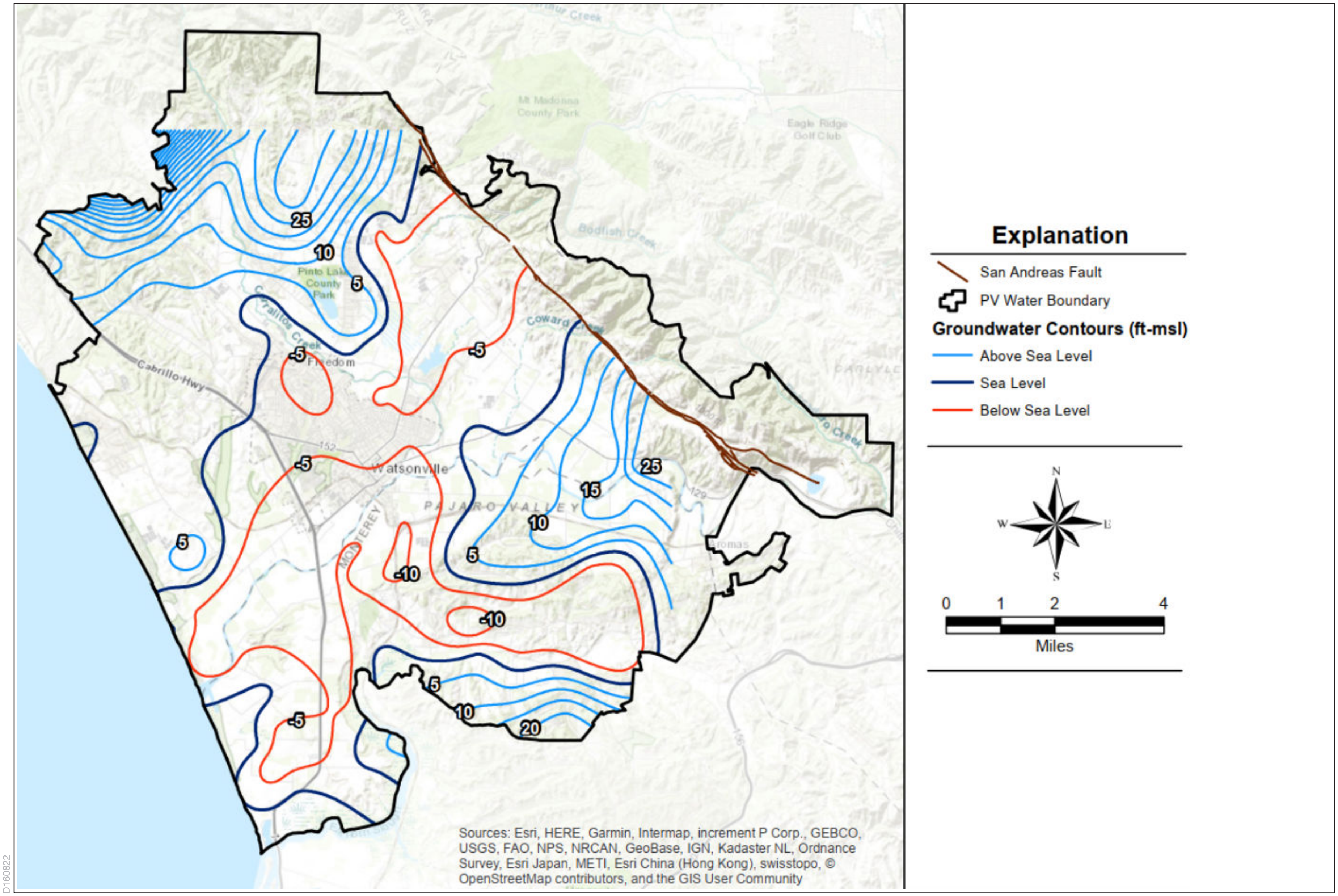
---

23 PV Water, *Final Basin Management Plan Update*, February 2014.

24 Elimination of groundwater pumping within PV Water’s Delivered Water Zone (i.e., the areas currently served by the CDS) is considered the most effective method of reducing seawater intrusion.

25 Hanson, R. T., Wolfgang Schmid, Claudia C. Faunt, Jonathan Lear, and Brian Lockwood. USGS Scientific Investigations Report 2014-5111, Integrated Hydrologic Model of the Pajaro Valley, Santa Cruz and Monterey Counties, California, 2014.

26 Hanson, R. T., B. Lockwood, W. Schmid, Journal of Hydrology 519 (2014) 131-147, *Analysis of Projected Water Availability with current Basin Management Plan*, 2014.

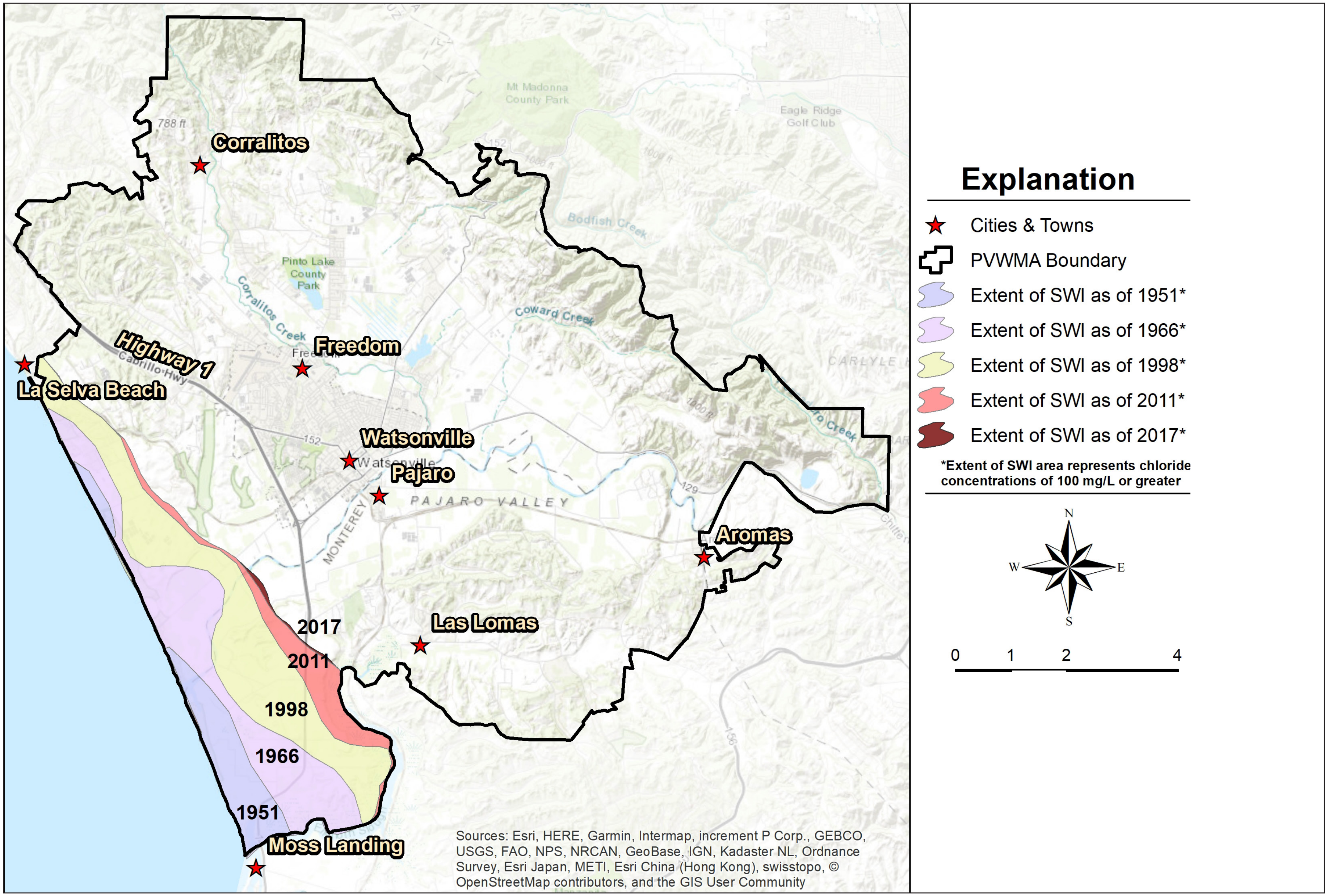


SOURCE: PV Water, 2019.

College Lake Integrated Resources Management Project

Figure 2-5
Pajaro Basin Groundwater Elevation (Fall 2018)

ESA

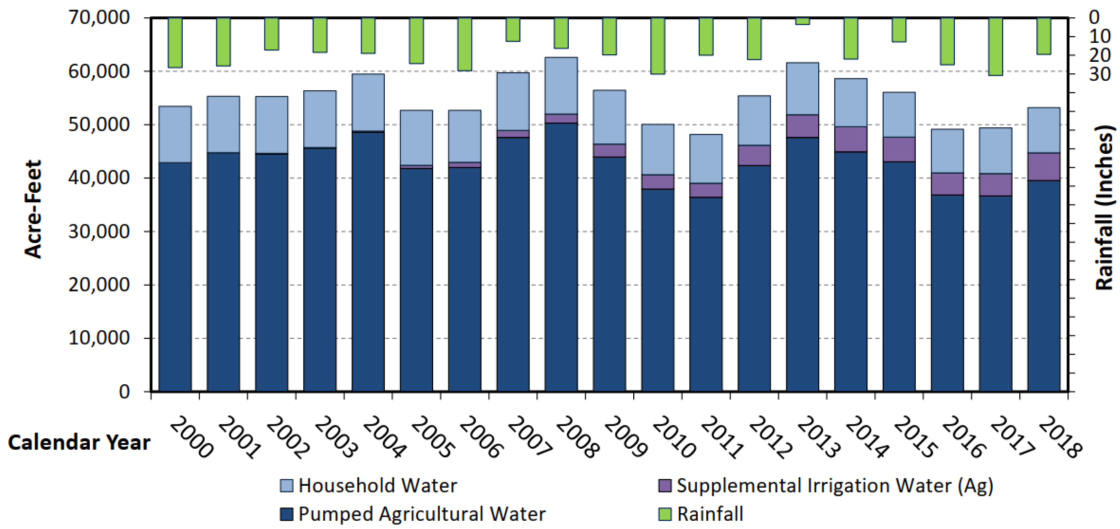


SOURCE: PV Water, 2017.

College Lake Integrated Resources Management Project

Figure 2-6
Seawater Intrusion within the Pajaro Valley

ESA



SOURCE: PV Water, Proposed College Lake Integrated Resources Management Project, NOP Scoping Meeting Presentation, December 12, 2017.

Figure 2-7
Pajaro Valley Water Use and Precipitation Trends (2000-2018)

In 2014, the Board adopted the BMP Update. The BMP Update consists of three primary components to eliminate the estimated 12,100 AFY deficit. These three elements are shown on **Figure 2-8.** The Project is the potential new water supply project with the largest estimated new water supply yield.

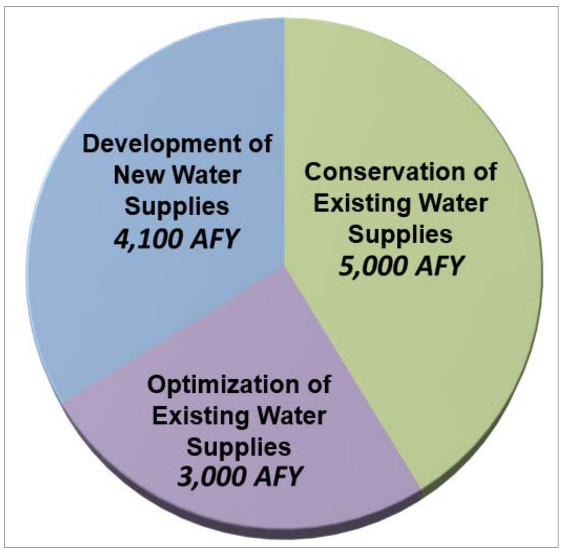


Figure 2-8
BMP Update Primary Components[27]

2.4 Project Objectives

The primary purposes of the Project are to help balance the groundwater basin, prevent further seawater intrusion, and meet water supply needs in PV Water's service area by developing College Lake as a water storage and supply source. The following objectives were included in the 2014 BMP Update PEIR:

- Prevent seawater intrusion, long-term groundwater overdraft, land subsidence, and water quality degradation;
- Manage existing and supplemental water supplies to control overdraft and provide for present and future water needs;
- Create a reliable, long-term water supply, which has been identified as an important cornerstone of the long-term economic vitality of the Pajaro Valley;

27 PV Water, Proposed College Lake Integrated Resources Management Project, NOP Scoping Meeting Presentation, December 12, 2017. Available online at https://www.pvwater.org/college-lake-project.

- Develop water conservation programs; and
- Recommend a program that is cost effective and environmentally sound.

PV Water anticipates that the Project would advance all of these objectives, with the exception of development of water conservation programs.[28]

As discussed in Section 2.1.2.4, SGMA was signed into law after PV Water's approval of the 2014 BMP Update PEIR. In light of the BMP objectives, the requirements of SGMA, and the mitigation measures adopted as part of its approval of the BMP Update, the Board adopted the following project-specific objectives for the College Lake Project on December 20, 2017:

- Design and implement reliable facilities to help achieve sustainable groundwater management of the Pajaro Valley Groundwater Subbasin by 2040, taking into account potential future hydrologic changes, including those associated with climate change.
- Substantially contribute to the Pajaro Valley's water supply needs in a timely manner, consistent with the Basin Management Plan Update implementation goals.
- Use locally controlled surface water for agricultural purposes to offset groundwater pumping in a manner consistent with habitat preservation and enhancement, and in coordination with resource agencies, the public, and other stakeholders.
- Make efficient use of, and leverage federal, state, and local investments in, existing Agency infrastructure.

2.5 Project Components

2.5.1 Overview

Table 2-1 summarizes key features of the Project. **Figure 2-9** presents the overall estimated schedule and the general steps involved in implementing the Project. (Table 2-5, below, presents details on the proposed construction schedule.)

2.5.2 Environmental Commitments Proposed as Part of the Project

Appendix PD-2 identifies mitigation measures that apply to the Project and were adopted by the Board on April 16, 2014 as part of the mitigation monitoring and reporting program for the 2014 BMP Update PEIR. For the purposes of this EIR, the mitigation measures in Appendix PD-2 are considered parts of the College Lake Project, except that, as indicated in Chapter 3, *Environmental Setting, Impacts, and Mitigation Measures*, in some cases mitigation measures in Appendix PD-2 have been revised, replaced or augmented to reflect current conditions and to address project-specific and site-specific impacts.

[28] While the Project would conserve groundwater by creating a reliable source of surface water to offset groundwater pumping, PV Water's water conservation programs are designed to reduce water use in the Pajaro Valley. Information on PV Water's water conservation programs is available at https://www.pvwater.org/.

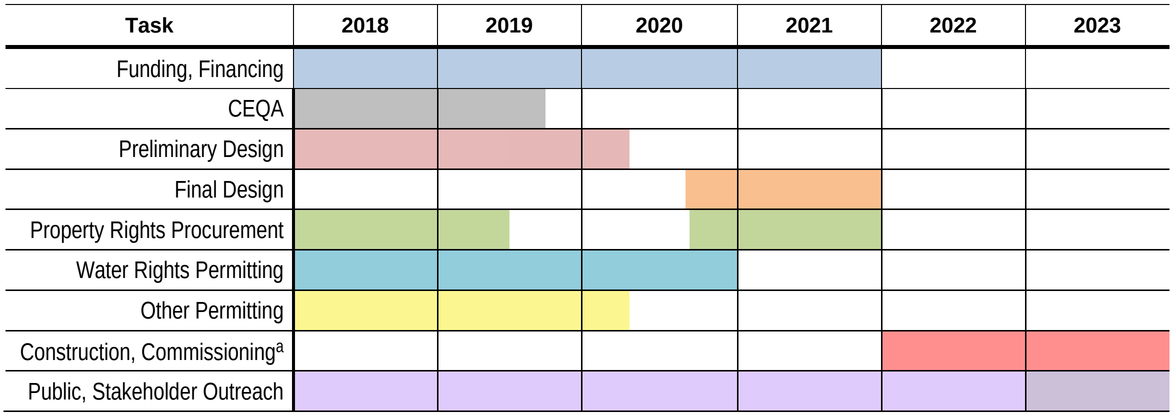
TABLE 2-1
KEY FEATURES OF COLLEGE LAKE INTEGRATED RESOURCES MANAGEMENT PROJECT

<table>
<tr><th colspan="2">Key Feature</th><th colspan="3">Summary Description</th></tr>
<tr><td rowspan="2">Annual Yield</td><td>Normal Range</td><td colspan="3">Approximately 1,800 to 2,300 AFY[a]</td></tr>
<tr><td>Maximum</td><td colspan="3">3,000 AFY</td></tr>
<tr><td colspan="2">Storage Capacity[b]</td><td colspan="3">Approximately 1,800 AF at water surface elevation 62.5 feet NAVD88</td></tr>
<tr><td colspan="2">Water Surface Area[b]</td><td colspan="3">285 acres at water surface elevation of 62.5 feet NAVD88</td></tr>
<tr><td rowspan="3">Components</td><td>Weir Structure, Intake pump station</td><td colspan="3">• Concrete structure equipped with adjustable weir and designed to accommodate fish passage. Weir height adjustable from 60.1 feet NAVD88 (elevation of existing weir) to 62.5 feet NAVD88.
• Intake would be screened compliant with NMFS and CDFW screening criteria for anadromous salmonids.
• Pump station would be located on western bank adjacent to weir structure</td></tr>
<tr><td>Water Treatment Plant</td><td colspan="3">• The preferred WTP site is located adjacent to Holohan Road; the optional WTP site is located just west of the weir structure and pump station sites.
• Includes sedimentation, filtration, electrical/operations buildings, chemical storage and feed, chlorine contact basin[c], filter influent pump station and effluent pump station. Intermediate ozonation could be added if necessary for meeting water quality objectives.</td></tr>
<tr><td>Pipelines</td><td colspan="3">• Pipeline from intake pump station to WTP
• 5.5 miles from WTP to Coastal Distribution System and Recycled Water Facility (same distance for preferred and optional pipeline alignments)</td></tr>
<tr><td rowspan="7">Operations and Maintenance</td><td colspan="2">Proposed Fish Passage, Bypass of Casserly Creek Flows:[d]</td><td>Adult Steelhead Migration
Dec. 15 – Mar. 31</td><td>Smolt Outmigration
Apr. 1 – May 31</td></tr>
<tr><td colspan="2">Minimum flow between Corralitos-Salsipuedes Confluence and Pajaro River</td><td>21 cfs</td><td>8 cfs</td></tr>
<tr><td colspan="2">Minimum flow at weir[e] and in Salsipuedes Creek between weir and Corralitos Creek</td><td>1.8 cfs</td><td>1.0 cfs</td></tr>
<tr><td colspan="2">Minimum lake level</td><td>59.5 feet NAVD88</td><td>59.3 feet NAVD88</td></tr>
<tr><td colspan="4">Flood Hazards: Weir height during wet season would be managed so as not to exacerbate upstream or downstream flooding (refer to Section 2.7, Operations and Maintenance)</td></tr>
<tr><td>Water supply diversions</td><td colspan="3">• Dec. 15 – May 31: would occur after minimum lake level and proposed fish passage flows have been achieved, and would be based on demand
• May 31 – Dec. 14: would occur based on demand, considering water supply portfolio priorities</td></tr>
<tr><td>Maintenance</td><td colspan="3">• Periodic inspections and maintenance of Project components
• Within College Lake Basin
- Sediment and debris removal
- Vegetation maintenance (disking/tilling, trimming and mowing, removal)
- Vector control</td></tr>
</table>

NOTES:

AFY = acre-feet per year
AF = acre-feet
CDFW = California Department of Fish and Wildlife
cfs = cubic feet per second
NAVD88 = North American Vertical Datum of 1988
NMFS = National Marine Fisheries Service
NOAA = National Oceanic and Atmospheric Administration
WTP = water treatment plant

[a] Average water yield for College Lake would vary year to year, depending on hydrologic conditions (e.g., rainfall), weir structure operations, and water demand.
[b] Information is from cbec, inc. eco engineering (cbec), *College Lake Integrated Resources Management Project, Hydrologic and Hydraulic Modeling Technical Memorandum*, November 2018.
[c] Chlorine contact basins provide disinfection contact time between free chlorine (sodium hypochlorite) and water.
[d] Instream flow requirements based on critical riffle surveys conducted in 2017 and 2018. Each minimum flow requirement would be the number specified in this table or the flow resulting from bypassing the total inflow into College Lake, whichever is less. Minimum flow between the Corralitos Creek-Salsipuedes Creek confluence and Pajaro River is for the combined flow from Corralitos Creek and College Lake. Refinements to fish passage assumptions and modeling may occur during permitting based on agency consultations.
[e] The minimum flows may be refined during design phase of the proposed weir and fish passage structure.



SOURCE: Personal communication between Lidia Gutierrez and Carollo Engineers regarding Project schedule, December 2018.

[a] The duration shown for Construction and Commissioning is based on the preferred WTP site. The duration of surcharging for the optional WTP site would be increased by 12 to 18 months to allow for consolidation of fill at that site. There would be no construction activity at the site during consolidation. The remainder of the construction phase durations for the WTP would be the same for both site options.

Figure 2-9
Proposed Project Implementation Schedule

2.5.3 Water Budget

As part of project development, PV Water estimated College Lake watershed inflows and outflows and lake water levels, and prepared water budgets for existing and future with-project conditions.[29] A water budget provides a temporal accounting of the volumes of inflow, outflow, and change in storage over a specified time period and under different hydrologic conditions. For the purposes of defining and evaluating the Project, four water years (October 1 through September 30) were modeled:

- 2014, representative of a critically dry water year;
- 2015, representative of a below-average water year;
- 2016, representative of an above-average water year; and
- 2017, representative of an extremely wet water year.

In general, the water budgets were developed using field measurements, topographic surveys, development of a digital elevation model (which in turn was used to convert College Lake's water surface elevation to an impounded volume, and estimate water surface area and evaporation rate), data collection and analysis (e.g., stream gage and rainfall data), and hydrologic and hydraulic modeling (refer to **Table 2-2**).

29 cbec, *College Lake Integrated Resources Management Project, Hydrologic and Hydraulic Modeling Technical Memorandum*, November 2018.

TABLE 2-2
ELEMENTS OF WATER BUDGET DEVELOPED FOR THE PROJECT

Time-Varying Feature		Source
Inflows	Tributary inflows, direct precipitation, runoff	Hydrologic model, data from stream gages
	Agricultural returns from Casserly Creek	Measured stage record[a] and flows
	Local agricultural returns	Assumed to be negligible
	Reverse flow over weir	Hydraulic model
Outflows	Evaporation and evapotranspiration	Estimated based on California Irrigation Management Information System data
	Natural outflow over weir	Hydraulic model
	Water pumped from lake into intake	Estimated based on historical agency water demand data and modeled available supplies
	Groundwater recharge through infiltration	Estimated
Change of Lake Volume		Lake water surface elevation in combination with hypsometric curve[b] from Digital Elevation Model

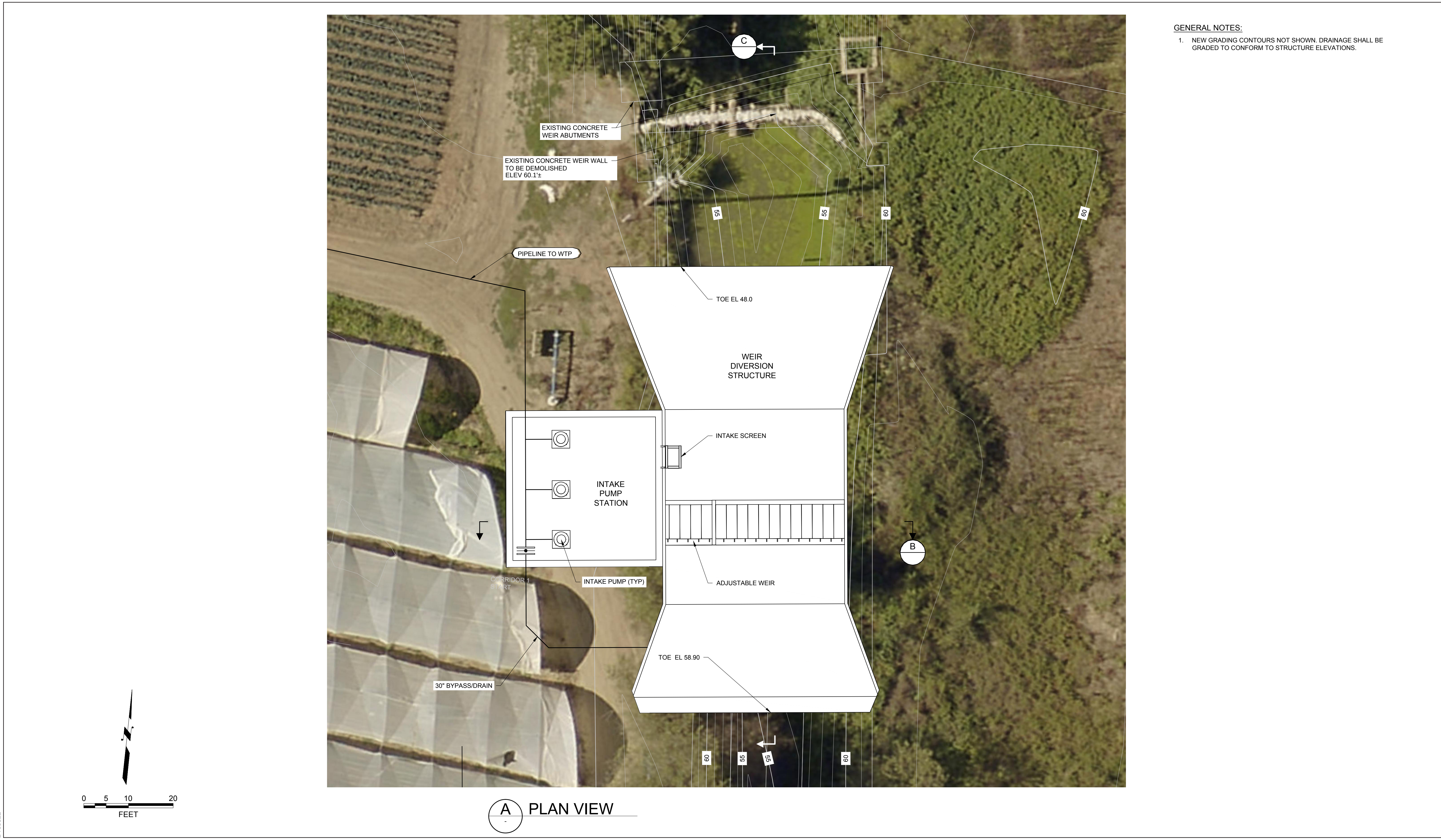
NOTES:
[a] A hydrologic stage is defined by the National Oceanic and Atmospheric Administration as the level of water surface above a given datum at a given location.
[b] A hypsometric curve depicts a relationship between an elevation and a water volume to convert the lake's water surface elevation to a volume of impounded water.

SOURCE: cbec, *College Lake Integrated Resources Management Project, Hydrologic and Hydraulic Modeling Technical Memorandum*, November 2018.

2.5.4 Weir Structure and Intake Pump Station

The Project would include a proposed weir structure with an adjustable crest, and a diversion and intake pump station to divert surface water from College Lake. The intake pump station would pump raw (untreated) water from an intake just upstream of the weir to the proposed WTP via a 30-inch diameter intake pipeline. The intake pump station would have a maximum pumping capacity of 30 cubic feet per second (cfs). The proposed weir structure would consist of a reinforced concrete spillway with mechanically adjustable weir, abutment retaining walls on both sides of the structure, and reinforced concrete aprons upstream and downstream of the weir. **Figures 2-10** and **2-11** present a site plan and cross sections for the weir structure; **Table 2-3** presents the estimated dimensions of the proposed weir structure (as well as other project components). The proposed height of the weir (measured from the maximum possible water storage elevation to the downstream toe of the weir) is 5.2 feet. The proposed weir structure would also be designed to accommodate fish bypass flows and fish passage, in coordination with the National Oceanic and Atmospheric Administration National Marine Fisheries Service (NMFS). The proposed adjustable weir would be capable of raising the College Lake water level by up to 2.4 feet above the elevation of the existing weir to a water surface elevation of 62.5 feet NAVD88. The storage capacity of College Lake is approximately 1,150 AF at a water surface elevation of 60.1 feet NAVD88 and approximately 1,800 AF at a water surface elevation of 62.5 feet NAVD88 (**Figure 2-12**).[30]

30 cbec, College Lake Stage-Volume and Stage-Area Curves, November 10, 2017.

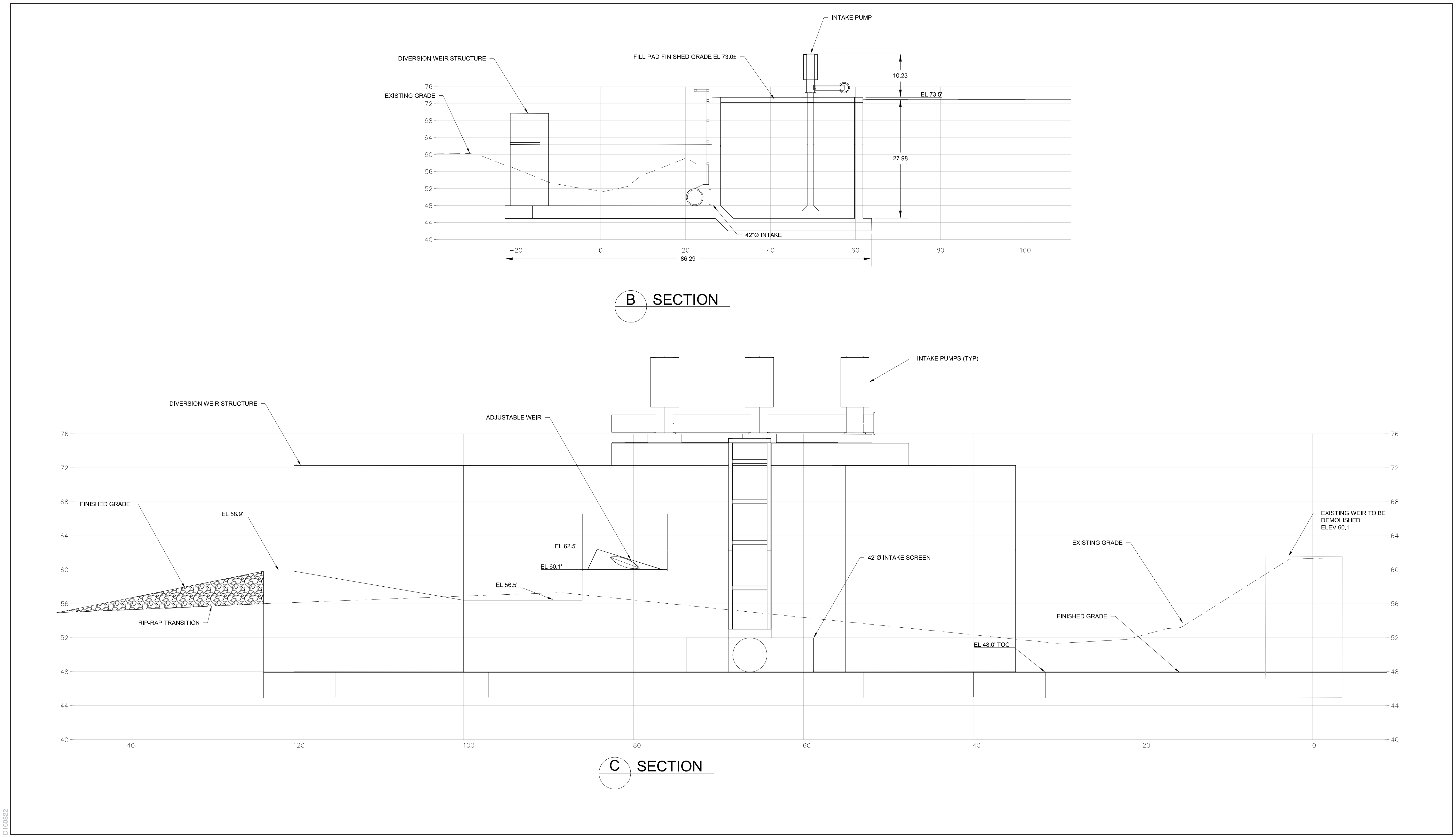


SOURCE: Carollo Engineers, 2018.

College Lake Integrated Resources Management Project

Figure 2-10
Preliminary Weir Diversion Structure and Intake Pump Station Site Plan

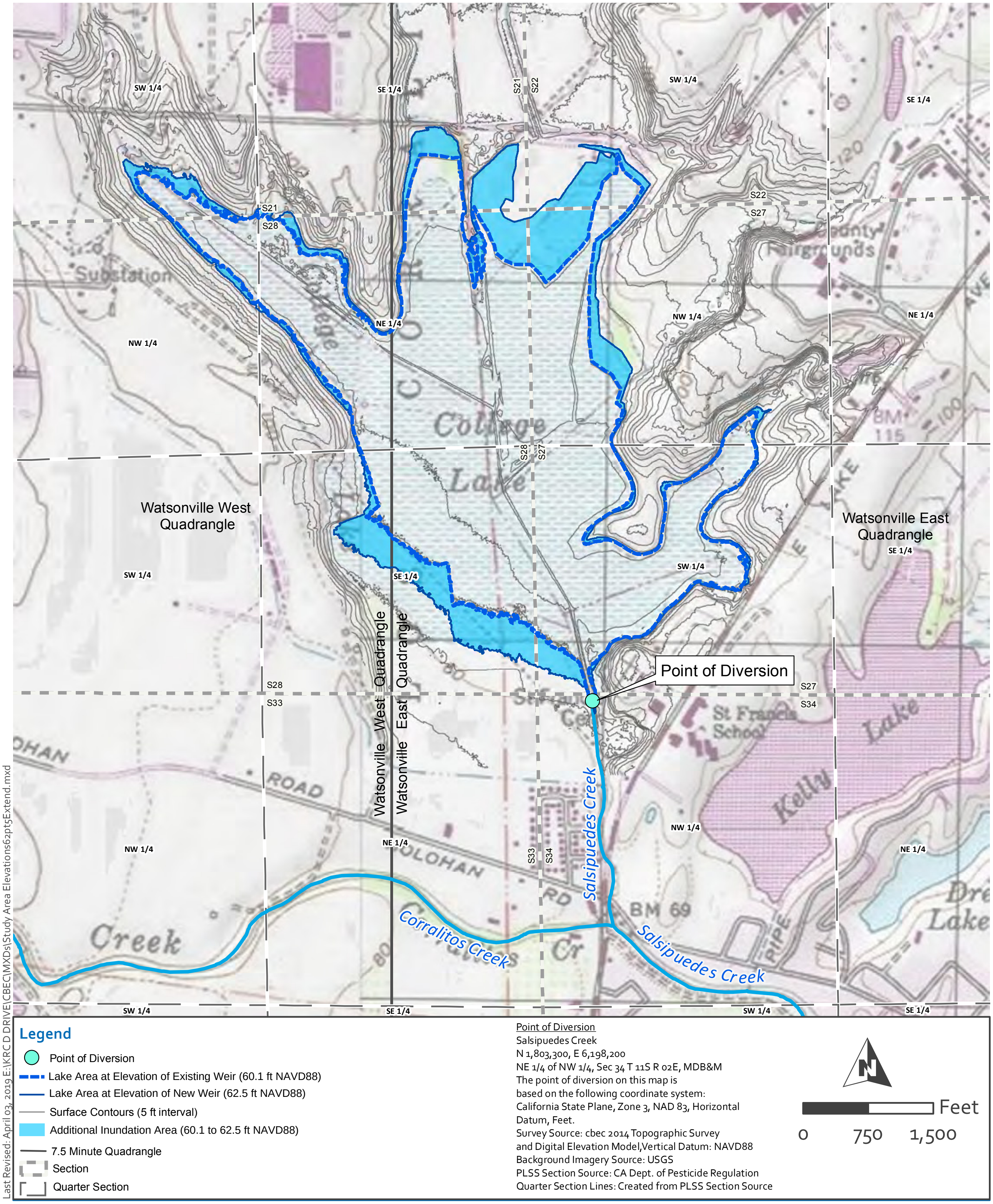
ESA



SOURCE: Carollo Engineers, 2019.

College Lake Integrated Resources Management Project

Figure 2-11
Preliminary Weir Diversion Structure and Intake Pump Station Site Plan - Cross Sections B & C



Last Revised: April 03, 2019 E:\KRCD DRIVE\CBEC\MXDs\Study Area Elevations62pt5Extend.mxd

SOURCE: Carollo Engineers, August 14, 2017.

College Lake Integrated Resources Management Project

Figure 2-12

College Lake Topography

ESA

TABLE 2-3
ESTIMATED DIMENSIONS OF PROJECT COMPONENTS

Project Component	Approximate Dimensions (length x width; feet)	Maximum Depth of Excavation for Preferred, Optional Sites (feet)	Depth Below Finished Grade (feet)[a]	Depth Below Existing Grade for Preferred, Optional Sites (feet)	Height Above Finished Grade (feet)
Diversion Weir and Intake Structure					
Weir Structure	100 x 55	19	3	3	2 to 24[b]
Intake Pump Station	36 x 36	25	27	27	3
Water Treatment Plant					
Inlet Diversion Structure	30 x 25	20, 17	18	15, 12	2
Sedimentation Basins (2)	132 x 34	13, 10	16	12, 9	0
Filter Influent Pump Station	30 x 25	25, 21	23	20, 16	2
Filters	92 x 52	Above grade	1	Above grade	15
Electrical/Operations Building	40 x 60	Above grade	2	Above grade	18
Coagulation Chemical Storage and Feed Facility	40 x 60	Above grade	2	Above grade	18
Sodium Hypochlorite Storage and Feed Facility	40 x 60	Above grade	2	Above grade	23
Chlorine Contact Basin for Local Users	60 x 25	14, 10	12	9, 5	2
Potential Future Ozone Building	45 x 20	Above grade	2	Above grade	16
Potential Future Ozone Contactor	50 x 20	14, 10	12	9, 5	2
Potential Future Liquid Oxygen and Evaporator	40 x 30	Above grade	2	Above grade	18
Local User Effluent Pump Station	10 x 15	14, 10	12	9, 5	2
Gravity Thickener (includes Thickened Solids Pump Station)	55-ft diameter	20, 17	18	15, 12	2
Solids Drying Beds (includes Decant Return Pumps)	230 x 115	11, 7	9	6, 2	1

NOTES:
[a] Refer to Figures 2-11, 2-15, and 2-17 for existing and finished grade at Project sites.
[b] The height of the proposed weir structure is measured from the lowest point in the existing channel which is at approximately 48 feet NAVD88.

SOURCE: Carollo Engineers, Request for Information, e-mail from R. Gutierrez, November 16, 2018; Carollo Engineers, e-mail from R. Gutierrez, February 12, 2018.

A screened intake would be constructed within the proposed weir structure. The proposed screen opening size is intended to comply with NMFS[31] and California Department of Fish and Wildlife (CDFW) criteria for screen opening sizes for anadromous salmonids. Refer to Figures 2-10 through 2-11 for a site plan and cross sections of the proposed weir structure and intake pump station and **Figure 2-13** for a photo of the type of screens anticipated for the Project.

The Project would include a 30-inch diameter pipeline to convey the diverted surface water from the intake pump station to the WTP (refer to Figure 2-2). The intake pipeline alignment and length would depend on the location selected for the WTP; both options are evaluated in equal levels of detail in this EIR.

SOURCE: Intake Screens Inc., FSOC Fish Screen Conference Presentation, September 13, 2016.

Figure 2-13
Example of Screened Intake

2.5.5 Water Treatment Plant

The Project would include a WTP to remove sediment and to filter and disinfect the diverted surface water. As shown on Figure 2-2, PV Water has identified two potential locations for the WTP, both of which are analyzed in this EIR. The preferred WTP site, shown on **Figures 2-14 and 2-15**, would occupy approximately five acres. The optional WTP site, shown on **Figures 2-16 and 2-17**, would occupy six acres. PV Water has identified the site on Holohan Road as its preferred location due to geotechnical considerations; development of the optional WTP site would require an elevated fill pad to raise the WTP site above flood elevation. As shown on Figures 2-14 and 2-16, the configuration of the WTP at either site would be similar.

The WTP would contain concrete-lined sedimentation basins, solids drying beds, a filter influent pump station, a filtration system consisting of filters installed on a concrete pad or in concrete basins, a sodium hypochlorite disinfection system, and an effluent pump station for local users.

[31] National Marine Fisheries Service, Anadromous Salmonid Passage Facility Design, July 2011; National Marine Fisheries Service, Fish Screening Criteria for Anadromous Salmonids, January 1997.

Solids coming from the sedimentation basins and filter backwash at the WTP would be pumped to gravity thickeners before reaching solids drying beds for additional settling and drying. As the solids settle out of the water, the decant water from both the gravity thickeners and solids drying beds would be recycled to the start of the treatment process. Additional moisture from the solids would be removed via evaporation in the solids drying beds prior to off-haul of the solids to the nearest landfill. As a backup to this process, diluted solids could be bled into the Salsipuedes Sanitary District sewer system, which discharges into the City of Watsonville Wastewater Treatment Facility, at flow rates to be approved by the Salsipuedes Sanitary District and the City to not exceed the existing sewer capacity. However, off-hauling of dried solids is assumed for normal process operations.

The filter influent pump station would pump water decanted from the sedimentation basins through the filters. Effluent from the filters would be disinfected using sodium hypochlorite and the disinfected water would flow to the College Lake pipeline (described below in Section 2.5.6) and then to the CDS pipeline or to local users (refer to Figure 2-4). The WTP would have a capacity up to about 13 million gallons per day. As shown on Figures 2-14 and 2-16, the site plan provides space for a potential intermediate ozonation treatment process which could be needed in the future if PV Water deems it appropriate in terms of meeting irrigation water quality goals.[32]

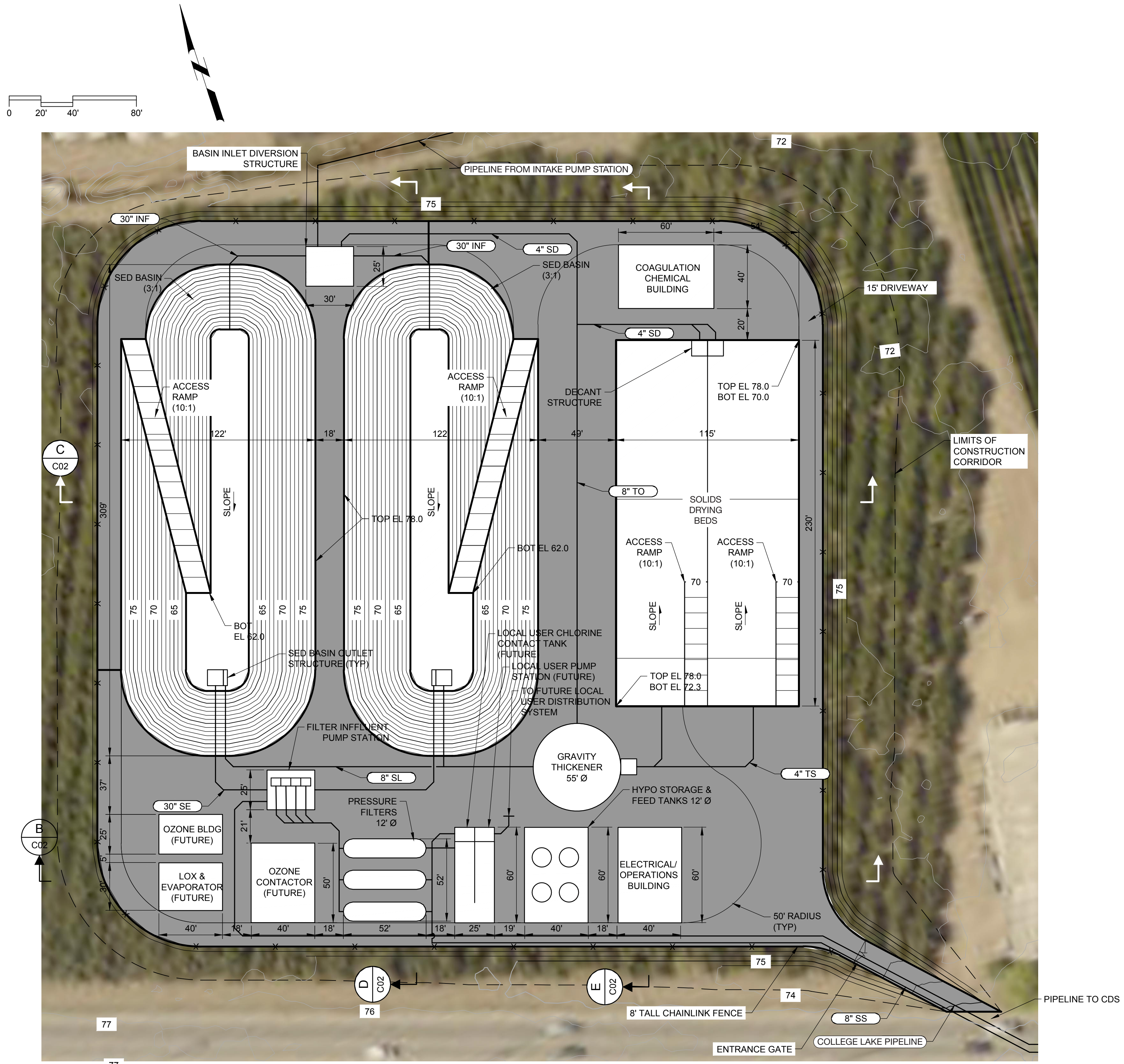
Table 2-4 identifies the chemicals that would be stored and used at the WTP.

TABLE 2-4
CHEMICAL USE AND STORAGE AT WATER TREATMENT PLANT

Chemical	Purpose	Form	Estimated Storage Quantity
Sodium hypochlorite	Disinfection	Liquid, 12.5% solution	10,000 gallons
Coagulant	Coagulation	Liquid	3,300 gallons
High Purity Oxygen (if required)	Ozonation if required for removal of toxicity or inorganic compounds	Liquid Oxygen	2,000 gallons
Hydrogen Peroxide (if required)	Advanced oxidation for removal of toxicity	Liquid	1,600 gallons
Diesel Fuel	Standby generator	Liquid	600 gallons

SOURCE: Carollo Engineers, e-mail from R. Gutierrez, February 12, 2018.

32 Intermediate ozonation is an oxidation process that would use ozone gas to oxidize organic compounds and chemicals. Ozonation systems generate ozone from a feed gas (air or liquid oxygen) and feed the ozone into a contact chamber.



A ENLARGED PLAN

B OVERVIEW PLAN

LEGEND

INF = Influent
SS = Sanitary Sewer
LOX = Liquid Oxygen
TS = Thickened Sludge
SL = Sludge
SD = Storm Drain

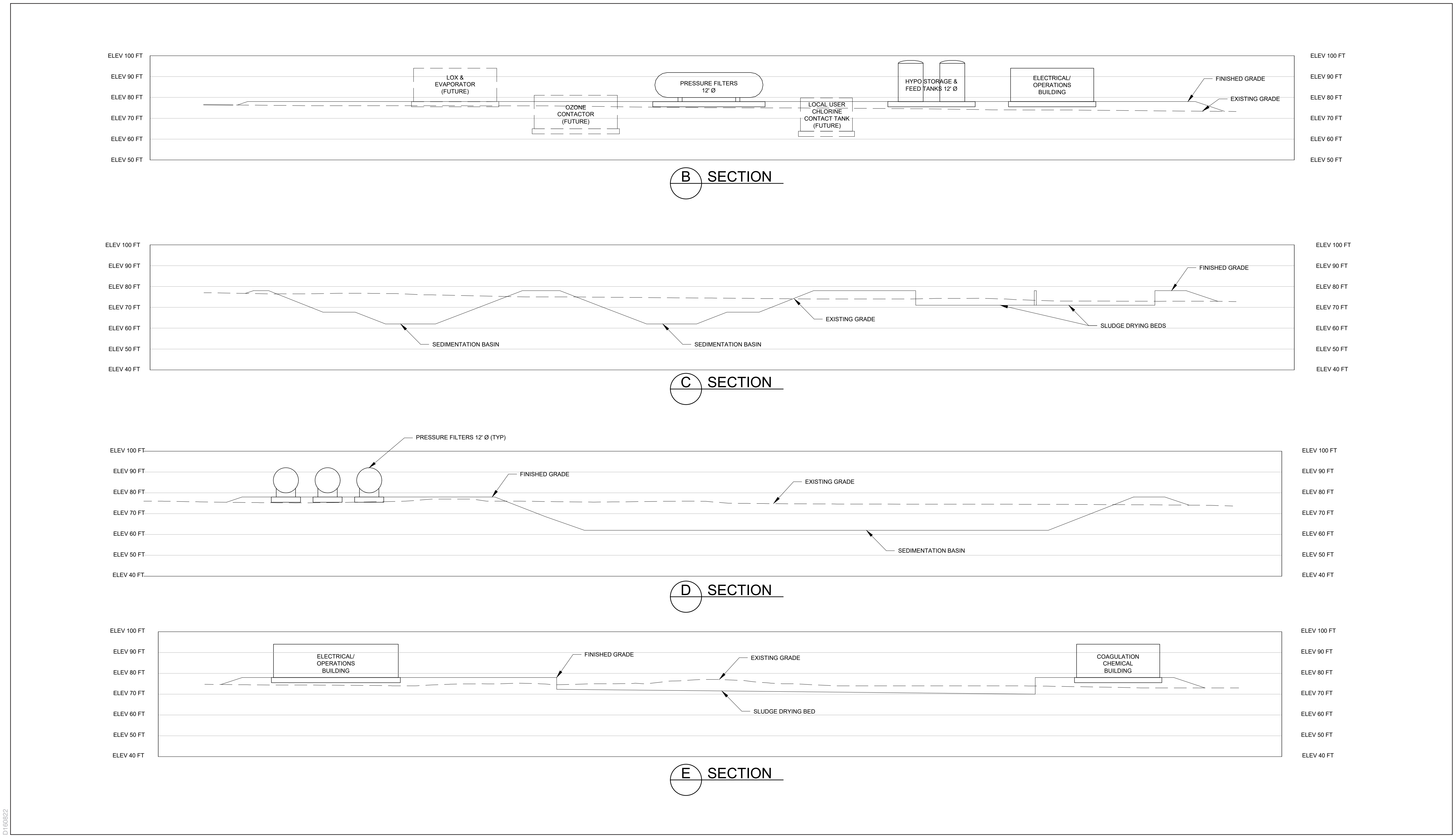
D160822

SOURCE: Carollo Engineers, 2018

ESA

College Lake Integrated Resources Management Project

Figure 2-14
Preferred Water Treatment Plant Preliminary Site Plan

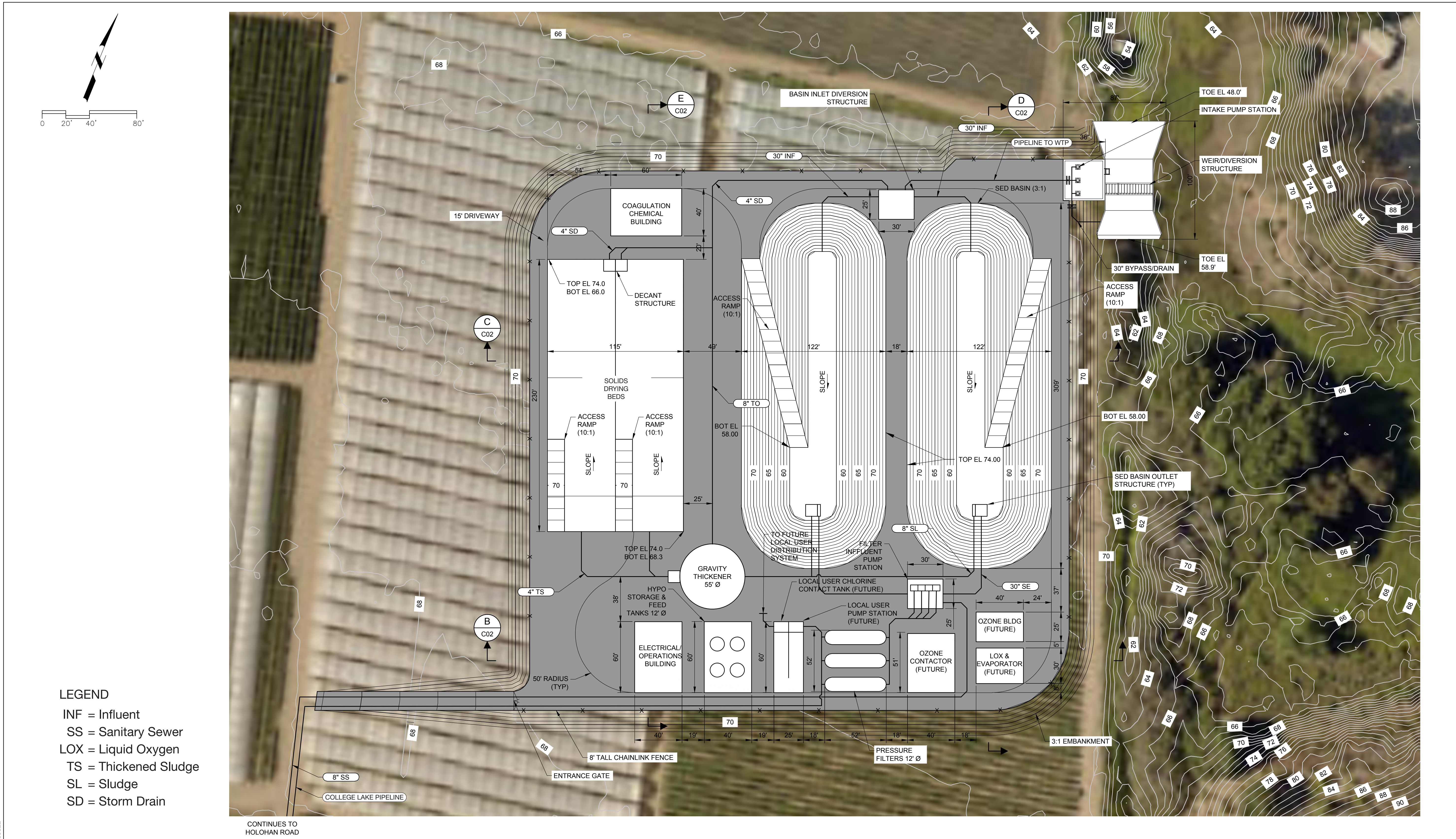


SOURCE: Carollo Engineers, 2018

College Lake Integrated Resources Management Project

Figure 2-15
Preferred Water Treatment Plant Preliminary Cross Section

ESA



LEGEND

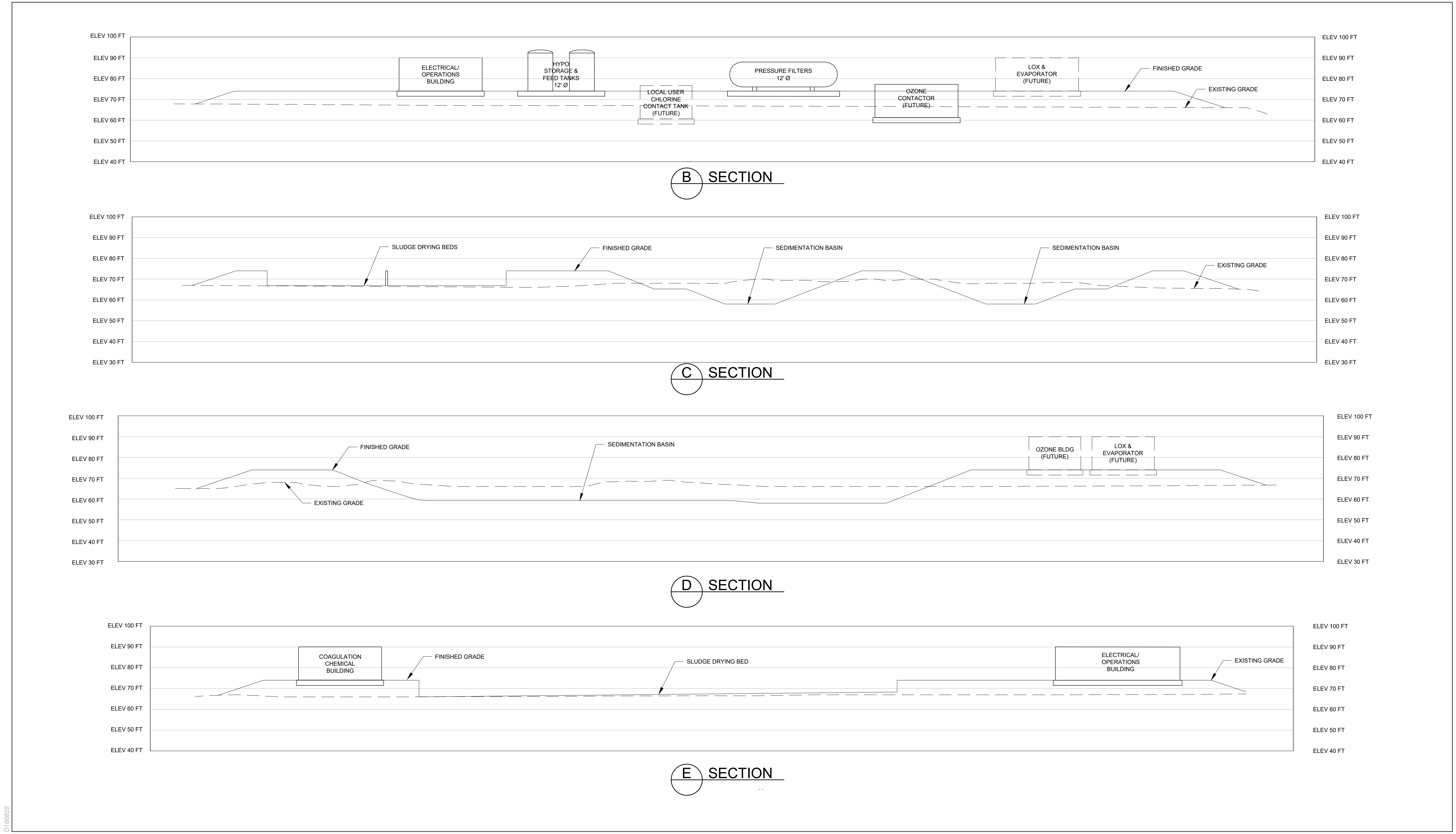
INF = Influent
SS = Sanitary Sewer
LOX = Liquid Oxygen
TS = Thickened Sludge
SL = Sludge
SD = Storm Drain

D160822

SOURCE: Carollo Engineers, 2018

Figure 2-16
Optional Water Treatment Plant Preliminary Site Plan

ESA



SOURCE: Carollo Engineers, 2018

College Lake Integrated Resources Management Project

Figure 2-17
Optional Water Treatment Plant Preliminary Cross Section

ESA

2.5.6 College Lake Pipeline

The Project would include an approximately 5.5-mile-long, 24-inch-diameter pipeline made of polyvinyl chloride or high density polyethylene from the WTP to the CDS and the RWF.[33] (Refer to Figure 2-4 for a map depicting areas that could receive treated water from College Lake.) As shown on Figures 2-3a through 2-3e, the College Lake pipeline route generally follows existing road rights-of-way and traverses agricultural fields. The location of the easternmost segment of the College Lake pipeline would depend on the WTP site selected for implementation (refer to Figure 2-3a); this EIR evaluates all potential pipeline segments shown on Figure 2-3a at equal levels of detail. While PV Water prefers to install the College Lake pipeline in West Beach Street at the SR 1 crossing, there may not be sufficient room beneath the roadway at this location. The exact location of existing utilities in this segment of West Beach Street would be determined during design. Consequently, PV Water is considering a different alignment for the pipeline segment between the intersection of West Beach Street and Harvest Drive and the Watsonville Wastewater Treatment Facility (Figures 2-3d and 2-3e). Both alignments are analyzed in this EIR.

2.6 Construction

2.6.1 Construction Schedule, Hours, and Work Force

2.6.1.1 Construction Schedule

Construction is expected to last about 18 months and would be initiated following project approval, issuance of permits, and completion of design. For purposes of evaluation, it is assumed that construction would begin in 2022 and end in 2023. **Table 2-5** shows the currently anticipated construction schedule and duration of each activity.

2.6.1.2 Construction Hours

Standard hours for construction activities generating noise would be 8:00 a.m. to 5:00 p.m., Monday through Saturday. Truck trips would generally be scheduled outside of peak commute hours when feasible (i.e., avoiding weekdays from 7:00 a.m. to 9:00 a.m. and 4 p.m. to 6 p.m.). Exceptions to standard construction hours would include:

- ***Weir Structure and Intake Pump Station Construction.*** Given seasonal constraints on the construction of these Project components (no work would occur during the wet weather season) and the distance from sensitive receptors, standard construction hours for the proposed weir and intake pump station would be 7:00 a.m. to 7:00 p.m. seven days per week.
- ***Trenchless Pipeline Construction.*** Tunneling requires continuous excavation. Consequently, pipeline construction at the locations circled on Figures 2-3a through 2-3e could occur for up to 24 hours per day and (for longer tunneling such as beneath Corralitos Creek) several days in a row.

[33] Carollo Engineers, PV Water, BMP Program Management Services, College Lake to CDS Pipeline Routing Study, Final, August 2017.

TABLE 2-5
APPROXIMATE CONSTRUCTION SCHEDULE

Project Component/Construction Phase	Expected Duration	Estimated Schedule
Water Treatment Plant		
Mobilization	1 month	April 2022
Grading and Surcharging Fill Pad[a]	3.5 months	May 2022 – August 2022
Concrete Work	8 months	September 2022 – April 2023
Mechanical Equipment installation	2 months	May 2023 – June 2023
Pre-Commissioning	0.5 month	July 2023
Weir Structure and Intake Pump Station		
Mobilization	1 month	April 2022
Dewatering, Grading and Excavation	0.5 month	June 2022
Pile Driving	0.5 month	June 2022
Concrete Work	6 months[b]	July 2022 – December 2022
Demolition of Existing Weir Structure	1 month[b]	October 2022
Mechanical Equipment Installation	1.5 months	May 2023 – July 2023
Pre-Commissioning	1 month	July 2023 – August 2023
System Commissioning		
Intake and Treatment Process Startup and Testing	1.5 months	July 2023- August 2023
Begin Delivery of Treated Water	NA	August 2023
Contractor Demobilization	1 month	September 2023
College Lake Pipeline		
Pipeline Construction	13 months	June 2022 – June 2023

NOTES:

a Schedule based on construction of grading and surcharging fill pad for the preferred WTP site. The duration of surcharging for the optional WTP site would be increased by 12 to 18 months to allow for consolidation of fill pad at that site. There would be no construction activity at the site during consolidation. The remainder of the construction phase durations for the WTP would be the same for both site options.

b The construction site would be winterized and no work would occur within the Salsipuedes Creek channel between November 2022 and May 2023, at which point debris would be removed from the site, and winterization material would be removed from the creek. Construction of upland parts of the intake pump station could occur during this time as they would be out of the creek channel.

SOURCE: Carollo Engineers, Request for Information, e-mail from R. Gutierrez, November 16, 2018; Carollo Engineers, e-mail from R. Gutierrez, February 12, 2018.

2.6.1.3 Construction Workforce and Equipment

Table 2-6 identifies the workforce as well as the construction equipment associated with the various Project components. Between 11 to 26 workers would be working at a construction site at any given time.

2.6.1.4 Staging and Laydown Areas

Construction equipment and materials would be stored within the construction work areas to the extent feasible, though additional offsite laydown areas may be required. If required, the additional laydown area(s) would be located near the Project sites. Construction staging and laydown for the proposed weir structure and intake pump station would occur within an approximately 0.6-acre area surrounding the facilities. Construction staging and laydown for the proposed WTP would consist

TABLE 2-6
CONSTRUCTION WORKFORCE AND EQUIPMENT

Project Component	Approximate Average Daily Work Force	Construction Equipment	
Weir Structure and Intake Pump Station	18	• Excavator (2) • Concrete delivery trucks (1) • Back Hoe/Track Hoe (1) • Fork Lifts (2) • Pile driving equipment (1)	• Crane (1) • Pumps (4) • Generator Set (1) • Wiring Pulling Machine (1) • Air Compressor (1)
Water Treatment Plant (Both Site Options)	26	• Excavator (2) • Concrete delivery trucks (1.9) • Dozers or Scrapers (2) • Skip Loader (1) • Back Hoe/Track Hoe (2) • Fork Lifts (2) • Crane (1)	• Scissor Lift (1) • Pumps (8) • Air Compressor (4) • Water Truck (1) • Generator Set (2) • Asphalt/Paver Truck (1) • Wiring Pulling Machine (2)
College Lake Pipeline and Pipeline from Weir Structure to Water Treatment Plant	11	• Excavator (1) • Skip Loader (1) • Back Hoe/Track Hoe (2) • Fork Lifts (1) • Plate Compactor (2 • Pumps (2)	• Air Compressor (1) • Water Truck (1) • Generator Set (1) • Concrete Saw (1) • Asphalt/Paver Truck (1) • Sweepers/ Scrubbers (1)
Trenchless Pipeline Installation	5	• Mud Pump (1) • Drilling Rig (1) • Excavator (1) • Crane (1)	• Backhoe (2) • Drill Fluid Treatment System (1) • Sheet Pile Driver (1)

SOURCE: Carollo Engineers, Request for Information, e-mail from R. Gutierrez, November 16, 2018; Carollo Engineers, e-mail from R. Gutierrez, February 12, 2018.

of the WTP site (either preferred or optional); a construction disturbance area (e.g., to accommodate heavy equipment movement for site grading) would also occur within up to 30 feet from the WTP site boundary, although Salsipuedes Creek, the Pinto Creek drainage ditch, and Holohan Road would be avoided. Staging and laydown for pipeline construction would occur primarily within the width of the construction corridor and along the pipeline route.

2.6.2 Soils Management and Disposal

Table 2-7 presents the estimated volume of excess soil and rock material (spoils) that would be generated during construction of each Project component. Excess excavated material generated during project construction of each component would be off-hauled to Buena Vista Landfill or appropriate recycling facility.

Construction of the WTP at the optional site would require importing soil for the fill pad. Clean fill and other materials (e.g., pipe bedding) would also be required for other Project components.

TABLE 2-7
EXCAVATION SOIL VOLUMES

Project Component	Excavation Soil Volume (cubic yards)	Bulking Factor[a]	Excavated Soil to be Reused as Fill (cubic yards)	Excess Spoils to be Hauled Away (cubic yards)
Weir Structure	4,100	30%	0	5,300
Intake Pump Station	1,700		0	2,200
Preferred Water Treatment Plant Site	19,800		17,800	4,700
Optional Water Treatment Plant Site	8,900		8,000	1,200
Pipeline from Weir Structure to Water Treatment Plant[b]	2,500		1,100	1,800
College Lake Pipeline	34,400		21,500	16,300
			Total Excess Soils[c]	**26,800 - 30,300**

NOTES:
[a] The bulking factor is the measure of change in volume of a material from when it is excavated to when it is deposited.
[b] Only applies to preferred WTP site since optional WTP site is adjacent to weir.
[c] Totals may not add due to rounding.

SOURCE: Carollo Engineers, Request for Information, e-mail from R. Gutierrez, November 16, 2018; Carollo Engineers, e-mail from R. Gutierrez, February 12, 2018.

2.6.3 Construction Traffic Routing

The construction work force would likely come from Santa Cruz and Monterey County areas via SR 1 and/or SR 152. Vehicle trips would originate from a variety of locations and distances, but the primary vehicle access route for construction haul trucks and deliveries to the weir structure and treatment plant sites would be via Holohan Road. Trucks are anticipated to travel to and from Holohan Road to SR 1 using SR 152 and Airport Boulevard. Delivery trucks would use streets in the immediate area of the College Lake pipeline installation to access the construction corridor in the City of Watsonville.

Construction debris and recyclable material would be transported from the Project sites to the Buena Vista Landfill. Trucks exiting the treatment plant and weir structure construction sites would travel west on Holohan Road, continue onto Airport Boulevard, turn right onto Ranport Road, and turn left onto Buena Vista Drive to arrive at the landfill.

2.6.4 Demolition of Existing Weir Structure

Construction activities would include demolition of the existing weir and pump station. The proposed weir diversion structure would be constructed just downstream of the existing weir in Salsipuedes Creek. Demolition of the existing weir and pump station would occur after the concrete and grading work for the proposed weir structure is complete, allowing the existing weir to hold back any potential flow and facilitating diversion of flows around the construction zone. Demolition activities within the creek would take place during the dry weather season.

2.6.5 Weir Structure and Treatment Plant Construction

In general, construction of the proposed weir structure, intake pump station, and WTP facilities would involve dewatering; grading and excavation; pile driving; erecting concrete structures; installing piping, pumps, electrical and mechanical equipment; testing and commissioning facilities; finish work such as erecting enclosures; installing flooring, doors, windows, landscaping, and fencing; and painting and paving. Table 2-6 identifies the equipment that would be required for construction of these Project components.

2.6.6 Pipeline Installation

The construction method for installation of the pipelines (i.e., the pipeline connecting the pump station at the proposed weir structure to the treatment plant and the College Lake pipeline) would depend on location. Conventional open-trench construction techniques would be used for installation of pipelines in existing roadways and agricultural fields. Crossings of several surface features (creeks and other drainages, railroads, and state highways) would require trenchless construction; these locations are shown on Figures 2-3a through 2-3e and identified in **Table 2-8**.

Under typical circumstances in urban areas, the width of the disturbance corridor for pipeline construction would be approximately 20 feet. One full lane width and shoulder (or parking lane) closure would be required, with alternating one-way traffic control on two-lane roads. For open-trench pipeline construction in agricultural fields, a 40-foot-wide construction corridor generally would be used to facilitate construction and movement of equipment, where possible. A typical pipeline trench would be approximately 6.5 feet wide and would typically be no more than 8 feet deep (additional depth might be necessary in some locations to avoid conflict with existing utilities). Table 2-8 lists typical construction equipment for pipeline installation. Pipeline construction is estimated to occur at installation rates of approximately 100 linear feet per day for urban areas, and up to 250 linear feet per day in undeveloped areas such as agricultural fields. Each trenchless crossing would take about one week to complete. Construction of the College Lake pipeline is expected to take about 13 months.

2.6.6.1 Open Trench Installation

The overall construction sequence for installation of pipelines would involve: clearing and grading the ground surface along the pipeline alignment; excavating the trench; dewatering of the excavation if necessary; installing pipe bedding material (sand or aggregate); preparing and installing pipeline sections; backfilling the trench; regrading the ground surface; and revegetating or paving as appropriate. Construction of pipeline segments within agricultural land would disrupt farming activities; this issue is addressed in Section 3.2, Land Use and Agricultural Resources. The traditional open-trench construction method involves using a conventional backhoe, excavator, or other mechanized excavation equipment. The pipeline trench would be stabilized with trench boxes or by shoring, or (in farm fields) laying back and benching slopes to prevent the walls from collapsing during construction. The contractor would line the trench bottom with pipe bedding that would be shaped to support the pipeline. Installers would then place sections of the new pipelines in the trench, and then backfill the trench with native or imported fill material. The minimum depth of cover above the pipeline in agricultural fields is expected to be 5 feet, which is expected to provide sufficient cover to avoid conflicts with typical farming operations, such as tilling and ripping. However, the pipeline easements would preclude certain farming practices (e.g., deep excavation, tree planting) to prevent damage to the pipeline. The pipelines would be pressure-tested and disinfected prior to being placed in operation.

2.6.6.2 Trenchless Pipeline Installation

One of the following two trenchless pipeline installation techniques would be used:

- ***Horizontal Directional Drilling.*** This is a type of trenchless pipeline installation that involves drilling a pilot bore using a surface-mounted drill rig with tracking and steering capabilities. The pilot bore is launched from the surface at an angle, transitions to horizontal as the required depth is reached, and finally angles back up to the surface at the exit location. Following enlargement of the pilot hole to the appropriate diameter, the pipe is pulled through the drill path to the exit pit. Drilling fluids (typically containing bentonite, an inert clay) are used to lubricate the cutting head, transport drill cuttings to the surface in a slurry, and stabilize the bore path, especially in loose or soft soils. After use, the drilling fluids would undergo treatment on site prior to disposal. Construction at the entry site would require an approximately 150-foot-wide and 250-foot-long area, and the exit site would need an approximately 100-foot-wide by 250-foot-long area.

- ***Jack and Bore.*** This method requires the use of a horizontal boring machine or auger to drill a hole, and a hydraulic jack to push a casing through the hole under the crossing. As the boring proceeds, a steel casing pipe is jacked into the hole and the pipeline is installed in the casing. This process requires the excavation of pits typically 10 feet by 35 feet (depth varies) at opposite ends of the crossing.

Groundwater levels in excavation areas would be measured prior to construction to help determine the extent of dewatering required. Soil removed from pits would either be stockpiled and reused, or loaded directly into dump trucks and hauled away for disposal. If existing soil is not adequate for backfilling, then new material would be imported for backfilling.

2.6.7 General Construction Activities

2.6.7.1 Construction Dewatering

Two types of dewatering discharges would be necessary during project construction:
(1) dewatering of groundwater and rainwater in open excavations; and (2) discharges of water after cleaning the newly installed pipes before they are connected.

Dewatering of excavated areas would be temporary and necessary when surface water or subsurface water is encountered. Water from excavated areas would be discharged to agricultural lands, storm drains, or other waterways, and would be discharged in accordance with applicable regulatory requirements (refer to Section 3.3, Surface Water, Groundwater, and Water Quality). The contractor would treat water from excavated areas as necessary prior to discharge. The treatment could include settling tanks or filter bags to allow sediment to settle out.

TABLE 2-8
COLLEGE LAKE PIPELINE CONSTRUCTION DETAILS

Segment[a]	General Location	Location in Public Streets[b]	From	To	Length (ft.)	Construction Method	Full Road Closures[c]	Estimated Average Production Rate (linear ft./day)[d]
A	**Preferred:** Unincorporated Santa Cruz County - Located within agricultural fields and within public right of way	Holohan Road	Proposed Weir	Preferred Water Treatment Plant Site, Wagner Avenue & Mohovy Street	6,400	Open Trench, Trenchless at Corralitos Creek Crossing	None	100-250
	Optional: Unincorporated Santa Cruz County - Located within agricultural fields and within public right of way	Holohan Road	Proposed Weir	Optional Water Treatment Plant Site, Wagner Avenue & Mohovy Street	4,700	Open Trench, Trenchless at Corralitos Creek Crossing	None	100-250
B	City of Watsonville – Located within public right of way	Wagner Avenue Mohovy Street Dolores Avenue California Street Martinelli Street Tuttle Avenue Tharp Avenue Palm Avenue State Route 152 Hushbeck Avenue East Beach Street	Wagner Avenue & Mohovy Street	East Beach Street & Lincoln Street	7,040	Open Trench, Trenchless at State Route 152 Crossing if feasible (otherwise trenched)	Assumed closures of Palm and Hushbeck Avenue at State Route 152 Crossing	100
C	City of Watsonville – Located within public right of way	Lincoln Street Maple Avenue 2nd Street Pine Street	East Beach Street & Lincoln Street	Pine Street & West Beach Street	5,520	Open Trench, Trenchless at Railroad Crossing; State Route 152 Crossing at Lincoln and Beach Streets open trench or trenchless	None	100
D	**Preferred:** City of Watsonville and Unincorporated Santa Cruz County – Located within public right of way	West Beach Street	Pine Street & West Beach Street	West Beach Street & Lee Road	5,700	Open Trench	None	100
	Optional: City of Watsonville and Unincorporated Santa Cruz County – Located within public right of way and agricultural fields	West Beach Street, Harvest Drive	West Beach Street & Harvest Drive	State Route 1	6,250	Open Trench, Trenchless at State Route 129 Crossing	None	100-250
E	**Preferred:** Unincorporated Santa Cruz County – Located within public right of way	West Beach Street Clearwater Lane	West Beach Street & Lee Road	Watsonville Wastewater Treatment Facility	4,500	Open Trench	None	100
	Optional: Unincorporated Santa Cruz County – Located within public right of way and agricultural fields	None	State Route 1	Watsonville Wastewater Treatment Facility	3,560	Open Trench, Trenchless at State Route 1 crossing of Optional Pipeline alignment		
Flushing, Pressure Testing, Chlorination	Entire Pipeline					N/A	None	N/A
Final Paving	All segments except for Segment A				23,400[e]	Paving	Same as Segment B	700
				Total[f]	**27,070-29,160**			

NOTES:

[a] Please refer to Figures 2-3a through 2-3e for segment locations. Segments A through E identified in Table 2-8 correspond with the figure letter on Figure 2-3 (i.e., Figure 2-3a depicts Segment A, etc.). All table contents apply to both preferred and optional pipeline alignments unless otherwise noted.
[b] Includes longitudinal encroachments in streets; does not include streets crossing alignment. Refer to maps for streets crossing the pipeline alignments.
[c] Only the portions of roads under construction would be closed. Remaining segments of the pipeline alignment would remain open.
[d] The production rate is subject to variation due to site conditions (access, existing utilities, and traffic control requirements).
[e] Assumes preferred pipeline for Segments D and E. The optional pipeline at Segments D and E would not require paving, as they are within agricultural land,
[f] The lower range of pipeline length assumes construction of the optional pipeline at Segments A, D, and E. The higher range assumes construction of the preferred pipeline at Segments A, D, and E.

This page intentionally left blank

After pipeline installation, the construction contractor would clean and disinfect the newly installed pipelines by removing materials and debris and flushing with chlorinated water before bringing the pipe into service. The water at the outlet end of the pipeline would be collected, transported to and treated at the Watsonville Wastewater Treatment Facility.

2.6.7.2 Site Cleanup and Restoration

Project construction activities would result in up to approximately 15 acres of ground disturbance (refer to **Table 2-9**, below). After construction, undeveloped areas and agricultural fields used during construction would generally be restored to pre-project conditions consistent with applicable permit conditions.

TABLE 2-9
ANTICIPATED GROUND DISTURBANCE

Project Component	Approximate Area (square feet)	Approximate Area (acres)
Weir Structure and Intake Pump Station	26,100	0.6
Water Treatment Plant[a]	283,100 - 300,600	6.5 - 6.9
Connection from Weir Structure to Water Treatment Plant	24,000	0.6
College Lake Pipeline	300,000	6.9
Total Disturbance Area[a]	**633,200 - 650,700**	**14.6 - 15.0**

NOTES:

[a] The lower range of ground disturbance reflects construction at the preferred WTP site, while the higher number reflects construction at the optional WTP site.

SOURCE: Carollo Engineers, e-mail from R. Gutierrez, February 12, 2018.

2.7 Operations and Maintenance

PV Water has developed preliminary strategies to operate and maintain College Lake, described below, based on facility conceptual design, hydrologic and hydraulic modeling, information on demand for irrigation water, and Project yield. Given the complex nature of the multiple Project objectives, PV Water is also proposing to develop an Adaptive Management Plan (AMP). That framework for adaptive decision making is described below in Section 2.7.3 after the planned operations and management are described.

2.7.1 Operations

2.7.1.1 Operations Before and During Construction

For purposes of analysis, it is assumed that RD 2049 would continue its current pumping and water management practices until commencement of Project construction. During construction of the proposed weir structure and other Project components, PV Water would pump water from the College Lake lakebed in a manner similar to current procedures and then would bypass all inflows via a temporary pipeline into Salsipuedes Creek. Refer to Section 3.4, Biological

Resources, regarding measures to avoid or reduce impacts on sensitive resources during Project construction.

2.7.1.2 Proposed Fish Passage and Bypass of Casserly Creek During Operations

As described in Section 2.5.4, the proposed weir structure would be designed to accommodate release of fish bypass flows and to facilitate fish passage between Salsipuedes Creek and College Lake. Table 2-1 lists proposed minimum lake levels and minimum flows for fish passage for adult steelhead migration (December 15 through March 31) and smolt outmigration (April 1 through May 31).

Fish bypass releases would begin only when the water surface elevation in College Lake increases to the minimum level at which passable conditions for fish would have occurred without the existing weir in place and with flows being regulated only by the existing channel topography in Salsipuedes Creek. These conditions correspond to the College Lake water surface elevation that yielded a depth of 0.6 feet at the critical riffle (59.5 feet NAVD88) for the adult season, and 0.4 feet of depth (59.3 feet NAVD88) for the smolt season, as determined by a critical riffle analysis.[34] After the simulated lake level reached this minimum level for the adult season, the Water Budget Model computed simulated fish bypass releases by determining which hydraulic reaches could be made passable. The proposed flows based on site-specific fish passage studies that included the results of the critical riffle analysis for three hydraulic reaches and locations are:

- ***Salsipuedes Creek between Corralitos Creek the Pajaro River.*** This reach is considered passable when the total of the flow from Corralitos Creek and the College Lake outflow is greater than or equal to 21 cfs for adult fish and 8 cfs for smolts.
- ***Salsipuedes Creek between the Proposed Weir Structure and Corralitos Creek.*** Flows required to make this reach passable must produce a depth of 0.6 feet in the reach's critical riffle for adults and 0.4 feet for smolts, which correspond to minimum College Lake outflows of 1.8 cfs and 1.0 cfs, respectively.
- ***Weir Structure.*** The minimum weir passage flow rates would be refined during the design phase of the fish passage structure; for modeling and evaluation purposes, these rates have been assumed to be the same as the corresponding minimum rates for the reach of Salsipuedes Creek between the proposed weir structure and Corralitos Creek.

Releases for fish passage would not exceed total inflows into College Lake during any time step. Figure 14 in **Appendix HYD** details the decision logic used in the Water Budget Model for fish bypass flows.

In addition, PV Water anticipates that other future conditions may warrant pumping flows from College Lake into Salsipuedes Creek during the summer and fall. The Project design includes a 30-inch bypass pipeline from the pump station to the downstream side of the proposed weir structure for this purpose. This bypass pipeline could be used to drain College Lake for equipment maintenance or equipment repair, to ensure the lake bottom is able to dry out for

[34] Podlech, M., *College Lake Integrated Resources Management Project, Fish Passage Assessment*, March 2019.

purposes of predator control, or to prevent water quality issues such as low dissolved oxygen, algal blooms, or other unforeseen issues from developing within the lake. Although PV Water is not presently able to anticipate the frequency of such operations, the bypass pipeline would be operated in compliance with applicable regulatory permit conditions.

2.7.1.3 Proposed Weir Operations

To understand the potential flood impacts of the Project compared to existing conditions, cbec, inc. eco engineering (cbec) conducted two-dimensional modeling of flood dynamics associated with the 10-year and 100-year run-off events (refer to Appendix HYD). Based on this analysis, PV Water would manage the proposed adjustable weir[35] to avoid exacerbating flood risk while retaining water from late season precipitation events for subsequent treatment and distribution to irrigators in the Pajaro Valley. The proposed weir would be raised to 62.5 feet NAVD88 following the last anticipated significant storm event of the season. Factors that would affect the timing of the weir adjustment include water surface elevation and corresponding duration of drawdown, short- and long-term meteorological forecasts, and downstream channel conditions. Refer to Section 3.3, Surface Water, Groundwater, and Water Quality, and Appendix HYD for more detail.

2.7.1.4 Water Supply Extractions

Table 2-1 lists anticipated average and maximum annual water diversion rates. PV Water provided estimated monthly demands based on existing conditions for irrigation water for each modeled water year type (i.e., ranging from very wet to extremely dry). Operational criteria used in the water budget model to determine the extent to which projected monthly demand could be met included the following restrictions:

- Water supply extractions could not begin until lake achieved the lake levels for adult steelhead migration and smolt outmigration shown in Table 2-1; and
- For the period December 15 to May 31, only College Lake inflows exceeding the proposed minimum fish bypass flows in Table 2-1 could be diverted to the treatment plant for irrigation supply.

Depending on water year type, monthly demand was estimated at anywhere from 14 acre-feet to 470 acre-feet (refer to Appendix HYD).

2.7.1.5 Water Treatment Plant

The WTP may be operated 24 hours per day, seven days a week, at flow rates up to 9,000 gallons per minute.

35 As described in Section 2.5.4, Weir Structure and Intake Pump Station, the weir crest could be adjusted from 60.1 feet NAVD88 (the height of the existing weir) to 62.5 feet NAVD88.

2.7.2 Maintenance

2.7.2.1 Weir Structure, Pump Station, Water Treatment Plant and College Lake Pipeline

Once the Project is fully operational, PV Water staff would periodically conduct routine inspections (e.g., for visual signs of wear and tear, obstructions or leakage) and perform scheduled maintenance of the weir structure, pump station, WTP and pipelines. Should damage to facilities occur, PV Water would dispatch a crew to conduct the necessary repairs.[36] Standby equipment, including standby emergency diesel generators, would be periodically tested.

2.7.2.2 College Lake Water Storage Area

With implementation of the Project, water would be stored in College Lake longer, requiring changes in existing land use activities. PV Water would conduct routine (annual or semi-annual) maintenance activities within College Lake to preserve water storage capacity, avoid exacerbating existing flood hazards,[37] and manage habitat in a manner consistent with requirements established in permits and approvals and in accordance with the AMP. PV Water has committed that the AMP would provide a framework for routine monitoring and maintenance of habitat. PV Water would conduct initial geomorphological assessments to confirm the factors in the watershed that control sediment production, transport, and deposition and to guide development of effective maintenance activities. The amount and type of maintenance or management actions needed in any given year would depend on weather and hydrologic conditions, and frequency and extent of past maintenance activities. For purposes of evaluation in this EIR, potential routine maintenance activities are anticipated to include the following:[38]

- ***Vegetation*. Figure 2-18** depicts areas proposed for vegetation management; these are areas that are farmed under baseline conditions and that are expected to support seasonal wetland vegetation with implementation of the Project. PV Water is not proposing any specific vegetation management activities within the existing willow forest habitat on land currently owned by the agency. In general, areas below 59 feet in elevation would be managed as open water habitat during the wet season. Vegetation management in this area during the dry season, assumed to occur as frequently as once per year, would support this habitat and could include disking and tilling, trimming and mowing, and removal of flow-constricting

[36] During the life of the Project, emergencies could occur that could affect the environment. A situation is considered an "emergency" if it is a sudden, unexpected occurrence involving a clear and imminent danger that demands immediate action to prevent or mitigate loss of or damage to life, health, property, or essential public services (Public Resource Code Section 21060.3). Because emergency situations by their nature cannot be foreseen, they are not covered in this EIR.

[37] The Santa Cruz County Flood Control and Water Conservation District Zone 7 (Zone 7) is responsible for the provision of drainage improvements in the Project area. Zone 7 was formed for the primary purpose of improving the flood carrying capacity of the Pajaro River, Salsipuedes Creek and Corralitos Creek systems within the Pajaro Valley floodplain. This is achieved through funding the maintenance of and minor capital improvements to existing drainage facilities within the zone's boundaries. Santa Cruz County Flood Control and Water Conservation District Zone 7 does not currently have an existing stream maintenance plan or other adopted sediment management plan for the College Lake area. (County of Santa Cruz Department of Public Works, Flood Control and Water Conservation District: Zone No. 7, 2019. Available online at http://www.dpw.co.santa-cruz.ca.us/Home/FloodControlStormwater/FCWCZone7.aspx. Accessed on April 10, 2019.)

[38] Depending on vegetation, sediment, and debris management, activities may require additional review under CEQA as the practices are better defined.

vegetation within channels and around Project components and equipment. Proposed vegetation management does not target a reduction of the current extent of riparian forest but aims to limit new establishment of woody riparian plants that could trap sediment and restrict flow or drainage. Aquatic vegetation in channels may also be removed mechanically using a drag-line and excavator bucket, and in association with sediment and debris removal described below. Additional preservation and potential enhancement of habitat features in College Lake would be determined in consultation with regulatory agencies with approval authority over the Project. Examples of preservation and enhancement of habitat features that could be required include restrictions on ground disturbance and removal of trash within the existing riparian forest in the lake basin.

- ***Sediment and Debris.*** PV Water would remove excess sediment and debris from certain areas of College Lake. Sediment removal is the act of mechanically removing sediment that has deposited within a channel. The need for sediment removal within College Lake would be evaluated annually during routine facility monitoring. Sediment and debris removal would be conducted during the dry season, and could be implemented if sediment accumulations (for example) impede fish passage, compromise channel capacity, or impair operation of the proposed weir and intake structure. As noted above, the Santa Cruz County Flood Control and Water Conservation District Zone 7 is responsible for the provision of drainage improvements in the Project area. The evaluation presented in this EIR assumes PV Water's maintenance activities would be limited to the College Lake basin.

2.7.3 Adaptive Management

2.7.3.1 Overview

Adaptive management is a science-based approach to manage natural resources through a cycle of continual assessment of progress and adjustment of approaches to meet project goals. The Project would apply an adaptive management approach to achieve College Lake operation and maintenance objectives, consistent with adopted Mitigation Measure BIO-2i.1 presented in Appendix PD-2 of this EIR. The AMP would identify monitoring activities linked to specific goals such as monitoring hydrology/hydraulics and wildlife populations, triggers for taking adaptive management actions, and finally a suite of potential management actions that respond to the monitoring results, such as active vegetation, sediment, and debris removal as described in Section 2.7.2.2.

Mitigation Measure BIO-2i.1 requires that an AMP for College Lake be developed in consultation with state and federal resource agencies (NMFS, U.S. Fish and Wildlife Service, and CDFW), and College Lake stakeholders. The mitigation measure calls for development of multi-year baseline waterfowl population and habitat use data, and integration of hydrology and hydraulic analyses and fish passage flow and bypass criteria (based on consultation with state and federal agencies). PV Water has collected data on waterfowl population since 2015, conducted hydrologic and hydraulic modeling for the Project that incorporates fish-bypass flows developed through site-specific fish passage studies, and estimated the projected changes in water depths that would occur due to Project operations over time and during different water year types. These data will help provide the baseline environmental conditions for the AMP. PV Water would continue monitoring wildlife, hydrologic, and hydraulic conditions according to the protocols and objectives established in the AMP.

2.7.3.2 Development of the College Lake AMP

PV Water would develop the College Lake AMP as part of Project permits and other agreements, and prior to initiation of Project operations. The first step in developing the College Lake AMP would be to confirm specific College Lake operations and maintenance objectives. The following initial concepts for AMP objectives reflect the goals of the proposed operations and maintenance procedures described in the preceding sections:

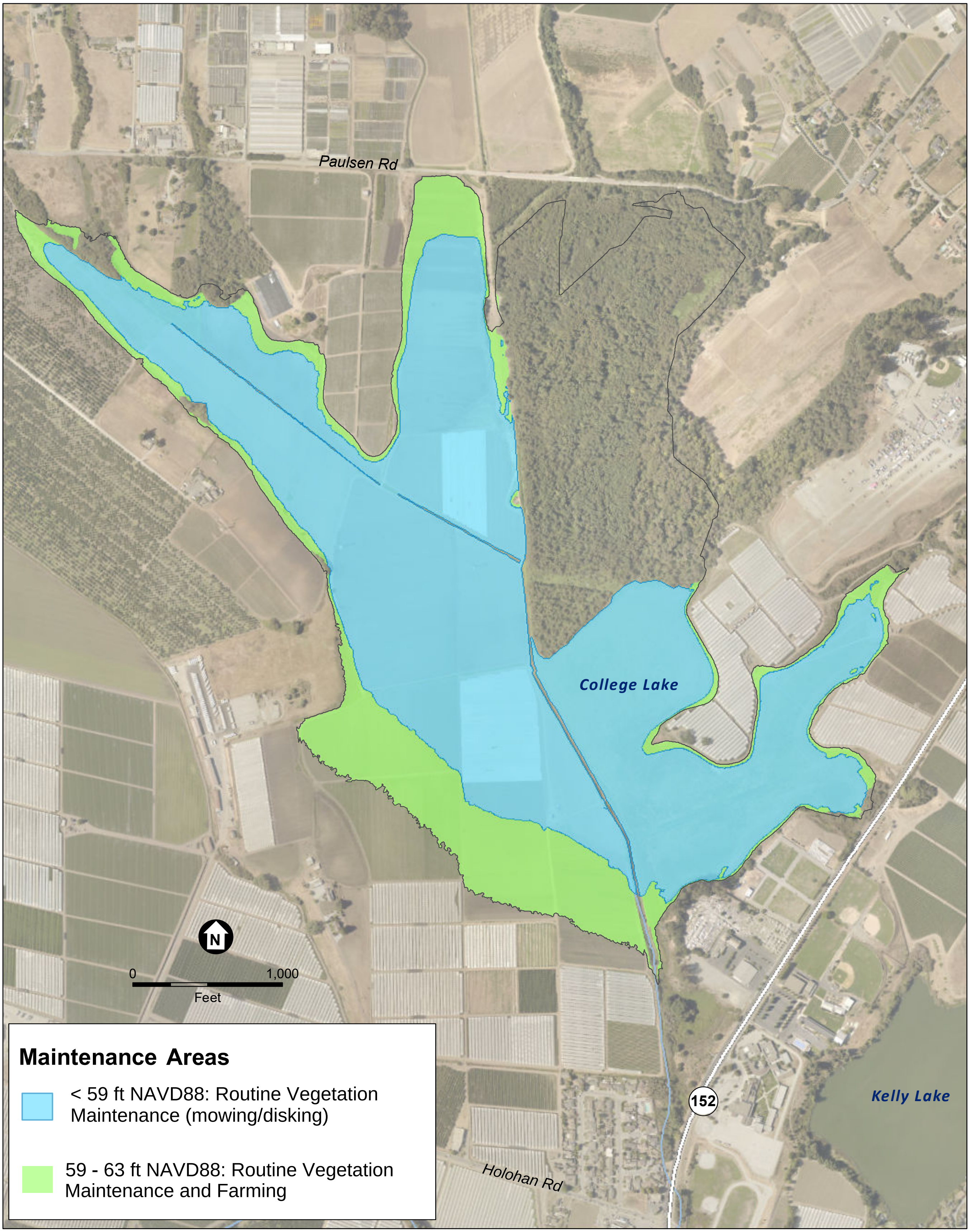
- ***Fish passage****:* Improve fish passage between Salsipuedes Creek and College Lake.
- ***Water Storage****:* Preserve water storage capacity within College Lake.
- ***Flooding****:* Avoid exacerbating existing flood hazards outside the proposed water storage area.
- ***Farming***: Promote farming within the College Lake basin between 59 feet and 63 feet elevation NAVD88.
- ***Waterfowl management****:* Support continued waterfowl use of College Lake.

The AMP objectives would also address water quality (refer to Mitigation Measure HYD-2a in Section 3.3, Surface Water Groundwater, and Water Quality).

Developing and prioritizing specific AMP objectives would include modifying the proposed operations and maintenance described in the preceding sections to conform with permit conditions. Following this step, PV Water would solicit input on the draft objectives from local stakeholders. Local stakeholders could include the neighboring property owners, governmental and non-governmental agencies and organizations, and other interested parties. For each specific objective, PV Water would then develop monitoring criteria, data gathering methods, evaluation procedures, action triggers based on the evaluation results, and management actions. In addition, fundamental to any AMP is a commitment to periodically re-evaluate objectives in the presence of new data.

2.7.4 Truck Trips During Operations and Maintenance

Operations and maintenance activities would generate solids from the water treatment process, estimated at approximately 200,000 pounds annually and requiring 52 truck trips per year (assumed 9-cubic yards per truckload). Routine maintenance activities within College Lake would generate an estimated 1,300 truck trips per year. Operations and maintenance sediment and debris would be hauled to the Buena Vista Landfill for recycling or disposal.



SOURCE: USDA, 2016; ESA, 2018

Note: NAVD88 = North American Vertical Datum of 1988

College Lake Integrated Resoures Management Project

Figure 2-18
Proposed Maintenance Areas within College Lake

ESA

2.7.5 Mosquito Abatement

With implementation of the Project, water would be stored in College Lake for a longer period of time compared to existing conditions. Standing water can be used as habitat by pest species such as mosquitoes, which can cause nuisance level populations that would be capable of dispersing into the surrounding community. The Santa Cruz County Mosquito Abatement and Vector Control, County Service Area 53 works with land owners to prevent the spread of mosquito-transmitted diseases through mosquito breeding abatement. Abatement measures commonly include reducing breeding sources and controlling the aquatic stages of larval development to prevent the hatching of adult mosquitoes. PV Water would coordinate with Mosquito Abatement and Vector Control to determine the specific measures that would be employed to control mosquitoes at College Lake, if warranted. Refer to **Appendix PD-3** for background information on this issue and potential measures that could be employed to control mosquito populations.

2.8 Intended Uses of the EIR

This EIR is intended to provide the information and describe the environmental consequences of the Project in accordance with CEQA requirements for public disclosure, and to assist public agency decision-makers in considering the approvals necessary for implementing the Project. If the Board certifies this EIR as adequate and approves implementation of the Project, the Agency would then proceed with design and carry out the following actions:

- ***Permits and Approvals***. PV Water would conduct the necessary studies and consultations to obtain the permits and approvals shown in **Table 2-10**. PV Water would also obtain any other regulatory approvals required by law.
- ***Acquisition of Property, Easements and Rights-of-Way***. PV Water would obtain rights to access and use the Project sites (as described in Section 2.2, Project Location) and a water-right permit on water-right Application A032881, which PV Water has filed with the State Water Resources Control Board. The decision regarding the type of property rights (e.g., ownership, easement, or right-of-way) to obtain would depend on, among other things, characteristics of the proposed use and negotiations with landowners. After the types of property rights are determined, PV Water would work with landowners to develop and execute agreements to secure those rights, including developing legal descriptions and appraisals. PV Water would meet with the affected property owners and their representatives to attempt to reach agreements on the terms under which the Agency would procure the property rights.
- ***RD 2049.*** Upon PV Water’s securing all required regulatory approvals and acquiring all necessary property rights, easements and rights of way, the Project contemplates demolition of the existing weir and pump station operated by RD 2049. As noted in Section 2.1.4.2, the primary (if not sole) function of RD 2049 is to pump College Lake dry each Spring and conduct intermittent pumping thereafter to maintain a dry lake bed suitable for farming for the duration of the dry season. As it would eliminate the sole function of RD 2049, the Project also contemplates the eventual dissolution of RD 2049 in accordance with the

Cortese-Knox-Herzberg Local Government Reorganization Act of 2000.[39] Dissolution proceedings would either be initiated by PV Water or RD 2049's Board of Trustees.

- ***Final Design, Bid, and Project Construction.*** Refer to Table 2-5 in Section 2.6, Construction, regarding the schedule for project construction.

TABLE 2-10
REQUIRED PERMITS AND APPROVALS

Agency or Organization	Action Requiring Permit or Consultation	Permit or Approval
Federal		
U.S. Army Corps of Engineers	Impacts on wetlands/waters of the U.S.	Clean Water Act Permits
U.S. Fish and Wildlife Service	Impacts on biological resources and federal nexus	Endangered Species Act Section 7 compliance
U.S. Fish and Wildlife Service: National Marine Fisheries Service	Construction in wetland and upland areas where federally listed species may be present	Endangered Species Act Section 7 compliance
State		
State Historic Preservation Officer	Construction in or near cultural resources	National Historic Preservation Act Section 106 compliance
State Water Resources Control Board: Division of Water Rights	Diversion and beneficial use of surface water	Water Rights Permit (Application A032881) and Release from Priority of Application A018334
	Funding	Consideration for Clean Water State Revolving Fund loan
California Department of Fish and Wildlife	Alteration of streambeds during construction	Section 1602 Lake and Streambed Alteration Agreement
	If state-listed species are present, or may be present, & project may adversely affect such species	California Endangered Species Act Section 2081 Incidental Take Permit
California Department of Transportation (Caltrans)	Construction in Caltrans right-of-way	Encroachment Permit
Regional Water Quality Control Board	Potential for surface water quality impairment from pollutant discharge	Clean Water Act 401 Certification and National Pollution Discharge Elimination System Permit for Construction
Local		
PV Water	Certification of the Final EIR and project approval	PV Water Board of Directors Approval of EIR
Santa Cruz County	Pipeline construction in unincorporated Santa Cruz County	Encroachment Permit Minor Coastal Development Permit
City of Watsonville	Pipeline construction in City of Watsonville	Grading and Encroachment Permits
Monterey Bay Air Resources District	Backup generators	Permit to Operate

[39] California Government Code Section 56000, et seq.

This page intentionally left blank

CHAPTER 3
Environmental Setting, Impacts, and Mitigation Measures

3.1 Overview

This chapter provides an analysis of the physical environmental effects of implementing the proposed College Lake Integrated Resources Management Project (Project) as described in Chapter 2, *Project Description*. This chapter describes the environmental setting, assesses impacts, and identifies mitigation measures for significant impacts.

The Project was analyzed under its former name—the College Lake with Inland Pipeline to Coastal Distribution System—at a program level of detail in the *2014 Basin Management Plan Update Program Environmental Impact Report* (2014 BMP Update PEIR) as one of seven components under the BMP Update described in Section 2.1.[1] This EIR provides detailed, project-level analysis of the Project based on site-specific and up-to-date information developed subsequent to the preparation of the 2014 BMP Update PEIR. While information from the 2014 BMP Update PEIR is incorporated into parts of this chapter, this EIR provides an independent analysis of the Project's significant impacts.

The 2014 BMP Update PEIR identified mitigation measures that were adopted by the Board of Directors under Resolution No. 2014-05. The adopted mitigation measures are applicable to the BMP Update projects, including the Project. As indicated in Section 2.5.2 of Chapter 2, *Project Description*, for the purposes of this EIR, those mitigation measures (presented in Appendix PD-2) are considered part of the Project.

3.1.1 Scope of Analysis

This chapter is organized by environmental resource topics, as follows:

Chapter 3 Sections	
3.1 Overview	3.8 Noise and Vibration (NOI)
3.2 Land Use and Agricultural Resources (LU)	3.9 Transportation and Traffic (TRA)
3.3 Surface Water, Groundwater, and Water Quality (HYD)	3.10 Cultural Resources (CUL)
3.4 Biological Resources (BR)	3.11 Tribal Cultural Resources (TCR)
3.5 Air Quality and Greenhouse Gases(AIR)	3.12 Energy, Utilities, Public Services, and Recreation (EUP)
3.6 Geology and Soils (GEO)	3.13 Aesthetic Resources (AES)
3.7 Hazards and Hazardous Materials (HAZ)	

[1] The 2014 BMP Update PEIR is available for review at the PV Water offices (36 Brennan Street, Watsonville, CA 95076) and on PV Water's website at https://www.pvwater.org/bmp-update (PV Water, *Final Environmental Impact Report for the Basin Management Plan Update*, February 2014).

Each section of Chapter 3 contains the following elements, based on the requirements of the California Environmental Quality Act (CEQA):

- **Setting.** This subsection describes the existing physical environmental conditions in the Project area with respect to each resource topic, at an appropriate level of detail to allow the reader to understand the impact analysis.
- **Regulatory Framework.** This subsection describes the relevant laws and regulations that apply to protecting the environmental resources within the Project area, and the governmental agencies responsible for enforcing those laws and regulations.
- **Impacts and Mitigation Measures.** This subsection evaluates the potential for the Project to result in adverse effects on the physical environment described in the setting. Each impact analysis section defines significance criteria for evaluating environmental impacts, and the Methodology explains how the significance criteria are applied in evaluating the Project impacts. The conclusion of each impact analysis is expressed in terms of the impact significance under CEQA, which is discussed further below. The analysis documents whether the adopted measures adequately avoid or mitigate significant impacts. Each impact subsection identifies mitigation measures for all of the impacts considered significant, consistent with CEQA *Guidelines* Section 15126.4. If needed, additional mitigation is included in the form of (1) modifications to update the adopted mitigation measures or (2) new mitigation measures to replace or augment an adopted mitigation measure. If additional impacts could result from implementation of a mitigation measure, those impacts are identified, consistent with CEQA *Guidelines* Section 15126.4.[2]
- **Cumulative Impacts.** This subsection discusses cumulative impacts, if applicable, following the description of the project-specific impacts and identified mitigation measures. The cumulative impacts consider the potential impacts of the Project in combination with the impacts of other past, present, and probable future projects.

3.1.2 Significance Determinations

The significance criteria used in this EIR were developed by Pajaro Valley Water Management Agency (PV Water) and are largely based on CEQA *Guidelines* Appendix G. Each section of this chapter presents, before the discussion of impacts, the significance criteria used to analyze each resource topic. The categories used to designate impact significance are as follows:

- **No Impact (NI).** This determination applies if there is no potential for impacts or the environmental resource does not occur within the Project area or the area of potential effect.
- **Less than Significant (LS).** This determination applies if there is a potential for some limited impact but not a substantial, adverse effect that qualifies under the significance criteria as a significant impact. No mitigation is required for impacts determined to be less than significant.
- **Less than Significant with Mitigation (LSM).** This determination applies if there is a potential for the Project to result in an adverse effect that would or could meet or exceed the significance criteria, but feasible mitigation is available that would reduce the impact to a less-than-significant level.

[2] CEQA *Guidelines* Section 15126.4 states that "if a mitigation measure would cause one or more significant effects in addition to those that would be caused by the project as proposed, the effects of the mitigation measure shall be discussed but in less detail than the significant effects of the project as proposed."

- **Significant and Unavoidable with Mitigation (SUM).** This determination applies if the Project would result in an adverse effect that would or could meet or exceed the significance criteria and there is feasible mitigation available to lessen the severity of the impact, but either the residual effect after implementation of the measure would remain significant or there is some uncertainty as to the effectiveness of the mitigation measure (e.g., implementation of the measures relies on an agreement with a third party).
- **Significant and Unavoidable (SU).** This determination applies if the Project would result in an adverse effect that would or could meet or exceed the significance criteria and for which there is no feasible mitigation available.

3.1.3 Approach to Cumulative Impacts Analysis and Cumulative Projects

3.1.3.1 CEQA Provisions Regarding Cumulative Impacts

Cumulative impacts, as defined in Section 15355 of the CEQA *Guidelines*, refer to two or more individual effects that, when taken together, are "considerable" or that compound or increase other environmental impacts. A cumulative impact from several projects is the change in the environment that would result from the incremental impact of each project when added to those of other closely related past, present, or probable future projects. Section 15130 of the CEQA *Guidelines* provides the following pertinent guidance for cumulative impact analysis:

- An EIR shall discuss cumulative impacts of a project when the project's incremental effect is "cumulatively considerable" (i.e., the incremental effects of an individual project are considerable when viewed in connection with the effects of past, current, and probable future projects, including those outside the control of the agency, if necessary).
- An EIR should not discuss impacts that do not result in part from the project evaluated in the EIR.
- A project's contribution is less than cumulatively considerable, and thus not significant, if the project is required to implement or fund its fair share of a mitigation measure or measures designed to alleviate the cumulative impact.
- The discussion of impact severity and likelihood of occurrence need not be as detailed as for effects attributable to the project alone.
- The focus of analysis should be on the cumulative impact to which the identified other projects contribute, rather than on attributes of the other projects that do not contribute to the cumulative impact.

CEQA *Guidelines* Section 15130(b)(1) provides two approaches to a cumulative impact analysis. The analysis can be based (a) on a list of past, present, and probable future projects producing related or cumulative impacts; and/or (b) a summary of projections contained in a general plan or related planning document. Both approaches are used in this EIR.

3.1.3.2 Approach to Cumulative Impact Analysis in this EIR

The cumulative impact analysis considers the effects of the Project together with those of other past, present, or probable future projects proposed by PV Water or others. In Sections 3.2 through 3.13 of this chapter, the cumulative impact analysis for each resource topic follows the analysis of the project-specific impacts. Additional mitigation measures are identified if the cumulative impact analysis determines that a significant cumulative impact could occur and the Project's contribution to a significant cumulative impact would be considerable, even with project-level mitigation. As permitted in CEQA *Guidelines* Section 15130(b)(1), the analysis in this EIR employs the list-based approach for defining projects to be considered in the cumulative impact analysis — that is, the analysis is based on a list of past, present, and probable future projects that could result in related or cumulative impacts. A probable future project is defined as one that is "reasonably foreseeable," which is generally a project for which an application has been filed with the approving agency or that has approved funding. The probable future projects are subject to independent environmental review and consideration by approving agencies. Consequently, it is possible that some of the projects will not be approved or will be modified prior to approval (e.g., as a result of the CEQA process). Projects that are relevant to the cumulative analyses include those that could contribute incremental effects on the same environmental resources and would have similar environmental impacts as those identified for the Project in this EIR.

The cumulative analyses presented in Sections 3.2 through 3.13 first consider whether there is an impact of the Project that could result in adverse physical effects on the environment. If so, the cumulative analysis considers whether any of the relevant projects would result in related impacts or affect the same environmental resources as the Project, resulting in a cumulative impact. If the cumulative impact is considered significant based on the identified significance criteria, the analysis considers whether the Project's contribution would be cumulatively considerable (significant) or not cumulatively considerable (less than significant). If the Project's contribution would be cumulatively considerable, mitigation measures are identified to reduce the Project's contribution to a less-than-cumulatively-considerable level (less than significant with mitigation). If there is no feasible mitigation to reduce the Project's contribution to a less-than-significant level, the Project's contribution to the cumulative impact is considered significant and unavoidable.

Table 3.1-1 describes the past, present, and probable future projects that are considered in the cumulative analyses (based on the factors described above), and their locations are shown on **Figure 3.1-1**. The list includes projects that have overlapping construction schedules with the Project (or would be completed prior to or following Project construction) and that could be constructed in the general vicinity of the Project, with the potential to result in cumulative impacts during construction. The list also includes projects that could be in operation concurrently with the Project and that could have similar environmental impacts as the Project's operations, with the potential to result in cumulative operational impacts.

As discussed in Section 2.5.2 of Chapter 2, *Project Description*, the Board of Directors has adopted mitigation measures for all of the projects evaluated in the 2014 BMP Update PEIR. The cumulative impact analysis assumes that, like the Project, the other BMP Update projects would implement adopted mitigation measures.

TABLE 3.1-1
PROJECTS CONSIDERED IN CUMULATIVE IMPACT ANALYSIS

Project No. on Map	Project Name (Project Sponsor or Jurisdiction)	Project Description	Construction Dates
1	Harkins Slough Recharge Facilities Upgrades[a] (PV Water)	This project is included in PV Water's BMP Update. This project includes installation of new shallow extraction wells at the existing Harkins Slough recharge basin, upgrading the pump station and filters at the slough diversion to improve system operation and recharge infiltration rates, and construction of new recharge basins.	2020-2025
2	Watsonville Slough with Recharge Basins[a] (PV Water)	This project is included in PV Water's BMP Update. This project would divert Watsonville Slough water during high flows from December to May. The water would be stored in a surficial groundwater aquifer via a recharge basin. The project includes a new diversion point in the slough system. A pump station at the diversion point would divert the water to the existing Harkins Slough filtration facility via a new pipeline. Recovery wells constructed around the recharge basin would extract water during the irrigation season. Horizontal wells will also be considered. As planned, this project would require construction of an intake structure, inlet pump station, intake pipeline, expansion of the existing filtration facility at Harkins Slough, booster pump station, recharge basin(s), and recovery wells.	2022-2023
3	Murphy Crossing with Recharge Basins[a] (PV Water)	This project is included in PV Water's BMP Update. This project would divert water from the Pajaro River between December and May, when the Pajaro River water quality is within an acceptable range and stream flows are above the required minimum necessary to maintain steelhead habitat. The project includes the construction of an infiltration gallery, pump station, monitoring wells, recharge basins, and a connector pipeline from pump station to recharge basins. An infiltration gallery located upstream of the Murphy Crossing bridge would capture water and transport it to four recharge basins. The recharge basins would be located just north of the intersection of State Route 129 and Murphy Road.	After 2025
4	Main Street Improvement Project (City of Watsonville)[b]	The modified Main Street Improvement Project includes sidewalk widening extensions and medians at First Street and at Peck Street, intersection improvements at Second and Maple, and upgraded curb ramps. The future phase of this project will include additional beautification elements, planter boxes, lighting upgrades, enhanced signage, and additional medians and sidewalk enhancements.	2019-2020
5	Lincoln Street Safety Project (City of Watsonville)[c]	The City of Watsonville, in partnership with Pajaro Valley Unified School District, is implementing the Lincoln Street Safety Improvement Project. The project includes new pedestrian crosswalks, sidewalks and lighting between East Beach Street and Riverside Drive near Watsonville High School; bicycle racks, pavement markings and signage; and education programs that improve bicycle and pedestrian safety.	Summer 2020
6	Pajaro Valley Recharge Net Metering Pilot Program (PV Water, Resource Conservation District of Santa Cruz County, University of California at Santa Cruz)[d]	The Resource Conservation District of Santa Cruz County proposes to construct a one-acre sediment basin (base elevation of 44.5-feet) and an adjacent four-acre groundwater recharge basin (base elevation of 30-feet and berm elevation of 53-feet) on parcel number 051-241-34. The project involves up to 80,000 cubic yards of grading. The goal of this managed aquifer recharge project is to collect and infiltrate an estimated 350 acre-feet per year of runoff into the Pajaro Valley Groundwater Basin.	Undetermined
7	Pajaro River Flood Risk Management Study (U.S. Army Corps of Engineers)[e]	The project, located in Santa Cruz and Monterey Counties, consists of levees and channel improvements on the Pajaro River and Corralitos and Salsipuedes Creeks to increase the level of flood protection afforded by existing flood protection infrastructure. The Tentatively Selected Plan includes measures to improve existing levees, measures to construct new levees, and measures to construct flood walls on Salsipuedes Creek, Corralitos Creek, and Pajaro River. Specific components include constructing new setback levees and rebuilding an existing levee on Reach 2 (on Pajaro River), rebuilding existing levees and floodwalls on Reach 3 (on Pajaro River), constructing a new setback levee along the southern bank of Reach 4 (on Pajaro River), constructing a new setback levee and floodwalls and rebuilding an existing levee along Reach 5 (on Lower Salsipuedes Creek), and constructing new setback levees along Reach 6 (on Corralitos Creek). The Tentatively Selected Plan features are intended to provide 1 percent annual chance of exceedance level of protection for the City of Watsonville (including adjacent agricultural areas) and 4 percent annual chance of exceedance level of protection for the Orchard Park and Interlaken neighborhoods (including adjacent agricultural areas).	2021-2025

TABLE 3.1-1 (CONTINUED)
PROJECTS CONSIDERED IN CUMULATIVE IMPACT ANALYSIS

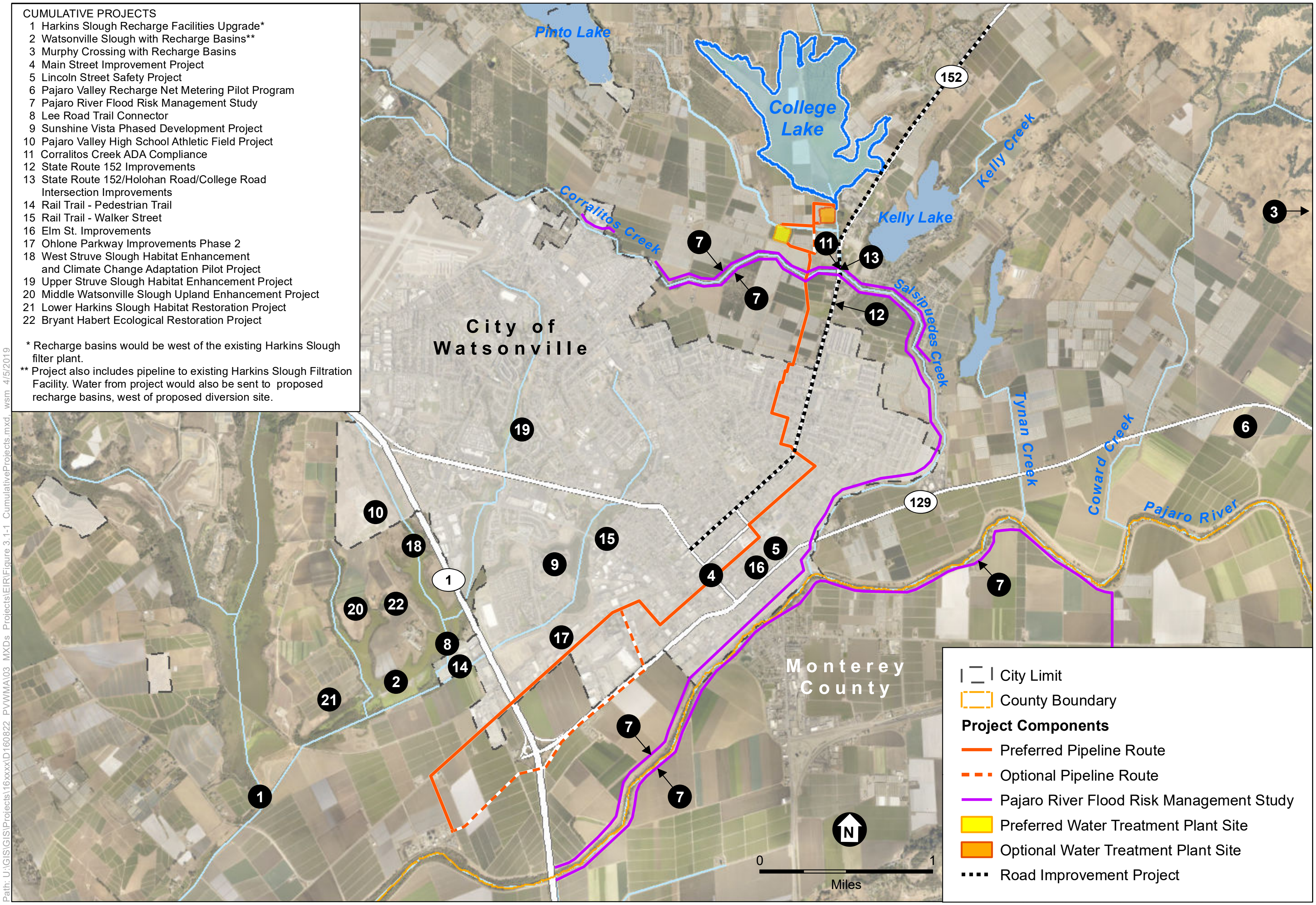
Project No. on Map	Project Name (Project Sponsor or Jurisdiction)	Project Description	Construction Dates
8	Lee Road Trail Connector (City of Watsonville)[f]	The California Coastal Conservancy has recommended that the City of Watsonville prepare plans, designs, environmental analyses, and permit applications for the Lee Road Connector Trail, a 1.4-mile bicycle and pedestrian trail planned for the west side of the City of Watsonville. The Lee Road Connector Trail would be part of the Watsonville Area Scenic Trails Network, a trail system that currently offers approximately 10 miles of bicycle and pedestrian trails that follow the Watsonville Sloughs. The southern terminus of the Lee Road Connector Trail would connect to a planned trail along the Santa Cruz Branch Line railroad tracks, known as the Rail Trail, which, in this area, would run northwest to a junction with the Monterey Bay National Sanctuary Scenic Trail, at which point the Rail Trail would head north along the coast and form part of the Monterey Bay National Sanctuary Scenic Trail. The trail would also include a bridge across Struve Slough.	2020
9	Sunshine Vista Phased Development Project[g]	This project includes the clean-up of a project site in Watsonville, including removal of all junk vehicles, trash, debris, and structures; soil-remediation; export of approximately 49,552 cubic yards of soil; temporary stormwater drainage measures; and regrading. The project also includes development of the project site with 150 housing units, associated parking, utilities, stormwater management, and a public-access nature trail. The project would be implemented in phases, with the site clean-up and remediation activities comprising phase one, and remediation activities and residential development comprising phase two.	Phase 1 construction late 2018 to early 2019; Phase 2 construction 2019 to 2021
10	Pajaro Valley High School Athletic Field Project[h]	This project would update the existing athletic facilities at Pajaro Valley High School by replacing the existing grass turf with synthetic turf and adding a regulation track, bleachers, a ticket booth, an announcer's booth, a scorekeeper's booth, a concessions building, and restrooms. The athletic fields would consist of two softball fields and football field.	1 year
11	Corralitos Creek ADA Compliance (Caltrans)[i]	This project involves construction of an accessible pathway in Santa Cruz County, north of Watsonville. The project would extend 0.1 mile from the intersection of Holohan Road/College Road to Beverly Drive. The project would include installation of a new ADA curb ramp, non-motorized overcrossing/undercrossing for accessibility, and a Class II bike lane.	2021-2022
12	State Route 152 Improvements (Caltrans)[i]	This project includes drainage improvements and transportation systems elements at various locations of State Route 152 in Santa Cruz County. The project extends from the State Route 152/Main Street intersection to the State Route 152/Bella Vista Lane intersection.	2024-2025
13	State Route152/Holohan Road/College Road Intersection Improvements (Santa Cruz County)[j]	This project consists of operational and geometric improvements (widening) at the intersection of State Route 152/Holohan Road/College Road. Two lanes are proposed to be added to the Holohan Road approach to result in a left turn lane, a left and through lane, a bicycle lane, and a right turn lane. An acceleration/merge lane on northbound State Route 152 north of the intersection is also proposed. The project is partially funded and Santa Cruz County continues to seek grants to complete the funding.	2021-2022
14	Rail Trail - Pedestrian Trail (City of Watsonville)[k]	This project would install a 4000-foot-long by 12-foot wide pedestrian trail within the railroad corridor between Lee Road and Watsonville Slough Trail as part of the Rail Trail.	2019-2020
15	Rail Trail - Walker Street (City of Watsonville)[k]	This project would install a 2200-foot-long by 12-foot-wide pedestrian trail within the railroad corridor between Watsonville Slough Trail and Walker Street as part of the Rail Trail.	2019-2020
16	Elm St. Improvements (City of Watsonville)[k]	This project includes reconstructing roadway, providing drainage improvements, and replacing curbs, gutters and sidewalks on Elm Street between Marchant Street and Lincoln Street in Watsonville.	2019-2020
17	Ohlone Parkway Improvements Phase 2 (City of Watsonville)[k]	This project includes repaving roadway; providing bike lanes; repairing, replacing, and installing curbs, gutters, sidewalks, and curb ramps; and replacing and upgrading signage and striping from the Union Pacific Railroad to West Beach Street in Watsonville.	2021-2022
18	West Struve Slough Habitat Enhancement and Climate Change Adaptation Pilot Project (Watsonville Wetlands Watch)[l]	This purpose of this project is to enhance native habitat along West Struve Slough and pilot climate change adaptation methods for habitat restoration. This would support further integration of climate change related planning and adaptive management in the Watsonville Slough System. This project is located at Watsonville Sloughs Ecological Reserve. Watsonville Wetlands Watch is partnering with the California Department of Fish and Wildlife.	2017-2022

TABLE 3.1-1 (CONTINUED)
PROJECTS CONSIDERED IN CUMULATIVE IMPACT ANALYSIS

Project No. on Map	Project Name (Project Sponsor or Jurisdiction)	Project Description	Construction Dates
19	Upper Struve Slough Habitat Enhancement Project (Watsonville Wetlands Watch)[l]	This is a 20-acre urban greening project along upper West Struve Slough that is removing invasive species and enhancing wildlife habitat and the Upper West Struve Slough Trail. The project is located at Upper Struve Slough Trail between Main Street and Pennsylvania Drive. Watsonville Wetlands Watch is partnering with the City of Watsonville.	2016-2018
20	Middle Watsonville Slough Upland Enhancement Project (Watsonville Wetlands Watch)[l]	This project is a 7-acre native grassland habitat restoration project adjacent to Watsonville Slough on the Land Trust of Santa Cruz County's land. Watsonville Wetlands Watch is partnering with the Land Trust of Santa Cruz County, Resource Conservation District of Santa Cruz County, and US Fish and Wildlife Service.	2013-2019
21	Lower Harkins Slough Habitat Restoration Project (Watsonville Wetlands Watch)[l]	This project is a 22-acre wetland habitat restoration project adjacent to Harkins and Watsonville Slough between Lee Road and San Andreas Road. Watsonville Wetlands Watch is partnering with the Natural Resources Conservation Service.	2016-2020
22	Bryant Habert Ecological Restoration Project (Watsonville Wetlands Watch)[l]	This project is a 20-acre wetland restoration and native habitat restoration project along Watsonville Slough on the Land Trust of Santa Cruz County's land.	Phase I complete in 2016, Phase II unfunded

SOURCES:

[a] PV Water, *Final Environmental Impact Report for the Basin Management Plan Update*, February 2014.
[b] City of Watsonville, Public Works & Utilities, Main Street Improvement Project, 2017. Available online at https://www.cityofwatsonville.org/606/Main-Street-Improvement-Project. Accessed October 20, 2017.
[c] Watsonville Patch, Watsonville Recommended for $633,000 Grant, September 21, 2017. Available online at https://patch.com/california/watsonville/watsonville-recommended-633-000-grant. Accessed on October 20, 2017.
[d] Resource Conservation District of Santa Cruz County, *Pajaro Valley Groundwater Recharge Project*, Initial Study/Environmental Checklist, March 9, 2017.
[e] U.S. Army Corps of Engineers*, Pajaro River Flood Risk Management General Reevaluation Report & Integrated Environmental Assessment Updated Draft FONSI and Executive Summary*, November 2017.
[f] California Coastal Conservancy, Staff Recommendation for the Lee Road Trail Connector, Project No. 17-045-01, March 22, 2018. Accessed on April 27, 2018. Available online at http://scc.ca.gov/webmaster/ftp/pdf/sccbb/2018/1803/20180322Board12_Lee_Road_Watsonville_Slough.pdf.
[g] City of Watsonville, *Sunshine Vista Phased Development Project*, Draft Environmental Impact Report State Clearinghouse No. 2017032041, February 2018.
[h] Pajaro Valley Unified School District, *Draft Subsequent Environmental Impact Report for Pajaro Valley High School Athletic Field Project*, State Clearinghouse No. 1996032052, April 2017.
[i] Personal communications between C. Bjornstad, Caltrans District 5, and A. Maudru, Environmental Science Associates, regarding cumulative projects, May 4, 2018.
[j] Personal communications between S. Wiesner, County of Santa Cruz, and A. Maudru, Environmental Science Associates, regarding cumulative projects, May 9, 2018.
[k] Personal communications between M. Fontes, City of Watsonville, and A. Maudru, Environmental Science Associates, regarding cumulative projects, May 15, 2018.
[l] Personal communications between J. Pilch, Watsonville Wetlands Watch, and A. Maudru, Environmental Science Associates, regarding cumulative projects, June 8, 2018.



SOURCE: ESRI World Imagery, 2018; ESA data developed for the College Lake Project

College Lake Integrated Resources Management Project

Figure 3.1-1
Cumulative Projects

ESA

3.2 Land Use and Agricultural Resources

This section presents an analysis of potential impacts related to land use and agricultural that would result from implementation of the proposed College Lake Integrated Resources Management Project (Project). The analysis includes both site options (preferred and optional) for the water treatment plant (WTP) as well as preferred and optional pipeline alignments for the College Lake pipeline. Information from the 2014 Basin Management Plan Update Program Environmental Impact Report that remains relevant and accurate for the purposes of describing the physical or regulatory setting of land use and agricultural resources has been incorporated as appropriate.

3.2.1 Setting

3.2.1.1 Existing Land Use in Project Vicinity

Regional

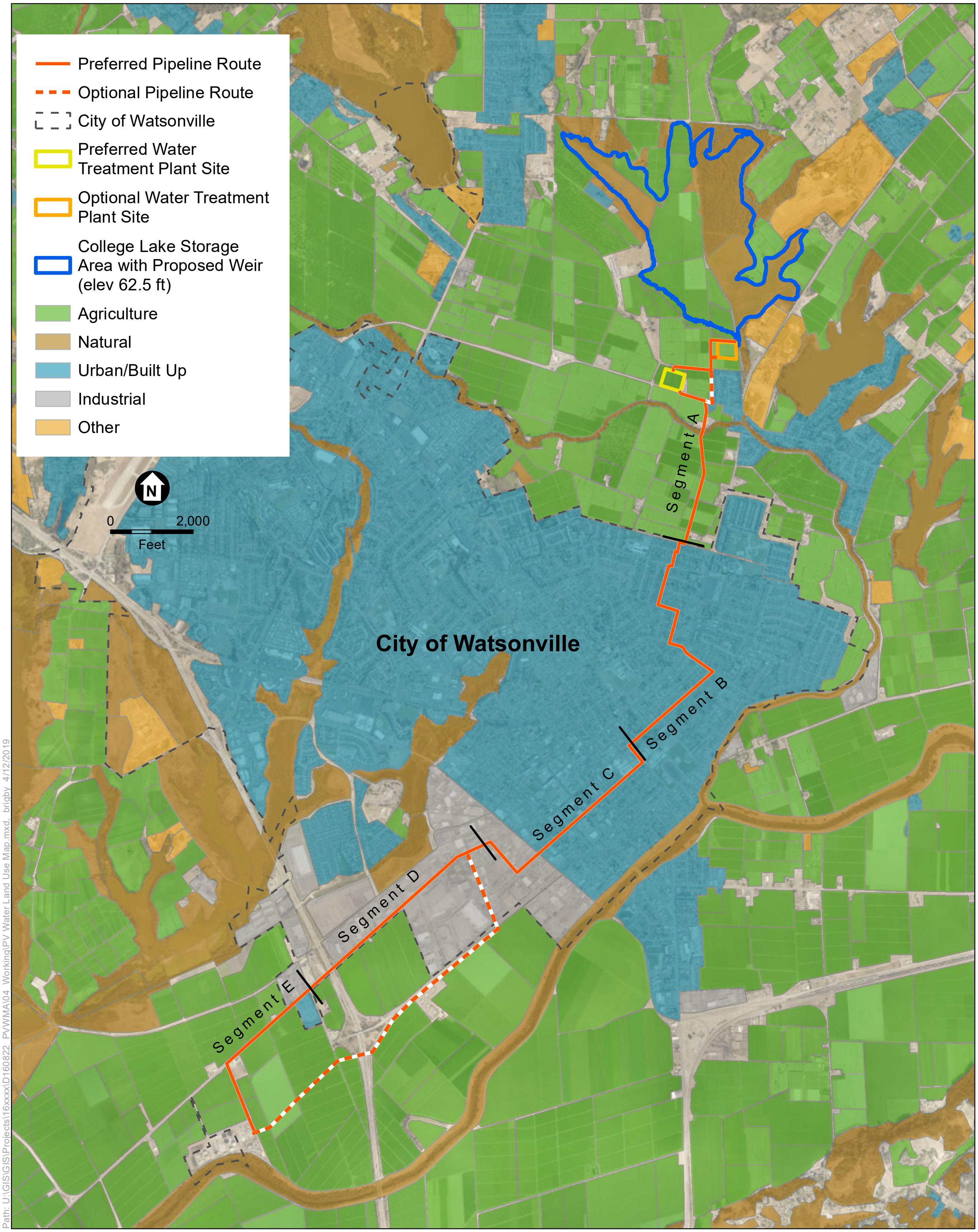
College Lake and the proposed locations for the weir structure, intake pump station, and WTP sites are located in unincorporated Santa Cruz County; the College Lake pipeline would extend through unincorporated areas of the county as well as through the City of Watsonville (refer to Figure 2-1 in Chapter 2, *Project Description*). As shown on **Figure 3.2-1**, agriculture is the predominant land use in the Project area outside of the City of Watsonville. A variety of crops are grown in the Pajaro Valley, including strawberries, raspberries and blackberries, apples, flowers, lettuces, artichokes, and other fruits and vegetables. While residences are scattered throughout the Pajaro Valley, residential areas within the Project area are primarily located near urban centers, including the City of Watsonville and the neighboring community of Freedom. Rural residential development is also present in inland foothill areas. Commercial uses, schools, and parks are also concentrated in the City of Watsonville.

College Lake

Appendix PD-1 lists by Assessor Parcel Number (APN) the properties located within the College Lake storage area, as well as those associated with the weir structure and intake pump station, WTP site options, and the College Lake pipeline.

Appendix AG presents maps depicting land uses (based on observations for years 2014 through 2018) within the lake basin below 64 feet North American Vertical Datum of 1988 (NAVD88) elevation, the study area in this EIR for effects on agricultural uses associated with water storage operations; **Table 3.2-1** summarizes this information in terms of acreage.[1] On average, natural areas comprise about 61 percent of land use during this 2014 to 2018 observation period, while about 37 percent of the land has been cultivated at least once during this period. The remaining 2 percent of land not identified in annual surveys as natural or cultivated areas, shown in Table 3.2-1 as "Other," generally includes drainage channels and farm roads traversing the lake

[1] Land use data presented in Appendix AG and in Table 3.2-1 was compiled from annual surveys conducted by the Pajaro Valley Water Management Agency (PV Water) typically in June and July, wildlife surveys conducted by Gary Kittleson typically in the fall, and reviews of aerial imagery from Google Earth (dates vary).



SOURCE: Pajaro Valley Water Management Agency, 2017; G. Kittleson, 2018

College Lake Integrated Resources Management Project

Figure 3.2-1
Land Use in the Project Area (2018)

ESA

basin, some land associated with the Santa Cruz County Fairgrounds, and other smaller-scale features. The total area cultivated within the basin during a given year depends on lake elevations, precipitation patterns, and lease agreements, among other factors.

TABLE 3.2-1
LAND USE WITHIN COLLEGE LAKE BELOW 64 FEET NAVD88

Land Use		Acres					
		2014	2015	2016	2017	2018	Average
Natural		200.6	203.7	191.1	182.9	177.5	191.2
Agriculture	Deciduous (Apple Orchards)	0.5	0.5	0.5	0.5	0.5	0.5
	Nurseries/Flowers/Tropical Plants	0.1	0.1	0.1	0.1	0.1	0.1
	Raspberries, Blackberries, Strawberries	2.6	1.8	3.8	1.8	1.8	2.4
	Vegetable Row Crop	101.1	101.8	112.4	122.3	128.7	113.3
	Fallow	0.0	0.0	0.0	1.0	0.0	0.2
Total Agriculture		**104.2**	**104.2**	**116.8**	**125.6**	**131.1**	**116.4**
Other[a]		9.3	6.2	6.2	5.5	5.5	6.5
TOTAL[b]		**314.0**					

NOTES:
[a] "Other" includes agricultural drainage channels, farm roads, a portion of the Santa Cruz County Fairground lands, and other small scale features. The Pajaro Valley Water Management Agency (PV Water) Annual Land Use Surveys are conducted at the parcel level to indicate the dominant land uses. Often the digitized polygons overlap internal farm roads and other small-scale features on properties that are not classified as natural or agricultural.
[b] Numbers may not total due to rounding.

SOURCE: PV Water Annual Land Use Surveys 2014-2018; Google Earth aerial imagery; and Kittleson, Gary, Wildlife Surveys 2014 through 2018.

Farming Practices

As described in Section 2.1.4 in Chapter 2, *Project Description*, Reclamation District 2049 (RD 2049) currently pumps water out of College Lake each spring to accommodate summer farming. RD 2049pumps water over its existing weir and into Salsipuedes Creek in the spring, usually beginning in mid-March depending on spring rain patterns. Tile drains installed in portions of the lake basin remove excess water and direct it toward the agricultural drainage ditches that run through the basin. Once the land is dry enough to accommodate heavy machinery (typically around May 30), tractors turn the soil; it then takes about one month to prepare the land for planting. Most of the crops in College Lake require 60 to 90 days to reach maturity, so crops planted on July 7 would be harvested between September 7 and October 7. Growers aim to complete harvesting and other agricultural operations in the lake basin before the winter rains, generally by the end of October, although farming can and has occurred later in the year.[2]

As shown in Table 3.2-1, vegetable row crops (including varieties of kale, lettuces, and onions) comprised the largest area under cultivation from 2014 to 2018. Other crops (e.g., apples, raspberries and blackberries) comprising about 3 acres in total, are grown at higher elevations and

[2] Peixoto, Dick, Lakeside Organic Gardens, LLC, Letter to Mary Banister, May 12, 2014.

extend just below 64 feet NAVD88. The rooting depths for the vegetable row crops grown in College Lake vary; while the root structures can extend as much as 24 inches below ground, the main root systems are in the top 6 to 12 inches of soil.[3,4]

Weir Structure and Intake Pump Station

The proposed weir structure would occupy an approximately 5,500 square foot site spanning the Salsipuedes Creek channel approximately 25 feet downstream of the existing weir. The intake pump station would occupy an approximately 1,300 square-foot site west of the weir structure that is part of the farm road system for the adjacent farmed areas.

The proposed alignment for the 30-inch influent pipeline between the intake pump station and the preferred WTP site, shown on Figure 2-14 in Chapter 2, *Project Description*, follows existing farm roads. The optional WTP site would be adjacent to the intake pump station so the proposed alignment of the influent pipeline is within the optional WTP site.

Preferred and Optional Water Treatment Plant Sites

An apple orchard occupies the five-acre preferred WTP site adjacent to Holohan Road. The six-acre optional WTP site is currently planted with raspberries. The optional WTP site occupies a larger footprint in order to raise the WTP out of the flood hazard area.

College Lake Pipeline

The proposed College Lake pipeline route generally follows existing road rights-of-way and agricultural fields. **Table 3.2-2** identifies land uses within and adjacent to the preferred and optional pipeline alignments.

3.2.2 Regulatory Framework

3.2.2.1 Federal and State

Farmland Protection and Policy Act

The Farmland Protection and Policy Act requires an evaluation of the relative value of farmland that could be affected by decisions sponsored in whole or part by the federal government.[5] High value farmland categories defined in the Farmland Protection and Policy Act include the following:

- ***Prime Farmland*** is land that has the best combination of physical and chemical characteristics for long-term production of food, feed, forage, fiber, oilseed, and other agricultural crops with minimum inputs of fuel, fertilizer, pesticides, and labor, and without intolerable erosion. It has the soil quality, growing season, and moisture supply needed to

---

3 Pittenger, D. R., *California Master Gardener Handbook*, Second Edition, 2017.
4 Shock, C.C., Pereira, A.B., Hanson, B.R., Cahn, M.D., Vegetable Irrigation, 2007.
5 NRCS, Farmland Protection Policy Act, No date. Available online at http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/landuse/fppa/. Accessed on March 12, 2019.

TABLE 3.2-2
LAND USES WITHIN AND ADJACENT TO THE COLLEGE LAKE PIPELINE ALIGNMENT

Segment[a]	General Location of Alignment		From	To	Length (feet)	Land Uses	
						Within Alignment	**Adjacent to Alignment**
A	Unincorporated Santa Cruz County		Water Treatment Plant	Wagner Avenue & Mohovy Street	5,665	Agriculture, public street, natural (Corralitos Creek)	Agriculture, urban/built up
B	City of Watsonville		Wagner Avenue & Mohovy Street	East Beach Street & Lincoln Street	7,040	Agriculture, public streets	
C	City of Watsonville		East Beach Street & Lincoln Street	Pine Street & West Beach Street	5,520	Public streets	Urban/built up, industrial
D	City of Watsonville, Unincorporated Santa Cruz County	**Preferred**	Pine Street & West Beach Street	West Beach Street & Lee Road	5,715	Public streets	Agriculture, industrial, urban/built up
		Optional	West Beach Street & Harvest Drive	State Route 1	6,340	Public streets, agriculture, urban/built up	
E	Unincorporated Santa Cruz County	**Preferred**	West Beach Street & Lee Road	Watsonville Wastewater Treatment Facility	4,500	Public streets	Agriculture, urban built up
		Optional	State Route 1	Watsonville Wastewater Treatment Facility	3,500	Agriculture, other (State Route 1)	Agriculture

NOTES:
[a] Please refer to Figure 3.2-1 for segment locations.

SOURCE: California Department of Conservation, GIS data, 2015.

sustain high crop yields when appropriately treated and managed. Prime farmland may be cropland, pastureland, rangeland, forestland, or other land, but not urban built-up land or water storage. In addition, the land must have been used for irrigated agricultural production during the four years prior to the mapping date to qualify under this category.

- ***Unique Farmland*** is land that does not meet the criteria for Prime Farmland but has been used for the production of specific high-value food and fiber crops. It has the special combination of soil quality, location, growing season, and moisture supply needed to economically produce sustained high quality or high yields of specific crops when treated and managed according to acceptable farming methods. This land is usually irrigated, but may include the types of non-irrigated orchards or vineyards that are found in some climatic zones of California. Unique Farmland must have been in agricultural production at some time during the four years prior to the mapping date.
- ***Farmland of Statewide Importance*** is land, in addition to Prime and Unique Farmlands, that is of statewide importance for the production of food, feed, fiber, forage, and oil seed crops. This land is similar to Prime Farmland, but with minor shortcomings such as greater slopes and less ability to store moisture. Land must have been used for irrigated agricultural production at some time during the four years prior to the mapping date.
- ***Farmland of Local Importance*** applies to land of importance to the local agricultural economy as determined by appropriate unit of local government agency or agencies. This land is either currently producing crops or has the capability of production, but does not meet the criteria of the preceding categories.

Several activities are not subject to the Farmland Protection Policy Act, including projects on land already in urban development or used for water storage.[6]

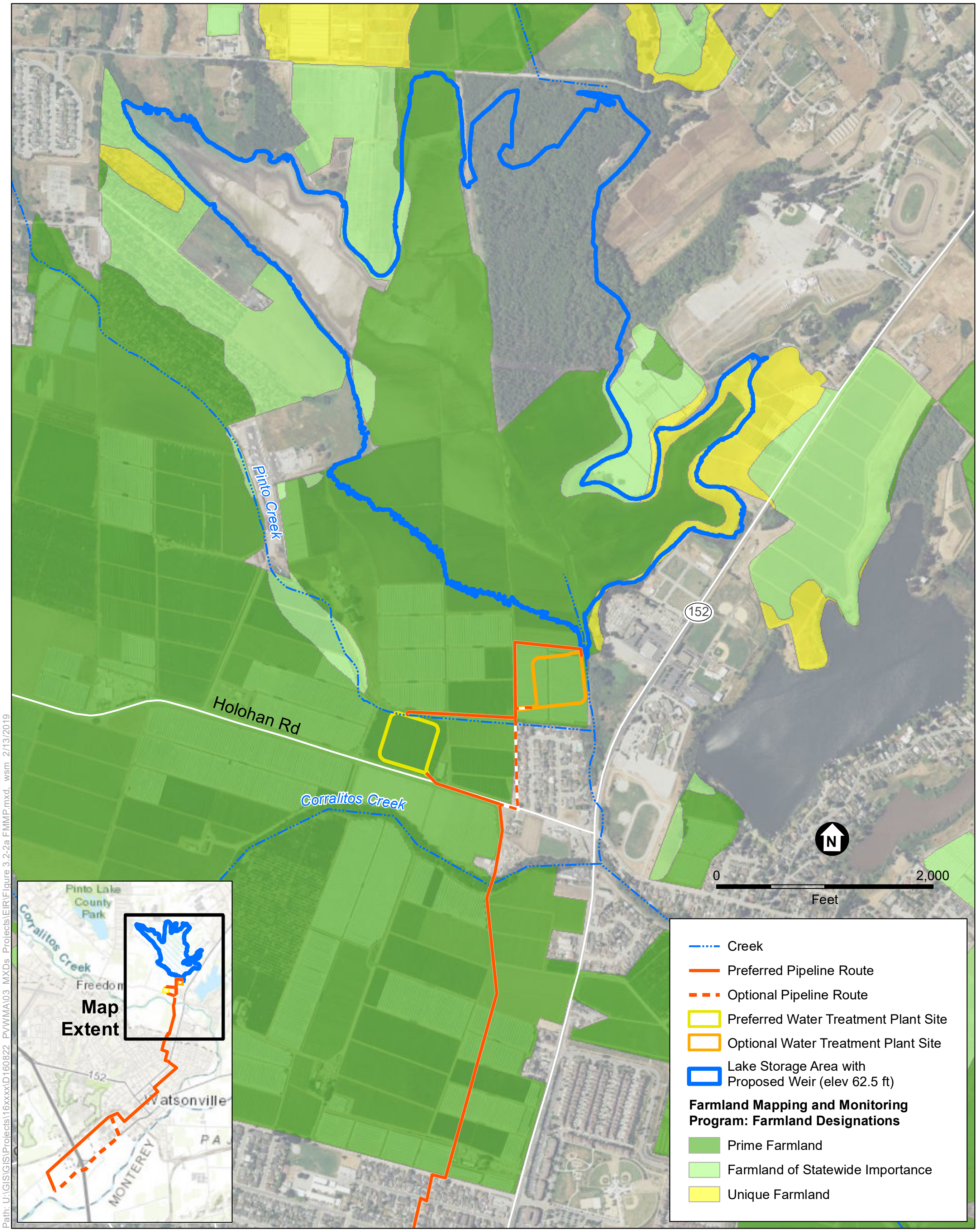
State Designated Farmland

The California Department of Conservation, Division of Land Resource Protection maps important farmlands throughout California. Important farmlands include Prime Farmland, Farmland of Statewide Importance, Unique Farmland, and Farmland of Local Importance (consistent with the definitions identified above), as well as Grazing Land. The first three types of important farmland have been incorporated into Appendix G of the California Environmental Quality Act (CEQA) *Guidelines* (refer to Section 3.2.3.1). For ease of reference, Prime Farmland, Farmland of Statewide Importance, and Unique Farmland, are collectively referred to in this environmental impact report (EIR) as "Important Farmland."[7] **Figures 3.2-2a** and **3.2-2b** depict Important Farmland at and in the vicinity of the Project sites.

---

6 NRCS, Farmland Protection Policy Act, No date. Available online at http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/landuse/fppa/. Accessed on March 12, 2019.

7 There is no land designated by the California Department of Conservation as "Farmland of Local Importance" within the College Lake basin or along the College Lake pipeline alignment.

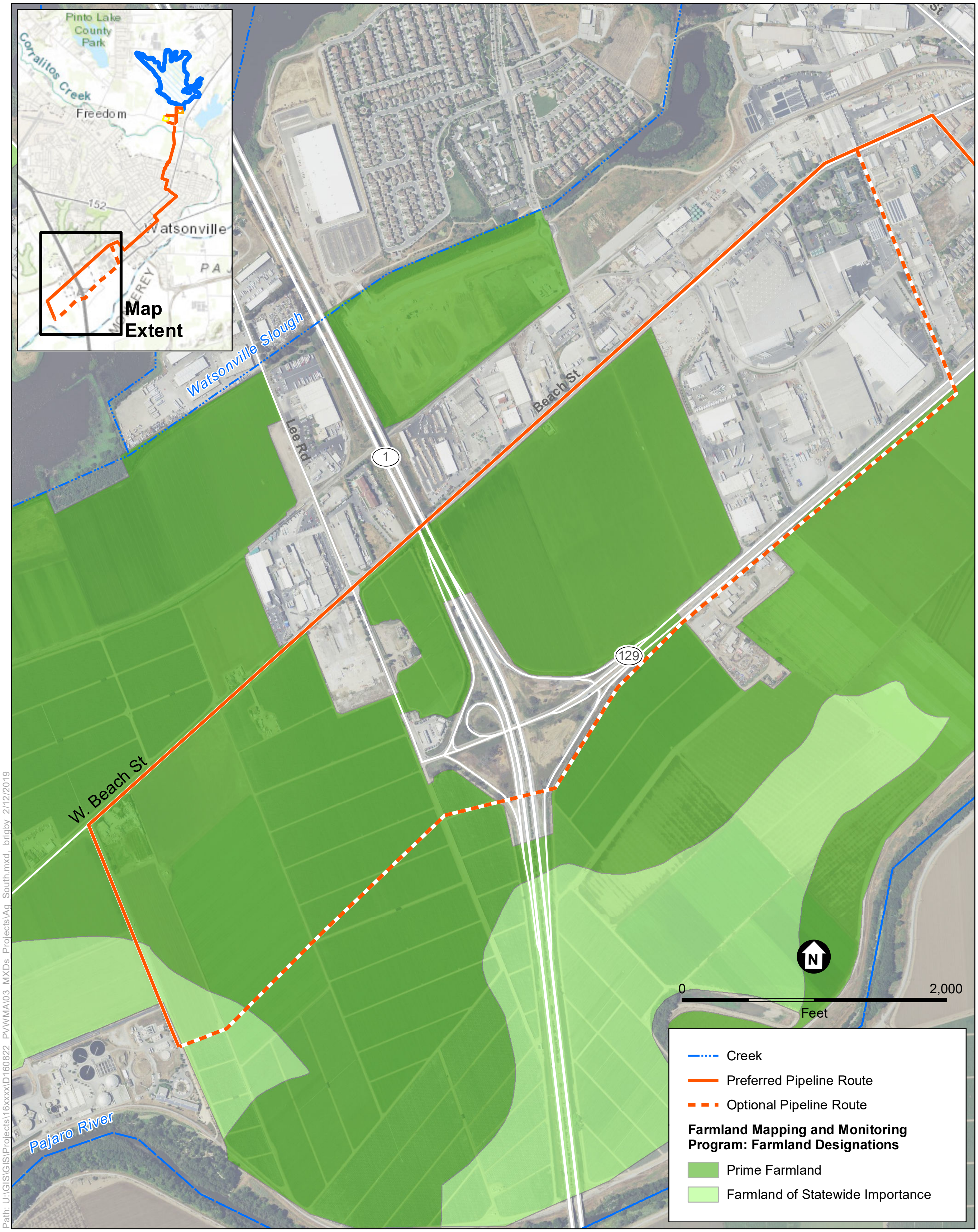


SOURCE: California Department of Conservation, 2016

College Lake Integrated Resources Management Project

Figure 3.2-2a
Important Farmland

ESA



SOURCE: California Department of Conservation, 2016

College Lake Integrated Resources Management Project

Figure 3.2-2b
Important Farmland

ESA

Coastal Zone Management Act and California Coastal Act

The California Coastal Commission administers the federal Coastal Zone Management Act along California's coastline by regulating the use of land and water within the coastal zone. Santa Cruz County has authority to approve coastal development permits within its jurisdiction pursuant to the provisions of its Local Coastal Program certified by the California Coastal Commission. The County's approved Local Coastal Program is integrated into the General Plan. The westernmost segment of the College Lake pipeline (west of State Route [SR] 1), shown on Figure 2-3e in Chapter 2, is within the Coastal Zone as defined in the California Coastal Commission's Coastal Zone Boundary maps.[8] As indicated in Table 2-10 in Chapter 2, construction of the College Lake pipeline within the Coastal Zone would require a coastal development permit.

California Land Conservation Act of 1965

The California Land Conservation Act of 1965 (commonly referred to as the Williamson Act) is the state's primary program for the conservation of private land for agricultural and open space uses. The Williamson Act provides a mechanism through which private landowners can contract with counties and cities to voluntarily restrict their land to agricultural and compatible open space uses. In return, Williamson Act contracts offer tax incentives by ensuring that land is assessed for its agricultural productivity rather than its highest and best use. Contracts typically restrict land use for a minimum of 10 years. Contracts are automatically renewed unless the landowner or local government files for non-renewal or petitions for cancellation.[9]

The California Department of Conservation prepares countywide maps of lands enrolled in Williamson Act contracts. One parcel (APN 051-101-10) located within the College Lake water storage area is enrolled in a Williamson Act Contract and designated as Mixed Enrollment Agricultural Land, defined by the California Department of Conservation as enrolled lands containing a combination of Prime, Non-Prime, Open Space Easement, or other contracted or enrolled lands not yet delineated by the County.[10] The parcel is located in the northern portion of the lake basin west of the riparian forest. The initial term of the Williamson Act contract for this parcel was for 10 years commencing in 1983 and automatically renewing thereafter for an additional year. During the term of the agreement, the property is to be "used for commercial production of agricultural commodities and/or those compatible uses allowed in the CA (Commercial Agricultural) and P (Agricultural Preserve) Combining District of the County Zoning Ordinance." Section 5 of the agreement indicates that if the parcel is acquired for a public improvement, the agreement becomes null and void.[11]

8 Santa Cruz County, *1994 General Plan and Local Coastal Program for the County of Santa Cruz, California*, 1994.

9 Under the non-renewal process, the remaining contract term is allowed to lapse, with the contract null and void at the end of the term. During the nonrenewal process, the annual tax assessment continually increases each year until it is equivalent to current tax rates at the end of the nonrenewal period. Under limited circumstances, cancellation of Williamson Act contracts is allowed, but the landowner is required to pay a cancellation fee and the process can take up to ten years to complete as contract cancellation involves a comprehensive review and approval process.

10 California Department of Conservation, Division of Land Resources Protection, Santa Cruz County Williamson Act FY 2015/2016, 2015.

11 County of Santa Cruz, Land Conservation Contract, APN 051-101-10, February 15, 1983.

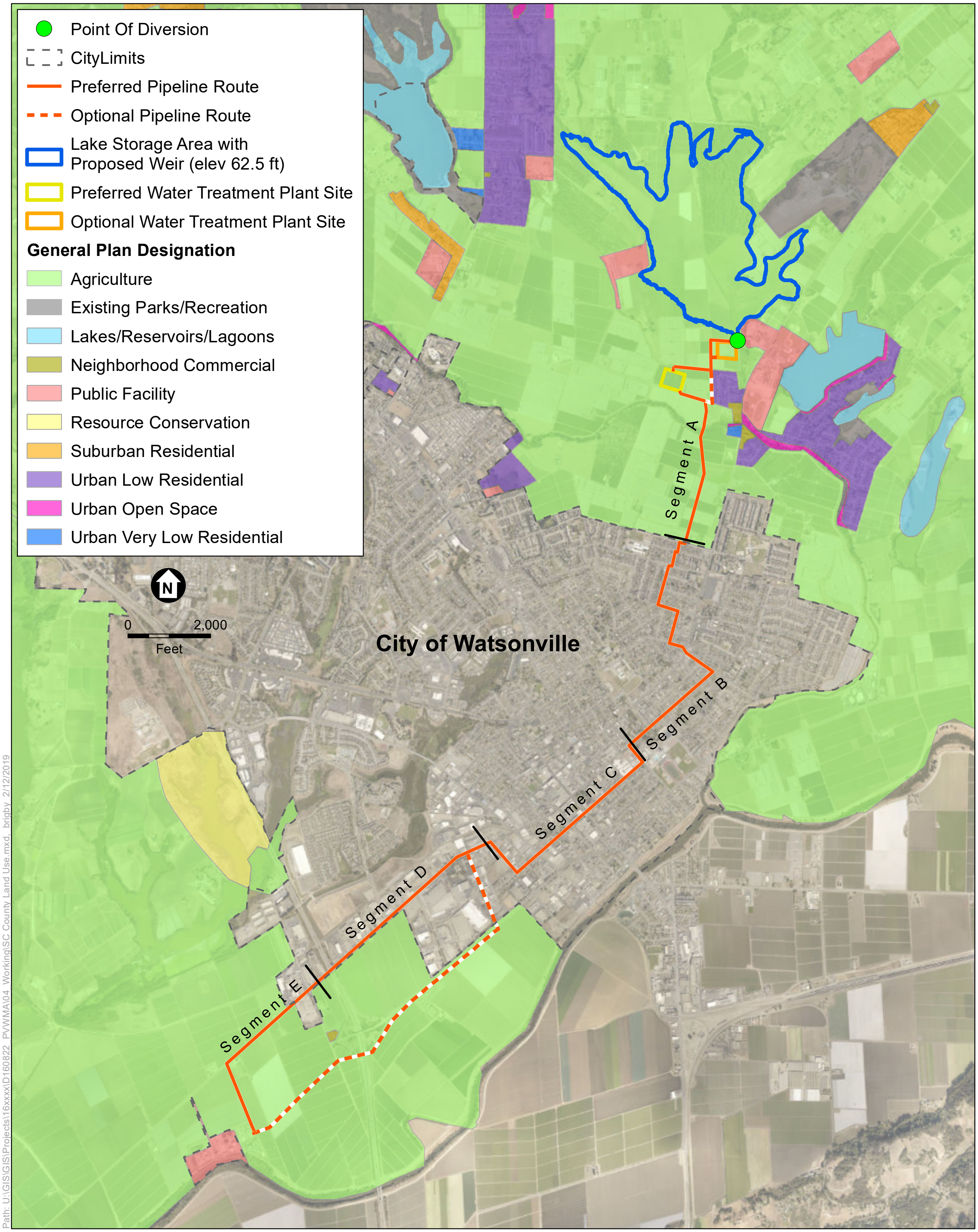
3.2.2.2 Local

General plan and zoning designations for Project component locations as well as relevant general plan policies are described below. California Government Code Section 53091 exempts agencies like Pajaro Valley Water Management Agency (PV Water) from complying with local building and zoning ordinances when locating or constructing facilities for the production, generation, storage, treatment, or transmission of water. California Government Code Section 65402(c) requires that PV Water notify cities and counties of its plans to construct projects or to acquire or dispose of property. The planning agency then has 40 days to determine project consistency with its general plan. If the planning agency disapproves (i.e., determines that the project is inconsistent with its general plan), the disapproval may be overruled by PV Water. In some cases, local policies are used in this EIR as criteria to determine the significance of physical effects on the environment (e.g., Impact NOI-1 in Section 3.8, Noise and Vibration).

General Plan and Zoning Designations

Figure 3.2-3 shows land use designations in the Project vicinity for the Santa Cruz County 1994 General Plan/Local Coastal Program. The parcels on which the weir structure, intake pump station, and WTP (both the preferred and optional sites) would be constructed are designated as “Agricultural” in the Santa Cruz County General Plan and “CA- Commercial Agricultural” in the Santa Cruz County Zoning Ordinance. The principal permitted land uses within the “CA-Commercial Agricultural” zone are agricultural pursuits for the commercial cultivation of plant crops and the commercial raising of animals. In addition, dams, canals, and aqueducts of any public water project are principal permitted uses.[12] Parcels within the College Lake basin below 64 feet NAVD88 are designated as “Agricultural” in the Santa Cruz County General Plan and “CA-Commercial Agricultural” in the Santa Cruz County Ordinance; one parcel is zoned “Commercial Agricultural – Preserve,” indicating that the owner has executed an Agricultural Preserve or Farmland Security contract with the County to maintain the land in its natural state for 10 years.[13] The College Lake pipeline alignments (both the preferred and optional alignments) are located in public roadways and in parcels designated as “Agricultural” in the Santa Cruz County General Plan and “CA- Commercial Agricultural” in the Santa Cruz County Zoning Ordinance. General plan and zoning designations for land uses in the City of Watsonville adjacent to the College Lake pipeline alignment vary. **Table 3.2-3** presents pertinent local plans and policies regarding land use and agricultural resources to support County and City consideration of Project consistency with general plan policies.

[12] Section 13.10.312 (b) of the Santa Cruz County Code.
[13] This parcel (APN 051-101-10) is enrolled in a Williamson Act contract.



Path: U:\GIS\GIS\Projects\16xxxx\D160822_PVWMA\04_Working\SC County Land Use.mxd, brigby 2/12/2019

SOURCE: Santa Cruz County, Geographic Information Services, 2018; ESA, 2018.

College Lake Integrated Resources Management Project

Figure 3.2-3
Santa Cruz County 1994 General Plan/Local Coastal Program Land Use Designations

ESA

TABLE 3.2-3
LOCAL PLANS AND POLICIES RELEVANT TO THE PROJECT

CITY OF WATSONVILLE PLANS AND POLICIES
Watsonville 2005 General Plan
Goal 3.3 Agricultural Land Use. Foster the continuation of agriculture in the Pajaro Valley.
Policy 3.F Agricultural Land Conservation. The City shall plan for the preservation and enhancement of important agricultural soils by encouraging the County and LAFCO to prohibit continued urbanization of lands beyond the Urban Limit Line and by encouraging the retention of land beyond the Urban Limit Line for long term agricultural purposes.
Implementation measure 9.E.2 Soil Stockpiling - The City shall require that topsoil disturbed during project grading be stockpiled at the site and reapplied after construction to promote vegetative growth, unless that soil is to be transferred to another site for agricultural use.
SANTA CRUZ COUNTY PLANS AND POLICIES
Santa Cruz County General Plan/Local Coastal Program
Objective 5.5a: Watershed Protection. To protect and manage the watersheds of existing and future surface water supplies to preserve the quality and quantity of water produced and stored in these areas to meet the needs of County residents, local industry, agriculture, and the natural environment.
Objective 5.8b, Overdrafted Groundwater Basins: To act directly and coordinate and work with relevant water purveyors and agencies to eliminate long-term groundwater overdraft in all water basins where overdraft has been documented. *Program c) ([Local Coastal Program] LCP)*. Work with water purveyors and water management agencies to augment natural groundwater recharge where it is environmentally and fiscally acceptable. (Responsibility: Flood Control, Water Purveyors, PV Water) *Program h) (LCP)*. Continue to work with [PV Water] to eliminate overdraft and salt water intrusion through implementation of their Basin Management Plan.
Objective 5.13 Commercial Agricultural Land. a) To maintain for exclusive agricultural use those lands identified on the County Agricultural Resources Map as best suited to the commercial production of food, fiber and ornamental crops and livestock and to prevent conversion of commercial agricultural land to non-agricultural uses. To recognize that agriculture is a priority land use and to resolve policy conflicts in favor of preserving and promoting agriculture on designated commercial agricultural lands.
Policy 5.13.1 Designation of Commercial Agriculture Land. Designate on the General Plan and LCP Resources and Constraints Maps as Agricultural Resource all land which meets the criteria (as defined in the General Plan Glossary) for commercial agricultural land.
Policy 5.13.2 Types of Agriculture Land. Maintain by County ordinance specific agricultural land type designations for parcels identified as commercial agricultural land based on the criteria set forth in the General Plan and LCP Land Use Plan and maintain Agricultural Resources Maps, by County ordinance to identify the distribution of the following types of Commercial Agricultural Land in the County: Type IA - Viable Agricultural Land. Type 1A agricultural lands comprise areas of known high productivity which are not located in any utility assessment district for which bonded indebtedness has been incurred. These lands essentially meet the U.S. Department of Agriculture Soil Conservation Service and the California Department of Food and Agriculture criteria for “prime” and “unique” farmland and “prime” rangeland. Type IB - Viable Agricultural Land in Utility Assessment Districts. This type includes viable agricultural lands, as defined above, which are within a utility assessment district for which bonded indebtedness has been incurred, except Agricultural Preserves. Type 2C – Limited Agricultural Land in Utility Assessment Districts. This type includes agricultural lands with limiting factors which are in a utility assessment district, as of 1979, which has incurred bonded indebtedness. Type 3 - Viable Agricultural Land within the Coastal Zone. This category includes all of the following lands outside the Urban Services Line and the Urban Rural Boundary, and within the Coastal Zone in Santa Cruz County: • Land which meets the U.S. Department of Agriculture Soil Conservation or California Department of Food and Agricultural Service criteria for prime farmland or rangeland soils and which is physically available for agricultural use. • Land which meets the California Department of Food and Agriculture criteria for unique farmland of statewide importance and which is physically available for agricultural use.
General Agricultural Policies Program F. Ensure a continued sustainable supply of water for agricultural use through conservation, protection and development of surface and groundwater, utilization of excess domestic water, utilization of recycled wastewater, or importation of water from outside the County.
SOURCE: City of Watsonville, Watsonville 2005 General Plan. Adopted May 24, 1994; Santa Cruz County, 1994 General Plan and Local Coastal Program for the County of Santa Cruz, California, 1994.

3.2.2.3 Agricultural Conservation Easements

Some parcels in the Pajaro Valley have agricultural conservation easements. An agricultural conservation easement is a legal agreement between a landowner and a conservation organization or government agency that permanently protects land from development while keeping land in productive use.[14] Three agencies involved in the issuance of agricultural easements in Santa Cruz County and their respective roles include the following:

- The National Resources Conservation Service (NRCS) provides financial and technical assistance to help conserve agricultural lands and their related benefits.[15]
- The Land Trust of Santa Cruz County (Santa Cruz Land Trust) administers the agricultural conservation easement program within the Pajaro Valley.[16]
- The Resource Conservation District of Santa Cruz County partners with the NRCS and Santa Cruz Land Trust to provide technical assistance, site assessments, and conservation planning for landowners.[17]

None of the parcels directly affected by the Project is known to have an agricultural conservation easement.

3.2.3 Impacts and Mitigation Measures

3.2.3.1 Significance Criteria

In accordance with the CEQA, State CEQA *Guidelines* (including Appendix G), relevant plans, policies, and/or guidelines, and agency standards, the Project could have a significant impact if it were to:

- Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (referred to herein as Important Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use;
- Conflict with existing zoning for agricultural use, or a Williamson Act contract;
- Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g));
- Result in the loss of forest land or conversion of forest land to non-forest use;

[14] Santa Cruz Land Trust, What's a Conservation Easement, No date. Available online at https://www.landtrustsantacruz.org/for-landowners/whats-a-conservation-easement/. Accessed on March 4, 2019.
[15] NRCS, Agricultural Conservation Easement Program, No date. Available online at https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/easements/acep/. Accessed on March 4, 2019.
[16] Santa Cruz Land Trust, Conservation Easement, No date. Available online at https://www.landtrustsantacruz.org/for-landowners/whats-a-conservation-easement/. Accessed on March 4, 2019.
[17] Resource Conservation District of Santa Cruz County, Technical Assistance, 2019. Available online at http://www.rcdsantacruz.org/technical-assistance. Accessed on March 4, 2019.

- Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use;
- Physically divide an established community; and/or
- Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect.

The following topics are not analyzed further in this section for the reasons described below:

- ***Conflict with existing zoning for agricultural use.*** As indicated in Section 3.2.2.2, California Government Code Section 53091 exempts PV Water from complying with local zoning ordinances for the Project (i.e., a project used for the production, generation, storage, treatment, or transmission of water). The potential for the Project to conflict with state laws intended to protect agricultural land are addressed below under Impacts LU-1 (conversion of farmland designated by the State of California as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance) and LU-2 (conflict with a Williamson Act contract).
- ***Conflict with existing zoning for forest land, loss of forest land, or conversion of forest land to non-forest use.*** [18] Statewide mapping prepared by CAL FIRE classifies land cover in the Project area as Urban and Agriculture. There is no forest land on the Project sites, so implementation of the Project would not conflict with zoning regulations for forest land, result in the loss of forest land, or result in the conversion of forest land to non-forest use. Therefore, these criteria are not applicable to the Project.
- ***Physically divide an established community.*** College Lake is an existing feature surrounded by predominantly agricultural uses; implementation of the Project would alter the use of College Lake but would not physically divide an established community. The College Lake pipeline would extend through the City of Watsonville, but the pipeline would be underground, and would not divide any established communities. Therefore, this criterion is not applicable to the Project.

3.2.3.2 Methodology

As described in Section 3.1, Overview, this EIR provides an independent analysis of the Project's potential environmental impacts. Potential impacts are evaluated in the following section. If warranted, mitigation measures are included. The analyses below assess whether and how Project construction and operation might alter existing land uses in such a way that it would trigger one or more of the environmental impacts identified in Section 3.2.3.1.

Consistent with CEQA, this analysis focuses on significant impacts on the physical environment. Economic effects, such as loss of revenue due to disruption of farming, are not evaluated as significant impacts under CEQA, unless such effects would result in a significant impact on the physical environment. For information on acquisition of property, easements, and rights-of-way proposed as part of the Project, refer to Section 2.8 in Chapter 2, *Project Description*.

---

[18] Section 12220(g) of the California Public Resources Code defines forest land as "land that can support 10 percent native tree cover of any species, including hardwoods, under natural conditions, and that allows for management of one or more forest resources (e.g., timber, aesthetics, fish and wildlife, biodiversity, water quality, recreation, and other public benefits."

Additional information on methodology is provided below under each impact statement.

3.2.3.3 Impacts and Mitigation Measures

Impact LU-1: The Project would convert Important Farmland to non-agricultural use and could involve changes in the existing environment which, due to their location or nature, could result in conversion of Important Farmland to non-agricultural use. (*Significant and Unavoidable with Mitigation*)

This impact combines the first and fifth bullets listed in Section 3.2.3.1, Significance Criteria: conversion of Important Farmland (i.e., farmland designated by the State as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance), and changes to the existing environment that could result in the conversion of farmland to non-agricultural use.[19]

Project components are located wholly or partially on Important Farmland (see Figures 3.2-2a and 3.2-2b). As shown in Appendix AG, some land currently considered Important Farmland within the lake basin has not been farmed within the past five years and may be reclassified when state mapping is updated, pursuant to the definitions summarized in Section 3.2.2.1, above. The Project has the potential to adversely affect Important Farmland in several ways:

- **Direct permanent conversion of Important Farmland.** For example, construction of the WTP at either site would result in the permanent conversion of Important Farmland.
- **Other changes that could result in conversion of Important Farmland.** For example, the Project would cause water to be stored longer in College Lake, which would impair farming, potentially resulting in the conversion of farmland.
- **Temporary disruption of agricultural use during Project construction.** For example, open trenching for pipeline construction would disrupt farming within the pipeline construction corridor.

These issues are addressed for the College Lake water storage area, weir structure and intake pump station, WTP, and College Lake pipeline below. **Table 3.2-4** summarizes direct impacts and other changes that could result in the permanent conversion of Important Farmland.

The purpose of the Project is to help balance the Pajaro Valley Groundwater Basin, prevent further seawater intrusion, and meet water supply needs in PV Water’s service area by replacing groundwater supplies with surface water supplies for agricultural irrigation. Consequently, while the Project would adversely affect Important Farmland in and around College Lake, it would also promote the long-term preservation of such farmland within the Pajaro Valley into the future by substituting surface water for groundwater resources in the areas shown on Figure 2-4 in Chapter 2.

[19] As noted in Section 3.2.2.1, there is no land designated by the California Department of Conservation as “Farmland of Local Importance” within the College Lake basin or along the College Lake pipeline alignment.

TABLE 3.2-4
ANTICIPATED CONVERSION OF IMPORTANT FARMLAND[a]

<table>
<tr><th colspan="2" rowspan="2">Project Component</th><th colspan="3">Area (Acres)</th></tr>
<tr><th>Total</th><th>Important Farmland</th><th>Important Farmland Anticipated to be Converted</th></tr>
<tr><td rowspan="2">College Lake Basin Below 63 feet NAVD88[b]</td><td>Below approximately 59 feet NAVD88</td><td>167.2</td><td>136.4</td><td>136.4</td></tr>
<tr><td>Between approximately 59 and 63 feet NAVD88</td><td>50.7</td><td>40.8</td><td>9.2</td></tr>
<tr><td rowspan="2">Water Treatment Plant[c]</td><td>Preferred</td><td>5.0</td><td>5.0</td><td rowspan="2">5.0 – 6.0</td></tr>
<tr><td>Optional</td><td>6.0</td><td>6.0</td></tr>
<tr><td colspan="2">Weir Structure and Intake Pump Station</td><td>0.2</td><td>0.2</td><td>0.2</td></tr>
<tr><td colspan="4">Total</td><td>150.8 – 151.8</td></tr>
<tr><td colspan="4">Total accounting for potential division or fragmentation of parcels</td><td>193.7 – 198.5[d]</td></tr>
</table>

NOTES:
[a] Important Farmland refers to Prime Farmland, Farmland of Statewide Importance, and Unique Farmland as mapped by the California Department of Conservation, Farmland Mapping and Monitoring Program.
[b] As indicated in Section 3.2.1.1, the lake basin below 64 feet NAVD88 is the study area for effects on agricultural uses associated with water storage operations. As described under Impact LU-1, modeling results for Project operations indicate that the effects of water management on agricultural uses would be limited to land at and below 63 feet NAVD88.
[c] Acreage numbers are rounded based on the current level of CAD design.
[d] Refer to discussions under the headings College Lake Water Storage Area and Preferred and Optional Water Treatment Plant Sites regarding the potential for the division or fragmentation of parcels to increase conversion of Important Farmland. The higher end of the range in acreage is associated with development of the optional WTP site.

SOURCE: California Department of Conservation GIS data; cbec, inc. eco engineering, *College Lake Integrated Resources Management Project Hydrologic and Hydraulic Modeling Technical Memorandum*, November 2018.

College Lake Water Storage Area

Direct Permanent Conversion of Important Farmland

There would be no direct permanent conversion of Important Farmland within the College Lake water storage area because no structures would be built in this area.

Other Changes that Could Result in Conversion of Important Farmland: Water Management Operations

The evaluation of the potential for water management operations to convert Important Farmland included consideration of existing farming practices within the lake basin, future with-Project water surface elevations (WSEs) and groundwater conditions, and proposed land maintenance activities.

Farming Practices in the Lake Basin. Existing farming practices at College Lake are described in Section 3.2.1.1. Based on a review of existing farming practices, it was determined that for current farming practices to continue, land would need to be sufficiently dry, based on WSEs and groundwater conditions, to accommodate farm machinery (tractors) on or about June 1 to provide enough time for harvesting one vegetable row crop. This may be a conservative assumption: surveys indicate that some land within the lake basin that was not cultivated in late June/early July was under cultivation in the fall of the same year.

Water Surface Elevations. cbec, inc. eco engineering conducted hydrologic and hydraulic modeling to simulate with-Project WSEs for College Lake (described in Section 3.3, Surface Water, Groundwater, and Water Quality, and in Appendix HYD). Of particular interest for the evaluation of impacts on farmland are WSEs on or about June 1, which is when land would need to be sufficiently dry to accommodate farming machinery. Figures 3.3-7a through 3.3-7d in Section 3.3 show (among other things) WSEs around June 1. Until May 31, areas within the College Lake basin at or below approximately 59 feet NAVD88 would generally be inundated during all modeled water years.

Groundwater Elevations. PV Water conducted an analysis of shallow groundwater conditions to develop an understanding of potential adverse impacts on farming outside of the storage area where, based on topography, shallow groundwater conditions could constrain farming operations. The analysis included installing piezometers around College Lake (shown on Figure 3.3-9 in Section 3.3) and reviewing groundwater data collected at either 15- or 30-minutes intervals.[20] Based on review of piezometer data collected from spring 2017 through fall 2018, the Project could result in shallow groundwater elevations remaining elevated for a longer period of time than under current conditions along the southwestern side of College Lake during the summer and fall. Shallow groundwater could remain within 1 foot of the ground surface until June 1 in this area with the Project, which is up to 1 foot shallower than measured groundwater elevations in this area on June 1, 2018 (refer to Table 3.3-6 in Section 3.3).

Proposed Land Maintenance. Given projected water surface and groundwater elevations under with-Project conditions, PV Water has proposed the following maintenance activities within the College Lake basin, described in Chapter 2:

- ***59 feet NAVD88 and below.*** Areas below approximately 59 feet NAVD88 would be inundated on June 1 during all modeled water years (see Figures 3.3-7a through 3.3-7d, Section 3.3). During the dry season, PV Water proposes to conduct annual vegetation management (disking and mowing) and removal of flow-constricting vegetation in the areas shown in blue on Figure 2-18 in Chapter 2.
- ***59 feet to 63 feet NAVD88.***[21] Assuming that groundwater needs to be 2 feet below ground surface as of June 1, farming may be impaired up to ground elevation 63 feet NAVD88 under with-Project conditions. The extent of impairment of farming operations between approximately 59 feet and 63 feet NAVD88 would vary by year depending on precipitation patterns.[22] When the lake bed is dry, PV Water proposes to conduct (through agreements with landowners or lessees) farming or routine vegetation maintenance (disking and mowing) in the areas shown in green on Figure 2-18 in Chapter 2.

Conversion of Important Farmland from Water Management. Based on the factors described above, water management activities for water supply and fish passage (i.e., maintaining minimum WSEs of approximately 59 feet NAVD88 until May 31) would preclude farming below

[20] Some piezometers collected data every 15 minutes, while others collected data every 30 minutes.

[21] To clarify, the study area for effects on agricultural uses associated with water storage operations was below 64 feet NAVD88. The evaluation indicated that farming may be impaired up to ground elevation 63 feet NAVD88 under future with-Project conditions.

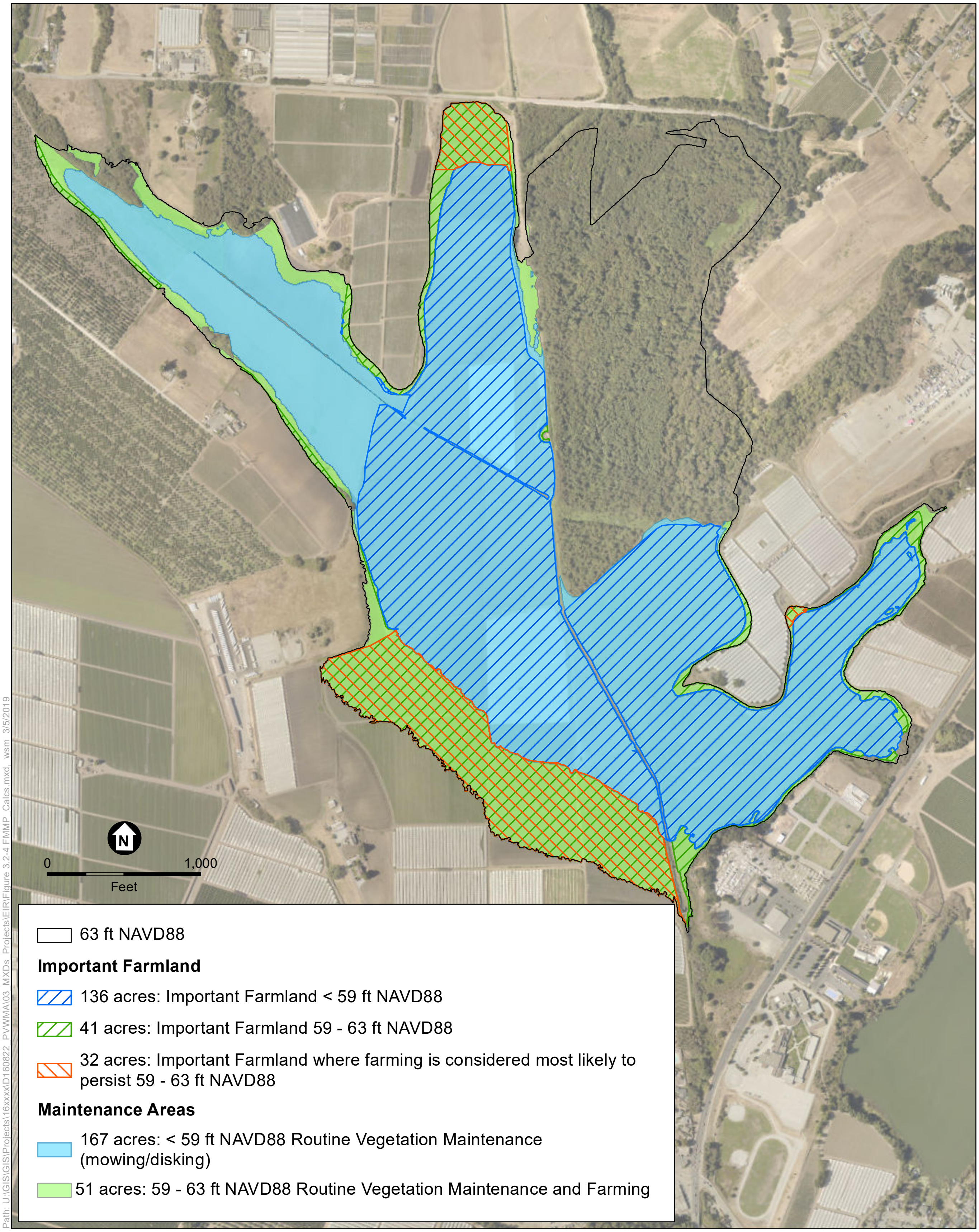
[22] As shown in Figures 3.3-7a through 3.3-7d (in Section 3.3), modeled lake levels around June 1 for proposed operations vary between about 59 feet and 61 feet NAVD88.

approximately 59 feet NAVD88 during all modeled water years. Consequently, over several years, the cessation of farming caused by water management activities would likely result in the conversion of approximately 136 acres of Prime Farmland, Farmland of Statewide Importance, and Unique Farmland in this area, although College Lake would be used for purposes of agricultural irrigation. Implementation of **Mitigation Measures LU-1a and LU-1b** would help reduce the magnitude of this impact.

While proposed land management activities are anticipated to help preserve farming between approximately 59 and 63 feet NAVD88, additional conversion of Important Farmland in this elevation range is anticipated. **Figure 3.2-4** depicts anticipated impacts on Important Farmland below 59 feet NAVD88 and between 59 feet and 63 feet NAVD88. Much of the land between 59 feet and 63 feet NAVD88 is located in the southwestern and north-central areas (the areas depicted with red hatching in Figure 3.2-4). Records indicate that land in the southwest has been cultivated every year from 2014 to 2018, while most of the land in the north-central area has been cultivated four out of the past five years. The remaining areas of Important Farmland within this elevation band are fragmented, are not contiguous with land at higher elevations that is regularly cultivated, and/or have not been cultivated (or were infrequently cultivated) during the past five years, lessening the likelihood that such areas would be successfully farmed under future with-Project conditions. In addition, growers may experience a reduction in production relative to existing conditions (e.g., resulting from one crop rotation instead of two crop rotations in some cases), which could result in a loss of revenue. Pursuant to CEQA,[23] economic effects may not be treated as a significant effect, unless they result in a substantial or potentially substantial adverse change in the physical environment. Changes to the physical environment caused by a project's economic effects are indirect effects that must be analyzed in an EIR if they are reasonably foreseeable and significant. With respect to Important Farmland between approximately 59 and 63 feet NAVD88, for reasons stated above it is reasonable to expect that land in the southwestern and north-central areas of the lake basin would be farmed and disked at sufficient intervals to preclude conversion. However, it is reasonable to expect that the fragmented areas of Important Farmland in this elevation band, estimated at approximately 9.2 acres, could convert to another land cover designation.

Division or Fragmentation of Parcels. Additional conversion of Important Farmland could also occur through the division or fragmentation of parcels: where the Project requires use of a portion of a parcel, the remaining "non-project" area of the parcel may be isolated or of insufficient size for viable farming operations to persist. As a result, a greater proportion or in some cases the entirety of such parcels could undergo conversion. **Figure 3.2-5** depicts parcels affected by the Project that include Important Farmland. As shown in Table 3.2-4, taking into account the potential division or fragmentation of parcels, the total area of Important Farmland that could convert is estimated at 198.5 acres. Mitigation Measures LU-1a and LU-1b would help reduce the magnitude of this impact.

23 Public Resources Code Sections 21100 and 21151; and CEQA Guidelines Sections 15064(d) and 15064(e), 15382, and 15131(a).



SOURCE: California Department of Conservation, 2016; ESA, 2019.

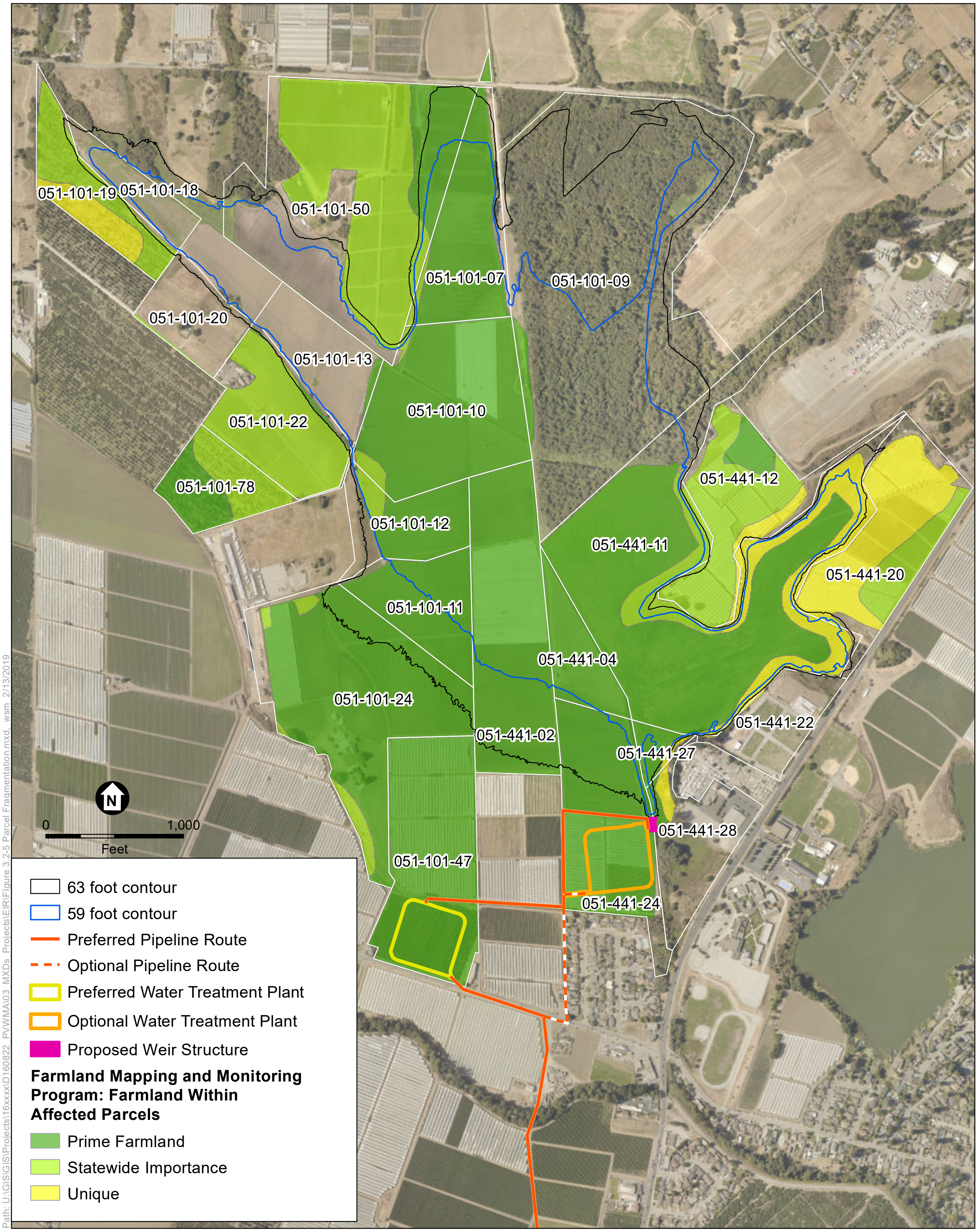
College Lake Integrated Resources Management Project

Notes: 1. Numbers are rounded to the nearest acre.
2. NAVD88 = North American Vertical Datum of 1988

Figure 3.2-4

Impacts to Important Farmland

ESA



Path: U:\GIS\GIS\Projects\16xxxx\D160822_PVWMA\03_MXDs_Projects\EIR\Figure 3.2-5 Parcel Fragmentation.mxd, wsm 2/13/2019

SOURCE: California Department of Conservation, 2016

College Lake Integrated Resources Management Project

Figure 3.2-5
Parcels Containing Important Farmland
Affected by Fragmentation

ESA

To the extent that growers are able to prepare the land after June 1 and successfully plant and harvest crops, or otherwise productively use land for agricultural purposes (e.g., access for farm machinery or ancillary agricultural uses), this analysis may overestimate the amount of Important Farmland that could permanently be converted.

Water management activities are not expected to result in the conversion of Important Farmland above 63 feet NAVD88 based on projected WSEs and groundwater characteristics compared to existing conditions during the growing season. Current farming activities at elevations above 63 feet NAVD88 could still experience some disruption due to water management activities. For example, growers regularly access berry farms on either side of the "arm" in the southeastern portion of College Lake by driving across it. That access likely would no longer be feasible with implementation of Project.

Temporary Disruption of Agricultural Use During Project Construction

As indicated in Section 2.7 in Chapter 2, *Project Description*, PV Water proposes that existing water management and farming practices would continue during construction of the proposed weir structure, intake pump station, and WTP. Consequently, no disruption of existing farming within the lake basin due to water management activities is anticipated during construction.

Weir Structure and Intake Pump Station

Direct Permanent Conversion of Important Farmland

As shown in Table 3.2-4, the weir structure and intake pump station would permanently remove approximately 0.2 acres of Important Farmland from cultivation, resulting in the permanent conversion of Important Farmland to another use.

Temporary Disruption of Agricultural Use During Project Construction

Construction staging for the proposed weir structure and intake pump station would occur within the selected WTP site. As described in Table 2-9 in Chapter 2, *Project Description*, the anticipated ground disturbance for construction of the proposed weir structure and intake pump station is approximately 0.6 acre spanning the creek channel, a portion of which is considered Important Farmland. Based on a review of aerial imagery, the hillside directly east of the weir structure has not been farmed within the last decade, but land directly west of the proposed weir structure has been used for raspberry and blackberry cultivation and for farm access roads from 2014 to 2018. Construction of the weir structure and intake pump station would temporarily disrupt agricultural uses. In addition, general construction activities (e.g., trucks traveling on farm roads to the optional WTP site, noise, and dust) could disrupt farming practices on neighboring properties. Disruption of farming due to construction would not constitute a significant impact on Important Farmland because it would not result in the conversion of Important Farmland. Refer to Table 3.5-5 in Section 3.5, Air Quality and Greenhouse Gases, for measures adopted by PV Water to control dust from construction.

Construction of the 30-inch pipeline from the intake pump station to the preferred WTP site would disrupt Important Farmland between the intake pump station and WTP site. While the alignment follows a farm road, the alignment is constrained by the Pinto Creek drainage ditch.

While the construction corridor can be narrowed from the proposed 40-foot width in this area, some loss of crops, as well as trees within an apple orchard, due to construction would be unavoidable along this alignment. Following cessation of pipeline construction activities, farming could resume within the construction corridor; however, trees with roots extending more than three feet deep would be prohibited above the pipeline. Roots deeper than three feet could damage the pipeline and its cover. Following construction, if top soil is not replaced, long-term impacts on the productivity of the land could occur. Implementation of **Mitigation Measures LU-1c** would prevent a long-term adverse effect on Important Farmland resulting from pipeline construction.

Preferred and Optional Water Treatment Plant Sites

Permanent Conversion of Important Farmland

As shown in Table 3.2-4, both WTP sites occupy Important Farmland. Development of the WTP on either site would permanently remove Important Farmland from cultivation, resulting in its conversion to another use, as follows:

- ***Preferred WTP Site.*** Construction of the WTP at the preferred site would result in the conversion of five acres of Important Farmland. The parcel of land on which the preferred WTP site would be constructed is 26.2 acres and consists entirely of Important Farmland. The orchard within which the preferred WTP site is situated is approximately nine acres (see Figure 3.2-5). The northern border of this orchard is a farm road that separates the orchard from the rest of the parcel. Because the preferred WTP site would take over half of the orchard out of production and could potentially damage infrastructure, it is reasonably foreseeable that the entire nine-acre orchard could undergo conversion. Refer also to the discussion under Impact AES-1 in Section 3.13, Aesthetics, and mitigation measures related to retaining orchard trees along Holohan Road.
- ***Optional WTP Site***. Construction of the WTP at the optional site would result in the conversion of six acres of Important Farmland. Approximately 21.2 acres of this 22.8-acre parcel is Important Farmland, of which approximately 7.4 acres is below 63 feet NAVD88. Because the optional WTP site would occupy six acres of the parcel and an additional 7.4 acres is below 63 feet NAVD88, it is reasonably foreseeable that all of the Important Farmland within this parcel could convert if the optional WTP site were selected.

Temporary Disruption of Agricultural Use During Project Construction

As stated in Chapter 2, *Project Description*, construction staging and laydown for the proposed WTP would consist of the WTP site (either preferred or optional); a construction disturbance area (e.g., to accommodate heavy equipment movement for site grading) would also occur within up to 30 feet from the WTP site boundary, although Salsipuedes Creek, the Pinto Creek drainage ditch, and Holohan Road would be avoided. Up to approximately 6.5 acres of land could be disturbed for construction activities at the Preferred WTP site and up to 6.9 acres could be disturbed at the Optional WTP Site. During the construction period, construction activities (e.g., trucks traveling on farm roads to the optional WTP site, noise, and dust) could disrupt farming on adjacent properties, but would be temporary in nature. Development of the WTP at either site could also result in the destruction of irrigation systems and would necessitate rerouting irrigation lines following completion of either WTP, should the parcel continue to be farmed.

College Lake Pipeline

Permanent Conversion of Important Farmland

As shown on Figures 3.2-2a and 3.2-2b, segments of the College Lake pipeline alignment pass through Important Farmland. While there would be temporary disruption of farming operations during construction and PV Water would occasionally access the pipeline for maintenance purposes which could also temporarily disrupt farming operations, there would be no permanent conversion of Important Farmland associated with the College Lake pipeline.

Temporary Disruption of Agricultural Use During Project Construction

Pipeline construction through agricultural fields would result in a temporary loss of crop production. Pipeline construction is expected to last 13 months from 2022 to 2023, and construction through agricultural fields would require up to a 40-foot-wide construction corridor to facilitate construction and movement of equipment. Staging and laydown for pipeline construction would occur primarily within the width of the construction corridor and along the pipeline route. In agricultural fields, pipeline installation is estimated to occur at rates of up to 250 linear feet per day. Following cessation of pipeline construction activities, farming could resume within the construction corridor; however, trees with roots extending more than three feet deep would be prohibited above the pipeline because deep roots could damage the pipeline and its cover.

During pipeline construction in farm fields, excavated material would likely be side-cast adjacent to pipeline trenches. If top soil is not replaced following construction, long-term impacts on the productivity of Important Farmland could occur. Implementation of **Mitigation Measure LU-1c** would prevent a long-term adverse effect on Important Farmland resulting from pipeline construction.

Impact Summary

Although implementation of the Project would result in the permanent conversion of Important Farmland through direct and indirect changes in the environment, and pipeline construction could result in long-term adverse impacts on Important Farmland, these impacts would be partially mitigated by the Project's contribution to the long-term preservation of such farmland within the Pajaro Valley by substituting surface water for groundwater resources in the areas shown on Figure 2-4 in Chapter 2, which are otherwise threatened by long term conversion to non-agricultural use due to seawater intrusion. While implementation of Mitigation Measures LU-1a, LU-1b, and LU-1c could reduce these impacts, the loss of Important Farmland remains ***Significant and Unavoidable*** for the following reasons. First, implementation of Mitigation Measure LU-1b potentially relies on agreements with third parties (Santa Cruz Land Trust or similar entity), causing uncertainty as to whether PV Water can successfully implement this measure. In addition, the implementation of agricultural easements under Mitigation Measure LU-1b can diminish the value of a parcel because it restricts future land uses; consequently, land owners may be unwilling to put agricultural easements on their property. In addition, the cost to PV Water of implementing Mitigation Measure LU-1b is not known and cannot be known with certainty at this time; consequently, this measure may be infeasible. Lastly, while acquiring agricultural easements would ensure that the parcels over which they are acquired are preserved for agricultural uses, the Project would not reduce the number of acres lost to agricultural production. A conservation easement would not 'replace or provide a substitute resource' (CEQA Guidelines § 153701(e)) for the permanent loss of farmland acreage. While the Project would adversely affect Important Farmland in and around College Lake, its implementation would nevertheless in and of itself mitigate this impact to some extent, by also promoting the long-term preservation of such farmland within the Pajaro Valley into the future by substituting surface water for groundwater resources within a critically overdrafted groundwater basin.[24]

Mitigation Measure LU-1a: Promote Farming.

To reduce the amount of Farmland of Statewide Importance and Unique Farmland converted to other uses and in coordination with affected landowners, PV Water shall adopt practices to promote farming within the areas depicted with red hatching on Figure 3.2-4 of the College Lake Integrated Resources Management Project EIR. Such practices may include, but are not limited to, the following:

- Maintain, improve and potentially expand tile drain systems.
- If controlling land by easement, establish terms that require land owners to cultivate crops or otherwise productively use the land for agricultural purposes at least once every five years, hydrologic conditions permitting.
- If acquiring land outright, enter into lease arrangements for the land to be cultivated or otherwise productively used for agricultural purposes at least once every five years, hydrologic conditions permitting.

Mitigation Measure LU-1b: Compensate for Conversion of Important Farmland.

Track Conversion of Important Farmland. PV Water shall review California Department of Conservation's Farmland Mapping and Monitoring Program farmland designations for College Lake annually beginning with the first year of construction and continuing for five years of Project operation. PV Water shall identify Prime Farmland, Farmland of Statewide Importance, and Unique Farmland referred to herein as Important Farmland that is within the College Lake basin below elevation 63 feet NAVD88 that converts due to water management operations.

Establish Memorandum of Understand for Agricultural Easement Fund. PV Water shall enter into a Memorandum of Understanding with the Santa Cruz Land Trust or similar entity. The Memorandum of Understanding shall include details regarding an Agricultural Easement Fund to be paid by PV Water and the timing of acquisition of agricultural easements for the purpose of offsetting impacts on Important Farmland caused by the Project. Acceptance of this fee by the Santa Cruz Land Trust or similar entity shall serve as an acknowledgment and commitment to: (1) secure agricultural easements to offset the conversion of Important Farmland caused by the Project; and (2) provide documentation to PV Water describing the project(s) funded by the mitigation fee. If there is any remaining unspent portion of the Agricultural Easement Fund following implementation, PV Water shall be entitled to a refund in that amount. To qualify under this mitigation measure, the specific agricultural easement acquisition projects must preserve acreage of farmland of an equal or greater Farmland Mapping and

[24] Department of Water Resources, Bulletin 118, https://water.ca.gov/Programs/Groundwater-Management/Bulletin-118, Accessed March 22, 2019.

Monitoring Program designation value within the PV Water service area to offset the permanent conversion of Important Farmland by the Project.

Contribute to Agricultural Easement Fund. PV Water shall initially designate funds to secure easements for up to 6 acres of Prime Farmland to offset impacts associated with the water treatment plant. In addition, for Prime Farmland, Farmland of Statewide Importance, or Unique Farmland within the lake basin that the Department of Conservation converts to non-agricultural designations after the Project has operated for a period of one year, PV Water shall designate for the Agricultural Easement Fund an amount to cover the costs associated with acquisition of agricultural easements of equivalent value.

Directly Fund Agricultural Easements**.** As an alternative approach to establishing a memorandum of understanding for, and contributing to an agricultural easement fund, PV Water could elect to directly fund the purchase of agricultural easements for Important Farmland in the Pajaro Valley.

Mitigation Measure LU-1c: Replacement of Topsoil.

In agricultural areas, PV Water shall require contractors to stockpile topsoil at Project sites during Project grading and reapply it in situ after construction to promote vegetative growth. In agricultural areas temporarily disturbed by construction and where excavation occurs, the following measures shall apply:

- Strip 18 inches of topsoil from the area excavated unless otherwise stipulated by landowner. The topsoil shall be stored separately from subsoil and other construction materials.
- Clearly mark topsoil signs, and store topsoil separately from other excavated and imported materials in such a manner that the topsoil is not damaged, mixed, or covered by subsoil or surface rocks, and so that it is not continually disturbed.
- Stockpile topsoil on the same property from which it was stripped and return topsoil to same property from which it was stripped.

Impact LU-2. The Project could conflict with a Williamson Act contract, or conflict with an applicable land use plan, policy, or regulation of an agency with jurisdiction over the Project adopted for the purpose of avoiding or mitigating an environmental effect. (*Less than Significant*)

As indicated in Section 3.2.2.1, there is one parcel under Williamson Act contract that would be affected by the Project. In addition, the Local Coastal Plan applies to the portion of the College Lake pipeline alignment that extends into the Coastal Zone (i.e., west of SR 1).

Williamson Act

As indicated in Section 3.2.2.1, Assessor Parcel No. 051-101-10 within the College Lake storage area is enrolled in a Williamson Act Contract. In the event that the parcel is acquired for a public improvement, the Williamson Act contract becomes null and void.[25] As part of the Project, PV Water proposes to acquire or otherwise control use of this parcel. Implementation of the Project would cause this parcel to be regularly inundated such that farming could not continue. Because the College Lake Project would be a public improvement, acquisition of this parcel would render the Williamson Act contract null and void, thus eliminating any conflict. Consequently, there would be no impact related to cancellation of a Williamson Act contract.

Coastal Development Plan

As described in Section 3.2.2, Santa Cruz County has authority to approve coastal development permits for the portion of the state-designated Coastal Zone within its jurisdiction. The portion of the College Lake pipeline west of SR 1 is within the Coastal Zone. Chapter 13.20 of the Santa Cruz County Code establishes the Coastal Zone review and permit processes for the purpose of implementing the California Coastal Act. Pursuant to Section 13.20.050 of the Santa Cruz County Code, PV Water would need to obtain a coastal development permit.

Table 3.2-3 presents objectives and policies from the Santa Cruz County General Plan/Local Coastal Program. The County would make a formal determination of consistency with the Local Coastal Plan through issuance of the Coastal Development Permit. A review of Santa Cruz County General Plan/Local Coastal Program policies conducted for this EIR did not identify any apparent inconsistencies associated with the Project. Installation of the proposed College Lake pipeline would not preclude farming, and would help preserve agricultural lands in the Coastal Zone over the long term by reducing pumping and overdraft which has led to sea water intrusion in the Pajaro Valley. Implementation of the Project would be consistent with several General Plan/Local Coastal Programs goals and policies including those related to fostering the continuation of agriculture in the Pajaro Valley, protecting and managing watersheds and surface water supplies, eliminating long-term groundwater overdraft, and ensuring a continued sustainable supply of water for agricultural use through protection and development of surface and groundwater, and the impact would be ***less than significant***.

Mitigation: None required.

Cumulative Impacts

Impact C-LU-1: The Project, in combination with past, present, and probable future projects in the Project area, would have a cumulatively considerable impact on the conversion of Important Farmland to non-agricultural use. (*Significant and Unavoidable with Mitigation*)

The geographic scope for cumulative impacts on land use and agriculture is the Pajaro Valley. The focus of the analysis of cumulative impacts on land use and agricultural resources is the permanent conversion of Important Farmland. This analysis uses a list-based approach. The

25 County of Santa Cruz, Land Conservation Contract, APN 051-101-10, February 15, 1983.

projects described in Table 3.1-1 in Section 3.1, Overview, were reviewed to determine whether any could result in the permanent conversion of Important Farmland.[26] Based on available information, the following projects could result in the conversion of Important Farmland:

- ***Harkins Slough Recharge Facilities Upgrades***. Components of this project, specifically the recharge basins, could result in the conversion of up to approximately 29.4 acres of Important Farmland.[27]
- ***Watsonville Slough with Recharge Basins***. Components of this project, specifically the recharge basins, could result in the conversion of up to 3.9 acres of Important Farmland.[28]
- ***Murphy Crossing with Recharge Basins***. The recharge basins associated with the Murphy Crossing project would result in the permanent conversion of 21 acres of Important Farmland.[29]
- ***Pajaro Valley Groundwater Recharge Net Metering***. Components of this project, specifically the recharge basins, could result in the conversion of up to five acres of Important Farmland.[30]
- ***Pajaro River Flood Risk Management Study.*** This project involves implementing flood protection measures and would result in the loss of up to 130.6 acres of Important Farmland adjacent to the Pajaro River.[31]
- ***Bryant Habert Ecological Restoration Project***. This project involved the restoration of 20 acres of wetland and upland habitat subject to extended inundation and seasonally high groundwater. Completed in 2016, this project resulted in the conversion of approximately 20 acres of Important Farmland.[32]

The projects listed above, in addition to the College Lake Project, could account for the conversion of up to approximately 408.4 acres of Important Farmland to non-agricultural use. This would be a significant impact, and the project's contribution to this impact would be cumulatively considerable. Implementation of Mitigation Measures LU-1a through LU-1c could reduce the project's contribution to this cumulative impact to less-than-cumulatively considerable. However, for reasons stated under Impact LU-1, this impact is still considered significant and unavoidable and thus its contribution to this cumulative impact is considered cumulatively considerable. Those cumulative projects proposed by PV Water will be subject to project-specific CEQA, at which point PV Water will evaluate impacts on Important Farmland

---

[26] No acreages for conversion of Important Farmland were available for projects 18-21 in Table 3.1-1 of Section 3.1. Therefore, these projects are not discussed.

[27] Carollo Engineers, Harkins Slough Recharge Facilities Upgrades Preliminary Design Drawings, prepared for PV Water, February 2019.

[28] Carollo Engineers, Watsonville Slough with Recharge Basins Preliminary Design Drawings, prepared for PV Water, February 2019.

[29] PV Water, *2014 Basin Management Plan Update, Final EIR*, February 2014.

[30] Resource Conservation District of Santa Cruz County, *Pajaro Valley Groundwater Recharge Project*, Initial Study/Environmental Checklist, March 9, 2017.

[31] U.S. Army Corps of Engineers, *Pajaro River Flood Risk Management General Reevaluation Report & Integrated Environmental Assessment Updated Draft FONSI and Executive Summary*, November 2017.

[32] Land Trust of Santa Cruz County, *Bryant-Habert/Wait Ecological Restoration Project, Initial Study/Mitigated Negative Declaration*, January 19, 2016.

based on (then) current design information and will, in accordance with CEQA, adopt measures to mitigate impacts on Important Farmland.

Mitigation Measure LU-1a: Promote Farming (refer to Impact LU-1)

Mitigation Measure LU-1b: Compensate for Conversion of Important Farmland (refer to Impact LU-1)

3.3 Surface Water, Groundwater, and Water Quality

This section presents an analysis of potential impacts related to surface water, groundwater, and water quality that would result from implementation of the proposed College Lake Integrated Resources Management Project (Project). The analysis includes both site options (preferred and optional) for the water treatment plant (WTP) as well as preferred and optional pipeline alignments for the College Lake pipeline. Information from the 2014 Basin Management Plan Update Program Environmental Impact Report (2014 BMP Update PEIR) that remains relevant and accurate for the purposes of describing the physical or regulatory setting of surface water, groundwater, and water quality has been incorporated as appropriate. The Project includes mitigation measures adopted by the Board of Directors to reduce the severity and magnitude of potential environmental effects.

3.3.1 Setting

The 2014 BMP Update PEIR Section 3.9.1 describes existing hydrology and water quality conditions in the Project region. Regional environmental setting information from the 2014 BMP Update PEIR is summarized here. This section also describes hydrologic and water quality information specific to the Project area.

3.3.1.1 Regional Physiography, Climate, Hydrology, and Geomorphology

The Project is located in the Pajaro River watershed, an approximately 1,300-square-mile drainage unit constituting most of San Benito County and portions of Santa Clara, Santa Cruz, and Monterey counties. The Pajaro River watershed is part of the Central Coast Hydrologic Region that extends from southern San Mateo County to southern Santa Barbara County.[1] Topographic features along the central coast are dominated by the rugged sea coast and west- to northwest-trending mountain ranges; long valleys run parallel to the mountains. The Pajaro Valley is located in the lower Pajaro River watershed, and it is bounded by the Santa Cruz Mountains to the north and east, the Los Carneros Hills to the south, and Monterey Bay (the Pacific Ocean) to the west. The northwest-trending San Andreas and the Zayante-Vergeles fault zones cross the eastern side of the basin. The basin is filled with alluvial, aeolian, and marine sediments that together are over 3,500 feet thick in the deepest parts of the Pajaro Valley. Section 3.6, Geology and Soils, further discusses Pajaro Valley geology.

The Pajaro Valley is in a Mediterranean climate typical of central coastal California. This climate zone is characterized by cool, wet winters and warm, dry summers. Over 90 percent of annual precipitation falls from November through April, and coastal fog is common in the summer and fall months. The mean annual temperature is 57 degrees Fahrenheit; the mean monthly maximum temperature is 74 degrees Fahrenheit in September; and the mean monthly minimum temperature is 39 degrees Fahrenheit in January. The long-term mean annual rainfall at Watsonville is 21.8

[1] RWQCB, Central Coast Regional, Water Quality Control Plan for the Central Coastal Basin, September 2017.

inches, averaged for the period of record from water years 1908 to 2017, while the 30-year average (1988 to 2017) is 21.9 inches. The mean precipitation for the Pajaro Valley ranges from 16 inches near the coast to more than 40 inches in the foothills of the Santa Cruz Mountains.[2] Annual precipitation is highly variable, ranging from less than 40 percent to more than 200 percent of the mean of data collected for over 100 years.[3] The long-term precipitation and streamflow records suggest that most of the variation in precipitation and streamflow occurs due to longer climate cycles.[4]

Precipitation that falls in Pajaro Valley and that does not reenter the atmosphere via evapotranspiration may infiltrate into the ground and percolate into the groundwater system or run off into streams and eventually flow into the Pacific Ocean. In some areas of the Pajaro Valley, particularly in the foothill areas north and east of the Pajaro River, water from the streams at times infiltrates into the groundwater system. Much of the streamflow in the Pajaro Valley originates as runoff from outside the Pajaro Valley (to the east, in San Benito County) and enters through the Pajaro River. Changes in natural streamflow within the Pajaro Valley include the construction and operation of water diversion structures for urban and agricultural supplies and for artificial recharge.[5] Under developed conditions, decades of groundwater withdrawals in excess of recharge have led to groundwater storage depletion, which has lowered groundwater levels and altered the movement of groundwater, causing onshore migration of seawater and the formation of regional cones of depression in the center of the Pajaro Valley.[6]

Regional topography, geology, climate, and hydrology influence patterns of erosion and sedimentation in the basin.[7] The terrain in the Santa Cruz Mountains consists of shallow, erodible soils overlying highly fractured sedimentary rock. Intense precipitation combined with erodible material results in high erosion rates of the mountain slopes. The relief between the Santa Cruz Mountains and the Pajaro Valley drives sediment deposition in the Pajaro Valley, as available stream power declines in areas of reduced channel gradient. Streams in these areas form incised channels cut into extensive alluvial deposits. Prior to agriculture becoming the dominant land use, little runoff occurred from land adjacent to these lowland stream channels; instead, these stream channels conveyed water from the mountainous reaches to the ocean.[8] Under increasingly developed conditions, erosion and sedimentation patterns have been influenced by land uses that

2 Hanson, R.T., Schmid, Wolfgang, Faunt, C.C., Lear, Jonathan, and Lockwood, Brian, 2014, Integrated hydrologic model of Pajaro Valley, Santa Cruz and Monterey Counties, California: U.S. Geological Survey Scientific Investigations Report 2014–5111, http://dx.doi.org/10.3133/sir20145111..

3 Hanson, Geohydrologic Framework of Recharge and Seawater Intrusion in the Pajaro Valley, Santa Cruz and Monterey Counties, California. USGS Water-Resources Investigations Report 03-4096, 2003.

4 Hanson, R.T., Schmid, Wolfgang, Faunt, C.C., Lear, Jonathan, and Lockwood, Brian, 2014, Integrated hydrologic model of Pajaro Valley, Santa Cruz and Monterey Counties, California: U.S. Geological Survey Scientific Investigations Report 2014–5111, http://dx.doi.org/10.3133/sir20145111.

5 Ibid.

6 Ibid.

7 Information in this description derived from Fall Creek Engineering, Lower Pajaro River Enhancement Plan for Green Valley, Casserly, Hughes, Tynan, Coward and Thompson Creeks, Santa Cruz County, California, December 2002.

8 Fall Creek Engineering, Lower Pajaro River Enhancement Plan for Green Valley, Casserly, Hughes, Tynan, Coward and Thompson Creeks, Santa Cruz County, California, December 2002.

increase impervious area in the watershed. When impervious areas reduce infiltration and cause precipitation to flow into stream channels, the increased flow in channels causes new patterns of channel incision and bank erosion.[9] Studies of sediment transport within the Pajaro River watershed have indicated that the lower Pajaro River, downstream of the Chittenden stream flow gage,[10] is degrading (eroding). Ongoing channel adjustments resulting from land use changes appear to be in progress, and they affect current and projected future drainage patterns in the watershed.

3.3.1.2 Surface Water Hydrology of College Lake and Salsipuedes Creek

College Lake

College Lake is a seasonal lake in Pajaro Valley that forms in a topographic depression along the Zayante-Vergeles Fault zone surrounded by locally elevated terraces (discussed in greater detail in Section 3.6, Geology and Soils). The College Lake watershed, partially shown on **Figure 3.3-1**, consists of approximately 11,000 acres of range, rural residential, and crop lands.[11] The majority of the water in College Lake enters from the north side of the lake through Casserly Creek, though other small unnamed drainages also contribute flow to the lake.[12] During wet weather, flow direction in the reach of Salsipuedes Creek between College Lake and Corralitos Creek reverses due to high flows in Corralitos Creek, and surface water enters the lake as backflow from Salsipuedes Creek. During other periods, outflow from College Lake drains into Salsipuedes Creek, which is tributary to the Pajaro River. Reclamation District (RD) 2049 pumps College Lake dry in the spring to accommodate summer farming of the lakebed. Pumping usually begins in mid-March, depending on the amount of spring rain.[13] An existing weir with crest at elevation 60.1 feet North American Vertical Datum of 1988 (NAVD88) associated with the pumps spans the Salsipuedes Creek channel and, under certain conditions, controls the water level in College Lake.[14] When the lake water surface elevation (WSE) is at the existing weir crest elevation, approximately 228 acres of the lake basin is inundated, storing about 1,150 acre-feet of water.[15] Subsurface tile drains are present within the College Lake basin; during the summer farming period, flow from these drains is collected and pumped into a channel at the center of the College Lake basin. Water in the channel flows to the weir and pumps.

---

9 Ibid.

10 The Chittenden gage (USGS Gage 11159200) measures stream flow on the Pajaro River. River data has been collected at this gage since 1956. The gage is located at the crossing of Chittenden Road, upstream of the confluence with Salsipuedes Creek and approximately 8.8 miles southeast of College Lake.

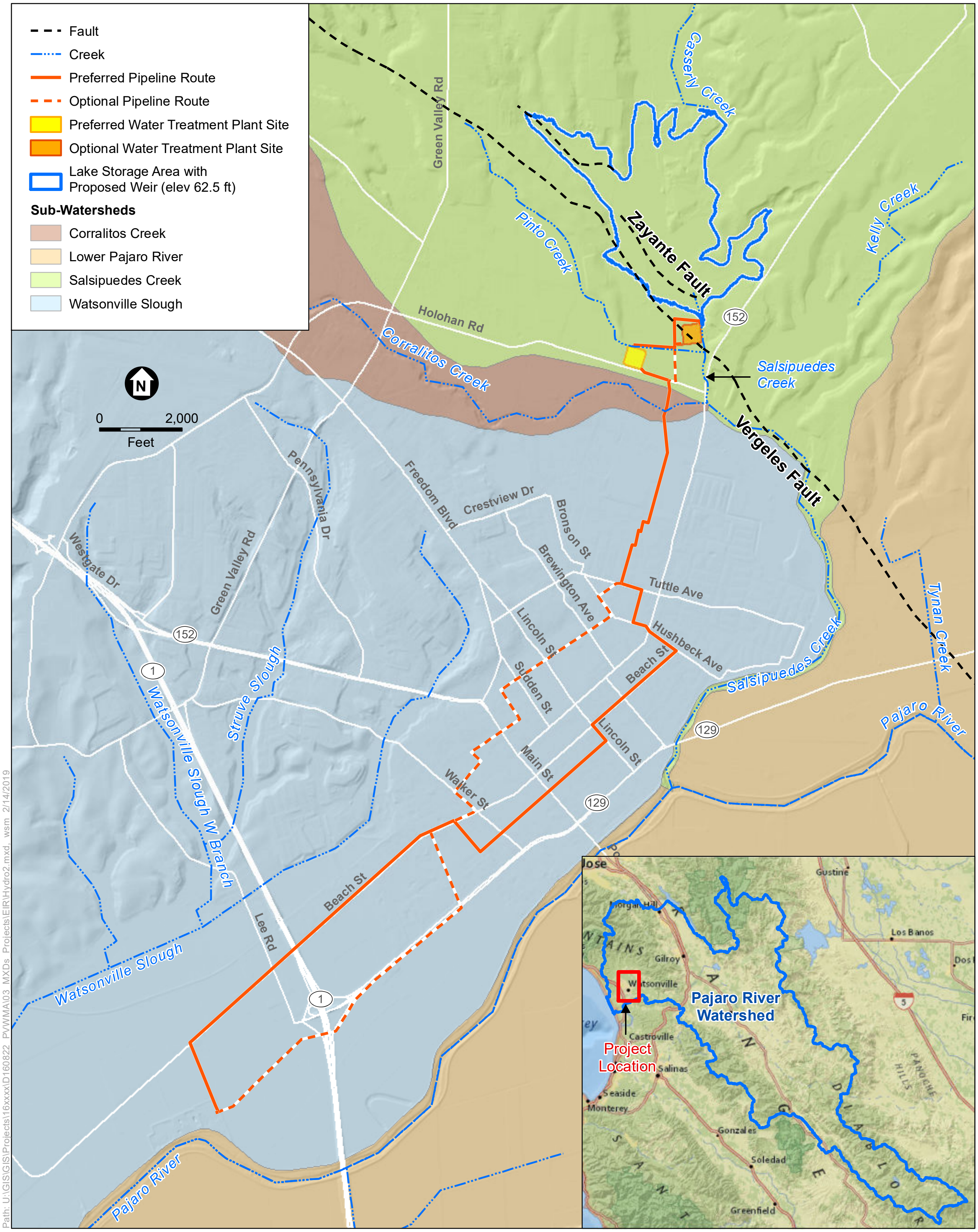
11 PV Water, *Final Basin Management Plan Update*, February 2014.

12 Fall Creek Engineering, Lower Pajaro River Enhancement Plan for Green Valley, Casserly, Hughes, Tynan, Coward and Thompson Creeks, Santa Cruz County, California, December 2002.

13 RD 2049 was formed in 1920 and was granted express legal authority under State law (California Water Code Section 50000 et. seq.) to pump water from College Lake to reclaim the land for agricultural production.

14 The primary purpose of the existing weir is to prevent pumped water from flowing from Salsipuedes Creek into College Lake.

15 Resource Conservation District of Santa Cruz County (RCD-SCC), *College Lake Multi-Objective Management Report Final Report*, prepared by cbec, November 14, 2014.



SOURCE: USGS, 2016

College Lake Integrated Resources Management Project

Figure 3.3-1
Hydrology and Watersheds in the Project Vicinity

ESA

Sediment contributions to College Lake are principally from Green Valley Creek, although significant erosion has been observed in the unnamed east tributary. Deltaic deposits have been reported at the mouth of Casserly Creek.[16] Based on 2012 topographic data, the storage capacity of College Lake at WSE 62.5 feet NAVD88 was estimated to be approximately 1,800 acre-feet.

Figure 3.3-2 shows WSEs in College Lake for water years 2012 through 2017, which cover water year types ranging from very dry to very wet.[17]

Salsipuedes Creek

Wet Season

During the wet season (approximately between October and April), the WSE in College Lake varies, but is generally above the elevation of the existing weir, and water flows out of the lake into Salsipuedes Creek approximately 1,900 feet upstream of its confluence with Corralitos Creek. About 80 percent of the time, if the WSE of College Lake has already exceeded the elevation of the existing weir, the WSE of College Lake is above 61 feet NAVD88 (refer to Figure 3.3-2). During wet conditions, surface water from Pinto Lake (a perennial lake located west of College Lake, in a similar topographic depression along the Zayante-Vergeles Fault zone) flows through Pinto Creek, an engineered channel, into the reach of Salsipuedes Creek immediately downstream of College Lake; however, this inflow has only minor effects on flow magnitude and direction in Salsipuedes Creek.[18]

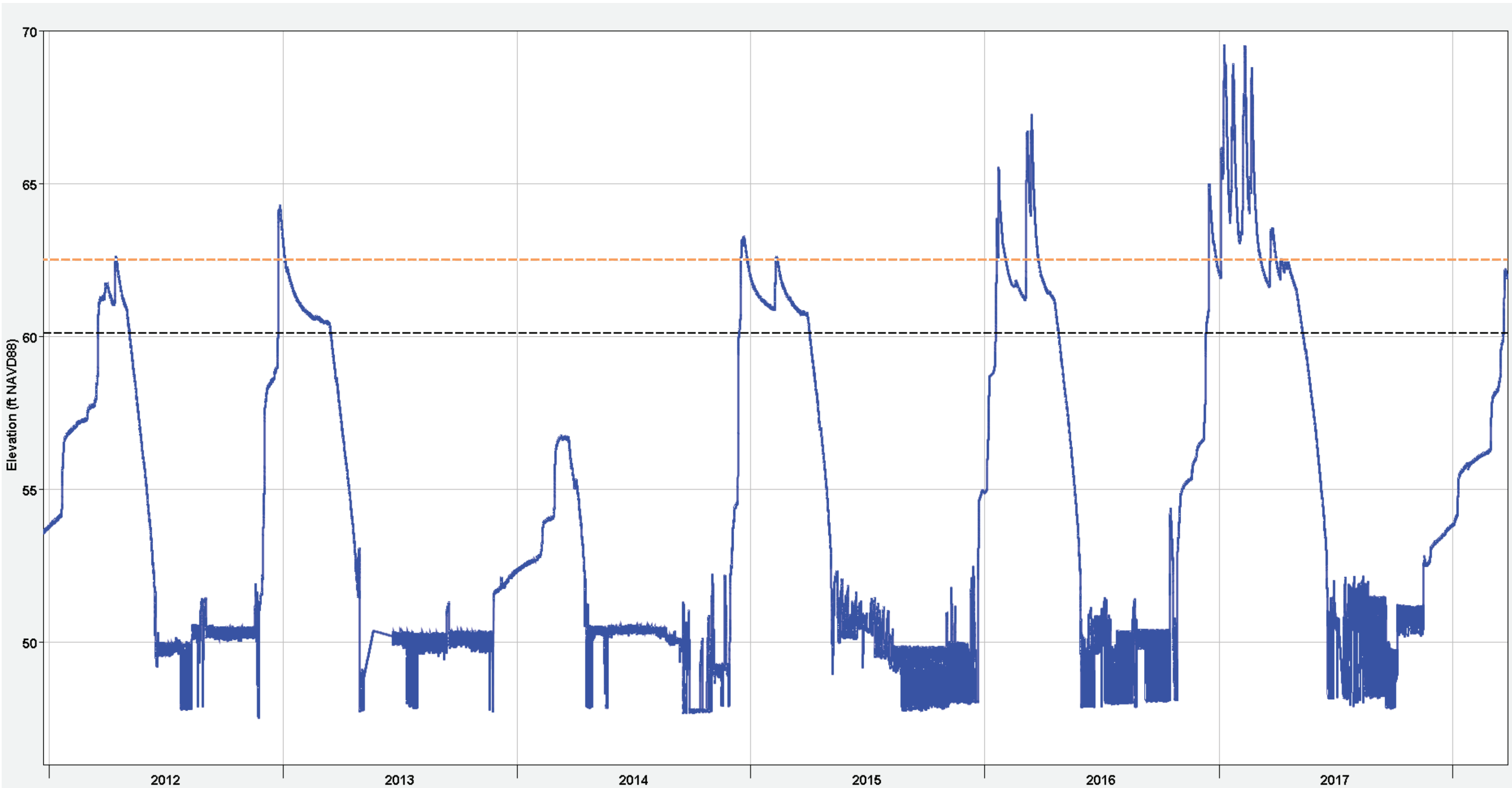
There are no public stream gages measuring flow in Salsipuedes Creek. The stream gage nearest to the confluence of Salsipuedes Creek and Corralitos Creek is located on Corralitos Creek at the Green Valley Road crossing (U.S. Geological Survey [USGS] Station Number 11159200, Corralitos Creek at Freedom, California), approximately two miles upstream. The peak discharge of Corralitos Creek at this gage between 2012 and 2017 was 3,360 cubic feet per second (cfs). During 2014, the annual peak discharge at this gage was 172 cfs.[19] During the 50-year record at this gage, only four storms resulted in peak discharge greater than the recent peak of 3,360 cfs. The greatest discharge measured at this gage was 5,610 cfs during the storm of January 4, 1982.

[16] PV Water, *Final Environmental Impact Report for the Basin Management Plan Update*, February 2014

[17] Based upon water year classification developed by 2nd Nature for PV Water.

[18] RCD-SCC, *College Lake Multi-Objective Management Report Final Report*, prepared by cbec, November 14, 2014.

[19] U.S. Geological Survey, National Water Information System Peak Streamflow data for USGS 11159200 Corralitos C A Freedom CA, 1956 to 2017. Available online at https://nwis.waterdata.usgs.gov/nwis/peak?site_no=11159200&agency_cd=USGS&format=html. Accessed on February 1, 2019.



Notes: The elevation of the existing Reclamation District 2049 weir crest (60.1 feet NAVD88) is indicated by the lower black dashed line. The maximum elevation of the proposed weir crest (62.5 feet NAVD88) is indicated by the upper orange dashed line.

D160822

SOURCE: cbec, 2018.

College Lake Integrated Resources Management Project

Figure 3.3-2
College Lake Observed Stage (water levels)

ESA

Dry Season

In the spring, RD 2049 pumps water from College Lake into Salsipuedes Creek to drain the lake for farming. Pumping the lake dry generally takes 30 to 40 days, typically resulting in a dry lakebed by May 1st to May 10th.[20] Intermittent pumping into Salsipuedes Creek continues after this date as needed to maintain a dry lakebed. The pumping rate (and corresponding discharge to Salsipuedes Creek) has been estimated to range from 10 to 22 cfs based on observed change in lake WSE at the existing pump house in 2012 and 2013.[21]

The existing weir generally prevents most water pumped into Salsipuedes Creek from flowing back into College Lake once the water level falls below the weir elevation. As Salsipuedes Creek south of College Lake has aggraded, shown on **Figure 3.3-3**, the channel bed elevation on the south side of the existing weir has increased to approximately 57 feet NAVD88. On the north side of the existing weir, the elevation of the channel bed is approximately 49 feet NAVD88. At the initiation of pumping, the elevation of the weir is raised by approximately 2 feet with sandbags to prevent water in Salsipuedes Creek from flowing back into College Lake.[22]

The sandbags on the existing weir generally are removed by October 31, although on occasion they are left in place beyond that date.[23]

3.3.1.3 Pajaro Lagoon Hydrology

Seasonally a lagoon forms at the mouth of the Pajaro River where it reaches the Pacific Ocean. The lagoon forms when wave energy causes a sand bar to form across the river mouth, and opens when either the river or waves overtop the sand bar and cause the river to cut a new opening. The lagoon's status as open or closed affects water quality and local flooding, and is in part influenced by the amount of water passing down the Pajaro River. The lagoon is also mechanically opened by Santa Cruz County Department of Public Works, when appropriate to protect public safety and in accordance with requirements issued by the U.S. Army Corps of Engineers, Central Coast Regional Water Quality Control Board, and California Department of Fish and Wildlife.

Historically there has been at least one year (2015) during which the lagoon closed during the spring, prior to April when RD 2049 pumped College Lake, and when the lake was pumped the lagoon did not open by itself, resulting in flooding at Pajaro Dunes. The County Flood Control District breached the lagoon to release the water pumped from College Lake. The existing breaching patterns may thus be somewhat artificial (disconnected from precipitation and seasonal hydrology).

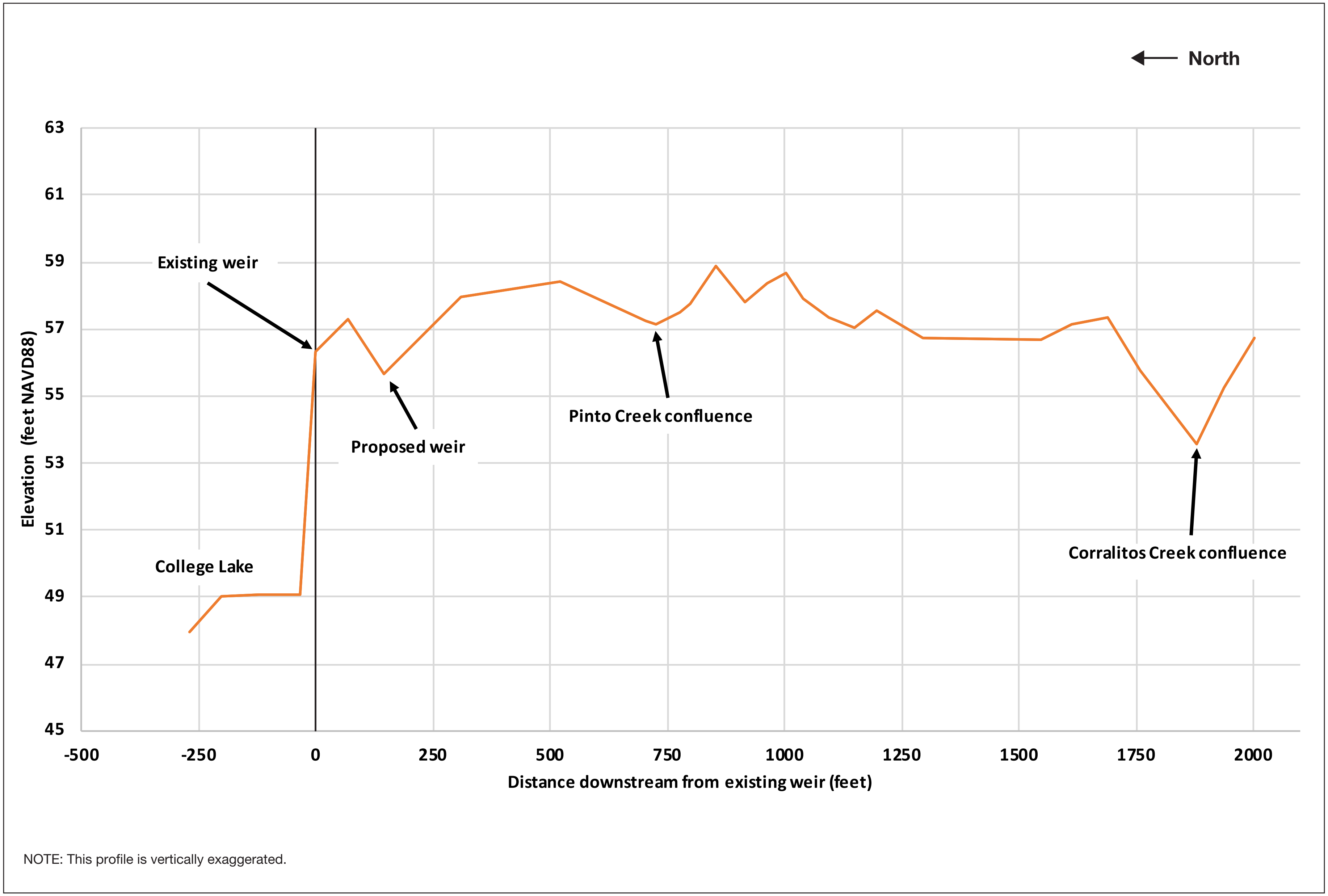
---

[20] Peixoto, Dick, Lakeside Organic Gardens, LLC, Letter to Mary Bannister, May 12, 2014.

[21] RCD-SCC, *College Lake Multi-Objective Management Report Final Report*, prepared by cbec, November 14, 2014. The actual pumping rate is dependent on the number of pumps running and the difference between the water surface elevations upstream and downstream of the existing weir; generally, the pumping rate is higher when the water surface elevations on either side of the weir are similar and drops as the lake level drops.

[22] RCD-SCC, *College Lake Multi-Objective Management Report Final Report*, prepared by cbec, November 14, 2014.

[23] Ibid.



SOURCE: cbec, 2018.

College Lake Integrated Resources Management Project

Figure 3.3-3
Channel Elevation Profile: Salsipuedes Creek Between College Lake and Corralitos Creek Conluence

ESA

In the relatively dry water years of 2014 and 2015, during the few winter storm events, the mouth opened for several months before closing due to wave action in early spring.[24] In both years, low base flows were eventually overmatched by beach seepage[25] and evaporative losses, visible as seasonal low points in water levels in early fall. In the wetter water years of 2016 and 2017, winter flows scoured a deeper mouth, causing the lagoon to remain open to tides until fall. Powerful waves during the El Nino winter of 2015-2016 created a beach bar that partially blocked outflows from the lagoon, leading to high water levels in the open lagoon. Although waves in the fall of 2016 were powerful enough to close the mouth, high base flows at the time caused the lagoon to fill rapidly and breach (erode a new mouth after overtopping the beach).

3.3.1.4 Groundwater

Regional Groundwater

As described in the 2014 BMP Update PEIR, the Pajaro Valley is underlain by Tertiary and Quaternary age sediments and sedimentary rocks overlying Cretaceous granitic rocks. The thickness of the sedimentary rocks and sediment ranges from 500 feet to over 3,000 feet.[26]

In 2014, Pajaro Valley Water Management Agency (PV Water) and the USGS developed an integrated hydrologic model of Pajaro Valley, called the Pajaro Valley Hydrologic Model (PVHM), to support groundwater basin management planning.[27] This conceptual model identified inflows and outflows to the Pajaro Valley groundwater system that include movement and use of water from natural and human components. As described in the associated report, a hydrogeologic framework was developed for modeling purposes. The hydrogeologic framework grouped the more than 90 separate mapped layers of geologic units in Pajaro Valley into aquifers and confining units. The hydrogeologic layers are:

- Two layers of alluvial deposits representing an alluvial deposit aquifer layer[28] and basal fine-grained confining unit.[29] These are of variable spatial extent and range in thickness from about 15 to 380 feet (alluvial deposits) and 15 to 55 feet (basal fine-grained confining layer).
- Three layers of Aromas Sand of late Quaternary age representing the upper Aromas aquifer, an upper Aromas basal fine-grained confining unit, and a lower Aromas aquifer unit. The

[24] ESA, *Lagoon Quantified Conceptual Model Memorandum for Pajaro River Lagoon*, April 12, 2018. Unless otherwise noted, content describing Pajaro Lagoon is from this source.

[25] Beach seepage refers to the draining of Pajaro Lagoon to the ocean through the beach sand.

[26] Hanson, Geohydrologic Framework of Recharge and Seawater Intrusion in the Pajaro Valley, Santa Cruz and Monterey Counties, California. USGS Water-Resources Investigations Report 03-4096, 2003.

[27] The PVHM is a six-layer hydrologic flow model that comprises 9,570 15-acre active model cells. Information regarding the PVHM derived or quoted from Hanson, R.T., Schmid, Wolfgang, Faunt, C.C., Lear, Jonathan, and Lockwood, Brian, 2014, Integrated hydrologic model of Pajaro Valley, Santa Cruz and Monterey Counties, California: U.S. Geological Survey Scientific Investigations Report 2014–5111, http://dx.doi.org/10.3133/sir20145111.

[28] Geologic deposits grouped into this first unit include Older Alluvium, Landslide Deposits, Undivided Terrace Deposits, Marine Terrace Deposits, Watsonville Terrace Deposits, Beach Sands, Basin Deposits, Older Dune Sands, and Alluvial Fan Deposits.

[29] The fine-grained basal confining unit may comprise deposits from one or more periods of sea-level high stand during the Pleistocene, or may represent flood deposits.

upper Aromas aquifer constitutes predominantly terrestrial sedimentary deposits (fluvial and aeolian) and ranges in thickness from about 15 to 500 feet. The thickness of the upper Aromas basal fine-grained confining unit ranges from about 15 to 115 feet. The lower Aromas consists predominantly of marine sediments and ranges in thickness from about 15 to 1,000 feet.

- One layer representing a combination of the Purisima Formation and other minor pre-Pliocene bedrock units. These units consist predominantly of marine deposits of Pliocene age (Purisima Formation), continental deposits, and the Butano Sandstone.

The Aromas Sand is considered the primary aquifer (water-bearing) unit of the Pajaro Valley. Under predevelopment conditions, groundwater flowed from the foothills of the Santa Cruz Mountains to the Pacific Ocean. Under developed conditions, decades of withdrawals in excess of recharge has altered the movement of groundwater to onshore flow of seawater and the formation of regional cones of depression in the center of Pajaro Valley.[30]

The PVHM simulated inflows to and outflows from the Pajaro Valley groundwater system. Groundwater inflows include recharge from infiltration of precipitation, streamflow, and applied water from irrigation. Along with deep percolation of precipitation, streamflow infiltration is the other major source of natural recharge in Pajaro Valley. More than 80 percent of the recharge occurs within the Alluvial aquifer system layer, owing to the distribution of outcrops and confining layers, and significant portions of recharge occur within outcrop areas of the Purisima Formation (10 percent) and the upper Aromas (7 percent). Recharge is driven by climate variations; simulated recharge during wet periods can be more than double the simulated recharge from dry periods. Groundwater flow downwards across geologic layer boundaries is driven by recharge along with pumpage (most pumpage occurs in the upper Aromas aquifer). Flow within the lower Aromas aquifer is downward to the upper Purisima during most years, but can be upward to the Lower Aromas during some wet years.

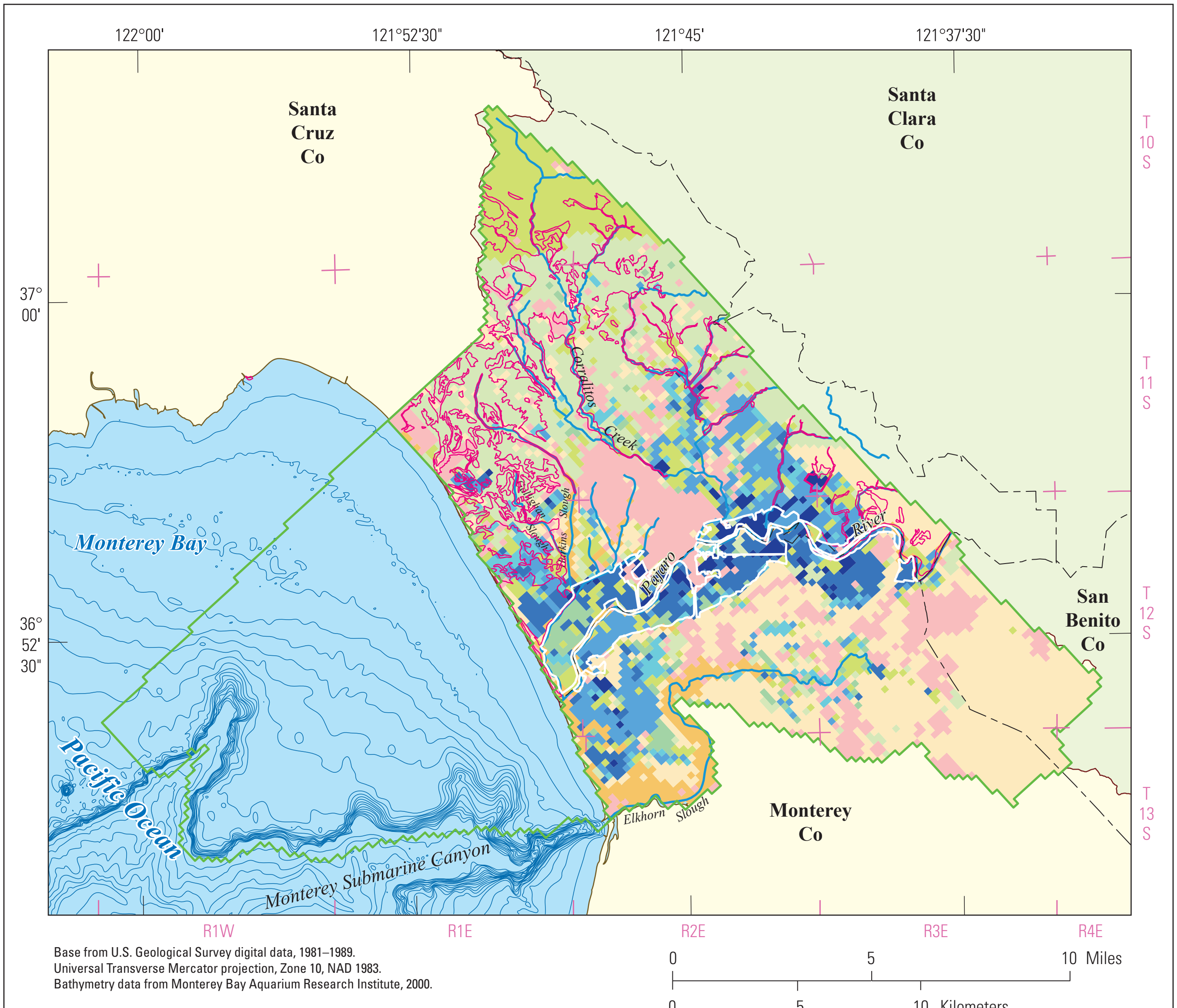
Overall net recharge to the groundwater system[31] ranges from less than 30,000 acre-feet per year during most dry years to more than 40,000 acre-feet during many wet years. The median distribution of net recharge is largely coincident with the alluvial channels of the streamflow network, the regions of tile drains, and the inland and coastal regions representing outcrops of the Aromas, as shown on **Figure 3.3-4**. Much of the intensive artificial recharge related to irrigation in the central region of the Pajaro Valley is intercepted by tile drains and becomes engineered runoff. The College Lake area has low potential for groundwater recharge, based on multiple regional groundwater recharge mapping efforts.[32]

---

30 Hanson, R.T., Schmid, Wolfgang, Faunt, C.C., Lear, Jonathan, and Lockwood, Brian, 2014, Integrated hydrologic model of Pajaro Valley, Santa Cruz and Monterey Counties, California: U.S. Geological Survey Scientific Investigations Report 2014–5111, http://dx.doi.org/10.3133/sir20145111

31 Net recharge to groundwater is the portion of irrigation and precipitation not consumptively used by plants reduced by losses to surface-water runoff and evapotranspiration from groundwater.

32 Pajaro Valley Water Management Agency, *Salt and Nutrient Management Plan*, Final, October 2016.



Base from U.S. Geological Survey digital data, 1981–1989.
Universal Transverse Mercator projection, Zone 10, NAD 1983.
Bathymetry data from Monterey Bay Aquarium Research Institute, 2000.

EXPLANATION

- Pajaro River watershed
- Outside Pajaro River watershed
- Reported tile drain areas (PVWMA, written commun., September, 2012)
- Model grid boundary
- River or streams
- Bathymetry contours
- Santa Cruz County primary areas for potential groundwater recharge (from Santa Cruz County (2009))

Median value of Farm-net recharge per model cell, in acre-feet per year (Negative values indicate more evapotranspiration than recharge)

- −16,367 to 0
- >0 to 300
- >300 to 600
- >600 to 1,200
- >1,200 to 2,400
- >2,400 to 3,600
- >3,600 to 4,800
- >4,800 to 7,200
- >7,200 to 12,000
- >12,000 to 33,726

> is greater than

NOTE: Farm-net recharge is the sum of excess irrigation and precipitation minus the sum of surface-water runoff from precipitation and irrigation and evapotranspiration from groundwater.
The total active modeled area is 543 square miles on a grid consisting of 150 rows, 150 columns, and 6 layers. Each cell is approximately 15.4 acres; the size was chosen to be comparable to the typical land parcel size.

D160822

SOURCE: Hanson, R.T., Schmid, Wolfgang, Faunt, C.C., Lear, Jonathan, and Lockwood, Brian, 2014, Integrated hydrologic model of Pajaro Valley, Santa Cruz and Monterey Counties, California: U.S. Geological Survey Scientific Investigations Report 2014 -5111, 166 p., http://dx.doi.org/10.3133/sir20145111.

Figure 3.3-4
Pajaro Valley Modeled Groundwater Recharge

Groundwater outflow includes pumpage from wells and tile drains, base flow or rejected recharge along streams, evapotranspiration, and subsurface underflow to the offshore portions of the aquifer systems and discharge to the ocean along submarine rock outcrops. As noted in Chapter 2, *Project Description*, groundwater levels in the Pajaro Valley Groundwater Basin have declined as a result of long-term groundwater overdraft, which has resulted in seawater intrusion, groundwater quality degradation, and groundwater storage depletion. Most of the groundwater storage depletion has occurred in the Alluvial aquifer layer, with substantial amounts of storage depletion also occurring in the upper Aromas and Purisima Formation aquifers. Seawater has intruded into the Alluvial layer and the upper Aromas layer through submarine rock outcrops to replace the depleted fresh groundwater. While it has varied annually and with changing climate, overdraft is currently estimated to have averaged about 12,100 acre-feet per year over the past 30 years.

Shallow Groundwater Near College Lake

College Lake is a seasonal water body in a natural depression bordered by gentle to moderate slopes along the upper-lying northern edge of the Pajaro Valley plain. The lake bottom is classified as Quaternary Basin deposits (considered part of the alluvial deposit layer), consisting of unconsolidated plastic clay and silty clay with high organic content (refer to Figure 3.6-2, Geologic Units, in Section 3.6, Geology and Soils). Locally, thin-bedded silt and sandy silt deposits are contained within the clays. Subsurface soils encountered during geotechnical borings taken near the existing weir at College Lake consisted of about 3 to 8 feet of fills of unknown engineered characteristics, underlain by interbedded very soft to very stiff clays and loose to very dense sands to the maximum depth explored of about 51.5 feet; within the upper 38 to 44 feet, the clayey soils were generally highly plastic, high to very high in moisture content, and highly compressible.[33]

The thickness of alluvial clays in the Pajaro Valley Groundwater Basin vary; in the vicinities of College Lake, Salsipuedes Creek, and the Pajaro River downstream of the confluence with Salsipuedes Creek, the alluvial clay thickness is generally greater than 16 feet.

The connection between College Lake and groundwater beneath the lake is uncertain. Shallow groundwater at College Lake is very close to the ground surface, generally within 5 feet of the surface during the wet season near Paulsen Road, within 5 to 10 feet of ground surface along the eastern Lake margin, and less than 5 feet along the southwest side of the Lake near Holohan Road.[34] Water levels of irrigation wells monitored around College Lake varied by between 15 to 20 feet over the historical record, and are typically greater than 60 feet below ground surface, suggesting there is a disconnect between the shallow groundwater and deeper groundwater system. Varying acre-feet of recharge to the groundwater system were estimated by the PVHM to occur in the area surrounding College Lake, as shown on Figure 3.3-4.

[33] Fugro, Preliminary Geotechnical and Geologic Site Assessments Phases 1 & 2 Pajaro Valley Water Management Agency 2017-2019 BMP Program Management Services for College Lake Integrated Resource Management Project Harkins Slough Recharge Facility Upgrades, and Watsonville Slough with Recharge Basins. Fugro Project No.: 04.72170008. Document No.: 04.72170008-PR-002(Rev.01), 2018.

[34] cbec and PV Water, Piezometer data collected from December 2017 through October 2018.

3.3.1.5 Flooding

The Pajaro River within the Pajaro Valley is a managed floodway. The United States Army Corps of Engineers (USACE) constructed a continuous levee system along the Pajaro River from the mouth to the Murphy Road Crossing[35] and along the lower reach of Salsipuedes Creek in 1949.[36] Salsipuedes Creek is contained on its west bank by an earthen levee built by USACE in 1949; the east bank is a natural channel from the Corralitos confluence to Lakeview Road. Corralitos Creek has not been leveed. Both Salsipuedes and Corralitos Creeks, in the vicinity of the Project, have sinuosity ratios within the range of a generally straight channel.

The Pajaro River and its tributaries have a long history of flooding. The flood of 1955 was the most extensive in recorded history, breaching and overtopping the 1949 levees. Other Pajaro River flooding in the recent past occurred in 1982, 1986, 1995, 1997, and 1998. During these floods, the primary levee failure mode has been overtopping. Flooding on Corralitos and Salsipuedes Creeks has occurred due to a combination of high flows and backwater from the Pajaro River.

College Lake, Paulsen Road, and Salsipuedes Creek

The existing one percent annual chance floodplain[37] mapped by the Federal Emergency Management Agency (FEMA) includes College Lake, lowland areas north of Paulsen Road, and areas along either side of Corralitos and Salsipuedes Creeks from College Lake to the Pajaro River, as shown on **Figure 3.3-5**.[38] Base flood elevations (the WSE during a flood with a one percent annual chance of exceedance) have been defined by FEMA in many locations between College Lake and the Pajaro River, including at Salsipuedes Creek near the Orchard Park neighborhood and the confluence with Corralitos Creek, and for Corralitos Creek upstream of the confluence. Base flood elevation is defined by FEMA as 73 feet NAVD88 north of Paulsen Road, in College Lake, and within Orchard Park, and decreases to approximately 70 feet NAVD88 at the confluence of Corralitos and Salsipuedes Creeks.[39] As described in greater detail in Section 3.3.3.2, Methodology, a combined one-dimensional and two-dimensional hydraulic model has been developed for the College Lake system.[40] The modeled WSE during the existing one percent annual chance flood event are the same as those reported by FEMA. The model was also used to estimate existing WSE during the ten percent annual chance flood event (commonly referred to as the 10-year flood), which are approximately 70 feet NAVD88 near Orchard Park and 68 feet NAVD88 at the confluence with Corralitos Creek. Floodwaters enter Orchard Park from Corralitos Creek, Salsipuedes Creek, and Pinto Creek under existing conditions for this modeled scenario.

---

35 Located upstream of the confluence of Pajaro River and Salsipuedes Creek, approximately four miles southeast of the proposed weir location.

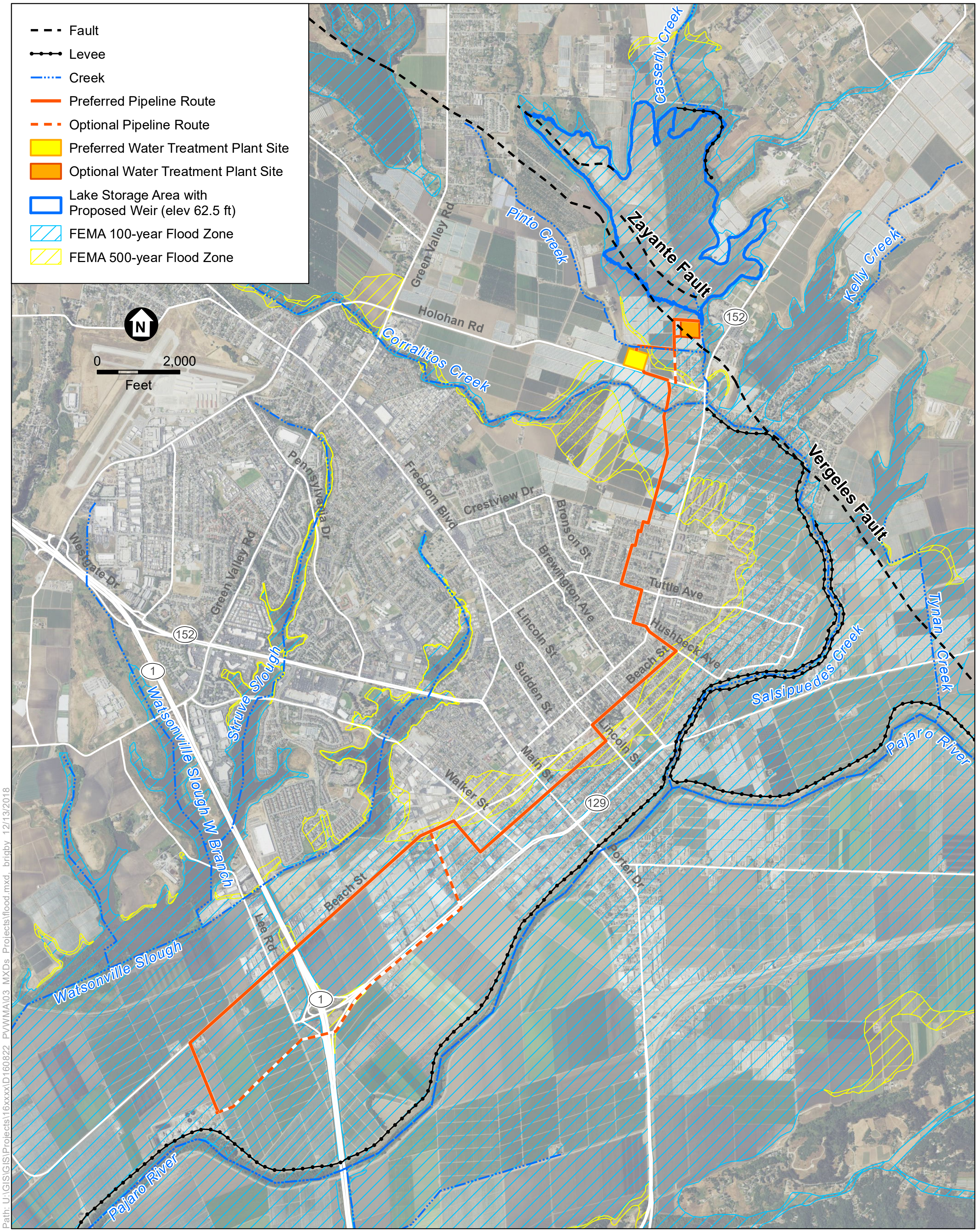
36 USACE, Pajaro River Flood Risk Management Study Monterey and Santa Cruz Counties, CA, Draft General Reevaluation and Environmental Assessment, October 2017. Unless otherwise noted, content in Section 3.3.1.6 is derived from this source.

37 These are areas subject to flooding by the flood event with a one percent chance of occurring in any individual year, commonly referred to as the 100-year flood.

38 FEMA, National Flood Hazard Layer, Santa Cruz County, 06087C0403E (effective May 15, 2012) and 06087C0411E (effective May 16, 2012).

39 FEMA, National Flood Hazard Layer, Santa Cruz County, 06087C0411E, effective May 16, 2012.

40 cbec, *College Lake Integrated Resources Management Project Hydrologic and Hydraulic Modeling Technical Memorandum,* November 8, 2018.



Path: U:\GIS\GIS\Projects\16xxxx\D160822_PVWMA\03_MXDs_Projects\flood.mxd, brigby 12/13/2018

SOURCE: FEMA, 2017

College Lake Integrated Resources Management Project

Figure 3.3-5
Existing Flood Hazard Areas in Project Vicinity

ESA

Corralitos Creek

Progressing upstream for approximately one-half-mile from the confluence with Salsipuedes Creek, the one percent annual chance flood elevation along Corralitos Creek increases from approximately 70 feet to 81 feet NAVD88.[41] The current FEMA one percent annual chance flood hazard area along this stream reach extends to either side of the creek channel from Holohan Road in the north to the Watsonville city limits in the south.

Pajaro River

The one percent annual chance flood hazard area along the Pajaro River downstream of the confluence with Salsipuedes Creek extends on either side of the river; in Watsonville the one percent annual chance flood hazard area extends north to West Beach Street, then connects with Watsonville Slough to the west of Watsonville.

Pajaro Dunes

The Pajaro Dunes community is located along the coastline northwest of Pajaro Lagoon. The southern and western areas of the Pajaro Dunes community are located within the FEMA one percent annual chance flood hazard area;[42] eastern portions of the community are also within the one percent annual chance floodway[43]. The base fluvial flood elevations along the eastern side of the Pajaro Dunes area range from 13 feet NAVD88 nearest the current mouth of the Pajaro River (in the south) to nearly 16 feet NAVD88 in the north. In addition to flooding due to extreme precipitation events, flooding may occur in the Pajaro Dunes area when the lagoon mouth is closed (that is, a berm of beach sand prevents water from draining to the ocean) and pulses of stream flow, from large storms or from RD 2049 College Lake pumping operations, fill the lagoon without breaching the beach berm.

3.3.1.6 Water Quality

Surface Water

College Lake

PV Water has a record of College Lake water quality data from 1994 to present.[44] Samples have been collected monthly to bimonthly on average, measuring 30 different analytes. Historical trends show that in the current mode of operation, College Lake water has met objectives for “delivered water quality” as set by PV Water’s Projects and Facility Operations Committee for these four analytes, with sodium adsorption ratio (SAR) [45], sodium, and chloride remaining well below the objective levels of SAR less than 4, sodium less than 100 milligrams per liter (mg/L),

---

[41] FEMA, National Flood Hazard Layer, Santa Cruz County, 06087C0411E, effective May 16, 2012.

[42] These are areas subject to flooding by the 1 percent annual chance flood.

[43] FEMA defines a floodway as the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1 percent annual chance flood can be carried without substantial increases in flood heights.

[44] Unless otherwise noted, information in this section is derived from Carollo, PV Water, BMP Program Technical Services Technical Memorandum: College Lake Treatment Plant Water Quality Study, November 2, 2017.

[45] SAR is a measure of the amount of sodium relative to calcium and magnesium in water or water extracted from soil. Soils with higher SAR (greater presence of sodium) may be characterized by a general degradation of soil structure, reduced hydraulic conductivity, and reduced soil aeration.

and chloride less than 150 mg/L. Summer concentrations of nitrate have also not exceeded the 10 mg/L water quality objective; however, they have been much closer to exceeding objective levels than the other constituents.

Data collected at College Lake document a summer increase in nitrate, which may correspond to irrigation runoff from the farming within the lake storage area. In 2017, PV Water conducted sampling to evaluate the presence of algae within College Lake. Sampling results indicated that while Cyanobacteria are present in College Lake, they were present in very low concentrations (1,130 cells per milliliter during an algal bloom event in September, and were not releasing algal toxins at levels that could be detected by sampling methods; for comparison, concentrations of Cyanobacteria have exceeded 100,000 cells per milliliter in Pinto Lake).

Pajaro Lagoon

Like other coastal lagoons in California, water quality in the Pajaro Lagoon system (including parts of Watsonville Slough that experience backwater effects) is likely to be strongly influenced by the presence of trapped saltwater. Saltwater enters the lagoon during incoming ocean tides and during wave overtopping events, as observed previously by Balance Hydrologics.[46] Saltwater in the lagoon is denser than freshwater, so it sinks to the bottom. When the mouth of the lagoon is open (i.e., when ocean tides are able to move in and out of the estuary), the strong currents generated by the tidal motions can cause vertical mixing, meaning that the intruding saltwater can create brackish or salty conditions at the top of the water column in some areas. When wave-driven sand blocks the mouth (i.e., preventing ocean tides from entering the lagoon), the lack of tidal motions often means that currents are too weak to cause vertical mixing, and trapped saltwater relaxes, creating a vertically-stratified system with a freshwater layer overtopping a bottom salty layer. This relaxation also encourages trapped saltwater near the mouth to potentially spread upstream in both the Pajaro River and Watsonville Slough.[47] Wherever the saltwater is present, the density difference between the bottom salty and surface fresh layers can be strong enough to prevent vertical mixing.

The following processes have been observed in other California coastal lagoons with lower layers of salt water:[48]

- Over time, the natural breakdown of detritus in the lower layer draws oxygen out of the water column, reducing the dissolved oxygen content of the lower layer.
- The surface fresh layer maintains high dissolved oxygen levels due to interaction with the atmosphere.
- The lack of vertical mixing creates a condition where the upper layer has dissolved oxygen levels appropriate for salmonid survival (greater than 3 mg/L), whereas the lower layer often becomes hypoxic, or anoxic (about 0 mg/L) over time.

---

[46] Balance Hydrologics, Watsonville Sloughs Hydrology Study, Prepared for RCD Santa Cruz County, February 14, 2014.

[47] Ibid.

[48] ESA, *Lagoon Quantified Conceptual Model Memorandum for Pajaro River Lagoon*, April 12, 2018.

- Absorption of solar radiation at the interface between the lower and upper layers sometimes causes water to warm in the lower layer. This effect tends to become weaker as freshwater accumulates in the upper layer over time, and more energy is absorbed above the bottom layer.

These conditions demonstrate that the amount of trapped saltwater in the lagoon during mouth closure events is an important determinant of water quality conditions, as it effectively controls the extent and amount of low dissolved-oxygen water, and sometimes the extent and amount of warm water in the estuary.[49]

Groundwater Quality

Approximately 95 percent of the water used in the Pajaro Valley is pumped groundwater. In the Pajaro Valley Groundwater Basin, groundwater levels have declined as a result of long-term groundwater overdraft, causing groundwater levels to drop below sea level throughout much of the basin, creating conditions that allow for the inland migration of the freshwater/seawater interface. As discussed in Section 3.3.1.4, most of the groundwater storage depletion has occurred in the Alluvial aquifer layer, with substantial amounts of storage depletion also occurring in the upper Aromas and Purisima Formation layers. Seawater has intruded into the Alluvial layer and the upper Aromas layer through submarine rock outcrops to replace the depleted fresh groundwater. Chloride concentration, specific conductance, and total dissolved solids (TDS), are useful metrics to characterize the extent of seawater intrusion. Based on chloride concentrations in wells in the coastal area of Pajaro Valley Basin, the extent of landward seawater intrusion has increased along the coastal region over the last decades (refer to Figure 2-6 in Chapter 2, *Project Description*). Seawater intrusion rates accelerate in response to growing cumulative overdraft. The Pajaro Valley Basin 30-year average annual deficit is estimated to be approximately 12,100 acre-feet per year.

Other primary groundwater quality constituents of concern in Pajaro Valley are TDS and nitrate. For purposes of assessing quality of the Pajaro Valley Groundwater Basin, TDS is used as a water quality indicator of the salinity of water and nitrate is used as the proxy for nutrients including nitrogen and phosphorous. The three primary pathways for salts and nutrients to enter groundwater are via surface water infiltration primarily from applied irrigation water, streamflow infiltration, and seawater intrusion. The total salt loading potential to groundwater in the Basin as a result of these pathways is highest along the coast where the seawater intrusion potential is high. Areas of moderate loading potential are also located in the upper Pajaro River above Murphy Crossing where surface water salt concentration and recharge potential is elevated. Nitrogen loading potential in the Pajaro Valley is primarily from agricultural fertilizer and irrigation runoff, streamflow recharge, and sewer and septic systems. Potential loading sites from streamflow nitrate recharge are similar to those with salt loading potential associated with inherited poor water quality from the upper Pajaro River watershed.[50]

---

[49] ESA, *Lagoon Quantified Conceptual Model Memorandum for Pajaro River Lagoon*, April 12, 2018.

[50] PV Water, Salt and Nutrient Management Plan, Prepared by 2NDNATURE LLC, Platts, and PV Water Staff, October 2016.

3.3.2 Regulatory Framework

3.3.2.1 Federal and State

National Flood Insurance Program

The National Flood Insurance Program is a voluntary Federal program that enables property owners in participating communities to purchase insurance protection against losses from flooding. Participation in the National Flood Insurance Program is based on an agreement between local communities and the Federal government. If a community adopts and enforces floodplain management regulations to reduce future flood risks to new construction and substantially improved structures in Special Flood Hazard Areas, the Federal government will make flood insurance available within the community as a financial protection against flood losses.[51] Santa Cruz County has adopted floodplain management regulations. As noted in Section 3.3.1 - Setting, some of the Project components are within special flood hazard areas mapped by FEMA. These are denoted as flood insurance rate zones that correspond to certain conditions. “Zone AE” refers to the flood insurance rate zone that corresponds to 1 percent annual chance floodplains where base flood elevations are shown. “Zone AH” refers to areas of the 1 percent chance shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. “Zone AO” refers to areas of the 1 percent annual chance shallow flooding (usually sheet flow on sloping terrain) with average inundation depths between 1 and 3 feet. The proposed optional WTP site, weir structure, and portions of the College Lake pipeline would be built in Zone AE; and other segments of the proposed College Lake pipeline would traverse areas mapped as Zones AO and AH. Floodways have not been mapped in the vicinity of Project components.

The community’s floodplain management regulations must meet or exceed criteria established in accordance with Title 44 Code of Federal Regulations Part 60, Section 60.3, *Flood plain management criteria for flood-prone areas.* Minimum standards for communities where the Federal Insurance Administrator has provided a notice of final flood elevations for one or more special flood hazard areas on the community’s flood insurance rate map (FIRM) and, if appropriate, has designated other special flood hazard areas without base flood elevations on the community’s FIRM, but has not identified a regulatory floodway or coastal high hazard area require:

- All new construction and substantial improvements of non-residential structures to elevate the lowest floor to or above the base flood level or, together with attendant utility and sanitary facilities, be designed so that below the base flood level the structure is watertight (with walls substantially impermeable to the passage of water and with structural components having the capability of resisting hydrostatic and hydrodynamic loads and effects of buoyancy).
- A registered professional engineer or architect shall develop and/or review structural design, specifications, and plans for the construction, and certify the design and methods of construction for watertight non-residential structures.
- Development within the flood zone must demonstrate that the cumulative effect of the proposed development, when combined with other existing and anticipated development, will not increase the WSE of the base flood more than one foot.

[51] FEMA, *Flood Insurance Study Santa Cruz County, California and Incorporated Areas*, Volume 1 of 3, Flood Insurance Study Number 06087CV001C, Revised September 29, 2017.

- Notwithstanding any other provisions of Title 44 Code of Federal Regulations Part 60, Section 60.3, *Flood plain management criteria for flood-prone areas*, a community may approve certain development in Zones AI-30, AE and AH on the community's FIRM that increases the base flood elevation by more than one foot in the flood hazard zone after receiving approval of a revised FIRM.

Sustainable Groundwater Management Act

As described in Chapter 2, Section 2.1.2.4, the Sustainable Groundwater Management Act (SGMA), establishes a framework for local agencies to develop and implement plans to sustainably manage critically overdrafted, high priority basins like the Pajaro Valley Groundwater Basin by 2040.[52] PV Water is the Groundwater Sustainability Agency for the Pajaro Valley Groundwater Basin.[53] The BMP Update (and thus, the Project) is a key component of PV Water's groundwater sustainability plan alternative designed to support PV Water's goal to achieve sustainable groundwater resources in part by managing groundwater in a manner to reduce, and eventually halt, long-term overdraft of the groundwater basin while ensuring sufficient water supplies for present and anticipated needs, consistent with the purpose of SGMA.

National Pollutant Discharge Elimination System Construction General Permit

Because Project construction would disturb more than one acre of land surface, potentially affecting the quality of stormwater discharges, the Project would be subject to the *National Pollution Discharge Elimination System* (NPDES) *General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities* (Order 2009-0009-DWQ, NPDES No. CAS000002; as amended by Orders 2010-0014-DWQ and 2012-006-DWQ) (also referred to as the Construction General Permit). The Construction General Permit (CGP) regulates discharges of pollutants in stormwater associated with construction activity to waters of the U.S. from construction sites that disturb one or more acres of land surface, or that are part of a common plan of development or sale that disturbs more than one acre of land surface. The permit regulates stormwater discharges associated with construction or demolition activities, such as clearing and excavation; construction of buildings; and linear underground/overhead projects, including installation of water pipelines and other utility lines.

The CGP requires that construction sites be assigned a Risk Level of 1 (low), 2 (medium), or 3 (high), based both on the sediment transport risk at the site and the receiving waters risk during periods of soil exposure (e.g., grading and site stabilization). The sediment risk level reflects the relative amount of sediment that could potentially be discharged to receiving water bodies and is based on the nature of the construction activities and the location of the site relative to receiving water bodies. The receiving waters risk level reflects the risk to the receiving waters from the sediment discharge. Depending on the risk level, the construction projects could be subject to the following requirements:

---

[52] PV Water, Sustainable Groundwater Management, 2016. Available online at https://www.pvwater.org/sgm. Accessed on April 12, 2019.

[53] SGMA designated PV Water as the exclusive local agency to manage groundwater within its statutory boundaries, the Board of Directors voted to be the Groundwater Sustainability Agency for the Pajaro Valley Groundwater Basin in August 2015, and PV Water subsequently submitted a Groundwater Sustainability Agency formation notice to the California Department of Water Resources.

1. Effluent standards
2. Good site management "housekeeping"
3. Non-stormwater management
4. Erosion and sediment controls
5. Run-on and runoff controls
6. Inspection, maintenance, and repair
7. Monitoring and reporting requirements

The CGP also requires the development and implementation of a Stormwater Pollution Prevention Plan (SWPPP) that includes specific construction best management practices designed to prevent sediment and pollutants from contacting stormwater from moving offsite into receiving waters. The best management practices fall into several categories, including erosion control, sediment control, waste management, and good housekeeping, and are intended to protect surface water quality by preventing the off-site migration of eroded soil and construction-related pollutants from the construction area. Routine inspection of all best management practices is required under the provisions of the CGP. In addition, the SWPPP is required to contain a visual monitoring program, a chemical monitoring program for non-visible pollutants, and a sediment monitoring plan if the site discharges directly to a water body listed on the 303(d) list for sediment. The Pajaro River was included on the 303(d) list for the pollutant "Sedimentation/Siltation" in 2007.[54]

The SWPPP must be prepared before the construction begins. The SWPPP must contain a site map(s) that delineates the construction work area, existing and proposed buildings, parcel boundaries, roadways, stormwater collection and discharge points, general topography both before and after construction, and drainage patterns across the Project area. The SWPPP must list best management practices and the placement of those best management practices that the applicant would use to protect stormwater runoff. Additionally, the SWPPP must contain a visual monitoring program; a chemical monitoring program for "non-visible" pollutants to be implemented if there is a failure of best management practices; and a sediment monitoring plan if the site discharges directly to a water body listed on the 303(d) list for sediment.

Examples of typical construction best management practices include scheduling or limiting certain activities to dry periods, installing sediment barriers such as silt fence and fiber rolls, and maintaining equipment and vehicles used for construction. Non-stormwater management measures include installing specific discharge controls during certain activities, such as paving operations, vehicle and equipment washing and fueling. The CGP also sets post-construction standards (i.e., implementation of best management practices to reduce pollutants in stormwater discharges from the site following construction).

In addition to stormwater discharges, the CGP also covers other non-stormwater discharges including irrigation of vegetative erosion control measures, water to control dust, uncontaminated groundwater from dewatering, and other discharges not subject to a separate general NPDES permit adopted by the Regional Water Board. The discharge of non-stormwater is authorized under the following conditions:

---

54 State Water Resources Control Board, Regional Board 3 – Central Coast Region, Final California 2012 Integrated Report (303(d) List/305(b) Report), Supporting information for the Pajaro River. Available online at https://www.waterboards.ca.gov/water_issues/programs/tmdl/2012state_ir_reports/00811.shtml#20078. Accessed on May 10, 2018.

- The discharge does not cause or contribute to a violation of any water quality standard;
- The discharge does not violate any other provision of the CGP;
- The discharge is not prohibited by the applicable Basin Plan;
- The discharger has included and implemented specific best management practices required by the CGP to prevent or reduce the contact of the non-stormwater discharge with construction materials or equipment;
- The discharge does not contain toxic constituents in toxic amounts or (other) significant quantities of pollutants;
- The discharge is monitored and meets the applicable Numeric Action Limits; and
- The discharger reports the sampling information in the Annual Report.

In the Project area, the CGP is implemented and enforced by the Central Coast Regional Water Quality Control Board, which administers the stormwater permitting program. Dischargers are required to electronically submit a notice of intent and permit registration documents in order to obtain coverage under this CGP. Dischargers are responsible for notifying the Regional Water Quality Control Board of violations or incidents of non-compliance, as well as for submitting annual reports identifying deficiencies of the best management practices and how the deficiencies were corrected. The risk assessment and SWPPP must be prepared by a State Qualified SWPPP Developer and implementation of the SWPPP must be overseen by a State Qualified SWPPP Practitioner meeting the requirements set forth in the CGP. A Legally Responsible Person, who is legally authorized to sign and certify permit registration documents, is responsible for obtaining coverage under the CGP.

For linear underground and overhead projects, such as pipelines, the SWPPP must include best management practices that address stabilization of land after ground disturbance is complete. All disturbed areas of the construction site must be stabilized prior to termination of coverage under the CGP (as described in Section C.1 of CGP Attachment A). Final stabilization criteria are identified in CGP Attachment A, and specify that: (a) areas that were vegetated prior to ground disturbance must be re-vegetated at ratios identified in CGP Attachment A Section C.1, (b) areas that were not vegetated must be returned to original line and grade and/or compacted to achieve stabilization, or (c) equivalent stabilization measures must be employed.

Water Quality Control Plan for the Central Coast Basin

Since adoption of the 2014 BMP Update PEIR, the Central Coast Regional Water Quality Control Board (RWQCB) has adopted a new *Water Quality Control Plan for the Central Coastal Basin* (2017 Basin Plan).[55] The beneficial uses listed for the Pajaro River and Salsipuedes Creek in the 2014 BMP Update PEIR did not change in the 2017 Basin Plan. Surface water bodies within the Central Coast Region that do not have beneficial uses designated for them (including College Lake) are assigned "Municipal and Domestic Water Supply" and "Protection" of both recreation and aquatic life. As discussed in the 2014 BMP Update PEIR, the RWQCB has promulgated, and the

55 RWQCB, Central Coast Regional, *Water Quality Control Plan for the Central Coastal Basin*, September 2017.

U.S. Environmental Protection Agency has approved, total maximum daily loads (TMDLs) for select surface waters in the Pajaro Basin. These include TMDLs for Corralitos Creek, Salsipuedes Creek, and the Pajaro River, and are discussed below and listed in **Table 3.3-1**.

TMDL for Nitrogen Compounds and Orthophosphate in Streams of the Pajaro River Watershed[56]

In the Pajaro River watershed, discharges of nitrogen compounds and orthophosphate are occurring in surface waters at levels which are impairing a spectrum of beneficial uses. The pollutants addressed in TMDLs established for streams of the Pajaro River watershed are nitrate, un-ionized ammonia, and orthophosphate. All water bodies are required to attain the 2017 Basin Plan general toxicity objective for un-ionized ammonia in inland surface waters and estuaries. The TMDLs are designed to address impairments in Casserly Creek (nitrate, low dissolved oxygen), Corralitos Creek (nutrients [biostimulatory substances objective]), and Pinto Creek (called the Pinto Lake outflow ditch in the 2017 Basin Plan; nitrate), among other streams. The 2017 Basin Plan contains the following narrative water quality objectives for biostimulatory substances:

> "Waters shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses"

To implement this narrative objective, the RWQCB developed numeric targets based on established methodologies and approaches. The 2017 Basin Plan includes an implementation plan for these TMDLs and lists ways the RWQCB assesses progress towards attainment of load allocations.

Discharges of un-ionized ammonia, nitrate, and orthophosphate originating from the sources identified in Table 3.3-1 are contributing loads to receiving waters. Irrigated agriculture is the largest source of controllable water column nutrient loads in the Pajaro River watershed and this source category is not currently meeting its proposed load allocation. Municipal NPDES-permitted stormwater sources are a relatively minor source of nitrogen compounds and orthophosphate, but can be locally significant.[57] Livestock waste sources associated with grazing lands and rural residential areas are currently meeting proposed load allocations, as are sources associated with industrial and construction NPDES-permitted sources and golf courses.[58]

The final allocations of these pollutants, which are equal to the TMDLs for streams in the Pajaro River watershed, should be achieved 25 years after the TMDL effective date of July 12, 2016 (note that pollutant allocations are concentration-based, and so are not additive). Interim load allocations have been set for dates 10 and 15 years after the effective date of the TMDLs. Owners and operators of irrigated agricultural land must comply with the Conditional Waiver of Waste Discharge Requirements for Irrigated Lands (Order R3-2017-0002) or its renewal or replacement, to meet load allocations and achieve the TMDLs.[59]

---

56 Unless otherwise noted, information in this section is derived from Central Coast RWQCB, *Water Quality Control Plan for the Central Coastal Basin,* September 2017 Edition.

57 Ibid.

58 Ibid.

59 The 2017 agricultural order is the third agricultural order adopted in the Central Coast Region, and is also referred to as "Ag Order 3.0."

TABLE 3.3-1
LIST OF 303(D) WATER QUALITY IMPAIRMENTS FOR SURFACE WATERS POTENTIALLY AFFECTED BY THE PROJECT

Water Body	Pollutant(s)	Potential Source	TMDL Schedule (Category 5 Criteria)
Pajaro River watershed streams (Casserly, Pinto, Corralitos Creeks)	Nitrogen compounds and orthophosphate	Irrigated agriculture; stormwater system discharges; Industrial and construction stormwater; livestock waste; golf courses; natural sources	Approved 2016 (5B)
Corralitos Creek	Turbidity (upstream of confluence with Salsipuedes Creek)	Unknown	Required by 2023 (5A)
	pH	Unknown	Required by 2027 (5A)
	Fecal coliform and Escherichia coli (E coli)	Agriculture-animal; Domestic; Municipal Point Sources; Natural Sources; Septic Tanks; Transient encampments	Approved 2012 (5B)
Salsipuedes Creek	E coli	Unknown	Approved 2012 (5B)
	Fecal coliform	Collection System Failure; Domestic Animals/Livestock; Natural Sources; Septic Tanks; Transient encampments; Urban Runoff/Storm Sewers	Approved 2012 (5B)
	Nitrate	Unknown	Required by 2018 (5A)
	Dissolved Oxygen, pH		Required by 2027 (5A)
	Toxicity, Turbidity		Required by 2023 (5A)
Pajaro River	Boron (below Main Street to the mouth)	Unknown	Required by 2027 (5A)
	Sedimentation/ Siltation	Agriculture; Domestic Animals/Livestock; Grazing-Related Sources; Habitat Modification; road construction; Hydromodification; Land Development; Logging Road Construction/Maintenance; Urban Runoff/Storm Sewers	Approved 2007 (5B)
	Fecal Coliform	Collection System Failure; Domestic Animals/Livestock; Urban Runoff/Storm Sewers	Approved 2010 (5B)
	Nitrate	Agriculture; Domestic Animals/Livestock; Natural Sources	Approved 2006 (5B)
	Toxicity	Unknown	Required by 2023 (5A)
	Diazinon	Agriculture	Approved 2013 (5B)
	Dieldrin, Chloride, Chlordane, Sodium, Dissolved Oxygen, E. coli, Chromium, pH, Polychlorinated biphenyls, DDD (Dichlorodiphenyldichloroethane), DDE (Dichlorodiphenyldichloroethylene), DDT (Dichlorodiphenyltrichloroethane)	Unknown	Required by 2027 (5A)
	Chlorpyrifos	Agriculture	Approved 2013 (5B)
	Turbidity	Unknown	Required by 2023 (5A)

TABLE 3.3-1 (CONTINUED)
LIST OF 303(D) WATER QUALITY IMPAIRMENTS FOR SURFACE WATERS POTENTIALLY AFFECTED BY THE PROJECT

Water Body	Pollutant(s)	Potential Source	TMDL Schedule (Category 5 Criteria)
Pajaro Lagoon	Diazinon	Agriculture	Approved 2013 (5B)
	Dissolved Oxygen, pH, water temperature, Toxicity, Malathion, DDE	Unknown	Required (5A)

NOTES:
[a] Category 5 criteria: A water segment where standards are not met and a TMDL is required, but not yet completed, for at least one of the pollutants being listed for this segment. TMDL requirement status definitions for listed pollutants are: A- TMDL still required, B- being addressed by USEPA approved TMDL, C- being addressed by action other than a TMDL.

SOURCE: State Water Resources Control Board, 2014 and 2016 California Integrated Report (Clean Water Act Section 303(d) List and 305(b) Report, approved by U.S. Environmental Protection Agency April 6, 2018.

Water Quality Objectives for Agricultural Supply

The RWQCB has promulgated water quality objectives for agricultural supply in the 2017 Basin Plan. These include:

- **pH.** The pH value shall neither be depressed below 6.5 nor raised above 8.3.
- **Dissolved Oxygen.** Dissolved oxygen concentration shall not be reduced below 2.0 mg/L at any time.
- **Chemical Constituents.** Waters shall not contain concentrations of chemical constituents in amounts which adversely affect the agricultural beneficial use. Interpretation of adverse effect shall be as derived from the University of California Agricultural Extension Service guidelines provided in Table 3-1 of the 2017 Basin Plan. Chemical constituents for which water quality guidelines are listed in Table 3-1 of the 2017 Basin Plan include total dissolved solids or salinity, sodium, chloride, boron, ammonia, nitrate, bicarbonate, and pH. The Table notes that the "guidelines are flexible and should be modified when warranted by local experience or special conditions of crop, soil, and method of irrigation."

In addition, waters used for irrigation and livestock watering shall not exceed concentrations for those chemicals listed in Table 3-2 of the 2017 Basin Plan, which identifies maximum concentrations for 21 elements. Salt concentrations for irrigation waters shall be controlled through implementation of the anti-degradation policy to the effect that mineral constituents of currently or potentially usable waters shall not be increased. It is emphasized that no controllable water quality factor shall degrade the quality of any groundwater resource or adversely affect long-term soil productivity.

NPDES General Permit for Discharges with Low Threat to Water Quality

The RWQCB adopted Order No. R3-2017-0042, *Waste Discharge Requirements National Pollutant Discharge Elimination System General Permit for Discharges with Low Threat to Water Quality* (NPDES No. CAG993001) on December 7, 2017. This region-wide Low-Threat General Permit authorizes the discharge of wastes meeting the criteria specified in finding two of this general permit to waters of the U.S. by any discharger. Low-threat discharges are discharges that contain minimal amounts of pollutants and pose little or no threat to water quality and the environment, such as uncontaminated dewatered groundwater that is released to land. Discharges covered by this permit may be treated and discharged on either continuous or batch bases. A complete list of discharges eligible for coverage under this permit is not provided by the RWQCB; however, a list of discharges *not* covered includes: discharges covered by other statewide permits; discharges from domestic wastewater treatment facilities; and discharges from secondary containment structures such as brine ponds. The Low-Threat General Permit includes limitations for pH, temperature, color, turbidity, dissolved oxygen, biostimulatory substances, taste and odor, oil and grease, settable and floating materials, toxicity, and radionuclides. To be covered by this Low-Threat General Permit, discharges must meet the following criteria:

- Pollutant concentrations in the discharge do not (a) cause, (b) have a reasonable potential to cause, or (c) contribute to an excursion above any applicable water quality objectives, including prohibitions of discharge;
- The discharge does not include water added for the purpose of diluting pollutant concentrations;

- Pollutant concentrations in the discharge will not cause or contribute to degradation of water quality or impair beneficial uses of receiving waters;
- Pollutant concentrations in the discharge shall not exceed the limits set in the order unless the executive officer determines that the applicable water quality control plan does not require effluent limits;
- The discharge shall not cause acute or chronic toxicity in receiving waters; and
- The discharger shall demonstrate the ability to comply with the requirements of this Low-Threat general permit.

3.3.2.2 Local

Table 2-10 in Chapter 2, *Project Description*, identifies the permits and approvals from Santa Cruz County and/or the City of Watsonville required for the Project. **Table 3.3-2** presents pertinent local plans and policies regarding hydrology and water quality to support County and City consideration of Project consistency with general policies.[60] In some cases, local policies are used in this EIR as criteria to determine the significance of physical effects on the environment (e.g., Impact NOI-1 in Section 3.8, Noise and Vibration).

3.3.3 Impacts and Mitigation Measures

3.3.3.1 Significance Criteria

In accordance with the California Environmental Quality Act (CEQA), State CEQA *Guidelines* (including Appendix G), relevant plans, policies, and/or guidelines, and agency standards, a Project impact would be considered potentially significant if the Project would:

- Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality;
- Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin;
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would: (i) result in substantial erosion or siltation on- or off-site; (ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite; (iii) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or (iv) impede or redirect flood flows;

[60] California Government Code Section 53091 exempts agencies like PV Water from complying with local building and zoning ordinances when locating or constructing facilities for the production, generation, storage, treatment, or transmission of water. California Government Code Section 65402(c) requires that PV Water notify cities and counties of its plans to construct projects or to acquire or dispose of property. The planning agency then has 40 days to determine project consistency with its general plan. If the planning agency disapproves, the disapproval may be overruled by PV Water.

- In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation;[61]
- Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan.

TABLE 3.3-2
LOCAL PLANS AND POLICIES RELEVANT TO THE PROJECT

CITY OF WATSONVILLE PLANS AND POLICIES
Watsonville General Plan
Goal 9.5 Water Quality. Ensure that surface and groundwater resources are protected.
Policy 9.D Water Quality. The City shall provide for the protection of water quality to meet all beneficial uses, including domestic, agricultural, industrial, recreational, and ecological uses.
Implementation Measure 9.D.2 The City shall continue to enforce regulations over grading activities and other land use practices that expose bare soil and accelerate soil erosion and sedimentation.
Goal 12.3 Flood Hazard Reduction. Reduce the potential for loss of life and property damage in areas known to be flood prone.
Policy 12.D Flood Hazard Reduction. The City shall pursue the protection of new and existing development from the impacts of flooding up to the 100-year event.
SANTA CRUZ COUNTY PLANS AND POLICIES
Santa Cruz County General Plan/Local Coastal Program
Objective 6.4 Local Flood Hazards. To protect new and existing structures from flood hazards in order to minimize economic damages and threats to public health and safety, and to prevent adverse impacts on floodplains, and maintain their beneficial function for flood water storage and transport and for biotic resource preservation.
Policy 6.4.1 Geologic Hazards Assessment Required in Flood Hazard Areas. Require a geologic hazards assessment of all development proposals within the County's flood hazard areas in order to identify flood hazards and development constraints.
Policy 6.4.2 Development Proposals Protected from Flood Hazard. Approve only those grading applications and development proposals that are adequately protected from flood hazard and which do not add to flooding damage potential. This may include the requirement for foundation design which minimizes displacement of flood water, as well as other mitigation measures.
Policy 6.4.9 Septic Systems, Leach fields, and Fill Placement. Allow the placement of fill within the 100-year floodplain in the minimum amount necessary, not to exceed 50 cubic yards. Fill shall only be allowed if it can be demonstrated that the fill will not have cumulative adverse impacts on or off site. No fill is allowed in the floodway.

SOURCE: City of Watsonville, 2014. Watsonville Municipal Code. Available online: www.codepublishing.com/CA/Watsonville/. Accessed on May 14, 2018; City of Watsonville, 1994. *Watsonville 2005 General Plan*. Adopted May 24, 1994; Santa Cruz County, 1994. *1994 General Plan and Local Coastal Program for the County of Santa Cruz, California*.

The following topics are not analyzed further in this section for the reasons described below:

- ***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.*** The proposed WTP would create new impervious area that could generate new runoff. The WTP would be designed such that stormwater is collected onsite and diverted to the beginning of the water treatment process; the Project would not generate new polluted runoff or exceed the capacity of existing or planned stormwater drainage systems. There would be no impact with respect to this criterion resulting from construction or operation of the Project. Effects of

[61] Tsunamis (seismic sea waves) are long-period waves that are typically caused by underwater seismic disturbances, volcanic eruptions, or submerged landslides. A seiche is caused by the oscillation of the surface of an enclosed body of water such as San Francisco Bay due to an earthquake or large wind event.

Project construction and operations on water quality are discussed in Impacts HYD-1 and HYD-2.

- ***Risk release of pollutants due to inundation by seiche or tsunami***. The Project site is not located within a potential tsunami hazard inundation zone nor an area subject to seiches. Therefore, there would be no impact related to these topics resulting from construction or operation of the Project. Risk of release of pollutants due to project inundation from flooding is discussed below in Impact HYD-2.

3.3.3.2 Methodology

As described in Section 3.1, Overview, this EIR provides an independent analysis of the Project's potential environmental impacts. The impact analyses discuss impacts associated with both potential WTP sites (preferred and optional). **Table 3.3-3** presents mitigation measures from the 2014 BMP Update PEIR adopted by the Board of Directors for the purpose of reducing impacts related to surface water, groundwater, and water quality. These adopted mitigation measures are considered part of the Project and thus are considered prior to any significance determinations. Potential impacts are evaluated in the following section. If warranted, additional mitigation is included and takes the form of (1) modifications to update the mitigation measures presented in Table 3.3-3 to reflect current conditions and site-specific impacts; or (2) new mitigation measures to replace or augment an adopted mitigation measure.

CEQA does not require lead agencies to consider how existing hazards or conditions might impact a project's users or residents, except where the project would significantly exacerbate an existing environmental hazard. Accordingly, hazards resulting from a project that places development in an existing or future flood hazard area are not considered impacts under CEQA unless the project would significantly exacerbate the flood hazard. Thus, the analysis below evaluates whether the Project would exacerbate an existing or future flood hazard in the Project area, resulting in a substantial risk of loss, injury, or death. The impact is considered significant if the Project would exacerbate flood hazards by increasing the frequency or severity (in terms of flood water elevation) of flooding or causing flooding to occur in an area that would not be subject to flooding without the Project.

Construction effects on water quality are direct or indirect impacts that could occur during construction, including groundwater dewatering. The impact analysis considers whether compliance with regulatory requirements for these activities would ensure that these water quality-related impacts are less than significant during construction. The analysis below also evaluates the Project's potential to directly or indirectly increase inputs or mobilization of sediments or pollutants to the streams in the watershed during the operational phase of the Project.

Depletion of groundwater resources is considered significant if the project would interfere with groundwater recharge, or substantially reduce groundwater supplies, such that sustainable groundwater management of the basin is impeded. Sustainable groundwater management means the management and use of groundwater in a manner that can be maintained during the planning and implementation horizon without causing undesirable results. Undesirable results in this context are one or more of the following:

- Chronic lowering of groundwater levels;

TABLE 3.3-3
2014 BMP UPDATE PEIR MITIGATION MEASURES – SURFACE WATER, GROUNDWATER, AND WATER QUALITY

HWQ-1: [PV Water] shall require contractors to apply for all applicable NPDES permits, including dewatering permits, develop a SWPPP for construction of proposed facilities, and comply with conditions of the permit(s), as required by the [Central Coast Regional Water Quality Control Board]. The objectives of the SWPPP are to identify pollutant sources that may affect the quality of stormwater discharge and to implement [best management practices] to reduce pollutants in stormwater discharges. The SWPPP for this proposed action would include the implementation, at a minimum, of the following elements:

- Source identification
- Preparation of a site map
- Description of construction materials, practices, and equipment storage and maintenance
- List of pollutants likely to contact stormwater
- Estimate of the construction site area and percent impervious area
- Erosion and sedimentation control practices, including soils stabilization, revegetation, and runoff control to limit increases in sediment in stormwater runoff, such as detention basins, straw bales, silt fences, check dams, geofabrics, drainage swales, and sandbag dikes
- Proposed construction dewatering plans
- Provisions to eliminate or reduce discharge of materials to stormwater
- Description of waste management practices
- Maintenance and training practices

HWQ-2: Rapid, imposed water-level fluctuations shall be avoided within the sloughs, Salsipuedes Creek, and the Pajaro River to minimize erosion and failure of exposed (or unvegetated), susceptible banks. This can be accomplished by operating the pumps at an appropriate flow rate, in conjunction with commencing operation of the pumps only when suitable water levels or flow rates are measured in the water body. Criteria for minimizing fluctuations and/or protecting banks from related erosion will need to be developed, as some banks presently are stable and others are not. Control is important, as the mobilized sediment also impairs in-slough habitat values, and potentially exacerbates bacterial levels in the slough system. It may be that water-level fluctuations may be controlled as well to minimize other impacts, such as desiccation of amphibian eggs or waterlogging of agricultural soils adjacent to the sloughs.

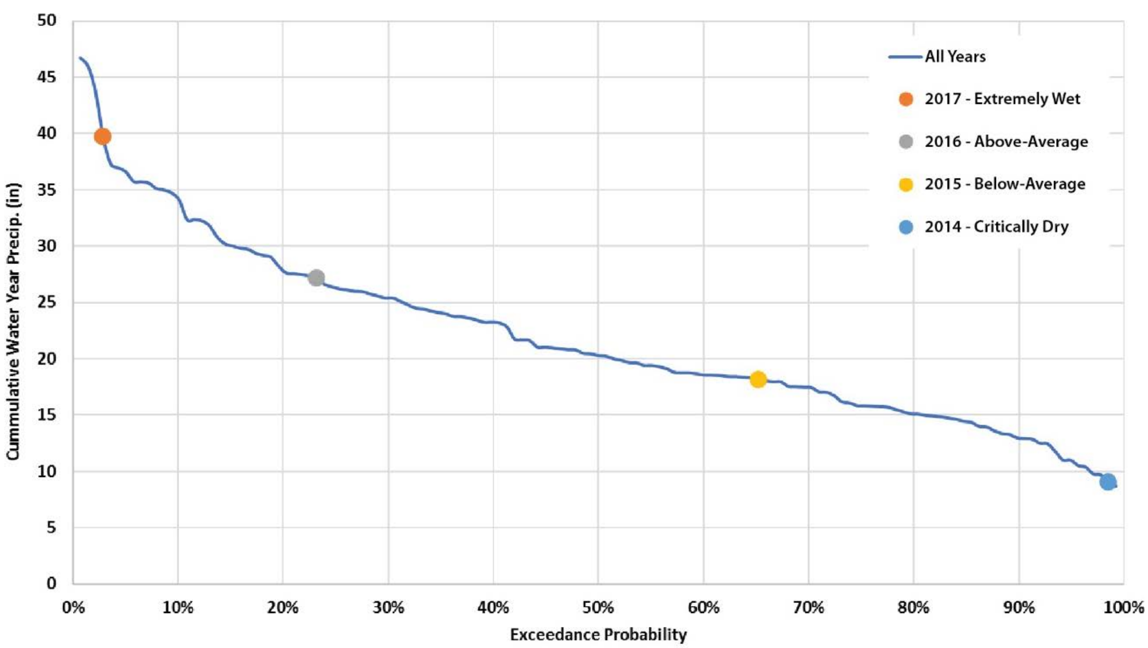
HWQ-3: If pumping rates in existing wells fall below levels that can support existing or planned land uses, and the reduction in pumping can be attributed to one or many of the project components, then one of several measures may be undertaken to mitigate the loss of pumping. These mitigation measures may include:

1. Improving irrigation efficiency
2. Modifying irrigation and agricultural operations
3. Lowering the pump in the irrigation well
4. Lowering and changing the pump in the irrigation well
5. Adding storage capacity for irrigation supply
6. Replacing the irrigation well
7. Replacing the irrigation water source to determine if well production loss can be attributed to one of the project components, PV Water will allow well owners to enroll in a monitoring and mitigation program. PV Water will collect baseline data necessary for establishing significant impacts only from wells that are enrolled in the MMP. If a well is not enrolled in the MMP, to claim a significant impact the well owner will need to provide adequate and reliable baseline data. To claim a significant impact for each well enrolled in the MMP, PV Water will first establish baseline irrigation well extraction rates, drawdowns, and water quality near planned components. Pumping rate reductions and changes in water quality from these baseline values will be analyzed to assess whether or not they are caused by the project. A pumping rate reduction or adverse change in water quality is assumed to be caused by the Project if: 1) it occurs at the same time as the onset of operations of BMP Update component(s); 2) it occurs in an area reasonably predicted to be affected by the BMP Update component(s); 3) static groundwater levels have dropped; 4) pumping groundwater levels have not dropped more than static groundwater levels; and 5) no other obvious reason exists for the drop in production capacity. For PV Water or others to identify another reason for loss of production it must be based on the written professional opinion of a qualified hydrogeologist that will be submitted to the PV Water staff or their designee, for review and concurrence.

HWQ-4: Facilities shall be designated to comply with FEMA and County of Santa Cruz requirements to floodproof the facilities and shall not exacerbate upstream or downstream flood hazards on other properties. The FEMA process will require identification of the FEMA floodway zone and may require no increase water elevations for a one percent chance annual flood. The FEMA process will require identification of the FEMA zone type and may require no increase water elevations for a one percent chance annual flood. To meet the specific FEMA requirements for the component, substantial modifications to the facility design and additional mitigation may be required.

- Significant and unreasonable reduction of groundwater storage;
- Significant and unreasonable seawater intrusion;
- Significant and unreasonable degraded water quality, including the migration of contaminant plumes that impair water supplies;
- Significant and unreasonable land subsidence that substantially interferes with surface land uses; and/or
- Depletions of interconnected surface water that have significant and unreasonable adverse impacts on beneficial uses of the surface water.

Impacts associated with changes in surface water hydrology are evaluated by assessing the extent to which the Project would change the locations, seasonality, or magnitude of surface water discharge and sediment load in the watershed. The hydrology in the Project vicinity varies annually due to variations in precipitation; for this reason, the Project's potential impacts vary depending on annual precipitation. Using historic data, "water year types" can be defined to describe the relative wetness of a given year compared to precipitation during a normal year. As indicated on **Figure 3.3-6**, the water years 2014 through 2017 cover a wide range of water year types (i.e., from critically dry to extremely wet); consequently, PV Water selected these years for hydrologic and hydraulic modeling of existing and with-Project conditions (discussed below). The impact analyses in this section present results for these water years, as appropriate.



Notes: Based on 137 years of data from the Watsonville Water Works (WWW) station from 1880-2017.

SOURCE: cbec, *College Lake Integrated Resources Management Project Hydrologic and Hydraulic Modeling Technical Memorandum*, November 8, 2018.

Figure 3.3-6
Water Years 2014-2017: Rainfall Characterization

Hydrologic and Hydraulic Modeling[62]

College Lake, Salsipuedes Creek, Corralitos Creek, Pajaro River

Several numerical models were used in combination to simulate College Lake inflows and outflows for the assessment of potential water management alternatives, and to evaluate potential flood impacts related to the Project. An existing Precipitation Runoff Modeling System hydrologic model was updated and recalibrated using recent precipitation data to calculate inflows to College Lake from its tributaries and direct precipitation to the lake basin. Two sets of hydraulic models were also developed for various analyses. An existing one-dimensional (1-D) Hydrologic Engineering Center's River Analysis System model from prior work within the College Lake system was adapted for a range of applications, including:[63]

- calculate flow over the weir;
- determine fish bypass flow requirements, assess drainage time of College Lake;
- assess changes in the relative contributions of College Lake outflows to total Pajaro River discharge; and
- generate flood inundation maps and profiles.

Further, a coupled one-dimensional/two-dimensional (1-D/2-D) Hydrologic Engineering Center's River Analysis System model was subsequently developed based on a recently acquired USACE model of the Pajaro River and College Lake area, which allowed for better characterization of floodplain dynamics and inundation mapping.

Finally, a custom water budget model was created that relied upon data from the hydrologic and hydraulic models, fish passage flow requirements, water demand, and other parameters to simulate outflow and the WSE in College Lake throughout selected water years of interest. Model information is summarized below; refer to **Appendix HYD** for additional discussion of model development.

A reliable hydraulic model is one that can produce field-measured water levels and flow within an acceptable range of error. Error exists because information on the real world system is always incomplete, and the field information that is available has associated errors (for example, measurement error). WSE results from the hydraulic models are reported to the nearest 0.1 foot, corresponding to the industry standard due to accuracies of available data.[64]

---

62 Unless otherwise noted, content throughout the description of hydrologic and hydraulic modeling is derived from cbec, *College Lake Integrated Resources Management Project Hydrologic and Hydraulic Modeling Technical Memorandum*, November 8, 2018.

63 Previous work is documented in RCD-SCC, *College Lake Multi-Objective Management Report Final Report*, prepared by cbec, November 14, 2014.

64 The quality of available topographic data and the certainty to which resolve Manning’s roughness values in spatially heterogeneous stream reaches that also experience geomorphic changes on short timescales render computing water surface elevations to a greater level of precision difficult.

For existing conditions, the existing weir geometry was used, while for proposed and cumulative effects conditions, the proposed weir structure was modeled.

Flow Contribution Analysis: College Lake Outflows to Pajaro River

To assess the annual contribution of College Lake outflows to the Pajaro River over the four water years (2014 to 2017) studied, several flows were calculated from gaged and simulated records.[65] The flow in the Pajaro River at Chittenden Road was known, due to the presence of a USGS gage at that location. However, the flow in the Pajaro River upstream of the Salsipuedes Creek confluence was not known, and varied in more complex ways than could be estimated by applying a simple lag time to the hydrograph at Chittenden Road due to tributary inflows and losses to groundwater between these two locations.[66] Instead, a relationship was identified between simulated flows at Chittenden Road and above the Salsipuedes Creek confluence using the Integrated Hydrologic Model of Pajaro Valley,[67] and this relationship was then applied to compute the discharges above the confluence from known Chittenden Road flows.

As measured outflows from College Lake are not available, “existing” flow contributions reported in this document are modeled flows and not actual flows. The College Lake water budget model was modified to calculate College Lake outflows that occurred under existing conditions, from both pumping and uncontrolled flow over the weir, which were ultimately combined with daily USGS gaged flows on Corralitos Creek to provide daily flow rates for Lower Salsipuedes Creek, upstream of the Pajaro River confluence, assuming no gains or losses occur within Lower Salsipuedes Creek.[68] The hydrographs for Lower Salsipuedes Creek and the Pajaro River upstream of the confluence were then summed to determine the Pajaro River flows downstream of the confluence, and the percent contributions of College Lake outflows to the total Pajaro River flows were calculated for each day.

The total outflow from College Lake under proposed conditions was computed as the sum of fish bypass flows and weir flow. Given the variability of discharge under existing conditions, a statistical analysis of the modeled flows at three locations (College Lake outflow, Salsipuedes Creek, and Pajaro River downstream of the Salsipuedes Creek confluence) was conducted to assess the statistical significance of changes between mean monthly discharge under existing and Project conditions. The absolute value of the average monthly flow rate for modeled conditions was compared to the standard deviation of monthly flow rates for existing conditions. If the change in modeled mean monthly flow was within two standard deviations of the existing

[65] cbec, *College Lake Integrated Resources Management Project Hydrologic and Hydraulic Modeling Technical Memorandum*, November 8, 2018.

[66] Ibid.

[67] Hanson, R.T., Schmid, Wolfgang, Faunt, C.C., Lear, Jonathan, and Lockwood, Brian, 2014, Integrated hydrologic model of Pajaro Valley, Santa Cruz and Monterey Counties, California: U.S. Geological Survey Scientific Investigations Report 2014–5111, http://dx.doi.org/10.3133/sir20145111..

[68] The Precipitation Runoff Modeling System hydrologic model, which was used to calculate College Lake inflows, generally over-predicted accumulated lake inflow volume. The pumping rates applied in the Water Budget Model to reconcile simulated and observed lake stages (and thus to estimate outflow from College Lake under existing conditions) were consequently similarly over-predicted, which led to an artificially high contribution of College Lake flows to the Pajaro River under existing conditions in certain cases.

monthly average (i.e., if the magnitude of the change in mean monthly flow was within the range of approximately 95 percent of the existing monthly flow rates), then the change was not considered statistically significant.[69] A change in flow of a magnitude greater than two standard deviations was considered statistically significant.

Existing Conditions Model

The existing conditions hydraulic model was developed by updating the USACE's existing conditions hydraulic model, which included the Pajaro River, Salsipuedes Creek, Corralitos Creek, College Lake, and adjacent floodplain areas. The USACE model was refined and expanded to provide more accurate hydraulic information for the areas of interest to the Project, and extended upstream of Paulsen Road to include 2018 channel topographic survey data and overbank flow areas for Casserly Creek. For College Lake itself, the stage-discharge relationship for the 1-D storage area representing the lake was updated to incorporate more accurate topographic data collected by cbec, inc. eco engineering (cbec) and the boundary of the storage area was re-delineated. USACE cross-section, bridge, and College Lake weir data for Salsipuedes Creek upstream of the confluence with Corralitos Creek were replaced with geometric data from the 1-D model, including cbec's 2017 topographic survey. Likewise, cross-section data from Northwest Hydraulic Consultants' 2015 1-D channel capacity model for Corralitos and Salsipuedes Creeks were used in place of USACE topography. The Pajaro River portion of the USACE model was not changed.

Significant updates were also made to the 2-D flow areas from the USACE model, which were used to simulate flow within the floodplain areas, including the City of Watsonville. Manning's n values[70] were re-assigned based on land cover classes from the National Land Cover Dataset. Additionally, significant grid refinement occurred to locally reduce the USACE model's 200-foot grid cells to 50-foot grid cells in areas of interest and in areas with complex hydraulics.

Proposed Conditions Model

The proposed conditions 2-D model was constructed from the existing conditions 2-D model by incorporating elements of the Project. These included the proposed weir structure, channel modifications in the vicinity of the weir, and the presence of the WTP within the floodplain adjacent to the weir structure at the optional WTP site.[71]

---

69 While statistically significant, these changes do not always indicate a significant impact for purposes of CEQA, as explained in Impact HYD-4.

70 Manning's n values are used in hydraulic modeling to account for the resistance to flow exerted by the ground surface or other surface (e.g., vegetation) that the flowing water is exposed to. A greater n value indicates greater surface roughness and resistance to flow.

71 While two locations are under consideration for the location of the WTP, the optional WTP site was used in the hydraulic analysis because, as indicated on Figure 3.3-5, it is located within the 100-year floodplain. Including the optional WTP site allowed PV Water to evaluate its effects on flood water surface elevations. The preferred WTP site is outside of the 100-year floodplain and was therefore not included in the model.

Cumulative Conditions Model

The cumulative conditions 2-D model was built from the proposed conditions 2-D model by incorporating the aspects of the USACE Pajaro River Flood Risk Management Study (USACE project) in the region that would alter flooding along Salsipuedes and Corralitos Creeks.

The USACE project consists of levee and channel improvements on the Pajaro River and Corralitos and Salsipuedes Creeks to increase the level of flood protection afforded by existing flood protection infrastructure.[72] The USACE project's Tentatively Selected Plan includes measures to improve existing levees, construct new levees, and construct flood walls on Salsipuedes Creek, Corralitos Creek, and Pajaro River. Specific components include constructing new setback levees and rebuilding an existing levee on Reach 2 (on Pajaro River), rebuilding existing levees and floodwalls on Reach 3 (on Pajaro River), constructing a new setback levee along the southern bank of Reach 4 (on Pajaro River), constructing a new setback levee and floodwalls and rebuilding an existing levee along Reach 5 (on Salsipuedes Creek near Corralitos Creek), and constructing new setback levees along Reach 6 (on Corralitos Creek). The Tentatively Selected Plan features provide one percent annual chance of exceedance level of protection for the City of Watsonville (including adjacent agricultural areas) and four percent annual chance of exceedance level of protection for the Orchard Park and Interlaken neighborhoods (including adjacent agricultural areas).

Updating the 2-D model to include the USACE project primarily included incorporating higher levees along all model reaches, as well as incorporating levee setbacks along portions of the Pajaro River and Lower Salsipuedes Creek.

To understand the comparative flood impacts of the Project, with and without the USACE project in place, the cumulative 2-D model was used to simulate existing, proposed, and cumulative effects conditions for the ten percent annual chance (10-year) and one percent annual chance (100-year) flood events. While the discussion of flood hazards often focuses on the 100-year flood event, a more frequent (10-year) event was also evaluated for potential Project impacts because flooding is known to occur south of College Lake during more frequent flood events. Past modeling indicated that the initial College Lake WSE during a flood event strongly influenced the severity of flooding modeled. Therefore, the first step for running these simulations was to determine the level that College Lake is typically at or above during the wet season with the existing weir crest at 60.1 feet NAVD88. An exceedance probability analysis of observed stage data for water years (WYs) 2012-2017 was conducted in which the distribution was calculated from a subset of the data that corresponded to periods when the lake was above the weir crest elevation, and pumping to drain the lake was not occurring. The 80 percent exceedance probability lake level was chosen, corresponding to a College Lake stage of approximately 61.0 feet NAVD88. This lake level was considered the baseline College Lake WSE for purposes of impact analysis.

[72] USACE, Pajaro River Flood Risk Management Study Monterey and Santa Cruz Counties, CA, Draft General Reevaluation and Environmental Assessment, October. Refer to Table 3.1-1 and Figure 3.1-1 in Section 3.1, Overview, for a description of the USACE project.

Pajaro Lagoon

To provide an understanding of how Pajaro Lagoon would respond to future with-Project and cumulative conditions, Environmental Science Associates developed a quantified conceptual model (QCM), which predicts lagoon mouth morphology and the resulting water levels of the lagoon. A QCM is a simplified time-series model which implements a lagoon water balance alongside a parametric model of the lagoon mouth and beach. Detailed discussion of QCM development, calibration, and assumptions is provided in Appendix HYD.

The QCM approach is centered on a water budget for the lagoon, which is coupled with a sediment budget for the lagoon mouth. The model is based on two core concepts:

- All water flows entering and leaving the lagoon should balance.
- The net erosion/sedimentation of the inlet channel results from a balance of erosive (fluvial and tidal) and constructive/deconstructive (wave) processes.

The model uses time series of nearshore waves and tides, watershed runoff, and evapotranspiration data as boundary conditions. Using these as forcing conditions with information about the lagoon's topography, the model dynamically simulates time series of lagoon water levels, along with inlet, beach, and lagoon state. With each time step, the net inflows or outflows to the system are estimated, along with the net sedimentation or erosion in the mouth. The flow terms vary depending on whether the mouth of the lagoon is open or closed. During closed conditions, inflows are based on watershed runoff and wave overwash into the lagoon, while outflows are based on beach berm seepage and evapotranspiration.

Boundary conditions used in the model include:

- Combined fluvial inflows from the Pajaro River (below the confluence with Corralitos Creek) and Watsonville Slough;
- Ocean tides;
- Nearshore wave conditions; and
- Evapotranspiration.

The Pajaro River and Watsonville Slough are treated as separate basins (i.e., interconnected water balances). For the purposes of this study, the "lagoon" is assumed to include both water bodies, since both experience tides during open-mouth lagoon conditions and water levels inundate both areas when the beach blocks the mouth.

Since water levels were only collected on Watsonville Slough, they are presumed to be representative of lagoon conditions for mid- to high tides in the lagoon and typical closed-lagoon water levels (when water ponds behind the beach and inundates both the slough and river), but do not show low water levels that may occur in the lagoon at low tide. This is because the bed of Watsonville Slough is higher than the bed of the Pajaro River, and thus it truncates low tides during open-mouth lagoon conditions.

3.3.3.3 Impacts and Mitigation Measures

Modeled Changes in College Lake, Salsipuedes Creek, Pajaro River, and Pajaro Lagoon Hydrology

The Project would change the hydrology of College Lake, Salsipuedes Creek, and the Pajaro River and Lagoon. Using the modeling methodology discussed in Section 3.3.3.2, changes in surface water hydrology with the Project were modeled for the four water year types. Areas of focus of the modeling effort included:

- WSE of College Lake throughout each water year type, including during flood events;
- WSE of nearby hydraulically connected water bodies during flood events;
- Discharge from College Lake into Salsipuedes Creek;
- Proportion of flow in Pajaro River supplied by outflow from College Lake (presuming no transmission gains or losses within lower Salsipuedes Creek); and
- Changes in the Pajaro Lagoon (e.g., effects on lagoon opening/closure).

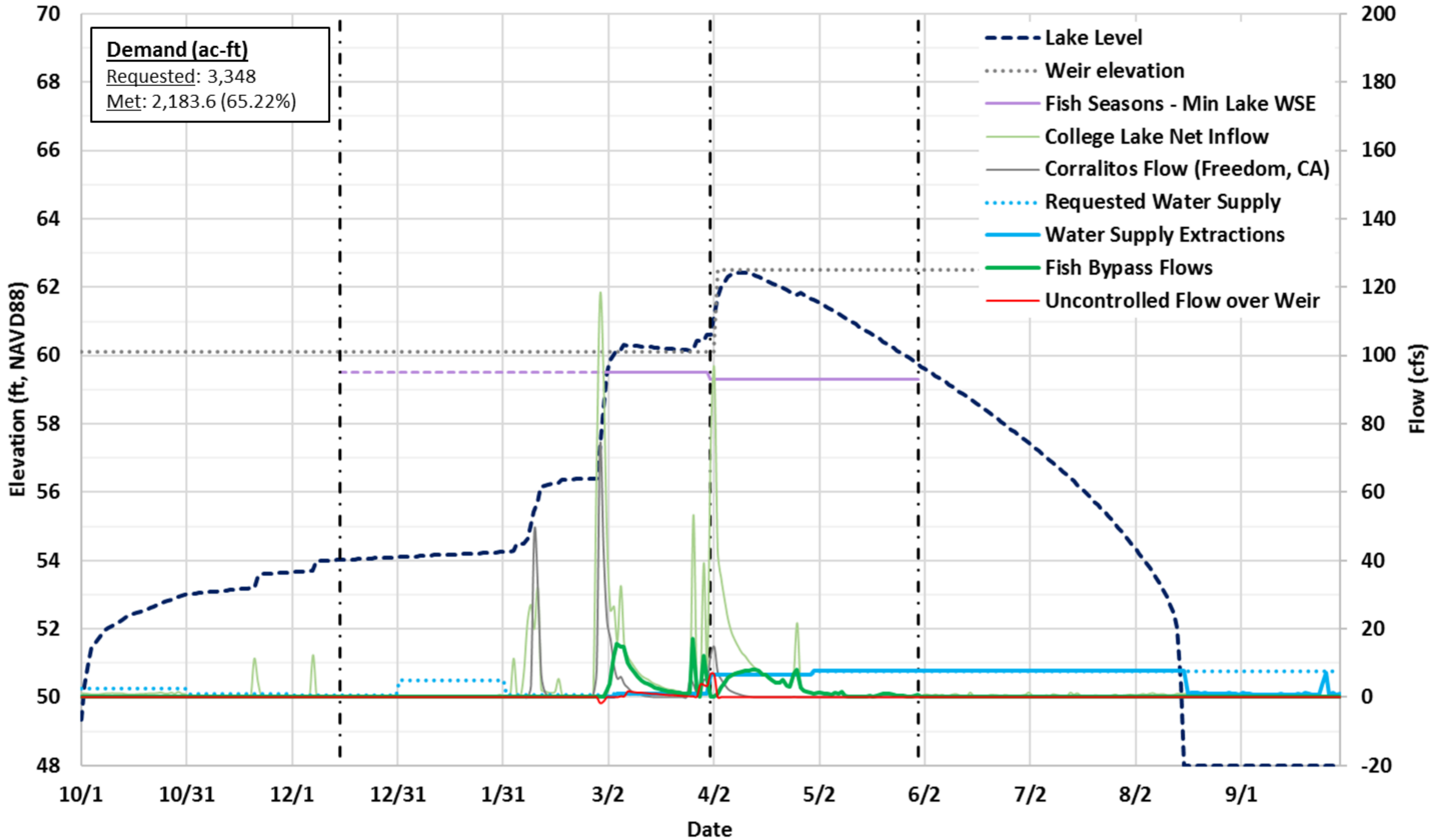
This section summarizes the modeled results for the Project. Impact evaluations follow this general discussion, and rely on its contents, while in some cases providing more specific model output.

During the wet season prior to the last predicted major precipitation event of the year, the proposed weir would remain at 60.1 feet NAVD88, which is the same elevation as the existing weir. The proposed weir would not be raised to 62.5 feet NAVD88 until after the last anticipated major precipitation event of the season, such that the College Lake stage (i.e., WSE) would not exceed approximately 62.5 feet NAVD88 after that point in the season.

Under future with-Project conditions during the wet season, the weir would be in the low position at the same elevation as the crest of the existing weir. The principal difference between existing and Project conditions with respect to potential flood impacts is the possible presence of more water in College Lake at the start of a flood event, reducing the volume of storage available to retain flood waters, if the weir crest is at its higher elevation.

Changes to College Lake Water Surface Elevation and Extent

As shown on **Figures 3.3-7a** through **3.3-7d**, under all with-Project water year scenarios, if sufficient precipitation and/or inflows are present, water would remain in College Lake between April 1 and May 31 (mimicking a natural lake), and, depending on the WSE of College Lake, water would be released into Salsipuedes Creek to support fish passage. After May 31, fish passage flow releases would cease, and water remaining in the lake could be diverted to meet water demands. The Project would thus lengthen the amount of time water remains in College Lake, relative to existing conditions. Because the weir would not be raised until after the last anticipated major precipitation event of the season, the WSE of College Lake during the wet season would not change as a result of the Project, with the exception that, during a one percent annual chance flood event, a small area of new inundation located at the southwestern edge of the lake, and areas in the vicinity of the weir and WTP (both discussed in greater detail in Impact HYD-5) could be affected. Once the weir is raised, the lake would remain at a higher elevation than under existing conditions (up to 0.5 feet higher than existing conditions during April-May).



Notes: Weir raised as early as possible after last major storm event to ensure that lake did not surpass 62.5 ft. Vertical dashed-dotted black lines indicate fish bypass season dates.

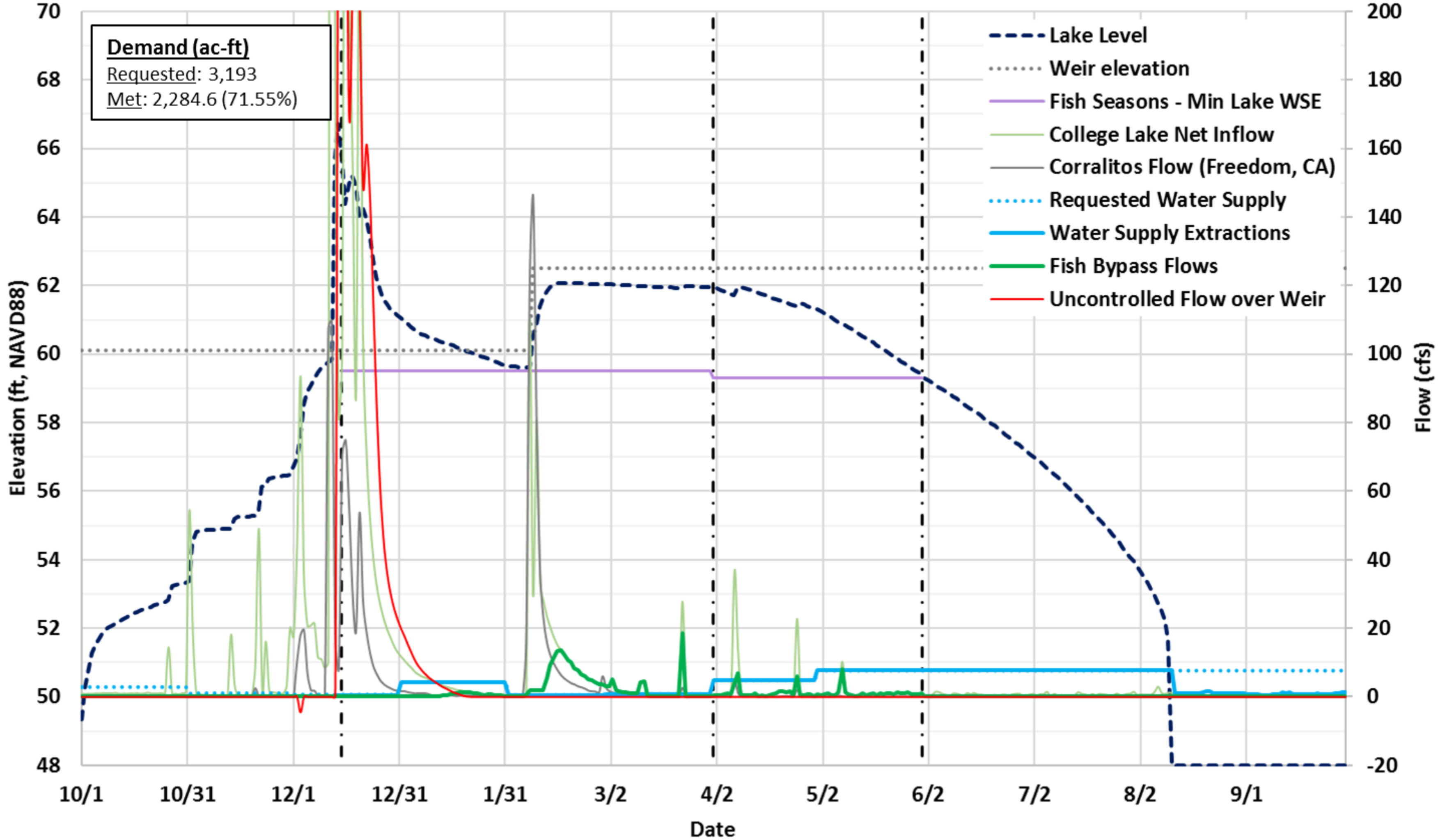
D160822

SOURCE: cbec, 2018

College Lake Integrated Resources Management Project

Figure 3.3-7a
Modeled Water Surface Elevations in College Lake with Project, Modeled Water Year 2014

ESA



Notes: Weir raised as early as possible after last major storm event to ensure that lake did not surpass 62.5 ft. Vertical dashed-dotted black lines indicate fish bypass season dates.

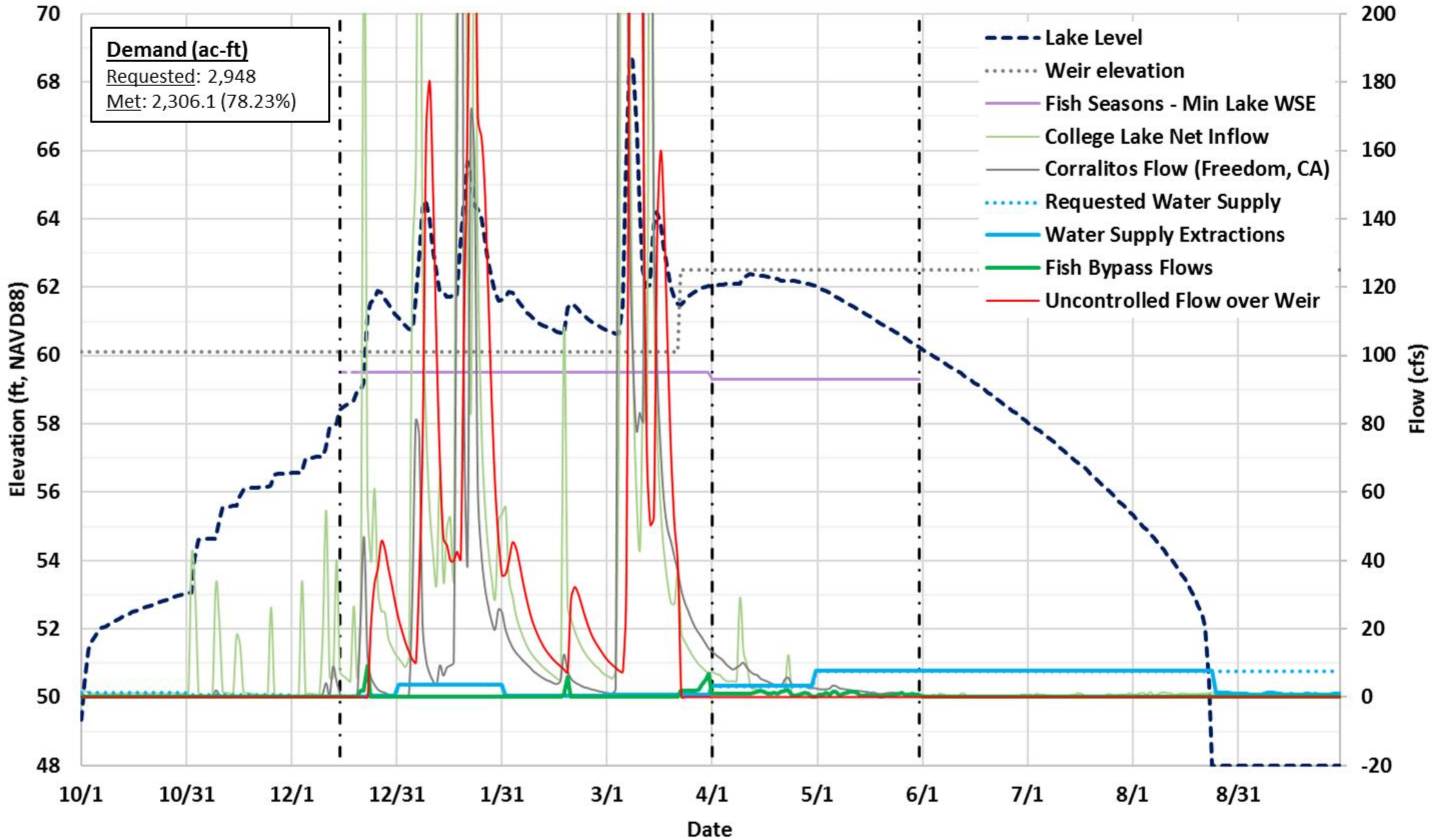
D160822

SOURCE: cbec, 2018

College Lake Integrated Resources Management Project

Figure 3.3-7b
Modeled Water Surface Elevations in College Lake with Project, Modeled Water Year 2015

ESA



Notes: Weir raised as early as possible after last major storm event to ensure that lake did not surpass 62.5 ft. Vertical dashed-dotted black lines indicate fish bypass season dates.

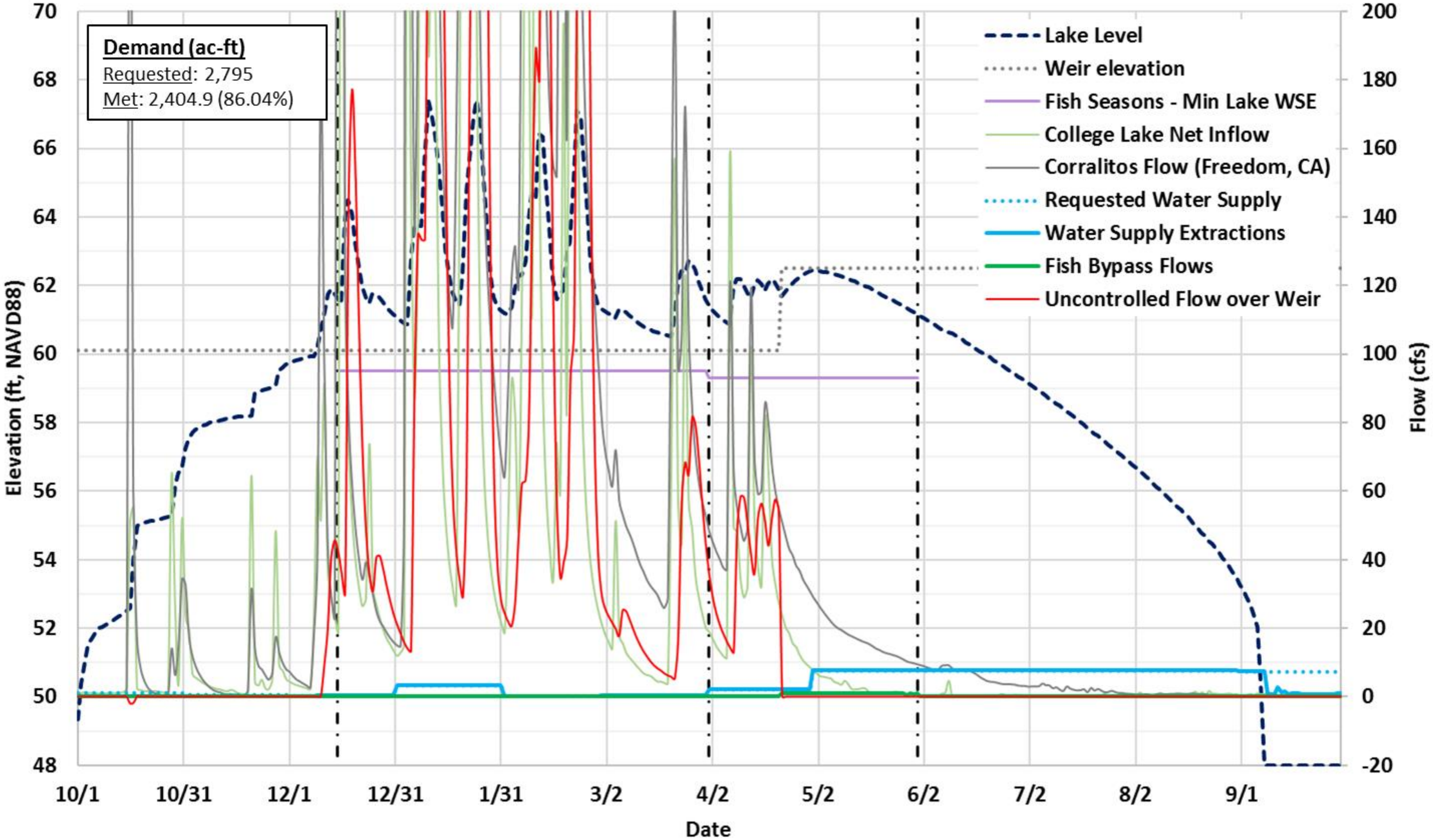
D160822

SOURCE: cbec, 2018

College Lake Integrated Resources Management Project

Figure 3.3-7c
Modeled Water Surface Elevations in College Lake with Project, Modeled Water Year 2016

ESA



Notes: Weir raised as early as possible after last major storm event to ensure that lake did not surpass 62.5 ft. Vertical dashed-dotted black lines indicate fish bypass season dates.

D160822

SOURCE: cbec, 2018

College Lake Integrated Resources Management Project

Figure 3.3-7d
Modeled Water Surface Elevations in College Lake with Project, Modeled Water Year 2017

ESA

Contributions to Discharge in Salsipuedes Creek and Pajaro River

The Project would generally reduce the flows from College Lake into Salsipuedes Creek and the Pajaro River throughout the year, due to the elimination of pumping over the weir by RD 2049; weir operations toward the end of the wet season; and the proposed water diversions from College Lake, as shown in **Table 3.3-4**. Contributions to flow in Salsipuedes Creek and the Pajaro River would occur at times when higher flows are occurring naturally throughout the watershed. Compared with existing conditions, discharge over the weir would be reduced starting after the peak of the last major storm event for each water year and for subsequent minor flow events. Instead of intermittent artificial high flows from College Lake during the late spring and summer months (when, under existing conditions, water is pumped out of the lake), a lower volume of water would steadily leave the lake during April through May (the smolt season), after which no additional water would generally flow from College Lake into Salsipuedes Creek during the dry season. Once College Lake WSE has reached the “natural level for passage,” the proposed rate of discharge (to be confirmed through consultation with federal and state wildlife agencies) into Salsipuedes Creek would be equivalent to the rate of inflow into College Lake up to a maximum flow of 21 cfs between December 15 and March 31, and up to a maximum flow of 1.5 cfs between April 1 and May 31.[73] Inflows in excess of these rates could be diverted for water supply. Figures A2 through A5 in Appendix HYD illustrate the anticipated changes in streamflow in Lower Salsipuedes Creek and the Pajaro River with the Project for conditions ranging from critically dry to excessively wet years.

Pajaro Lagoon

As shown on **Figure 3.3-8**, modeling indicates that the Project could increase the chance of the lagoon mouth being closed during spring, but otherwise would not alter the likelihood of the lagoon being breached. The increase in expected closure days in April and May is a result of the earlier closure in the spring of 2015. Given the small sample size, it is unclear how relevant this result is. While the predicted change is within the expected uncertainty of model predictions for number of closure days per month (10 to 20 percent), it may be possible that during especially dry years, lower inflows to the lagoon could allow wave action to close the mouth sooner in the year than would occur under the existing conditions of artificial pumping to drain College Lake.

Modeled lower water levels in the lagoon result from reducing modeled inflows to the lagoon in spring, which makes it easier for seepage through the berm and evapotranspiration to remove water from the lagoon. These results also have an expected degree of uncertainty given the small sample size of years, and the assumption that groundwater contributions to surface flows are small (estimated to be 2 cfs; refer to Appendix HYD). It is possible that a reduction in surface water levels would increase groundwater flows to the lagoon (due to a higher head gradient between the local groundwater table and surface water in the lagoon at the channel edges).

[73] The “natural level for passage” would vary during seasons. Between December 15 and March 31, College Lake WSE would reach 59.5 feet NAVD88 prior to discharge into Salsipuedes Creek; between April 1 and May 31 this level would be 59.3 feet NAVD88. There would be no requirement during other seasons.

TABLE 3.3-4
COMPARISON OF EXISTING AND PROPOSED MODELED AVERAGE MONTHLY DISCHARGE[a]

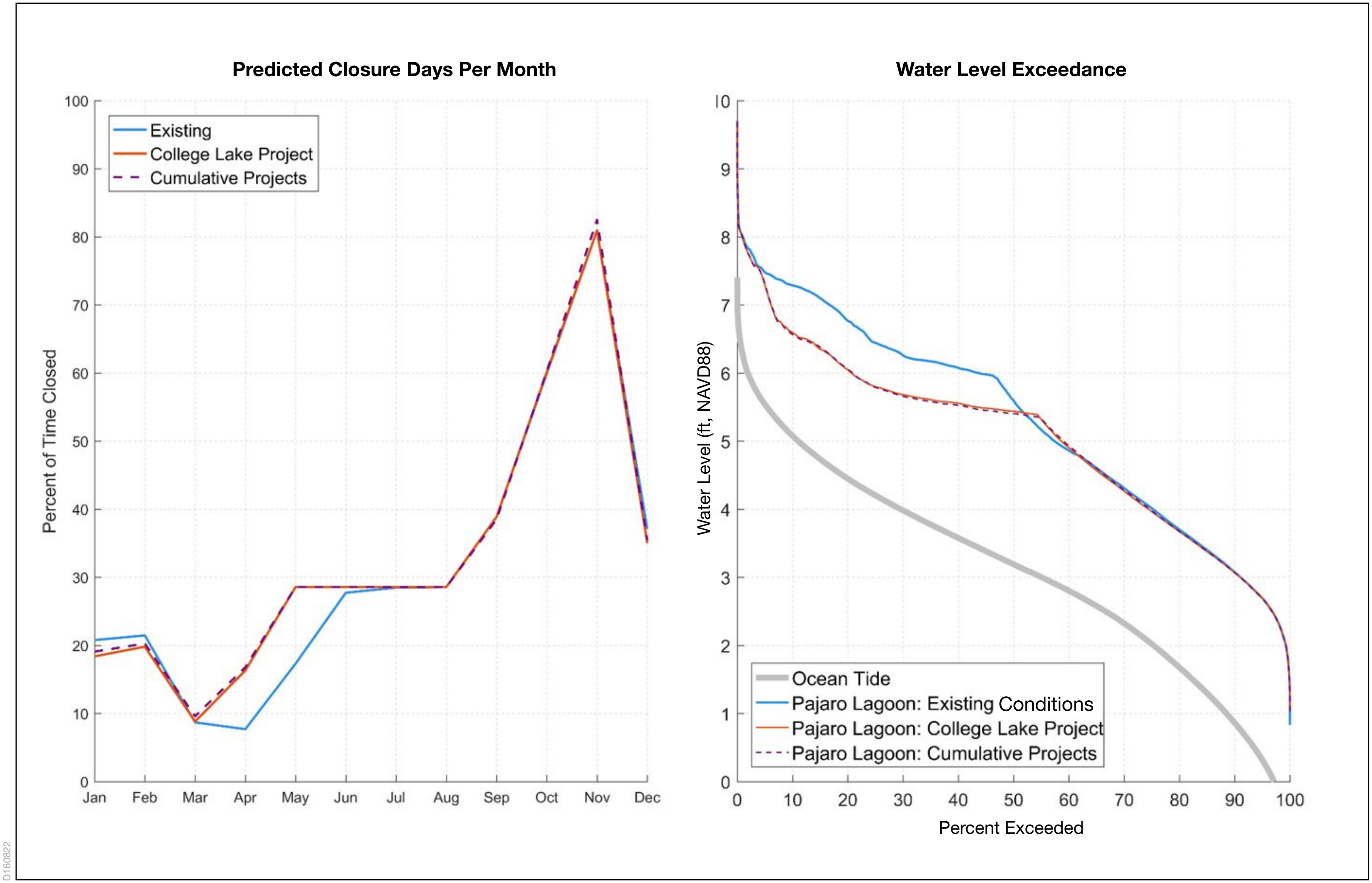
	2014			2015			2016			2017		
Modeled Year	Existing	With Project	Statistically Significant Difference?[b]	Existing	With Project	Statistically Significant Difference?	Existing	With Project	Statistically Significant Difference?	Existing	With Project	Statistically Significant Difference?
Average College Lake Outflow (cfs)												
October	1.0	0.0	Yes	1.5	0.0	No	1.1	0.0	Yes	5.2	0.0	No
November	0.9	0.0	No	6.4	0.0	No	7.1	0.0	No	0.0	0.0	N/A
December	0.0	0.0	N/A	72.5	82.5	No	7.2	9.4	No	30.5	38.6	No
January	0.0	0.0	N/A	9.1	4.6	No	84.1	89.0	No	151.4	148.9	No
February	0.0	0.0	N/A	14.4	5.2	No	25.3	22.9	No	132.5	131.3	No
March	8.7	6.3	No	3.6	1.6	No	91.7	86.3	No	28.7	28.4	No
April	22.7	5.3	Yes	19.7	1.1	Yes	12.4	1.1	No	38.3	28.0	No
May	13.0	0.6	No	5.8	1.1	No	16.9	0.8	Yes	17.8	1.0	Yes
June	1.5	0.0	Yes	1.5	0.0	Yes	1.4	0.0	Yes	10.2	0.0	No
July	1.2	0.0	Yes	1.3	0.0	Yes	1.3	0.0	Yes	1.1	0.0	No
August	1.1	0.0	Yes	1.2	0.0	Yes	1.2	0.0	Yes	1.3	0.0	No
September	1.2	0.0	No	0.8	0.0	No	0.9	0.0	Yes	1.0	0.0	No
Average Salsipuedes Creek Flow (cfs) [a]												
October	1.0	0.0	Yes	1.5	0.0	No	1.1	0.0	Yes	20.3	15.1	No
November	0.9	0.0	No	6.5	0.1	No	7.2	0.1	No	7.7	7.7	No
December	0.0	0.0	N/A	94.9	104.9	No	11.0	13.2	No	97.4	105.5	No
January	0.0	0.0	N/A	9.6	5.1	No	134.7	139.6	No	477.6	475.1	No
February	6.2	6.2	No	32.6	23.5	No	32.3	30.0	No	486.2	484.9	No
March	13.1	10.7	No	4.1	2.0	No	219.2	213.8	No	95.6	95.3	No
April	24.4	7.0	Yes	20.0	1.4	Yes	18.9	7.6	No	93.3	83.0	No
May	13.0	0.6	No	5.8	1.1	No	18.5	2.4	Yes	34.5	17.7	Yes
June	1.5	0.0	Yes	1.5	0.0	Yes	1.6	0.3	Yes	16.7	6.5	No

TABLE 3.3-4 (CONTINUED)
COMPARISON OF EXISTING AND PROPOSED MODELED AVERAGE MONTHLY DISCHARGE[a]

Modeled Year	2014			2015			2016			2017		
	Existing	With Project	Statistically Significant Difference?[b]	Existing	With Project	Statistically Significant Difference?	Existing	With Project	Statistically Significant Difference?	Existing	With Project	Statistically Significant Difference?
Average Salsipuedes Creek Flow (cfs)[a] (cont.)												
July	1.2	0.0	Yes	1.3	0.0	Yes	1.5	0.2	Yes	3.4	2.3	No
August	1.1	0.0	Yes	1.2	0.0	Yes	1.3	0.1	Yes	2.1	0.8	No
September	1.2	0.0	No	0.8	0.0	No	0.9	0.0	Yes	1.4	0.4	No
Average Pajaro River Flow (below Salsipuedes Creek confluence; cfs)												
October	1.0	0.00	Yes	1.5	0.00	No	1.1	0.00	Yes	49.3	44.1	No
November	1.0	0.11	No	6.5	0.09	No	7.3	0.29	No	22.2	22.15	No
December	1.2	1.23	No	150.7	160.71	No	13.2	15.34	No	196.8	204.94	No
January	3.4	3.42	No	16.9	12.41	No	333.4	338.34	No	3530.0	3527.52	No
February	15.9	15.92	No	92.8	83.70	No	91.5	89.12	No	3801.3	3800.01	No
March	34.2	31.84	No	14.5	12.46	No	938.4	933.03	No	717.2	717.01	No
April	42.1	24.76	No	23.6	5.03	Yes	73.1	61.77	No	399.6	389.37	No
May	16.3	3.98	No	6.6	1.88	No	46.6	30.51	No	128.0	111.13	No
June	2.7	1.27	No	1.5	0.00	Yes	9.6	8.25	No	53.0	42.74	No
July	1.2	0.00	Yes	1.3	0.00	Yes	1.9	0.68	No	19.1	17.96	No
August	1.1	0.00	Yes	1.2	0.00	Yes	1.3	0.05	Yes	15.9	14.60	No
September	1.2	0.00	No	0.8	0.00	No	0.9	0.00	Yes	11.5	10.50	No

NOTES:
[a] Does not account for any transmission losses or gains.
[b] Statistical significance of the difference between modeled existing and modeled with-Project mean discharge assessed by comparing the magnitude of change with two standard deviations of the existing monthly average. If the magnitude of the change in mean monthly discharge is within the range of approximately 95 percent of the existing monthly flow rates, the change is not considered statistically significant. Entries in this column "N/A" if the mean monthly discharge is zero in both existing and proposed conditions. Grey highlights indicate months during which the with-Project scenario results in a statistically significant change in stream discharge.

SOURCE: cbec, *College Lake Integrated Resources Management Project Hydrologic and Hydraulic Modeling Technical Memorandum*, November 8, 2018; Environmental Science Associates, 2018.



SOURCE: cbec, 2018.
NOTE: Artificial breaching was assumed whenever lagoon water levels reached 8 feet NAVD88.

College Lake Integrated Resources Management Project

Figure 3.3-8
Pajaro Lagoon Characteristics: Existing, Proposed, and Cumulative Conditions (water years 2014-2017)

ESA

The modeled Project did not result in delays in the seasonal breach events, since inflows during the first major rainfall event of each year were sufficient to fill and breach the lagoon regardless of prior College Lake releases. Although some of the late dry-season flow releases that occurred under existing conditions in 2014 and 2015 raised water levels in the lagoon, full breaching of the lagoon mouth did not occur until later, when the first major rainfall event of each of those years occurred. Although the modeled Project scenario left lower water levels in the lagoon at the time that these storms arrived, the ensuing runoff was more than sufficient to raise water levels to the height of the beach (and thus induce breaching).

Impact HYD-1: Project construction could violate water quality standards and/or waste discharge requirements, or otherwise substantially degrade surface or groundwater quality. (*Less than Significant with Mitigation*)

Construction Site Stormwater Runoff

The Project would demolish existing facilities and construct new facilities within College Lake and Salsipuedes Creek, as well as construct new facilities in areas that drain to Pinto Creek, Salsipuedes Creek, Corralitos Creek, and Pajaro River. Associated activities would include earthmoving such as excavation, grading, and soil stockpiling, which could result in soil erosion and subsequent discharge of sediments to nearby surface waters or drainages. Construction staging areas could also disturb soils in these areas. One section of the proposed new pipeline would be installed across Corralitos Creek. At this location, the pipeline would not be installed by cutting a trench, but instead would be installed using trenchless pipeline installation techniques (either horizontal directional drilling or jack and bore). Demolition of the existing weir structure would occur during the dry weather season (April 15 to October 15). Construction of the proposed weir structure and intake pump station, which would be within the channel of Salsipuedes Creek, would also occur only during the dry season.

Discharge of sediments could degrade water quality by increasing turbidity, affecting channel stability, and affecting aquatic and riparian habitats. Sediment also transports other pollutants such as nutrients, metals, and oils and greases. Hazardous materials associated with construction equipment and practices, such as fuels, oils, antifreeze, coolants, and other substances, could also adversely affect water quality if released to surface waters. Construction activities can impact a construction site's runoff sediment supply and transport characteristics both during and after the construction phase. Excess sediment could be mobilized anywhere earthwork occurs. Salsipuedes Creek and the Pajaro River are listed on the 303(d) list for turbidity, and the Pajaro River is listed for sedimentation/siltation. Because of the sensitivity of these water bodies and the proximity of construction to the creeks, impacts related to degradation of water quality as a result of erosion and sedimentation or release of other water quality pollutants during construction would be potentially significant. If weir construction work proceeds during periods when water is present in Salsipuedes Creek, construction activities could adversely affect water quality by increasing turbidity and potentially releasing fuels and other chemicals associated with construction equipment, a potentially significant impact. **Mitigation Measure HYD-1**, below, would address this impact.

In areas where water is not present, this potential impact would be addressed by implementation of adopted Mitigation Measure HWQ-1 and requirements of the CGP. PV Water would require all contractors to apply for and obtain all NPDES permits and comply with conditions of the permit(s) as required by the Central Coast RWQCB, pursuant to adopted Mitigation Measure HWQ-1. Compliance with the CGP would mandate the development and implementation of a SWPPP, and would be required because the Project would disturb more than one acre of ground.

The CGP characterizes construction activities by the level of risk to water quality. This is determined using a combination of the sediment risk of the Project and the receiving water quality risk. Projects can be characterized as Risk Level 1, Risk Level 2, or Risk Level 3, with Risk Level 1 representing the lowest risk to receiving water quality. The minimum best management practices and monitoring that must be implemented during construction are based on the risk level. For Risk Level 1 sites, the CGP specifies minimum best management practices to be implemented that address good housekeeping practices (including those for managing hazardous materials used during construction); non-stormwater management, erosion, and sediment control; and run-on and runoff control. For construction activities characterized as higher risk levels, the minimum requirements identified for Risk Level 1 apply, as do other more stringent requirements. For example, a Rain Event Action Plan would be required for higher risk areas to ensure that active construction sites have adequate erosion and sediment controls in place prior to the onset of a storm event, even if construction is planned only during the dry season. The best management practices are designed to prevent pollutants from coming into contact with stormwater and to keep eroded and/or stormwater pollutants from moving off-site into receiving waters. Pursuant to the CGP, a SWPPP would be prepared for the Project. The SWPPP would be prepared by a Qualified SWPPP Developer and submitted to the Central Coast RWQCB prior to Project implementation, and would specify established best management practices to be used to control stormwater run-on/runoff and sediment (such as use of check dams and fiber rolls for reducing erosion on slopes and retaining sediment in stormwater) that would be implemented during construction. These best management practices would avoid or minimize stormwater and water quality effects caused by construction site runoff.

Construction Dewatering

Construction dewatering at the Project sites would likely be required to create dry work areas for excavations (groundwater dewatering) and for work within the creek channel (areas separated from the surrounding creek by a cofferdam). Dewatering of groundwater from excavations typically would involve pumping water out of the excavated area into settlement tanks and, following appropriate on-site treatment, discharging the water over land or into municipal separate sewer systems and/or creek. Water pumped from within the cofferdam could be redirected to the creek channel downstream of the work area.

Sediment or other water pollutants originating from construction equipment, existing contaminated groundwater, or surrounding disturbed land could be released with discharges from dewatering, degrading surface water quality. The removed water could be contaminated with chemicals released from construction equipment, sediments from excavation, or, although unlikely (refer to Section 3.7, Hazards and Hazardous Materials), from contaminated groundwater from offsite sources. Waters isolated within cofferdam areas would likely contain high concentrations of sediment as a result of the amount of ground disturbance within the isolated work area. These discharges could violate water quality standards or substantially degrade water quality, resulting in a potentially significant water quality impact.

This impact would also be addressed by implementation of adopted Mitigation Measure HWQ-1. Under the Clean Water Act, Section 402, discharging pollutants to receiving waters of the United States is prohibited unless the discharge is in compliance with an NPDES permit. Thus, discharge of non-stormwater from a trench or excavation that contains sediments or other pollutants to sanitary sewer, storm drain systems, or receiving waters is prohibited without first securing appropriate NPDES permit authorization. The State Water Resources Control Board recognizes within the CGP that certain non-stormwater discharges may be necessary for the completion of construction projects. Authorized non-stormwater discharges may include uncontaminated groundwater dewatering, and other discharges not subject to a separate general NPDES permit adopted by a RWQCB. The CGP authorizes such discharges provided they meet the following conditions:

- The discharge does not cause or contribute to a violation of any water quality standard;
- The discharge does not violate any other provision of the CGP;
- The discharge is not prohibited by the applicable 2017 Basin Plan;
- The discharger has included and implemented specific best management practices required by the CGP to prevent or reduce the contact of the non-stormwater discharge with construction materials or equipment;
- The discharge does not contain toxic constituents in toxic amounts or (other) significant quantities of pollutants;
- The discharge is monitored and meets the applicable Numeric Action Limits; and
- The discharger reports the sampling information in the Annual Report.

If discharges from construction dewatering are found to be contaminated they would be collected, handled, and treated on-site and discharged in compliance with CGP requirements. California Water Code Section 13269 authorizes the RWQCB to waive Waste Discharge Requirements for specific discharges or specific types of discharges to land where such a waiver is consistent with any applicable state or regional water quality control plan. Therefore, disposal of dewatering discharge would be required to comply with State permit conditions, either an NPDES Permit or a waiver (exemption) from the RWQCB.

College Lake Pipeline and Pipeline Cleaning Discharges

College Lake pipeline crossings of several surface features, including Corralitos Creek, would require trenchless pipeline construction techniques (horizontal directional drilling or jack and bore). Although not anticipated, there is potential for frac-outs to occur using horizontal directional drilling.[74] Corralitos Creek is listed by the RWQCB as impaired due to turbidity; however, a TMDL has not been developed to address this impairment. If a frac-out occurs,

[74] A frac-out is the condition where drilling mud or fluid is inadvertently released through fractured bedrock into the surrounding substrate and travels toward the surface where it could impact sensitive aquatic habitat and degrade water quality (i.e., elevated turbidity, suspended sediment, and deposition of drilling material into the water body).

bentonite slurry could be released into Corralitos Creek, which could degrade water quality, a significant impact. Mitigation Measure BR-1b, included in Section 3.4, Biological Resources, would reduce this impact to less than significant by requiring preparation of a Frac-out Contingency Plan and implementation of measures to contain and clean-up any frac-outs in waterways.

The Project would install the College Lake pipeline across Pinto Creek using open trench installation techniques. If open trench work proceeds during periods when water is present in Pinto Creek, construction activities could adversely affect water quality by increasing turbidity and potentially releasing fuels and other chemicals associated with construction equipment, a potentially significant impact. **Mitigation Measure HYD-1**, below, would address this impact.

Discharges of water after cleaning the newly installed pipelines before the ends are connected to other facilities would be required. Cleaning activity would include routing treated chlorinated water through the pipeline to disinfect and to rinse dust and other materials from the interior of the pipeline prior to use. The water at the outlet end of the pipeline would be collected, transported to and treated at the Watsonville Wastewater Treatment Facility, which operates in compliance with Central Coast RWQCB Order No. R3-2014-0006 (NPDES No. CA0048216). Pipeline cleaning discharges would therefore have a less-than-significant impact on water quality.

Impact Conclusion

Compliance with the CGP in accordance with adopted Mitigation Measure HWQ-1, including preparation and implementation of the SWPPP and associated best management practices as well as inspection and reporting, and implementation of Mitigation Measures BR-1b and HYD-1, would effectively reduce degradation of surface water and groundwater quality to a less-than-significant level. Adherence to these requirements would also effectively reduce potential impacts associated with spills or leaks of hazardous materials and other releases to surface water during construction and thus impacts would be ***less than significant with mitigation***.

Mitigation Measure BR-1b: Frac-out Contingency Plan (refer to Section 3.4, Biological Resources)

Mitigation Measure HYD-1: Implement Dewatering Best Management Practices for In-Water Construction

For in-water construction during pipeline installation activities, PV Water shall require its contractor(s) to prepare a Dewatering Plan. The Dewatering Plan shall identify best management practices that ensure construction activities at Salsipuedes and Pinto Creeks meet water quality objectives. This work shall be timed to take place as flows are receding and only after instream measures to reduce downstream turbidity are in place. In addition, PV Water shall require its contractors to implement the measures below, and water quality protection measures required by the RWQCB.

1. All work performed in-water shall be completed in a manner that meets the water quality objectives to ensure the protection of beneficial uses as specified in the 2017 Basin Plan.

2. All dewatering and diversion methods shall be installed such that natural flow is maintained upstream and downstream of the Project area.
3. Any temporary dams or diversion shall be installed such that the diversion does not cause sedimentation, siltation, or erosion upstream or downstream of the Project area.
4. Screened pumps shall be used in accordance with CDFW's fish screening criteria and in accordance with the NMFS Fish Screening Criteria for Anadromous Salmonids and the Addendum for Juvenile Fish Screen Criteria for Pump Intakes.
5. Cofferdams shall remain in place and functional throughout the in-stream construction.
6. Disturbance of protected riparian vegetation shall be limited or avoided entirely.

Impact HYD-2: Project operations could adversely affect surface water quality. (*Less than Significant with Mitigation*)

The Project would result in multiple operational changes that could affect surface water quality in the Pajaro River watershed. The proposed weir between College Lake and Salsipuedes Creek would be less permeable than the existing weir, reducing the flow of water between College Lake and Salsipuedes Creek during periods when WSE is lower than the weir crest. College Lake would retain water for a longer time than as present. PV Water may also occasionally pump water out of College Lake and into Salsipuedes Creek in summer and fall via a 30-inch bypass pipeline from the pump station to the south side of the proposed weir structure.

The proposed WTP would be designed to capture incident stormwater and route it to the beginning of the treatment process train; no new stormwater runoff would be generated by the WTP. Once installed, the College Lake pipeline would not substantially alter the extent of impervious surfaces or otherwise provide substantial additional polluted runoff because it would not result in more impervious surface than currently exists.

Changes to College Lake Water Quality[75]

Reduced Permeability of Weir Structure

The proposed weir would be constructed north of the confluence of Pinto and Salsipuedes Creeks, and would replace the existing leaky weir with a less permeable structure. PV Water monitors water quality in many locations around College Lake, and collected water quality data for Pinto Creek, Casserly Creek, and College Lake during 2017, shown in **Table 3.3-5**. Nitrate as Nitrogen concentrations were consistently higher in Pinto Creek than in College Lake or Casserly Creek during this period. Turbidity of both streams was similar, and turbidity in College Lake was higher than the value in both streams. Phosphate concentrations (orthophosphate as P) were

[75] Unless otherwise noted, historical water quality data in this section is derived from Carollo, PV Water, BMP Program Technical Services Technical Memorandum: College Lake Treatment Plant Water Quality Study, November 2, 2017.

higher in Casserly Creek than in Pinto Creek or College Lake.[76] With reduced inflow from Pinto Creek due to reduced permeability of the proposed weir, during Project operations the water quality in College Lake would more closely resemble water quality of Casserly Creek.

Longer Inundation Period of College Lake

The effects of a longer inundation period of College Lake are assessed in two ways for this analysis: by reviewing existing College Lake water quality data and by reviewing water quality concerns at nearby lakes. The Project's indirect effects on water quality due to changes in land use are also considered.

TABLE 3.3-5
WATER QUALITY DATA 2017

Constituent	College Lake	Pinto Creek	Casserly Creek
Nitrate as N (mg/L)	5.7 (average) 14.1 (maximum)	17.1 (average) 29.9 (maximum)	7.4 (average) 10.9 (maximum)
o-Phosphate-P (mg/L)	0.1 (average)[a] 0.1 (maximum)[a]	0.04 (average) 0.05 (maximum)	0.4 (average) 0.52 (maximum)
Turbidity (NTU)	52.5 (average) 190 (maximum)	21 (average) 85 (maximum)	21.7 (average) 100 (maximum)

NOTES:
[a] Not detected (minimum detection level 0.1 mg/L) in four of five sampling events.

SOURCE: PV Water

Multiple lakes that retain water year-round and drain from similar land uses are present near College Lake, including Kelly Lake and Pinto Lake. Pinto Lake lasts year-round and provides a local example of how the water chemistry could change when College Lake retains water in the warmer summer months.

Pinto Lake typically develops heavy Cyanobacteria blooms in the late summer, which produce high levels of algal toxins that exceed the safe recreational exposure limit established by the State of California. During the spring and early summer, a thermocline develops in Pinto Lake, preventing lake water from mixing vertically. Water at the bottom of the lake is not in contact with the atmosphere and becomes relatively depleted of oxygen; the low dissolved oxygen water then increases the release of sediment-bound phosphorous from the lake sediments into the lake water. Monitoring of Pinto Lake and its contributing streams indicated that release from lake sediments was the primary cause of nutrient loading in Pinto Lake. The summer thermocline in Pinto Lake in 2011 occurred starting at a depth of 2 meters below the lake water surface.[77]

[76] Pinto Lake underwent alum treatment for removal of phosphorous during 2017, which resulted in average lake-wide reduction of total phosphorous by 91 percent (City of Watsonville, *Pinto Lake Restoration Project Final Report*, May 31, 2018). In 2016, prior to alum treatment, average orthophosphate-P was 0.25 mg/L in Pinto Creek.

[77] City of Watsonville, Resource Conservation District of Santa Cruz County, and Chapman Science Academic Center, *Pinto Lake Total Maximum Daily Load (TMDL) Planning and Assessment*, April 2013.

While unlikely due to anticipated lake operations, Cyanobacteria blooms could occur in College Lake later in the summer if water of sufficient depth is present, given that the land uses in areas draining to College Lake are similar to those draining to Pinto Lake (although laboratory analysis of water quality samples show Cyanobacteria levels in College Lake during a bloom event in September 2017 were about one percent of the Cyanobacteria levels observed in Pinto Lake).[78] Presuming historic land uses draining to College Lake are similar to those draining to Pinto Lake (a mix of primarily agricultural land use with smaller percentages of urban, grazing, and wooded lands), College Lake water of lower dissolved oxygen concentrations could be in contact with nutrient-containing sediments for a longer period than under existing conditions, potentially increasing the phosphorous loading in College Lake water.

The Project would eliminate farming in portions of the lake bed (i.e., below 59 feet NAVD88), but otherwise would not change land use in areas draining to College Lake. As noted in Section 3.3.1.4, it is possible the existing summer increase in nitrate in College Lake corresponds to irrigation runoff from the farming within the lake basin which, under with-Project conditions would be eliminated below 59 feet NAVD88.

While the Project would maintain water in the lake longer than currently occurs, it would also reduce the size of the irrigated agricultural area within the lake storage area and reduce inputs from Pinto Creek, reducing nutrient contributions to the lake. Refer to Section 3.2, Land Use and Agriculture, for additional information. However, if a thermocline develops in College Lake, Cyanobacteria blooms in College Lake water could occur, a potentially significant impact.

As described in Chapter 2, *Project Description*, the bypass pipeline could be used to pump water from the lake around the weir (e.g., for equipment maintenance or repair, to ensure the lake bottom is able to dry out for purposes of predator control, or to prevent water quality issues such as low dissolved oxygen, algal blooms, or other unforeseen issues). This operation is expected to occur infrequently, and would comply with applicable federal and state water quality regulations, such as the federal Clean Water Act and the state Porter-Cologne Water Quality Control Act, which establish beneficial uses of surface and ground waters, and water quality standards and objectives for waters of the state that are protective of water quality. With implementation of **Mitigation Measure HYD-2a**, which would require management of College Lake to limit development of a thermocline during the summer, the Project's impact on College Lake water quality would be ***less than significant with mitigation***.

Pinto Creek

The College Lake pipeline would be installed across Pinto Creek. If not buried at sufficient depth, the pipeline could result in additional scour of Pinto Creek and a subsequent increase in turbidity in Pinto Creek and other downstream water bodies, a potentially significant impact. Implementation of **Mitigation Measure HYD-2b** would address this impact by requiring final pipeline design to be based upon more detailed project information and a scour analysis, and the impact would be ***less than significant with mitigation***.

78 Carollo, PV Water, BMP Program Technical Services Technical Memorandum: College Lake Treatment Plant Water Quality Study, November 2, 2017.

Salsipuedes Creek and Pajaro River

Both WTP Sites

The Project would generally reduce the discharge from College Lake into Salsipuedes Creek and the Pajaro River during the spring and summer. Instead of intermittent, artificial flows from College Lake during these months (when, under existing conditions, water is pumped out of the lake), a reduced amount of water would steadily leave the lake during April through May (the smolt season), after which little or no additional water would generally flow from College Lake into Salsipuedes Creek during the dry season.

As noted previously, existing agricultural practices in the College Lake basin likely contribute biostimulatory substances and nitrates, which impair Salsipuedes Creek and Pajaro River water quality; the Project would replace a portion of these land uses with submerged (unfarmable) area, reducing the potential sources of biostimulatory substances and nitrate entering Salsipuedes Creek. The Project would not build housing or result in more potential sources of fecal coliform. Land use changes resulting from the Project may therefore reduce biostimulatory substances and nitrate loading to Salsipuedes Creek and Pajaro River.

Reject water generated during operation of the proposed WTP (such as backwash from filters or decant water from solids drying beds) would generally be routed to the beginning of the WTP treatment train. A portion of reject water from the WTP could be routed to the existing wastewater collection system that drains to the City of Watsonville Wastewater Treatment Facility. The reject water routed to the collection system would meet influent quality requirements set by the Salsipuedes Sanitary District and the City of Watsonville. The Wastewater Treatment Facility discharges wastewater to Monterey Bay in compliance with Central Coast RWQCB Order No. R3-2014-0006 (NPDES No. CA0048216). Reject water would therefore have less-than-significant effects on surface water quality during Project operations.

As noted previously, PV Water may occasionally pump water out of College Lake and into Salsipuedes Creek in summer and fall through a 30-inch bypass pipeline from the pump station to the south side of the proposed weir structure. The bypass pipeline could be used to drain the lake to ensure the lake bottom is able to dry out for purposes of maintenance, predator control, or to prevent water quality issues such as low dissolved oxygen and algal blooms from developing. As also described previously, the Project could result in additional release of nutrients from the lake sediments, which could result in cyanobacteria blooms. While water quality effects in Salsipuedes Creek would be temporary, without additional information about the quality of College Lake water at the time of pumping, the potential impact on Salsipuedes Creek could be significant. Implementation of Mitigation Measure HYD-2a would reduce the potential for pumped water to adversely affect Salsipuedes Creek water quality. In addition, this operation is expected to occur infrequently and would comply with applicable federal and state water quality regulations, such as the federal Clean Water Act and the state Porter-Cologne Water Quality Control Act, which establish beneficial uses of surface and ground waters, and water quality standards and objectives for waters of the state that are protective of water quality. Through compliance with applicable regulatory permit requirements and Mitigation Measure HYD-2a, pumped flows from College

Lake into Salsipuedes Creek would not degrade water quality, and impacts would be ***less than significant with mitigation***.

Optional WTP Site

Unlike the preferred WTP site, the optional WTP site would be within the 100-year special flood hazard zone (illustrated on Figure 3.3-5). Potential water pollutants including treatment chemicals and diesel fuel would be stored at the WTP, and if not properly controlled could be inadvertently released during a flood event. The optional WTP site would be built on an elevated fill pad above the 100-year flood elevation, which would result in protection of operational and storage areas from flood flows, resulting in ***less-than-significant*** impacts.

Pajaro Lagoon

As shown on Figure 3.3-8, the Project could increase the chance of the lagoon mouth being closed during spring, but otherwise would not alter the likelihood of breaching the lagoon. The amount of trapped saltwater in the lagoon during mouth closure events is an important determinant of water quality conditions, as it effectively controls the extent and amount of low dissolved-oxygen water, and sometimes the extent and amount of warm water in the estuary.[79] The lagoon hydraulic model (discussed in Section 3.3.3.2, Methodology) was used to determine approximate amounts of trapped saltwater in the lagoon under existing conditions, and for conditions with the Project and other projects enacted in the future. The amount of trapped saltwater was estimated by comparing predicted overtopping rates during closure events against predicted export rates from seepage through the beach. Overall, this analysis showed that:

- As a result of reducing inflows to the lagoon, the projects (College Lake Project plus cumulative projects discussed under Impact C-HYD-1) allowed waves to close the lagoon mouth slightly earlier in dry years.
- The earlier closure events actually led to a slightly lower amount of trapped saltwater in the lagoon. This occurred because the earlier closure allowed waves to build a higher beach berm by summer, meaning that fewer wave overwash events were able to introduce saltwater to the lagoon during dry conditions, when lagoon water levels are lower and resulting seepage losses through the beach are weaker.

Given the lack of salinity measurements in the Pajaro Lagoon during the period of the model simulations, a high level of uncertainty should be attributed to these results. Conceptually, it is unclear whether reduced inflows to the lagoon would necessarily increase or decrease the amount of trapped saltwater, and thus the resulting amount of low-dissolved oxygen water. Project conditions would result in a more normative hydrologic regime in the lagoon in the absence of artificial pumping at College Lake. The Project would also alter land use in a manner that would reduce the release of biostimulatory substances into surface waters that drain to the lagoon by reducing the area of irrigated agriculture draining to the lagoon. For these reasons, impacts on Pajaro Lagoon water quality resulting from operation of the Project would be ***less than significant***.

[79] ESA, *Lagoon Quantified Conceptual Model Memorandum for Pajaro River Lagoon*, April 12, 2018.

Treated Water Use

As discussed in Section 3.3.1.6, PV Water analyzed historic College Lake water quality data to inform WTP design. Seasonal trends were analyzed to view how water quality has historically changed over the course of the year, and to evaluate how it may change under proposed operations. PV Water currently has water quality obectives for four analytes: SAR, chloride, sodium, and nitrate. Historical trends show that in the current mode of operation, College Lake water has met objectives for “delivered water quality” as set by PV Water’s Projects and Facility Operations Committee for these four analytes, with SAR, sodium, and chloride remaining well below the objective levels of SAR less than 4, sodium less than 100 mg/L, and chloride less than 150 mg/L. Summer concentrations of nitrate have also not exceeded the 10 mg/L water quality objective although they have been much closer to exceeding objective levels than the other analytes. Data collected also indicated that TDS levels in College Lake are suitable for irrigation pursuant to the Central Coast RWQCB 2017 Basin Plan guidelines, as well as the water quality objectives set by the PV Water Project and Facility Operations Committee. Under Project conditions, these constituents would likely increase in May and June, peaking in July and August, which may correspond to the draining of College Lake for water supply. These operational conditions are not anticipated to be an issue in the future for SAR, sodium, or chloride since they are well within PV Water’s delivered water quality objectives for those analytes.

The proposed WTP would be designed to produce water that meets the Food and Drug Administration Food Safety Modernization Act standards for water for agricultural irrigation. Operations of the proposed WTP would include routine water quality monitoring to ensure the effluent water is compliant with water quality standards.

Impact Conclusion

Project operations could alter College Lake water quality by reducing Pinto Creek inflow to the lake, by increasing the period during which the lakebed is inundated, and by altering land use in the lake bed. Water quality of Pinto Creek and downstream water bodies could also be affected by College Lake pipeline scour. With implementation of Mitigation Measures HYD-2a and HYD-2b to address these potential impacts, and implementation of regulatory agency permit requirements, impacts of the Project on surface water quality would be ***less than significant with mitigation***.

Mitigation Measure HYD-2a: Water Quality Adaptive Management for College Lake

To learn about potential impacts of the Project on College Lake water quality and the quality of downstream water bodies, PV Water shall monitor College Lake water for indications of Cyanobacteria blooms. When the proposed weir crest is elevated to 62.5 feet NAVD88, PV Water shall monitor College Lake water temperature within the water column to establish whether a thermocline develops. PV Water shall use results of this monitoring to support the development of the Adaptive Management Plan (refer to Section 2.7) that establishes management actions to minimize the conditions that can contribute to algal blooms, including cyanobacteria blooms, such that this impact is mitigated.

Mitigation Measure HYD-2b: Scour Analysis for Pinto Creek Crossing

To reduce Project impacts on erosion and sedimentation, PV Water shall evaluate the potential for scour and channel bank erosion due to the Pinto Creek pipeline crossing. The analysis shall recommend a design depth for the pipeline crossing that avoids scour, estimated using standard engineering methods. PV Water shall implement the pipeline depth that avoids scour in final project design.

Impact HYD-3: The Project could cause localized temporary or seasonal changes in shallow groundwater levels, but would not degrade groundwater quality or decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin. (*Less than Significant*)

Construction

As discussed in Impact HYD-1, dewatering may be necessary during construction that extends below groundwater levels. The impact on groundwater during these excavation activities would be temporary and limited to the immediate vicinity of the excavation. The influence of pumping (i.e., cone of depression) would not extend far from the excavation, and the dewatering would be temporary. For these reasons, the impacts of pipeline installation with respect to depletion of groundwater supplies would be ***less than significant***.

Operations

Shallow Groundwater

As described in Section 3.3.1.3, the lake bottom is classified as Quaternary Basin deposits, consisting of unconsolidated plastic clay and silty clay with high organic content.

Shallow groundwater is present around the lake, and levels fluctuate seasonally. **Table 3.3-6** lists the depths to shallow groundwater around the lake, measured between December 2017 and October 2018 using piezometers. **Figure 3.3-9** illustrates the locations of these piezometers.[80] Water elevations at these piezometers are shown in Appendix HYD. Nine of the twelve piezometers collected data from the northern and northeastern side of College Lake; three piezometers collect data from the southern side of College Lake. Potential Project effects in each area surrounding College Lake are discussed below.

- **Piezometers 1, 4, 5 and 6.** These piezometers collected data north of College Lake. Shallow groundwater was always higher than College Lake WSE at these piezometers. Starting in December 2017, shallow groundwater elevations gradually increased, with intermittent peaks associated with precipitation events. While the overall trend of shallow groundwater elevations increased over the period of data collection, after precipitation event peaks the shallow groundwater elevations in some cases declined to previous levels, while the elevation of College Lake continued to increase. Shallow groundwater in these areas may be draining to College Lake through drainage dikes to the west of the piezometer locations; however, the

[80] Piezometer locations selected based on local topography and land use.

elevation of shallow groundwater north of College Lake and Paulsen Road appears to be controlled by aggradation in and downstream of Casserly Creek and not the WSE of College Lake. Aggradation of Casserly Creek would not be affected by the Project, as discussed in greater detail in Impact HYD-4.

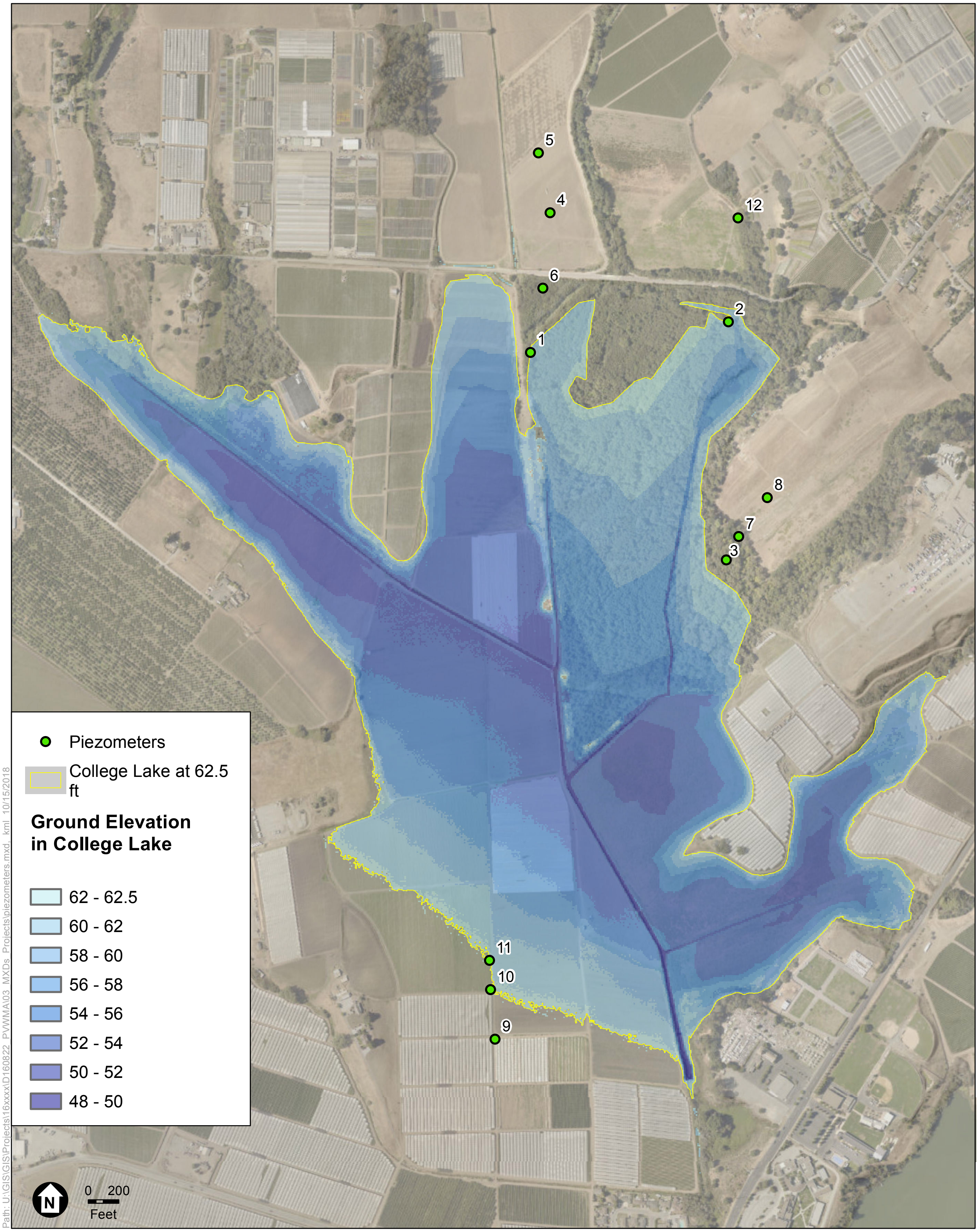
- **Piezometers 2 and 12.** These piezometers collected data northeast of College Lake. Shallow groundwater levels vary from just over 60 feet NAVD88 to just over 62 feet NAVD88 during the wet season at piezometer 2, and appear to be influenced by College Lake WSE once the lake is above 61 feet NAVD88. The effect of lake WSE on shallow groundwater at piezometer 12 is less certain given that shallow groundwater levels remained at an elevated level prior to the lake filling. The Project therefore is not expected to significantly alter the patterns of depth to shallow groundwater in this location. At the end of the wet season, when the lake was at approximately 61 feet NAVD88 (similar to what it would be for a longer period under Project conditions), the shallow groundwater level in piezometer 2 was approximately 61.3 feet NAVD88. Under Project conditions, groundwater in the vicinity of piezometer 2 may remain at 61.3 feet NAVD88 (1.5 feet below ground surface) until May 31, depending on precipitation conditions.

TABLE 3.3-6
SHALLOW GROUNDWATER AT COLLEGE LAKE

Piezometer	Ground Surface Elevation (rounded to the nearest foot)	Well Top Elevation (feet)	Groundwater Level range, December 2017-October 2018 (feet)[a,b]	Groundwater Feet Below Ground Surface (feet)
1	64	65.9	58.3-64	0-4
2	63	64.6	60-62.2	0.5-3
3	60	61.7	54.7-60	0-5
4	65	66.8	64.3-65	0-1
5	67	68.3	64.8-67[c]	0-2
6	64	65.3	60.4-64	0-3
7	65	66.4	58.0-65	0-7
8	70	70.9	62.3-68.4	1-8
9	67	68.1	59.9-64.3	2-7
10	63	64.0	59.4-62.8 [d]	0-4
11	62	62.6	59.0-62	0-3
12	64	64.7	59.3-63.5 [e]	0.5-5

NOTES:
[a] This period is selected because data is available for all piezometers. As shown in Appendix HYD, in some cases the peak measured groundwater level exceeded the ground surface elevation; this was due to local flooding at the time of the peak measurements. For clarity the peak groundwater level ranges reported in this table are reported as the ground surface elevation, if relevant.
[b] During this same period, the WSE recorded at the College Lake pumphouse ranged from 48 feet (in June, when water presence is limited to the channel) to 62 feet (in March).
[c] The first three days of piezometer installation recorded values lower than this range (down to 60.2 feet NAVD88), due to equalization with surrounding groundwater levels; These low values were excluded from this table in order to present an accurate range of values.
[d] The first three days of piezometer installation recorded values lower than this range (down to 54.8 feet NAVD88), due to equalization with surrounding groundwater levels; These low values were excluded from this table in order to present an accurate range of values.
[e] The first three days of piezometer installation recorded values lower than this range (down to 56.8 feet NAVD88), due to equalization with surrounding groundwater levels; These low values were excluded from this table in order to present an accurate range of values.

SOURCE: Appendix HYD



SOURCE: cbec, 2018

College Lake Integrated Resources Management Project

Figure 3.3-9
Piezometer Locations

ESA

- **Piezometers 3, 7, and 8.** These piezometers collected data east of College Lake. WSE at these piezometers generally increased during the data collection period. The shallow groundwater elevation measured in piezometer 3 was the same as the College Lake WSE starting at the bottom of the piezometer at 56 feet NAVD88. Changes in shallow groundwater levels in piezometers 7 and 8 in 2018 correlated with lake levels (coefficient greater than 0.93). The Project could result in shallow groundwater elevation remaining at seasonally elevated levels (approximately 62 to 63 feet NAVD88) until May 31 at piezometers 7 and 8.

- **Piezometers 9, 10, and 11.** These piezometers collected data southwest of College Lake. Under existing conditions, even when the lake is drained, shallow groundwater remained at or above 59 to 60 feet NAVD88 throughout the year from late 2017 to late 2018.

  In 2018, College Lake WSE was 61 feet NAVD88 around April 20, and, once pumping began, decreased to 51 feet NAVD88 over 1.5 months (to approximately June 7). College Lake WSE declined at a rate of approximately 6.7 feet per month in 2018 once pumping began.

  With the project, College Lake WSE would decrease at a slower rate in any of the water year scenarios, due to changes in pumping. Modeling indicates that College Lake WSE would decrease from 61 feet NAVD88 to 51 feet NAVD88 over approximately three months, between May 7 and August 15 in a dry year (WY 2014) or between June 1 and September 7 in a very wet year (WY 2017). The decrease in College Lake WSE would begin latest (around June 1) in the WY 2017 scenario, which represents the greatest change compared with existing conditions in terms of duration of College Lake WSE above 61 feet NAVD88. College Lake WSE would decrease at a rate of approximately 1 foot per month between June 1 and September 7, about one-sixth the current rate.

  Assuming that shallow groundwater levels at these piezometers are correlated with College Lake WSE, the highest shallow groundwater levels at June 1 would occur during a very wet year (similar to modeled WY 2017), when College Lake WSE would be around 61 feet NAVD88. Using information from the piezometers from 2018, shallow groundwater would therefore remain within one foot of the ground surface for a longer period at piezometers 10 and 11 (ground surface elevations of 63 and 62, respectively). Presuming that shallow groundwater elevations would decline at a slower rate, in proportion to the slower decrease in College Lake WSE under proposed conditions, shallow groundwater at piezometer 10 would remain within two feet of the ground surface until November 1. Shallow groundwater at piezometer 11 would remain within 1 foot of the ground surface until November 1. Shallow groundwater at piezometer 9 would remain between 4 and 5 feet of the ground surface until November 1. **Table 3.3-7** summarizes existing and future shallow groundwater conditions at piezometers 9 through 11.

In all locations around College Lake, the Project could increase the duration of elevated shallow groundwater levels or would not have a strong effect on shallow groundwater levels.

The Project would lengthen the amount of time water remains in College Lake relative to existing conditions, but would reduce the amount of water released downstream to Salsipuedes Creek and the Pajaro River. PV Water would implement adopted Mitigation Measure HWQ-3 to address any seasonal reductions in groundwater levels from baseline elevations at localized areas downstream of the lake. With implementation of adopted Mitigation Measure HWQ-3, the impact on downstream groundwater levels would be ***less than significant***.

TABLE 3.3-7
EXISTING AND WITH-PROJECT SHALLOW GROUNDWATER AT PIEZOMETERS 9 THROUGH 11

	Piezometer 11	Piezometer 10	Piezometer 9
Existing Conditions			
Ground surface elevation, feet NAVD88	62	63	67
Depth of shallow groundwater below ground surface when College Lake WSE was 61 feet, around 4/20/18	<1 foot (61.8)	<1 foot (62.5)	4 feet (63)
Change in shallow groundwater elevation between beginning of pumping and College Lake WSE of 51 feet, 2018 (1.5 months)	61.8 to 61	61.8 to 61	63 to 62
Rate of shallow groundwater elevation decline, 4/20 – 6/7, 2018 (feet per month)	0.5	1	0.7
Depth below ground surface on June 1, 2018 [a]	1 foot	2 feet	5 feet
Project Conditions (2017 water year)			
Depth below ground surface with Project on June 1[b]	< 1 foot	< 1 foot	4 feet
Rate of shallow groundwater elevation decline, with Project (feet per month)	< 0.1	0.2	0.1

NOTES:
[a] College Lake WSE on June 1, 2018, was approximately 54 feet NAVD88.
[b] College Lake WSE modeled to be 61 feet NAVD88 on June 1 in the WY 2017 scenario.

SOURCE: Appendix HYD

Pajaro Valley Groundwater Basin

As discussed in Section 3.3.1.4, the potential for groundwater recharge to the Pajaro Valley Groundwater Basin in the vicinity of College Lake is very low due to the underlying fine-grained (clay and silt) materials of the lake bed, which have very low permeabilities. The fine-grained, low-permeability lake bed materials separate the shallow groundwater around the lake from the Pajaro Valley Groundwater Basin, so Project effects on the shallow groundwater and Project effects on the Pajaro Valley Groundwater Basin are discussed separately here. Because of this very low recharge potential, changes in operations of College Lake would not substantially affect recharge from College Lake directly into the Pajaro Valley Groundwater Basin. Moreover, if there were any change in direct recharge during operations, the change would be to increase this direct recharge, because water would be stored in College Lake for more days each year under Project operations than under current conditions.

As discussed in Chapter 2, *Project Description*, the primary purposes of the Project are to help balance the groundwater basin, prevent further seawater intrusion, and meet water supply needs in PV Water's service area by developing College Lake as a water storage and supply source. PV Water is the exclusive local agency managing groundwater within its boundaries, and the Board of Directors voted to be the Groundwater Sustainability Agency under SGMA for the Pajaro Valley Groundwater Basin in August 2015. Implementation of the Project would reduce overdraft conditions and seawater intrusion in the Pajaro Valley Groundwater Basin. Impacts on sustainable groundwater management would therefore be beneficial, and no adverse effects would result.

Mitigation: None required.

Impact HYD-4: The Project would alter drainage patterns, changing erosion and sedimentation patterns in College Lake and downstream water bodies. (*Less than Significant with Mitigation*)

The Project would not alter sediment delivery to College Lake from upstream sources. The Project would remove an existing weir, construct a new proposed weir within a waterway, and alter seasonal water presence in College Lake, Salsipuedes Creek, and the Pajaro River and lagoon, which could alter patterns of sedimentation in these water bodies. Project impacts related to sedimentation and erosion during construction are discussed in Impact HYD-1.

College Lake

The modeled presence of water within College Lake during Project operations is illustrated on Figures 3.3-7a through 3.3-7d. During most of the wet season, when the greatest amount of sediment is transported into College Lake, the proposed weir crest would remain at 60.1 feet NAVD88. The maximum extent of the lake during the wet season therefore would not change due to the Project (refer to Figure 3.3-11c and associated discussion in Impact HYD-5). In the area where Casserly Creek enters College Lake at Paulsen Road, the inundated area would not substantially change compared with existing conditions during the wet season.

During the spring, the lake would remain at a higher elevation than under typical existing conditions (up to 62.5 feet NAVD88, or up to 0.5 feet higher than existing conditions during April-May). As noted above, the proposed weir would not be raised to 62.5 feet NAVD88 until after the last anticipated major precipitation event of the season, such that the College Lake stage would not exceed approximately 62.5 feet NAVD88 after that point in the season. While precipitation could occur after this point in the season, it is estimated that the College Lake inflow would be on the order of 40 cfs or less (based on review of hydrographs from 2014-2017 used in modeling). Most sediment that enters College Lake is estimated to be transported by events with greater discharge during the wet season (e.g., over half of storms in 2017 resulted in discharge greater than 100 cfs in Casserly Creek).[81] Therefore, it is unlikely the proposed weir would substantially alter sedimentation in College Lake.

However, as discussed in Chapter 2, *Project Description*, PV Water would conduct initial geomorphological assessments to confirm the factors in the watershed that control sediment production, transport, and deposition and to guide development of effective maintenance activities. PV Water would remove sediment from College Lake as needed if accumulation is identified during routine monitoring. If sediment accumulation in the lake impedes fish passage, compromises capacity, or impairs operation of the proposed weir or intake structure, removal would be needed.

For the reasons stated above, the potential for sedimentation to substantially increase in College Lake due to Project operations is low, and this impact is considered ***less than significant***.

[81] cbec, *College Lake Integrated Resources Management Project Hydrologic and Hydraulic Modeling Technical Memorandum,* November 8, 2018. Figure 7.

Pinto Creek

As discussed in Impact HYD-2, if the College Lake pipeline is not buried to sufficient depths beneath Pinto Creek, additional scour of the Pinto Creek channel could result, a potentially significant impact. Implementation of Mitigation Measure HYD-2b would address this impact by requiring final pipeline design to be based upon more detailed project information and a scour analysis, and the impact would be ***less than significant with mitigation***.

Corralitos Creek

The College Lake pipeline would be tunneled beneath Corralitos Creek using trenchless installation technology (horizontal directional drilling). Once installed, the College Lake pipeline would not substantially alter existing topography or drainage. The pipeline also would not affect the rate or volume of surface runoff with regard to flooding, as the pipeline would not create additional impervious surfaces. Accordingly, long-term impacts of the pipeline on erosion, siltation, or flooding would be ***less than significant***.

Salsipuedes Creek and Pajaro River

Once the Project is operational, it would generally decrease College Lake contributions to Salsipuedes Creek and the Pajaro River throughout the year, due to: (a) the elimination of RD 2049 pumping operations; (b) weir operations toward the end of the wet season; and (c) the proposed diversions of water from College Lake. In particular, College Lake contributions to the Pajaro River would decrease during the fall, late spring, and summer; a detailed breakdown of changes in discharge is provided in Table 3.3-4. Contributions to flow in Salsipuedes Creek and the Pajaro River that remain would occur at times when higher flows are naturally occurring throughout the watershed.

College Lake and Salsipuedes Creek Prior to Weir Raise

Because the proposed weir would be kept at 60.1 feet NAVD88 (the existing weir level) until the end of the wet season, it is unlikely that the Project would prevent more sediment from moving into College Lake from Salsipuedes Creek during reverse flow events (which generally occur during high discharge in the wet season) than occurs under existing conditions. Therefore, the Project is not likely to cause further sedimentation in Salsipuedes Creek near the proposed weir than occurs under existing conditions.

College Lake Outflow and Salsipuedes Creek After Weir Raise

Compared with existing conditions, discharge over the proposed weir is reduced starting after the peak of the last anticipated major storm event for each water year and for subsequent minor flow events. High intermittent discharge from College Lake during the dry season would no longer occur due to general cessation of pumping over the proposed weir.

The decrease in discharge under proposed conditions is more pronounced in drier years (WYs 2014 and 2015) than in wetter years (WYs 2016 and 2017).[82] This is because Corralitos Creek and Pajaro River discharge would be greater than discharge leaving College Lake.[83]

As shown in Table 3.3-4, all statistically significant changes in modeled mean monthly discharge would reduce, not increase, discharge volume, and would occur during periods when, under existing conditions, College Lake or the channel within the lakebed is being pumped (April through October). The flows entering Salsipuedes Creek under either existing or proposed conditions after the weir has been raised each year (0 to 5.3 cfs) are much lower than the peak annual flows of Corralitos Creek upstream of the Salsipuedes Creek confluence (which ranged from 172 to 3,360 cfs between 2012 and 2017). Given the statistically significant reduction in discharge that occurs during periods when existing discharge is much lower than peak discharge, the Project would not substantially alter sedimentation patterns in Salsipuedes Creek.

Pajaro River

The modeled change in average monthly discharge would be within the existing range of variability of discharge in Lower Salsipuedes Creek and the Pajaro River during wetter months; the Project would reduce discharge to Lower Salsipuedes Creek and the Pajaro River during drier months, at relatively low flows (less than 50 cfs).

While the proportion of discharge from College Lake contributing to the Pajaro River is high in both current and proposed conditions, the flows in either case are lower than the calculated peak annual flows of Salsipuedes Creek upstream of the Pajaro River confluence (ranging from 70 to 1,360 cfs) and the Pajaro River (ranging from 180 to 9,450 cfs) during 2014 to 2017 and the changes would generally occur during the dry season.[84] The Project's reductions in flows are therefore unlikely to alter existing sedimentation and erosion patterns in the Pajaro River. The impact would be ***less than significant***.

> **Mitigation Measure HYD-2b. Scour Analysis For Pinto Creek Crossing** (refer to Impact HYD-2)

---

[82] cbec, Appendix A in *College Lake Integrated Resources Management Project Hydrologic and Hydraulic Modeling Technical Memorandum*, November 8, 2018.

[83] cbec, Appendix A in *College Lake Integrated Resources Management Project Hydrologic and Hydraulic Modeling Technical Memorandum*, November 8, 2018. It is also important to note that the Precipitation Runoff Modeling System hydrologic model, which was used to calculate College Lake inflows, generally over-predicted accumulated lake inflow volume, particularly in dry years. For WY 2014, this over-prediction was enough to cause the simulated lake stage to surpass the 60.1 foot weir crest, while observed lake stages did not reach the weir during WY 2014. The pumping rates applied in the water balance model to reconcile the simulated and observed stages were therefore similarly over-predicted, which led to an artificially high contribution of College Lake flows to the Pajaro River for 2014 under existing conditions.

[84] cbec, Appendix A in *College Lake Integrated Resources Management Project Hydrologic and Hydraulic Modeling Technical Memorandum*, November 8, 2018.

Impact HYD-5: The Project would not substantially increase the rate or amount of surface runoff, but would impede or redirect flood flows and alter the seasonality of surface runoff. (*Less than Significant with Mitigation*)

As discussed above in Section 3.3.1.4, flood hazards are present in and around College Lake, as well as along Corralitos Creek, Salsipuedes Creek, the Pajaro River, and Pajaro Dunes. As shown on Figures 3.3-7a through 3.3-7d, based on modeling, the Project may retain water in parts of the lake into September, depending on weather conditions and water demand, compared to current conditions.[85] By changing the seasonal patterns of water present within Salsipuedes Creek, the Project could also affect downstream water bodies, such as the Pajaro River and lagoon. If those changes were to increase WSE during flood events, or result in new inundation depths of greater than 0.1 foot on parcels not managed by PV Water as part of the Project (see Figure 2-18 in Chapter 2), the Project's impacts related to flooding would be significant.

Paulsen Road and College Lake

For purposes of flooding, College Lake functions as a basin (instead of a stream). The greater the volume of water in the basin when a storm occurs, the less capacity available to retain inflows into the basin; as a result, water begins to spill over the "top" of the basin – in this case, potentially flooding areas around College Lake that would not have been inundated during the same storm without the Project. Due to proposed weir operations, the weir crest would generally be at 60.1 feet NAVD88 during most potential flood events similar to existing conditions, and so the weir crest elevation would not substantially alter existing flood conditions around College Lake and at Paulsen Road. However, the footprint of the proposed weir and the WTP, if located at the optional site, would be within the one percent annual chance floodplain. The local effects of the Project on flooding at College Lake and Paulsen Road are driven by the location of these facilities, and are described below.

With Optional WTP Site

During the ten percent annual chance flood event, the Project would not change inundation depths or cause new inundation compared with existing conditions, as shown in **Table 3.3-8** and **Figures 3.3-10a**, **3.3-10b**, and **3.3-10c**.[86] Table 3.3-8 summarizes flood impacts for locations addressed in this analysis. Cumulative impacts shown in these figures and table are discussed in Impact HYD-6. During the one percent annual chance event with construction of the WTP at the optional site, increased WSE or new inundation would occur in one location, at the southern end of College Lake. Under this scenario, the Project would not alter inundation depths or extents by more than 0.1 foot along Casserly Creek and Paulsen Road.

Figures 3.3-11a and **3.3-11b** illustrate modeled changes to WSE along Corralitos/Salsipuedes Creeks and in the channel between College Lake and the Corralitos confluence, respectively. The depth of inundation increases by 0.1 foot near the proposed weir and the WTP with the Project. No new areas of inundation occur during the one percent annual chance event, as shown on **Figure 3.3-11c**.

85 It is possible that higher lake levels could persist into the fall. The analyses presented in this EIR are based on modeled results.

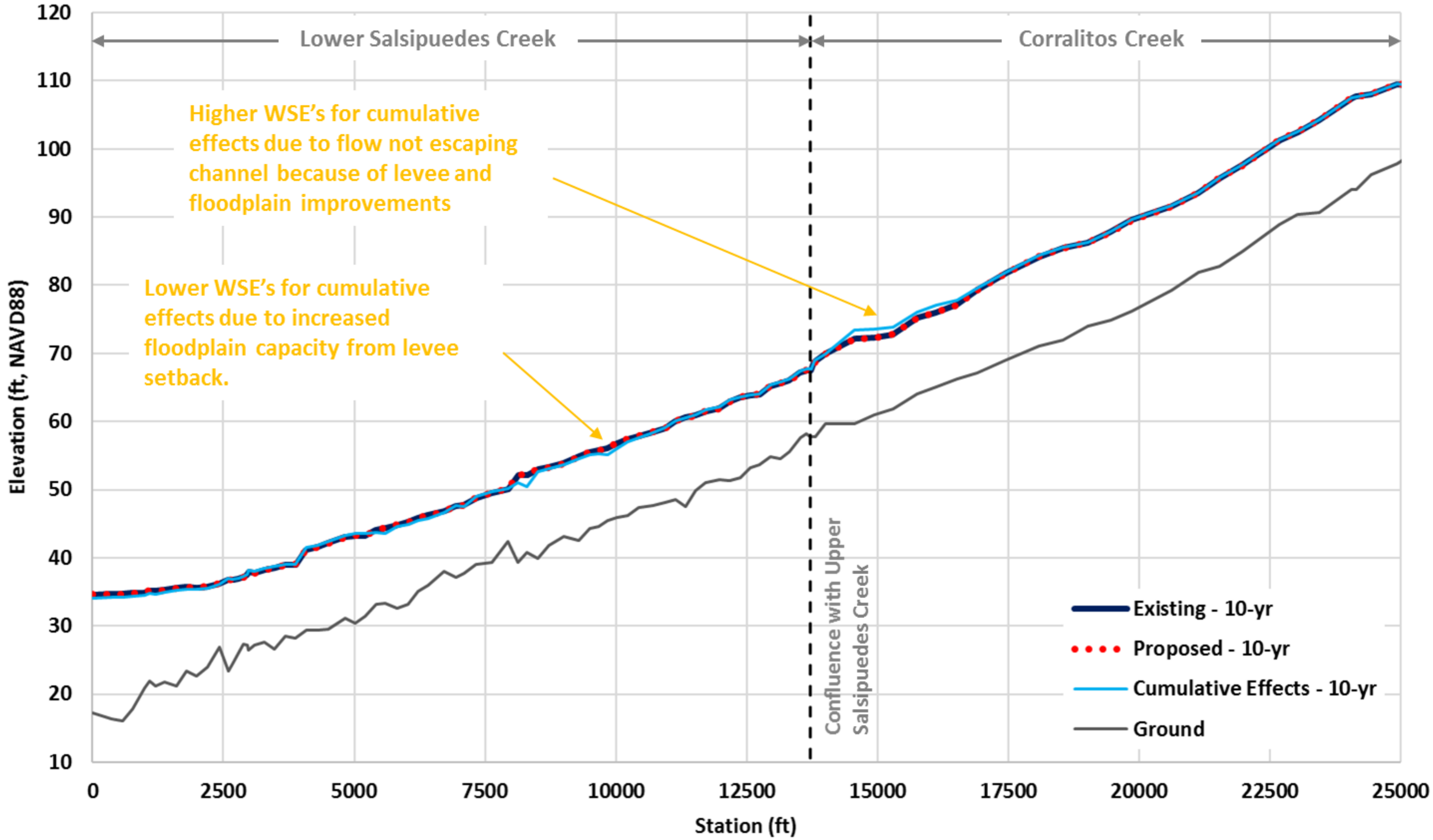
86 On Figures 3.3-10c and 3.3-11c, a threshold depth of 0.049 feet is used, such that depths that would round to 0.0 feet are not displayed.

TABLE 3.3-8
MAXIMUM WATER LEVEL (STAGE) DURING 10-YEAR AND 100-YEAR FLOOD EVENTS UNDER EXISTING, PROPOSED, AND CUMULATIVE CONDITIONS

	Maximum Stage (feet NAVD88) / Stage Difference if relevant (feet)[a]				
Event	**College Lake and Paulsen Road**	**Orchard Park**	**Salsipuedes Creek (downstream of confluence)**	**Corralitos Creek (upstream of confluence)**	**Pajaro Dunes**
Existing Conditions					
Ten Percent Annual Chance (10-Year)	70.6	70	68	68-80	--
One Percent Annual Chance (100-year)	73.4	73.4	71	71-81 (extending 0.5 mile upstream of confluence)	13-16 (from south to north along the beach)
Proposed Conditions[b]					
Ten Percent Annual Chance (10-Year)	70.6 / --	70 / --	68 / --	68-80 / --	--
One Percent Annual Chance (100-year)	73.4 / --	73.4 / --	71 / --	71-81 / --	13-16 (from south to north along the beach)
Cumulative Conditions[c]					
Ten Percent Annual Chance (10-Year)	70.7 / 0.1	68 / -2	68 / --	68-80 / --	--
One Percent Annual Chance (100-year)	73.6 / 0.2	72 / -1.4	71 / --	73-83 / 2	13-16 (from south to north along the beach)

NOTES:
a Proposed and cumulative conditions elevations are in-channel elevations. In the case of College Lake, Paulsen Road, and Orchard Park, these elevations are also projected floodplain elevations.
b Project with WTP at the optional WTP site. Implementation of the Project at the preferred WTP site would not affect WSE in College Lake during either the 10-year or 100-year flood events. Based on initial lake level of 61.0 feet.
c Cumulative impacts are discussed in Impact HYD-6

SOURCE: Appendix HYD.



Notes: WSE — water surface elevation.
10-yr — ten percent annual chance flood event.
Lower Salsipuedes Creek refers to the reach between Corralitos Creek and Pajaro River.
Upper Salsipuedes Creek refers to the the reach between College Lake and Corralitos Creek.

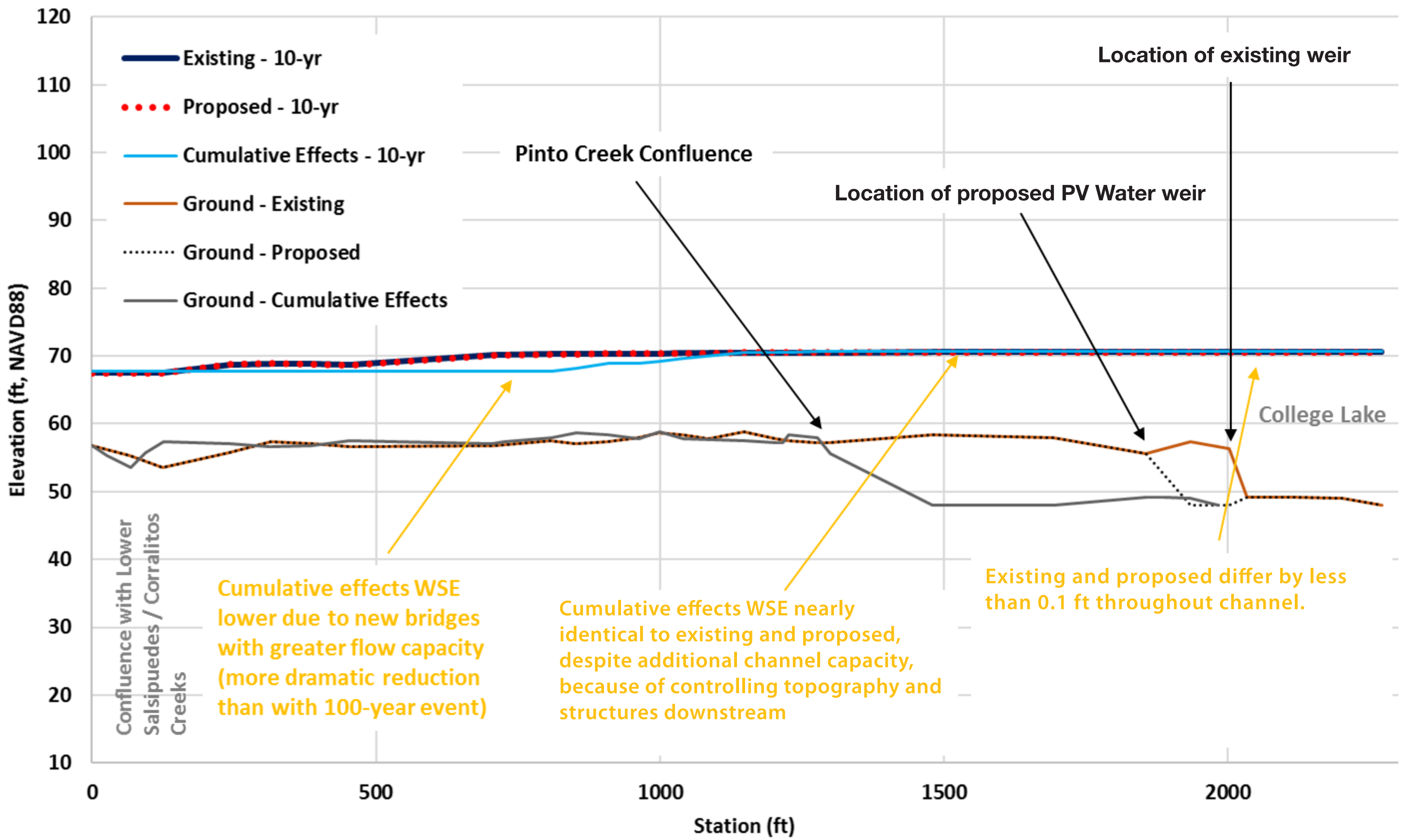
D160822

SOURCE: cbec, 2018

College Lake Integrated Resources Management Project

Figure 3.3-10a
Water Surface Elevation Profile in Corralitos and Salsipuedes Creeks During Ten Percent Annual Chance Flood Event: Existing, Proposed, and Cumulative Conditions

ESA



Notes: WSE — water surface elevation.
10-yr — ten percent annual chance flood event.
Lower Salsipuedes Creek refers to the reach between Corralitos Creek and Pajaro River.

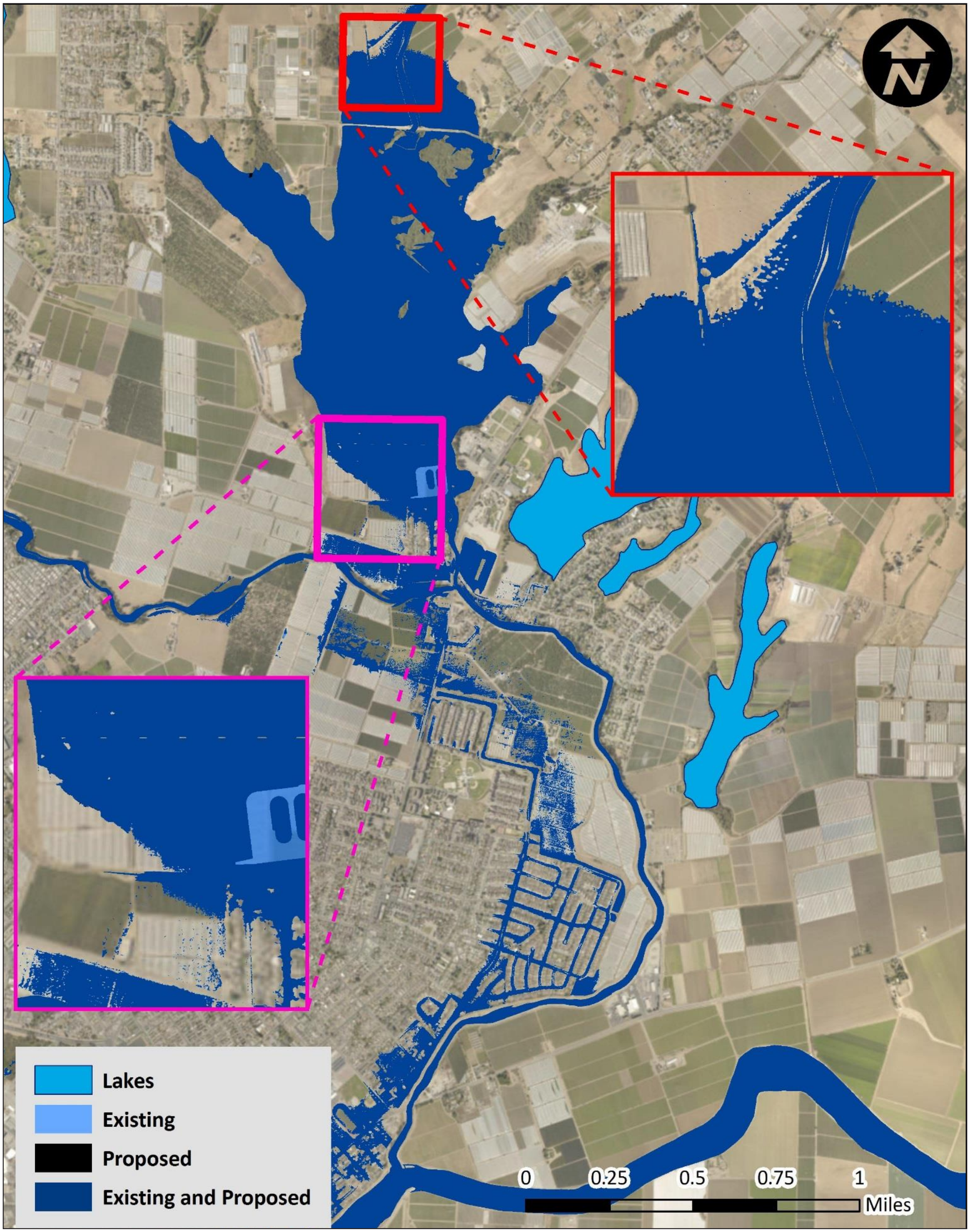
D160822

SOURCE: cbec, 2018

College Lake Integrated Resources Management Project

Figure 3.3-10b
Water Surface Elevation Profile From College Lake to Corralitos Creek During Ten Percent Annual Chance Flood Event: Existing, Proposed, and Cumulative Conditions

ESA

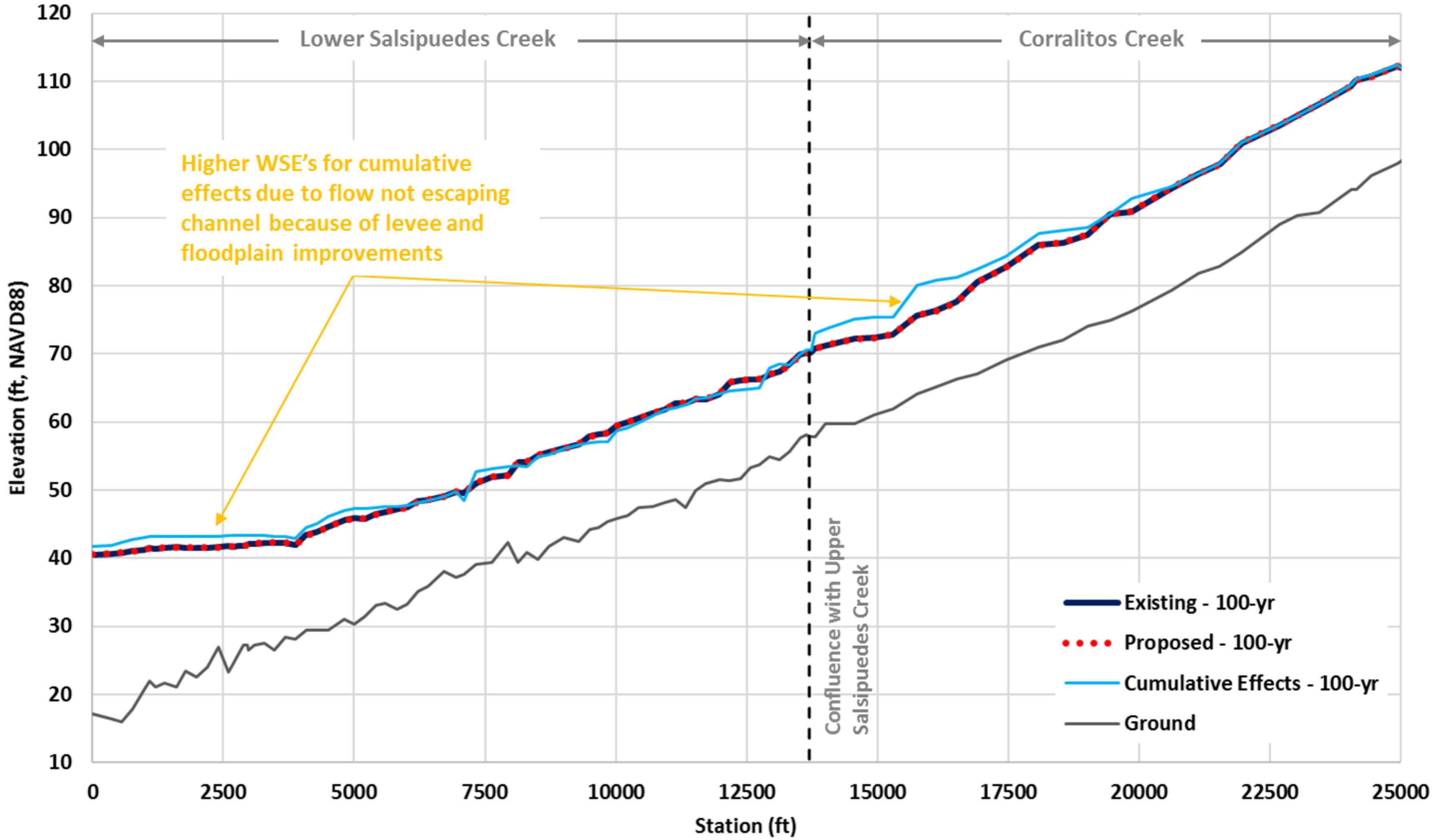


SOURCE: cbec, 2018
NOTE: In this figure, a threshold depth of 0.049 feet is used, such that depths that would round to 0.0 feet are not displayed.

ESA

College Lake Integrated Resources Management Project

Figure 3.3-10c
Ten Percent Annual Chance (10-year) Flood Event: Proposed and Existing Conditions



Notes: WSE — water surface elevation.
100-yr — one percent annual chance flood event.
Lower Salsipuedes Creek refers to the reach between Corralitos Creek and Pajaro River.
Upper Salsipuedes Creek refers to the the reach between College Lake and Corralitos Creek.

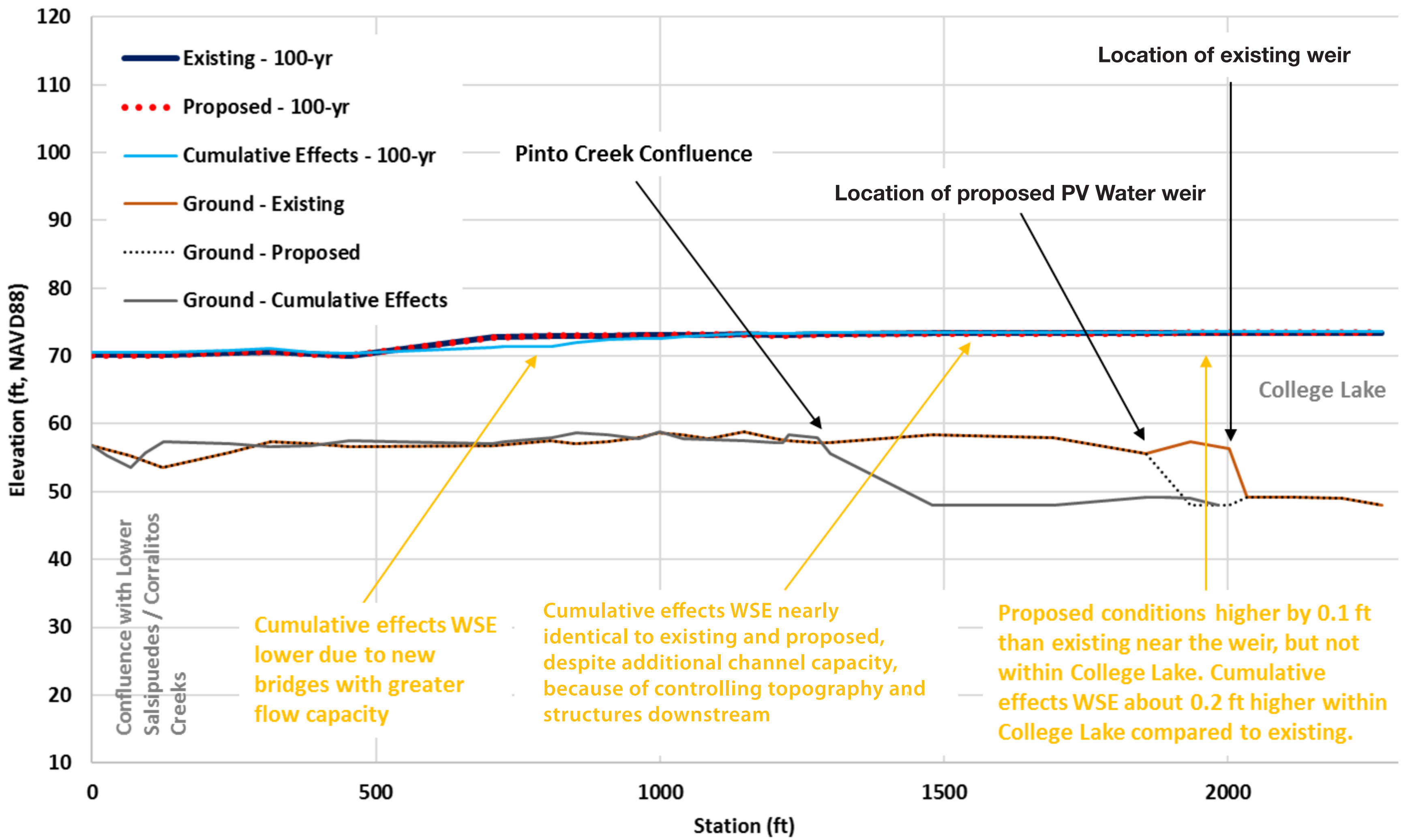
D160822

SOURCE: cbec, 2018

College Lake Integrated Resources Management Project

Figure 3.3-11a
Water Surface Elevation Profile in Corralitos and Salsipuedes Creeks During One Percent Annual Chance Flood Event: Existing, Proposed, and Cumulative Conditions

ESA



Notes: WSE — water surface elevation.
100-yr — ten percent annual chance flood event.
Lower Salsipuedes Creek refers to the reach between Corralitos Creek and Pajaro River.
Upper Salsipuedes Creek refers to the the reach between College Lake and Corralitos Creek.

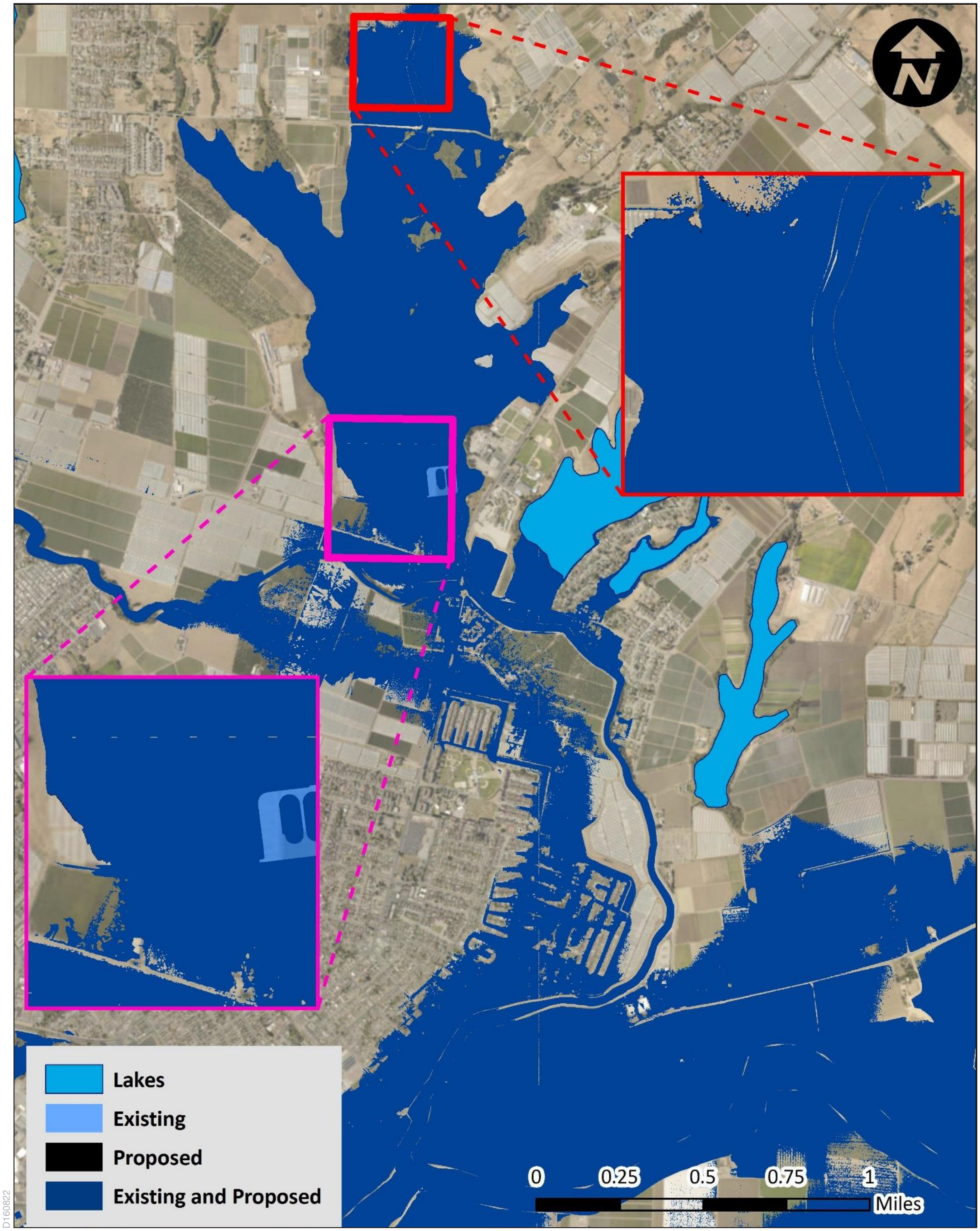
D160822

SOURCE: cbec, 2018

College Lake Integrated Resources Management Project

Figure 3.3-11b
Water Surface Elevation Profile From College Lake to Corralitos Creek During One Percent Annual Chance Flood Event: Existing, Proposed, and Cumulative Conditions

ESA



SOURCE: cbec, 2018
NOTE: In this figure, a threshold depth of 0.049 feet is used, such that depths that would round to 0.0 feet are not displayed.

ESA

College Lake Integrated Resources Management Project

Figure 3.3-11c
One Percent Annual Chance (100-year) Flood Event: Proposed and Existing Conditions

The proposed weir and the WTP at the optional site would be installed in the 100-year flood hazard zone. The WTP at the optional site would be floodproofed in compliance with National Flood Insurance Program requirements, but could redirect flood flows in the area, affecting on- and offsite flood inundation patterns. Hydraulic modeling comparing the two WTP sites indicated that the optional WTP site did not alter flood impacts compared to locating the plant outside of the floodplain for the 10-year and 50-year events. However, for the 100-year event, locating the WTP at the optional site caused an increase in WSE within College Lake of roughly 0.2 feet compared with the preferred WTP site location which is outside the 100-year floodplain, as further discussed below.[87] The results indicate that the optional WTP site is a primary driver for the Project-related flood impacts observed in the 100-year event. That is, the Project changes inundation patterns because the optional WTP site impedes the one percent annual chance floodplain.

There are no existing structures within the area affected by the Project that would not be removed as part of Project construction. While the Project would displace some flood waters, it would not exacerbate exposure of people or structures to loss, injury, or death due to flooding because the Project would not increase inundation depths or extents in residences or at existing structures.

With Preferred WTP Site

The WTP at the preferred site would not be built in the one percent annual chance flood hazard area.. The Project with the preferred WTP site therefore would not alter inundation depths or extents during the one percent or ten percent annual chance events within College Lake. Implementation of the Project with the preferred WTP site also would not alter inundation depths or extents by more than 0.1 foot along Casserly Creek and Paulsen Road.

Orchard Park, Salsipuedes Creek, and Corralitos Creek

Along Salsipuedes Creek between the proposed weir and the Corralitos Creek confluence, inundation depths during the ten percent annual chance event under proposed conditions would increase by less than 0.1 foot throughout the reach. During the one percent annual chance flood event, the Project would not change WSE or storage areas south of the Pinto Creek confluence.

Pajaro Lagoon and Pajaro Dunes

Conditions Without College Lake Pumped Flows

With the Project, during April, proposed minimum flows in Salsipuedes Creek for fish passage are 1.0 cfs.[88] The discharge in Salsipuedes Creek would therefore be lower than under current conditions. In addition, a portion of flows from the last storm of the season would be diverted instead of flowing downstream; without these flows to keep the lagoon open, the mouth of the lagoon may close earlier in the year. Figure 3.3-8 compares the modeled percent of time the lagoon mouth is closed and the water level exceedances for Project conditions with existing modeled conditions. Water level exceedance indicates the percent of time the WSE in Pajaro Lagoon exceeds a given elevation.

87 Neither of these conditions were compared to existing conditions as part of the modeling effort.
88 Provided water surface elevation in College Lake is higher than the “natural level for passage” of 59 feet NAVD88.

The effects of the Project on Pajaro Lagoon depend heavily on the relative annual wetness of conditions. Differences in closure timing and water levels were negligible in the 2016 and 2017 modeled water years. Differences were noticeable in both conditions in the 2014 and 2015 water years. In modeled spring 2015, reduced flows to the lagoon during the last rainstorm of the year as a result of the Project allowed waves to close the lagoon by about 5 to 6 weeks earlier than is typical. In 2014, seasonal closure occurred at roughly the same time for existing and Project conditions, which is likely due to the fact that wave conditions were conducive to mouth closure at that time, regardless of inflows.

The Project did not result in delays in seasonal breach events, since inflows during the first major rainfall event of each year were sufficient to fill and breach the lagoon regardless of prior College Lake releases.

Seasonal water levels in the lagoon tended to be similar to or lower than existing conditions for all modeled water years. Water level predictions are sensitive to the assumed amount of agricultural return flows entering the lagoon, which prevented inflows to the lagoon from dropping to zero in summer. The probability that water levels in the lagoon exceed 6 feet NAVD88 declined from about 50 percent of the time during the year to about 20 percent of the time during the year with the Project.

The predicted increase in expected closure days in April and May is a result of the earlier closure in the spring 2015 water year. Given the small sample size, it is unclear how relevant this result is. While the predicted change is within the expected uncertainty of model predictions for number of closure days per month (10 to 20 percent), it may be possible that during especially dry years, lower inflows could allow waves to close the mouth earlier in the year. With a greater range of years, the threshold for dryness that would influence this shift would become clearer. It is possible that most years would not experience this shift.

While the Project could hasten the closure of the lagoon mouth in spring, a condition during which the possibility of flooding at Pajaro Dunes could increase, by reducing the discharge flowing to the lagoon the Project would result in lower lagoon WSE, reducing the likelihood of flooding at Pajaro Dunes. Consequently, the Project would not adversely affect flood conditions at Pajaro Dunes during conditions without College Lake pumped flows.

Conditions with Pumped Flows

While the Project would generally operate as described above, and would not contribute discharge to Salsipuedes Creek during late summer and fall, PV Water may occasionally pump water out of College Lake during the summer or fall. The pumping rate is assumed to be the same as the proposed water treatment processing rate (a production rate of 9,000 gallons per minute or 20 cfs).

While this discharge is lower than the maximum rate of discharge under existing conditions, if pumped flows occur when the WSE is sufficiently elevated in Pajaro Lagoon, it could result in new flooding at Pajaro Dunes. To avoid this potential impact, PV Water would implement **Mitigation Measure HYD-3** would reduce this impact to less than significant.

Impact Conclusion

Implementation of the Project is not expected to substantially increase the rate or amount of, or adversely alter, flood flows with the possible exception of pumped flows. Implementation of Mitigation Measure HYD-3 would ensure that pumped flows do not result in new flood hazards or require mechanical lagoon breaching.

Mitigation Measure HYD-3: Avoid Flooding at Pajaro Dunes During Pumped Flow Events

PV Water shall not pump flow exceeding fish passage requirements into Salsipuedes Creek until receiving approval from the Santa Cruz County Flood Control District indicating that pumped flow can occur without lagoon breaching, based on current water surface elevation conditions in Pajaro Lagoon. The threshold water surface elevations described in the Santa Cruz County Flood Control District current lagoon breaching permits from the U.S. Army Corps of Engineers, the Central Coast Regional Water Quality Control Board, and the California Department of Fish and Wildlife will be used to assess whether pumped flows would require lagoon breaching. PV Water pumped flows shall not result in lagoon water surface elevations exceeding the threshold elevation identified in the lagoon breaching permits.

Impact HYD-6: The Project could conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan. (*Less than Significant with Mitigation*)

Section 3.3.2.1 describes the 2017 Basin Plan. As discussed in Impact HYD-1, PV Water would require all contractors to apply for and obtain all NPDES permits and comply with conditions of the permit(s) as required by the Central Coast RWQCB, pursuant to adopted Mitigation Measure HWQ-1, including the Construction General Permit. Implementation of Mitigation Measure BR-1b would reduce the water quality impacts of inadvertent frac-out during construction of the College Lake pipeline at Corralitos Creek, and implementation of Mitigation Measure HYD-1 would reduce water quality impacts associated with construction in Pinto Creek associated with the College Lake pipeline. Operations of the project would be required to comply with applicable federal and state water quality regulations, such as the federal Clean Water Act and the state Porter-Cologne Water Quality Control Act, which establish beneficial uses of surface and ground waters, and water quality standards and objectives for waters of the state that are protective of water quality whenpumping flows from College Lake to Salsipuedes Creek during the dry season, and would implement Mitigation Measure HYD-2a to avoid development of Cyanobacteria blooms in College Lake. Implementation of Mitigation Measure HYD-2b would avoid potential erosion or scour associated with the College Lake pipeline. The Project therefore would not conflict with or obstruct implementation of the water quality control plan.

PV Water elected to become the exclusive groundwater sustainability agency for the Pajaro Valley Groundwater Basin under the SGMA in 2015. With adoption of its first Basin Management Plan in 1994, PV Water has been implementing projects and programs designed to reduce overdraft, halt seawater intrusion, and improve and protect water quality within the Pajaro Valley Groundwater Basin for over 20 years. The Project is one of the potential projects included in the most recent, updated Basin Management Plan (discussed in greater detail in Section 2.1.2.2) which would help meet the goals of stopping seawater intrusion and basin overdraft. Implementation of the Project would reduce overdraft conditions and seawater intrusion in the Pajaro Valley Groundwater Basin. Impacts on sustainable groundwater management would be beneficial, and the project would not conflict with implementation of a sustainable groundwater management plan.

Mitigation Measure BR-1b: Frac-out Contingency Plan (refer to Section 3.4, Biological Resources)

Mitigation Measure HYD-1: Implement Dewatering Best Management Practices for In-Water Construction (refer to Impact HYD-1)

Mitigation Measure HYD-2a: Water Quality Adaptive Management for College Lake (refer to Impact HYD-2)

Mitigation Measure HYD-2b: Scour Analysis for Pinto Creek Crossing (refer to Impact HYD-2)

Cumulative Impacts

Impact C-HYD-1: The Project, in combination with past, present, and probable future projects in the Project area, would not result in significant adverse cumulative hydrology impacts. (*Less than Significant*)

Hydrology impacts of the Project are related to seasonal shallow groundwater levels, sedimentation and erosion patterns in Salsipuedes Creek, and flooding in College Lake. The geographic scope of cumulative impacts on shallow groundwater includes College Lake. The geographic scope of cumulative impacts related to scour, changes in discharge, and flooding includes projects in or affecting discharge to Salsipuedes Creek, the Pajaro River, and Pajaro Lagoon.

Cumulative projects considered in as part of the cumulative scenario for this analysis include those listed in Table 3.1-1 (in Section 3.1, Overview) that could alter hydrology, including other Basin Management Plan projects proposed by PV Water and the USACE project. Other BMP projects include the Harkins Slough Recharge Facilities Upgrades Project, Watsonville Slough with Recharge Basins Project, and Murphy Crossing with Recharge Basins Project. [89] While multiple BMP projects are proposed to divert surface water for groundwater storage, only the College Lake Project would divert water from or recharge water to the Salsipuedes Creek watershed.

Groundwater

No other projects in the cumulative scenario would affect shallow groundwater in College Lake, nor would any projects in the cumulative scenario reduce discharge within Salsipuedes Creek. There would be ***no adverse significant cumulative impact*** on groundwater as a result of the

89 The Murphy Crossing with Recharge Basins Project is not a Basin Management Plan Phase 1 project.

Project and other projects in the cumulative scenario. Overall, the cumulative projects would benefit the long-term sustainability of the groundwater basin.

Sedimentation and Erosion

The USACE project would alter patterns of discharge in Salsipuedes Creek and Pajaro River by installing flood control or reduction infrastructure. The USACE project (shown on Figure 3.1-1) would construct new levees along Corralitos Creek, set back from the existing natural streambanks. The USACE project would also replace existing levees with setback levees along Salsipuedes Creek. Setback levees would expand the meander belt for the streams and widen the waterway cross sections, resulting in reduced risk of levee erosion and increased deposition of sediments carried in floodwaters. There would be ***no adverse significant cumulative impacts*** related to sedimentation or erosion to which the Project would contribute.

Discharge and Flooding

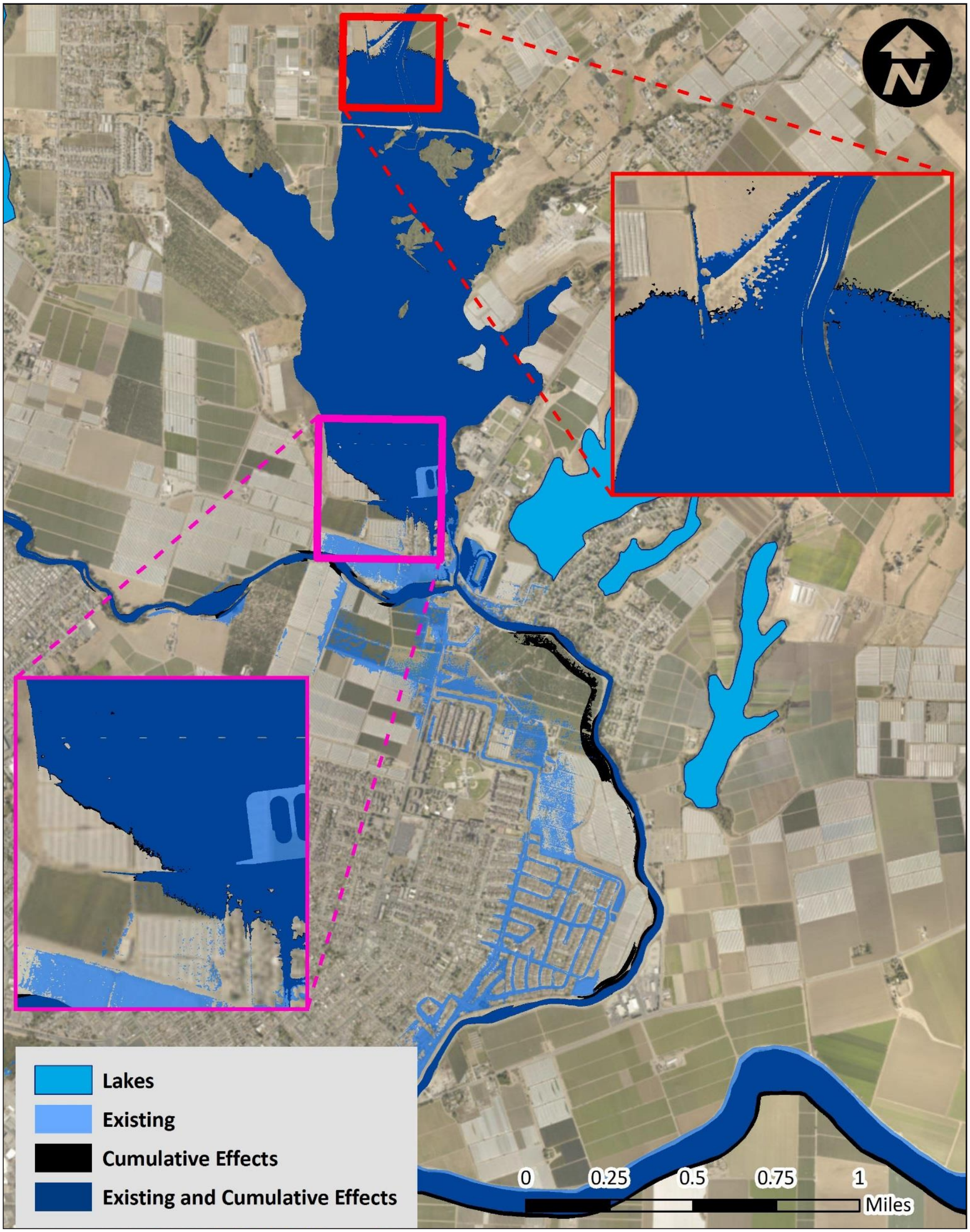
Other cumulative projects would alter patterns of discharge by installing flood control or reduction infrastructure, such as the components of the USACE project along Pajaro River, Salsipuedes Creek, and Corralitos Creek.[90] Section 3.3.3.2 includes a description of cumulative conditions modeling. The Project in combination with other cumulative flood projects planned for Corralitos and Salsipuedes Creeks could substantially alter flooding patterns in the area, a potentially significant cumulative impact. **Figures 3.3-12a** and **3.3-12b** show the changes in flood inundation during the ten percent annual chance and one percent annual chance flood events in the cumulative scenario. WSE profiles for cumulative conditions are shown on Figures 3.3-10a, 3.3-10b, 3.3-11a, and 3.3-11b. While the cumulative impact would be significant, the Project's contribution to this impact would ***not be cumulatively considerable*** for reasons discussed below.

Paulsen Road, College Lake, and Orchard Park

In the cumulative scenario, new inundated areas occur at the northern and southwestern borders of College Lake during the ten percent annual chance flood event, as shown on Figure 3.3-12a. The stage difference between cumulative effects and existing conditions scenarios within College Lake and in the areas immediately downstream were 0.1 feet and 0.2 feet for the 10-year and 100-year events, respectively. This change is primarily caused by the USACE project. While the State Route 152 and College-Holohan Road bridges in the USACE project allow for lower water surface elevations in much of Salsipuedes Creek under cumulative effects conditions, the Orchard Park area becomes inundated from the northern side, along Pinto Creek, which can occur either due to reverse flows from Corralitos Creek or due to College Lake flooding.[91] Unlike under existing and proposed conditions, flood waters do not enter Orchard Park from the river-left bank of Corralitos Creek, upstream of the Salsipuedes Creek confluence, because the USACE project

[90] While flood modeling for the cumulative scenario did not incorporate the surface water diversion projects, these projects would divert water during the wet season, and so would lower the overall discharge to Pajaro River during wet periods (such as floods). For this reason, excluding the diversion projects from the flooding evaluation results in a conservative assumption regarding the magnitude of flood impacts.

[91] Based on detailed investigation of particle tracking animations and 1-D/2-D lateral structure connection outputs (cbec, *College Lake Integrated Resources Management Project Hydrologic and Hydraulic Modeling Technical Memorandum*, November 8, 2018).



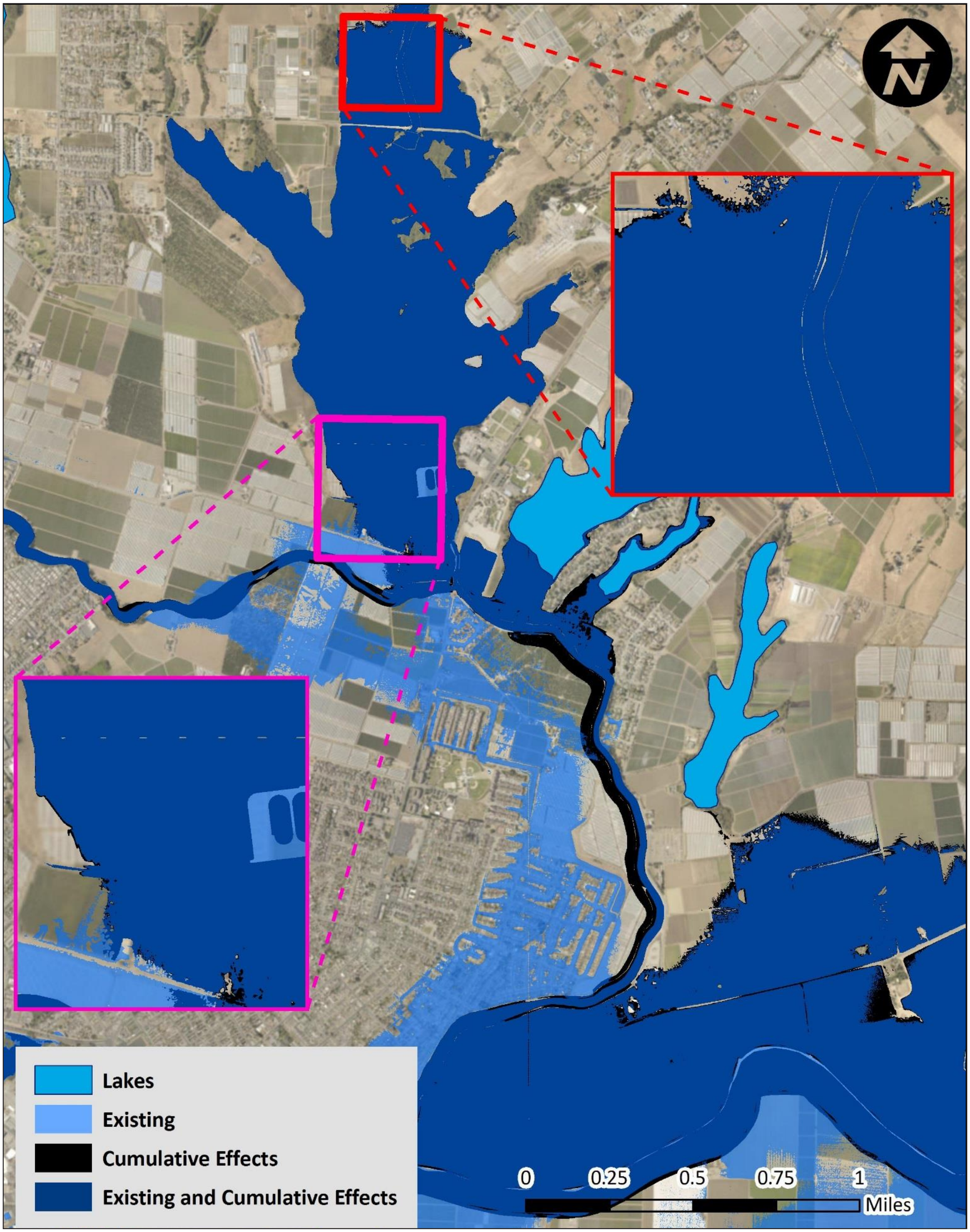
D160822

SOURCE: cbec, 2018
NOTE: In this figure, a threshold depth of 0.049 feet is used, such that depths that would round to 0.0 feet are not displayed.

College Lake Integrated Resources Management Project

Figure 3.3-12a
Ten Percent Annual Chance (10-year) Flood Event: Cumulative and Existing Conditions

ESA



SOURCE: cbec, 2018
NOTE: In this figure, a threshold depth of 0.049 feet is used, such that depths that would round to 0.0 feet are not displayed.

ESA

College Lake Integrated Resources Management Project

Figure 3.3-12b
One Percent Annual Chance (100-year) Flood Event: Cumulative and Existing Conditions

includes levee improvements along Corralitos Creek as well as along the portion of Salsipuedes Creek upstream of the Corralitos Creek confluence. The flood waters that enter Orchard Park from the north become trapped by the improved levees as they flow south toward Corralitos Creek and must ultimately flow back north to escape into Salsipuedes Creek via Pinto Creek. This accumulation of water within Orchard Park as a result of the improved levees creates a backwater effect into College Lake that persists despite improved channel capacity in Salsipuedes Creek.

Salsipuedes Creek and Corralitos Creek

In the cumulative scenario, WSEs are higher in some locations and lower in other locations along Corralitos and Lower Salsipuedes Creeks. Near Orchard Park, WSEs are lower than existing conditions due to upgraded bridge crossings for State Route 152 and Holohan Road (as part of the USACE project). In other locations, where WSEs in the channels increase, the increased WSEs in the channels are due to the downstream USACE project improvements, which result in more water remaining in the channel during flood events, and less water spilling onto the floodplain. In the cumulative scenario, while the WSEs would increase in Salsipuedes Creek channel, flooding outside of the channel would be reduced due to the presence of more effective levees along the creek.

Pajaro Lagoon

Flood control and water supply projects throughout the Pajaro River watershed could affect water levels in the Pajaro Lagoon. Modeling of cumulative conditions created resulted in similar outcomes as with-Project conditions. Characteristics of the cumulative projects contribute to this result. First, the flow bypass requirements anticipated for the proposed Murphy Crossing project would counteract the reduction in flows for water supply diversion. Second, the Harkins and Watsonville Slough projects, conservatively assumed to divert nearly all water available for water supply, contributes a relatively small proportion of wet season discharge to Pajaro Lagoon.

Climate Change

In 2018, the State of California published the Fourth Climate Change Assessment, which includes of a wide-ranging body of technical reports, including rigorous, comprehensive climate change scenarios at a scale suitable for illuminating regional vulnerabilities and localized adaptation strategies in California.[92] The Fourth Climate Change Assessment also includes recommendations and information to directly inform vulnerability assessments and adaptation strategies for, among others, water resources management. As discussed in the technical report for the Central Coast, climate changes that will affect the Central Coast include:

- Maximum and minimum temperatures will increase through the next century.
- Average precipitation is expected to increase slightly, but annual precipitation variability will increase substantially.
- Atmospheric rivers, which are the dominant drivers of locally-extreme rainfall events, are expected to increase.

[92] Langridge, Ruth. (University of California, Santa Cruz). Central Coast Summary Report. California's Fourth Climate Change Assessment. Publication number: SUM-CCCA4-2018-006, 2018.

- The wettest day of the year will become wetter relative to historical conditions.
- Water shortages during droughts may be exacerbated.

Modeling conducted for the College Lake Project incorporated a range of previous water year types to assess potential impacts over a range of hydrologic conditions; however, current 10- and 100-year design storms may not remain applicable over decadal or longer timescales. The Project would not alter elevation of the weir until after large storm events, and includes multiple features that result in operational flexibility to accommodate the variable climate conditions anticipated in the future.

At Pajaro Lagoon, inland migration of the beach in response to sea level rise would result in an increase in overall volume of the lagoon at times. The amount of increase in water storage in the lagoon will depend on several factors, including (1) the likelihood that agriculture fields would raise existing levees to continue to contain floodwaters in the lagoon, (2) the ability of sedimentation to partially offset some of the expected sea-level rise, and (3) the need to continue to breach the lagoon mouth at certain elevations to prevent flooding of existing properties. If, despite these factors, the volume of water stored in the lagoon increases, the net impact of the projects in the cumulative scenario could potentially decrease, since the alterations to inflows would represent a smaller fraction of the total lagoon volume.[93]

In summary, with climate change, the Project would not result in additional or more severe significant adverse impacts beyond those identified in this section. The Project's contributions to factors causing climate change are evaluated in Section 3.5, Air Quality and Greenhouse Gas Emissions.

Mitigation: None required.

Impact C-HYD-2: The Project, in combination with past, present, and probable future projects in the Project area, would not result in significant adverse cumulative water quality impacts. (*Less than Significant*)

Water quality impacts of the Project are related to the release of pollutants into stormwater during construction, changes in the duration of stable water conditions within College Lake and the Pajaro Lagoon, and changes in land use resulting from Project implementation. The geographic scope for cumulative water quality impacts on College Lake, Salsipuedes Creek, and Pajaro Lagoon includes projects within the Salsipuedes Creek and Pajaro River watersheds.

As discussed in Impact HYD-1, compliance with applicable regulatory requirements designed to reduce the cumulative effects of development on water quality (such as the State Water Resources Control Board Construction General Permit) would ensure that the Project would not result in any

[93] Further modeling would be required to understand the likelihood of this outcome, especially since future precipitation and runoff conditions could also change, which would also impact the amount of water delivered to the lagoon, with or without the Project.

significant water quality impacts as a result of construction-related discharges and operational stormwater and treated water discharges.

In the Pajaro Lagoon, with implementation of the BMP projects that would alter discharge in Pajaro River and Watsonville/Harkins Sloughs, the cumulative effect on the duration of stable water conditions within the lagoon would be very similar to the estimated with-Project lagoon conditions. This occurs for two reasons. First, fish bypass requirements anticipated for the Murphy Crossing project reduce the effects of that project on lagoon conditions. Second, the Watsonville/Harkins Sloughs contribute a relatively small portion of the total discharge to Pajaro Lagoon. As a result, the modeled cumulative conditions closely mirror with-Project conditions in Pajaro Lagoon, which would be ***less than significant***.

As discussed in Section 3.3.1.4, owners and operators of irrigated lands in the Pajaro River watershed are not currently meeting pollutant load allocations for nitrogen compounds and orthophosphate; however, TMDLs have been approved for these pollutants in the Pajaro River watershed and an implementation plan is in place, with a target of compliance within 25 years of the TMDLs' effective date (July 12, 2016). Interim targets have been set for 2026 and 2031. Progress on the adopted TMDLs for nitrogen compounds and orthophosphate would reduce the nutrient loading of College Lake over time. While the Project would contribute to this reduction by reducing the area of irrigated land within the College Lake basin, it also could result in additional release of nutrients from the lake sediments and consequent cyanobacteria blooms in College Lake. Release of this water into Salsipuedes Creek could contribute to cumulative water quality impacts in the Pajaro River watershed. While the cumulative impact would be significant, the Project's contribution to this impact would ***not be cumulatively considerable*** with implementation of Mitigation Measure HYD-2a.

Mitigation: None required.

3.4 Biological Resources

This section presents an analysis of potential impacts related to biological resources that would result from implementation of the proposed College Lake Integrated Resources Management Project (Project). The analysis includes siting options for both site options (preferred and optional) for the water treatment plant (WTP) as well as preferred and optional pipeline alignments for the College Lake pipeline. Information from the 2014 Basin Management Plan Update Program Environmental Impact Report (2014 BMP Update PEIR) that remains relevant and accurate for the purposes of describing the physical or regulatory setting of biological resources has been incorporated as appropriate. The Project includes mitigation measures adopted by the Board of Directors and several additional measures to reduce the severity and magnitude of potential environmental effects.

3.4.1 Setting

The 2014 BMP Update PEIR Section 3.4.1 describes existing biological resources in the Project region. Regional environmental setting information from the 2014 BMP Update PEIR is included below when relevant. Additional setting information based on database searches and surveys is provided below.

3.4.1.1 Definitions and Literature Review

The following terms are used throughout this section:

- For the assessment of biological resources, the "Project area" is defined as the area supporting any Project component (see Chapter 2, *Project Description*), including some areas assumed to be affected by construction or operations. The Project area includes the College Lake basin up to 70 feet North American Vertical Datum of 1988 (NAVD88), the proposed weir structure and intake pump station sites, the WTP sites (preferred and optional), the College Lake pipeline alignments (preferred and optional), and construction access and staging areas.
- The "biological resources study area" or "study area" includes a larger area within which potential effects on biological resources were studied for this evaluation. The study area includes the Project area as well as aquatic habitat within Salsipuedes Creek, the Pajaro River, and the Pajaro River Lagoon downstream of College Lake. **Figure 3.4-1** shows the study area for biological resources.
- The term "special-status biological resources" is defined as plant, wildlife, or fish species, or natural communities that have some rarity, endangerment, or protection status conferred by state, federal, or local laws, regulations or policies (see Section 3.4.2, Regulatory Framework).

The following resources were used in the analysis of the Project:

- California Department of Fish and Wildlife's (CDFW) California Natural Diversity Database (CNDDB). CNDDB reports occurrences of special-status species using United States Geological Survey (USGS) 7.5-minute topographic quadrangles. The study area is located in the following USGS 7.5-minute quadrangles: Watsonville West, Watsonville East,

SOURCE: Esri, 2015; Carollo Engineers, 2017; ESA, 2018

College Lake Integrated Resources Management Project

Figure 3.4-1
Biological Resources Study Area

ESA

Soquel, Chittenden, Moss Landing, Prunedale, San Juan Bautista, Loma Prieta, Mt. Madonna, and Gilroy.[1]

- California Native Plant Society, Rare Plant Program Inventory of Rare and Endangered Plants of California (online edition, v8-03 0.45). The database search included the Watsonville West, Watsonville East, Soquel, Chittenden, Moss Landing, Prunedale, San Juan Bautista, Loma Prieta, Mt. Madonna, and Gilroy quadrangles.[2]
- Information documented in prior environmental impact reports (EIRs) prepared by Pajaro Valley Water Management Agency (PV Water), including the 2014 BMP Update PEIR.
- The United States Fish and Wildlife Service (USFWS) National Wetlands Inventory maps were reviewed for mapped wetland features in or near the Project area.[3]

Based on the review of these information sources, a table was compiled of the special-status biological resources with potential to occur within the study area (**Table BIO-1** in **Appendix BIO**).

3.4.1.2 Surveys

Results from the following surveys and assessments were used in the analysis of the Project:

- On March 7, 2018, biologists with Environmental Science Associates (ESA) and Kittleson Environmental Consulting (KEC) performed a reconnaissance-level survey of the Project area to document site conditions and assess the potential for special-status biological resources to occur in and around the Project area.
- Aerial photographs and assessments from the 2014 BMP Update PEIR were used for descriptions of aquatic habitat within Salsipuedes Creek, the Pajaro River, and the Pajaro River Lagoon.
- Since 2001, KEC and collaborators have conducted numerous fish and wildlife field studies in the Pajaro River Flood Control Channel, Corralitos Creek/Salsipuedes Creek corridor, lower College Lake within the United States Army Corps of Engineers (USACE) flood control planning area downstream of the existing weir, and the Watsonville Slough system. Wildlife surveys conducted for Watsonville Sloughs Watershed Conservation & Enhancement Plan (2003), the Land Trust of Santa Cruz County-Watsonville Slough Farm (2009-2013), and the recently completed Caltrans Salinas Road interchange project have resulted in a substantial increase in data on California red-legged frog (*Rana draytonii*; CRF) and western pond turtle (*Actinemys marmorata*; WPT) populations and distribution in the lower Pajaro Valley.
- During summer and fall 2018, KEC conducted focused wildlife surveys on Salsipuedes Creek and the Pajaro River for USACE storm damage repairs and Zone 7 flood control clearing

[1] California Department of Fish and Wildlife (CDFW), California Natural Diversity Database (CNDDB), 2018. Available online at https://map.dfg.ca.gov/rarefind/view/RareFind.aspx. Accessed on October 4, 2018.

[2] California Native Plant Society (CNPS), Rare Plant Program, Inventory of Rare and Endangered Plants of California (online edition, v8-03 0.45), 2018. Available online at www.rareplants.cnps.org. Accessed on October 4, 2018.

[3] United States Fish and Wildlife Service (USFWS), National Wetlands Inventory Mapper, 2018. Available online at www.fws.gov/wetlands/data/mapper.html. Accessed on October 4, 2018.

from Murphy Road Crossing[4] to the State Route (SR) 1 bridge.[5] Surveys considered the potential presence of CRF, WPT, and San Francisco dusky-footed woodrat in the Salsipuedes Creek corridor and in mainstem Pajaro River, within the levees, and areas upstream (east) of SR 1.

- PV Water has funded five years of annual winter-spring waterfowl surveys at College Lake since approval of the 2014 BMP Update PEIR. Detailed waterfowl surveys by KEC and Bryan Mori Biological Consulting Services began in January 2014 and continued through 2018.
- An aquatic resources delineation was conducted within the Project area by ESA biologists on March 27 and 28, 2018.[6]
- In 2017 and 2018, consultants to PV Water conducted a Critical Riffle Analysis to assess fish passage requirements downstream of College Lake.[7]

3.4.1.3 Regional Setting[8]

Pajaro Valley

Historically, the Pajaro Valley supported a variety of vegetation communities, including extensive riparian forests along waterways, oak savanna intermixed with grasslands in the lowland areas, mixed hardwood forests on hillsides, coastal dunes near the ocean, and coastal scrub on rocky sites. Although remnants of these habitats can be seen in isolated patches, much of the Pajaro Valley is now in agriculture. The Pajaro River Valley is an agricultural area drained by the Pajaro River and two of its major tributaries, Salsipuedes Creek and Corralitos Creek, as well as by Watsonville Slough and Harkins Slough. Portions of these watercourses are bounded by levees to control periodic winter flooding. Smaller drainages also are found in the immediate vicinity of the Pacific Ocean. Figure 3.4-1 shows College Lake and surrounding drainages.

For a general description of the Pajaro River watershed and regional hydrology as well as general climate characteristics, please refer to Section 3.3.1.1 in Section 3.3, Surface Water, Groundwater, and Water Quality.

Rivers and Creeks

The lowest reach of the Pajaro River extends 2.4 miles from the mouth of the river, at the Pajaro Lagoon, to the Thurwacher Road Bridge west of SR 1. This reach is bounded by levees on the Santa Cruz County side and a mix of levees and coastal bluffs on the Monterey County side and has a U-shaped channel with steep earthen banks. Riparian plants growing here are tolerant of brackish water conditions. As the river extends upstream to its confluence with Salsipuedes Creek, it has a wider channel, with areas of densely vegetated river terraces and grassy levee slopes. Areas of dense willows and cottonwood trees grow on the terraces. Salsipuedes Creek enters the Pajaro River in the City of Watsonville. From this creek confluence upstream to

---

4 Murphy Road Crossing is located on the Pajaro River, approximately 4.5 miles southeast of College Lake, and approximately 5.0 river miles upstream of the Salsipuedes Creek confluence.

5 G. Kittleson, personal observation. Annual report in preparation.

6 Environmental Science Associates (ESA), *College Lake Integrated Resources Management Project Aquatic Resources Delineation Report*. Prepared for Pajaro Valley Water Management Agency, April 2019.

7 Podlech, M., *College Lake Integrated Resource Management Project, Fish Passage Assessment*, March 2019.

8 Information in this section is derived from Duffy & Associates, Inc., *Draft Environmental Impact Report for the Basin Management Plan Update*, prepared for Pajaro Valley Water Management Agency, October 2013.

Murphy Crossing, the Pajaro River channel morphology and vegetation cover are highly variable, with water flow generally intermittent with the channel bed dry in the summer months. The sediment in the channel bed and banks is unconsolidated coarse sands and gravels and is easily erodible.

Salsipuedes Creek is a major tributary of the Pajaro River flowing through a series of high grassy terraces contained by levees. The stream bottom is generally grassy, due to regular clearing of woody vegetation by Santa Cruz County Flood Control District, Zone 7, to reduce channel roughness and maintain hydraulic capacity. There is sparse tree cover outside the levees.

Corralitos Creek is a tributary to Salsipuedes Creek, and the confluence of the two creeks is approximately 2,000 feet downstream of College Lake. The watershed for Corralitos Creek extends to the north-northwest of Watsonville. Although Salsipuedes Creek is contained by levees, Corralitos Creek is not, and it supports a band of natural riparian vegetation along much of its length.

College Lake is a naturally occurring seasonally wet depression that receives water inflows from the Green Valley, Casserly, and Hughes Creek subwatersheds. Outflows from College Lake enter Salsipuedes Creek. In the early 1920s, local farmers reclaimed the area known as College Lake and in 1934, the Reclamation District 2049 (RD 2049) was formed. RD 2049 typically pumps the lake dry beginning mid-March to allow agricultural use of the lakebed (refer to Section 2.1.4 in Chapter 2, *Project Description*, for more information on current College Lake operations). Emergent wetland vegetation occurs in the seasonally wet depression in the winter/spring; the amount of wetland depends upon the rainfall and the spring-season drawdown. Riparian vegetation occurs along portions of the lake edge and along the contributing tributaries.

3.4.1.4 Surface Water Hydrology of College Lake

For a description of the surface water hydrology of College Lake, please refer to Section 3.3.1.2 in Section 3.3, Surface Water, Groundwater, and Water Quality. For additional information on summer farming in the lake basin, please refer to Section 2.1.4.2 in Chapter 2, *Project Description*.

3.4.1.5 Vegetation Communities and Associated Wildlife Habitat in the Project Area

The Project area supports ten vegetation communities and associated wildlife habitats. **Figures 3.4-2a** through **3.4-2c** depict the distribution of these areas in the Project area. Vegetation types are discussed for each of the wildlife habitats and are based on the *Preliminary Descriptions of the Terrestrial Natural Communities of California*[9] (hereinafter referred to as "Holland") and *A Manual of California Vegetation, Second Edition*[10] (hereinafter referred to as "Sawyer et al.").

[9] Holland, R. F., *Preliminary Descriptions of the Terrestrial Natural Communities of California*. California Department of Fish and Game, Sacramento, CA., 1986.

[10] Sawyer, J.O., T. Keeler-Wolf, and J.M. Evans, *A Manual of California Vegetation, Second Edition*. California Native Plant Society, 2009.

Riparian Scrub

Riparian scrub is found along the east margin of College Lake in one small location. This broadleaf deciduous forest is dominated by native riparian species including arroyo willow (*Salix lasiolepis*) and red willow (*Salix laevigata*). Associated species include California blackberry (*Rubus ursinus*), nettle (*Urtica* sp.), curly dock (*Rumex crispus*), and coyote brush (*Baccharis pilularis*). Riparian scrub contains elements of Central Coast Arroyo Willow Riparian Forest as described in Holland[11] and also conforms to the *Salix lasiolepis* Shrubland Alliance in Sawyer et al.[12]

Riparian scrub provides cover and resources for a variety of wintering and breeding birds, such as yellow-rumped warbler (*Dendroica coronata*), warbling vireo (*Vireo gilvus*), orange-crowned warbler (*Oreothlypis celata*), and Wilson's warbler (*Cardellina pusilla*). The mixed understory in this community supports a variety of small mammals and reptiles, including raccoon (*Procyon lotor*), deer mice (*Peromyscus maniculatus*), and coast garter snake (*Thamnophis elegans terrestris*).

Riparian Forest

Riparian forest was observed along portions of College Lake and its tributaries. This broadleaf deciduous forest is dominated by native riparian species including arroyo willow, red willow, black cottonwood (*Populus trichocarpa*), alder (*Alnus* spp.), western sycamore (*Platanus racemosa*), coast live oak (*Quercus agrifolia*), box elder (*Acer negundo* var. *californicum*), shining willow (*Salix lasiandra* var. *lasiandra*), and dogwood (*Cornus* sp.). Understory species include poison-oak (*Toxicodendron diversilobum*), mugwort (*Artemisia douglasiana*), California blackberry, and stinging nettle. Invasive, non-native plant species are often found at the edge of the forest, such as adjacent to roadways; non-native species of poison hemlock (*Conium maculatum*), giant reed (*Arundo donax*), and bristle ox-tongue (*Helminthotheca echioides*) were observed. Riparian forest contains elements of the Central Coast Cottonwood-Sycamore Forest and the North Coast Black Cottonwood Riparian Forest[13], as well as the *Populus trichocarpa* Forest Alliance and the *Salix lucida*[14] Woodland Alliance.[15]

Wildlife species found in riparian forest are similar to those species found in riparian scrub, as described above. Within the northeast parcel of College Lake (owned by PV Water), mature and decadent cottonwoods and willows provide excellent foraging habitat for brown creeper (*Certhia americana*), chestnut-backed chickadee (*Poecile rufescens*) and multiple woodpecker species. Numerous standing snags provide cavity-nest habitat for species like tree swallows (*Tachycineta bicolor*) and violet-green swallows (*Tachycineta thalassina*).

---

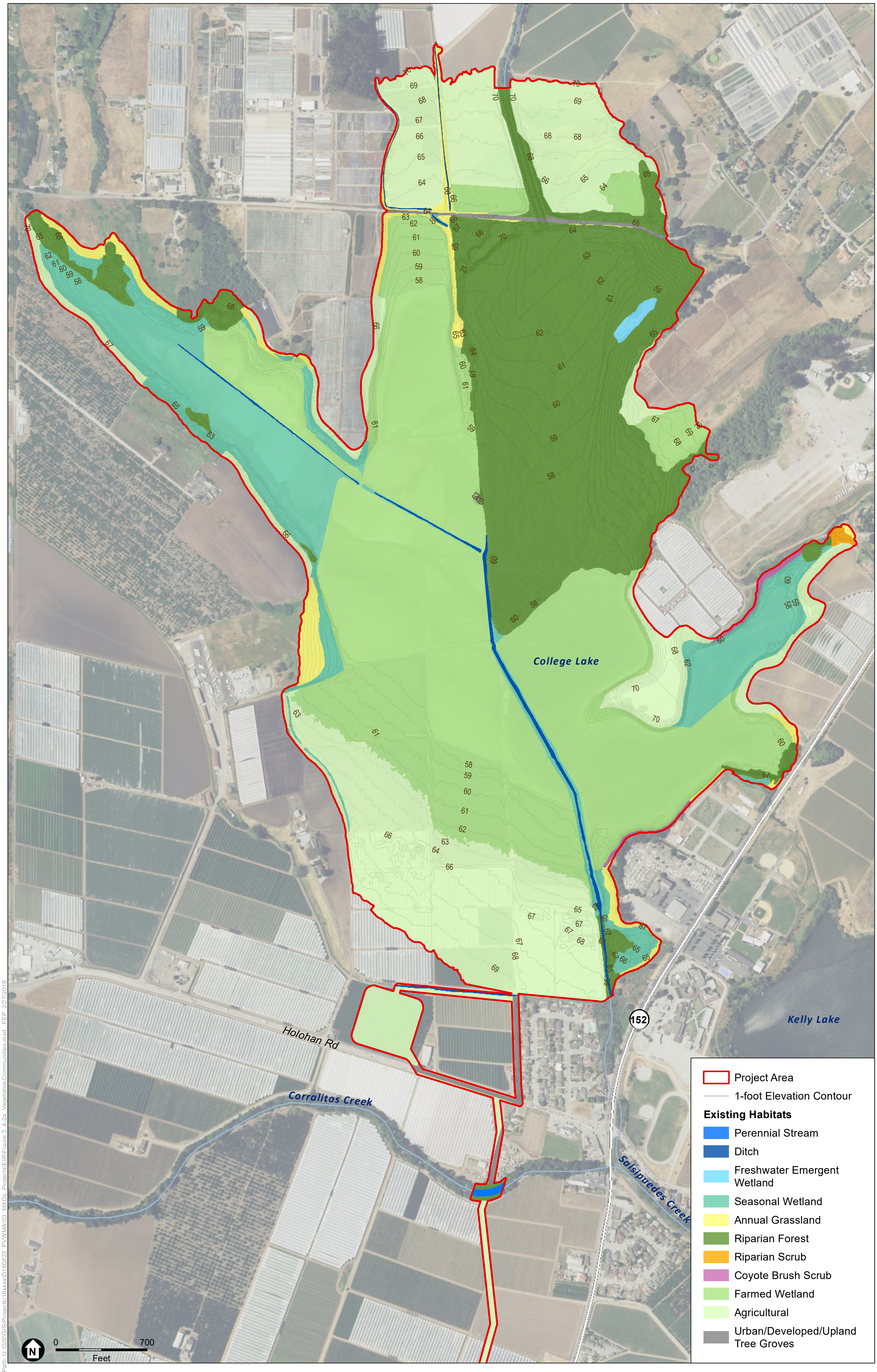
[11] Holland, R. F., *Preliminary Descriptions of the Terrestrial Natural Communities of California*. California Department of Fish and Game, Sacramento, CA., 1986.

[12] Sawyer, J.O., T. Keeler-Wolf, and J.M. Evans, *A Manual of California Vegetation, Second Edition*. California Native Plant Society, 2009.

[13] Holland, R. F., *Preliminary Descriptions of the Terrestrial Natural Communities of California*. California Department of Fish and Game, Sacramento, CA., 1986.

[14] *Salix lucida* is a nomenclatural synonym for *Salix lasiandra* var. *lasiandra* (shining willow or Pacific willow).

[15] Sawyer, J.O., T. Keeler-Wolf, and J.M. Evans, *A Manual of California Vegetation, Second Edition*. California Native Plant Society, 2009.



SOURCE: USDA, 2016; ESA, 2019

College Lake Integrated Resources Management Project

Figure 3.4-2a
Existing Habitats

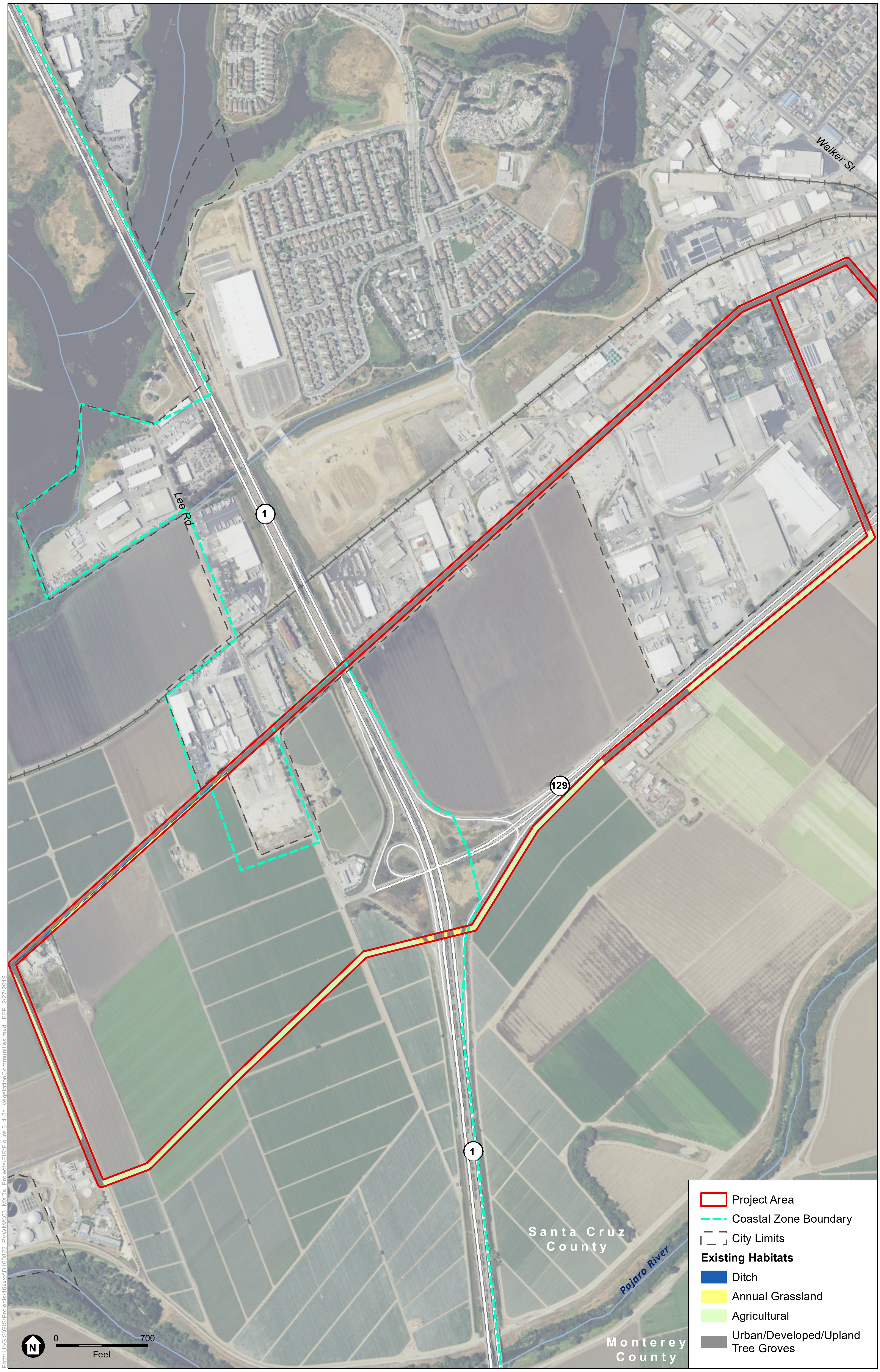
ESA

SOURCE: USDA, 2016; ESA, 2019

College Lake Integrated Resources Management Project

Figure 3.4-2b
Existing Habitats

ESA



SOURCE: USDA, 2016; ESA, 2019

College Lake Integrated Resources Management Project

Figure 3.4-2c
Existing Habitats

ESA

This page intentionally left blank

Freshwater Emergent Wetland

One small patch of freshwater emergent wetland is present in College Lake in an area of prolonged inundation, and smaller isolated patches may be present in the understory of the large riparian forest in the northeast area of the lake (Figure 3.4-2a). Dominant species include cattails (*Typha* sp.) and tules (*Schoenoplectus* sp.), along with other herbaceous wetland species such as smartweed (*Persicaria* spp.). Freshwater emergent wetland can also be classified as Coastal and Valley Freshwater Marsh as described in Holland (1986)[16] and also conforms to the *Typha* (*angustifolia, domingensis, latifolia*) Herbaceous Alliance in Sawyer et al. (2009).[17]

Freshwater emergent wetland may be used by birds associated with vegetated aquatic habitats such as marsh wren (*Cistothorus palustris*) and red-winged blackbird (*Agelaius phoeniceus*). This habitat may also be used by amphibians including the Sierran treefrog (*Pseudacris sierra*) and American bullfrog (*Lithobates catesbeianus*).

Coyote Brush Scrub

The Project area supports narrow bands of coyote brush scrub along moderate to steep banks, on the east side of the lake basin. This scrub type is dominated by the native shrub coyote brush, yet other species may also be present such as poison oak and California blackberry. Within the Project area, the understory is comprised of non-native grasses, such as wild oats (*Avena* spp.) and ripgut brome (*Bromus diandrus*). It conforms to Northern Coastal Scrub[18] and the *Baccharis pilularis* Shrubland Alliance.[19]

Coyote brush scrub habitat at College Lake provides cover and food for a variety of resident and wintering sparrows, house finch (*Haemorhous mexicanus*), lesser goldfinch (*Spinus psaltria*), American goldfinch (*Spinus tristis*), and Bewick's wren (*Thryomanes bewickii*).

Seasonal Wetland

Seasonal wetlands are found along the margins of College Lake and in the northwestern and eastern extensions of the lake. These areas support a wide variety of annual and perennial herbaceous species. Some dominant species include smartweed, cocklebur (*Xanthium strumarium*), and rushes (*Juncus* spp.). California blackberry and Himalayan blackberry (*Rubus armeniacus*) are also prevalent in seasonal wetlands near the existing weir, along some ditches, and as riparian understory. Seasonal wetlands may be mowed or disked in some years, particularly the large areas at the northwest end of College Lake, located in the portion of the lake that has been farmed within the past decade. Multiple seasonal wetlands at higher elevations (63 to 70 feet NAVD88) located on slopes appear to be supported by groundwater sources during the growing season. Seasonal wetland

[16] Holland, R. F., *Preliminary Descriptions of the Terrestrial Natural Communities of California*. California Department of Fish and Game, Sacramento, CA., 1986.

[17] Sawyer, J.O., T. Keeler-Wolf, and J.M. Evans, *A Manual of California Vegetation, Second Edition*. California Native Plant Society, 2009.

[18] Holland, R. F., *Preliminary Descriptions of the Terrestrial Natural Communities of California*. California Department of Fish and Game, Sacramento, CA., 1986.

[19] Sawyer, J.O., T. Keeler-Wolf, and J.M. Evans, *A Manual of California Vegetation, Second Edition*. California Native Plant Society, 2009.

most closely matches the description for Vernal Marsh,[20] as well as the *Polygonum lapathifolium-Xanthium strumarium* Herbaceous Alliance.[21]

Wildlife species found in seasonal wetlands are similar to those found in the freshwater emergent wetland, described above.

Agriculture

The deep alluvial soils along the floodplain of the Pajaro River and tributaries support a variety of row crops as well as orchards and vine/bush crops. The very mild climate in this region makes it suitable for crops such as strawberries, raspberries, blackberries, apples, flowers, lettuces, artichokes, and other fruits and vegetables. Agricultural habitats are subject to periodic disking, planting, harvesting, and the application of herbicides, pesticides, and fertilizers which prevent the establishment of natural plant species and communities. Agricultural fields located at elevations above approximately 62.5 feet NAVD88 can be planted with berries and orchards (i.e., crops requiring a longer growing season) while agricultural fields below 65.2 feet NAVD88 are typically planted with vegetable row crops (i.e., crops requiring a shorter growing season). Crop selection is directly related to elevation and location within the College Lake basin.

Agricultural fields within the College Lake basin are periodically fallowed, at the discretion of the farmer. In fallow years, these fields support weedy plant species, including: bristly ox-tongue; cocklebur; swamp pricklegrass (*Crypsis schoenoides, C. vaginiflora*); fat-hen (*Atriplex prostrata*); smartweeds; and, curly dock. Many of these plants are adapted to seasonal inundation, open, bare ground, rapid maturity, and high seed production, and rapidly colonize bare farm fields in the spring during low-water periods or as College Lake is drained in April. No special-status plant species are expected to occur in the active cropland agricultural areas, or areas periodically fallowed.

Agricultural areas can support wildlife species that have adapted to disturbances, but generally support few wildlife species because of their lack of diversity in vegetation and foraging opportunities. California ground squirrels (*Ottospermophilus beecheyi*) and Botta's pocket gopher (*Thomomys bottae*) often occur along the margins of cropland. Raptors such as red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), white-tailed kite (*Elanus leucurus*), and northern harrier (*Circus hudsonius*) often forage for these and other small rodents over agricultural lands. Fallow fields can attract other foraging birds, including Brewer’s blackbird (*Euphagus cyanocephalus*), American pipit (*Anthus rubescens*) and killdeer (*Charadrius vociferus*).

Farmed wetlands

During the wet season, the higher elevations along the margins of College Lake (approximately 58 to 62.5 feet NAVD88) are inundated continuously (in above-average rainfall years) or periodically (in below-average rainfall years) and the seasonal vegetation described above may

[20] Holland, R. F., *Preliminary Descriptions of the Terrestrial Natural Communities of California*. California Department of Fish and Game, Sacramento, CA., 1986.

[21] Sawyer, J.O., T. Keeler-Wolf, and J.M. Evans, *A Manual of California Vegetation, Second Edition*. California Native Plant Society, 2009.

establish opportunistically as a result of the year-specific inundation pattern. These conditions meet the definition of “wetlands” provided by the USACE[22] and U.S. Environmental Protection Agency[23] even though these areas support hydrophytic vegetation only for a very short period of time. This highly managed system presents a unique situation where farm fields provide aquatic habitat during the winter and early spring, seasonal wetland habitat for a brief period as College Lake is drawn down, arable farmland in the summer, and fallow fields in the fall and early winter. These areas are not classified as open water because they lack an ordinary high water mark.

Annual Grassland

This community typically comprises a dense to sparse cover of annual grasses, often associated with numerous species of annual and perennial forbs. These grasslands grow actively during winter and spring and remain dormant during summer and early fall. In the Project area, annual grassland is generally found on fine textured, clay-rich soils that are not cultivated, such as some slopes abutting College Lake. Plant species typical of the area include wild radish (*Raphanus sativus*), bristly ox-tongue, Italian ryegrass (*Festuca perennis*), and brome grasses (*Bromus* spp.). The vast majority of grasslands within the Project area have been used for cultivated agriculture at some point and do not resemble native plant dominated grasslands in their species composition. Grasslands in the greater Watsonville area provide habitat for special-status species, including Santa Cruz tarplant (*Holocarpha macradenia*), Monterey spineflower (*Chorizanthe pungens* var. *pungens*), Congdon’s tarplant (*Centromadia parryi* subsp. *congdonii*), San Francisco popcorn flower (*Plagiobothrys diffusus*), Choris’ popcorn flower (*Plagiobothrys chorisianus* var. *chorisianus*), Santa Cruz clover (*Trifolium buckwestiorum*), and Kellogg’s horkelia, yet none have been historically recorded from the Project area. In addition, long-term agricultural use of land within the Project area reduces the potential for species occurrence. Annual grassland can also be classified as Valley and Foothill Grassland as described in Holland (1986)[24] and also conforms to the following vegetation types identified by Sawyer et al. (2009).[25]

- *Brassica nigra* and other mustards Herbaceous Semi-Natural Alliance
- *Bromus* (*diandrus, hordeaceus*)- *Brachypodium distachyon* Herbaceous Semi-Natural Alliance

Annual grassland provides little cover for wildlife, yet numerous species forage and several species breed in this community. Small mammals such as deer mice, California ground squirrel, and Botta’s pocket gopher are common residents in annual grasslands. Larger mammals such as coyote (*Canis latrans*) and grey fox (*Urocyon cinereoargenteus*) occasionally forage in this community as well.

---

[22] U.S. Army Corps of Engineers (USACE), Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0) ed. J.S. Wakeley, R.W. Lichvar, and C.V. Noble. ERDC/EL TR-06-16. Vicksburg, MS: U.S. Army Engineer Research and Development Center, 2008.

[23] Environmental Laboratory, Department of the Army, *Technical Report Y-87-1*, Corps of Engineers Wetland Delineation Manual. U.S. Army Corps of Engineers. Waterways Experimental Station. Vicksburg, Mississippi, 1987.

[24] Holland, R. F., *Preliminary Descriptions of the Terrestrial Natural Communities of California*. California Department of Fish and Game, Sacramento, CA., 1986.

[25] Sawyer, J.O., T. Keeler-Wolf, and J.M. Evans, *A Manual of California Vegetation, Second Edition*. California Native Plant Society, 2009.

A variety of birds use annual grasslands as foraging habitat, including savannah sparrows (*Passerculus sandwichensis*) and western meadowlarks (*Sturnella neglecta*). Mourning doves (*Zenaida macroura*) may nest in grasslands in the Project area. Raptors, such as red-tailed hawks and northern harriers (*Circus cyaneus*), commonly forage over grasslands as well. Some species of raptors, such as red-tailed hawks and white-tailed kites, may occasionally nest in trees within grasslands. Western fence lizards (*Sceloporus occidentalis*), gopher snakes (*Pituophis catenifer catenifer*), and other snakes are also likely to occur in this community. Long-term agricultural use in the area may limit habitat suitability in the Project area.

Urban/Developed and Upland Tree Groves

Urban development is scattered throughout the Project area. These areas consist of homes, buildings associated with farming, and towns, of which Watsonville is the largest. Urban and developed areas tend to be landscaped with non-native ornamental plant species, including groves of trees. Stands of upland landscape trees, including eucalyptus (*Eucalyptus* spp.), Monterey cypress (*Cupressus macrocarpa*) and coast live oak occur within the Project area, such as along the perimeter of College Lake. No special-status plant species occur in these areas; Monterey pine trees (*Pinus radiata*) within the Project area were planted, and are not considered native stands that would have a special status.

As with agricultural areas, developed and landscaped areas can support wildlife species that have adapted to site disturbance but native plants are often absent and wildlife abundance and diversity are generally low. Raccoons and Virginia opossums (*Didelphis virginiana*) occur regularly in urban areas. Birds adapted to the urban landscape include house finches, northern mockingbirds (*Mimus polyglottos*), mourning doves, European starlings, house sparrows (*Passer domesticus*), and rock doves (*Columba livia*).

Perennial Stream

One perennial stream is mapped within the Project area: Corralitos Creek. Additional perennial streams in the greater study area, such as Salsipuedes Creek and the Pajaro River, are described in Section 3.4.1.6. The bed of Corralitos Creek consists of silt and sand with some gravel. Water depth at the time of the March 2018 aquatic resources delineation was around one foot. Creek width based on the ordinary high water mark was estimated to be 50 feet based on an observable scour line below which leaf litter and organic material was absent and vegetation had obviously been affected by water flows and inundation. Bank vegetation consists of an overstory of riparian trees including arroyo willow and white alder with many understory vines including California blackberry, Cape ivy (*Delairea odorata*), and English ivy (*Hedera helix*). Because of this dense overstory canopy, emergent vegetation in the channel and along the lower banks within the ordinary high water mark is limited.

Ditch

Ditches are man-made irrigation or drainage features associated with agricultural production. Ditches within the study area are assumed to provide mainly a drainage function. Three perennial ditches are present within College Lake; these features are located at the lowest elevation within the lake basin and have surface water throughout the agricultural production season (refer to

Figure 3.4-2a). A small seasonal engineered ditch, also called Pinto Creek or the Pinto Lake outflow ditch, is found adjacent to the pipeline alignment between the proposed intake pump station site and the preferred WTP site (refer to Figure 3.4-2a). Roadside ditches are present along West Beach Street (sometimes referred to as West Beach Street drainage ditch); the ditch adjacent to the south side of the street is within the Project area (refer to Figure 3.4-2c). These roadside ditches likely drain runoff from both the paved road and the adjacent farm fields, which then flows southwest into Watsonville Slough downstream of Beach Road, and eventually joins the ocean.

3.4.1.6 Aquatic Habitats in the Study Area Outside of the Project Area

Aquatic habitats within Salsipuedes Creek, the Pajaro River, and the Pajaro River Lagoon downstream of College Lake occur in the study area, but outside of the Project area. These reaches are shown on Figure 3.4-1 and described in Sections 3.4.1.3, 3.3.1.2, and 3.3.1.3.

3.4.1.7 Sensitive Natural Communities

Sensitive natural communities are those identified by CDFW as terrestrial natural communities native to California, listed in the *California Sensitive Natural Communities list.*[26] Natural communities with State ranks of S1 – critically imperiled, S2 – imperiled, and S3 – vulnerable, are considered sensitive. The following sensitive natural communities occur in the Project Area:

- *Populus trichocarpa* Forest Alliance, black cottonwood forest (61.120.00, rank S3)
- *Salix laevigata* Woodland Alliance, red willow thickets (61.205.00, rank S3)
- *Salix lucida* Woodland Alliance, shining willow groves (61.204.00, rank S3)

The sensitive natural communities within the Project area are also designated as riparian habitat and wetlands and other waters of the United States and State (see Section 3.4.1.9) and are afforded a higher level of regulatory protection because of this designation.

3.4.1.8 Environmentally Sensitive Habitat Areas

The southern portion of the pipeline alignment for the Project is located within the Coastal Zone (refer to Figure 3.4-2c). The California Coastal Act defines Environmentally Sensitive Habitat Areas (ESHA) as “any area in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which could be easily disturbed or degraded by human activities and developments.” (Cal. Public Resources Code Section 30107.5). ESHA is designated within the Coastal Zone by the California Coastal Commission (CCC) or in an applicable local coastal program. The Santa Cruz County Local Coastal Program (LCP) restricts development in environmentally sensitive coastal habitat areas. The study area contains potentially jurisdictional waters (the West Beach Street drainage ditch)

[26] CDFW, California Sensitive Natural Communities List, 2018. Accessed on October, 15, 2018. Available online at https://www.wildlife.ca.gov/Data/VegCAMP/Natural-Communities#sensitive%20natural%20communities.

within the Coastal Zone which, pursuant to Santa Cruz County Code criteria, would be considered ESHA.[27]

3.4.1.9 Aquatic Resources in the Project Area

ESA's aquatic resources delineation of the Project area[28] concluded that there are 341.76 acres of potentially jurisdictional waters of the U.S. present, including the following:

- 179.71 acres of farmed wetland (cropland/agricultural);
- 50.70 acres of seasonal wetland;
- 0.90 acre of freshwater emergent wetland;
- 107.06 acres of riparian forest wetland;
- 0.41 acre of riparian scrub;
- 0.27 acre of perennial stream; and
- 2.71 acres of ditch.

The aquatic resources in the Project area are described in Section 3.4.1.5, Vegetation Communities and Associated Wildlife Habitats in the Project Area, and shown on Figure 3.4-2a.

3.4.1.10 Special-Status Species

For the purposes of this EIR, "special-status species" include threatened, endangered, rare, candidate, and other sensitive species identified in local and regional plans, policies, and regulations, and by the CDFW, United States Fish and Wildlife Service (USFWS), and National Marine Fisheries Service (NMFS). Special-status species also include those species listed in Sections 15380(b)-(d) of the California Environmental Quality Act (CEQA) *Guidelines*. Special-status species include:

- Plant and wildlife species listed as rare, threatened, and endangered under the Federal Endangered Species Act (FESA) and California Endangered Species Act (CESA);
- Candidate species (species that are proposed for listing under either federal or state law);
- Species designated by CDFW as species of special concern or Fully Protected Species;
- Species protected by the federal Migratory Bird Treaty Act (MBTA) (16 United States Code [USC] Sections 703-711) and the California Fish and Game Code;
- Bald and golden eagles protected by the federal Bald and Golden Eagle Protection Act (16 USC Section 668); and

---

[27] County of Santa Cruz, Santa Cruz County Code, Chapter 16.32, 2018. Available online at https://www.codepublishing.com/CA/SantaCruzCounty/#!/SantaCruzCounty16/SantaCruzCounty1632.html. Accessed on December 21, 2018.

[28] Environmental Science Associates (ESA), *College Lake Integrated Resources Management Project Aquatic Resources Delineation Report*. Prepared for Pajaro Valley Water Management Agency, April 2019.

- Species that may be considered rare or endangered pursuant to Section 15380 of the CEQA Guidelines (including plants species with California Rare Plant Ranks of 1 or 2).

Appendix BIO provides the results of species occurrence database queries from the CNDDB, California Native Plant Society Electronic Inventory, USFWS, and NMFS. Based on this information, Table BIO-1 in Appendix BIO provides a focused list of special-status plant and animal species considered based on biologist expertise and includes an assessment of these species and their potential to occur within the study area based on previous special-status record locations and current site conditions. Based on this review, special-status species with a moderate or higher potential to occur within the study area are discussed in detail below.

Special-status plant species are either unlikely to occur or have a low potential to occur due to the absence of suitable habitat and regular or periodic disturbance by disking.

Fish

Pajaro River and the Eastern Watershed Fisheries

The Pajaro River provides habitat for at least nine documented fish species, including native fish species such as south-central California coast (S-CCC) steelhead, Pacific lamprey (*Lampetra tridentata*), and hitch (*Lavinia exilicauda*).

Steelhead

The Pajaro River watershed is one of the major components of the S-CCC Distinct Population Segment (DPS) of steelhead, as defined by NMFS.[29] Coastal steelhead are anadromous fish, spawning in coastal ocean tributaries but migrating to ocean waters as one- to three-year-old juveniles (smolts). Most of their adult life is spent in ocean waters, but they return to coastal tributaries to spawn. Steelhead in this DPS are listed as a federal threatened species.

In south-central California, near the southern limit of the range for steelhead on the Pacific Coast, it is estimated that annual S-CCC steelhead runs have declined dramatically from an estimated 25,000 returning adults historically, to currently less than 500 returning adults.[30]

Studies from the 1960s report steelhead runs in the Pajaro River ranging from 1,000 to 2,000 individuals (62 FR 43974). Reliable data to estimate current run size are not available, but are substantially smaller due to habitat quality declines stemming from water quality changes in the wake of land development along the watershed and loss of vegetation and channelization along riparian corridors.[31] The Pajaro River serves as a migration pathway for adult steelhead migrating upriver to spawning and nursery habitat in the upper watershed, and for steelhead smolts

[29] 62 FR 43937, August 18, 1997.

[30] Williams, T. H., S. T. Lindley, B. C. Spence, and D. A. Boughton, Status Review Update for Pacific Salmon and Steelhead Listed Under the Endangered Species Act: Southwest, May 20, 2011 update to January 5, 2011 Report to Southwest Region National Marine Fisheries Service from Southwest Fisheries Science Center, Fisheries Ecology Division, 2011.

[31] National Marine Fisheries Service, 5-Year Review: Summary and Evaluation of South-Central California Coast Steelhead Distinct Population Segment. National Marine Fisheries Service. West Coast Region. California Coastal Office. Santa Rosa, CA., 2016

migrating downriver from that habitat to the ocean. The adult steelhead migration period in the Pajaro River has not been studied, but is expected to be similar to Waddell Creek in northern Santa Cruz County where Shapovalov and Taft (1954)[32] documented adults entering freshwater to spawn from late December into April, with peak migration occurring January through mid-March. Only about 8 percent of all adult steelhead captured in an upstream trap over a period of nine years (1933-1942) migrated after April 1.[33] Most smolts migrate to the Pacific Ocean in April and May.

In the Pajaro River upper watershed, Pescadero, Uvas, Llagas, and Pacheco creeks and their tributaries provide potential spawning and rearing habitat. Pescadero and Uvas creeks provide access, spawning, and rearing in all but extreme drought years. Llagas and Pacheco creeks tend to be drier, and use of those streams is less frequent and less extensive.

During periods of lower flows beginning in late spring, the water temperatures of local streams increase. Part of this increase is due to the seasonal increase in day length and air temperatures, and part is due to the reduced temperature buffering provided by the reduced streamflows. Smolts can suffer from heat stress at higher temperatures; however, since smolts travel mostly at night when water temperatures are cooler, heat stress probably is minor for short migrations. Migrating smolts travel relatively quickly; therefore, temperature probably is not a problem at times when the flows are sufficient to allow easy passage through riffles. Steelhead spawning or rearing is unlikely to naturally occur in the Pajaro River downstream of Murphy Crossing because of the lack of spawning gravels and low and warm summer streamflows, but in May/June of 2008, KEC observed two steelhead spawning reds and young-of-the-year steelhead approximately 0.5 miles upstream of the SR 1 bridge following the nearby release of 42 adult steelhead rescued from drying reaches in Uvas Creek.[34]

Pacific Lamprey

Pacific lamprey, a California species of special concern, is an anadromous species that, like steelhead, migrate into freshwater to spawn and juveniles return to the ocean to mature. Adult migration times for lamprey tend to occur somewhat later (March-May) than the peak of the steelhead adult migration (January-March). However, lamprey adults are able to negotiate relatively shallow riffles. Juvenile lampreys migrate to the ocean with peak winter flows, and rarely suffer migration blockage.

Monterey Roach

Monterey roach (*Lavinia symmetricus subditus*), a subspecies of California roach and a California species of special concern, have similar habitat requirements to California roach in other areas where they are generally found in small streams and are adapted to life in intermittent watercourses where dense populations are frequently observed in isolated pools. Roach can

---

[32] Shapovalov, L. and A. C. Taft, The Life Histories of the Steelhead Rainbow Trout (*Salmo gairdneri gairdneri*) and Silver Salmon (*Oncorhynchus kisutch*) with Special Reference to Waddell Creek, California, and Recommendations Regarding Their Management. State of California, Department of Fish and Game, Fish Bulletin No. 98, 1954.

[33] Ibid.

[34] G. Kittleson, personal observation, May 29, 2008 and June 16, 2008.

tolerate a relatively wide range of temperatures and dissolved oxygen levels and are found in habitats ranging from cold, clear, well-aerated salmonid streams to intermittent streams where they can survive extremely high temperatures (30 to 35 degrees Celsius) and low dissolved oxygen levels (1 to 2 parts per million).[35]

Monterey Hitch

Monterey hitch (*Lavinia exilicauda harengus*), a subspecies of hitch and a California species of special concern, can occupy a wide variety of habitats, but are most abundant in lowland areas with large pools or in small reservoirs. Monterey Hitch were found to be most abundant in low-gradient sites in the Pajaro River basin that had permanent water and large pools in summer. [36] The water at these sites tended to be clear, warm in late summer, and moderately deep. Bottom substrates were mostly a mixture of sand and gravel and the presence of cover (e.g., fallen trees, overhanging bushes) was an important factor. Monterey hitch is known to occur in mainstem Pajaro River and upstream tributaries such as Uvas, Llagas, and Pacheco creeks.

Salsipuedes/Corralitos Creek Sub-Watershed Fisheries

S-CCC steelhead and Pacific lamprey regularly use the watershed of Corralitos Creek, which joins Salsipuedes Creek downstream of College Lake at SR 152. Diversion dams on Corralitos and Browns creeks and wells downstream of their confluence (operated by the City of Watsonville) affect spring and summer streamflows and may limit seasonal fish passage opportunities in lower Corralitos Creek and in Salsipuedes Creek.

Steelhead

Steelhead regularly spawn and rear in the Corralitos Creek watershed in Corralitos Creek, Shingle Mill Creek, Browns Creek, and Ramsey Creek. Upstream of College Lake, Casserly Creek and Green Valley Creek support steelhead and resident rainbow trout. Salsipuedes Creek is considered a migration corridor due to a lack of suitable spawning substrates and rearing pools, high water temperatures, and low summer flows with periodic fluctuations resulting from College Lake drainage pumping.

Corralitos Creek has long been recognized as a regionally important steelhead resource, and has been the beneficiary of several significant steelhead enhancement projects. Since 2008, four steelhead passage improvement projects have been completed by Santa Cruz County and the Resource Conservation District of Santa Cruz County at partial-barrier culverts on Corralitos Creek and its tributary Shingle Mill Creek. In addition, in 2008 the City of Watsonville rebuilt the fish ladder and screens to NMFS criteria at its Corralitos Creek diversion.

Inflows to College Lake come primarily from Casserly Creek and Green Valley Creek, which enters Casserly Creek immediately upstream of College Lake. Smaller tributaries, groundwater, and agricultural return flows also provide inflow to College Lake. Seasonally, flow direction

[35] Moyle, P.B., R. M. Quiñones, J. V. Katz and J. Weaver, Fish Species of Special Concern in California. Sacramento: California Department of Fish and Wildlife, 2015.
[36] Ibid.

along the reach of Salsipuedes Creek between College Lake and the Corralitos Creek confluence can be reversed and, which it is, surface water enters the lake from Salsipuedes Creek.

Green Valley Creek has two partial barriers to adult steelhead upstream migration, but more importantly, has low stream flows in its lower reaches by spring of even wet years. Poor smolt outmigration conditions appear to prevent maintenance of a steelhead run in Green Valley Creek. Smith[37] noted that a healthy resident rainbow trout, rather than steelhead, population is apparently present in Green Valley Creek based upon lack of smolt colors or smolt-sized fish in spring, presence of abundant smolt-sized fish in late spring, abundance of resident adults in the population, and distinctive genetic structure compared to Corralitos Creek. Casserly Creek and two of its tributaries, Banks Creek and Gaffney Creek, do support a steelhead population, and flows sufficient for smolt migration to College Lake are present in Casserly Creek through May in most years.[38]

While College Lake and its main tributary stream, Casserly Creek, support steelhead, the size and condition of the steelhead run is less studied, and consequently less understood. However, available evidence suggests College Lake provides the significant steelhead habitat and population benefits typically associated with estuaries and floodplains. Studies have confirmed that size at ocean entry for juvenile salmonids plays a critical role in determining ocean survival,[39] and therefore systems capable of producing greater numbers of relatively large juvenile salmonids each year are likely to have more robust adult populations.[40] Moreover, high winter flows in small upper watershed streams tend to displace a relatively large percentage of small young-of-the-year steelhead year class, while downstream velocity refuges such as estuaries, floodplains, and lakes, can significantly increase juvenile winter survival, thus aiding in overall population stability and persistence. College Lake is hypothesized to provide such habitat for steelhead. A steelhead smolt outmigration study was conducted in the spring of 2011 at the outlet of College Lake in order to gather pertinent data on relative population size, seasonal use, and general condition of the steelhead population in this subbasin.[41] The study was compromised by overwhelmingly high flows and tampering of the trap, and therefore did not provide population size estimates. Based on the limited data generated by the 2011 study, it appears likely that at least some juvenile steelhead from the upper watershed spend time rearing in College Lake during the winter and early spring prior to migrating out to the ocean.[42] Scale samples collected from two steelhead smolts indicated recent growth rates, based on back calculation, of

[37] Smith, J. J., Fisheries Issues Associated with the Present and Potential Future Operation of the College Lake Complex (Pajaro River Watershed) – Draft, San Jose State University, November 30, 2010.

[38] Becker, G.S., K.M. Smetak, and D.A. Asbury, Southern Steelhead Resources Evaluation: Identifying Promising Locations for Steelhead Restoration in Watersheds South of the Golden Gate. Cartography by D.A. Asbury. Center for Ecosystem Management and Restoration. Oakland, CA., 2010.

[39] M.H. Bond, M.H., S.A. Hayes, C.V. Hanson, R.B. MacFarlane, Marine survival of steelhead (*Oncorhynchus mykiss*) enhanced by a seasonally closed estuary. Canadian Journal of Fisheries and Aquatic Sciences, 65(10): 2242-2252, September 30, 2008.

[40] Casagrande, J., Distribution, abundance, growth and habitat use of steelhead in Uvas Creek, California. M.S. Thesis, San Jose State University. 160 pp., 2010. Available online at http://scholarworks.sjsu.edu/cgi/viewcontent.cgi?article=4747&context=etd_theses.

[41] Podlech, M., College Lake Smolt Outmigrant Study–Spring 2011. Prepared for Resource Conservation District of Santa Cruz County, 2011.

[42] Podlech, M., College Lake Smolt Outmigrant Study–Spring 2011. Prepared for Resource Conservation District of Santa Cruz County, 2011.

approximately 130 percent between winter annulus formation and the spring (April) capture dates. Upper watershed streams are typically not sufficiently productive to support such rapid growth rates in winter, but ponds, lakes, and seasonally inundated floodplains and agricultural fields have been shown to provide highly productive rearing habitat for juvenile salmonids.

The practice of draining College Lake through pumping occurs annually during the peak steelhead smolt outmigration period, and therefore blocks a presumably large portion of the smolt population in College Lake and Casserly Creek from migrating to the ocean. If left full, rather than annually drained, the lowland lake would be too warm to allow summer rearing by steelhead, especially in the presence of warm water fishes.

Salsipuedes Creek downstream of the Corralitos Creek confluence consist of a degraded channel flowing in a series of high grassy terraces contained by levees. The stream bottom is generally grassy, due to repeated clearing of woody vegetation, and tree cover is sparse. Summer flows are low and variable (due to intermittent pumping from College Lake). Salsipuedes Creek does not provide suitable spawning or summer rearing habitat for steelhead. No juvenile steelhead were observed during biological monitoring of construction and dewatering activities at approximately ten USACE storm damage repairs sites on Salsipuedes Creek during summer 2018.[43]

Pajaro River Lagoon Fisheries

Steelhead

Pajaro River and Salsipuedes Creek streamflows provide for steelhead passage and also supply freshwater to the Pajaro River estuary. In spring, the freshwater inflow provides a surface wedge of lighter freshwater on top of the salt water in the Pajaro River estuary. This freshwater wedge allows steelhead smolts to move up and down in the water column to aid in gradually adjusting to seawater. When flows are sufficient for passage to the estuary, the inflows are probably adequate to provide a good freshwater to saltwater transition zone. Migrating smolts may spend several weeks feeding in the estuary and adjusting to seawater. This transition may not be required, as many central California streams lack good transitional estuaries while sustaining steelhead populations. However, the transition may improve survival of smolts, especially smaller smolts, upon their entering the ocean.

A beach berm forms across the mouth of the Pajaro River in most years (refer to Appendix HYD). Beach berm formation at Pajaro River generally occurs once stream discharge has receded each year. Tidal flux through the mouth is substantially higher than freshwater inflows; even after the sandbar forms, seepage through the large sandbar probably is sufficient to prevent overtopping and sandbar breaching.

After sandbar formation, freshwater inflows lower the salinity of the summer lagoon and may be important to lagoon ecology.[44] Based on observations between 2012 and 2017, the beach berm formed annually in mid to late summer, with the exception of drought years 2014-2015, when the

43 Podlech, M., personal observations, July 2018.

44 Smith, J.J., 1990. The effects of sandbar formation and inflows on aquatic habitat and fish utilization in Pescadero, San Gregorio, Waddell and Pomponio Creek estuary/lagoon systems, 1985–1989 [online]. Interagency Agreement 84-04-324, San Jose State University, prepared for California Department of Parks and Recreation.

beach berm formed earlier due to low Pajaro River discharge (Appendix HYD). This is generally much later than the period of steelhead smolt passage and estuary adjustment and is also later than the present practice of pumping water from College Lake. Juvenile steelhead have not been documented to rear in the Pajaro Lagoon during six years (2012-2017) of late summer sampling.[45] However, some of these surveys (e.g., 2016 and 2017) have been conducted when the sandbar was open, creating tidally-influenced conditions that are not favorable to juvenile steelhead rearing. Smith[46] noted that steelhead apparently do not rear in the lagoon because spawning areas are far upstream within Pajaro River tributaries, but that the estuary provides potentially important feeding habitat in spring for outmigrating smolts.

Tidewater Gobies

Tidewater goby (*Eucyclogobius newberryi*), a federal endangered species, is present in the Pajaro River estuary and up to a mile further upstream in the Pajaro River. Sandbar formation is important for providing the calmer lagoon conditions favored by tidewater goby, and the salinity of the lagoon generally is not as important to goby viability. Aquatic sampling and surveys in the Pajaro Lagoon from 2012 through 2017 have found tidewater goby widely distributed in the Pajaro Lagoon, as far upstream as the Watsonville Wastewater Treatment Facility,[47] but they are typically present in low numbers.[48] Tidewater goby is also known to use the lowermost reach of Watsonville Slough, downstream of the Shell Road pump station. No tidewater goby studies have been conducted in the slough reaches areas upstream of Shell Road and San Andreas Road in Watsonville Slough.

The tidewater goby in central California maintain highly localized populations in lagoons ranging from freshwater (Soquel Creek in 1988, Pescadero Creek in 1985) to ocean salinities (Corcoran and Moran lagoons in 1996). After partial sandbar formation in late spring and summer, lagoon height increases, backing brackish water upstream to above SR 1. Tidewater goby may be found that far upstream in years of high abundance; however, in years of heavy winter floods, this species is probably confined to the downstream portion of the Pajaro River estuary and to Watsonville Slough.[49]

Critical Habitat

Critical habitat for two federally listed fish species, S-CCC DPS and tidewater goby, is designated within the study area.

South-Central California Coast Steelhead

Critical habitat for the S-CCC DPS within the study area includes most, but not all, occupied habitat from the Pajaro River, including Salsipuedes Creek and Corralitos Creek. Primary constituent elements considered essential for the conservation of the S-CCC DPS are those sites

---

[45] D.W. Alley & Associates, Fishery and Water Quality Monitoring of Pajaro River Lagoon in 2017, 2017.
[46] Smith, J. J., Steelhead distribution and ecology in the upper Pajaro River system, 2002.
[47] Kittleson, G., personal observation, 2012.
[48] D.W. Alley & Associates, Fishery and Water Quality Monitoring of Pajaro River Lagoon in 2017, 2017.
[49] Smith, J.J., 1990. The effects of sandbar formation and inflows on aquatic habitat and fish utilization in Pescadero, San Gregorio, Waddell and Pomponio Creek estuary/lagoon systems, 1985–1989 [online]. Interagency Agreement 84-04-324, San Jose State University, prepared for California Department of Parks and Recreation.

and habitat components that support one or more life stages and contain physical or biological features essential to survival, growth, and reproduction.

The Federal Register critical habitat designation notice for S-CCC DPS (70 FR 52488) defines the primary constituent elements for S-CCC DPS habitat as follows:

- Freshwater spawning sites with sufficient water quantity and quality as well as adequate substrate (i.e., spawning gravels of appropriate sizes) to support spawning, incubation and development.
- Freshwater rearing sites with: sufficient water quantity and floodplain connectivity to form and maintain physical habitat conditions and allow development and mobility; sufficient water quality to support growth and development; food and nutrient resources such as terrestrial and aquatic invertebrates and forage fish; and natural cover such as shade, submerged and overhanging large wood, log jams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks.
- Freshwater migration corridors free of obstruction and excessive risk of predation with adequate water quantity to allow for juvenile and adult mobility; cover, shelter, and holding areas for juveniles and adults; and adequate water quality to allow for survival.
- Estuarine areas that provide uncontaminated water and substrates; food and nutrient sources to support growth and development; and connected shallow water areas and wetlands to conceal and shelter juveniles. Estuarine areas include coastal lagoons that are seasonally stable, predominantly freshwater - flooded habitats that remain disconnected from the marine environment except during high streamflow events, and tidally-influenced estuaries that provide a dynamic shallow water environment.
- Marine areas with sufficient water quality to support growth, development and mobility; food and nutrient resources such as marine invertebrates and forage fish; and nearshore marine habitats with adequate depth, cover and marine vegetation to provide shelter.

Tidewater Goby

Tidewater goby critical habitat Unit SC-8 (Pajaro River) includes the lower reach of the Pajaro River and the lagoon. This unit is currently occupied by tidewater goby. The entire unit is within the study area. The Federal Register critical habitat designation notice for tidewater goby (78 FR 8746) defines the primary constituent elements for tidewater goby as follows:

- Persistent, shallow (in the range of approximately 0.3 to 6.6 feet (0.1 to 2 meters)), still-to-slow-moving lagoons, estuaries, and coastal streams with salinity up to 12 parts per thousand, which provide adequate space for normal behavior and individual and population growth that contain one or more of the following:
  - Substrates (e.g., sand, silt, mud) suitable for the construction of burrows for reproduction;
  - Submerged and emergent aquatic vegetation, such as Sago pondweed (*Stuckenia pectinata*), ditch grass (*Ruppia maritima*), broadleaf cattail (*Typha latifolia*), and bulrushes (*Scirpus* spp.), that provides protection from predators and high flow events; or
  - Presence of a sandbar(s) across the mouth of a lagoon or estuary during the late spring, summer, and fall that closes or partially closes the lagoon or estuary, thereby providing relatively stable water levels and salinity.

Essential Fish Habitat

A portion of the study area has been identified by the Pacific Fishery Management Council as Essential Fish Habitat (EFH) for various life stages of marine and estuarine fish species managed under the following two Fisheries Management Plans (FMPs): Pacific Coast Groundfish FMP and Coastal Pelagic Species FMP. EFH is the aquatic habitat (water and substrate) necessary for fish to spawn, breed, feed, or grow to maturity (50 Code of Federal Regulations 227) that will allow a level of production needed to support a long-term, sustainable commercial fishery and contribute to a healthy ecosystem.

Pacific Coast Groundfish FMP

The Pacific Coast Groundfish Fishery Management Council has designated EFH for 80-plus species of groundfish, which taken together include all waters from the high-water line and the upriver extent of saltwater intrusion in river mouths along the coast from Washington to California, including the Pajaro River. Within the study area, Starry Flounder (*Platichthys stellatus*) and English sole (*Parophrys vetulus*) have been reported by Smith[50] to occur in the Pajaro River estuary.

Coastal Pelagic Species FMP

Four fish species, Pacific sardine (*Sardinops sagax*), northern anchovy (*Engraulis mordax*), Pacific mackerel (*Scomber japonicus*), and jack mackerel (*Trachurus symmetricus*), and one invertebrate species, California market squid (*Loligo opalescens*) are managed under the Coastal Pelagic Species FMP. The EFH designation for coastal pelagic species groups the managed species into one complex based on similarities in their life histories and habitat requirements. EFH is based upon a thermal range bordered within the geographic area where a coastal pelagic species occurs at any life stage, where the species has occurred historically during periods of similar environmental conditions, or where environmental conditions do not preclude colonization by the coastal pelagic species. Within the study area, Pacific sardine and northern anchovy have been reported by Smith to occur in the Pajaro River estuary.[51]

Wildlife Species

Amphibians

California Red-legged Frog

The CRF is listed as threatened under FESA and is a California species of special concern. CRF are present in the Pajaro River in the study area. CRF have been observed at 19 distinct locations in the Pajaro River downstream of Murphy Crossing since 2009.[52] The first records of CRF breeding in the main stem Pajaro River were made in March 2019.[53] The location was a perennial side channel off the main Pajaro River that had developed as a result of scouring during 2017. Six

---

[50] Smith, J.J., Appendix A: Aquatic Habitat and Fisheries *in:* Mitchell Swanson & Associates, 1993. Pajaro Lagoon Management Plan, 1993.

[51] Smith, J.J., Appendix A: Aquatic Habitat and Fisheries *in:* Mitchell Swanson & Associates, 1993. Pajaro Lagoon Management Plan, 1993.

[52] Kittleson, G., personal observation as cited in Denise Duffy & Associates, Inc., *Draft Environmental Impact Report for the Basin Management Plan Update*. Prepared for the Pajaro Valley Water Management Agency, October 2013.

[53] Kittleson, G., personal observation, 2019.

egg masses and four adult frogs were observed at this location just upstream of the SR 1 bridge. Adult frogs were observed at this same location beginning in July 2018. CRF are also known to occur in Soda Lake and Chittenden Pass upstream of the study area, the Watsonville Slough system to the north and the Elkhorn Slough system to the south.

CRF have not been observed in College Lake, or the Corralitos Creek/Salsipuedes Creek corridor, nor have they been observed in those areaof each year. In addition, a focused breeding bird census is underway County-wide in 2018 and includes the Project area and watershed. Adaptive management of any approved water supply alternative would utilize this baseline, pre-Project data.

The data reflected the conversion from deep winter ponding to willow lacustrine habitat to mudflat as the lake bottom is drained for active farming. Because it is rapidly drained for farming in the spring migration period, College Lake is unique in the Central Coast when transitory freshwater mudflats appear for several weeks during spring migration, a time when the Watsonville Sloughs and other neighboring lakes are filled with winter runoff. This conversion results in important spring migration habitat for waterfowl and shorebirds. A paucity of data for summer and early fall corresponds with the typical onset of active row crop agriculture, following pump out of the basin and its drainage channels.

Table 3.4-1 lists the most common waterfowl species totals for each study season. The most commonly observed species is American coot, with nearly 25,000 individuals counted. Ruddy duck (*Oxyura jamaicensis*) is the second most numerous waterfowl species observed in the study period with 13,220 individuals documented.

The 2014 to 2018 College Lake waterfowl study period encompasses a wide range of water year types, ranging from critically dry to extremely wet. The dates, rates and extent of College Lake filling varied from year to year during the study period. The initial 2014 study year had late light rains and extremely low runoff that did not fill and spill the College lake. The opposite conditions occurred in 2017, which saw almost five months of water surface elevations over 62 feet NAVD88 and persistent flooding conditions over Paulsen Road at the Casserly Creek outlet into College Lake. Observed winter-spring waterfowl abundance at College Lake reflects this variability. Differences in water year type and relative abundance by month (monthly total divided by number of surveys) for the most commonly observed waterfowl species is shown in **Table BIO-2** at the end of Appendix BIO.

Spring shorebird and wading bird use of College Lake is highly dependent on annual RD 2049 pumping operations. The shorebird and wading bird abundance at College Lake from 2014 to 2018 also reflects the wide variability in water year type, but shows a regular peak in April and May during the lake's rapid drawdown. Two wading bird species, great blue heron (*Ardea herodias*) and great egret (*Ardea alba*), nest locally at Pinto Lake and can be found in relatively large numbers during and after the drawdown period feeding on abundant small fish and Louisiana swamp crayfish (*Procambarus clarkia*) that are stranded in low-lying mudflat areas, flooded furrows, and ditch lines. Waterfowl and shorebird nesting observations are limited at College Lake. Nesting attempts by Canada goose, mallard, pied-billed grebe, killdeer, and American avocet (*Recurvirostra americana*) have been documented during the 2014 to 2018 bird

TABLE 3.4-1
2014-2018 COLLEGE LAKE STUDY WATERFOWL TOTALS

Water Year Type	Critically Dry	Below-Average	Above-Average	Extremely Wet		
Species Name	**2014**	**2015**	**2016**	**2017**	**2018**	**Study Total**
American Coot - *Fulica americana*	1247	11834	4266	2055	5552	**24954**
Ruddy Duck - *Oxyura jamaicensis*	2319	3725	2231	1999	2946	**13220**
American Wigeon - *Mareca americana*	772	1295	4573	580	777	**7997**
Northern Shoveler - *Spatula clypeata*	1009	2255	1423	376	2437	**7500**
Mallard - *Anas platyrhynchos*	3677	718	1315	558	1180	**7448**
Ring-necked Duck - *Aythya collaris*	887	1035	2012	1026	689	**5649**
Gadwall - *Mareca strepera*	1047	812	648	171	896	**3574**
Canada Goose - *Branta canadensis*	579	409	765	534	1169	**3456**
Canvasback - *Aythya valisineria*	235	603	902	299	698	**2737**
Cinnamon Teal - *Spatula cyanoptera*	297	232	554	36	150	**1269**
Green-winged Teal - *Anas crecca*	67	176	248	134	398	**1023**
Bufflehead - *Bucephala albeola*	161	309	98	78	18	**664**
Hooded Merganser - *Lophodytes cucullatus*	148	82	96	122	191	**639**
Pied-billed Grebe - *Podilymbus podiceps*	100	117	73	57	193	**540**
Northern Pintail - *Anas acuta*	20	36	188	70	106	**420**
Eared Grebe - *Podiceps nigricollis*	1	49	22	14	11	**97**

SOURCE: Kittleson Environmental Consulting and Bryan Mori Biological Consulting Services, Results of Waterfowl Surveys Conducted at College Lake from January 2014 through 2018, 2018 study period, but only Canada geese, pied-billed grebe and mallard appear to successfully fledge young at College Lake. Killdeer and American avocet nesting at College Lake appears to have limited success due to nest predation and challenges presented by water drawdown.

Factors besides water level that have been shown to annually affect waterfowl and shorebird abundance and distribution include: crop choice; type and timing of active farming in the agricultural wetlands; vegetation types in active and fallowed fields; slope-side farming and orchard activity; and amount and duration of mudflat habitat. The persistent presence of predators like American peregrine falcon (*Falco peregrinus*), bald eagle (*Haliaeetus leucocephalus*), and coyote during annual waterfowl surveys have been shown to influence waterfowl behavior and numbers during counts.

Pajaro River and Corralitos Creek/Salsipuedes Creek Avian Resources

The bird community of the Lower Pajaro River was investigated in May and June of 2007, 2010, and 2012 to document the current status of populations using the Project area during the breeding season.[54,55,56] The purpose of the ongoing County bird investigations is to assist in the assessment of potential impacts that may result from the Pajaro River Levee Bench Sediment Excavation Project and provide current field data to the USACE Pajaro River Flood Control Project EIR process. Although the surveys were done for Pajaro River and Corralitos/Salsipuedes Creek flood control management projects, the data and observations are applicable to the Project.

A total of 64 bird species were observed during the 2007, 2010, and 2012 study periods on the Pajaro River downstream of Murphy Crossing. The special-status species observed during the 2007, 2010, and 2012 study periods within the boundaries of the Pajaro River and Corralitos Creek/Salsipuedes Creek area were limited to yellow warbler (*Setophaga petechia*) and white-tailed kite. Yellow warbler was confirmed as a nesting species throughout the willow riparian habitats in the lower Pajaro during general and plot surveys. White-tailed kite was regularly observed, but no nesting was confirmed on the Pajaro. Swainson's thrush (*Catharus ustulatus*) was observed to be a fairly common nesting species.

Special Status Bird Species

Tricolored Blackbird

Tricolored blackbird (*Agelaius tricolor*) is considered a California species of special concern and state candidate for listing as an endangered species. Tricolored blackbirds are found almost exclusively in the Central Valley and central and southern coastal areas of California. The tricolored blackbird is highly colonial and forms dense breeding colonies of up to tens of thousands of pairs. This species typically nests in tall, dense, stands of cattails or tules, but also nests in blackberry, wild rose bushes, and tall herbs. Nesting colonies are typically located near standing or flowing freshwater. Tricolored blackbirds form large, often multi-species, flocks

---

54 Suddjian, Kittleson, and Mori, Pajaro River Bench Excavation Project, 2007 Bird Surveys Draft Report, October 15, 2007.

55 Suddjian, Kittleson, and Mori, Pajaro River Bench Excavation Project. 2010 Bird Surveys: Unpublished Data, 2010.

56 Bryan Mori Biological Consulting Services, Breeding Season Bird Surveys and Special-status Species Assessment Pajaro River Flood Control Project, Santa Cruz and Monterey Counties, California. Prepared for Kittleson Environmental Consulting, 2012.

during the non-breeding period and range more widely during the non-breeding period than during the reproductive season. There are no recent records of this species nesting in the vicinity of the study area. This species may occasionally forage in agricultural fields, riparian scrub, or emergent wetland vegetation in the winter, but is not expected to nest within the study area due to absence of recent known nesting occurrence records in the region.

Short-eared Owl

Short-eared owl (*Asio flammeus*) is considered a California species of special concern. This species inhabits densely vegetated grasslands, emergent wetlands, and shrublands along the Pacific coast with abundant prey (e.g., voles, other small mammals, birds, reptiles, amphibians, and arthropods). Short-eared owls require dense vegetative cover such as tall grasses and freshwater emergent vegetation for roosting and resting. Nesting occurs from April through July, with nests constructed on dry ground in depressions concealed by dense vegetation. This species could forage in grassland or agricultural fields during winter or migration. Grassland areas within the study area are regularly disturbed by mowing or tiling, which limits nesting potential.

Burrowing Owl

Western burrowing owl (*Athene cunicularia*) is considered a California species of special concern. It is a small, terrestrial owl of open country that favors flat, open grassland and sparse shrubland ecosystems. In California, western burrowing owls are found in close association with California ground squirrels. Ground squirrels provide western burrowing owls with nesting and refuge burrows, and maintain areas of short vegetation height, providing foraging habitat and allowing for visual detection of avian predators by burrowing owls. Burrowing owls are semi-colonial nesters, and group size is one of the most significant factors contributing to site constancy by breeding burrowing owls. The nesting season, as recognized by the CDFW, runs from February 1 through August 31. This species could forage in grassland or agricultural fields during winter or migration. Grassland areas within the study area are regularly disturbed by mowing or tiling, which limits nesting potential.

Golden Eagle

Golden eagle (*Aquila chrysaetos*) is a CDFW Fully Protected Species. Golden eagles nest in open areas on cliffs and in large trees, often constructing multiple nests in one breeding territory. They prefer open habitats such as rolling grasslands, deserts, savannahs, and early successional forest and shrub habitats, with cliffs or large trees for nesting and cover. Golden eagles have occasionally been observed over College Lake and are commonly observed hunting ground squirrels on grazing lands along Pioneer Road two miles northwest of College Lake. Closest nest occurrence is approximately 10 miles southeast near Sugarloaf Peak. While no nesting has been reported in the College Lake Project area, suitable nesting habitat is present within the College Lake basin in the mature upland eucalyptus stands near the Santa Cruz County Fairgrounds, behind Our Lady Help of Christians Catholic Church, and along the slopes above the Casserly Creek floodplain, upstream of Paulsen-Whiting Road.

White-tailed Kite

White-tailed kite is a CDFW Fully Protected Species. These raptors forage for small rodents and other prey primarily in open grassy or scrubby areas. They nest in large shrubs or trees adjacent to this habitat. Kites are likely to be found foraging in a variety of vegetation communities throughout the Project area such as grassland, northern coastal scrub, and central maritime chaparral. White-tailed kites have been observed foraging and nesting at College Lake in trees along the northern and western banks. Agricultural fields and grasslands provide foraging habitat and kites also have potential to nest in trees within the study area.

American Peregrine Falcon

Peregrine falcon is a CDFW Fully Protected Species. They are known throughout California and are year-around residents along the Pacific coast. The peregrine is a specialist, preying primarily on mid-sized birds in flight, such as pigeons and doves. Occasionally these birds will eat insects and bats. Although typical nesting sites for the species are tall cliffs, preferably over or near water, peregrines are also known to use urban sites, including bridges and tall buildings. This species has been observed perched in the study area and foraging for smaller birds over College Lake. This species is not known to nest in in the vicinity of College Lake and nesting habitat is limited in the study area.

Bald Eagle

Bald eagle is listed as endangered under CESA and is a CDFW Fully Protected Species. In California, breeding habitat is typically found near reservoirs, lakes, and rivers in mountain and foothill forests and woodlands. Bald eagles typically build large stick nests in the upper canopy of the tallest trees in the area. Since 2014, a pair has successfully nested in a mature eucalyptus grove in Gallighan Slough (approximately 4.5 miles southwest of College Lake) in four of the past five years.[57] Bald eagles regularly hunt fish and American coot (*Fulica americana*) at College Lake when the lake is full. While no nesting has been reported in the College Lake Project area, suitable nesting habitat is present within the College Lake basin in the mature upland eucalyptus stands near the Santa Cruz County Fairgrounds, behind Our Lady Help of Christians Catholic Church, and along the slopes above the Casserly Creek floodplain, upstream of Paulsen-Whiting Road.

Yellow Warbler

The yellow warbler, a California species of special concern, is a common breeding bird in the Pajaro River, with confirmed breeding in the dense willow riparian habitat along the river.[58] More recently, this species was observed in Casserly Creek in May 2017. This species breeds from April to late July and commonly nests in willow-riparian habitats. Despite many local declines, yellow warblers currently occupy much of their former breeding range, except in the Central Valley, where they are close to extirpation. Broad-scale significant declines have been documented for the U.S. Pacific Northwest region (1979 to 1999) and declines approaching significance in California (1968 to 2016).[59,60] Both local abundance and long-term trends, however, vary greatly by region.

57 Kittleson, G., unpublished data, 2014-2019.
58 Kittleson, G., unpublished data, 2010.
59 Ballard, G., Geupel, G. R., Nur, N., and Gardali, T., Long-term declines and decadal patterns in population trends of songbirds in western North America, 1979–1999. Condor 105:737–755, 2003.
60 Sauer, J.R., The North American Breeding Bird Survey, Results and Analysis 1966 - 2015. Version 2.07.2017 USGS Patuxent Wildlife Research Center, Laurel, MD., 2017.

Yellow warblers generally occupy riparian vegetation near water along streams and in wet meadows.[61] Throughout California, they are found in willows (*Salix* spp.) and cottonwoods (*Populus* spp.). This species has potential to nest and forage in riparian forest and scrub within the study area.

Bryant's Savannah Sparrow

Bryant's savannah sparrow (*Passerculus sandwichensis alaudinus*) is considered a California species of special concern which inhabits coastal marshes and adjacent transitional grasslands within the coastal fog belt from Humboldt Bay to Morro Bay.[62] Bryant's savannah sparrow is one of four subspecies of savannah sparrow which breed in California and is fairly common at College Lake[63] between October and April, but has not been observed nesting at College Lake (typically between May and June) even though it is within the subspecies breeding range. This species builds an open-cup nest of grass beneath dense matted grasses or weeds on the ground.[64] Bryant's savannah sparrow utilizes fallow fields regularly to forage insects and seeds and is observed at the Pajaro River mouth; potential nesting habitat is present at the Pajaro Lagoon.[67]

Mammals

Western Red Bat

Western red bat (*Lasiurus blossevillii*) is considered a California species of special concern. In California, the western red bat is found in coastal areas south of the San Francisco Bay and in the Central Valley and surrounding foothills. They roost in tree and shrub foliage, predominantly in edge habitats adjacent to streams and open fields. They are often associated with riparian habitats. The western red bat could occur in trees within the study area, particularly those associated with riparian areas.

San Francisco Dusky-footed Woodrat

San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*) is a common rodent species in riparian woodlands, oak woodland and oak scrub habitats in the Monterey Bay region, where it builds large, long lasting house structures from sticks and woody material (middens). It is a California species of special concern and is present in low numbers within riparian habitat in the study area. Woodrat middens have been observed in willow-riparian habitat of upper College Lake and woodrats are infrequently observed along the Pajaro River upstream of the Salispuedes confluence, within the narrow riparian woodland habitat.[65]

---

61 Lowther, P. E., Yellow Warbler (*Setophaga petechia*), Version 2.0. In The Birds of North America (A. F. Poole and F. B. Gill, Editors). Cornell Lab of Ornithology, Ithaca, NY, 1999. Available online at doi.org/10.2173/bna.454.

62 Shuford, W. D., and Gardali, T., California Bird Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation concern in California. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento, Bryant's sparrow, pg 382-387, 2008.

63 eBird, College Lake, 2019. Available online at https://ebird.org/hotspot/L281754. Accessed on February 27, 2019.

64 Shuford, W. D., and Gardali, T., California Bird Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation concern in California. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento, Bryant's sparrow, pg 382-387, 2008.

65 Kittleson, G., personal observations, 2018.

3.4.2 Regulatory Framework

3.4.2.1 Federal

Federal Endangered Species Act

The USFWS (jurisdiction over terrestrial and freshwater aquatic species) and NMFS (jurisdiction over most anadromous and marine fish, and mammals) oversee the FESA. The FESA prohibits the "take"[66] of any fish or wildlife species listed as threatened or endangered, including the destruction of habitat that could hinder species recovery. Section 7 of the FESA mandates that a federal agency undertaking funding, issuing a permit or authorization, or carrying out an activity, consult with the USFWS and, or NMFS, depending on the affected species, to ensure that federal agency actions do not jeopardize the continued existence of a listed species or destroy or adversely modify critical habitat for listed species. The federal agency is required to consult with the USFWS and NMFS if it determines the Project "may affect" listed species or critical habitat.

Federal Migratory Bird Treaty Act

The federal MBTA (16 USC Section 703) prohibits the pursuit, hunting, take, capture, or killing of migratory birds in the United States, including nests and eggs of migratory birds during the breeding season. The current U.S. Department of the Interior interpretation of the MBTA (memorandum M-37050 in December 2017) does not prohibit or penalize take of migratory birds that results from incidental take during operations. However, taking of nests from construction activity remains prohibited under MBTA.

Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act or MSA) (16 USC Sections 1801−1884) of 1976, as amended in 1996 and reauthorized in 2007, is intended to protect fisheries resources and fishing activities within 200 miles of shore. Conservation and management of U.S. fisheries, development of domestic fisheries, and phasing out of foreign fishing activities are the main objectives of the MSA. The MSA provided NOAA Fisheries with legislative authority to regulate U.S. fisheries in the area between 3 miles and 200 miles offshore and established eight regional fishery management councils that manage the harvest of the fish and shellfish resources in these waters.

The MSA defines "essential fish habitat" as those waters and substrate that support fish for spawning, breeding, feeding, or maturation. The MSA requires that NOAA Fisheries, the regional fishery management councils, and federal agencies that take an action that may have an effect on managed fish species under MSA, identify essential fish habitat and protect important marine and anadromous fish habitat. The regional fishery management councils, with assistance from NOAA

[66] The definition of "take" pursuant to the FESA is to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." (16 USCS § 1532). The USFWS has also interpreted "harm" to include significant habitat modification or degradation that significantly impairs essential behavioral patterns of fish or wildlife. NMFS has defined harm to mean "an act which actually kills or injures fish or wildlife. Such an act may include significant habitat modification or degradation which actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns, including, breeding, spawning, rearing, migrating, feeding or sheltering." 50 CFR 222.102.

Fisheries, are required to develop and implement Fishery Management Plans. Fishery Management Plans delineate essential fish habitat and management goals for all managed fish species, including some fish species that are not protected under the MSA. Federal agency actions that fund, permit, or carry out activities that may adversely affect essential fish habitat are required under Section 305(b) of the MSA, in conjunction with required Section 7 consultation under FESA, to consult with NOAA Fisheries regarding potential adverse effects of their actions on essential fish habitat and to respond in writing to NOAA Fisheries' recommendations.

Clean Water Act Section 404

The federal Clean Water Act (CWA) was enacted as an amendment to the federal Water Pollution Control Act of 1972, which outlined the basic structure for regulating discharges of pollutants to waters of the United States. The CWA serves as the primary federal law protecting the quality of the nation's surface waters, including lakes, rivers, and coastal wetlands.

Waters of the United States are areas subject to federal jurisdiction pursuant to Section 404 of the CWA. Waters of the United States are typically divided into two types: (1) wetlands and (2) other waters of the United States. Wetlands are "areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (33 CFR Section 328.3(c)(4), 40 CFR Section 230.3(o)(3)(iv)). To be considered subject to federal jurisdiction, a wetland must normally support hydrophytic vegetation (plants growing in water or wet soils), hydric soils, and wetland hydrology.[67] Other waters of the United States are seasonal or perennial water bodies, including lakes, stream channels, drainages, ponds, and other surface water features, that exhibit an ordinary high-water mark but lack positive indicators for the three wetland parameters (33 CFR 328.4).

CWA Section 404 regulates the discharge of dredged and fill materials into waters of the United States. Applicants must obtain a permit from the USACE for discharges of dredged or fill material into waters of the United States, including wetlands, before proceeding with a proposed activity.

3.4.2.2 State

California Coastal Act

The California Coastal Act (Public Resources Code Section 30000 et seq.) provides for the long-term management of lands within California's Coastal Zone boundary, as established by the California Legislature and defined in the Coastal Act. Of primary relevance to terrestrial biological resources are Coastal Act policies concerning ESHAs and adjacent developments, and diking, filling, or dredging and continued movement of sediment and nutrients.

The CCC, in partnership with coastal cities and counties, plans and regulates the use of land and water in the Coastal Zone under the Coastal Act. Development activities are broadly defined by

[67] Environmental Laboratory, *Corps of Engineers Wetland Delineation Manual*, Final Report, Department of the Army Waterways Experiment Station, Vicksburg, Mississippi, January 1987.

the Coastal Act to include: the construction of buildings and structures, divisions of land, and activities that change the intensity of use of land or public access to coastal waters. A development activity within the Coastal Zone generally requires a coastal development permit from either the CCC, or from a local government with a certified LCP, to ensure that the activity complies with the Coastal Act. The Coastal Act includes goals and policies that constitute the statutory standards that are applied to planning and regulatory decisions made by the CCC and by local governments.

The CCC generally treats wetlands, streams, riparian habitats, and open coastal waters as ESHAs, although exceptions may exist where the definition of ESHA is not satisfied. Because the CCC typically defines wetlands based on a "one-parameter approach", CCC jurisdictional wetlands are typically greater in extent than those regulated by the USACE under the CWA. An ESHA may also be found in upland areas, for example stands of large, mature trees in an area otherwise lacking such habitat.

The principal Coastal Act policy pertaining to ESHAs is Public Resources Code Section 30240, which provides: "Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values, and only uses dependent on those resources shall be allowed within such areas." ESHA policy is applied by the CCC or by local agencies with approved LCPs.

California Endangered Species Act

California adopted the CESA in 1984. The state act prohibits the take[68] of state listed endangered and threatened species; however, habitat destruction is not included in the state's definition of take. Section 2090 of CESA requires state agencies to comply with endangered species protection and recovery and to promote conservation of these species. The CDFW administers the act and authorizes take through Section 2081 agreements (except for designated fully-protected species, as described under the heading, California Fish and Game Code, below). Under CCR Title 14, Section 786.9(b), CDFW can also approve the take of state rare plants under Section 2081.

California Fish and Game Code

Under California Fish and Game Code (CFGC) Section 3503, it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto. CFGC Section 3503.5 prohibits take, possession, or destruction of any birds in the orders Falconiformes (hawks)[69] or Strigiformes (owls), or of their nests and eggs.

CFGC Sections 3511 [birds], 4700 [mammals], 5050 [reptiles and amphibians] and 5515 [fish] allows the designation of a species as Fully Protected. This is a greater level of protection than is

[68] Take, under the CESA, is defined as "to hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill."

[69] At the time Section 3503.5 was written, the order Falconiformes included diurnal birds of prey in the families Accipitridae (eagles, hawks, kites, harriers and others) and Falconidae (falcons and caracaras). In 2010, Accipitridae was placed in a new order, Accipitriformes, by the North American Classification Committee (NACC). However, for the purposes of this report, we interpret the reference to the order Falconiformes in Section 3503.5 to also include diurnal birds of prey in the order Accipitriformes.

afforded by the CESA, since such a “Fully Protected” designation means the listed species cannot be taken at any time.

Under CFGC Sections 1600-1616, the CDFW regulates activities that would substantially divert, obstruct the natural flow of, or substantially change rivers, streams and lakes. CDFW’s regulated limits are defined in CFGC Section 1602 as, “bed, channel, or bank of, any river, stream, or lake, or deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake….” The CDFW requires a Streambed Alteration Agreement for activities within its regulated area. If CDFW determines that a project would result in substantial adverse effects on an existing fish or wildlife resource, CDFW would prepare a Lake or Streambed Alteration Agreement that includes reasonable measures to protect the resources.

CEQA Guidelines Section 15380

Although threatened and endangered species are protected by specific federal and state statutes, CEQA Guidelines section 15380 provides that a species not listed on the federal or state list of protected species may be considered rare or endangered if the species can be shown to meet certain specified criteria. These criteria have been modeled after the definition in the FESA and the section of the CFGC dealing with rare or endangered plants or animals. This section was included in the Guidelines primarily to deal with situations in which a public agency is reviewing a project that may have a significant effect on, for example, a “candidate species” that has not yet been listed by either the USFWS or CDFW. Thus, CEQA provides an agency with the ability to protect a species from a project’s potential impacts until the respective government agencies have an opportunity to designate the species as protected, if warranted.

Clean Water Act Section 401

Under CWA Section 401, applicants for a federal license or permit to conduct activities that may result in the discharge of a pollutant into waters of the United States must obtain certification from the state in which the discharge would originate or, if appropriate, from the interstate water pollution control agency with jurisdiction over affected water at the point where the discharge would originate. The California Regional Water Quality Control Board (RWQCB) administers this certification. Therefore, all projects that have a federal component and that may affect state water quality (including projects that require federal agency approval, such as issuance of a Section 404 permit) must also comply with CWA Section 401.

Porter-Cologne Water Quality Control Act of 1969

The Porter-Cologne Water Quality Control Act established the State Water Resources Control Board (State Water Board) and divided the state into nine basins, each with its own RWQCB. The State Water Board is the primary state agency responsible for protecting the quality of the state’s surface and subsurface water supplies, while the RWQCBs are responsible for developing and enforcing water quality objectives and implementation plans (basin plans).

The Porter-Cologne Water Quality Control Act authorizes the State Water Board to enact state policies regarding water quality in accordance with Section 303 of the CWA. In addition, the act authorizes the State Water Board to issue Water Discharge Requirements for projects that would discharge to state waters. "Waters of the state" are broadly defined as "any surface water or groundwater, including saline waters, within the boundaries of the state"[70] and include isolated, intrastate, and non-navigable waters and/or wetlands. The Porter-Cologne Water Quality Control Act also provides for protection of the beneficial uses of waters of the state, as described in the regional basin plan.

With respect to biological resources, the State Water Board and RWQCBs have authority over any fill activities within state waters, including isolated water/wetlands that may be outside the jurisdiction of the USACE. The California Wetlands Conservation Policy (Executive Order W-59-93) established a primary objective to "ensure no overall net loss… of wetlands acreage and values in California." The RWQCBs implement this policy, which requires mitigation for wetland impacts.

3.4.2.3 Local

Table 2-10 in Chapter 2, *Project Description*, identifies the approvals from Santa Cruz County and/or the City of Watsonville required for the Project. **Table 3.4-2** presents pertinent local plans and policies regarding biological resources to support County and City consideration of the Project's consistency with general policies.[71] In some cases, local policies are used in this EIR as criteria to determine the significance of physical effects on the environment (e.g., Impact BR-8 in Section 3.4.3.3).

TABLE 3.4-2
LOCAL PLANS AND POLICIES RELEVANT TO THE PROJECT

CITY OF WATSONVILLE PLANS AND POLICIES
City of Watsonville 2005 General Plan
Goal 9.8: Wildlife Habitat. Preserve and protect the remaining areas of wildlife habitat for their scenic and scientific value.
Implementation measure 9.A.4 Biological Study. The City shall cooperate with the County in preparing a biological study for protection of the sloughs and habitat dependent on the sloughs located in and around Watsonville. A plant inventory and map of sensitive biological and botanical resources should be a part of the study.
Implementation measure 9.F.1 Habitat Protection. Impacts to important wildlife habitat areas shall be identified as part of the City's development review and environmental review processes, and appropriate mitigations shall be considered. Mitigation measures to be considered include: designation of sensitive areas as open space, restriction of new development on lands that provide important wildlife habitat, setback requirements, habitat conservation plans, and habitat mitigation banking. Lands within the urban limit line that provide important wildlife habitat include, but are not limited to the following: a) Riparian Corridors, b) Fresh Water Marshes and Sloughs, c) Woodlands and Steep Slopes.

70 California Water Code Section 13050.

71 California Government Code Section 53091 exempts agencies like PV Water from complying with local building and zoning ordinances when locating or constructing facilities for the production, generation, storage, treatment, or transmission of water. California Government Code Section 65402(c) requires that PV Water notify cities and counties of its plans to construct projects or to acquire or dispose of property. The planning agency then has 40 days to determine project consistency with its general plan. If the planning agency disapproves, the disapproval may be overruled by PV Water.

TABLE 3.4-2 (CONTINUED)
LOCAL PLANS AND POLICIES RELEVANT TO THE PROJECT

SANTA CRUZ COUNTY PLANS AND POLICIES
Santa Cruz County General Plan / Local Coastal Program
Objective 5.1: To maintain the biological diversity of the County through an integrated program of open space acquisition and protection, identification and protection of habitat and wildlife corridors and habitats, low-intensity and resource-compatible land uses in sensitive habitats and mitigations on projects and resource extraction to reduce impacts on plant and animal life. (see Santa Cruz County General Plan/Local Coastal Program for details)
Policy 5.1.4: Implement the protection of sensitive habitats by maintaining the existing Sensitive Habitat Protection ordinance. The ordinance identifies sensitive habitats, determines which uses are allowed in and adjacent to sensitive habitats, and specifies required performance standards for land in or adjacent to those areas. Any amendments to this ordinance will require a finding that sensitive habitats will be afforded equal or greater protection by the amended language.
Policy 5.1.6: Sensitive habitats will be protected against any significant disruption of habitat values: and any proposed development within or adjacent to these areas must maintain or enhance the functional capacity of the habitat. Reduce in scale, redesign, or if no other alternative exists, deny any project which cannot sufficiently mitigate significant adverse impacts on sensitive habitats unless approval of a project is legally necessary to allow a reasonable use of the land.
Policy 5.1.11: For areas which may not meet the definition of sensitive habitat, yet contain valuable wildlife resources (such as migration corridors or exceptional diversity), protect these wildlife habitat values and species and use other mitigation measures identified through environmental review process.
Policy 5.1.12: Require as a condition of development approval, restoration of any areas of the subject property which is identified as degraded sensitive habitat, with the magnitude of restoration to be commensurate with the scope of the project. Such conditions may include erosion control measures, removal of non-native or invasive species, planting with characteristic native species, diversion of polluting run-off, water impoundment, and other appropriate means. The object of habitat restoration activities will be to enhance the functional capacity and biological productivity of the habitat(s) and whenever feasible, to restore them to a condition which can be sustained by natural occurrences, such as tidal flushing of lagoons.
Objective 5.2: To preserve, protect and restore all riparian corridors and wetlands for the protection of wildlife and aquatic habitat, water quality, erosion control, open space, aesthetic and recreational values and conveyance and storage of flood waters.
Policy 5.2.1: Designate the following areas as Riparian Corridors: a) 50 feet from the top of a distinct channel or physical evidence of high water mark on perennial stream; b) 30 feet from the top of a distinct channel or physical evidence of high water mark of an intermittent stream as designated from the General Plan maps and through field inspection of undesignated intermittent and ephemeral streams; c) 100 feet of the high water mark of a lake, wetland, estuary, lagoon, or natural body of standing water; d) The landward limit of a riparian woodland community; e) Wooded arroyos within urban areas. Transitional areas between terrestrial and aquatic systems are where the water table is usually at or near the surface, or the land is covered by water. Under a unified methodology now used by all federal agencies, wetlands defined as "those areas meeting certain criteria for hydrology, vegetation, and soils." Examples of wetlands are saltwater marshes, freshwater marshes, open or closed brackish water marshes, swamps, mudflats, and fens.
Policy 5.2.2: Implement the protection of Riparian Corridors and Wetlands through the Riparian Corridor and Wetland Protection ordinance. The ordinance identifies and defines riparian corridors and wetlands, determines the uses which are allowed in and adjacent to these habitats, and specifies required buffer setbacks and performance standards for land in and adjacent to these areas. Any amendments to this ordinance will require a finding that riparian corridors and wetlands will be afforded equal or greater protection by the amended language.
Policy 5.2.3: Development activities, land alteration and vegetation disturbance within riparian corridors and wetlands and required buffers will be prohibited unless an exception is granted per the Riparian Corridor and Wetlands Protection Ordinance.
Policy 5.2.4: Require a buffer setback from riparian corridors in addition to the specified distances found in the definition of riparian corridor. This setback will be identified in the Riparian Corridor and Wetland Protection ordinance and established based on stream characteristics, vegetation and slope. Allow reductions to the buffer setback only upon approval of a riparian exception. Require a 10-foot separation from the edge of the riparian corridor buffer to any structure. For wetlands, the buffer setback is included in the riparian corridor which surrounds the wetland.
Policy 5.2.5: Prohibit development within the 100-foot riparian corridor of all wetlands. Require measurements to prevent water quality degradation from adjacent land uses, as outlined in the Water Resources section.
Policy 5.2.7: Allow compatible uses in and adjacent to riparian corridors that do not impair or degrade the riparian plant and animal systems, or water supply values, such as non-motorized recreation and pedestrian trails, parks, interpretive facilities and fishing facilities.
Policy 5.2.9: Require development in or adjacent to wetlands to incorporate the recommendations of a management plan which evaluates: migratory waterfowl use December 1 to April 30; compatibility of agricultural use and biotic and water quality protection; and the protection of adjoining lands.

TABLE 3.4-2 (CONTINUED)
LOCAL PLANS AND POLICIES RELEVANT TO THE PROJECT

SANTA CRUZ COUNTY PLANS AND POLICIES (cont.)
Santa Cruz County General Plan / Local Coastal Program (cont.)
Policy 5.3.5: Require new water diversions, dams, and reservoirs which are constructed on anadromous fish streams to be designed to protect fish populations and to provide adequate flow levels for successful fish production.
Policy 5.6.1: Pending a determination based on a biological assessment, preserve perennial stream flows at 95 percent of normal levels during summer months and at 70 percent of the normal winter baseflow levels. Oppose new water rights which would diminish the instream flows necessary to maintain anadromous fish runs and riparian vegetation below the 97 percent/70 percent standard.
Santa Cruz County Municipal Code
Chapter 16.30 Riparian Corridor and Wetland Protection **16.30.040 Protection.** No person shall undertake any development activities other than those allowed through exemptions and exceptions as defined in the Santa Cruz Municipal Code (see code for details)
Chapter 16.32 Sensitive Habitat Protection (see code for details)
Chapter 16.34 Significant Trees Protection (see code for details)
SOURCE: City of Watsonville, Watsonville 2005 General Plan, Adopted May 24, 1994; County of Santa Cruz, 1994 General Plan/Local Coastal Program, Chapter 5 – Conservation and Open Space, Effective December 19, 1994.

3.4.3 Impacts and Mitigation Measures

3.4.3.1 Significance Criteria

In accordance with the CEQA, state CEQA *Guidelines* (including Appendix G), relevant plans, policies, and/or guidelines, and agency standards, the Project could have a significant impact on Biological Resources if it were to:

- Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW or USFWS;
- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by CDFW and USFWS;
- Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means;
- Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites;
- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; or
- Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

The following topics are not analyzed further in this section for the reasons described below:

- ***Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan***. The Project would not conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan, because there are no adopted Habitat Conservation Plans, Natural Community Conservation Plans, or other approved habitat conservation plans within the Project area.

3.4.3.2 Methodology

As described in Section 3.1, this EIR provides an independent analysis of the Project's potential environmental impacts. As part of approval of the 2014 BMP Update PEIR, the Board of Directors adopted extensive mitigation measures (Resolution 2014-05) to avoid or reduce significant impacts on biological resources. **Appendix PD-2** presents these measures, which are considered part of the College Lake Project and thus are considered prior to any significance determinations. Potential impacts are evaluated in the following section. If warranted, additional mitigation is included and takes the form of (1) modifications to update the mitigation measures presented in Appendix PD-2 to reflect current conditions and site-specific impacts; or (2) new mitigation measures to replace or augment an adopted mitigation measure.

3.4.3.3 Impacts and Mitigation Measures

Impact BR-1: Construction of Project components could result in a substantial adverse effect on special-status species. (*Less than Significant with Mitigation*)

Overview of Construction Activities

Activities associated with construction of the proposed weir structure and intake pump station, demolition of the existing weir and intake pump station, construction of the WTP, and construction of the College Lake pipeline have the potential to impact special-status species and/or their habitat.

The work area for the removal of the existing weir structure and intake pump station and construction of the proposed weir structure and intake pump station is approximately 0.57 acre. Of this area, 0.37 acre is within Salsipuedes Creek and adjacent seasonal wetland, riparian forest, and farmed wetland habitats. The remaining area (0.20 acre) is upland agriculture and annual grassland. Temporary sheetpiles and/or a cofferdam may be installed during installation of the new weir and dewatering likely would be needed. It is anticipated that the work area would be kept dry during removal of the existing weir through the use of dewatering wells or sumps if necessary.

Both WTP sites are located within existing agricultural areas west of Salsipuedes Creek and south of College Lake. If the WTP is installed at the preferred site, the temporary disturbance area would be approximately 6.5 acres in extent (including five acres of permanent disturbance), and if it is installed at the optional WTP site, the temporary disturbance area would be a total of approximately 6.9 acres in extent (including six acres of permanent disturbance).

The width of the construction corridor for the College Lake pipeline would be approximately 40 feet in agricultural areas and 20 feet in urban areas. The majority of the pipeline route consists of developed or agricultural areas. Conventional open trench construction techniques would be used for installation of pipelines in existing roadways and agricultural fields. Crossings of several surface features, including Corralitos Creek, railroads, and state highways, would require trenchless construction. The pipeline would be constructed through the Pinto Creek drainage ditch using open trench construction during the dry weather season. Although Pinto Creek, which is within the Project area, is typically dry in the summer, if water is present during construction in Pinto Creek, it is assumed that temporary cofferdams would be installed through this ditch and that the work area would be dewatered.

Construction Impacts on Special-Status Species

Several special-status fish and wildlife species have a moderate or high potential to occur within or adjacent to the Project construction areas described above. Potential construction-related impacts on these species are addressed below. No special-status plant species have potential to occur within the study area. Therefore, there would be no impact on special-status plant species.

Fish, California Red-legged Frog, and Western Pond Turtle

S-CCC steelhead are known to occur in Salsipuedes Creek, Corralitos Creek, College Lake, and upstream tributary streams. Pacific lamprey are known to occur in Salsipuedes Creek and Corralitos Creek, and may be present in College Lake. Hitch and roach (presumably belonging to the special-status subspecies) have also been observed in College Lake. CRF have not been observed within Salsipuedes Creek or Corralitos Creek within the study area. However, these areas contain potentially suitable breeding and non-breeding aquatic habitat and CRF have potential to occur in these creeks within the study area. Although WPT have not been observed within Salsipuedes Creek or Corralitos Creek within the study area, it has potential to occur within these creeks. There is low potential for CRF and WPT to occur within agricultural drainage ditches within the study area.

Individual steelhead, Monterey roach, Monterey hitch, CRF, and WPT have potential to occur within Salsipuedes Creek during demolition of the existing weir structure and intake pump station and installation of the proposed weir structure and intake pump station. CRF and WPT also have potential to occur in Pinto Creek and the West Beach Street drainage ditch during pipeline installation The movement of construction vehicles, equipment, or Project materials across the Project area could cause direct mortality of individuals, if present, by crushing. Impacts could also occur due to increased sedimentation in streams, deteriorated water quality, dewatering of channel pools, reducing the wetted extent of the pools (including exposing CRF egg masses or larvae to desiccation or predation), or other construction disturbance. Increased noise and human presence from construction equipment, vehicles, and personnel may alter CRF and WPT behavior in ways that could result in injury or mortality. Project activities could also result in increased movement, flushing from cover, or other altered activity patterns that reduce energy reserves and increase predation risks. Trash left on-site during or after construction could attract predators. Construction activities could promote the long-term spread of non-native invasive vegetation, which could degrade habitat over time. These impacts would be significant.

The adopted Mitigation Measures BIO-1b, 2a through 2l, and 2n, which address most of these potential impacts, are presented in Appendix PD-2. Implementation of these adopted mitigation measures would reduce but not completely eliminate potential impacts on steelhead, CRF, WPT and their habitat to a less-than-significant level. Additional impacts on steelhead due to potential stranding and poor water quality during construction, and the loss of CRF and WPT habitat are discussed below.

Lake Drainage for Construction Activities

As described in Section 2.1.4 and Section 3.3, Surface Water, Groundwater, and Water Quality, under current operations, RD 2049 pumps water out of College Lake in the spring to accommodate summer agricultural production. This lowers the water surface elevation of College Lake below the elevation of the existing weir and prevents juvenile steelhead (smolts) from migrating downstream to the ocean. Juvenile steelhead become trapped immediately upstream of the existing weir, exposing them to rapidly declining water levels and dissolved oxygen concentrations, increased water temperatures, predation pressures, and potential pump entrainment or impingement. While full implementation of the Project would reduce this existing adverse effect on steelhead, College Lake would still need to be drained prior to construction of the proposed weir structure in a manner similar to existing RD 2049 operations, potentially resulting in similar adverse effects to steelhead and other special-status fish species, a significant impact. **Mitigation Measure BR-1a** would reduce this impact to less than significant by requiring implementation of measures to minimize harm and mortality to steelhead and other native fish resulting from lake draining and construction site dewatering.

Degraded Water Quality

Eroded sediment and hazardous construction chemicals from Project construction activities can be transported offsite via stormwater runoff and adversely affect receiving downstream water bodies and degrade habitat for aquatic animals. Compliance with the *NPDES General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities* (Order 2009-0009-DWQ, NPDES No. CAS000002; as amended by Orders 2010-0014-DWQ and 2012-006-DWQ) (also referred to as the Construction General Permit) mandates the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP would specify established best management practices to be used to control stormwater run-on/runoff and sediment (such as use of check dams and fiber rolls for reducing erosion on slopes and retaining sediment in stormwater) that would be implemented during construction. These best management practices would avoid or minimize stormwater and water quality effects on aquatic habitat caused by construction site runoff. The Project is larger than one acre and is therefore required to comply with conditions of the Construction General Permit. As such, PV Water would comply with conditions of the Construction General Permit, and any additional measures required by the RWQCB as the local agency for oversight on compliance with the Construction General Permit, pursuant to adopted Mitigation Measure HWQ-1. See additional discussion of potential water quality-related impacts in Section 3.3, Surface Water, Groundwater, and Water Quality.

One section of the new pipeline would be installed beneath Corralitos Creek using horizontal directional drilling (HDD). Although not anticipated, there is potential for frac-outs to occur using HDD.[72] If a frac-out occurs, bentonite slurry could be released into the Corralitos Creek, which could degrade water quality and adversely affect steelhead, CRF, and WPT habitat and/or individuals by increasing suspended sediments, a significant impact. **Mitigation Measure BR-1b** would reduce this impact to less than significant by requiring preparation of a Frac-out Contingency Plan and implementation of measures to contain and clean-up any frac-outs in waterways to minimize impacts of frac-outs on special-status species and their habitat.

Temporary and Permanent Loss of Habitat

Removal of the existing weir structure and intake pump station and installation of the proposed weir structure and intake pump station, including installation of temporary sheetpiles and or a cofferdam and dewatering, would temporarily impact approximately:

- 0.1 acre of steelhead, and potential CRF and WPT aquatic habitat within Salsipuedes Creek; and
- 0.3 acre of riparian and seasonal wetland dispersal habitat associated with Salsipuedes Creek.

Removal of the existing weir structure and intake pump station would create approximately 300 square feet of open water channel aquatic habitat. The installation of the proposed adjustable weir would result in 0.07 acre of increased open water channel aquatic habitat and the permanent loss of approximately 0.029 acre of riparian and seasonal wetland dispersal habitat.

Installation of the pipeline through the Pinto Creek drainage ditch, including installation of temporary cofferdams and dewatering if needed, would temporarily impact approximately 100 square feet of potential CRF and WPT aquatic habitat. Temporary and permanent loss of CRF and WPT habitat would be significant. Revised **Mitigation Measures BIO-1c** and **BIO-1d** below would reduce these impacts to less than significant by ensuring that temporarily impacted habitat is restored to pre-construction conditions and providing compensation for permanent loss of potential habitat.

Birds

College Lake has over 200 documented bird species. During the past five years of PV Water funded waterfowl surveys, between 82 and 140 species have been documented at College Lake each study season. These birds and their nests are protected by the MBTA and CFGC. In addition, special-status birds such as white-tailed kite (a CDFW Fully Protected Species), yellow warbler (a California species of special concern), golden eagle (a CDFW Fully Protected Species), and bald eagle (a CESA endangered and CDFW Fully Protected Species) have potential to nest in or around the construction area.

Construction activities could result in direct impacts on breeding birds through direct removal of breeding habitat such as apple trees at the preferred WTP site and other vegetation removal during removal of the existing weir structure and intake pump station, installation of the proposed weir structure and intake pump station, and pipeline installation. Trees, shrubs, and other structures

[72] A frac-out is the condition where drilling mud or fluid is inadvertently released through fractured bedrock into the surrounding substrate and travels toward the surface where it could impact sensitive aquatic habitat and degrade water quality (i.e., elevated turbidity, suspended sediment, and deposition of drilling material into the water body).

adjacent to the construction footprint provide nesting habitat for these species. If nesting birds are present, their breeding may be disrupted due to construction noise and activities. The effects of disturbance from construction activities on breeding birds would be a potentially significant impact. In accordance with adopted Mitigation Measure BIO-2i, for any work conducted within the breeding bird season, PV Water would ensure that the Project area is surveyed for breeding birds and that any breeding birds are avoided. Adopted Mitigation Measures BIO-2i would ensure that potential impacts on special-status birds are less than significant.

Other special-status birds, such as American peregrine falcon, are either known to forage or hunt, or have potential to forage or hunt within the Project area. Project construction impacts would only temporarily disturb a small extent of suitable foraging habitat for these species at College Lake and Salsipuedes Creek, and impacts on habitat would be short-lived and less than significant.

Bats

Bats, including special-status bats such as western red bat, have potential to roost in trees in riparian areas in or around the Project area. Roosting bats could be disturbed, killed, or injured by tree removal activity if present in construction areas. Noise or construction activities near an active bat roost could disrupt breeding or roosting, a potentially significant impact. Implementation of **Mitigation Measure BR-1c** would reduce this impact to less than significant by requiring the identification and avoidance of active bat roost sites and the implementation of avoidance and minimization measures when non-maternity or hibernation bat roosts cannot be avoided.

San Francisco Dusky-footed Woodrat

The San Francisco dusky-footed woodrat has potential to occur within the Project area at Salsipuedes Creek during removal of the existing weir structure and pump station, and installation of the proposed weir structure and pump station. If woodrat nests are present within the construction area, individual woodrats could be injured or killed by construction equipment, a potentially significant impact. Implementation of **Mitigation Measure BR-1d** would reduce this impact to less than significant by requiring pre-construction surveys for San Francisco dusky-footed woodrat, avoidance of nests, and relocation of nests if they cannot be avoided.

Impact Conclusion

Compliance with the adopted Mitigation Measures BIO-1b, 2a through 2l, 2n, and HWQ-1, implementation of revised adopted Mitigation Measures BIO-1c and 1d,[73] and implementation of Mitigation Measures BR-1a through 1d would effectively reduce construction-related impacts on special-status species and their habitat to less-than-significant levels. Thus, construction-related impacts on special-status species would be ***less than significant with mitigation***.

---

73 Text that has been revised in adopted mitigation measures is indicated with <u>underlining</u> where text has been added, and ~~strikethrough~~ where text has been deleted.

Mitigation Measure BR-1a: Fish Relocations.

Prior to, or concurrent with, draining of College Lake and/or dewatering of the construction site, special-status and other native fish species shall be captured and relocated by a qualified fisheries biologist. The following measures shall be taken to minimize harm and mortality to steelhead and other native fish resulting from fish relocation and dewatering activities:

1) Fish relocation shall be performed by a qualified fisheries biologist, with all necessary state and federal authorizations. Captured fish shall be moved to the nearest appropriate site outside of the work area. A record of relocation activities shall be maintained and include the date of capture and relocation, the method of capture, the location of the relocation site in relation to the Project site, and the number and species of fish captured and relocated;
2) Electrofishing shall be conducted by properly trained personnel following *NOAA Guidelines for Electrofishing Waters Containing Salmonids Listed under the Endangered Species Act*, June 2000.
3) Prior to capturing fish, the most appropriate release location(s) shall be determined.
4) The most efficient method for capturing fish shall be determined by the biologist. Complex stream habitat generally requires the use of electrofishing equipment, whereas in outlet pools, fish may be concentrated by pumping-down the pool and then seining or dip-netting fish.
5) Handling of salmonids shall be minimized. However, when handling is necessary, hands or nets shall be wetted prior to touching fish.
6) Captured fish shall be held in cool, shaded, aerated water in a container with a lid. Aeration shall be provided with a battery-powered external bubbler. Fish shall be protected from jostling and noise, and shall not be removed from this container until time of release.
7) Air and water temperatures shall be measured periodically. A thermometer shall be placed in holding containers and, if necessary, periodically conduct partial water changes to maintain a stable water temperature. If water temperature reaches or exceeds 18 degrees Celsius, fish shall be released and rescue operations ceased, if feasible.
8) Overcrowding in containers shall be avoided by having at least two containers and segregating young-of-year fish from larger age-classes to avoid predation. If fish are abundant, the capturing of fish and amphibians shall cease periodically and shall be released at the predetermined locations.
9) Species and year-class of fish shall be visually estimated at time of release. The number of fish captured shall be counted and recorded. Anesthetization or measuring fish shall be avoided unless requested by appropriate resource agencies (NMFS, CDFW).

Fish relocation activities are typically restricted to the period of June 15 through November 1. However, draining of College Lake may have to commence prior to June 1 to ensure the lake is fully drained prior to the start of construction. If lake draining commences prior to June 1 (as it regularly does under existing conditions), fish relocations would be timed accordingly. Given that steelhead present at the time of draining are likely to be smolts attempting to reach the ocean, pre-June 1 relocations concurrent with lake draining would ensure suitable downstream passage conditions and timing for relocated smolts.

Mitigation Measure BR-1b: Frac-out Contingency Plan.

If HDD installation is implemented, PV Water shall require the contractor to retain a licensed geotechnical engineer to develop a Frac-out Contingency Plan. PV Water would submit the Frac-out Contingency Plan to the appropriate resource agencies (CDFW, RWQCB, USACE, USFWS, and NMFS) for review prior to the start of construction of any pipeline that would use HDD installation to avoid surface waters. The Frac-out Contingency Plan shall be implemented where HDD installation under a waterway will occur to avoid, minimize, or mitigate for potential Project impacts during HDD installation, as specified in the Frac-out Contingency Plan. The Frac-out Contingency Plan shall include, at a minimum:

1) Measures describing training of construction personnel about monitoring procedures, equipment, materials and procedures in place for the prevention, containment, clean-up (such as creating a containment area and using a pump, using a vacuum truck, etc.), and disposal of released bentonite slurry, and agency notification protocols;
2) Methods for preventing frac-out including maintaining pressure in the borehole to avoid exceeding the strength of the overlying soil.
3) Methods for detecting an accidental release of bentonite slurry that include: (a) monitoring by a minimum of one biological monitor throughout drilling operations to ensure swift response if a frac-out occurs; (b) continuous monitoring of drilling pressures to ensure they do not exceed those needed to penetrate the formation; (c) continuous monitoring of slurry returns at the exit and entry pits to determine if slurry circulation has been lost; and (d) continuous monitoring by spotters to follow the progress of the drill bit during the pilot hole operation, and reaming and pull back operations.
4) Protocols that the contractor would follow if there is a loss of circulation or other indicator of a release of slurry.
5) Cleanup and disposal procedures and equipment the contractor would use if a frac-out occurs.
6) If a frac-out occurs, the contractor shall immediately halt work, implement the measures outlined in Item 5 of the Frac-out Contingency Plan to contain, clean-up, and dispose of the bentonite slurry, and, if the frac-out occurs in the water channel, notify and consult with the staffs of the agencies listed above before HDD activities can begin again.

PV Water shall require the contractor to implement Frac-out Contingency Plan to ensure that measures are implemented to prevent frac-out and if a frac-out occurs, implement measures to contain, clean-up, and dispose of the bentonite slurry.

Mitigation Measure BIO-1c (Revised):

Where construction impacts ~~to~~n mixed riparian or willow riparian forest occur, revegetation and restoration measures will be developed as part of a revegetation plan approved by CDFW, RWQCB, and if applicable, USACE and/or California Coastal Commission, pursuant to regulatory agency permitting. The revegetation plan will include specific plans for the revegetation of impacted riparian forest, and for restoration of nearby creek riparian habitat, as appropriate. Upon approval by ~~Santa Cruz County and other~~ applicable agencies, PV Water ~~the PVWMA~~ may choose to coordinate with the Natural Resources Conservation Service ~~(NRCS)~~ and the Santa Cruz County Resource Conservation District (RCD) to develop and implement the required riparian revegetation, including providing funds to the RCD for their implementation of the revegetation. Revegetation measures will include the use of locally obtained plant materials, detailed descriptions of installation methods, after-installation care, weed control measures, success criteria, and corrective measures if the success criteria are not met. Temporarily impacted areas will be restored to pre-construction conditions with equivalent or greater habitat quality. Revegetation will include a 3:1 replacement ratio of the acreage of riparian habitat lost and for all trees lost as result of the Project to account for the reduced habitat values of smaller trees compared with mature vegetation. Success criteria for replanting will be less than 20 percent mortality of individual species annually ~~yearly~~ for 5 years. Replanting will be conducted each year that plantings exceed 20 percent ~~%~~ mortality, such that 80 percent ~~%~~ plant survival is maintained each year of the 5-year monitoring period. Cover provided by invasive, non-native plant species shall not exceed 5 percent ~~%~~ during each year of the 5-year monitoring period.

Mitigation Measure BIO-1d (Revised):

Where construction impacts ~~to~~n open water (creeks, streams, jurisdictional ditches), seasonal wetlands, or coastal freshwater marsh occurs, revegetation and restoration measures will be developed as part of a revegetation plan approved by CDFW, RWQCB, USACE, ~~and/or~~ California Coastal Commission, and/or Santa Cruz County, pursuant to regulatory agency permitting. Upon approval by ~~Santa Cruz County and other~~ applicable agencies, PV Water ~~the PVWMA~~ may choose to coordinate with the Natural Resources Conservation Service ~~(NRCS)~~ and the Santa Cruz County R~~esource Conservation District~~ ~~(~~RCD~~)~~ to develop and implement the required wetland revegetation and restoration, including providing funds to the RCD for their implementation of the revegetation and restoration. The revegetation plan will include specific plans for the revegetation of impacted ~~coastal marsh~~ wetlands, and for restoration of nearby wetland habitat, as appropriate. Revegetation measures will include the use of locally obtained plant materials, detailed descriptions of installation methods, after-installation care, weed control measures, success criteria, and corrective measures if the success criteria are not met. Temporarily impacted areas will be restored to pre-construction conditions with equivalent or greater habitat quality. Revegetation will include a 3:1 replacement ratio (or an equivalent habitat replacement strategy as agreed upon by PV Water ~~PVWMA~~ and regulatory agencies) for impacted wetlands. If natural recovery is a viable strategy, then a wetland plant cover exceeding 50 percent ~~%~~ should be attained after two growing seasons. Mitigation may occur via restoration, creation, or preservation of wetlands or waters. Mitigation will occur at a site acceptable to permitting agencies and pursuant to the Project's permit requirements. If the compensatory mitigation includes restoration, enhancement, or creation of wetlands or waters, a qualified biologist will monitor the designated wetland mitigation area for a minimum of five years to ascertain if the wetland mitigation is successful. Annual reports will be submitted to permitting agencies by December 31 of each monitoring year, describing the results of the monitoring and any remedial actions needed to achieve a minimum 3:1 habitat replacement ratio or equivalent for permanent impacts ~~to~~n wetlands~~ and other waters~~.

Mitigation Measure BR-1c: Avoid and Minimize Impacts on Special-status Bat Species.

A qualified biologist who is experienced with bat surveying techniques, behavior, roosting habitat, and identification of local bat species shall be consulted prior to initiation of construction activities to conduct a preconstruction habitat assessment to characterize potential bat habitat and identify active roost sites. The preconstruction habitat assessment shall be conducted within 100 feet of construction activities conducted in and around riparian habitat.

Should potential roosting habitat or potentially active bat roosts be identified during the habitat assessment in trees and/or structures to be disturbed under the Project, the following measures shall be implemented:

1. Removal or disturbance of trees or structures (e.g. the existing weir and intake pump station) identified as potential bat roosting habitat or active roosts shall occur when bats are active, approximately between the periods of March 1 to April 15 and August 15 to October 15, to the extent feasible. These dates avoid bat maternity roosting season (approximately April 15 to August 31) and periods of winter torpor (approximately October 15 to February 28).
2. If removal or disturbance of trees and structures identified as potential bat roosting habitat or active roosts during the periods when bats are active is not feasible, a qualified biologist would conduct pre-construction surveys within 14 days prior to disturbance to further evaluate bat activity within the potential habitat or roost site.
    a. If active bat roosts are not identified in potential habitat during preconstruction surveys, no further action is required prior to removal of- or disturbance to trees and structures within the preconstruction survey area.
    b. If active bat roosts or evidence of roosting is identified during pre-construction surveys, the qualified biologist shall determine, if possible, the type of roost and species.
        i. If special-status bat species or maternity or hibernation roosts are detected during these surveys, appropriate species- and roost-specific avoidance and protection measures shall be developed by the qualified biologist in coordination with CDFW. Such measures may include postponing the removal of structures or trees, or establishing exclusionary work buffers while the roost is active. A minimum 100-foot no disturbance buffer shall be established around special-status species, maternity, or hibernation roosts until the qualified biologist determines they are no longer active. The size of the no-disturbance buffer may be adjusted by the qualified biologist, in coordination with CDFW, depending on the species present, roost type, existing screening around the roost site (such as dense vegetation or a building), as well as the type of construction activity that would occur around the roost site, and if construction would not alter the behavior of the adult or young in a way that would cause injury or death to those individuals.

Under no circumstances shall active maternity roosts be disturbed until the roost disbands at the completion of the maternity roosting season or otherwise becomes inactive, as determined by the qualified biologist.

ii. If a non-maternity or hibernation roost (e.g., bachelor daytime roost) is identified, disturbance to- or removal of trees or structures may occur under the supervision of a qualified biologist as described under measure 3).

3. The qualified biologist shall be present during tree and structure disturbance or removal if active non-maternity or hibernation bat roosts or potential roosting habitat are present. Trees and structures with active non-maternity or hibernation roosts or potential habitat shall be disturbed or removed only under clear weather conditions when precipitation is not forecast for three days and when nighttime temperatures are at least 50 degrees Fahrenheit, and when wind speeds are less than 15 mph.

   a. Trimming or removal of trees with active (non-maternity or hibernation) or potentially active roost sites shall follow a two-step removal process:

      i. On the first day of tree removal and under supervision of the qualified biologist, branches and limbs not containing cavities or fissures in which bats could roost, shall be cut only using hand tools (e.g., chainsaws).

      ii. On the following day and under the supervision of the qualified biologist, the remainder of the tree may be removed, either using hand tools or other equipment (e.g. excavator or backhoe).

      iii. All felled trees shall remain on the ground for at least 24 hours prior to chipping, off-site removal, or other processing to allow any bats to escape, or be inspected once felled by the qualified biologist to ensure no bats remain within the tree and/or branches.

   b. Disturbance to or removal of structures containing or suspected to contain active bat (non-maternity or hibernation) or potentially active bat roosts shall be done in the evening and after bats have emerged from the roost to forage. Structures shall be partially dismantled to significantly change the roost conditions, causing bats to abandon and not return to the roost. Removal would be completed the subsequent day.

4. Bat roosts that begin during construction are presumed to be unaffected as long as a similar type of construction continues, and no buffer would be necessary. Direct impacts on bat roosts or take of individual bats would be avoided.

Mitigation Measure BR-1d: Avoidance and Minimization Measures for San Francisco Dusky-Footed Woodrat.

The following measures shall be implemented to avoid and minimize impacts on San Francisco dusky-footed woodrat:

1. A qualified wildlife biologist shall conduct preconstruction surveys for San Francisco dusky-footed woodrat in the Salsipuedes Creek riparian corridor within the existing and proposed weir structure and intake pump station work area. The surveys shall be conducted within 14 days prior to the start of construction in suitable habitat and shall identify any woodrat nests located within 50 feet of anticipated construction disturbance areas.

2. If woodrat nests are found during the preconstruction surveys, the wildlife biologist shall conduct additional surveys throughout the duration of construction activities at the Project site to identify any newly constructed woodrat nests.

3. If nests are observed outside of the construction area, the qualified biologist shall demarcate a minimum 50-foot buffer area with orange construction fencing and require that all construction activities and disturbance remain outside of the fencing.

4. Active woodrat nests located within the anticipated construction disturbance areas shall be relocated. Nests shall be relocated outside of the peak breeding season as feasible to minimize disturbance to young woodrats. Woodrat breeding season is December to September with peak breeding in mid-spring. Relocation of woodrats and/or their nests shall be conducted by the qualified wildlife biologist as follows:

    a. Clear understory vegetation from around the nest using hand tools.

    b. After all vegetative cover has been cleared around the nest, the biologist shall gently disturb the nest to encourage the woodrat(s) to abandon the nest and seek cover in adjacent habitat.

    c. Once the woodrats have left the nest, the biologist shall carefully relocate the nest sticks to suitable habitat outside of the construction disturbance area, piling the sticks at the base of trees or large shrubs if available. If multiple nests are relocated, the stick piles shall be placed at least 25 feet from one another.

    d. The qualified biologist supervising woodrat nest relocation shall ensure potential health hazards to the biologists moving nests are addressed to minimize the risk of contracting diseases associated with woodrats and woodrat nests. These include hantavirus, Lyme disease, and plague. The biologists that relocate nests shall take the following precautionary safety measures:

        i. Wear a Cal/OSHA-certified facial respirator to reduce inhalation of potential disease causing organisms.

        ii. Wear a white Tyvec protective suit to provide a barrier for ticks and fleas and facilitate their detection and removal and use gloves.

    e. If young woodrats are encountered during dismantling of the nest, nest material shall be replaced and a 50-foot no-disturbance buffer shall be established around the active nest. The buffer shall remain in place until the young woodrats have matured enough to disperse on their own accord and the nest is no longer active. Nesting substrate shall then be collected and relocated to suitable habitat outside of the Project area.

____

Impact BR-2: Construction of Project components would result in a substantial adverse effect on riparian habitat or other sensitive natural community or on state or federally protected wetlands or waters through direct removal, filling, hydrological interruption, or other means. (*Less than Significant with Mitigation*)

Sensitive natural communities, including riparian habitat, ESHA, and state or federally protected wetlands or waters occur within and adjacent to the Project area, as described in Section 3.4.1.7.

Sensitive natural communities within or adjacent to Project construction areas could be temporarily or permanently impacted during Project construction. Project construction activities that could impact these sensitive features are described in Impact BR-1. Potential construction impacts on sensitive natural communities are described below.

Direct Impacts

Salsipuedes Creek within the Project area includes the open water perennial channel and associated riparian forest and seasonal wetland. These features are considered sensitive natural communities and the open water, riparian forest, seasonal wetland, and farmed wetland, are considered potentially jurisdictional as regulated by the USACE, CDFW, and RWQCB. Removal of the existing weir structure and intake pump station and installation of the proposed weir structure and intake pump station, including installation of temporary sheetpiles and/or a cofferdam and dewatering, would result in temporary and permanent impacts on these resources, as shown below in **Table 3.4-3**.

TABLE 3.4-3
TEMPORARY AND PERMANENT IMPACTS (ACRE) TO RIPARIAN HABITAT AND STATE AND FEDERALLY-PROTECTED WETLANDS AND WATERS

Resource Type	Permanent		Temporary
	Intake pump station, adjustable weir, and concrete wing walls	Conversion to open water in Salsipuedes Creek	
Salsipuedes Creek	0.003	-	0.092
Riparian Forest	0.008	0.024	0.015
Seasonal Wetland	0.018	0.041	0.260
Farmed Wetland	-	-	0.003
Total	0.029	0.065	0.370

SOURCE: Environmental Science Associates

The intake pump station, adjustable weir, and concrete wing walls would permanently impact 0.029 acre of riparian habitat and state and federally-protected wetlands and waters. Approximately, 0.065 acre of riparian and seasonal wetland habitat would be converted to open water in Salsipuedes Creek since the upstream and downstream concrete weir abutments and concrete wing walls would effectively increase the width of the channel in these areas and the channel would be lined in concrete. This habitat conversion would thereby further increase the area of open water where seasonal wetland and riparian habitat are currently located. The net loss of wetlands and other waters of the U.S. would be approximately 0.029 acre.

Pinto Creek within the Project area is an open water seasonal channel that is considered a sensitive natural community and potentially jurisdictional by the USACE and RWQCB. Installation of the pipeline through the Pinto Creek drainage ditch including installation of temporary cofferdams and dewatering if needed, would temporarily impact approximately 100 square feet of Pinto Creek. Temporary and permanent loss of a sensitive natural community is a potentially significant impact.

Indirect Impacts

Sensitive natural communities near many Project components, including Salsipuedes Creek and Pinto Creek downstream of the Project footprint and the West Beach Street drainage ditch, could be subject to indirect impacts as a result of Project construction. The West Beach Street drainage ditch is a sensitive natural community, potentially jurisdictional as regulated by the USACE, CDFW, and RWQCB, and is located within the Coastal Zone and therefore may be considered an ESHA by the CCC/County LCP. Indirect impacts on sensitive natural communities outside the Project footprint could occur if construction activities inadvertently extend beyond the designated construction work area, if sediment is discharged downstream as a result of the installation of temporary cofferdams and dewatering, and/or if trash and debris is left in the features following construction. Other indirect impacts include sedimentation as a result of increased soil erosion from grading or trenching activities and degradation of water quality from pollutants (e.g., oil, hydraulic fluid) that are conveyed by surface water runoff from the construction site to offsite sensitive natural communities. These indirect impacts would be potentially significant.

PV Water would require the contractor to prepare and implement a SWPPP and best management practices to avoid or minimize water quality effects on aquatic sensitive natural communities, pursuant to adopted Mitigation Measure HWQ-1, which would reduce impacts from sedimentation and erosion to less than significant. Further, implementation of adopted Mitigation Measures BIO-1b, revised Mitigation Measures BIO-1c and 1d, and **revised Mitigation Measure BIO-1e**, would ensure that direct and indirect impacts on sensitive natural communities are less than significant. In accordance with Mitigation Measure BIO-1b, PV Water would require the contractor to implement measures to maintain water quality and to control erosion and sedimentation such as restricting trenching across all waterways to low-flow periods, diverting water around work areas, and placing sediment curtains downstream of the construction zone. In accordance with revised adopted Mitigation Measures BIO-1c and BIO-1d, PV Water would ensure that temporarily impacted sensitive natural communities are restored to pre-construction conditions and provide compensation for permanent loss of sensitive natural communities. In accordance with the revised Mitigation Measure BIO-1e, PV Water would ensure that, where construction occurs and/or facilities are placed within a riparian or wetland development setback area, indirect impacts on adjacent riparian and wetland vegetation would be reduced.

As described under Impact BR-1, the College Lake pipeline would be installed beneath Corralitos Creek, a sensitive natural community and potentially jurisdictional feature regulated by the USACE, CDFW, and RWQCB. The pipeline would be installed using HDD or jack and bore methods, requiring preparation of a Frac-out Contingency Plan and implementation of measures in the Plan to contain and clean-up any frac-outs in waterways to minimize impacts of frac-outs on sensitive natural communities pursuant to Mitigation Measure BR-1b.

Impact Conclusion

Compliance with the adopted Mitigation Measures BIO-1b and HWQ-1, implementation of revised adopted Mitigation Measures BIO-1c, BIO-1d, and BIO-1e, and implementation of Mitigation Measure BR-1b would effectively reduce and mitigate impacts on sensitive natural communities, including potentially jurisdictional wetlands and waters, to a less-than-significant level. Thus impacts would be ***less than significant with mitigation***. Minimization of temporary and permanent impacts on sensitive natural communities (including potentially jurisdictional features regulated by the USACE, CDFW, and RWQCB) would be achieved through implementation of best management practices to protect water quality, and a Frac-Out Contingency Plan to protect Corralitos Creek. Mitigation for temporary and permanent impacts on sensitive natural communities would be achieved through on-site restoration and revegetation of areas temporarily impacted by construction, and off-site restoration and wetland creation to replace the area of sensitive natural communities that would be permanently lost. On and off-site revegetation would be carried out at a 3:1 replacement ratio, and according to a revegetation plan with stated success criteria. Success would be tracked and assessed through monitoring and reporting.

Mitigation Measure BIO-1e (Revised).

Where construction and/or facilities are placed within a riparian or wetland development setback area (as defined in the Santa Cruz County Municipal Code), indirect impacts ~~to~~n adjacent riparian and wetland vegetation will be minimized. Where feasible, buffer plantings of native trees and shrubs will be installed between the facility and the adjacent wetland or riparian resource to provide a vegetated buffer. A buffer planting plan will be prepared as part of a revegetation plan approved by CDFW, RWQCB, USACE, and/or California Coastal Commission, pursuant to regulatory agency permitting. The buffer planting plan will include specific revegetation measures, including the use of locally obtained plant materials, detailed descriptions of installation methods, after-installation care, weed control measures, success criteria, and corrective measures if the success criteria are not met.

Mitigation Measure BR-1b: Frac-out Contingency Plan (See Impact BR-1)

Mitigation Measure BIO-1c (Revised) (See Impact BR-1)

Mitigation Measure BIO-1d (Revised) (See Impact BR-1)

Impact BR-3: Construction of Project components could interfere substantially with the movement of any native resident or migratory wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites. (*Less than Significant*)

Impacts on special-status species including CRF, WPT, specials-status birds, and steelhead, that have potential to utilize the Project area as a movement corridor are assessed in Impacts BR-1 and BR-2.

When filled with stormwater runoff in winter and spring, College Lake supports a variety of waterfowl, including ducks, herons, gulls and shorebirds. College Lake provides wintering habitat for many migratory bird species, and is noted for waterfowl abundance and diversity during the winter. It also provides migration habitat for many shorebird species during spring drawdown. No construction activities would occur within College Lake, so there would be no impact on the migratory wildlife corridor within College Lake during project construction.

Salsipuedes Creek and Corralitos Creek within the Project area also provide a movement corridor for common wildlife species such as birds and amphibians that utilize creek and riparian corridors throughout the Pajaro Valley. As described in Impacts BR-1 and BR-2, construction activities would temporarily impact Salsipuedes Creek during construction of the proposed weir structure and intake pump station and removal of the existing weir and pump station. These impacts would be relatively small and short-term (approximately 16 months[74]). The proposed weir structure and intake pump station would be larger than the existing weir structure and intake pump station, but are not expected to significantly impede wildlife movement through Salsipuedes Creek. The remaining adjacent vegetated riparian floodplain would remain intact and would provide wildlife passage around the new facilities, and the impact would be ***less than significant***.

Mitigation: None required.

Impact BR-4: Project operations could result in a substantial adverse effect on riparian habitat or other sensitive natural community or on state or federally protected wetlands or waters through direct removal, filling, hydrological interruption, or other means. (*Less than Significant*)

An analysis of the changes to existing vegetation communities and habitats within College Lake, Salsipuedes Creek, Pajaro River, and Pajaro Lagoon from Project operations is provided below under the heading Habitat Changes from Project Operations. An analysis of potential impacts as a result of these operational habitat changes and Project maintenance activities is provided below under the heading Project Operation Impacts on Sensitive Natural Communities and Protected Wetlands and Waters. The discussion of habitat changes from project operations also supports the analysis of potential impacts on special-status species presented in Impacts BR-5, BR-6, BR-7.

Habitat Changes from Project Operations

College Lake

Proposed College Lake water management operations would change the seasonal inundation patterns of habitats within the lake basin. The largest effects would be at the lowest elevations within the basin, which would remain inundated through the summer, as shown on Figures 3.3-7a through 3.3-7d (in Section 3.3, Surface Water, Groundwater, and Water Quality). In contrast, higher elevations are likely to experience relatively little change as a result of the Project, for all water year types. **Table 3.4-4** summarizes the anticipated changes to inundation periods, for an above-average rainfall year (modeled from Water Year 2016, as described in Appendix HYD). While inundation patterns vary from year to year, and would continue to vary substantially between above- and below-average rainfall years and based on seasonal rainfall patterns and water supply withdrawals, an above-average rainfall year was used to approximate an average inundation scenario with the Project (refer to Figure 3.3-7c in Section 3.3, Surface Water,

---

74 This construction duration excludes pre-commissioning and takes into account a four-month break between November and May when the site would be winterized and no construction would occur within the Salsipuedes Creek channel.

TABLE 3.4-4
ANTICIPATED CHANGES TO INUNDATION PERIODS AND HABITATS

Water Surface Elevation (feet NAVD88)	Existing Inundation Period[a]	With Project Inundation Period (62.5 foot weir)[b]	Existing Habitats	With Project Habitats, anticipated change
50 up to 57	4-7 months	7-11 months	Farmed wetland habitat consists of: 1. Open water (November1 to March 31) 2. Seasonal wetland vegetation (April 1 to May 31) 3. Agriculture[c] (June 1 to October 31)	Farmed wetland would convert to managed seasonal wetland which would consist of: 1. Open water (November 1 to July or August) 2. Mudflat with sparse seasonal wetland vegetation (July or August to October 31) No farming would occur at this elevation with the Project. Vegetation management (mowing, disking) would occur annually to maintain open water and mudflat habitat and prevent woody plant encroachment.
			Riparian Forest	No habitat type change. Riparian Forest present below 57 feet NAVD88 is expected to persist with its current riparian species composition and abundance in the short term but may shift in species composition and abundance in the future with a dominance of inundation-tolerant species such as Pacific willow (*Salix lasiandra*), and possibly a sparser overstory canopy with freshwater emergent plants in the understory.
57 up to 59	4 months	6-7 months	Farmed wetland habitat consists of: 1. Open water (December 1 to March 31) 2. Seasonal wetland vegetation (April 1 to May 31) 3. Agriculture[c] (June 1 to November 30)	Farmed wetland would convert to managed seasonal wetland, similar to 50 to 57 feet NAVD88. No farming would occur at this elevation with the Project. Vegetation management (mowing, disking) would occur annually to maintain open water, mudflat, and seasonal wetland habitat and prevent woody plant encroachment.
			Riparian Forest	No habitat type change, though species composition may change as this forest matures and older trees senesce.
			Seasonal Wetland	No habitat type change. This area would be managed as seasonal open water and wetland through mowing and disking, to prevent woody plant encroachment, similar to existing conditions.
59 up to 62	1-4 months	2-6 months	Farmed wetland habitat consists of: 1. Open water (January 1 to March 31) 2. Seasonal wetland vegetation (April 1 to May 31) 3. Agriculture[c] (June 1 to December 30)	No habitat type change. Although this elevation range would be inundated for longer durations (especially at the lower end of the range) these areas would continue to be used for seasonal crops in years and locations where at least one crop rotation is feasible. Areas that are not farmed would be managed as seasonal open water and wetland through mowing and disking, to prevent woody plant encroachment, similar to existing conditions.
			Riparian Forest, Seasonal Wetland	No habitat type change.
62 up to 64	1-6 weeks, not continuous	2-8 weeks, not continuous	Farmed wetland	No habitat type change. Although this elevation range would be inundated for longer durations these areas would continue to be used for seasonal crops in years and locations where at least one crop rotation is feasible. Areas that are not farmed would be managed as seasonal open water and wetland through mowing and disking, to prevent woody plant encroachment, similar to existing conditions.
			Riparian Forest, Riparian Scrub, and Seasonal Wetland	No habitat type change.
			Annual Grassland	Seasonal Wetland.
			Agriculture	Farmed wetland. This is not likely to change the land use practices or habitat value.[d]
64 up to 70	Periodic inundation of one week or less	Periodic inundation of one week or less	Agriculture, Riparian Forest, Riparian Scrub, Coyote Brush Scrub, and Grassland.	No habitat type change. These habitats are not expected to change as a result of water operations in College Lake.

NOTES:
a Based on observed water surface elevation during 2016.
b Based on the modeled above-average rainfall year (2016). See Appendix HYD and Figures 3.3-7a through 3.3-7d in Section 3.3, Surface Water, Groundwater, and Water Quality.
c Agriculture includes a fallow period after harvest during which time fields are bare, tilled soil.
d The anticipated change of agricultural land to farmed wetland would not affect the agricultural land use of this area.

SOURCE: cbec, inc. eco engineering, Inundation Statistics and Monthly Flows, December 18, 2018.

This page intentionally left blank

Groundwater, and Water Quality). This is the basis for estimating habitat changes as a result of proposed water management operations. Anticipated habitat effects under proposed operations at water surface elevations 57 feet NAVD88 and below; 57 to 59 feet NAVD88; 59 to 62 feet NAVD88; 62 to 64 feet NAVD88; and 64 to 70 feet NAVD88 are summarized below.

Elevations 57 Feet and Lower

As shown in Table 3.4-4, areas below 57 feet NAVD88 would remain inundated three to four months longer than under baseline conditions, with inundation from approximately November through August or September, depending on the timing of water supply withdrawals.[75] In addition, the water level would decrease at a slower rate during the summer months, based on agricultural demand, in contrast with the rapid pumping that takes place in April under existing RD 2049 operations.

Under project operation, these changes could influence mudflat habitat and seasonal wetland vegetation along the lake edges. As described in Chapter 2, *Project Description*, rather than seasonal farming in the summer and fall as currently occurs, the inundated area would be managed through vegetation mowing and disking as frequently as once per year when College Lake's basin is dry enough to accommodate tractors, and as needed based on the vegetation management and maintenance actions described in Section 2.7, Chapter 2, *Project Description*. For example, disking and tilling, trimming and mowing, and removal of flow-constricting vegetation within channels could occur as needed to maintain vegetation in College Lake. With Project operations, between elevations 50 and 57 feet NAVD88, the combined effects of the longer inundation period and regular vegetation management actions are expected to result in exposed mudflat habitat in the late summer or fall.

Additionally, limited seasonal wetland vegetation may establish following the receding water line, and would be comprised of species that tolerate prolonged seed inundation and whose seed can germinate in the summer. This would likely include the following species that are common at College Lake: cocklebur, fat-hen, smartweed, and swamp pricklegrass. In below-average rainfall years and depending on the rainfall and water surface elevation patterns, willow and cottonwood seedlings may establish and would be mowed and/or disked in the fall similar to current agricultural practices. Proposed vegetation management activities (described in Section 2.7) would maintain open water habitat in the winter and spring for aquatic species, and mudflat with seasonal wetland vegetation in the late summer or fall for shorebirds and migratory waterfowl. The spring and summer inundation at these elevations would also likely provide suitable conditions for algae growth in the deepest portions of College Lake, similar to neighboring Pinto Lake and Kelly Lake.

Existing riparian forest at elevations below 57 feet NAVD88 is likely to persist because mature trees would have leaves and branches above the water surface elevation during the growing season.[76] Seedling recruitment of the same riparian species (willows and cottonwoods, primarily) would occur only in very dry years when the lake area at 57 feet NAVD88 elevation is wet but not

75 It is possible that higher lake levels could persist into the fall. The analyses presented in this EIR are based on modeled results.

76 Garssen, A.G., A. Baattrup-Pedersen, L.A.C. Voesenek, J.T.A. Verhoeven, and M.B. Soons, Riparian plant community responses to increased flooding: a meta-analysis. Global Change Biology March 2015 DOI: 10.1111/gcb.12921, 2015.

inundated for a long-enough period in March, April, or May when seedlings typically establish. Vegetative recruitment may also occur in all water year types. Given the variation in inundation patterns between years, it is likely that suitable riparian forest establishment conditions would occur periodically during dry years when low branches are inundated for a shorter period of time. In contrast, average or above-average water years may provide opportunities for establishment of more emergent vegetation, such as cattails, than riparian species in the understory.

Elevations Between 57 and 59 Feet

Elevations between 57 and 59 feet NAVD88 that are typically inundated between December and March 31, followed by seasonal agricultural production between June and October, would transition to open water between approximately December 1 and July, and seasonal wetland through the late summer and fall. The inundated lake area would maintain open water for two to three additional months and may be disked or tilled as currently occurs under the agricultural production period. Existing riparian forest is unlikely to convert to a different habitat type under Project operation, though species composition may shift from species with a shorter inundation tolerance (arroyo willow) to species with a longer inundation tolerance (cottonwood, Pacific willow).[77]

Elevations Between 59 and 64 Feet

The area between 59 and 64 feet NAVD88 would undergo minimal habitat changes overall. Anticipated changes in the storage area and period, primarily between 62.5 and 63.5 feet NAVD88 with the higher weir elevation and slower spring and summer draw-down, would make this zone more suitable for wetland habitats. The existing wetland boundary, which was mapped fairly consistently at 62.5 feet NAVD88 according to the aquatic resources delineation, would shift upslope by about 1 foot in elevation to 63.5 feet NAVD88. Areas up to 63.5 feet NAVD88 are expected to support the minimum duration and frequency of inundation, saturation, or shallow groundwater table (within 12 inches of the soil surface) during the growing season to meet the USACE’s technical standard for wetland hydrology.[78] Therefore, existing upland habitat types, grassland and agriculture between 62.5 feet NAVD88 and approximately 63.5 feet NAVD88 would transition to wetland habitat types; existing grassland would transition to seasonal wetland and existing agricultural areas would transition to farmed wetland habitat. These habitat changes are expected to occur over approximately 0.2-0.5 acre, too small an area to provide meaningful habitat functions or values. Predicting how much and which areas would convert to specific wetland types is not possible given the variability from year to year in precipitation totals as well as fluctuating water level within College Lake. However, the area of seasonal and farmed wetland habitat is anticipated to nominally increase under the Project, compared to existing conditions. Vegetation management would occur as needed between 59 and 63 feet NAVD88, as described in Section 2.7 in Chapter 2, *Project Description*, to maintain habitat for waterfowl and other species, and to maintain and operate College Lake for water storage. Anticipated changes in wetland habitat types would not conflict with continued annual agricultural use of land above 63 feet NAVD88, and between 59 feet and 63 feet in dry years; agricultural land use would continue between 59 feet and

[77] River Partners, Effects of Long Duration Flooding on Riparian Plant Species, San Joaquin River National Wildlife Refuge, Stanislaus County, California. Prepared for U.S. Fish and Wildlife Service by L. Singleton, S. Small, and T. Griggs, Modesto, CA., 2008.

[78] USACE, *Technical Standard for Water-Table Monitoring of Potential Wetland Sites,* WRAP Technical Notes Collection (ERDC TN-WRAP-05-2), U. S. Army Engineer Research and Development Center, Vicksburg, MS., 2005.

64 feet NAVD88 in areas currently used for agriculture, and according to the conditions described in Impact LU-1 (refer to Section 3.2, Land Use and Agricultural Resources).

Elevations Above 64 Feet

Habitats above 64 feet NAVD88 are not expected to change as a result of College Lake water management operations.

In summary, proposed lake operations could result in the following changes:

- existing farmed wetlands below 59 feet NAVD88 would change to open water habitat during the spring followed by a combination of mudflat and seasonal wetland vegetation the late summer and fall;
- existing annual grassland between 62.5 feet NAVD88 and 63.5 feet NAVD88 would likely to convert to seasonal wetland; and
- existing agricultural areas between 62.5 feet NAVD88 and 63.5 feet NAVD88 would convert to farmed wetland.

Salsipuedes Creek, Pajaro River, and Pajaro Lagoon

Discharge downstream of College Lake would change under Project operations. As described in Subsection 3.3.3.3 in Section 3.3, Surface Water, Groundwater, and Water Quality, the Project would generally reduce the discharge from College Lake into Salsipuedes Creek and the Pajaro River (with slight increases in December and January and the greatest decreases in April and May), due to the elimination of pumping over the weir, weir operations toward the end of the wet season, and the proposed diversions of water from College Lake (refer to **Table 3.4-5**). In general, during Project operation, discharge during the winter and early spring months would be similar to existing conditions. Discharge within the late spring and summer months would change somewhat under the Project. Instead of intermittent artificial discharge from College Lake pumping operations during the late spring and summer months (when, under existing conditions, RD 2049 pumps water out of the lake), a lower volume of water would steadily leave the lake during April through June (the smolt season), after which no additional water would flow from College Lake into Salsipuedes Creek during the dry season except occasionally when PV Water might pump flows over the weir (refer to Section 2.7.1.2 in Chapter 2, *Project Description*, and discussions under Impacts HYD-2 and HYD-5 in Section 3.3, Surface Water, Groundwater, and Water Quality). These changes would be most apparent just downstream of College Lake and would be less apparent in the Pajaro Lagoon where the flow contribution from College Lake is minimized by the influence of additional water sources. As shown in Table 3.3-4 in Section 3.3, Surface Water, Groundwater, and Water Quality, monthly average flow contributions from College Lake to Salsipuedes Creek would decline by statistically significant amounts from the late spring to early fall months during the modeled above-average water year (WY 2016). Monthly average flow contributions to the Pajaro River would decline by statistically significant amounts in late summer and early fall months during the modeled above-average water year (WY 2016). The majority of the reduction would be due to proposed elimination of artificial pumping into Salsipuedes Creek. During these same months under the modeled above-average water year (WY 2016), the percent contributions to the Pajaro Lagoon would remain nearly the same between existing and Project conditions.

TABLE 3.4-5
AVERAGE MONTHLY DISCHARGE (CFS) FOR MODELED EXISTING AND MODELED PROJECT CONDITIONS FOR THE ABOVE-AVERAGE WATER YEAR (WY 2016)

	Salsipuedes Creek Reach		Pajaro River Below the Confluence with Salsipuedes Creek	
	Existing	Project	Existing	Project
October	1	0	1	0
November	7	0.1	7	0.3
December	11	13	13	15
January	135	140	333	338
February	32	30	92	89
March	219	214	938	933
April	19	8	73	62
May	19	2	47	31
June	2	0.3	10	8
July	2	0.2	2	1
August	1	0.1	1	0.1
September	1	0	1	0

NOTE: Existing spring discharge largely due to artificial draining of College Lake due to RD 2049 pumping. Existing discharge from June to October are due to intermittent maintenance pumping out of College Lake. Does not account for any transmission losses or gains within the Lower Salsipuedes Creek Reach.

SOURCE: cbec, inc. eco engineering, Inundation Statistics and Monthly Flows, December 18, 2018.

Table 3.4-5 includes the average monthly discharge under existing and with-Project conditions in two reaches (Salsipuedes between College Lake and its confluence with the Pajaro River and the Pajaro River below the confluence with Salsipuedes Creek) for the above-average water year (WY 2016). As shown in Table 3.4-5, average monthly discharge is similar under existing and Project conditions in December through March. Average monthly discharge then decreases starting in April through the fall months. There are decreases in the remaining summer and fall months (June through October), but discharge during this time period is fairly low under both existing and Project conditions. The greatest decrease between average monthly existing and with-Project discharge within the growing season occurs in April and May.

Overall, there would be similar flow conditions in the Pajaro River in the spring and summer when comparing existing to with-Project conditions. Although there would be a decrease in the average monthly flow in April and May, there would still be continuous flow down the river during this time that would support wetland and riparian vegetation. There would be a greater decrease in flow in April and May with the Project within Salsipuedes Creek compared to the Pajaro River. However, the overall flow trend in this reach is high flow in the early spring, followed by a sudden drop in April. It is assumed that the current wetland and riparian vegetation conditions within this reach are supported and maintained by this seasonal flow shift. Under the Project, there would continue to be high flow in the early spring followed by a sudden drop in April, with low flow in the summer months to maintain the existing hydrologic and vegetation conditions. Therefore, it is not anticipated that the composition or extent of wetland or riparian vegetation within either Salsipuedes Creek or Pajaro River would change under Project conditions.

Project Operation Impacts on Sensitive Natural Communities and Protected Wetlands and Waters

Project operations would change the seasonal inundation patterns within the College Lake basin and would change discharge downstream of College Lake, as described above. Sensitive natural communities, including riparian habitat and state or federally protected wetlands and waters occur within these areas. Sensitive natural communities, including state or federally protected wetlands and waters within the College Lake basin are described in Section 3.4.1.7 and Section 3.4.1.9, and include riparian scrub, riparian forest, freshwater emergent wetland, seasonal wetland, farmed wetlands, perennial stream, and ditches. Sensitive natural communities, including open water creek, instream wetlands, and riparian corridors are present within Salsipuedes Creek and the Pajaro River downstream of College Lake. As discussed above, existing riparian and wetland habitats are expected to remain the same, with the following exceptions:

- Farmed wetlands below 59 feet NAVD88 would no longer be farmed due to the longer inundation period. These areas would provide open water habitat for a longer period of the year followed by mudflat and seasonal wetland vegetation in the late summer or fall. These areas would be characterized as managed seasonal wetlands, and in the absence of farming would provide improved habitat functions and values for wildlife.
- Annual grassland habitat between 62.5 feet NAVD88 and 63.5 feet NAVD88 would likely convert to seasonal wetland because, on average, these areas would support suitable wetland conditions.
- Areas designated as agriculture between 62.5 feet NAVD88 and 63.5 feet NAVD88 would likely convert to farmed wetland because on average, these areas would support suitable wetland conditions.

Therefore, impacts on sensitive natural communities, including protected wetlands and waters, within College Lake would be minimal and favorable because they would result in improved functions and values and would likely increase the total area of wetland habitat.

Impact Conclusion

As described above, the composition and characteristics of wetland habitats within College Lake are expected to undergo changes at the lowest elevation in the lake primarily due to longer inundation periods. The total area of aquatic habitats is not expected to decrease, and may nominally increase. Similarly, riparian habitats in College Lake are not expected to decrease in total extent, though species composition at the lowest elevations may shift to species that are more tolerant of inundation. The composition or extent of wetland or riparian vegetation downstream of College Lake under Project operations is not anticipated to change. Overall, the flow regime within Salsipuedes Creek and the Pajaro River downstream of College Lake would be similar under Project operations compared to existing conditions. Although there would be a decrease in flow in April and May, overall future with-Project conditions would generally be the same in the spring and summer growing season as currently exist. Therefore, Project operations on sensitive natural communities, including wetlands and waters, downstream of College Lake would be ***less than significant***.

Mitigation: None required.

Impact BR-5: Project operations could result in a substantial adverse effect on terrestrial special-status species. (Less than Significant with Mitigation).

Project Operation Impacts on Special-status Terrestrial Species

Special-status terrestrial wildlife species that have a moderate or high potential to occur within or adjacent to the Project operation areas (College Lake, Salsipuedes Creek, and the Pajaro River) include CRF, WPT, special-status and nesting birds, western red bat and San Francisco dusky-footed woodrat (refer to Table BIO-1 in Appendix BIO). Potential operation-related impacts on these species are addressed below, based on the potential habitat changes presented in Impact BR-4. No special-status plant species have potential to occur within the study area; therefore, there would be no impact on special-status plant species due to Project operation. Potential impacts on special-status fish species are discussed in Impact BR-6.

College Lake

Neither CRF or WPT have been observed within College Lake, but both species have a moderate potential to occur within the riparian forest and scrub around the lake, and may occasionally disperse through other portions of the lake. Several special-status bird species have at least a moderate potential to forage within College Lake, including tricolored blackbird, short-eared owl, burrowing owl, golden eagle, white-tailed kite, American peregrine falcon, bald eagle, yellow warbler, and Bryant's savannah sparrow. Additionally, suitable nesting habitat is present for golden eagle, white-tailed kite, bald eagle, and yellow warbler, as well as many common bird species. Suitable roosting habitat for western red bat is present among tree and shrub foliage edge habitat and San Francisco dusky-footed woodrat middens have been observed in riparian habitat College Lake.

Project operations would potentially change the composition of some habitat types within College Lake as described above under the heading *Habitat Changes from Project Operations* in Impact BR-4. These changes include:

- existing farmed wetlands below 59 feet NAVD88 would change to open water habitat during the spring followed by a combination of mudflat and seasonal wetland vegetation in the late summer and fall;
- existing annual grassland between 62.5 feet NAVD88 and 63.5 feet NAVD88 would likely convert to seasonal wetland; and
- existing agricultural areas between 62.5 feet NAVD88 and 63.5 feet NAVD88 would convert to farmed wetland.

Existing farmed wetlands do not provide habitat for CRF or WPT species and conversion of those areas to open water, mudflat, and seasonal wetland would increase the quality of dispersal habitat available to them. Grassland areas provide upland dispersal habitat for both species and conversion of grassland to seasonal wetland would continue to provide similar dispersal habitat for both species. Existing agricultural areas do not provide habitat for these species and their conversion to farmed wetland would not change the habitat quality for these species from existing conditions. Therefore, potential habitat changes under Project operations would result in less than significant impacts on CRF and WPT or their habitat.

Habitat conversion is expected to have nominal effects on special-status birds due to the relatively small quantity of suitable habitats for these species that would change under Project operations and the similar habitat functions and values these converted habitat areas would provide. Further, other common birds known to nest in various habitats of College Lake would be similarly unaffected by habitat conversion for these same reasons. Habitat conversions would primarily affect foraging habitat for special-status birds, as nesting habitat for special-status birds determined to have at least a moderate potential to breed at College Lake would be unchanged by Project operations. An increase in open water, mudflat, and seasonal wetland habitat from farmed wetlands under the Project would increase suitable foraging habitat for special-status birds. The conversion of grasslands and agricultural areas (approximately 0.2-0.5 acre) to seasonal wetlands and farmed wetlands, respectively, is not expected to substantially affect foraging opportunity for special-status birds which currently use these upland habitats due to availability of similar habitat within the greater study area which would persist during Project operation. Therefore, potential habitat changes under Project operations would result in less-than-significant impacts on special-status birds.

Project operations, including maintenance activities, would maintain the existing extent of riparian and scrub habitat types within College Lake and these areas would remain available for use by CRF, WPT, special-status birds, western red bat and San Francisco dusky-footed woodrat under future with-Project operations. Therefore, Project operations would result in less-than-significant impacts on these species.

As described in Chapter 2, Section 2.7, maintenance activities would be conducted within College Lake as needed to meet Project objectives. Maintenance activities would be implemented during the dry season to maintain areas below 59 feet NAVD88 as open water during the wet season. If individual CRF or WPT are present within maintenance work areas they could be injured or killed by maintenance equipment, which would be a significant impact. Implementation of **revised Mitigation Measure BIO-2j** and **revised Mitigation Measure BIO-2k**, would reduce potential maintenance impacts on CRF and WPT to less than significant.

Maintenance activities within College Lake may occur during the breeding season for birds protected under the MBTA or Fish and Game Code. Vegetation or debris removal could result in direct impacts on breeding birds through direct removal of birds or their nests, if present. Nesting birds may also be disrupted by maintenance equipment noise and activities, which could result in nest abandonment. These impacts are potentially significant. Implementation of **revised adopted Mitigation Measure BIO-2i** would ensure that potential impacts on special-status birds are reduced to less-than-significant levels by ensuring that the Project area is surveyed for breeding birds and that breeding birds are avoided.

Potential operational impacts on native resident and migratory bird movement, corridors, and nursery sites are discussed in Impact BR-7.

Salsipuedes Creek and Pajaro River

Although CRF have not been observed in the study area at Salsipuedes Creek, this area provides aquatic non-breeding habitat suitable for this species. The presence of dense wetland vegetation, turbid water, and high stream velocity limits CRF breeding potential in this reach. Likewise, WPT have not been observed within this reach of Salsipuedes Creek and have low potential to occur because of the limited presence of open water areas.

CRF have been observed within the Pajaro River, and have just recently (March 2019) been observed breeding in isolated scour ponds located on floodplain benches within the levee, just north of the SR 1 crossing. Similar nearby scour ponds also provide suitable breeding habitat. WPT are known to occur within the Pajaro River and a breeding population has been documented within the study area.

As described above, the general flow pattern within the study area reaches of Salsipuedes Creek and the Pajaro River (heavy flow in the early spring, followed by a sudden drop in April) would remain with the Project. It is not anticipated that the composition or extent of wetland or riparian vegetation, or the extent of habitat for CRF or WPT, would change with the Project. Therefore, impacts on CRF and WPT downstream of College Lake would be less than significant.

As the composition and extent of wetland and riparian vegetation would not change downstream of College Lake as a result of Project operations, suitable habitat along Salsipuedes Creek and the Pajaro River is expected to continue to provide similar opportunity for special-status and nesting birds, western red bat, and San Francisco dusky footed woodrat as existing conditions. Impacts of Project operations on these species in Salsipuedes Creek and Pajaro River would be less than significant.

Impact Conclusion

Implementation of revised adopted Mitigation Measures BIO-2i, 2j, and 2k would effectively reduce impacts on special-status terrestrial species from Project operations to less-than-significant levels. Thus impacts would be ***less than significant with mitigation***.

Mitigation Measure BIO-2i: Nesting Bird Surveys (Revised):

Prior to any project construction or maintenance activities, the project proponent will take the following steps to avoid direct losses of nests, eggs, and nestlings and indirect impacts ~~t~~on avian breeding success:

- If construction or maintenance activities occur only during the non-breeding season, between August 31 and February 1, no surveys will be required.

- During the breeding bird season (February 1 through August 31), a qualified biologist will survey construction or maintenance areas in the vicinity of the Project site for nesting raptors and passerine birds not more than 14 days prior to any ground-disturbing activity or vegetation removal.
- Surveys will include all potential habitats within 500 feet (for raptors) of activities and all onsite vegetation including bare ground within 250 feet of activities (for all other species).
- If results are positive for nesting birds, avoidance procedures will be adopted, if necessary, on a case-by-case basis. These may include implementation of buffer areas (minimum 50-foot buffer for passerines and 250-foot minimum buffer for raptors) or seasonal avoidance.

Mitigation Measure BIO-2j: CRF~~T~~ (Revised):

The following measures for avoidance and minimization of adverse impacts ~~to~~n California Red-Legged Frog (*Rana draytonii*) (CRF) during construction and maintenance of the Project ~~BMP projects~~ are those typically employed for construction activities that may result in short-term impacts ~~to~~n individuals and their habitat. The focus of these measures is on scheduling activities at certain times of year, keeping the disturbance footprint to a minimum, and monitoring. Consultation with the USFWS will be conducted and a Biological Opinion developed for each BMP Update component that requires a USACE Section 404 Wetland Permit.

Ongoing and future CRF studies in the Project area may result in site-specific conditions that would be integrated into the future project-level BMP component designs, permitting and operations. CRF-1 through CRF-9 would apply only to Project locations identified as CRF habitat.

CRF-1. ~~The Agency~~ PV Water will annually submit the name(s) and credentials of biologists who would conduct activities specified in the following measures. No project activities would ~~will~~ begin until the Agency receives approval from the Service that the biologist(s) is qualified to conduct the work.

CRF-2. A USFWS-approved biologist will survey the ~~work~~ construction or maintenance site 48 hours prior to the onset of activities. If CRF, tadpoles, or eggs are found, the approved biologist will determine the closest appropriate relocation site. The approved biologist will be allowed sufficient time to move them from the work site before work activities begin. Only USFWS -approved biologists will participate in activities associated with the capture, handling, and moving of CRF.

CRF-3. Before any construction or maintenance activities begin on a project, a USFWS -approved biologist will conduct a training session for all construction personnel. At a minimum, the training will include a description of the CRF and its habitat, the importance of the CRF and its habitat, general measures that are being implemented to conserve the CRF as they relate to the Project, and the boundaries within which the Project may be accomplished. Brochures, books and briefings may be used in the training session, provided that a qualified person is on hand to answer any questions.

CRF-4. A USFWS-approved biologist will be present at the ~~work~~ construction or maintenance site until such time as all removal of CRF, instruction of workers, and disturbance of habitat have been completed. After this time, the biologist will designate a person to monitor on-site compliance with all minimization measures and any future staff training. The USFWS-approved biologist will ensure that this individual receives training outlined in measure WPT-2 and in the identification of CRF. The monitor and the USFWS-approved biologist will have the authority to stop work if CRF are in harm's way.

CRF-5. The number of access routes, number and size of staging areas, and the total area of the activity will be limited to the minimum necessary to achieve the project goal. Routes and boundaries will be clearly demarcated, and these areas will be outside of riparian and wetland areas to the extent practicable.

CRF-6. ~~Work~~ Construction and maintenance activities will be completed between April 1 and November 1 to the extent practicable. Should the Agency demonstrate a need to conduct activities outside this period, the Agency may conduct such activities after obtaining ~~the Service's~~ USFWS approval.

CRF-7. If a construction or maintenance ~~work~~ site is to be temporarily dewatered by pumping, and would take place within or adjacent to suitable CRF habitat, intakes will be completely screened with wire mesh not larger than five millimeters ~~(mm)~~ to prevent CRF from entering the pump system where applicable. Water will be released or pumped downstream at an appropriate rate to maintain downstream flows during construction. Upon completion of construction or maintenance activities, any barriers to flow will be removed in a manner that would allow flow to resume with the least disturbance to the substrate.

CRF-8. The Declining Amphibian Populations Task Force's Fieldwork Code of Practice will be followed to minimize the possible spread of chytrid fungus or other amphibian pathogens and parasites.

CRF-9: Implement Mitigation Measure HWQ-1~~3.10-1~~ through HWQ-4~~3.10-4~~ in Section 3.3, Surface Water, Groundwater, and Water Quality~~3.10, Hydrology and Water Quality~~.

Mitigation Measure BIO-2k: WPT (Revised):

The following measures for avoidance and minimization of adverse impacts ~~to~~on western pond turtle (*Actinemys marmorata*) (WPT) during construction and maintenance of the Project ~~BMP project elements~~ are those typically employed for construction activities that may result in short-term impacts ~~to~~on individuals and their habitat. The focus of these measures is on keeping the disturbance footprint to a minimum and aggressive monitoring of WPTs before vegetation removal and during the construction and revegetation phase.

WPT-1. PV Water~~The Agency~~ will annually submit the name(s) and credentials of biologists who would conduct activities specified in the following measures. No project activities will begin until proponents have received approval from CDFW that the biologist(s) is qualified to conduct the work.

WPT-2. A CDFW-approved biologist will survey the work site 48 hours prior to the onset of construction or maintenance activities. If WPT adults, juveniles or eggs are found, the approved biologist will determine the closest appropriate relocation site. The approved biologist will be allowed sufficient time to move them from the work site before work activities begin. Only CDFW-approved biologists will participate in activities associated with the capture, handling, and moving of WPT.

WPT-3. Before any construction or maintenance activities begin on a project, a CDFW-approved biologist will conduct a training session for all construction personnel. At a minimum, the training will include a description of the WPT and its habitat, the importance of the WPT and its habitat, general measures that are being implemented to conserve the WPT as they relate to the project, and the boundaries within which the project may be accomplished. Brochures, books and briefings may be used in the training session, provided that a qualified person is on hand to answer any questions.

WPT-4. A CDFW-approved biologist will be present at the construction or maintenance ~~work~~ site until such time as all removal of WPT, instruction of workers, and disturbance of habitat have been completed.

WPT-5. The number of access routes, number and size of staging areas, and the total area of the activity will be limited to the project plans. Routes and boundaries will be clearly demarcated. Where impacts occur in these staging areas and access routes, restoration will occur as identified in the general best management practices ~~BMP~~ measures above.

Impact BR-6: Project operations could result in a substantial adverse effect on special-status fish species. (*Less than Significant with Mitigation*)

College Lake Rearing Habitat

As described in Impact BR-4, the Project would change the seasonal inundation patterns of habitats within the lake basin. The proposed weir structure would not be raised until spring; therefore, the maximum water surface elevation and inundation extent of College Lake during the wet season would not change with the Project. The results of a steelhead smolt outmigration study suggest that the existing winter inundation patterns in College Lake provide highly productive rearing habitat for juvenile steelhead prior to their outmigration to the ocean,[79] and those results are consistent with the finding of studies conducted in similar juvenile steelhead rearing habitats such as agricultural ponds,[80] estuaries,[81] inundated floodplains,[82] and rice fields.[83] During Project operations, no water would be diverted from College Lake after December 15 while it is filling. Water supply diversions would only occur when the water surface elevation in College Lake exceeds the level (59.5 feet NAVD88 between December 15 and March 31, and 59.3 feet

[79] Podlech, M., College Lake Smolt Outmigrant Study. Prepared for Resource Conservation District of Santa Cruz County, Spring 2011.

[80] ESA, San Vicente Creek and Pond Smolt Outmigramt Study, Prepared for National Marine Fisheries Service on behalf of Coast Dairies & Land Company, Spring 2003.

[81] Hayes, S. A., M. H. Bond, C. V. Hanson, E. V. Freund, J. J. Smith, E. C. Anderson, A. J. Ammann, and B. MacFarlane, *Steelhead growth in a small central California watershed: Upstream and estuarine rearing patterns*. Transactions of the American Fisheries Society 137:114-128, 2008.

[82] Jeffres, C.A, J.J. Opperman, and P.B. Moyle, *Ephemeral floodplain habitats provide best growth conditions for juvenile Chinook salmon in a California river*, Environmental Biology of Fishes, 2008.

[83] Katz J.V.E, Jeffres C, Conrad J.L., Sommer T.R., Martinez J., Brumbaugh S. Corline N., and P.B. Moyle, *Floodplain farm fields provide novel rearing habitat for Chinook salmon*. PLoS ONE 12(6): e0177409, 2017.

NAVD88 between April 1 and May 31) at which passable conditions for fish would have occurred naturally (i.e., without any weir in place) in Salsipuedes Creek above Corralitos Creek; and, for the period December 15 through May 31, only when College Lake inflows exceed the proposed fish bypass flows described below. As such, productive winter rearing habitat conditions are expected to remain unchanged, and the duration of rearing habitat availability would be extended through May 31, at a minimum, compared to existing conditions under which RD 2049 pumping operations to drain College Lake typically commences in March or April.

The proposed weir would be raised to 62.5 feet NAVD88 following the last large anticipated precipitation event of the season. As such, lake water surface elevations in the spring are expected to rise above existing elevations (see Table 3.4-4). Potential changes to steelhead winter/spring rearing habitat resulting from increased water surface elevations were evaluated previously by cbec inc eco engineering.[84] The estimated changes in proportional surface areas for a variety of depth categories (0 to 0.5 feet, 0.5 to 1 feet, 1 to 2 feet, 2 to 4 feet, 4 to 6 feet, and greater than 6 feet) across a wide range of water surface elevations were found to be relatively minor between storage elevations of 60 feet NAVD88 and 65 feet NAVD88, suggesting that raising the lake level with a taller weir would result in similar distributions of habitat availability at different depths. Based on these data, the Project is not expected to change the suitability of College Lake for winter/spring juvenile steelhead rearing in response to the raising of the weir elevation.

Water temperature data collected by PV Water at the College Lake pump house confirm previous assumptions (e.g., Smith, 2010) that water temperatures in the lake are too warm in the summer to allow summer rearing by juvenile steelhead, especially in the presence of warm water predatory fishes.[85,86] It should be noted that the available summer water temperature data represent existing drawn-down lake conditions (i.e., surface water confined to the drainage channels of the lake), and that higher summer water surface elevations under future with-Project conditions may provide a different temperature regime (cooler or warmer). However, water temperature data collected in Casserly Creek immediately upstream of College Lake in 2013 indicates that daily average inflow temperatures to the lake may reach stressful levels for steelhead (greater than 18 degrees Celsius) by mid-June before these waters even reach the open lake.[87] Therefore, it appears unlikely that suitable conditions for summer juvenile rearing could be achieved in College Lake.

College Lake currently supports non-native fish species known to prey on juvenile steelhead and other native fish species.[88] Under current RD 2049 operations, water from College Lake is pumped out in spring and wetted habitat in the summer and fall is restricted to the drainage ditches within the lake. While this practice does not entirely eliminate populations of non-native predatory species, it likely helps to control and reduce populations annually. With implementation of the Project, water would be retained in College Lake for a longer period of time in the spring,

---

[84] cbec, inc. eco engineering, *College Lake Multi-Objective Management Report Final Report,* November 14, 2014.
[85] Smith, J. J., Fisheries Issues Associated with the Present and Potential Future Operation of the College Lake Complex (Pajaro River Watershed) – Draft, San Jose State University, November 30, 2010.
[86] Ibid.
[87] Ibid.
[88] Podlech, M., College Lake Smolt Outmigrant Study. Prepared for Resource Conservation District of Santa Cruz County, Spring 2011.

summer, and fall compared to existing conditions. An extended inundation season in College Lake could allow populations of non-native predatory species to increase. This would be a significant impact on S-CCC steelhead. Implementation of **Mitigation Measure BR-2** would reduce this impact to less than significant by requiring development and implementation of an invasive fish species control plan that would reduce potential predation upon steelhead.

Fish Passage

The proposed bypass flows for the Project were developed through assessments of fish passage flow requirements for adult (December 15 to March 31) and smolt (April 1 to May 31)[89] S-CCC steelhead within three distinct hydraulic regions:

- ***Salsipuedes Creek between Corralitos Creek and the Pajaro River*.** Fish passage flow needs within this reach were assessed through a Critical Riffle Analysis.[90] The Critical Riffle Analysis evaluated flows necessary to provide sufficiently wide passage corridors meeting or exceeding minimum passage depths of 0.6 feet for adults and 0.4 feet for smolts across the most limiting (i.e., shallow) riffles identified as potential impediments to steelhead. Based on the CRA, this reach is considered passable when the combined flow from Corralitos Creek and College Lake outflow is 21 cubic feet per second (cfs) for adult fish and 8 cfs for smolts.
- ***Salsipuedes Creek between the Proposed Weir Structure and Corralitos Creek*.** This reach of Salsipuedes Creek does not contain typical riffle habitat and, at times (i.e., during high flow events) receives reverse flow from Corralitos Creek toward College Lake. Fish passage through this reach was evaluated by cbec[91] using hydraulic modeling to identify flows necessary to meet the same minimum passage depths described above. The analysis concluded that flows of 1.8 cfs and 1.0 cfs from College Lake would provide suitable passage conditions for adults and smolts, respectively, through this reach.
- ***Proposed Weir Structure*.** The weir passage flow rates would be refined during the design phase of the fish passage structure, but for modeling and evaluation, these were assumed to be the same as those for Salsipuedes Creek between the weir and the Corralitos Creek confluence.[92]

Bypass flows for fish passage would be provided between December 15 and May 31 after the water surface elevation in College Lake has surpassed the level at which passable conditions for fish would have occurred naturally (i.e., without the weir in place) on Salsipuedes Creek above Corralitos Creek. Water supply extractions from December 15 to May 31 would only occur when College Lake inflows exceed the proposed fish bypass flows. As such, fish passage conditions at the proposed weir and in Salsipuedes Creek would improve over existing conditions under which fish passage is not actively managed or considered. The current practice of pumping College Lake out beginning in March or April artificially increases downstream flows by up to 22 cfs over natural flow rates for 30 to 40 days. Although these artificial flows create favorable fish passage conditions in Salsipuedes Creek during the smolt outmigration season, these artificially favorable

---

89 Refinements to fish passage assumptions and modeling may occur during permitting based on agency consultations.
90 Podlech, M., *College Lake Integrated Resource Management Project, Fish Passage Assessment*, March 2019.
91 cbec, inc. eco engineering, *College Lake Integrated Resources Management Project, Hydrologic and Hydraulic Modeling Draft Technical Memorandum,* October 3, 2018.
92 Ibid.

conditions cannot be taken advantage of by smolts trapped in College Lake by the pumping activities that create the artificially high flows.

The mainstem Pajaro River channel downstream of the Salsipuedes Creek confluence is dominated by sand and small gravel substrates. Such substrates are easily mobilized and shifted by moderate and high flows. As such, riffles in lower Salsipuedes Creek are highly transient features. Fish passage needs evaluations such as CDFW's Critical Riffle Analysis method used on Salsipuedes Creek between the Corralitos Creek and Pajaro River confluences are only applicable to channels dominated by gravel and cobble substrates, and therefore are not an appropriate analysis methodology for the lower Pajaro River. To evaluate the potential for the Project to adversely affect fish passage conditions in the lower Pajaro River, a hydrologic analysis of the relative contributions of the College Lake watershed to the Pajaro River below the Salsipuedes Creek confluence was prepared by cbec.[93] The 17-square-mile College Lake watershed accounts for approximately 1.3 percent of the approximately 1,300 square mile Pajaro River watershed. Accordingly, flows from College Lake under existing and future with-Project conditions account for a minor portion of lower Pajaro River flows during the wet season. However, as natural flows throughout the watershed recede in the spring, the existing RD 2049 practice of pumping water to drain College Lake artificially increases the relative contribution of flows to the lower Pajaro River. As these discharges recede in the late spring, reaches of Corralitos Creek and the Pajaro River immediately upstream of their respective confluences with Salsipuedes regularly dry up. When surface flow contributions from Corralitos Creek and the Pajaro River cease, pumping of College Lake may account for nearly100 percent of the flows in the lower Pajaro River, and the elimination of artificial pumping under the Project would result in more normative hydrographs throughout the study area. As such, the frequency and duration of steelhead migration passage opportunities in the lower Pajaro River are not expected to be significantly modified by the Project because such opportunities only exist naturally at times when Pajaro River and Corralitos Creek flows are sufficiently high to allow for migration, and at those times, bypass flows would also be provided from College Lake. Specifically, linear regression ($R^2 = 0.7481$) of modelled flows in the study area indicates that a 21 cfs adult passage flow in Salsipuedes Creek corresponds to an estimated flow of 115 cfs (range is 29 to 144 cfs) in the Pajaro River downstream of the Salsipuedes Creek confluence, and an 8 cfs smolt passage flow in Salsipuedes Creek corresponds to an estimated flow of 38 cfs (range is 11 to 63 cfs) in the Pajaro River downstream of the Salsipuedes Creek confluence.

Overall, the potential effects of the Project on steelhead passage conditions would range from unchanged to improved in Salsipuedes Creek and at the proposed weir, and are expected to remain largely unchanged in the lower Pajaro River.

Salsipuedes Creek

As shown in Table 3.4-5, the Project would essentially eliminate summer and fall pumping discharges from College Lake into Salsipuedes Creek. Salsipuedes Creek does not provide summer/fall rearing habitat for juvenile steelhead and the species is not expected to be affected by

[93] Ibid.

the Project's change in flows. Moreover, cbec[94] estimated that summer evapotranspiration rates from College Lake would likely have exceeded summer inflow rates under pre-reclamation conditions (i.e., in the absence of the existing weir and associated summer maintenance pumping) and that outflows from the natural lake configuration therefore would likely have ceased at some point in the dry season. As such, Project conditions are expected to result in a more normative summer/fall hydrologic regime in Salsipuedes Creek in the absence of artificial pumping, resulting in no impact and potentially beneficial effects to fish passage at this location.

Pajaro River Lagoon

Beach berm-built estuaries such as Pajaro River Lagoon typically support a wide diversity of habitats and microhabitats and are known to be highly productive. Juvenile steelhead in particular have been shown to benefit from significant growth rates when rearing in estuaries and lagoons. However, juvenile steelhead are currently not known to utilize Pajaro River Lagoon for rearing, and the estuary is assumed to function largely as a migratory corridor for adult and smolt steelhead when the sandbar is open. As described in Section 3.3, Surface Water, Groundwater, and Water Quality, the Project would affect freshwater inflows to the Pajaro River Lagoon. Based on the results of a quantified conceptual model for the study area (Appendix HYD), the Project could increase the chance of the lagoon mouth being closed during spring, but otherwise would not alter the likelihood of breaching the lagoon. The effects of the Project on lagoon closure depend largely on the relative annual wetness of conditions. Differences in closure timing and water levels were negligible in the above-normal water years of 2016 and 2017. In 2014, a very dry water year, seasonal closure also occurred at roughly the same time for existing and future with-Project conditions, which is likely due to the fact that wave conditions were conducive to mouth closure at that time, regardless of inflows. However, in the spring of below-average water year 2015, reduced flows to the lagoon during the last rainstorm of the year under future with-Project conditions allowed waves to close the lagoon earlier by about five to six weeks. Given the small sample size (2014 to 2017), it is unclear how relevant these results are. While the predicted changes in closure timing in 2015 are within the expected uncertainty of model predictions for number of closure days per month (10 to 20 percent), it may be possible that during especially dry years, lower inflows could allow waves to close the mouth sooner in the year than would occur under the existing conditions of artificial pumping to drain College Lake. While earlier closure of the lagoon in the spring may reduce smolt ocean entry opportunities in some years, Project conditions would result in a more normative hydrologic regime in the lagoon in the absence of artificial pumping at College Lake. Sandbar closure timing varies greatly from year to year at most central California lagoons, and the potential Project-related shift to an earlier closure in some years in the absence of artificially elevated lagoon inflows is a less-than-significant impact on steelhead smolts.

Impact Conclusion

Implementation of Mitigation Measure BR-2 would effectively reduce impacts on special-status fish species from Project operations to less-than-significant levels. Thus impacts would be ***less than significant with mitigation***.

---

[94] cbec, inc. eco engineering, *College Lake Multi-Objective Management Report Final Report*, November 14, 2014.

Mitigation Measure BR-2: Invasive Fish Species Control Plan.

PV Water shall develop an Invasive Fish Species Control Plan. PV Water would submit the plan to the appropriate resource agencies (CDFW, USFWS, and NMFS) for approval within one year of Project implementation. The Fish Species Control Plan shall be implemented at College Lake within two years of Project implementation. The Fish Species Control Plan shall include, at a minimum:

1. Measures describing PV Water's methods of draining College Lake to the greatest extent feasible;
2. Measures describing PV Water's methods, equipment, and timing of invasive species eradication efforts to be conducted in association with lake drawdown efforts;
3. Measures describing the frequency at which invasive species control efforts are to be implemented.

Impact BR-7: Project operations could interfere substantially with the movement of native resident or migratory wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites. (*Less than Significant*)

As described in Impact BR-4, Project operations would change the seasonal inundation patterns within the College Lake basin by holding water in the lake for a longer period annually, shifting the annual draining from April-May to July-September. As proposed, College Lake would likely be drained annually for water supply and management of non-native fish. No decrease in waterfowl habitat is anticipated. Changes in inundation period may result in changes in vegetation composition as farming below 59 feet NAVD88 ceases. Management of those habitat areas to maintain open water during the wet season would be accomplished through vegetation management, as described in Section 2.7 in Chapter 2, *Project Description*, and in consultation with state and federal resource agencies and local experts.

The filling of College Lake in late fall and winter is dependent on rainfall runoff, and would remain unchanged from current conditions. Effects on the arrival timing for wintering waterfowl that use the flooded basin are, therefore, not expected. Departure times of wintering waterfowl vary by species, but data from the 2014 to 2018 College Lake Waterfowl Studies indicates that the majority of wintering ducks leave the lake by late April-early May, just prior to, or concurrent with, the rapid drawdown.

The largest effects of the proposed operations would be at the lowest elevations within the basin (50 to 57 feet NAVD88). Under the Project, these elevations would stay inundated through the summer, providing open water and emergent marsh waterfowl habitat in areas that are currently drained by RD 2049 and converted to agriculture by June.

Spring season mudflat conditions that occur during April and May under current conditions are a result of rapid draining of active farm fields. Tile drains underlie portions of the active farm fields and are operated throughout the spring drawdown period. The resulting transitory mudflat habitat conditions are utilized by migrating shorebirds and waterbirds, often in great numbers. Under the

Project, the spring-period mudflat habitat below elevation 59 feet NAVD88 would be reduced in acreage, but those mudflat conditions would instead be present during fall migration. Comparable fall migration-period mudflat habitat conditions could exist either through natural suppression of emergent vegetation caused by the increased inundation period, or by seasonal management of soils and vegetation according to vegetation management described in Section 2.7 in Chapter 2, *Project Description*.

Lands at higher elevations within the lake basin (about 59 to 62 feet NAVD88) are likely to experience relatively little change as a result of the Project, for all water year types. Under proposed operations, mudflat conditions and seasonal wetland habitat could be present in these higher elevations during spring migration, either through the continuation of active farming, where feasible, or by seasonal management of soils and vegetation according to vegetation management described in Section 2.7.

Under Project operations, the weir would be raised to 62.5 feet NAVD88 following the last large anticipated storm event of the season. As such, College Lake water surface elevations in the spring are expected to rise above existing elevations. Late wintering and late spring migrant waterfowl species like northern shovelers, gadwalls, and ruddy ducks may benefit from the persistent late spring-early summer foraging habitat.

Waterfowl, wading bird, and shorebird nesting is limited at College Lake, under current operation conditions. During the 2014 to 2018 College Lake Waterfowl Survey study period, Canada goose, mallard, pie-billed grebe, killdeer, and American avocet have been documented attempting to nest within College Lake’s storage area. All of these species make nests on the ground along the upland margins of the inundated lake and on elevated areas along the ditch lines caused by dredge spoils. All of these species have been found to suffer nest mortality by predators during rapid drawdown conditions, when coyote, grey fox, crows, ravens and other predators gain access to nest sites. Under the proposed late season adjustable weir operations, higher late spring water surface elevation may decrease predation on ground nesting bird species by reducing predator access.

As stated in Impact BR-4, existing riparian and wetland habitats are expected to remain the same following Project implementation, with the following exceptions:

- Existing farmed wetlands below 59 feet NAVD88 would change to open water habitat during the spring followed by a combination of mudflat and seasonal wetland vegetation in the late summer or fall. These areas would be characterized as managed seasonal wetlands, and in the absence of farming would provide longer periods of available foraging habitat for waterfowl, wading birds, and shorebirds;
- Existing annual grassland between 62.5 feet NAVD88 and 63.5 feet NAVD88 would likely convert to seasonal wetland; and
- Existing agricultural areas between 62.5 feet NAVD88 and 63.5 feet NAVD88 would convert to farmed wetland.

Therefore, impacts on Wildlife Corridors or Nursery Sites within College Lake would be minimal and beneficial because they would result in improved wetland habitat conditions, would increase the period of inundation during spring breeding season, and increase the overall extent of wetland habitat. The impact would be ***less than significant***.

Comments received on the Notice of Preparation requested that an assessment of impacts on waterfowl food supply be included in the EIR analysis. It would be speculative to predict which annual plants would grow in which areas, based on fluctuating water levels and different water year types. With the Project, College Lake would be inundated at slightly higher elevations, and would stay inundated longer for all water year types. Farming would continue at upper elevations, and lower elevations would receive regular vegetation management (mowing, disking) which has a similar effect as the current farm practices. Because of these slightly different but mostly similar conditions, the exposed wet substrate area at the receding water line would be expected to support nearly the same suite of species that currently establish as the water is drawn down. At lower elevations there would likely be less vegetation (open mudflat) as discussed in Impact BR-4. The species that are expected to be dominant after the project is implemented are discussed in general terms in Impact BR-4. In addition, because the lower elevations would not be farmed, any food that grows there would be able to complete its life cycle (unlike existing conditions, when the plants all get tilled under on June 1). Even if there was a reduction in waterfowl food supply at College Lake (which is speculative to quantify), other local food sources are available for waterfowl, and the impact would be ***less than significant***.

Mitigation: None required.

Impact BR-8: Implementation of the Project could conflict with local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance. (*Less than Significant*)

Construction of the proposed weir and intake pump station would occur, and installation of the pipelines adjacent to the Pinto Creek and West Beach Street ditches may occur, within sensitive habitat and the riparian corridor as defined in Santa Cruz County Municipal Code, Chapter 16.30 Riparian Corridor and Wetland Protection. As discussed in Section 3.4.2.3, California Government Code Section 53091 exempts agencies like PV Water from complying with local building and zoning ordinances when locating or constructing facilities for the production, generation, storage, treatment, or transmission of water. This discussion is intended to support City and County consideration of Project consistency with general plans as well as issuance of a Coastal Development Permit for the College Lake pipeline.

Implementation of mitigation measures discussed in Impacts BR-1 through BR-7 would limit the Project's potential conflicts with local policies or ordinances by reducing the Project's impacts on biological resources. Implementation of revised adopted Mitigation Measures BIO-1b, 1c, and 1d, and adopted Mitigation Measure BIO-1e, would reduce impacts on sensitive habitats and riparian corridors, and potential conflict with local policies and codes to less than significant. In accordance with revised adopted Mitigation Measure BIO-1b, PV Water would implement measures to maintain water quality and to control erosion and sedimentation such as restricting trenching across all waterways to low-flow periods, diverting water around work areas, and placing sediment curtains downstream of the construction zone. In accordance with revised adopted Mitigation Measures BIO-1c and BIO-1d, PV Water would ensure that temporarily impacted sensitive natural communities are restored to pre-construction conditions and provide compensation for permanent loss of sensitive natural communities. In accordance with adopted Mitigation Measure BIO-1e, PV Water would ensure that, where construction and/or facilities are placed within a riparian or wetland development setback area, indirect impacts on adjacent riparian and wetland vegetation would be reduced.

There is a potential conflict with Santa Cruz County General Plan/Local Coastal Plan Policy 5.6.1, which states, “pending a determination based on a biological assessment, preserve perennial stream flows at 95 percent of normal levels during summer months and at 70 percent of the normal winter baseflow levels. Oppose new water rights which would diminish the instream flows necessary to maintain anadromous fish runs and riparian vegetation below the 97 percent/70 percent standard.” Project operations may conflict with this policy. Biological Assessments would be prepared to support federal consultation under Section 7 of FESA. The Project would comply with any conditions of the Section 7 consultation and would ensure consistency with FESA requirements for the protection of federally listed threatened and endangered species and critical habitat.

Chapter 16.34 of the Santa Cruz Municipal Code restricts actions that would cause adverse effects to significant trees within the Coastal Zone.[95] No significant trees within the Coastal Zone would be removed, therefore the Project would not conflict with the Santa Cruz County Municipal Code protecting significant trees, and the impact would be ***less than significant***.

Mitigation: None required.

---

[95] Significant trees are defined in the Municipal Code as any tree, sprout clump, or group of trees that is (A) Within the urban services line or rural services line, any tree which is equal to or greater than 20 inches diameter at breast height (d.b.h.) (approximately five feet in circumference); any sprout clump of five or more stems each of which is greater than 12 inches d.b.h. (approximately three feet in circumference); or any group consisting of five or more trees on one parcel, each of which is greater than 12 inches d.b.h. (approximately three feet in circumference); or (B) outside the urban services line or rural services line, where visible from a scenic road, any beach, or within a designated scenic resource area, any tree which is equal to or greater than 40 inches d.b.h. (approximately 10 feet in circumference); any sprout clump of five or more stems, each of which is greater than 20 inches d.b.h. (approximately five feet in circumference); or, any group consisting of 10 or more trees on one parcel, each greater than 20 inches d.b.h. (approximately five feet in circumference).

Cumulative Impacts

Impact C-BR-1: The Project, in combination with past, present, and probable future projects in the Project area, could result in significant adverse impacts on special-status species, sensitive natural communities and wetlands, wildlife corridors or nursery sites, or conflicts with local plans and policies. (*Less than Significant*)

The geographic scope of analysis for cumulative impacts on sensitive biological resources includes the Project sites, as well as biologically linked terrestrial and aquatic areas within approximately five miles of these sites. This includes Salsipuedes Creek, Pajaro River, and the Pajaro Lagoon. The cumulative impact analysis considers whether the incremental effects of the Project, when combined with the effects of past, present, and reasonably foreseeable projects (as listed in Table 3.3-1 and shown on Figure 3.1-1 in Section 3.1, Overview), would result in cumulatively considerable impacts on special-status species and sensitive natural communities, including wetlands or other waters of the U.S. or state, or on wildlife movement corridors or nursery sites.

Special-Status Species

Construction

Construction activities may impact special-status species in the College Lake Basin including CRF, WPT, S-CCC steelhead, Monterey roach, Monterey hitch, and nesting birds during demolition of the existing weir structure and intake pump station and installation of the proposed weir structure and intake pump station at College Lake. Installation of the new pipeline through Pinto Creek would also affect these species. Species would be affected by water quality impacts associated with this work and general habitat degradation during the construction period as well.

As with the Project, the following other projects may similarly impact these special-status species during construction:

- PV Water’s Harkins Slough Recharge Facilities Upgrades Project (CRF, WPT, waterfowl, nesting birds),
- PV Water’s Watsonville Slough with Recharge Basins Project (CRF, WPT, waterfowl and nesting birds),
- PV Water’s Murphy Crossing with Recharge Basins Project (CRF, WPT, nesting birds, steelhead),
- Recharge Net Metering Pilot Program (CRF),
- USACE Pajaro River Flood Risk Management Study Project (CRF and steelhead), and
- City of Watsonville Lee Road Trail Connector (possible impacts on CRF).

The combined effects of the Project and the cumulative projects listed above could result in a cumulatively significant impact on special-status species.

These cumulative projects would be required to comply with applicable regulatory requirements protecting biological resources and project-specific mitigation measures (where applicable) similar to those of the Project.

As discussed in Impact BR-1, implementation of the adopted Mitigation Measures BIO-1b, 2a through 2l, and 2n which address most of these potential impacts on fish, CRF, and WPT, and supplemented by new Mitigation Measures BR-1a and BR-1b and revised Mitigation Measures BIO-1c and BIO-1d would reduce, avoid or minimize the project's impacts on these special-status species Further, the Project would implement the adopted Mitigation Measure BIO-2i and new Mitigation Measures BR-1c and BR-1d, which would reduce the project's impacts on nesting birds, roosting bats, and San Francisco dusky-footed woodrat. Additional avoidance and minimization measures would be implemented for active roosts and woodrat nests that cannot be avoided by the project. These protective requirements would avoid or minimize the project's contribution to significant cumulative impacts on special-status species and their habitat such that the Project's contribution to cumulative impacts would not be cumulatively considerable.

Operational Impacts on Fish

Fish Passage

Flood control and water supply projects throughout the Pajaro Valley Groundwater Basin could affect fish passage conditions in the Pajaro River and Salsipuedes Creek. The USACE Pajaro River Flood Risk Management Study project (USACE project) would alter patterns of discharge in Salsipuedes Creek and Pajaro River by installing flood control or reduction infrastructure. The USACE project would construct new levees along Corralitos Creek, set back from the existing natural streambanks. The USACE project would also replace existing levees with setback levees along Salsipuedes Creek. Setback levees would expand the meander belt for Salsipuedes Creek and the Pajaro River, and thus provide more natural channel processes, riparian cover, habitat complexity, and potentially more stream shading. The Project proposes to provide suitable fish passage conditions during the December 15-May 31 steelhead migratory period with project-specific bypass flows. Although the channel morphology resulting from implementation of the USACE project cannot be predicted at this time, the cumulative effects of bypass flows and more natural channel processes are not expected to adversely affect fish passage conditions in Salsipuedes Creek and the Pajaro River. Moreover, fish bypass requirements anticipated for the proposed Murphy Crossing project would ensure no cumulative effects to fish passage would occur in the Pajaro River below the Salsipuedes Creek confluence. There would be ***no significant cumulative impacts*** related to fish passage to which the Project would contribute.

Pajaro Lagoon

Implementation of the Project may result in a shift to slightly earlier lagoon mouth closure in some years in the absence of artificially elevated lagoon inflows resulting from the existing practice of draining College Lake. Flood control and water supply projects throughout the Pajaro Valley Groundwater Basin could affect water levels and mouth closure timing in the Pajaro Lagoon. Modeling of the cumulative project conditions resulted in similar results as the with-Project condition (refer to Appendix HYD). Characteristics of the cumulative projects contribute to this result. First, the flow bypass requirements of the proposed Murphy Crossing project would counteract the reduction in flows for water supply diversion. Second, the Harkins and Watsonville Slough projects, conservatively assumed to divert nearly all water available for water supply, contributes a relatively small proportion of wet season discharge to Pajaro Lagoon. As a result, the modeled cumulative conditions closely mirror with-Project conditions in Pajaro Lagoon, and cumulative impacts on fish in the lagoon would be ***less than significant.***

Operational Impacts on Special-Status Terrestrial Species

College Lake Inundation

Proposed College Lake water management operations would change the seasonal inundation patterns of habitats within the lake basin, with the largest effects at the lowest elevations within the basin (which would stay inundated through the summer). The longer inundation period and vegetation management activities would maintain seasonally-inundated areas as wildlife habitat, such as open water habitat in the winter and spring for aquatic species, and mudflat with seasonal wetland vegetation in the summer through fall for shorebirds and migratory waterfowl. Although some habitat conversion is expected under Project operations it was determined to result in less-than-significant impacts on special-status species (CRF, WPT, special-status and nesting birds, western red bat, and San Francisco dusky-footed woodrat) due to the similar function and value the converted habitats provide compared with baseline conditions.

College Lake Maintenance

Maintenance activities at College Lake on annual/semi-annual basis (e.g., disking, tilling, vegetation removal) could injure or kill individual CRF, WPT, nesting birds, or cause nest abandonment within these work areas, which would be a significant impact. As with the Project, operation of the following other projects may impact these special-status terrestrial species through maintenance activities or habitat conversion:

- PV Water's Harkins Slough Recharge Facilities Upgrades Project (CRF breeding and waterfowl nesting, and WPT from changes or decreases in water levels from water diversion), and
- PV Water's Watsonville Slough with Recharge Basins Project (CRF breeding and waterfowl nesting, and WPT from changes or decreases in water levels from water diversion and pumping noise).

These cumulative projects would be required to comply with applicable regulatory requirements protecting biological resources and project-specific mitigation measures (where applicable) similar to those of the Project.

These combined operational effects, of the Project and the cumulative projects that offer similar opportunity for CRF, WPT, or nesting birds, would result in a cumulatively significant impact. As discussed in Impact BR-5, the Project would implement revised adopted Mitigation Measure BIO-2i, 2j, and 2k to reduce impacts on terrestrial special-status species by conducting surveys prior to maintenance activities for nesting birds, CRF, and WPT, monitoring during maintenance activities if species presence warrants it, and otherwise protecting these species from adverse effects of maintenance activities through staff education, no-work buffers, and modification of maintenance approaches. These protective requirements would avoid or minimize the Project's operational impacts on CRF, WPT, and nesting birds such that the Project's contribution to the cumulative impacts would not be cumulatively considerable.

Habitats Downstream of College Lake

While discharge downstream of College Lake would be reduced in some months compared to pre-project conditions, the general seasonality of discharge would remain and is not anticipated to change the composition or extent of wetland or riparian vegetation used by CRF and WPT within either the Lower Salsipuedes Creek or Pajaro River under Project conditions. Similarly, upland riparian habitat along these waterways hosting special-status and nesting birds, western red bat, and San Francisco dusky-footed woodrat would not change as a result of Project operation. The USACE Pajaro River Flood Risk Management Study project would affect patterns of discharge in Salsipuedes Creek and Pajaro River, resulting in more natural channel processes in these streams. In addition, several wetland restoration projects in the cumulative scenario would expand wetland and adjacent upland habitat used by these special-status terrestrial species which include the Watsonville Wetlands Watch West Struve Slough Habitat Enhancement and Climate Change Adaptation Pilot Project, Upper Struve Slough Habitat Enhancement Project, Middle Watsonville Slough Upland Enhancement Project, Lower Harkins Slough Habitat Restoration Project, and Bryant Habert Ecological Restoration Project. The cumulative impacts of these projects on special-status terrestrial species during project operations would be ***less than significant***.

Sensitive Natural Communities and Potentially Jurisdictional Wetlands and Waters

Construction activities would affect sensitive natural communities and wetlands within Salsipuedes Creek, Pinto Creek, and West Beach Street drainage ditch through direct habitat removal, habitat conversion, or degradation of water quality. Removal of the existing weir structure and intake pump station and installation of the proposed weir structure and intake pump station, including installation of temporary sheetpiles and or a cofferdam and dewatering, would result in temporary and permanent impacts on the Salsipuedes Creek open water channel, riparian forest, seasonal wetland, and farmed wetland. Temporary direct impacts on Pinto Creek open water channel would occur during pipeline installation and indirect impacts associated water quality of Salsipuedes Creek, Pinto Creek, and West Beach Street drainage ditch may also occur during construction.

Other projects may affect sensitive natural communities and wetlands and waters in the same area which include:

- PV Water's Harkins Slough Recharge Facilities Upgrades Project (temporary impacts on wetlands in Harkins Slough and riparian habitat along access roads),
- PV Water's Watsonville Slough with Recharge Basins Project (construction impacts on Watsonville Slough wetlands and riparian habitat along access roads),
- PV Water's Murphy Crossing with Recharge Basins Project (construction impacts on riparian habitat), and
- USACE Pajaro River Flood Risk Management Study Project (possible impacts on riparian habitat)

As with the Project, these impacts are primarily related to the construction phases, which are temporary. Cumulative projects would be required to comply with applicable regulatory requirements protecting biological resources and project-specific mitigation measures (where applicable) similar to those of the Project.

Project construction along with construction of the cumulative projects would result in a cumulatively significant impact. Implementation of the adopted Mitigation Measure BIO-1b and revised adopted Mitigation Measures BIO-1c, 1d, and 1e would reduce the project's contribution to cumulative impacts on sensitive natural communities through standard measures to maintain water quality and to control erosion and sedimentation during construction, protection and avoidance of existing riparian and wetland vegetation from indirect impacts during construction, and compensatory revegetation of impacted riparian habitat and wetlands and waters at a 3:1 ratio. These protective requirements and compensatory revegetation would avoid or minimize the project's contribution to cumulative impacts on sensitive natural communities and wetlands and waters.

As discussed in Impact BR-4, project operation would result in some habitat conversion at College Lake with the overall quantity of seasonal and farmed wetland habitat anticipated to nominally increase compared to existing conditions. Operational impacts on sensitive natural communities and potentially jurisdictional wetlands and waters within College Lake would be minimal with the total area of wetland habitat increasing as a result of the project.

The cumulative projects would not alter discharge volumes within Salsipuedes Creek, but would alter discharge in Pajaro River. The flow regime within the Pajaro River downstream of College Lake would be similar under Project operations compared to existing conditions (high discharge during winter and early spring months, followed by lower discharge during the spring and summer growing season). In addition, the Murphy Crossing with Recharge Basins Project would include fish bypass requirements.

Further, Watsonville Wetlands Watch West Struve Slough Habitat Enhancement and Climate Change Adaptation Pilot Project, Upper Struve Slough Habitat Enhancement Project, Middle Watsonville Slough Upland Enhancement Project, Lower Harkins Slough Habitat Restoration Project, and Bryant Habert Ecological Restoration Project are wetland restoration projects which would provide a cumulative benefit on sensitive natural communities and wetlands and waters in the study area by expanding and improving the function and value of these resources through restoration.

Cumulative operational impacts on sensitive natural communities, including wetlands and waters, would be ***less than significant***.

Wildlife Corridors or Nursery Sites

College Lake supports a variety of waterfowl when filled in winter and spring and provides wintering habitat for many migratory bird species. Other projects that may impact wildlife corridors or nursery sites in the same geographic scope include the several Watsonville Wetlands Watch restoration projects (West Struve Slough Habitat Enhancement and Climate Change

Adaptation Pilot Project, Upper Struve Slough Habitat Enhancement Project, Middle Watsonville Slough Upland Enhancement Project, Lower Harkins Slough Habitat Restoration Project, and Bryant Habert Ecological Restoration Project) which would restore or enhance wetlands that could support migrating waterfowl. Impact BR-7 evaluates the Project's impacts on wildlife corridors and nursery sites; as discussed there, while wildlife movement would be temporarily affected during construction, no significant adverse effects to wildlife corridors and nursery sites are anticipated during operations. In particular, a function of the longer inundation period would be the larger area of mudflat habitat present during the fall migration period, which is beneficial to migratory waterfowl. The Project in combination with the cumulative projects could result in a beneficial cumulative impact on wildlife movement corridors and available foraging and breeding habitat through habitat expansion.

The project's incremental contribution to potential impacts on wildlife corridors and nursery sites, in combination with other past, present and future projects ***would not be cumulatively considerable***.

Mitigation: None required.

This page intentionally left blank

3.5 Air Quality and Greenhouse Gases

This section presents an analysis of potential impacts related to air quality and greenhouse gases that would result from implementation of the proposed College Lake Integrated Resources Management Project (Project). The analysis includes both site options (preferred and optional) for the water treatment plant (WTP) as well as preferred and optional pipeline alignments for the College Lake pipeline. Information from the 2014 Basin Management Plan Update Program Environmental Impact Report (2014 BMP Update PEIR) that remains relevant and accurate for the purposes of describing the physical or regulatory setting of air quality and greenhouse gases has been incorporated as appropriate. The Project includes mitigation measures adopted by the Board of Directors to reduce the severity and magnitude of potential environmental effects.

3.5.1 Setting

3.5.1.1 Background

Criteria Air Pollutants

The United States Environmental Protection Agency (USEPA) has identified six criteria air pollutants that are a threat to public health and welfare. These pollutants are called "criteria" air pollutants because standards have been established for each of them to meet specific public health and welfare criteria (see Regulatory Framework, below). The following criteria pollutants are a concern in the Project area.

Ozone

Ozone is a respiratory irritant and an oxidant that increases susceptibility to respiratory infections and can also cause substantial damage to vegetation and other materials. Ozone is not emitted directly into the atmosphere, but is a secondary air pollutant produced in the atmosphere through a complex series of photochemical reactions involving reactive organic gases (ROG) and nitrogen oxides (NO_X). ROG and NO_X are known as precursor compounds for ozone. Significant ozone production generally requires ozone precursors to be present in a stable atmosphere with strong sunlight for approximately three hours.

Ozone is a regional air pollutant because it is not emitted directly by sources, but is formed downwind of sources of ROG and NO_X under the influence of wind and sunlight. Ozone concentrations tend to be higher in the late spring, summer, and fall, when the long sunny days combine with regional subsidence inversions to create conditions conducive to the formation and accumulation of secondary photochemical compounds like ozone.

Ozone poses a health threat to those who already suffer from respiratory diseases as well as to healthy people. It is a respiratory irritant that can cause severe ear, nose, and throat irritation and increased susceptibility to respiratory infections. According to USEPA, ozone can cause the muscles in the airways to constrict, potentially leading to wheezing and shortness of breath.[1]

---

1 USEPA, Health Effects of Ozone Pollution, last updated October 10, 2018. Available online at https://www.epa.gov/ground-level-ozone-pollution/health-effects-ozone-pollution. Accessed in January 2019.

Ozone can make it more difficult to breathe deeply and vigorously; cause shortness of breath and pain when taking a deep breath; cause coughing and sore or scratchy throat; inflame and damage the airways; aggravate lung diseases such as asthma, emphysema, and chronic bronchitis; increase the frequency of asthma attacks; make the lungs more susceptible to infection; continue to damage the lungs even when the symptoms have disappeared; and cause chronic obstructive pulmonary disease.[2] Long-term exposure to ozone is linked to aggravation of asthma, and is likely to be one of many causes of asthma development, and long-term exposures to higher concentrations of ozone may also be linked to permanent lung damage, such as abnormal lung development in children.[3] According to the California Air Resources Board (CARB), exposure to ozone is "associated with symptoms such as coughing, chest tightness, shortness of breath, and the worsening of asthma symptoms. The greatest risk for harmful health effects belongs to outdoor workers, athletes, children and others who spend greater amounts of time outdoors during smoggy periods".[4] Inhalation of ozone causes inflammation and irritation of the tissues lining human airways, causing and worsening a variety of symptoms, and exposure to ozone can reduce the volume of air that the lungs breathe in and cause shortness of breath.[5] USEPA states that people most at risk from breathing air containing ozone include people with asthma, children, older adults, and people who are active outdoors, especially outdoor workers.[6] Children are at greatest risk from exposure to ozone because their lungs are still developing and they are more likely to be active outdoors when ozone levels are high, which increases their exposure.[7] According to CARB, studies show that children are no more or less likely to suffer harmful effects than adults; however, children and teens may be more susceptible to ozone and other pollutants because they spend nearly twice as much time outdoors and engaged in vigorous activities compared to adults.[8] Children breathe more rapidly than adults and inhale more pollution per pound of their body weight than adults and are less likely than adults to notice their own symptoms and avoid harmful exposures. Further research may be able to better distinguish between health effects in children and adults.[9]

Nitrogen Dioxide

Nitrogen dioxide (NO_2) is an air quality pollutant of concern because it acts as a respiratory irritant. NO_2 is a major component of the group of gaseous nitrogen compounds commonly referred to as NO_X. A precursor to ozone formation, NO_X is produced by fuel combustion in motor vehicles, industrial stationary sources (such as refineries, power plants, and chemical

2 Ibid.

3 Ibid.

4 CARB, *Ozone and Ambient Air Quality Standards*. Available online at https://www.arb.ca.gov/research/aaqs/caaqs/ozone/ozone.ht. Accessed in October 2016.

5 CARB, Ozone & Health, Health Effects of Ozone. Available online at https://ww2.arb.ca.gov/resources/ozone-and-health. Accessed in January 2019.

6 USEPA, Health Effects of Ozone Pollution, last updated October 10, 2018. Available online at https://www.epa.gov/ground-level-ozone-pollution/health-effects-ozone-pollution. Accessed in January 2019.

7 Ibid.

8 CARB, Ozone & Health, Health Effects of Ozone. Available online at https://ww2.arb.ca.gov/resources/ozone-and-health. Accessed in January 2019.

9 Ibid.

manufacturing facilities), ships, aircraft, and rail transit. Typically, NO_X emitted from fuel combustion is in the form of nitric oxide (NO) and NO_2, with the vast majority (95 percent) of the NO_X emissions being comprised of NO. NO is converted to NO_2 in the atmosphere when it reacts with ozone or undergoes photochemical reactions.

NO_X acts as an acute respiratory irritant and increases susceptibility to respiratory pathogens.[10] According to USEPA, short-term exposures to NO_2 can potentially aggravate respiratory diseases, particularly asthma, leading to respiratory symptoms (such as coughing, wheezing, or difficulty breathing), hospital admissions, and visits to emergency rooms, while longer exposures to elevated concentrations of NO_2 may contribute to the development of asthma and potentially increase susceptibility to respiratory infections.[11] According to CARB, controlled human exposure studies show that NO_2 exposure can intensify responses to allergens in allergic asthmatics.[12] In addition, a number of epidemiological studies have demonstrated associations between NO_2 exposure and premature death, cardiopulmonary effects, decreased lung function growth in children, respiratory symptoms, emergency room visits for asthma, and intensified allergic responses.[13] Infants and children are particularly at risk from exposure to NO_2 because they have disproportionately higher exposure to NO_2 than adults due to their greater breathing rate for their body weight and their typically greater outdoor exposure duration; in adults, the greatest risk is to people who have chronic respiratory diseases, such as asthma and chronic obstructive pulmonary disease.[14] CARB states that much of the information on distribution in air, human exposure and dose, and health effects is specifically for NO_2, and there is only limited information for NO and NO_X, as well as large uncertainty in relating health effects to NO or NO_X exposure.[15]

Carbon Monoxide

Carbon monoxide (CO) is a non-reactive pollutant that is a product of incomplete combustion and is mostly associated with motor vehicle traffic. High CO concentrations develop primarily during winter when periods of light winds combine with the formation of ground-level temperature inversions (typically from the evening through early morning). These conditions result in reduced dispersion of vehicle emissions. Motor vehicles also exhibit increased CO emission rates at low air temperatures.

The primary adverse health effect associated with CO is interference with normal oxygen transfer to the blood, which may result in tissue oxygen deprivation.[16] According to USEPA, breathing air with a high concentration of CO reduces the amount of oxygen that can be transported in the blood stream to critical organs like the heart and brain, and at very high levels, which are possible

---

[10] Centers for Disease Control, *Air Pollutants*, 2014. Available online at http://www.cdc.gov/air/pollutants.htm.

[11] USEPA, Nitrogen Dioxide Pollution, last updated September 8, 2016. Available online at https://www.epa.gov/no2-pollution/basic-information-about-no2,. Accessed January 2019.

[12] CARB, Nitrogen Dioxide & Health. Available online at https://ww2.arb.ca.gov/resources/nitrogen-dioxide-and-health. Accessed January 2019.

[13] Ibid.

[14] CARB, Nitrogen Dioxide & Health. Available online at https://ww2.arb.ca.gov/resources/nitrogen-dioxide-and-health. Accessed January 2019.

[15] Ibid.

[16] Centers for Disease Control, *Air Pollutants*, 2014. Available online at http://www.cdc.gov/air/pollutants.htm.

indoors or in other enclosed environments, CO can cause dizziness, confusion, unconsciousness, and death.[17] Very high levels of CO are not likely to occur outdoors; however, when CO levels are elevated outdoors, they can be of particular concern for people with cardiovascular diseases, chronic lung disease, or anemia since these people already have a reduced ability for getting oxygenated blood to their hearts and are especially vulnerable to the effects of CO when exercising or under increased stress.[18] According to CARB, the most-common effects of CO exposure are fatigue, headaches, confusion, and dizziness due to inadequate oxygen delivery to the brain.[19] For people with cardiovascular disease, short-term CO exposure can further reduce their body's already compromised ability to respond to the increased oxygen demands of exercise, exertion, or stress; inadequate oxygen delivery to the heart muscle leads to chest pain and decreased exercise tolerance.[20] Unborn babies, infants, elderly people, and people with anemia or with a history of heart or respiratory disease are most likely to experience health effects with exposure to elevated levels of CO.[21]

Particulate Matter

Particulate matter less than 10 microns in diameter (PM_{10}) and particulate matter less than 2.5 microns in diameter ($PM_{2.5}$) represent fractions of particulate matter that can be inhaled into air passages and the lungs and can cause adverse health effects. Particulate matter in the atmosphere results from many kinds of dust- and fume-producing industrial and agricultural operations, fuel combustion, and atmospheric photochemical reactions. Some sources of particulate matter, such as demolition and construction activities, are more local in nature, while others, such as vehicular traffic, have a more regional effect.

Very small particles of certain substances (e.g., sulfates and nitrates) can cause lung damage directly, or can contain adsorbed gases (e.g., chlorides or ammonium) that may be injurious to health. Particulate matter also can damage materials and reduce visibility.

Both PM_{10} and $PM_{2.5}$ may adversely affect the human respiratory system, especially in people who are naturally sensitive or susceptible to breathing problems.[22] According to CARB, both PM_{10} and $PM_{2.5}$ can be inhaled, with some depositing throughout the airways; PM_{10} is more likely to deposit on the surfaces of the larger airways of the upper region of the lung while $PM_{2.5}$ is more likely to travel into and deposit on the surface of the deeper parts of the lung, which can induce tissue damage and lung inflammation.[23]

[17] USEPA, Carbon Monoxide (CO) Pollution in Outdoor Air, last updated September 8, 2016. Available online at https://www.epa.gov/co-pollution/basic-information-about-carbon-monoxide-co-outdoor-air-pollution. Accessed on January 8, 2019.

[18] Ibid.

[19] CARB, Carbon Monoxide & Health. Available online at https://ww2.arb.ca.gov/resources/carbon-monoxide-and-health. Accessed January 2019.

[20] Ibid.

[21] Ibid.

[22] Centers for Disease Control, *Air Pollutants*, 2014. Available online at http://www.cdc.gov/air/pollutants.htm.

[23] CARB, Inhalable Particulate Matter and Health (PM2.5 and PM10), last reviewed August 10, 2017. Available online at https://www.arb.ca.gov/research/aaqs/common-pollutants/pm/pm.htm. Accessed January 2019.

Particulate matter generally is "associated with increased risk of hospitalization for lung and heart-related respiratory illness, including emergency room visits for asthma. Particulate matter exposure is also associated with increased risk of premature deaths, especially in the elderly and people with pre-existing cardiopulmonary disease. In children, studies have shown associations between particulate matter exposure and reduced lung function and increased respiratory symptoms and illnesses".[24] Short-term (up to 24 hours) exposure to PM_{10} has been associated primarily with worsening of respiratory diseases, including asthma and chronic obstructive pulmonary disease, leading to hospitalization and emergency department visits.[25] The effects of long-term (months or years) exposure to PM_{10} are less clear, although studies suggest a link between long-term PM_{10} exposure and respiratory mortality. The International Agency for Research on Cancer published a review in 2015 that concluded that particulate matter in outdoor air pollution causes lung cancer.[26] Short-term exposure to $PM_{2.5}$ has been associated with premature mortality, increased hospital admissions for heart or lung causes, acute and chronic bronchitis, asthma attacks, emergency room visits, respiratory symptoms, and restricted activity days; long-term exposure to $PM_{2.5}$ has been linked to premature death, particularly in people who have chronic heart or lung diseases, and reduced lung function growth in children.[27] According to CARB, populations most likely to experience adverse health effects with exposure to PM_{10} and $PM_{2.5}$ include older adults with chronic heart or lung disease, children, and asthmatics, and children and infants are more susceptible to harm from inhaling pollutants such as PM_{10} and $PM_{2.5}$ compared to healthy adults because they inhale more air per pound of body weight than do adults, spend more time outdoors, and have developing immune systems.[28] According to a study prepared by the CARB, exposure to ambient $PM_{2.5}$, particularly diesel particulate matter (DPM), can be associated with approximately 14,000 to 24,000 premature annual deaths statewide.[29]

Other Criteria Pollutants

Sulfur dioxide (SO_2) is produced through combustion of sulfur or sulfur-containing fuels such as coal. SO_2 is also a precursor to the formation of atmospheric sulfate and particulate matter (both PM_{10} and $PM_{2.5}$) and can contribute to sulfuric acid formation in the atmosphere that could precipitate downwind as acid rain. Lead has a range of adverse neurotoxin health effects, and was formerly released into the atmosphere primarily via leaded gasoline. The phase-out of leaded gasoline in California resulted in decreasing levels of atmospheric lead.

[24] CARB, *Particulate Matter – Overview*. Available online at https://www.arb.ca.gov/research/aaqs/caaqs/pm/pm.htm. Accessed October 2016.

[25] CARB, Inhalable Particulate Matter and Health (PM2.5 and PM10), last reviewed August 10, 2017. Available online at https://www.arb.ca.gov/research/aaqs/common-pollutants/pm/pm.htm. Accessed January 2019.

[26] Ibid.

[27] Ibid.

[28] Ibid.

[29] CARB, Methodology for Estimating Premature Deaths Associated with Long Term Exposure to Fine Airborne Particulate Matter in California, Draft Staff Report, December 7, 2009.

Toxic Air Contaminants

Toxic Air Contaminants (TACs) are airborne substances that are capable of causing short-term (acute) and/or long-term (chronic or carcinogenic, i.e., cancer-causing) adverse human health effects (i.e., injury or illness). TACs include both organic and inorganic chemical substances. They may be emitted from a variety of common sources including gasoline stations, automobiles, dry cleaners, industrial operations, and painting operations. The current California list of TACs includes approximately 200 compounds, including DPM emissions from diesel-fueled engines which was identified as a TAC by CARB in 1998.[30]

Climate Change

According to the USEPA, the term "climate change" refers to any significant change in measures of climate (such as temperature, precipitation, or wind) lasting for an extended period (over several decades or longer). There is scientific consensus that climate change is occurring and that human activity contributes in some measure (perhaps substantially) to that change. Gases that trap heat in the atmosphere are often called greenhouse gases (GHGs). Emissions of GHGs, if not sufficiently curtailed, are likely to contribute further to increases in global temperatures. The potential effects of climate change in California include sea level rise and reductions in snowpack, as well as an increased number of extreme-heat days per year, high ozone days, large forest fires, and drought years.[31] Globally, climate change could affect numerous environmental resources through potential, though uncertain, changes in future air temperatures and precipitation patterns. According to the International Panel on Climate Change, the projected effects of climate change are likely to vary regionally, but are expected to include the following direct effects[32]:

- Higher maximum temperatures and more hot days over nearly all land areas;
- Higher minimum temperatures (fewer cold days and frost days over nearly all land areas);
- Reduced diurnal temperature range over most land areas;
- Increase in heat index over most land areas; and
- More intense precipitation events.

In addition, many secondary effects are projected to result from climate change, including a global rise in sea level, ocean acidification, changes in disease vectors, and changes in habitat and biodiversity. The possible outcomes and feedback mechanisms involved are not fully understood, and much research remains to be done; however, over the long term, the potential exists for substantial environmental, social, and economic consequences.

---

[30] CARB, Toxic Air Contaminant Identification List, July 2011. Available online at https://www.arb.ca.gov/toxics/id/taclist.htm. Accessed on February 26, 2019.

[31] CARB, First Update to the Climate Change Scoping Plan, Building on the Framework Pursuant to AB 32, the California Global Warming Solutions Act of 2006, May 15, 2014.

[32] Intergovernmental Panel on Climate Change (IPCC), *Climate Change 2014, Impacts, Adaptation, and Vulnerability*, Summary for Policymakers, 2014.

Greenhouse Gas Emissions

GHG emissions that result from human activities primarily include carbon dioxide (CO_2), with much smaller amounts of nitrous oxide (N_2O), methane (CH_4, often from unburned natural gas), sulfur hexafluoride (SF_6) from high-voltage power equipment, and hydrofluorocarbons and perfluorocarbons from refrigeration/chiller equipment. Because these GHGs have different warming potentials (i.e., the amount of heat trapped in the atmosphere by a certain mass of the gas), and CO_2 is the most common reference gas for climate change, GHG emissions are often quantified and reported as CO_2-equivalent (CO_2e) emissions. For example, while SF_6 represents a small fraction of the total annual GHGs emitted worldwide, this gas is very potent, with 23,900 times the global warming potential of CO_2. Therefore, an emission of 1 metric ton of SF_6 would be reported as 23,900 metric tons CO_2e. The global warming potential of CH_4 and N_2O are 25 times and 298 times that of CO_2, respectively.[33] The principal GHGs resulting from human activity that enter and accumulate in the atmosphere are described below.

Carbon Dioxide

CO_2 is a naturally occurring gas that enters the atmosphere through natural as well as anthropogenic (human) sources. Key anthropogenic sources include the burning of fossil fuels (e.g., oil, natural gas, and coal), solid waste, trees, wood products, and other biomass, as well as industrially relevant chemical reactions such as those associated with manufacturing cement. CO_2 is removed from the atmosphere when it is absorbed by plants as part of the biological carbon cycle.

Methane

Like CO_2, CH_4 is emitted from both natural and anthropogenic sources. Key anthropogenic sources of CH_4 include gaseous emissions from landfills, releases associated with mining and materials extraction industries (in particular coal mining), and fugitive releases associated with the extraction and transport of natural gas and crude oil. CH_4 emissions also result from livestock and agricultural practices. Small quantities of CH_4 are released during fossil fuel combustion.

Nitrous Oxide

N_2O is also emitted from both natural and anthropogenic sources. Key anthropogenic sources include industrial activities, agricultural activities (primarily the application of nitrogen fertilizer), the use of explosives, combustion of fossil fuels, and decay of solid waste.

Fluorinated Gases

Hydrofluorocarbons, perfluorocarbons, and SF_6 are synthetic gases emitted from a variety of industrial processes, and they contribute substantially more to the greenhouse effect on a pound for pound basis than the GHGs described previously. Fluorinated gases are often used as substitutes for ozone-depleting substances (i.e., chlorofluorocarbons, hydrochlorofluorocarbons, and halons). These gases are typically emitted in small quantities, but because of their potency they are sometimes referred to as “high global warming potential gases.”

[33] CARB, Global Warming Potentials, last reviewed June 22, 2018. Available online at http://www.arb.ca.gov/cc/inventory/background/gwp.htm. Accessed on February 26, 2019.

3.5.1.2 Regional Topography, Meteorology, and Climate

The Project is located within the North Central Coast Air Basin (NCCAB). The NCCAB is comprised of Monterey, Santa Cruz, and San Benito counties and covers 5,159 square miles along the central coast of California. It is generally bounded by the Monterey Bay to the west, the Santa Cruz Mountains to the northwest, the Diablo Range on the northeast, with the Santa Clara Valley between them. Pajaro Valley Water Management Agency (PV Water) lies within the northern portion of the NCCAB. The PV Water service area is bounded by the Santa Cruz range to the north and northeast, the Monterey Bay to the west, and the Salinas Valley to the south.

The potential for high pollutant concentrations developing at a given location depends upon the quantity of pollutants emitted into the atmosphere in the surrounding area and/or upwind, the capacity of the atmosphere to disperse the contaminated air, and the presence / intensity of sunlight. The atmospheric pollution potential is independent of the location of emission sources and is instead a function of factors such as topography and meteorology. Atmospheric conditions such as wind speed, wind direction, and air temperature gradients interact with the physical features of the landscape to determine the movement and dispersal of air pollutants.

The semi-permanent high-pressure cell over the eastern Pacific Ocean is the basic controlling factor in the climate of the NCCAB. In the summer, the high pressure cell is dominant and causes persistent west and northwest winds over the entire California coast. The onshore air currents pass over cool ocean waters and bring fog and relatively cool air into the coastal valleys. The warmer air acts as a lid, inhibiting vertical air movement. The generally northwest-southeast orientation of mountainous ridges tends to restrict the summer onshore air currents. Typically, during the fall, when surface winds become weak, north or east winds develop and can transport pollutants from either the San Francisco Bay Area or the Central Valley into the NCCAB.

During the winter, the Pacific high-pressure area has less influence on the NCCAB. Air frequently flows in a southeasterly direction out of the Salinas and San Benito valleys, especially during night and morning hours. Northwest winds are still dominant in the winter, but easterly flow is more frequent. The absence of deep, persistent inversions and the occasional storm systems usually result in good air quality for the basin as a whole in winter and early spring.

The presence and intensity of sunlight is another important factor that affects air pollution as ozone is formed at higher temperatures. Since temperatures in many of the NCCAB inland valleys are so much higher than near the coast, these inland areas are much more prone to photochemical air pollution.

The climate in the NCCAB is characterized by cool, wet winters and warm, dry summers. Over 90 percent of the yearly precipitation falls from November through April, and coastal fog is common in the summer and fall months. The mean annual temperature is 57 degrees Fahrenheit; the mean monthly maximum temperature is 74 degrees Fahrenheit in September; and the mean monthly minimum temperature is 39degrees Fahrenheit in January.

3.5.1.3 Existing Air Quality

Criteria Air Pollutants

The Monterey Bay Air Resources District (MBARD) operates seven air quality monitoring stations in the NCCAB that provide information on ambient concentrations of criteria air pollutants. The Santa Cruz station is located at 2544 Soquel Avenue in Santa Cruz (approximately 15 miles from College Lake) and measures concentrations of ozone and $PM_{2.5}$. The Salinas station is located at East Laurel Drive in Salinas (approximately 26 miles from College Lake) and measures ozone, $PM_{2.5}$, and NO_2. **Table 3.5-1** shows a five-year (2013 through 2017) summary of air quality data from these stations. The table also compares the data to the California Ambient Air Quality Standards (CAAQS) and National Ambient Air Quality Standards (NAAQS). As indicated in Table 3.5-1, there were no recorded violations of the state or federal standards from 2013 through 2016.However, there was one exceedance of the state and national 8-hour ozone standard and two exceedances of the 24-hour average $PM_{2.5}$ standard in 2017. There were no measured exceedances of the NO_2 standards from 2013 through 2017. CO was not monitored at either station over the five-year study period; however, CO concentrations have continued to decline all over the County and are expected to be well below standards in the project area.

3.5.1.4 Greenhouse Gas Sources

Anthropogenic GHG emissions in the United States are derived mostly from the combustion of fossil fuels for transportation and power production. Energy-related CO_2 emissions resulting from fossil fuel exploration and use account for approximately three-quarters of the human-generated GHG emissions in the United States, primarily in the form of CO_2 emissions from burning fossil fuels. More than half of the energy-related emissions come from large stationary sources, such as power plants; over one-quarter derive from transportation; and a majority of the remaining sources include: industrial and agricultural activities, and commercial and residential sources.[34]

Statewide emissions of GHG from relevant source categories for 2010 through 2016 are summarized in **Table 3.5-2**. Specific contributions from individual air basins, such as the NCCAB, which encompasses the Project area, are included in the emissions inventory but are not itemized by air basin. In 2015, California produced 440 million gross metric tons of CO_2e emissions. Transportation was the source of 39 percent of the state's GHG emissions, followed by industrial sources at 23 percent, electricity generation at 19 percent, commercial and residential sources at 11 percent, and agricultural and forestry related sources comprised the remaining 8 percent.[35]

[34] USEPA, Sources of Greenhouse Gas Emissions, October 9, 2018. Available online at https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions. Accessed on February 26, 2019.

[35] CARB, California Greenhouse Gas Inventory for 2000–2015 – by Sector and Activity, last updated June 6, 2017.

TABLE 3.5-1
AMBIENT AIR QUALITY MONITORING SUMMARY FOR THE PROJECT AREA (2013–2017)

Pollutant	Standard	Monitoring Data by Year				
		2013	2014	2015	2016	2017
Ozone[a]						
Maximum 1-hour concentration (ppm)	0.09 ppm	0.069	0.076	0.076	0.064	0.082
Days over State Standard		0	0	0	0	0
Maximum 8-Hour Average (ppm)	0.070 ppm	0.055	0.068	0.060	0.057	0.075
Days over State Standard		0	0	0	0	1
Days over National Standard		0	0	0	0	1
Fine Particulate Matter ($PM_{2.5}$)[a]						
Maximum 24-Hour Average (µg/m^3)	35 µg/m^3	19.0	15.7	20.5	12.7	47.3
Estimated Days over National Standard		0	0	0	0	2
State Annual Average (µg/m^3)	12 µg/m^3	6.8	5.7	5.3	5.6	NA
Nitrogen Dioxide (NO_2)[b]						
Maximum 1-Hour Average (µg/m3)	0.18 ppm	0.042	0.038	0.033	0.033	0.034
Estimated Days over National Standard		0	0	0	0	0

NOTES:
NA = Not Available
ppm = parts per million; µg/m^3 = micrograms per cubic meter.
[a] Emissions data collected at the Santa Cruz-2544 Soquel Avenue Monitoring Station.
[b] Emissions data collected at the Salinas-East Laurel Drive Monitoring Station.

SOURCE: California Air Resources Board, iADAM: Air Quality Data Statistics, 2018. Available online at: http://www.arb.ca.gov/adam/. Accessed on April 18, 2018.

TABLE 3.5-2
CALIFORNIA GHG EMISSIONS (MILLION METRIC TONS CO_2E)

Emission Inventory Category	2010	2011	2012	2013	2014	2015	2016	
Transportation	163.01	159.68	159.44	158.14	160.03	164.63	169.38	39%
Electric Power	90.34	88.06	95.09	89.65	88.24	83.67	68.58	16%
Commercial and Residential	45.05	45.50	42.89	43.54	37.37	37.92	39.36	9%
Industrial	91.01	90.65	90.90	93.48	93.77	91.71	89.61	21%
Recycling and Waste	8.37	8.47	8.49	8.52	8.59	8.73	8.81	15%
High Global Warming Potential Gases	13.64	14.74	15.74	16.82	17.82	19.05	19.78	
Agriculture	34.64	35.28	36.42	34.93	36.03	34.65	33.84	
Total Gross Emissions	**446.06**	**442.38**	**448.97**	**445.08**	**441.85**	**440.36**	**429.36**	**100%**

SOURCE: California Air Resources Board, California Greenhouse Gas Inventory for 2000–2016 – by Category as Defined in the 2008 Scoping Plan, 2017.

3.5.1.5 Sensitive Receptors

For the purposes of air quality analyses, sensitive receptors are defined as facilities and land uses where people spend extended amounts of time or that include members of the population that are particularly sensitive to the effects of air pollutants, such as children, the elderly, and people with respiratory medical conditions and other illnesses. Examples of sensitive uses include residences, schools, hospitals, and daycare centers. The reasons for greater than average sensitivity include pre-existing health conditions, proximity to emissions sources, and/or duration of exposure to air pollutants. Schools, hospitals, and convalescent homes are considered to be relatively sensitive to poor air quality because children, elderly people, and the infirm are more susceptible to respiratory distress and other air quality-related health problems than the general public. Residential areas are considered sensitive to poor air quality because people usually stay home for extended periods of time, which results in greater exposure to ambient air quality. Sensitive receptors located within the vicinity of the various Project components are discussed below.

Weir Structure and Intake Pump Station

Sensitive receptors near the proposed weir structure and intake pump station consist of the Our Lady Help of Christians church, St. Francis Catholic High School, Lakeview Middle School and single-family residences. The closest institutional use (e.g., church, school) is the Our Lady Help of Christians church, which is located approximately 340 feet east of the proposed weir structure boundary. A residential community is located approximately 710 feet southwest of the proposed intake pump station boundary.

Preferred Water Treatment Plant Site

Sensitive receptors near the preferred WTP site consist of single-family residences. The closest residence is located 40 feet southeast of the preferred WTP site boundary. A residential community is located approximately 630 feet east of the preferred WTP site boundary.

Optional Water Treatment Plant Site

Sensitive receptors near the optional WTP site include the Our Lady Help of Christians church, St. Francis Catholic High School, Lakeview Middle School, and single-family residences. The closest institutional use (e.g., church, school) is the church, which is located approximately 470 feet east of the optional WTP site boundary. A residential community is located approximately 330 feet south of the optional WTP site boundary.

College Lake Pipeline

The Project would include an approximately 5.5-mile-long pipeline from the proposed WTP to the existing Watsonville Wastewater Treatment Facility. Figures 2-3a through 2-3e in Chapter 2, *Project Description*, show the proposed pipeline alternatives, which generally follow either existing road rights-of-way or are within agricultural fields. Sensitive receptors along the alignments consist of single- and multi-family residences and Watsonville High School. The nearest sensitive receptors to pipeline construction are approximately 25 feet away.

3.5.2 Regulatory Framework

3.5.2.1 Federal and State

Federal, state, and regional regulations provide the framework for analyzing and controlling air pollutant emissions and thus general air quality. The USEPA is responsible for implementing the programs established under the federal Clean Air Act, such as establishing and reviewing the NAAQS and reviewing State Implementation Plans (SIPs), described further below. However, the USEPA has delegated the authority to implement many of the federal programs to the states while retaining an oversight role to ensure that the programs continue to be implemented.

In California, CARB is responsible for establishing and reviewing the state ambient air quality standards, developing and managing the California SIP, securing approval of this plan from the USEPA, and identifying TACs. CARB also regulates mobile emissions sources in California, such as construction equipment, trucks, and automobiles, and oversees the activities of air quality management districts, which are organized at the county or regional level. The MBARD is the regional agency primarily responsible for regulating stationary emission sources at facilities within its geographic area (i.e., Monterey, Santa Cruz, and San Benito counties) and for preparing the air quality plans that are required under the Federal Clean Air Act and the California Clean Air Act.

The Federal Clean Air Act Amendments of 1977 established the NAAQS, and individual states retained the option to adopt more stringent standards and to include other pollution sources. California had already established its own air quality standards when federal standards were established, and because of the unique meteorological problems in California, there are considerable differences between some of the state and federal standards. As shown in **Table 3.5-3**, the CAAQS standards tend to be at least as protective as NAAQS, and are often more stringent.

Federal ambient air quality standards (federal standards) exist for seven criteria air pollutants: ozone, CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and lead. In addition, California has established State standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles. The ambient air quality standards are intended to protect public health and welfare, and they specify the concentration of pollutants (with an adequate margin of safety) to which the public can be exposed without adverse health effects. They are designed to protect those segments of the public most susceptible to respiratory distress, referred to as sensitive receptors, including people with asthma, the very young, elderly, people weak from other illness or disease, and/or people engaged in strenuous work or exercise. Healthy adults can tolerate occasional short term exposure to air pollution levels that are somewhat above the ambient air quality standards before adverse health effects are observed.

Areas with air quality that exceed federal or state air quality standards are designated as "non-attainment" areas for the relevant air pollutants. Designations are made for each criteria pollutant according to the categories listed below. Designations in relation to state standards are made by the CARB, while designations in relation to national standards are made by the USEPA. State designations are updated annually, while the national designations are updated either when the standards change or when an area requests re-designation due to changes in air quality. Non-attainment designations are of most concern because they indicate that unhealthy levels of the pollutant exist in the area, which typically triggers a need to develop a plan to achieve the applicable standards. The NCCAB as a whole is considered by the USEPA as attainment or unclassified for all regulated criteria pollutants relative to the NAAQS. At the state level, the region is designated as non-attainment-transitional for ozone and non-attainment for PM_{10}. Non-attainment-transitional is designated when, during a single calendar year, the CAAQS is not exceeded more than three times at any one monitoring location within the NCCAB. The region is attainment for all other CAAQS.[36]

TABLE 3.5-3
AMBIENT AIR QUALITY STANDARDS AND AIR BASIN ATTAINMENT STATUS

Pollutant	Averaging Time	State Standard	Attainment Status for California Standard	Federal Primary Standard	Attainment Status for Federal Standard
Ozone	8 Hour	0.070 ppm	Non-attainment - Transitional	0.070 ppm	Attainment
	1 Hour	0.09 ppm	Attainment	---	---
Carbon Monoxide	8 Hour	9.0 ppm	Attainment	9 ppm	Attainment
	1 Hour	20 ppm	Attainment	35 ppm	Attainment
Nitrogen Dioxide	Annual Average	0.030 ppm	---	0.053 ppm	Attainment
	1 Hour	0.18 ppm	Attainment	0.100 ppm	Unclassified
Sulfur Dioxide	Annual Average	---	---	0.030 ppm	Attainment
	24 Hour	0.04 ppm	Attainment	0.14 ppm	Attainment
	1 Hour	0.25 ppm	Attainment	0.075 ppm	Attainment
Respirable Particulate Matter (PM_{10})	Annual Arithmetic Mean	20 $\mu g/m^3$	Attainment	---	---
	24 Hour	50 $\mu g/m^3$	Non-attainment	150 $\mu g/m^3$	Unclassified
Fine Particulate Matter ($PM_{2.5}$)	Annual Arithmetic Mean	12 $\mu g/m^3$	Attainment	12.0 $\mu g/m^3$	Unclassified/ Attainment
	24 Hour	---	---	35 $\mu g/m^3$	Attainment
Sulfates	24 Hour	25 $\mu g/m^3$	Attainment	---	---
Lead	Calendar Quarter	---	---	1.5 $\mu g/m^3$	Attainment
	30-Day Average	1.5 $\mu g/m^3$	Attainment	---	---
	3-Month Rolling Average	---	---	0.15 $\mu g/m^3$	Unclassified
Hydrogen Sulfide	1 Hour	0.03 ppm	Unclassified	No Federal Standard	---
Vinyl Chloride	24 Hour	0.010 ppm	No information available	---	---
Visibility Reducing Particles	8 Hour	Extinction of 0.23/km; visibility of 10 miles or more	Unclassified	No Federal Standard	---

NOTES:
PPM = parts per million; $\mu g/m^3$ = micrograms per cubic meter; --- = no applicable standard.

SOURCES: CARB, Ambient Air Quality Standards, May 4, 2016. Available online at https://www.arb.ca.gov/desig/adm/adm.htm. Accessed on February 19, 2018; CARB, Area Designation Maps for State and Federal Ambient Air Quality Standards, 2017. Available online at https://www.arb.ca.gov/desig/adm/adm.htm. Accessed on February 18, 2018.

36 CARB, Area Designation Maps for State and Federal Ambient Air Quality Standards. Available online at https://www.arb.ca.gov/desig/adm/adm.htm. Accessed on February 18, 2018.

Federal Clean Air Act

The 1977 federal Clean Air Act (last amended in 1990; Title 42 United States Code Section 7401 et seq.) requires regional planning and air resource agencies to prepare a regional air quality plan to outline the measures by which both stationary and mobile sources of pollutants will be controlled to achieve all standards within the specified deadlines.

The USEPA is responsible for implementing programs developed under the federal Clean Air Act, such as establishing and reviewing the federal standards for CO, ozone, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and lead. The federal Clean Air Act also requires the USEPA to designate areas (counties or air basins) as attainment or non-attainment with respect to each criteria pollutant, depending on whether the area meets the federal standards. If an area is designated as non-attainment, it does not meet a federal standard and is required to create and maintain a SIP for achieving compliance with the applicable federal standard. Conformity to the SIP is defined under the 1990 Clean Air Act amendments as conformity with the plan's purpose in eliminating or reducing the severity and number of violations of the federal standards and achieving expeditious attainment of these standards.

The federal Clean Air Act General Conformity Rule helps states improve air quality in areas that do not attain the federal standards by ensuring that federal actions conform to the SIP. If the Project would result in a federal action it would not be subject to the General Conformity Rule because it would be located in an area that meets federal standards and the area is not applicable to a maintenance plan with conformity requirements.[37]

On April 2, 2007, in *Massachusetts v. USEPA* (549 US 497), the U.S. Supreme Court found that GHGs are air pollutants covered by the Clean Air Act. The Court held that the USEPA must determine whether emissions of GHGs from new motor vehicles cause or contribute to air pollution that may reasonably be anticipated to endanger public health or welfare, or whether the science is too uncertain to make a reasoned decision. In making such decisions, the USEPA is required to follow the language of Section 202(a) of the Clean Air Act, which obligates it to prescribe (and from time to time revise) standards applicable to the emission of any air pollutant from any class or classes of new motor vehicles or new motor vehicle engines. The Supreme Court decision resulted from a petition for rulemaking under Section 202(a) filed by more than a dozen states and environmental advocacy organizations such as the Center for Biological Diversity, Greenpeace, the Sierra Club, and the Natural Resources Defense Council, among others.

On April 17, 2009, the USEPA Administrator signed proposed "endangerment" and "cause or contribute" findings for GHGs under Section 202(a) of the Clean Air Act. The USEPA found that

[37] The Phase 1 final rule to implement the 8-hour ozone standard was published on April 30, 2004. The anti-backsliding provisions in that rule set forth specific requirements for areas that are designated attainment for the 8-hour Ozone standard and that were at the time of the 8-hour designations (generally June 15, 2004) either attainment areas with maintenance plans for the 1-hour standard, such as the NCCAB; or nonattainment for the 1-hour standard. Specifically, 40 CFR part 51, section 51.905(a)(3) and (4) requires these areas to submit a maintenance plan under section 110(a)(1) of the Clean Air Act. That maintenance plan must demonstrate maintenance for 10 years post-designation; however, this maintenance plan does not carry with it any conformity obligations (unlike maintenance plans required under Section 175A of the Act).

six GHGs, taken in combination, endanger both the public health and the public welfare of current and future generations. The USEPA also found that the combined emissions of these GHGs from new motor vehicles and new motor vehicle engines contribute to the greenhouse effect as air pollution that endangers public health and welfare under Clean Air Act Section 202(a). Pursuant to 40 CFR Part 52*, Proposed Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule*, USEPA has mandated that Prevention of Significant Deterioration and Title V requirements apply to facilities whose stationary source CO_2e emissions exceed 100,000 tons per year.[38] The Project would not trigger Prevention of Significant Deterioration or Title V permitting under this regulation because it would generate substantially less than 100,000 tons of CO_2e emissions per year.

California Clean Air Act

The California Clean Air Act was approved in 1988 and required each local air district in the state to prepare an air quality plan to achieve compliance with the State standards. CARB is the agency delegated responsibility for preparing and submitting the SIP to the USEPA. CARB also oversees air quality policies in California and has established State standards for NO_2, CO, PM_{10}, $PM_{2.5}$, SO_2, ozone, lead, sulfates, hydrogen sulfide, vinyl chloride, and visibility reducing particles. Similar to the USEPA, CARB designates counties or air basins in California as attainment or non-attainment with respect to the CAAQS.

Regulations for Mobile Sources of Air Pollutants

The following air quality regulations apply to mobile sources and are directly relevant to the Project. On-road vehicles with a gross vehicular weight rating of 10,000 pounds or greater shall not idle for longer than five minutes at any location (Title 13 California Code of Regulations Section 2485). This restriction does not apply when vehicles remain motionless during traffic or when vehicles are queuing. Off-road equipment engines shall not idle for longer than five minutes (Title 13 California Code of Regulations Section 2449(d)(3)). Exceptions to this rule include: idling when queuing; idling to verify that the vehicle is in safe operating condition; idling for testing, servicing, repairing or diagnostic purposes; idling necessary to accomplish work for which the vehicle was designed (such as operating a crane); and idling required to bring the machine to operating temperature as specified by the manufacturer.

Executive Order S-3-05

Executive Order S-3-05 was established by former Governor Arnold Schwarzenegger in June 2006, and establishes statewide emission reduction targets through the year 2050 as follows:

1. By 2010, reduce GHG emissions to 2000 levels;
2. By 2020, reduce GHG emissions to 1990 levels; and
3. By 2050, reduce GHG emissions to 80 percent below 1990 levels.

38 USEPA, Clean Air Act Permitting for Greenhouse Gas Emissions, last updated March 14, 2017. Available online at https://www.epa.gov/nsr/clean-air-act-permitting-greenhouse-gases. Accessed on September 18, 2017.

This executive order establishes GHG emissions goals only and does not include any specific requirements that pertain to the Project; however, future actions taken by the State to implement these goals may affect the Project, depending on the specific implementation measures that are developed.

Assembly Bill 32

California Assembly Bill (AB) 32,[39] the Global Warming Solutions Act of 2006, is the cornerstone of state efforts to reduce GHG emissions. As described below, the law requires CARB to establish a statewide GHG emissions cap for 2020 based on 1990 emission levels, develop a mandatory reporting program of GHG emissions, adopt regulations for discrete early actions to reduce GHG emissions, prepare a scoping plan to identify how emissions reductions will be achieved, and adopt a regulation that establishes a market-based compliance mechanism (also referred to as “Cap and Trade”).

Statewide GHG Emissions Cap

In 2007, CARB established the statewide GHG emissions limit that must be achieved by 2020, equivalent to the statewide GHG emissions levels in 1990, at 427 million metric tons of CO_2e. This figure is approximately 30 percent below projected “business-as-usual” emissions of 596 million metric tons of CO_2e for 2020, and about 10 percent below average annual GHG emissions during the period of 2002 through 2004.[40]

Climate Change Scoping Plan

In December 2008, CARB approved the AB 32 Climate Change Scoping Plan (Scoping Plan) outlining the state’s strategy to achieve the 2020 GHG emissions limit.[41] The Scoping Plan estimated a reduction of 174 million metric tons CO_2e from the transportation, energy, agriculture, forestry, and high climate-change-potential sectors, and proposed a comprehensive set of actions designed to reduce overall GHG emissions in California, improve the environment, reduce dependence on oil, diversify California’s energy sources, save energy, create new jobs, and enhance public health. The Scoping Plan must be updated every five years to evaluate the mix of AB 32 policies to ensure that California is on track to achieve the 2020 GHG reduction goal. CARB released the First Update to the Scoping Plan in May 2014.[42]

Executive Order B-30-15 (see below) and Senate Bill 32 extended the goals of AB 32 and set a 2030 goal of reducing emissions 40 percent from 2020 levels. The recently adopted 2017 Scoping Plan establishes a path that will get California to its 2030 target. The Plan includes economically viable and technologically feasible actions to not just keep California on track to achieve its 2030

[39] AB 32 is codified in California Health and Safety Code Division 25.5, Sections 38500 et seq.

[40] CARB, Climate Change Scoping Plan: A Framework for Change, December 2008, amended version included errata and Board requested modifications posted May 11, 2009. Available online at http://www.arb.ca.gov/cc/scopingplan/document/adopted_scoping_plan.pdf.

[41] Ibid.

[42] CARB, First Update to the Climate Change Scoping Plan, Building on the Framework Pursuant to AB 32, the California Global Warming Solutions Act of 2006, May 2014.

target, but to stay on track for a low- to zero-carbon economy by involving every part of the state. The Plan relies on a balanced mix of strategies to economically achieve the GHG target while also improving public health, investing in disadvantaged and low-income communities, protecting consumers, and supporting economic growth, jobs and energy diversity.[43]

Senate Bill 97[44]

In 2007, the California State Legislature passed Senate Bill 97, which required amendment of the California Environmental Quality Act (CEQA) *Guidelines* to incorporate analysis of, and mitigation for, GHG emissions from projects subject to CEQA. The amendments took effect March 18, 2010. The amendments add Section 15064.4 to the CEQA *Guidelines*, specifically addressing the potential significance of GHG emissions. Section 15064.4 neither requires nor recommends a specific analytical methodology or quantitative criteria for determining the significance of GHG emissions. Rather, the section calls for a "good faith effort" to "describe, calculate or estimate" GHG emissions and indicates that the analysis of the significance of any GHG impacts should include consideration of the extent to which the project would:

- Increase or reduce GHG emissions;
- Exceed a locally applicable threshold of significance; or
- Comply with "regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of greenhouse gas emissions."

The CEQA *Guidelines* also state that a project may be found to have a less-than-significant impact related to GHG emissions if it complies with an adopted plan that includes specific measures to sufficiently reduce GHG emissions (Section 15064(h)(3)).

Executive Order B-30-15

In April 2015, former Governor Edmund G. Brown Jr. issued an executive order to establish a California GHG reduction target of 40 percent below 1990 levels by 2030. Reaching this emission reduction target will help make it possible for California to reach its ultimate goal of reducing emissions 80 percent under 1990 levels by 2050, as identified in Executive Order S-3-05. In 2016, the Legislature passed Senate Bill 32, which codifies a 2030 GHG emissions reduction target of 40 percent below 1990 levels. Executive Order B-30-15 also specifically addresses the need for climate adaptation and directs state government to:

- Incorporate climate change impacts into the State's 5-Year Infrastructure Plan;
- Update the Safeguarding California Plan, the state climate adaption strategy to identify how climate change will affect California infrastructure and industry and what actions the state can take to reduce the risks posed by climate change;
- Factor climate change into state agencies' planning and investment decisions; and

[43] CARB, *The 2017 Climate Change Scoping Plan Update – The Proposed Strategy for Achieving California's 2030 Greenhouse Gas Target*, last updated June 6, 2017. Available online at https://www.arb.ca.gov/cc/scopingplan/2030sp_pp_final.pdf. Accessed on January 20, 2017.

[44] Codified in Section 15064.4 of the CEQA *Guidelines*.

- Implement measures under existing agency and departmental authority to reduce GHG emissions.[45]

Executive Order B-30-15 requires CARB to update the AB 32 Scoping Plan to incorporate the 2030 target. The 2030 Draft Scoping Plan will serve as the framework to define California's climate change priorities for the next 15 years and beyond. In June 2016, CARB released the 2030 Target Scoping Plan Update Concept Paper to describe potential policy concepts to achieve the 2030 target that can be incorporated in the 2030 Draft Scoping Plan. The concept paper presents four potential high-level concepts for achieving the needed GHG reductions.[46]

3.5.2.2 Regional and Local

Table 2-10 in Chapter 2, *Project Description*, identifies the approvals from Santa Cruz County and/or the City of Watsonville required for the Project. **Table 3.5-4** presents pertinent local plans and policies regarding air quality and greenhouse gas emissions to support County and City consideration of project consistency with general policies.[47] In some cases, local policies are used in this EIR as criteria to determine the significance of physical effects on the environment (e.g., Impact NOI-1 in Section 3.8, Noise and Vibration).

Monterey Bay Air Resources District

The MBARD is the regional agency responsible for air quality regulation within the NCCAB. The MBARD regulates air quality through its planning and review activities. The MBARD has permit authority over most types of stationary emission sources and can require stationary sources to obtain permits, impose emission limits, set fuel or material specifications, and establish operational limits to reduce air emissions. The MBARD regulates new or expanding stationary sources of criteria pollutants and toxic air contaminants.

State law assigns local air districts the primary responsibility for control of air pollution from stationary sources, under CARB's oversight. The MBARD is responsible for developing regulations governing emissions of air pollution, permitting and inspecting stationary sources of air pollution, monitoring of ambient air quality, and air quality planning activities, including implementation of transportation control measures. The MBARD does not regulate the emissions of dust and other construction emissions, except to require that each project's relevant CEQA document quantify the emissions of particulate matter and provide mitigation, if the relevant threshold of significance is exceeded.

---

[45] Office of the Governor, Governor Brown Establishes Most Ambitious Greenhouse Gas Reduction Target in North America, April 29, 2015. Available online at https://www.gov.ca.gov/2015/04/29/news18938. Accessed on February 21, 2018.

[46] CARB, 2030 Target Scoping Plan Update Concept Paper, June 17, 2016.

[47] California Government Code Section 53091 exempts agencies like PV Water from complying with local building and zoning ordinances when locating or constructing facilities for the production, generation, storage, treatment, or transmission of water. California Government Code Section 65402(c) requires that PV Water notify cities and counties of its plans to construct projects or to acquire or dispose of property. The planning agency then has 40 days to determine project consistency with its general plan. If the planning agency disapproves, the disapproval may be overruled by PV Water.

TABLE 3.5-4
LOCAL PLANS AND POLICIES RELEVANT TO THE PROJECT

Relevant Goals, Objectives, and Policies
CITY OF WATSONVILLE PLANS AND POLICIES
Watsonville General Plan
Implementation measure 9.C.7, Other Use-based Incentives. The City shall provide incentives to high trip generation uses, such as schools, hospitals, and some commercial uses to develop trip reduction programs.
Implementation measure 9.C.9, Environmental Review. The City shall use the environmental review process to determine both stationary source and transportation related potential air quality impacts for project proposals.
Implementation measure 9.C.10, Construction-related Impacts. The City shall require construction contractors to implement a dust abatement program to reduce the effect of construction on local PM10 concentrations.
Implementation measure 9.C.12, Promotion of Low-Emission Automobiles. Where feasible, the City shall consider replacing its fleet of city automobiles with clean fuel and low-emission vehicles as vehicles wear out.
Implementation measure 9.C.13, Innovative Programs. The City shall look for ways to work with the private, nonprofit, and public sectors to achieve the implementation of innovative programs to mitigate new air quality impacts and improve existing air quality. Innovative programs may include, but are not limited to, high emission level vehicle buy-back (old vehicle buy-back) programs, incentives to accommodate electric vehicles in new developments, and programs to encourage transit ridership by employees.
Implementation measure 9.C.14, Trip Reduction. The City shall consider for adoption a trip reduction ordinance.
SANTA CRUZ COUNTY PLANS AND POLICIES
Santa Cruz County General Plan/Local Coastal Program
Objective 5.18, Air Resources. To improve the air quality of Santa Cruz County by meeting or exceeding state and federal ambient air quality standards, protect County residents from the health hazards of air pollution, protect agriculture from air pollution induced crop losses and prevent degradation of the scenic character of the area.
Policy 5.18.1, New Development. Ensure new development projects are consistent at a minimum with the Monterey Bay Unified Air Pollution Control District Air Quality Management Plan and review such projects for potential impact on air quality.

SOURCE: City of Watsonville, Watsonville 2005 General Plan, Adopted May 24, 1994; County of Santa Cruz, 1994 General Plan/Local Coastal Program, Chapter 5 – Conservation and Open Space, Effective December 19, 1994.

Air Quality Management Plan for the Monterey Bay Region

In 1991, the MBARD adopted the Air Quality Management Plan (AQMP) for the Monterey Bay Region in response to the California Clean Air Act of 1988, which established specific planning requirements to meet the ozone standards. The California Clean Air Act requires that air quality management plans be updated every three years. The MBARD has updated the air quality management plan seven times. The most recent update, the 2012-2015 AQMP was adopted in 2017. The 2012-2015 AQMP relies on a multi-level partnership of federal, State, regional, and local governmental agencies. These agencies, including USEPA, CARB, local governments, Association of Monterey Bay Area Governments and the MBARD, are the primary agencies that implement the air quality management plan programs. The MBARD's focus continues to be on achieving the 8-hour ozone CAAQS, as the region has already attained the 1-hour standard. The 2012-2015 AQMP builds on information developed in past air quality management plans. Consequently, some sections of the 2008 AQMP and 2012 Triennial Plan are incorporated by reference for those elements that have not been updated; however, due to continued progress toward attaining the 8-

hour ozone standard, the 2012-2015 AQMP recommends that control measures presented in the 2008 AQMP continue not to be implemented.[48]

County of Santa Cruz Climate Action Strategy

The Climate Action Strategy (CAS) serves as a framework for the actions that the unincorporated communities of the County of Santa Cruz can take to both lessen its contribution to climate change and prepare for the impacts when they do occur. In addition to guiding County government actions, the CAS is intended to inspire non-government community organizations in their efforts to address climate change, and to identify opportunities for partnerships with other government agencies and community groups. The CAS outlines a course of action to reduce GHG emissions produced by governmental operations and community activities within unincorporated Santa Cruz County. Implementation of the CAS is intended to build on the fact that Santa Cruz County has already met the 2020 emissions reduction target recommended by the state and will set the County on a path toward reducing emissions to 59 percent below 2009 levels by 2050.[49]

City of Watsonville Climate Action Plan

The City of Watsonville's Climate Action Plan (CAP) was adopted on February 24, 2015 to guide and reinforce the City's commitment to reduce GHG emissions and increase its ability to adapt to future climate impacts and protect public health, safety and critical infrastructure.[50]

The City of Watsonville's CAP serves to reinforce policy commitments in the General Plan, such as encouraging pedestrian- and bicycle-friendly neighborhoods, increasing transportation options, improving energy efficiency, reducing waste and increasing recycling, and protecting of open space. The CAP also quantifies the estimated greenhouse gas reduction savings of such programs.

City of Watsonville Carbon Fund Program

The City's CAP contains policies to reduce GHG emissions throughout the City over the next 15 to 20 years. Many of these improvements will require funding, and in order to create a revenue source to implement the GHG reducing measures, a new Carbon Fund Ordinance was adopted by the City Council on March 10, 2015.

The Watsonville Carbon Fund Program, adopted by Ordinance 1314-15, is a mechanism to incentivize energy efficient buildings, and on-site renewable energy technologies and to fund greenhouse gas reduction projects throughout the city. The Carbon Fund Ordinance establishes a Carbon Fee to be charged to all development projects except single family residential alterations, temporary buildings, and/or building area that is not used as conditioned space. The money collected from the Carbon Fund Fee is placed in a separate account to be used for citywide greenhouse gas reduction projects. Applicants of development projects can be refunded a portion or all of their Carbon Impact Fee if they reduce their development's average annual electricity demand

---

[48] MBARD, 2012-2015 Air Quality Management Plan, Adopted March 15, 2017.
[49] County of Santa Cruz, Climate Action Strategy, approved by the Board of Supervisors on February 26, 2013.
[50] City of Watsonville, Climate Action Plan - Final version, April 9, 2015.

through on-site renewable energy and/or energy efficiency. The Carbon Impact Fees collected will be routed to a Carbon Fund from which the City will fund GHG-reducing projects in the City.

3.5.3 Impacts and Mitigation Measures

3.5.3.1 Significance Criteria

In accordance with the CEQA, state CEQA *Guidelines* (including Appendix G), relevant plans, policies, and/or guidelines, and agency standards, the Project could have a significant impact if it were to:

- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard;
- Expose sensitive receptors to substantial pollutant concentrations;
- Conflict with or obstruct implementation of the applicable air quality plan;
- Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people;
- Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment; and/or
- Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions.

3.5.3.2 Methodology

As described in Section 3.1, this EIR provides an independent analysis of the Project's potential environmental impacts. **Table 3.5-5** presents mitigation measures from the 2014 BMP Update PEIR adopted by the Board of Directors (Resolution 2014-05) for the purpose of reducing impacts related to energy, utilities and public services. These adopted mitigation measures are considered part of the Project and thus are considered prior to any significance determinations. Potential impacts are evaluated in the following section. If warranted, additional mitigation is included and takes the form of (1) modifications to update the mitigation measures presented in Table 3.5-5 to reflect current conditions and site-specific impacts; or (2) new mitigation measures to replace or augment an adopted mitigation measure.

Guidelines and Methodologies Used

For the purposes of this EIR, the thresholds of significance established by the MBARD in its *CEQA Air Quality Guidelines* were applied. MBARD has adopted two different sets of guidelines: *CEQA Air Quality Guidelines* that provide guidance for lead agencies that prepare project-specific CEQA documentation for projects within the air district[51] and *Guidelines for Implementing the California Environmental Quality Act* for the MBARD's implementation of

[51] MBUAPCD, *CEQA Air Quality Guidelines*, revised February 2008.

CEQA as a lead or responsible agency.[52] The *Guidelines for Implementing the California Environmental Quality Act* establish criteria pollutant significance thresholds for construction emissions, which were not included in the *CEQA Air Quality Guidelines*.

TABLE 3.5-5
2014 BMP UPDATE PEIR MITIGATION MEASURES – AIR QUALITY AND GREENHOUSE GASES

AQ-1: The construction contractor shall implement a dust program that includes the following elements:

- Water all active construction sites at least twice daily
- Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard
- Pave, apply water three times daily, or apply (non- toxic) soil stabilizers on all unpaved access roads, parking areas and staging areas at construction sites
- Sweep daily (with water sweepers) all paved access roads, paved parking areas and paved staging areas at construction sites
- Sweep streets daily (with water sweepers) if visible soil material is carried onto adjacent public streets.
- Hydroseed or apply (non-toxic) soil binders to inactive construction areas. However, do not apply these measures in operating agricultural fields under cultivation unless requested by the grower
- Enclose, cover, water twice daily or apply (non- toxic) soil binders to exposed stockpiles (dirt, sand, etc.).
- Limit traffic on unpaved roads to 15 mph
- Install sandbags or other erosion control measures to prevent silt runoff to public roadways
- Replant vegetation in disturbed areas as quickly as possible
- The contractor or builder shall designate a person or persons to monitor the fugitive dust emissions and enhance the implementation of the measures as necessary to minimize dust complaints. The name and telephone number of such persons shall be provided to the [air pollution control district] APCD Compliance Division prior to the start of any grading, earthwork or demolition.

SOURCE: Pajaro Valley Water Management Agency, Resolution No. 2014-05, adopted April 16, 2014.

Although the MBARD is not the lead agency for the environmental review of the Project, due to the amount of Project-related construction activities that would occur within the NCCAB, the criteria pollutant mass emissions significance thresholds identified in the MBARD's *Guidelines for Implementing the California Environmental Quality Act* have been used to evaluate the regional air quality impacts that would be associated with the Project.

The *Guidelines for Implementing the California Environmental Quality Act* state that a project would not have a significant air quality effect on the environment if construction or operation of the project would emit less than 137 pounds per day of NO_x and ROG, 82 pounds per day of PM_{10}, 55 pounds per day of $PM_{2.5}$, and 550 pounds per day of CO.[53]

Health Risk

This EIR uses methodology provided by the Office of Environmental Health Hazard Assessment[54], coupled with a significance threshold from the MBARD, in evaluating the potential for the Project to expose sensitive receptors to substantial levels of toxic air contaminants. The MBARD considers temporary emissions of a carcinogenic TAC that can result in a hazard index greater than 1 for acute

[52] MBUAPCD, Guidelines for Implementing the California Environmental Quality Act, Adopted 1996, Revised February 2016.

[53] Ibid.

[54] Office of Environmental Health Hazard Assessment, *Air Toxics Hot Spots Program Risk Assessment Guidelines: Guidance Manual for Preparation of Health Risk Assessments*, adopted February, 2015.

or chronic impacts and/or a cancer risk greater than 10 incidents per population of 1,000,000 to be significant.

Greenhouse Gases

MBARD does not have established project-specific thresholds of significance for the analysis of GHG emissions from land use projects or non-stationary source projects. For such projects, the MBARD recommends that lead agencies use either the Bay Area Air Quality Management District (BAAQMD) GHG significance threshold of 1,100 metric tons CO_2e per year[55] or the San Luis Obispo County Air Pollution Control District (SLO APCD) GHG significance threshold of 1,150 CO_2e per year.[56] Since the BAAQMD's significance threshold is lower and hence, more conservative than the SLO APCD significance threshold, and for the reasons set forth below, this EIR uses the BAAQMD significance threshold of 1,100 metric tons CO_2e per year to evaluate whether the Project's emissions could have a significant impact on the environment.

Use of this threshold results in approximately 59 percent of all non-stationary source projects subject to CEQA review in the Bay Area being above the significance threshold and having to implement feasible mitigation measures to meet their CEQA obligations. These projects account for approximately 92 percent of all GHG emissions anticipated to occur between now and 2020 from new land use development in the Bay Area.[57] If all land use-project emissions are mitigated to below this threshold, it would represent an overall reduction in new land use project-related emissions of up to 92 percent.

This significance threshold was developed to focus on emissions reductions by 2020; the BAAQMD, MBARD, and CARB have not yet provided guidance or recommendations for significance thresholds to evaluate consistency with emissions reduction goals for years beyond 2020. However, since (a) the Executive Order B-30-15 emissions reductions goal of lowering GHG emissions to 40 percent below 1990 levels by 2030 is roughly equivalent to reducing emissions by 42 percent below current levels and (b) the Executive Order S-3-05 emissions reductions goal of lowering GHG emissions to 80 percent below 1990 levels by 2050 is roughly equivalent to reducing emissions by 81 percent below current levels, the 1,100 metric tons CO_2e per year threshold can be used as a rough gauge to determine if the Project would be consistent with these post-2020 goals.

Neither the MBARD or BAAQMD staff have identified a specific significance threshold for short-term construction-related GHG emissions. Therefore, GHG emissions from Project construction activities are evaluated based on guidance developed by the SLO APCD. For construction-related GHGs, the SLO APCD recommends that total emissions from construction be amortized over a period equal to the estimated life of the Project (in this case 50 years) and added to operational emissions, and then compared to the operational significance threshold.[58]

---

[55] BAAQMD, *BAAQMD CEQA Air Quality Guidelines*, adopted June 2, 2010, updated May 2017.
[56] SLO APCD, *CEQA Air Quality Handbook*, April 2012, last updated November 2017.
[57] BAAQMD, *BAAQMD CEQA Air Quality Guidelines*, adopted June 2, 2010, updated May 2017.
[58] SLO APCD, *CEQA Air Quality Handbook*, April 2012, last updated November 2017.

Estimating Air Emissions for the Project

Appendix AIR details all of the emission factors and assumptions used to estimate construction and operational emissions that would be associated with the Project.

The California Emissions Estimator Model (CalEEMod) version 2016.3.2 was used to estimate regional criteria air pollutant emissions associated with project construction. Proposed construction would take place between 2022 and 2023 and would include construction of the following proposed components:

- Weir structure and intake pump station;
- WTP; and
- College Lake pipeline.

Off-road equipment exhaust and vehicle trip emissions (both exhaust and fugitive dust) were estimated using CalEEMod, with assumptions for construction equipment inventories and use rates, haul truck and vehicle trips, and construction phasing developed by MBARD ’s engineering consultant for this EIR analysis. Trip lengths of 12.5 miles and 25.0 miles per worker trips and haul truck trips, respectively, were used to estimate the on-road vehicle emissions. CalEEMod defaults were used where project specific data was not available.

The Project’s construction-related GHG emissions was also derived from CalEEMod, which calculates the emissions of CO_2, CH_4, and N_2O associated with construction-related GHG sources such as off-road construction equipment, material delivery trucks, soil haul trucks, and construction worker vehicles. As recommended by the SLO APCD, estimated total construction GHG emissions were amortized over a 25-year period and added to the Project’s operational emissions estimates.[59]

Sources of operational criteria air pollutant and GHG emissions include vehicle trips made to the WTP and diesel combustion for testing and maintenance of the proposed standby generator. In addition, GHG emissions would be generated by indirect sources such as generation of electricity that is used at the Project.

Operational criteria pollutant emissions are discussed qualitatively given the small number of employee commute and truck trips generated by the Project. Criteria pollutant emissions generated from the testing and maintenance of standby generators are also discussed qualitatively assuming compliance with MBARD Rules and Regulations.

GHG emissions from vehicle trips (employee commute trips and chemical delivery trips) were estimated using Emission Factor 2014 (EMFAC2014) emission factors assuming a one-way trip length of 12.5 miles for employee vehicles and 25 miles for delivery trucks. The EMFAC2014 emissions model is developed and used by CARB to assess emissions from on-road vehicles including cars, trucks, and buses in California, and to support CARB's regulatory and air quality planning efforts to meet the Federal Highway Administration's transportation planning

[59] SLO APCD, *CEQA Air Quality Handbook*, April 2012, last updated November 2017.

requirements. USEPA approves EMFAC2014 for use in State Implementation Plan and transportation conformity analyses. The most recent approved version is EMFAC2014. As EMFAC2014 does not provide emission factors for CH_4 and N_2O, CH_4 and N_2O emission factors for on road vehicles were derived from The Climate Registry for highway vehicles.[60] N_2O and CH_4 emission values were multiplied by their respective global warming potentials and added to the CO_2 emissions to obtain CO_2e emissions. For the estimation of GHG emissions from the standby generator, emission factors for CO_2 were derived from the OFFROAD2017 model, while factors for CH_4 and N_2O were obtained from The Climate Registry's 2017 Default Emission Factors for large utility diesel equipment.[61]

Indirect GHG emissions that would be associated with the Project's electricity use were estimated using emissions factors for electricity generation in California from USEPA's Emissions and Generation Resource Integrated Database summary tables.[62] GHG emissions were estimated for CO_2, N_2O, and CH_4, the total CO_2e associated with Project power demand was calculated by multiplying the N_2O and CH_4 emissions by their respective global warming potential, and then those values were added to the CO_2 emissions.

3.5.3.3 Impacts and Mitigation Measures

Impact AIR-1: Construction and operational activities associated with the Project could generate criteria air pollutant emissions that would conflict with implementation of the Clean Air Plan. ***(Less than Significant)***

The Project would not lead to an increase in population and would therefore not generate any population-related emissions (e.g., motor vehicles, residential heating and cooling emissions) that would need a consistency determination with the AQMP. Consistency of direct emissions associated with equipment or process operations of a commercial, industrial, or institutional facility subject to MBARD permit authority is determined by assessing whether the emission source complies with all applicable MBARD rules and regulations, including emission offset and emission control requirements, and/or whether or not Project emissions are accommodated in the AQMP. Emissions from sources not subject to MBARD permit authority may be deemed consistent with the AQMP if such emissions are forecasted in the AQMP emission inventory. The Project would not include any stationary sources of emissions other than the emergency standby generator. As described above, the emergency standby generator would be subject to MBARD's permitting requirements thus ensuring consistency with the MBARD's Rules and Regulations. Therefore, if the Project would result in emissions less than the quantitative thresholds of significance during both construction and operation, it would be considered to be accounted for in regional air quality planning and would be considered to be consistent with the goals of the AQMP.

Construction

Construction activities are short term and typically result in emissions of ozone precursors (ROG and NOx) and PM in the form of dust (fugitive dust) and exhaust (e.g., vehicle tailpipe

60 The Climate Registry, The Climate Registry 2017 Default Emission Factors, March 15, 2017.
61 Ibid.
62 USEPA, eGRID2014v2 Summary Tables, February 27, 2017.

emissions). Emissions of ozone precursors and PM are primarily a result of the combustion of fuel from on-road and off-road vehicles. However, ROGs are also emitted from activities that involve painting, other types of architectural coatings, or asphalt paving.

Pollutant emissions associated with Project construction would be generated from the following general construction activities: (1) grading, excavation, and construction; (2) vehicle trips from workers traveling to and from the construction areas; (3) trips associated with delivery of construction supplies to, and hauling debris from, the construction areas; (4) fuel combustion by on-site construction equipment; and (5) paving and architectural coatings. These construction activities would temporarily generate air pollutant emissions in addition to dust and fumes. The amount of emissions generated on a daily basis would vary, depending on the intensity and types of construction activities occurring simultaneously. Overall, the Project's construction activities would occur over a period of 18 months between 2022 and 2023.[63]

Though construction emissions are considered short term and temporary, they have the potential to represent a significant impact with respect to air quality particularly when construction extends over a long period of time and/or when sensitive receptors are located close by. Particulate matter (i.e., PM_{10} and $PM_{2.5}$) are among the pollutants of greatest localized concern with respect to construction activities. Particulate emissions from construction activities can lead to adverse health effects and nuisance concerns, such as reduced visibility and soiling of exposed surfaces. Particulate emissions can result from a variety of construction activities, including excavation, grading, vehicle travel on paved and unpaved surfaces, and vehicle and equipment exhaust. Construction emissions of PM can vary greatly depending on the level of activity, the specific operations taking place, the number and types of equipment operated, local soil conditions, weather conditions, and the amount of earth disturbance.

Emissions of ozone precursors ROG and NO_X are primarily generated from construction equipment exhaust and mobile sources and vary as a function of the number of daily vehicle trips, and the types and number of heavy-duty, off-road equipment used and the intensity and frequency of their operation. Additionally, construction-related ROG emissions would also result from the application of asphalt and architectural coatings and the amount of these emissions would vary depending on the amount of paving or coating that would occur each day.

Construction emissions were estimated using CalEEMod and are presented in **Table 3.5-6**. The table shows maximum daily emissions by construction year and compares them to the MBARD significance thresholds for construction.

63 Schedule based on construction of grading and surcharging fill pad for the preferred WTP site. The duration of surcharging for the optional WTP site would be increased by 12 to 18 months to allow for consolidation of fill pad at that site. There would be no construction activity at the site during consolidation. The remainder of the construction phase durations for the WTP would be the same for both site options.

TABLE 3.5-6
PROJECT CONSTRUCTION EMISSIONS

Project Construction Activities	Estimated Maximum Daily Construction Emissions[a] (pounds/day)			
	ROG	NO_X	PM_{10}	$PM_{2.5}$
Year 1	10.6	102.8	7.2	5.1
Year 2	9.6	91.0	6.5	4.4
MBARD Significance Threshold	137	137	82	55
Exceed Threshold?	No	No	No	No

[a] Estimated maximum daily emissions shown are for summer conditions and do not represent emissions throughout the year.

SOURCE: Appendix AIR of this EIR.

As shown in Table 3.5-6, the average daily construction emissions of ROG, NOx, PM_{10} and $PM_{2.5}$ would not exceed the MBARD significance thresholds for construction. The 2014 BMP Update PEIR included Mitigation Measure AQ-1 to reduce fugitive dust emissions from construction activities, which would be implemented as part of the Project and would further reduce fugitive PM emissions by approximately 35 percent. Therefore, this impact is ***less than significant***.

Operation

After Project construction is completed and facilities are commissioned and operational, there would be operational traffic associated with worker commute, chemical deliveries, and maintenance. The Project would require two employees to operate and maintain the new facilities, resulting in four one-way employee commutes per day. In addition, there would be truck trips associated with debris removal from College Lake and the off haul of solids from the drying beds at the water treatment plant. For purposes of analysis, debris removal was estimated to generate 1,300 annual truck trips with a maximum of 33 one-way truck trips per day. Off-haul of solids from the drying beds would generate another 52 annual truck trips with a maximum of two one-way trips per day. Emissions would also be generated from the testing and maintenance of the proposed diesel fueled standby generator. However, compliance with MBARD Rule 1010 would limit diesel PM emissions to a rate less than or equal to 0.15 grams per brake horsepower-hour and also require that the generator be operated for no more than 50 hours per year for maintenance and testing purposes. NOx emissions would be limited by MBARD's Best Available Control Technology requirements for new sources. **Table 3.5-7** shows the maximum daily operational emissions from employee and trucks trips during operation. As shown in Table 3.5-7, emissions would be well below MBARD's operational thresholds.

Given that the Project would result in emissions less than the quantitative thresholds of significance during both construction and operation, the Project would be considered to be accounted for in regional air quality planning and would be considered to be consistent with the goals of the AQMP. This impact would be ***less than significant***.

Mitigation: None required.

TABLE 3.5-7
PROJECT OPERATIONAL EMISSIONS

Source	Estimated Maximum Daily Operational Emissions[a] (pounds/day)			
	ROG	NO_X	PM_{10}	$PM_{2.5}$
Vehicle Emissions	<1	3	<1	<1
MBARD Significance Threshold	137	137	82	55
Exceed Threshold?	No	No	No	No

[a] Estimated maximum daily emissions would occur when the Project is in operation depending on demand and water availability and do not represent emissions throughout the year.

SOURCE: Appendix AIR of this EIR.

Impact AIR-2: The Project could expose sensitive receptors to substantial levels of pollutants. ***(Less than Significant)***

Toxic Air Contaminants

Construction

Construction of the Project would result in the short-term generation of DPM emissions from the use of off-road diesel equipment required to construct the proposed facilities, and from construction material deliveries and debris removal using on-road heavy-duty trucks. DPM is a complex mixture of chemicals and particulate matter that has been identified by the State of California as a TAC with potential cancer and chronic non-cancer effects. The dose to which receptors are exposed is the primary factor affecting health risk from TACs. Dose is a function of the concentration of a substance in the environment and the duration of exposure to the substance. According to the Office of Environmental Health Hazard Assessment, health risk assessments, which determine the exposure of sensitive receptors to TAC emissions, should be based on a 30-year exposure period when assessing TACs (such as DPM) that have only cancer or chronic non-cancer health effects.[64] However, assumed exposure in such health risk assessments should be limited to the duration of the emission-producing activities associated with the Project.

Construction activities associated with the Project would take place over an 18-month period, although the level of activity would vary both temporally and spatially. Construction activities associated with the proposed weir structure and intake pump station are expected to take place over a 16-month period, excluding pre-commissioning, and taking into account a break between November and May when the site would be winterized and no construction would occur within the Salsipuedes Creek channel. Construction of the WTP is expected to last 16 months[65] and construction of the College Lake pipeline is expected to last 13 months. Based on emissions

64 Office of Environmental Health Hazard Assessment, *Air Toxics Hot Spots Program Risk Assessment Guidelines: Guidance Manual for Preparation of Health Risk Assessments*, adopted February, 2015.

65 Schedule based on construction of grading and surcharging fill pad for the preferred WTP site. The duration of surcharging for the optional WTP site would be increased by 12 to 18 months to allow for consolidation of fill pad at that site. There would be no construction activity at the site during consolidation. The remainder of the construction phase durations for the WTP would be the same for both site options.

estimates shown in Table 3.5-6, maximum daily emissions of PM_{10} and $PM_{2.5}$ associated with the simultaneous construction of all Project components would be less than 6 pounds per day. Though there would be times when all four Project components are under construction concurrently, the same set of receptors would not be exposed to emissions from all four components. Therefore, sensitive receptors in the vicinity of construction activities would be exposed to a fraction of these total emissions. The closest receptors are located 710 feet southwest of the proposed intake pump station boundary, approximately 40 feet southeast of the preferred WTP site boundary, and approximately 330 feet south of the optional WTP site boundary. Pipeline construction could take place as close as 25 feet from residential and school sensitive receptors; however, pipeline construction would advance at the rate of 150 linear feet per day, so the same set of receptors would not be continually exposed to diesel exhaust from pipeline construction equipment for an extended period.

Given that the pipeline construction activities would be limited to 13 months, exposure of receptors to the low level of DPM emissions shown in Table 3.5-6 would not lead to a significant health risk impact. Because the total emissions and duration of exposure at any one sensitive receptor location would be relatively minor compared to the 30-year exposure used in health risk assessments, the health risk from exposure to short-term DPM emissions associated with construction of Project components would be negligible, and this impact would be ***less than significant***.

Operation

Once operational, the only source of TACs from the Project would be from the testing and maintenance of the emergency standby generator. However, the standby generator would be subject to the requirements of MBARD Rule 1010, which requires all new stationary emergency standby diesel fueled engines greater than 50 horsepower to adhere to a diesel PM standard of less than or equal to 0.15 grams per brake horsepower hour, and restricts the number of hours such generators can be operated for testing and maintenance to a maximum of 50 hours per year.

Testing and maintenance of the proposed standby generator in compliance with MBARD Rule 1010 would generate less than 0.1 pounds per day of diesel PM emissions assuming that testing would be conducted on a monthly basis and for a maximum of 4.2 hours per test day. Though sensitive receptors are located close to both WTP site options, as close as 40 feet from the preferred WTP site and 330 feet from the optional WTP site, this low level of emissions from the occasional operation of the standby generator is not expected to contribute significantly to the health risk at these receptors. Required compliance with MBARD Rules and Regulations, specifically Rule 1010, would ensure that the risk from exposure to TACs generated by the testing and maintenance of the emergency standby generator would be ***less than significant***.

Criteria Air Pollutants

Construction and Operation

The Project would generate criteria pollutant emissions as discussed under Impact AIR-1; however, the impacts of project emissions on sensitive receptors are harder to quantify. Given that ozone formation occurs through a complex photo-chemical reaction between its precursors NO_X and ROG in the atmosphere with the presence of sunlight, the impacts of ozone are typically considered on a basin-wide or regional basis instead of a localized basis. The health-based ambient air quality standards for ozone therefore are as concentrations of ozone and not as tonnages of their precursor pollutants (i.e., NO_X and ROG). It is not necessarily the tonnage of precursor pollutants emitted that causes human health effects, but the concentration of resulting ozone or particulate matter. Because of the complexity of ozone formation and the non-linear relationship of ozone concentration with its precursor gases, and given the state of environmental science modeling in use at this time, it is infeasible to convert specific emissions levels of NO_X or ROG emitted in a particular area to a particular concentration of ozone in that area. Meteorology, the presence of sunlight, seasonal impacts, and other complex chemical factors all combine to determine the ultimate concentration and location of ozone.[66,67] Since the Project would not exceed the numeric indicator for ROG and NO_X emissions during either construction or operation, it is not likely that Project ROG and NO_X emissions could result in an increase in ground-level ozone concentrations in proximity to the Project sites or elsewhere in the air basin and impacts can be considered ***less than significant***.

As expressed in the *amicus curiae* brief submitted for the *Sierra Club v. County of Fresno* case (also known as the *Friant Ranch Case*),[68,69] the CEQA criteria pollutants significance thresholds from the air district were set at emission levels tied to the region's attainment status, and are emission levels at which stationary pollution sources permitted by the air district must offset their emissions. The CEQA project must use feasible mitigations in order for the region to attain the health based ambient air quality standards. Therefore, given that the Project would not exceed the mass emissions thresholds established by MBARD, it is not likely that emissions from Project-related activities will cause or contribute to the exposure of sensitive receptors to ground-level concentrations in excess of health-protective levels.

The primary health concern with exposure to NO_X emissions is the secondary formation of ozone. As the *amicus curiae* briefs submitted for the *Sierra Club v. County of Fresno* case suggested, and as was stated above, because of the complexity of ozone formation, and given the state of environmental science modeling in use at this time, it is infeasible to determine whether, or the extent to which, a single project's precursor (i.e., NO_X and VOCs) emissions would potentially result in the formation of secondary ground-level ozone and the geographic and temporal distribution of such secondary formed emissions. Furthermore, available models today are designed to determine regional, population-wide health impacts, and cannot accurately quantify ozone-related health impacts caused by NO_X or VOCs emissions from local level (project level).

---

[66] SCAQMD, Application of the South Coast Air Quality Management District for Leave to File Brief of Amicus Curiae in Support of Neither Party and Brief of Amicus Curiae. In the Supreme Court of California. Sierra Club, Revive the San Joaquin, and League of Women Voters of Fresno v. County of Fresno, 2014.

[67] SJVAPCD, Application for Leave to File Brief of Amicus Curiae Brief of San Joaquin Valley Unified Air Pollution Control District in Support of Defendant and Respondent, County of Fresno and Real Party In Interest and Respondent, Friant Ranch, L.P. In the Supreme Court of California. Sierra Club, Revive the San Joaquin, and League of Women Voters of Fresno v. County of Fresno, 2014.

[68] SCAQMD, Application of the South Coast Air Quality Management District for Leave to File Brief of Amicus Curiae in Support of Neither Party and Brief of Amicus Curiae. In the Supreme Court of California. Sierra Club, Revive the San Joaquin, and League of Women Voters of Fresno v. County of Fresno, 2014.

[69] SJVAPCD, Application for Leave to File Brief of Amicus Curiae Brief of San Joaquin Valley Unified Air Pollution Control District in Support of Defendant and Respondent, County of Fresno and Real Party In Interest and Respondent, Friant Ranch, L.P. In the Supreme Court of California. Sierra Club, Revive the San Joaquin, and League of Women Voters of Fresno v. County of Fresno, 2014.

Notwithstanding these scientific constraints, the disconnect between Project level NO_X emissions and ozone-related health impact cannot be bridged at this time.

Mitigation: None required.

Impact AIR-3: The Project could create objectionable odors that would affect a substantial number of people. ***(Less than Significant)***

Construction

Construction activities that would be associated with the Project could result in temporary odors from use of diesel-fueled equipment. These odors would be temporary, would dissipate quickly, and would be unlikely to create objectionable odors that would affect a substantial number of people. The impact would be ***less than significant***.

Operation

There would be no operational sources of odor associated with the Project. Chemical storage and chemical feed facilities at the WTP would be closed systems that would generate no odorous emissions. Therefore, the Project would not be expected to create objectionable odors that would affect a substantial number of people. The impact would be ***less than significant***.

Mitigation: None required.

Impact AIR-4: The Project could lead to an increase of GHG emissions that are associated with global climate change; however, not at a cumulatively considerable level. (*Less than Significant*)

Construction

Construction of the Project would generate GHG emissions associated with the use of heavy-duty off-road construction equipment and automobile and truck trips required to transport workers, materials, and debris to and from the Project sites. As described above, construction GHG emissions were derived from the CalEEMod output and are presented in **Table 3.5-8**.

TABLE 3.5-8
ESTIMATED CONSTRUCTION GHG EMISSIONS

Year	GHG Emissions as metric tons of CO_2e
2022	1590.3
2023	1453.8
Total	3044.2
Assumed Project Life (years)	25
Amortized Annual Construction Emissions	121.8

SOURCE: Appendix AIR of this EIR.

As recommended by MBARD and in accordance with the SLO APCD CEQA *Guidelines*, the amortized annual construction emissions are added to the Project's operational emissions discussed below and considered in the impact evaluation.

Operation

Table 3.5-9 shows the Project's operational emissions from both direct and indirect sources. The sum of these emissions and the amortized annual construction emissions is compared to the BAAQMD's 1,100 MT of CO_2e per year threshold.

TABLE 3.5-9
PROJECT GHG EMISSIONS

Source	CO_2e (metric tons/year)
Standby Generator – Testing and Maintenance[a]	16.3
Worker Commute and Chemical Delivery Truck Trips	59.5
Electricity Generation[b] (Indirect)	440.3
Amortized Annual Construction Emissions	121.8
Total	637.9
Significance Threshold	1100
Significant?	No

[a] Assumes operation of the emergency standby generator for a maximum of 50 hours per year for testing and maintenance per MBARD Rule 1010.

SOURCE: Appendix AIR of this EIR,

Indirect emissions from the generation of electricity that would be required to operate the Project was based on the Project's projected total operational demand of 1095 MWh per year. Total Project emissions would be well below the 1,100 tons per year threshold and the Project would therefore not generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment. This impact would be ***less than significant***.

Mitigation: None required.

Impact AIR-5: The Project would not conflict with the Executive Order B-30-15 Emissions Reduction Goal. (*Less than Significant*)

As noted in Section 3.5.3.2, the threshold of 1,100 metric tons CO_2e per year, which is used to assess the significance of Impact AIR-5 and use of this threshold, effectively requires mitigation for the top 92 percent of emissions generated by new land use projects, which would represent an overall reduction in new land use project-related emissions of up to 92 percent. Since the issuance of Executive Order B-30-15, GHG emissions reductions goals of lowering GHG emissions to 40 percent below 1990 levels by 2030 is roughly equivalent to reducing emissions by 42 percent below current levels. This analysis uses the same significance threshold to determine if the

Project would generally be consistent with Executive Order B-30-15. As discussed under Impact AIR-4, the carbon footprint of the Project and the impact associated with GHG emissions would be less than significant. Therefore, the Project would not conflict with the Executive Order B-30-15 Emissions Reduction Goal, and the associated impact would be ***less than significant***.

Mitigation: None required.

Cumulative Impacts

Impact C-AIR-1: The Project, in combination with past, present, and probable future projects in the Project area, would not result in significant adverse cumulative air quality or greenhouse gas impacts. (*Less than Significant*)

Air Quality

The contribution of an individual project's air emissions to regional air quality impacts is, by its nature, a cumulative effect. Emissions from past, present, and reasonably foreseeable future projects in the region also have or will contribute to adverse regional air quality impacts on a cumulative basis, resulting in a potentially significant cumulative air quality impact. No single project by itself would be sufficient in size to result in non-attainment of ambient air quality standards. Instead, a project’s individual emissions contribute to existing cumulative air quality conditions.[70] The project-level thresholds for criteria air pollutants are based on levels at which new sources are not anticipated to contribute to an air quality violation and would be consistent with the assumptions in the regional air quality management plan. Stationary sources such as standby generators would be subject to permit requirements of MBARD and would be considered consistent with regional air quality planning assumptions as the emission source complies with all applicable District rules and regulations, including emission offset and emission control requirements and/or whether or not project emissions are accommodated in the AQMP.[71] The Project would not cause an increase in population-related emissions. Therefore, as the Project’s emissions would not exceed the project-level thresholds as explained under Impact AIR-1, and because the Project would comply with all applicable MBARD permitting requirements, the Project would not result in a considerable contribution to cumulative regional air quality impacts, and the impact would be ***less than significant***.

Greenhouse Gases

Climate change is a global problem, and GHGs are global pollutants, which are pollutants of regional and local concern. Whereas pollutants with localized air quality effects have relatively short atmospheric lifetimes (about 1 day), GHGs have long atmospheric lifetimes (1 year to several thousand years). GHGs persist in the atmosphere for long enough time periods to be dispersed around the globe. Therefore, the effects of GHGs are also experienced globally. The atmospheric concentration of GHGs determines the intensity of climate change, with current

---

70 Bay Area Air Quality Management District, *California Environmental Quality Act – Air Quality Guidelines*, May 2017.

71 MBUAPCD, *CEQA Air Quality Guidelines*, revised February 2008.

levels already leading to increases in global temperatures, sea level rise, severe weather, and other environmental impacts. The continued increase in atmospheric GHG concentrations will only worsen the severity and intensity of climate change, leading to irrevocable environmental changes. Therefore, from the standpoint of CEQA, GHG impacts to global climate change are inherently cumulative. As with criteria air pollutants, no single project could generate enough GHG emissions to contribute noticeably to a change in the global average temperature. However, the combination of GHG emissions from past, present, and future projects contribute substantially to the phenomenon of global climate change and its associated environmental impacts.

As discussed under Impact AIR-4, GHG emissions from the construction and operation of the Project would be less than significant. The Project would also comply with the goals and actions of applicable GHG reduction plans at the local and state levels that aim to achieve the 2030 target established by SB 32 for California to meet a 40 percent reduction in GHG emissions by 2030 compared to 1990 levels. Therefore, Project contribution to the global cumulative impact would be ***less than significant***.

Mitigation: None required.

3.6 Geology and Soils

This section presents an analysis of potential impacts related to geology, soils, paleontological resources, and geologic features that would result from implementation of the proposed College Lake Integrated Resources Management Project (Project). The analysis includes both site options (preferred and optional) for the water treatment plant (WTP) as well as preferred and optional pipeline alignments for the College Lake pipeline. Information from the 2014 Basin Management Plan Update Program Environmental Impact Report (2014 BMP Update PEIR) that remains relevant and accurate for the purposes of describing the physical or regulatory setting of geology, soils, paleontological resources, and geologic features has been incorporated as appropriate. The Project includes mitigation measures adopted by the Board of Directors to reduce the severity and magnitude of potential environmental effects.

3.6.1 Setting

The 2014 BMP Update PEIR Section 3.7.1 (p. 3.7-1 *et seq*.) describes existing geological, soils, and seismic conditions in the Project region. Regional environmental setting information from the 2014 BMP Update PEIR is summarized here. This section describes geology, soils, and seismicity information specific to the Project area.

3.6.1.1 Regional Setting

Geology

The Project is located within the Pajaro Valley, a wide plain between the Coast Ranges and Monterey Bay. The Coast Ranges are defined by their northwest-trending mountains and valleys, created by the many active faults in the area. The southern Santa Cruz Mountains consist of Middle to Lower Pleistocene[1] marine sedimentary rocks and Early Miocene[2] marine deposits. The Pajaro Valley is underlain by Quaternary[3] alluvium from Aromas to Monterey Bay, and separates the southern Santa Cruz Mountains to the north from the Gabilan Range to the south.

Seismicity

The region is characterized by high seismic activity. The fault zones described below are considered to be components of the larger San Andreas Fault system. While each of these are their own discrete fault zones, and each of them move independently of one another, they are considered to be extensions of the main San Andreas Fault, and they each have somewhat different characteristics. The fault zones below are designated as Earthquake Fault Zones under the Alquist-Priolo Act of 1972.

[1] The Pleistocene Epoch is a length of geologic time spanning from 2.6 million years ago to 11,000 years ago.
[2] The Miocene Epoch is a length of geologic time spanning from 23 million years ago to 5.3 million years ago.
[3] The Quaternary Period is a broad length of geologic time spanning from 2.6 million years ago up to the present time.

San Andreas Fault zone

The San Andreas Fault is a northwest-trending, right-lateral, strike-slip fault, approximately 2.6 miles from the nearest Project component.[4] The San Andreas has produced many major earthquakes in the recent past, including the 1906 San Francisco earthquake and the 1989 Loma Prieta earthquake. The 1989 Loma Prieta earthquake, which was a magnitude 6.9 event, was responsible for numerous deaths and injuries, and millions of dollars in damage to the Bay Area. Although the epicenter of this earthquake was located in the Forest of Nisene Marks State Park, just north of the unincorporated community of Aptos in Santa Cruz County, the effects were felt throughout the Bay Area as far north as San Francisco.

San Gregorio Fault zone

The San Gregorio Fault is also a northwest-trending, right-lateral, strike-slip fault, as is characteristic of the many faults that are associated with the San Andreas Fault system. It is located approximately 22.7 miles from the Project area and is considered active.

Calaveras Fault

The Calaveras Fault is a major fault that extends for about 100 miles from Dublin to Hollister, where it merges with the San Andreas Fault. The southern portion, which is considered to be the most active segment, is located approximately 14.1 miles from the nearest Project component.

Sargent Fault zone

The Sargent Fault branches off of the San Andreas Fault and extends for approximately 34 miles from the Lexington Reservoir to Hollister. The fault is located approximately 5.3 miles from the nearest Project component, and is considered active.

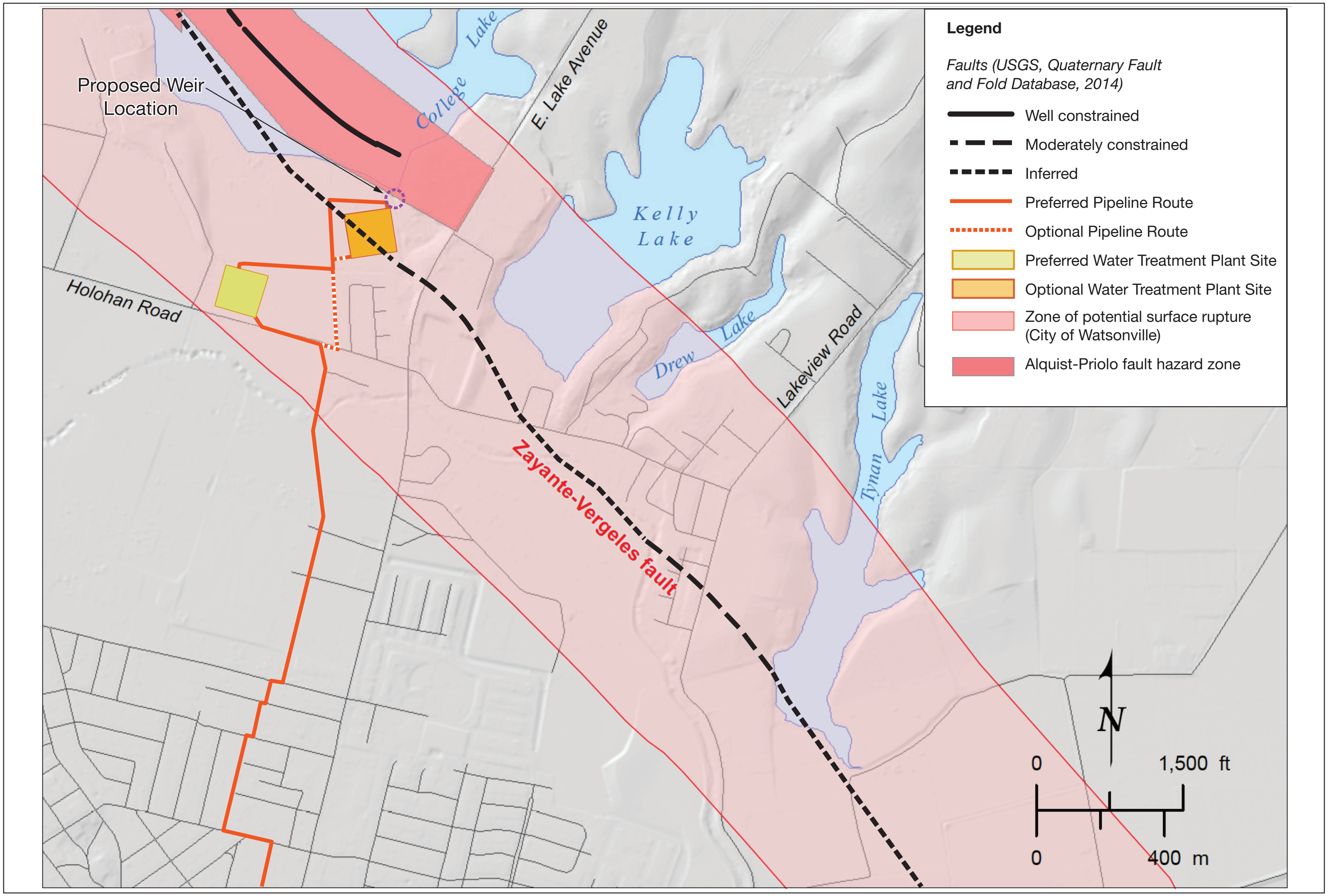
Zayante-Vergeles Fault zone

The Zayante-Vergeles Fault (ZVF) zone is of particular importance in relation to this Project as a portion of the fault runs directly through College Lake (refer to **Figure 3.6-1**). The northern segment of the fault zone is the Zayante Fault and is the segment that traverses the Project area. The fault is considered active, showing evidence for Holocene displacement.[5,6] As mapped, part of the optional WTP site would be located on the potential southwestern strand of the ZVF. The actual location of this potential strand of the ZVF is undetermined. No obvious geomorphic evidence for faulting was observed in the digital elevation data and satellite imagery reviewed during a desktop study. Likewise, no obvious evidence for surface faulting was observed during a

4 Fugro, Preliminary Geotechnical and Geologic Site Assessments Phases 1 & 2 Pajaro Valley Water Management Agency 2017-2019 BMP Program Management Services for College Lake Integrated Resource Management Project Harkins Slough Recharge Facility Upgrades, and Watsonville Slough with Recharge Basins. Fugro Project No.: 04.72170008. Document No.: 04.72170008-PR-002(Rev.01), 2018.

5 The Holocene Epoch is a period of geologic time that spans from the end of the last Ice Age (approximately 11,000 years ago) up to the present time.

6 Fugro, Preliminary Geotechnical and Geologic Site Assessments Phases 1 & 2 Pajaro Valley Water Management Agency 2017-2019 BMP Program Management Services for College Lake Integrated Resource Management Project Harkins Slough Recharge Facility Upgrades, and Watsonville Slough with Recharge Basins. Fugro Project No.: 04.72170008. Document No.: 04.72170008-PR-002(Rev.01), 2018.



SOURCE: Fugro, Preliminary Geotechnical and Geologic Site Assessments Phases 1 & 2, Pajaro Valley Water Management Agency 2017-2019 BMP Program Management Services for College Lake Integrated Resources Management Project, Harkins Slough Recharge Facility Upgrades, and Watsonville Slough with Recharge Basins, April 2018.

ESA

College Lake Integrated Resources Management Project

Figure 3.6-1
Surface-Fault Rupture Hazard Zones

field visit on March 15, 2017.[7] However, in both cases, the absence of evidence may be a result of intensive plowing and associated agricultural activity, as well as a lack of natural exposures and does not indicate absence of the fault. The dissimilar soil stratigraphy encountered in Borings B-01 and B-02 from the Fugro site assessment[8] suggests a possible geologic contact (and/or potentially a fault trace) may exist in the area of the proposed College Lake water storage area and optional WTP site.

3.6.1.2 Local Setting

College Lake is located in an alluvial area bordered by gentle to moderate slopes along the northern edge of the Pajaro Valley plain. College Lake, and two nearby lakes—Kelly and Drew Lake—are in areas comprised of Quaternary alluvium, and the lake bottoms are classified as Quaternary Basin deposits, as shown on **Figure 3.6-2**. The basin deposits consist of unconsolidated plastic clay and silty clay; they have a high organic content with interbedded silt and sandy silt deposits. These types of soils have a high susceptibility to liquefaction in the event of an earthquake. Designated liquefaction zones are established by the Watsonville General Plan in low-lying areas underlain by the following types of geologic deposits: older and younger sequences of Holocene flood plain deposits along the Pajaro River and Corralitos Creek (unit Qfl) and Holocene basin deposits within low-lying areas of the Pajaro Valley (unit Qb). These units are shown on Figure 3.6-2 and described in greater detail below.

The Watsonville terrace deposits (Qtw) are Quaternary non-marine terrace deposits, subdivided into fluvial and alluvial fan facies.[9] These terrace deposits are semi-consolidated, moderately to poorly sorted sediment ranging from silty clay to gravel-sized particles. These deposits have a low susceptibility to liquefaction and none of the mapped areas are considered unstable enough to produce landslides.

Both Corralitos and Salsipuedes creeks flow across the flood plain deposits (Qfl). The area immediately south of College Lake is alluvium classified as older flood plain deposits, which consist of unconsolidated, relatively fine-grained sand and silt with intermittent clay lenses; these deposits generally have a moderate susceptibility to liquefaction. The area surrounding Corralitos and Salsipuedes creeks is classified as younger flood plain deposits, which have a similar composition to the previously mentioned older deposits, the difference being that these deposits have a very high susceptibility to liquefaction.

The College Lake area is subject to strong seismic ground shaking.[10] Ground shaking poses a significant risk to the proposed and existing facilities in the area. The entire area is expected to experience ground shaking of severe intensity in the event of a major earthquake, with peak

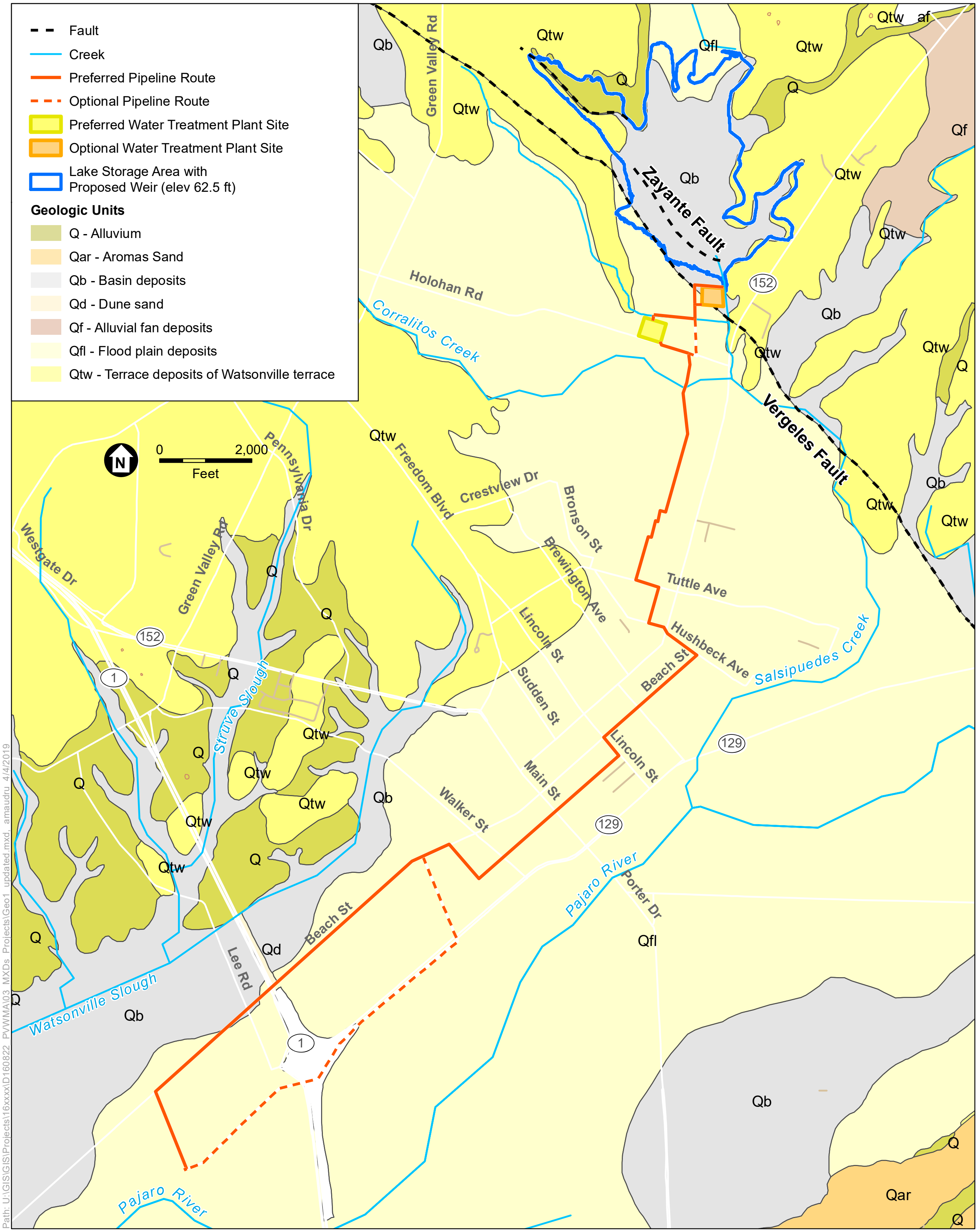
---

7 Ibid.

8 Ibid.

9 A sedimentary facies is the sum total of features that reflect the specific environmental conditions under which a given rock was deposited.

10 Fugro, Preliminary Geotechnical and Geologic Site Assessments Phases 1 & 2 Pajaro Valley Water Management Agency 2017-2019 BMP Program Management Services for College Lake Integrated Resource Management Project Harkins Slough Recharge Facility Upgrades, and Watsonville Slough with Recharge Basins. Fugro Project No.: 04.72170008. Document No.: 04.72170008-PR-002(Rev.01), 2018.



SOURCE: California Geological Survey, 2002

College Lake Integrated Resources Management Project

Figure 3.6-2
Geologic Units

ESA

ground accelerations reaching 0.8g.[11] The College Lake area has a high potential for liquefaction, as does the area along the College Lake pipeline alignment.

No part of the College Lake area is in a tsunami hazard area; however, movement on any of the active or potentially active faults in the project vicinity could result in the creation of a seiche.

The soils in the College Lake area are mostly Conejo loam on 0 to 2 percent slopes. The soils are flooded in the winter and drained by a Reclamation District 2049 in the spring for cultivation. The clay content creates a moderate hazard relative to expansive soils that make the soil unsuitable for construction materials, embankments, and levees, and is problematic for some types of construction. The perimeter areas of College Lake are comprised of a variety of soils types including the Danville loam, Diablo clay, Elder sandy loam, Tierra-Watsonville complex, and Watsonville loam.[12] The site where the proposed weir structure and treatment facilities would be located are comprised of Baywood Variant loamy sand and the southern portion of the College Lake pipeline alignment is comprised of Baywood loamy sand. No part of the College Lake area is within a designated zone of mineral, aggregate, oil and gas, or geothermal resources.

3.6.1.3 Identification of Paleontological Resources and Geologic Features

Paleontological resources are the fossilized remains or impressions of plants and animals, including vertebrates (animals with backbones; mammals, birds, fish, etc.), invertebrates (animals without backbones; starfish, clams, coral, etc.), and microscopic plants and animals (microfossils). They are valuable, non-renewable, scientific resources used to document the existence of extinct life forms and to reconstruct the environments in which they lived. Fossils can be used to determine the relative ages of the depositional layers in which they occur and of the geologic events that created those deposits. The age, abundance, and distribution of fossils depend on the geologic formation in which they occur and the topography of the area in which they are exposed. The geologic environments within which the plants or animals became fossilized usually were quite different from the present environments in which the geologic formations now exist.

As previously discussed, the Project area is primarily underlain by Holocene-aged flood plain deposits. While the uppermost layers may not be old enough to have preserved fossils, they may be underlain by sediments that could exceed 5,000 years in age (early Holocene or older) and therefore may preserve fossil resources, as defined by the Society of Vertebrate Paleontology. The Pleistocene terrace deposits, present within a very small portion of the Project area, do have a record of vertebrate fossil preservation in Southern California, but similar sediments in Santa Cruz County only have a record of fossil plants that are poorly represented in fossil collections, indicative of low paleontological sensitivity. No fossil localities are known to be located within the Project area.[13]

---

[11] Ibid.

[12] Natural Resources Conservation Service, Web Soil Survey. Soil Map—Santa Cruz County, California. Map. Scale 1:22,700, 2018.

[13] University of California Museum of Paleontology, Specimen Search, no date. Available online at https://ucmpdb.berkeley.edu/. Accessed on June 24, 2018.

The County of Santa Cruz has identified four areas with significant hydrological, geological and paleontological features that stand out as rare or unique and representative in the County because of their scarcity, scientific or educational value, aesthetic quality or cultural significance.[14] These areas include:

- **Majors Creek Canyon:** The cliffs and exposed rocks of this canyon to the east of State Route 1 are outstanding scenic features.
- **Martin Road:** East and west of Martin Road, encompassed in the botanical sites, are unusual sandhill outcroppings.
- **Wilder Creek:** This area contains a concentration of limestone caves worth protecting.
- **Table Rock:** Highly scenic coastal rock formations can be found in the vicinity of Table Rock and Yellow Bank Creek.

None of these features are present within College Lake or at the Project sites.

3.6.2 Regulatory Framework

3.6.2.1 Federal and State

There have been no substantial changes in the federal or state regulations, policies, or plans relevant to the Project as set forth in the 2014 BMP Update PEIR, Section 3.7, Geology and Soils (p. 3.7-1). This analysis incorporates 2014 BMP Update PEIR, Section 3.7, Geology and Soils (p. 3.7-1) and relies on the summaries of federal or state regulations, policies, or plans set forth therein.

Paleontological Resources

California Environmental Quality Act

The California Environmental Quality Act (CEQA) Guidelines (Title 14, Chapter 3 of the California Code of Regulations, Section 15000 *et seq*.), define the procedures, types of activities, individuals, and public agencies required to comply with CEQA. As part of the CEQA process, one of the questions that must be answered by the lead agency relates to paleontological resources: "Will the proposed project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?" (CEQA Guidelines Section 15023, Appendix G, Section XIV, Part a).

The loss of any identifiable fossil that could yield information important to prehistory, or that embodies the distinctive characteristics of a type of organism, environment, period of time, or geographic region, would be a significant environmental impact. Direct impacts to paleontological resources primarily concern the potential destruction of non-renewable paleontological resources and the loss of information associated with these resources. This includes the unauthorized collection of fossil remains. If potentially fossiliferous bedrock or surficial sediments are disturbed, the disturbance could result in the destruction of paleontological resources and subsequent loss of

[14] County of Santa Cruz, Geospatial Data, Geologic Paleontologic, February 5, 2019. Available online at https://opendata-sccgis.opendata.arcgis.com/datasets/de093ade949749a396cb9fafc55d9307_59. Accessed on April 10, 2019.

information (significant impact). At the project-specific level, direct impacts can be mitigated to a less than significant level through the implementation of paleontological mitigation.

The CEQA threshold of significance for a significant impact on paleontological resources is reached when a project is determined to "directly or indirectly destroy a significant paleontological resource or unique geologic feature." In general, for projects that are underlain by paleontologically sensitive geologic units, the greater the amount of ground disturbance, the higher the potential for significant impacts to paleontological resources. For projects that are directly underlain by geologic units with no paleontological sensitivity, there is no potential for impacts on paleontological resources unless sensitive geologic units which underlie the non-sensitive unit are also affected.

Public Resources Code Section 5097.5 and Section 30244

Other state requirements for paleontological resource management are included in Public Resources Code Section 5097.5 and Section 30244. These statutes prohibit the removal of any paleontological site or feature from public lands without permission of the jurisdictional agency, define the removal of paleontological sites or features as a misdemeanor, and require reasonable mitigation of adverse impacts to paleontological resources from developments on public (state, county, city, district) lands.

Society of Vertebrate Paleontologists Guidelines

In addition to the laws, regulations, and policies described in the regulatory framework, the standard practice in analyzing paleontological resources includes using guidance from the Society of Vertebrate Paleontology. Although not a law or regulation in the legal sense, these guidelines have become the standard in the industry. The Society of Vertebrate Paleontology defines the level of potential for sedimentary rocks based upon the potential for yielding fossils of certain types and the importance of recovered evidence for understanding the geologic record. The level of potential of geologic units in the Project area has not been evaluated. For purposes of analysis, it is assumed that all sedimentary units older than early Holocene (i.e., older than 5,000 years) may contain paleontological resources.

3.6.2.2 Local

Table 2-10 in Chapter 2, *Project Description*, identifies the approvals from Santa Cruz County and/or the City of Watsonville required for the Project. Table 3.6-1 presents pertinent local plans and policies regarding geology and soils to support County and City consideration of project consistency with general policies.[15] In some cases, local policies are used in this EIR as criteria to determine the significance of physical effects on the environment (e.g., Impact NOI-1 in Section 3.8, Noise and Vibration).

[15] California Government Code Section 53091 exempts agencies like PV Water from complying with local building and zoning ordinances when locating or constructing facilities for the production, generation, storage, treatment, or transmission of water. California Government Code Section 65402(c) requires that PV Water notify cities and counties of its plans to construct projects or to acquire or dispose of property. The planning agency then has 40 days to determine project consistency with its general plan. If the planning agency disapproves, the disapproval may be overruled by PV Water.

TABLE 3.6-1
LOCAL PLANS AND POLICIES RELEVANT TO THE PROJECT

CITY OF WATSONVILLE PLANS AND POLICIES
Watsonville General Plan
Policy 12.C.2: Soils Investigation. The City shall require a soils investigation report prior to new development on sites deemed to have a high potential for soil erosion, landslide, or other soil-related constraints.
Watsonville Municipal Code
Section 9-5.705 (8) Polluted Runoff Controls. All development shall incorporate structural and nonstructural Best Management Practices. [Best Management Practices] are methods for controlling, reducing, or removing typical runoff pollutants. All components (i-x) of Section 9-5.705 are applicable here.
SANTA CRUZ COUNTY PLANS AND POLICIES
Santa Cruz County General Plan/Local Coastal Program
Policy 5.9.1: Protection and Designation of Significant Resources. Protect significant geological features such as caves, large rock outcrops, inland cliffs and special formations of scenic or scientific value, hydrological features such as major waterfalls or springs, and paleontological features, through the environmental review process. Designate such sites on the General Plan and Local Coastal Program Resources and Constraints Maps where identified.
Policy 6.1.1: Geologic Review for Development in Designated Fault Zones. Require a review of geologic hazards for all discretionary development projects, including the creation of new lots, in designated fault zones. Fault zones designated for review include the Butano, Sargent, Zayante, and Corralitos complexes, as well as the State designated Seismic Review Zones. Required geologic reviews shall examine all potential seismic hazards, and may consist of a Geologic Hazards Assessment and a more complete investigation where required. Such assessment shall be prepared by County staff under supervision of the County Geologist, or a certified engineering geologist may conduct this review at the applicant's choice and expense.
Policy 6.1.3: Engineering Geology Report for Public Facilities in Fault Zones. Require a full engineering geology report by a certified engineering geologist whenever a significant potential hazard is identified by a Geologic Hazards Assessment or Preliminary Geologic Report, and prior to the approval of any new public facility or critical structures within the designated fault zone.
Policy 6.1.8: Design Standards for New Public Facilities. Require all new public facilities and critical structures to be designed to withstand the expected groundshaking (specified in design standards) during an earthquake on the San Andreas Fault.
Policy 6.3.5: Installation of Erosion Control Measures. Require the installation of erosion control measures consistent with the Erosion Control Ordinance, by October 15, or the advent of significant rain, or project completion, whichever occurs first. Prior to October 15, require adequate erosion control to be provided to prevent erosion from early storms. For development activities require protection of exposed soil from erosion between October 15 and April 15 and require vegetation and stabilization of disturbed areas prior to completion of the project. For agricultural activities, require that adequate measures be taken to prevent excessive sediment from leaving the property.

SOURCE: City of Watsonville, Watsonville Municipal Code, 2014. Available online at www.codepublishing.com/CA/Watsonville/. Accessed on May 14, 2018; City of Watsonville, *Watsonville 2005 General Plan*. Adopted May 24, 1994; Santa Cruz County, *1994 General Plan and Local Coastal Program for the County of Santa Cruz, California*, 1994.

3.6.3 Impacts and Mitigation Measures

3.6.3.1 Significance Criteria

In accordance with the CEQA, state CEQA Guidelines (including Appendix G), relevant plans, policies, and/or guidelines, and agency standards, the Project could have a significant impact if it were to:

- Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:

i. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault;

ii. Strong seismic ground shaking;

iii. Seismic-related ground failure, including liquefaction; and/or

iv. Landslides.

- Result in substantial soil erosion or the loss of topsoil;
- Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse;
- Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property;
- Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater; and/or
- Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.

The following topics are not analyzed further in this section for the reasons described below:

- ***Having soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater.*** None of the Project components include the use of septic tanks or alternative wastewater disposal systems, and therefore, would have no impact on the support capacity of affected soils. For these reason, this criterion is not applicable to the Project.

- ***Result in the loss of topsoil.*** Impacts related to topsoil are evaluated in Section 3.2, Land Use and Agricultural Resources and reduced through implementation of Mitigation Measure LU-1c, Replacement of Topsoil (refer to Impact LU-1).

3.6.3.2 Methodology

As described in Section 3.1, this EIR provides an independent analysis of the Project's potential environmental impacts. **Table 3.6-2** presents mitigation measures from the 2014 BMP Update PEIR adopted by the Board of Directors (Resolution 2014-05) for the purpose of reducing impacts related to geology and soils. These adopted mitigation measures are considered part of the Project and thus are considered prior to any significance determinations. Potential impacts are evaluated in the following section. If warranted, additional mitigation is included and takes the form of (1) modifications to update the mitigation measures presented in Table 3.6-2 to reflect current conditions and site-specific impacts; or (2) new mitigation measures to replace or augment an adopted mitigation measure. The basis for the evaluations below are compliance with state requirements and implementation of the recommendations of geotechnical evaluations.

TABLE 3.6-2
2014 BMP UPDATE PEIR MITIGATION MEASURES – GEOLOGY AND SOILS

GS-1: Future construction of proposed BMP Update facilities shall be designed in accordance with design recommendations of geotechnical reports and in compliance with applicable policies and appropriate engineering investigation practices necessary to reduce the potential detrimental effects of ground shaking and liquefaction. Construction shall be in accordance with applicable City and County ordinances and policies regarding mitigation of seismic and geologic hazards, and appropriate geotechnical studies shall be conducted.
GS-2: Construction of future BMP Update facilities shall include preparation and implementation of erosion control plans to minimize erosion and inadvertent transport of sediments into water bodies during installation of facilities. Measures shall include, but not be limited to: limiting the area of ground disturbance and vegetation removal at any one time during construction; conducting work prior to the rainy season if possible and protecting disturbed areas during the rainy season; installing bales or other appropriate barriers adjacent to water bodies to prevent transport of sediments into sloughs and water courses; immediately revegetating disturbed areas; and other Best Management Practices during construction to protect water quality. All grading and construction shall conform to requirements of the Santa Cruz County Grading Ordinance. To the extent possible, grading activities in non-cropped areas shall be limited to the period between April 15 and October 31.
GS-3: All diversion and pipeline facilities shall be designed and engineered in accordance with recommendations of a geotechnical report and appropriate engineering designs to reduce the potential detrimental effects of expansive soils, corrosivity, and/or other identified soils constraints. A licensed geotechnical engineer shall prepare recommendations applicable to foundation design, earthwork, and site preparation prior to or during the project design phase. Recommendations will address mitigation of site- specific, adverse soil and bedrock conditions that could hinder development. Project engineers shall implement the recommendations. Geotechnical design and design criteria will comply with applicable codes and requirements of the California Building Code with California additions (CCR Title 24), applicable City and County construction and grading ordinances.
SOURCE: Pajaro Valley Water Management Agency, Resolution No. 2014-05, adopted April 16, 2014.

3.6.3.3 Impact Evaluation

Impact GEO-1: The Project could directly or indirectly cause potential substantial adverse effects, including risk of loss, injury, or death involving an exacerbation of existing risks related to earthquake rupture, strong seismic ground shaking, seismic related ground failure including liquefaction, and landslides. (*Less than Significant*)

The Project components are not within a Zone of Required Investigation as delineated on an Alquist-Priolo Earthquake Fault Zone Map. As depicted on Figure 3.6-1, the proposed weir structure, intake pump station, and WTP (both preferred and optional sites) are within the City of Watsonville's mapped Zayante-Vergeles zone of potential surface rupture. The optional WTP site is located on what may be a southwestern strand of the Zayante-Vergeles Fault; however, the actual location of this potential fault strand is undetermined.[16] Obvious geomorphic evidence for the fault has not been found, although there is a disconformity present in the stratigraphy at the optional WTP site, which could represent a fault trace. In the event of a major earthquake in the Zayante-Vergeles fault zone each of the Project components is at risk of receiving damage as a result of that earthquake. These substantial adverse effects could include surface rupture, strong seismic ground shaking, and seismic related ground failures (e.g., liquefaction and/or landslides).

[16] Fugro, Preliminary Geotechnical and Geologic Site Assessments Phases 1 & 2 Pajaro Valley Water Management Agency 2017-2019 BMP Program Management Services for College Lake Integrated Resource Management Project Harkins Slough Recharge Facility Upgrades, and Watsonville Slough with Recharge Basins. Fugro Project No.: 04.72170008. Document No.: 04.72170008-PR-002(Rev.01), 2018.

The Board of Directors adopted Mitigation Measure GS-1 (presented above in Table 3.6-2) to reduce these potential risks by requiring that all Project components be designed in accordance with recommendations from a geotechnical report and in compliance with applicable policies and appropriate engineering investigations practices. Pajaro Valley Water Management Agency (PV Water) is currently implementing this measure and has conducted preliminary geotechnical investigations[17] that have informed the designs presented in this EIR. PV Water would continue to implement this measure as design of the Project components progresses. In accordance with California Government Code Section 53091, adopted **Mitigation Measure GS-1** has been revised as shown below.[18] Continued implementation of this revised adopted mitigation measure would ensure that design engineers incorporate the findings of geotechnical investigations into project design, reducing this impact to ***less than significant***.

Mitigation Measure GS-1 (Revised).

Future construction of proposed BMP Update facilities shall be designed in accordance with design recommendations of geotechnical reports and in compliance with applicable policies and appropriate engineering investigation practices necessary to reduce the potential detrimental effects of ground shaking and liquefaction. Construction shall be in accordance with applicable requirements ~~City and County ordinances and policies~~ regarding mitigation of seismic and geologic hazards, and appropriate geotechnical studies shall be conducted.

Impact GEO-2: The Project could result in substantial soil erosion. (*Less than Significant*)

Construction activities associated with each Project component would result in erosion and discharge of sediment in water bodies. These activities include the demolition of the existing weir structure and the construction of the proposed weir structure, intake pump station, WTP, and College Lake pipeline. Construction of Project components would involve dewatering, grading and excavation, landscaping, paving, and installing piping. Potential maintenance activities include the removal of excess sediment and debris from around the weir and in drainage channels in the lake. The Board of Directors adopted Mitigation Measure GS-2 (presented above in Table 3.6-2) to address erosion and discharge of sediment. In accordance with California Government Code Section 53091, Mitigation Measure GS-2 has been revised as shown below. In accordance with revised adopted Mitigation Measure GS-2, PV Water would prepare and implement (or require the construction contractor to prepare and implement) an erosion control plan. The erosion control plan would include, but would not be limited to:

- Limiting the area of ground disturbance and vegetation removal at any one time during construction;

---

[17] Fugro, Preliminary Geotechnical and Geologic Site Assessments Phases 1 & 2 Pajaro Valley Water Management Agency 2017-2019 BMP Program Management Services for College Lake Integrated Resource Management Project Harkins Slough Recharge Facility Upgrades, and Watsonville Slough with Recharge Basins. Fugro Project No.: 04.72170008. Document No.: 04.72170008-PR-002(Rev.01), 2018.

[18] Text that has been revised in adopted mitigation measures is indicated with underlining where text has been added, and ~~strikethrough~~ where text has been deleted.

- Conducting work prior to the rainy season to the extent possible and protecting disturbed areas during the rainy season;
- Installing bales or other appropriate barriers adjacent to water bodies to prevent transport of sediments into sloughs and water courses;
- Immediately revegetating disturbed areas; and
- Implementing other Best Management Practices during construction to protect water quality.

Mitigation Measure GS-2 would also require that all grading and construction shall conform to applicable requirements (refer to Section 3.3, Surface Water, Groundwater and Water Quality, for more information). Implementation of revised adopted **Mitigation Measure GS-2,** including the erosion control plan, would reduce impacts associated with erosion and loss of top soil to ***less than significant***.

Mitigation Measure GS-2 (Revised).

Construction of future BMP Update facilities shall include preparation and implementation of erosion control plans to minimize erosion and inadvertent transport of sediments into water bodies during installation of facilities. Measures shall include, but not be limited to: limiting the area of ground disturbance and vegetation removal at any one time during construction; conducting work prior to the rainy season if possible and protecting disturbed areas during the rainy season; installing bales or other appropriate barriers adjacent to water bodies to prevent transport of sediments into sloughs and water courses; immediately revegetating disturbed areas; and other Best Management Practices during construction to protect water quality. All grading and construction shall conform to applicable requirements.~~ of the Santa Cruz County Grading Ordinance. To the extent possible, grading activities in non-cropped areas shall be limited to the period between April 15 and October 31.~~

Impact GEO-3: The Project could be located on a geologic unit or soil that becomes unstable as a result of the Project or that could potentially result in landslide, lateral spreading, subsidence, liquefaction, or collapse for reasons caused or exacerbated by the Project. (*Less than Significant*)

The College Lake pipeline, weir structure and pump station, and WTP could exacerbate hazards associated with underlying soil properties. The soils to the east and west of the proposed weir structure, intake pump station, WTP (both preferred and optional sites), and within College Lake itself have a high to moderate liquefaction potential.[19] In the event of a major earthquake in or around the Project area these soils would potentially liquefy. The two large shotcrete-lined sedimentation basins that are planned within the new treatment plant have been identified in the geotechnical report as having the potential to become unstable in the event of a major earthquake. Fugro estimates large slope displacements should an earthquake occur; however, the actual

[19] Fugro, Preliminary Geotechnical and Geologic Site Assessments Phases 1 & 2 Pajaro Valley Water Management Agency 2017-2019 BMP Program Management Services for College Lake Integrated Resource Management Project Harkins Slough Recharge Facility Upgrades, and Watsonville Slough with Recharge Basins. Fugro Project No.: 04.72170008. Document No.: 04.72170008-PR-002(Rev.01), 2018.

damage may vary depending on the characteristics of the potential earthquake. In addition, compressible soils may be present in the unit Qb and unit Qfl deposits, which may be susceptible to consolidation settlement under new loads from the Project components. The Board of Directors adopted Mitigation Measure GS-3 to address the risks associated with potentially unstable soils that could result in landslide, lateral spreading, subsidence, and liquefaction. Mitigation Measure GS-3 requires that all Project components be designed and engineered in accordance with recommendations of a geotechnical report and appropriate engineering designs to reduce the detrimental effects of any identified soil constraints. Also, geotechnical design and design criteria would comply with the most recent California Building Code specifications. In accordance with California Government Code Section 53091, Mitigation Measure GS-3 has been revised as shown below. Implementation of revised adopted Mitigation Measure GS-3 would ensure that impacts related to this criterion are ***less than significant***.

Mitigation Measure GS-3 (Revised).

All diversion and pipeline facilities shall be designed and engineered in accordance with recommendations of a geotechnical report and appropriate engineering designs to reduce the potential detrimental effects of expansive soils, corrosivity, and/or other identified soils constraints. A licensed geotechnical engineer shall prepare recommendations applicable to foundation design, earthwork, and site preparation prior to or during the project design phase. Recommendations will address mitigation of site- specific, adverse soil and bedrock conditions that could hinder development. Project engineers shall implement the recommendations. Geotechnical design and design criteria will comply with applicable codes and requirements of the California Building Code ~~with California additions~~ (CCR Title 24)~~, applicable City and County construction and grading ordinances~~.

Impact GEO-4: The Project could be located on expansive soil, creating or exacerbating substantial risks to life and property. (Less than Significant)

Soils near bodies of water tend to be expansive, or have a high "shrink-swell" potential. This is due to the high ratio of clay to sand present in the soils. Soil samples taken from two locations at College Lake, to the east and to the west of where the weir would be located, exhibit expansive properties. The 2014 BMP Update PEIR identified these potential risks and concluded that mitigation was necessary for the Project. Adopted Mitigation Measure GS-3 requires that all components of the Project shall be designed and engineered in accordance with recommendations from Fugro's geotechnical report and appropriate engineering designs to reduce the impacts associated with expansive soils.[20] Implementation of Mitigation Measure GS-3 would ensure that the impacts related to this criterion are ***less than significant***.

Mitigation: None required.

---

[20] Fugro, Preliminary Geotechnical and Geologic Site Assessments Phases 1 & 2 Pajaro Valley Water Management Agency 2017-2019 BMP Program Management Services for College Lake Integrated Resource Management Project Harkins Slough Recharge Facility Upgrades, and Watsonville Slough with Recharge Basins. Fugro Project No.: 04.72170008. Document No.: 04.72170008-PR-002(Rev.01), 2018.

Impact GEO-5: The Project could directly or indirectly destroy a unique paleontological resource or site or unique geologic feature. (*Less than Significant with Mitigation*)

No unique geologic features would be adversely affected by the Project, but there is a potential to impact a unique paleontological resource or site. The surficial sediments of the Project area are unlikely to have preserved fossils; however, there is a potential for increased sensitivity with depth. The majority of Project-related excavation is relatively shallow. Excavations could extend up to approximately 20 to 25 feet below ground surface at the proposed weir, intake pump station, and WTP, and even greater depths where pits are required for horizontal direction drilling or jack and bore construction along the College Lake pipeline route (shown on Figure 2-3a through 2-3e in Chapter 2, *Project Description*). These deeper excavations could encounter sediments that contain fossils. Thus the Project could directly or indirectly destroy a unique paleontological resource or site. With implementation of **Mitigation Measure GEO-1**, which includes procedures to follow in the event of a paleontological discovery, impacts to unique paleontological resources or sites would be ***less than significant***.

> **Mitigation Measure GEO-1: Inadvertent Discovery of Paleontological Resources.**
>
> If construction or other Project personnel discover any potential fossils during construction, work at the discovery location shall cease in a 50-foot radius of the discovery until a qualified paleontologist meeting the Society of Vertebrate Paleontology standards has assessed the discovery and made recommendations as to the appropriate treatment. If the find is deemed significant, it shall be salvaged following the standards of the Society of Vertebrate Paleontology and curated with a certified repository. Following a discovery, the qualified paleontologist shall also provide PV Water with recommendations regarding future paleontological monitoring, if deemed warranted.

Cumulative Impacts

Impact C-GEO-1: The Project, in combination with past, present, and probable future projects in the Project area, could have cumulatively considerable impacts on a unique paleontological resource. (*Less than Significant with Mitigation*)

Geology and Soils

Although the Project area is within a seismically active region with a wide range of geologic and soil conditions, these conditions can vary greatly within a short distance. Accordingly, impacts related to geology, soils, and seismicity tend to be site-specific and depend on the local geology and soil conditions. For these reasons, the geographic scope for potential cumulative impacts consists of the Project sites and the immediate vicinity. The Project could contribute to a cumulative impact on geology, soils, and seismicity if the effects of the Project overlapped in time and space with those of other projects in the area, producing similar effects. Significant cumulative impacts related to geology, soils, and seismicity could occur if the incremental impacts of the Project combined with the incremental impacts of a cumulative project would directly or indirectly cause substantial adverse effects involving geologic, seismic, and soil hazards.

There are 22 projects listed in Table 3.1-1 that would be near or adjacent to the Project that could be constructed at the same time, which could cause significant cumulative erosion effects. However, as discussed in Section 3.3.2, Regulatory Framework, the National Pollutant Discharge Elimination System Construction General Permit would require each project involving disturbance of one acre or more of land to prepare and implement a Storm Water Pollution Prevention Plan (SWPPP). The SWPPPs would describe Best Management Practices to control runoff and prevent erosion for each such project. Through compliance with this requirement, the potential for erosion impacts would be reduced. The Construction General Permit has been developed to address cumulative conditions arising from construction throughout the state, and is intended to maintain cumulative effects of projects subject to this requirement below levels that would be considered significant. For example, two adjacent construction sites would be required to implement Best Management Practices to reduce and control the release of sediment and/or other pollutants in any runoff leaving their respective sites. The runoff water from both sites would be required to achieve the same action levels, measured as a maximum amount of sediment or pollutant allowed per unit volume of runoff water. Thus, even if the runoff waters were to combine after leaving the sites, the sediments and/or pollutants in the combined runoff would still be at concentrations (amount of sediment or pollutants per volume of runoff water) below action levels and would not combine to be cumulatively significant. In addition to the SWPPP, Mitigation Measure GS-2 (described in detail in Table 3.6-2) would require the preparation and implementation of an erosion control plan, which would further reduce the cumulative effects of the Project. Therefore, the Project would have a less-than-significant contribution to a cumulative impact with respect to soil erosion.

Seismically induced ground shaking, liquefaction and lateral spreading, and expansive or corrosive soils could cause structural damage or pipeline leaks or ruptures during construction and operations phases. However, state and local building regulations and standards have been established to address and reduce the potential for such impacts to occur. The Project and cumulative projects would be required to comply with applicable provisions of these laws and regulations. Through compliance with these requirements, the potential for impacts would be reduced. The purpose of the California Building Code (and local ordinances) is to regulate and control the design, construction, quality of materials, use/occupancy, location, and maintenance of all buildings and structures within its jurisdiction; by design, it is intended to reduce the cumulative risks from buildings and structures. Based on compliance with these requirements, the incremental impacts of the Project combined with impacts of other projects in the area would not combine to cause cumulatively considerable impacts related to seismically induced ground shaking, liquefaction and lateral spreading, or expansive or corrosive soils, and the impact would be ***less than significant***.

Paleontological Resources

As noted, multiple projects that would result in ground disturbance are proposed throughout the geographic scope of analysis (refer to Table 3.1-1 and Figure 3.1-1 for projects). Cumulative impacts to unique paleontological resources or sites or unique geologic features could occur if any of these projects, in conjunction with this Project, would have impacts on paleontological resources that, when considered together, would be significant.

As described above under Impact GEO-5, there is the potential for deeper excavations to impact unique paleontological resource or sites. The surficial sediments of the Project area are unlikely to have preserved fossils, however, there is a potential for increased sensitivity with depth. Other projects in the cumulative scenario that include ground disturbance could result in similar impacts to paleontological resources. The incremental impact of the Project combined with those of the cumulative projects could result in a cumulative impact on paleontological resources. However, Mitigation Measure GEO-1 (described above) would ensure that the Project's contribution toward cumulative effects on paleontological resources would not be cumulatively considerable, and the impact would be ***less than significant with mitigation***.

Mitigation Measure GEO-1: Inadvertent Discovery of Paleontological Resources
(refer to Impact GEO-5)

This page intentionally left blank

3.7 Hazards and Hazardous Materials

This section presents an analysis of potential impacts related to hazards and hazardous materials that would result from implementation of the proposed College Lake Integrated Resources Management Project (Project). The analysis includes both site options (preferred and optional) for the water treatment plant (WTP) as well as preferred and optional pipeline alignments for the College Lake pipeline. Information from the 2014 Basin Management Plan Update Program Environmental Impact Report (2014 BMP Update PEIR) that remains relevant and accurate for the purposes of describing the physical or regulatory setting of hazards and hazardous materials has been incorporated as appropriate. The Project includes mitigation measures adopted by the Board of Directors to reduce the severity and magnitude of potential environmental effects.

3.7.1 Setting

The 2014 BMP Update PEIR Section 3.8.1 generally describes existing hazardous materials in the Project region which likely include petroleum hydrocarbons and hazardous materials common to agriculture. This section is incorporated by reference and updated as provided below.

3.7.1.1 Hazardous Materials at Nearby Sites

A Cortese list[1] database search for hazardous materials sites within one-quarter mile of the Project was performed to update the setting. Within one-quarter mile of the Project components (both preferred and optional) including the College Lake pipeline (both preferred and optional alignments), there are 76 sites listed in these databases; many are closed leaking underground storage tank (LUST) sites or other closed cleanup sites. Eight of these sites are currently active, not fully closed, or closed with land use restrictions, and are summarized in **Table 3.7-1** and discussed in greater detail below. Refer to **Appendix HAZ** for the locations of these sites near Project components. Previous uses that released contaminants include vehicle fueling stations, dry cleaning, a manufactured gas plant, pesticide manufacturing, transformer dismantling and salvaging, and a military base.

Roy Wilson Maintenance Yard

The Roy Wilson Maintenance Yard is located on the west side of College Lake. This vehicle and equipment maintenance and storage yard includes three buildings and adjacent paved areas and is operated by the Santa Cruz County Department of Public Works. The Pajaro Valley Unified School District leases the northern portion of the site as a yard for school buses where buses are parked on-site and fueled using two above ground storage tanks. While three underground storage tanks were removed and surrounding soil excavated in 1995, the site remains active and is being

1 Sites identified as meeting the Cortese List requirements are listed in the Department of Toxic Substances Control EnviroStor database, State Water Resources Control Board (State Water Board) GeoTracker database, State Water Board list of solid waste disposal sites with constituents above hazardous waste levels outside the waste management unit, State Water Board list of active Cease and Desist and Cleanup and Abatement Orders, and DTSC list of hazardous waste facilities subject to corrective action pursuant to California Health and Safety Code Section 25187.5.

TABLE 3.7-1
CORTESE LIST SITES WITHIN ONE-QUARTER MILE OF PROJECT COMPONENTS[a]

Business Name (Figure Number in Appendix HAZ)	Street Address	Latitude, Longitude	Case Type	Status	Status Date	Potential Hazardous Materials on Site
State Water Resources Control Board GeoTracker						
Roy Wilson Maintenance Yard (1)	198 Grimmer Rd, Watsonville	36.944233, -121.753675	LUST Cleanup Site	Open - Verification Monitoring	9/11/2014	Benzene, Diesel, Ethylbenzene, Gasoline, MTBE / TBA / Other Fuel Oxygenates, Naphthalene, Total Petroleum Hydrocarbons
East Lake Dry Cleaners – Former (2)	982 E. Lake Ave, Watsonville	36.923531, -121.745596	Cleanup Program Site	Open - Verification Monitoring	5/22/2018	Perchloroethylene and Trichloroethylene
Former Arco (2)	153 Main St, Watsonville	36.90682, -121.753168	LUST Cleanup Site	Open - Eligible for Closure	7/3/2015	Benzene, Ethylbenzene, Gasoline, MTBE / TBA / Other Fuel Oxygenates, Xylene
Sturdy Oil Card Lock (3)	1110 West Beach Street, Watsonville	36.90189, -121.77272	Cleanup Program Site	Open - Site Assessment	3/3/2016	Diesel
Columbia Pac Alum Corp., Pac Extrusion	1715 West Beach Street, Watsonville	36.896, -121.7788	Tiered Permit	Inactive – Needs Evaluation	8/9/2017	Arsenic, Copper, Nickel
Department of Toxic Substances EnviroStor						
Radcliff Elementary School (2)	Rodriguez Street/West Lake Avenue, Watsonville	36.9105, -121.76037	School Cleanup	Certified	3/21/2005	Lead
California Spray & Chemical (2 & 3)	135 Walker Street, Watsonville	36.905178, -121.758834	Voluntary Cleanup	Certified / Operation & Maintenance	6/20/2002	Manufacturing - Pesticides
Berman Steel (3)	627 Walker St, Watsonville	36.910012, -121.765941	State Response	Certified	5/1/1981	Lead, Polychlorinated Biphenyls, Copper, and Zinc

NOTES:
[a] Includes the optional College Lake pipeline alignments and both WTP site options.

MTBA= Methyl tert-butyl ether
TBA = tertiary butyl alcohol
PG&E = Pacific Gas and Electric

SOURCE: California Water Quality Control Board, Central Coast Region, Staff Report for Regular Meeting of September 10, 2004, Item No. 8, pg 13, prepared on August 17, 2004; Department of Toxic Substances Control, EnviroStor reports for: Radcliff Elementary School, PG&E Watsonville #1, California Spray & Chemical, Berman Steel. Available online at http://www.envirostor.dtsc.ca.gov/public/. Accessed on September 20, 2017; State Water Resources Control Board GeoTracker reports for: Roy Wilson Maintenance Yard, East Lake Dry Cleaners, PG&E – Former Manufactured Gas Plant #1, E. 5th Street Warehouse Property, Former Arco, Pajaro Valley Unified School District, Chevron Station 9-1927, Sturdy Oil Card Lock, Truck Spill. Available online at http://geotracker.waterboards.ca.gov. Accessed on September 19, 2017.

remediated by monitoring natural attenuation.[2] Reports from Geotracker indicate that the elevated soil vapor concentrations are related to elevated chemical concentrations in groundwater. Potential contaminants of concern include benzene, diesel, ethylbenzene, gasoline, naphthalene, total petroleum hydrocarbons, methyl tert-butyl ether (MTBE), tertiary butyl alcohol (TBA), and other fuel oxygenates. This site is not within the proposed water storage area of College Lake, but is within one-quarter mile of it.

East Lake Dry Cleaners - Former

This site contains low levels of perchloroethylene and trichloroethylene in the groundwater from an alleged one-time spill event. The spill released an unknown quantity of dry cleaning solvent during a change in site operation in 1979. There is no threat to human health from inhalation, and although the College Lake pipeline alignment is within one-quarter mile, it does not intersect this site.

Former Arco

This site contains a former Arco Station where three gasoline tanks and one waste oil tank were removed in 1998. Contaminants were detected in soil and samples were collected from beneath the tanks. Pollutants of concern at this site include benzene ethylbenzene, gasoline, xylene, MTBE, TBA, and other fuel oxygenates. The site is undergoing clean up, and no longer requires groundwater monitoring, but does not have closed levels of contamination yet. The College Lake pipeline alignment is within one-quarter mile, but does not intersect this site.

Sturdy Oil Card Lock

A release of diesel to soil was discovered during underground piping removal in 2015. Shortly thereafter, contaminated soils were excavated to a depth of 7.5 feet below ground surface in an area within 30 feet of West Beach Street. The shallow groundwater table is present approximately 4 feet below ground surface in the onsite well nearest West Beach Street, but generally flows away from West Beach Street. While cleanup of the site is not yet complete, the maximum concentrations of residual petroleum hydrocarbons in soil at the site are less than levels protective of utility worker direct contact in the top 10 feet below ground surface. This site is adjacent to and north of the College Lake pipeline alignment along West Beach Street.

Columbia Pac Alum Corp., Pac Extrusion

Groundwater underlying this property contains hazardous materials. Soil at the property was contaminated by aluminum extrusion and anodizing operations conducted by Indalex West, Inc. and other previous operators. These operations resulted in contamination of soil with TPH and metals. Groundwater underlying the site contains concentrations or arsenic and hexavalent chromium in excess of drinking water standards. Water may not be extracted for any use at the property. The College Lake pipeline alignment is adjacent to this site, but does not intersect it.

---

2 The RWQCB determined in 2014 that the site does not yet qualify for closure for multiple reasons including that the site is not located within the area of a public water system, the site groundwater criteria do not meet the class one through four criteria of the Groundwater-Specific Criteria, and the soil vapor concentrations are above Low Threat Closure Policy criteria at two soil vapor monitoring points (SV-4 and SV-7).

Radcliff Elementary School

This approximately 1.4-acre site is occupied by mixed residential/commercial structures surrounded by a residential neighborhood and the existing school. The site has been historically utilized for mixed residential/commercial purposes. The potential contaminant of concern is lead; however, the contaminant removal action was completed on March 21, 2005, and the Department of Toxic Substances Control (DTSC) determined that all appropriate response actions were completed and that no further removal/remedial action was necessary. The College Lake pipeline alignment is within one-quarter mile, but does not intersect this site.

California Spray & Chemical

The California Spray and Chemical Company was formed in 1907 to produce lead arsenate insecticide spray. Manufacturing of the lead arsenate was discontinued at the site in 1929. The site is currently the location of a truck tire repair operation and a road construction and paving supply company. Potential contaminants of concern are arsenic and lead. Land uses, including activities that will disturb the soil, are restricted at the site. A Soil Management Plan and a Health and Safety Plan must be approved by the DTSC prior to excavation of contaminated soils, and the owner must provide the DTSC written notice at least fourteen days prior to any building, filling, grading, mining, or excavating below the ground surface. The College Lake pipeline alignment is within one-quarter mile, but does not intersect this site.

Berman Steel

The Berman Steel site was one of two sites used for transformer dismantling and salvaging. Contaminants found in soils included lead, polychlorinated biphenyls, copper, and zinc. Oil and contaminated soil were removed during site cleanup. Site cleanup was completed and certified in 1981. The College Lake pipeline alignment is within one-quarter mile of, but does not intersect this site.

3.7.1.2 Airports

The Watsonville Municipal Airport, located approximately 2.5 miles from the nearest Project component, is the only municipal airport in Santa Cruz County. It is considered a reliever airport for general aviation from the San Francisco Bay Area. The airport is home to approximately 333 aircraft and accommodates over 55,000 operations per year on four runways.[3] Safety issues associated with the airport operations include noise, ground safety, and flight hazards. To address these issues, the City is implementing the Watsonville Municipal Airport Master Plan, which addresses airport safety and noise abatement.

[3] Watsonville Municipal Airport, About Us, No date. Available online at https://cityofwatsonville.org/320/About-Us. Accessed on May 2, 2018.

3.7.1.3 Wildfire Hazards

Based upon fire hazard mapping by the California Department of Forestry and Fire Protection Forest Resources Assessment Program[4], the Project sites are not located within identified high fire hazard areas, and are in areas classified as Local Responsibility Area Unzoned (that is, fire hazard is not considered very high, high, or moderate in the project areas).[5] Project sites similarly are not within Generalized Critical Fire Hazard Areas mapped by Santa Cruz County.

3.7.1.4 Schools

The following schools are within one-quarter mile of Project components: Ann Soldo Elementary, MacQuiddy Elementary, Mintie White Elementary, Radcliff Elementary, E.A. Hall Middle School, Lakeview Middle School, Watsonville High School, Ceiba College Prep Academy, and Linscott Charter.[6]

3.7.1.5 Emergency Response Plans

The Santa Cruz Operational Area Emergency Management Plan (EMP) addresses the planned response to extraordinary situations associated with large-scale emergency incidents affecting Santa Cruz County.[7] The EMP is reviewed, updated, republished, and redistributed by the Santa Cruz County Office of Emergency Services every four years in order to stay current. The Office of Emergency Services is responsible for ensuring that emergency response personnel can demonstrate and maintain, to the level deemed appropriate, the minimum National Incident Management System standards and Standardized Emergency Management System performance objectives. The EMP also addresses response levels, mutual aid, and federal, state, and local authorities for conducting and/or supporting emergency operations.

---

[4] California Department of Forestry and Fire Protection, *Draft Fire Hazard Severity Zone in LRA, Santa Cruz County*, October 3, 2007.

[5] Wildland fire protection in California is the responsibility of either the State, local, or the federal government. Local responsibility areas include incorporated cities, cultivated agriculture lands, and portions of the desert. Local responsibility area fire protection is typically provided by city fire departments, fire protection districts, counties, and by CAL FIRE under contract to local government. (CAL FIRE, Frequently Asked Questions, Questions About Designation of Very High Fire Hazard Severity Zones in Local Responsibility Areas, 2012. Available online at http://www.fire.ca.gov/fire_prevention/fire_prevention_wildland_faqs#desig01. Accessed on August 3, 2018.)

[6] Other sensitive receptors near Project components, such as daycare centers, are identified in Section 3.5, Air Quality and Greenhouse Gases.

[7] County of Santa Cruz, Office of Emergency Services, *Operational Area Emergency Management Plan (EMP)*, October 2015.

3.7.2 Regulatory Framework

3.7.2.1 Federal

In California, federal regulations pertaining to the use and management of hazardous materials and wastes are largely enforced through state and local regulations. Relevant state and local regulations are discussed below.

3.7.2.2 State

California Fire Code

The California Fire Code, Article 80, includes specific requirements for the safe storage and handling of hazardous materials. These requirements reduce the potential for a release of hazardous materials and for mixing of incompatible chemicals, and specify the following specific design features to reduce the potential for a release of hazardous materials that could affect public health or the environment:

- Separation of incompatible materials with a non-combustible partition, or appropriate distance separation;
- Spill control in all storage, handling, and dispensing areas; and
- Separate secondary containment for each chemical storage system. The secondary containment must hold the entire contents of the tank, plus the volume of water needed to supply the fire suppression system for a period of 20 minutes in the event of a catastrophic spill.

The California Fire Code, Article 79, includes specific requirements for the safe storage and handling of flammable and combustible liquids. Specific requirements address fire protection; prevention and assessment of unauthorized discharges; labeling and signage; protection from sources of ignition; specifications for piping, valving, and fittings; maintenance of aboveground tanks; requirements for storage vessels, vaults, and overfill protection; and requirements for dispensing, using, mixing, and handling of flammable and combustible liquids.

The California Fire Code, Chapter 33, specifies safety requirements to prevent fires during construction and demolition. This chapter specifies precautions that must be taken to protect against fire and procedures for management of flammable and combustible liquids as well as flammable gasses during construction. Requirements for providing a water supply for fire protection, portable fire extinguishers, and a means of egress are also addressed.

Hazardous Materials Release Response Plans and Inventory Act

The Hazardous Materials Release Response Plans and Inventory Act of 1985, codified in Health and Safety Code, Sections 25500 et seq., also known as the Business Plan Act, requires businesses using hazardous materials to prepare a Hazardous Materials Business Plan (HMBP) that describes their facilities, inventories, emergency response plans, and training programs. HMBPs contain basic information on the location, type, quantity, and health risks of hazardous materials stored, used, or disposed. This code and the related regulations in 19 California Code of

Regulations (CCR) Sections 2620 et seq. require local governments to regulate local business storage of hazardous materials in excess of certain quantities. The law also requires that entities storing hazardous materials be prepared to respond to releases. Those using and storing hazardous materials are required to submit a HMBP to their local Certified Unified Program Agency (CUPA) and to report releases to their CUPA and the State Office of Emergency Services. The California Office of Emergency Services is responsible for implementing the accident prevention and emergency response programs established under the Act and implementing regulations. Refer to Unified Hazardous Waste and Hazardous Management Regulatory Program, below, for more information.

The HMBP would apply to the Project because contractors working on the Project that use hazardous materials would be required to comply with requirements for the use, handling, transportation, storage, and disposal of hazardous materials. The HMBP would include a spill response plan.

Unified Hazardous Waste and Hazardous Materials Management Regulatory Program

The Unified Hazardous Waste and Hazardous Materials Management Regulatory Program (Unified Program), codified in Health and Safety Code Sections 25404 et seq., requires the administrative consolidation of six hazardous materials and waste programs under one agency, a CUPA. The following programs are consolidated under the Unified Program:

1. Hazardous Waste Generator and On-Site Hazardous Waste Treatment Programs (a.k.a. Tiered Permitting);
2. Aboveground Petroleum Storage Tanks and SPCCs;
3. Hazardous Materials Release Response Plans and Inventory Program (a.k.a. Hazardous Materials Disclosure or “Community-Right-To-Know”);
4. California Accidental Release Prevention Program;
5. Underground Storage Tank Program; and
6. Uniform Fire Code Plans and Inventory Requirements.

The Unified Program is intended to provide relief to businesses complying with the overlapping and sometimes conflicting requirements of formerly independently managed programs. The Unified Program is implemented at the local government level by CUPAs. Most CUPAs have been established as a function of a local environmental health or fire department. As stated in the 2014 BMP Update PEIR, the County of Santa Cruz Environmental Health Services Department is the designated CUPA and is responsible for enforcing local ordinance and state laws pertaining to use and storage of hazardous materials.

California and Federal Hazardous Waste Criteria

In accordance with Title 22 of CCR Section 66261.20 et seq., excavated soil is classified as a hazardous waste if it exhibits the characteristics of ignitability, corrosivity, reactivity, and/or toxicity. A waste is considered toxic in accordance with CCR 22 Section 66261.24 if it contains:

- Total concentrations of certain substances at concentrations greater than the total threshold limit concentrations;
- Soluble concentrations greater than the soluble threshold limit concentrations (STLCs);
- Soluble concentrations of certain substances greater than federal toxicity regulatory levels using the Toxic Characteristic Leaching Procedure (TCLP); or
- Specified carcinogenic substances at a single or combined concentration of 0.001 percent.

State and federal regulations consider waste to be hazardous if the soluble concentration exceeds the federal regulatory level as determined by the TCLP. Because the TCLP involves a 20-to-1 dilution of the sample, the total concentration of a substance in the soil would need to exceed 20 times the regulatory level for the soluble concentration to exceed the regulatory level in the extract. A waste is also considered hazardous under state regulations if the soluble contaminant concentration exceeds the STLC as determined by the waste extraction test method. Because the waste extraction test analysis is performed using a 10-to-1 dilution of the sample, the total concentration of a substance would need to exceed 10 times the STLC for the soluble concentration to possibly exceed the STLC in the extract. A waste may also be classified as toxic if testing indicates toxicity greater than the specified criteria. Soil that is not classified as a hazardous waste can be accepted at a Class II or Class III designated landfill, depending on the waste acceptance criteria for the specific landfill. This soil may also be reused on-site or sent to a recycling facility for reuse at another site if it is non-hazardous and meets specific criteria. Typically, the concentrations of all chemicals should be less than RWQCB Residential Environmental Screening Levels for unrestricted on-site reuse or off-site recycling.

National Pollutant Discharge Elimination System Construction General Permit

Refer to Section 3.3, Surface Water, Groundwater, and Water Quality, for a description of permitting needs in regard to the National Pollutant Discharge Elimination System General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities (Order 2009-0009-DWQ, National Pollutant Discharge Elimination System No. CAS000002; as amended by Orders 2010-0014-DWQ and 2012-006-DWQ).

Utility Notification Requirements

The regulations in CCR Title 8, Division 1, Chapter 4, Subchapter 4, Section 1541 require excavators to determine the approximate locations of subsurface installations, such as sewer, telephone, fuel, electric, and water lines (or any other subsurface installations that may reasonably be encountered during excavation work) prior to opening an excavation. The California Government Code (Sections 4216 et seq.) requires owners and operators of underground utilities to become members of and participate in a regional notification center. According to Section 4216.1, operators of subsurface installations who are members of, participate in, and share in the costs of a regional notification center, such as USA North 811 are in compliance with this section of the code. USA North 811 receives planned excavation reports from public and private excavators and transmits those reports to all participating members that may have underground facilities at the location of excavation. Members will mark or stake their facilities, provide information, or give clearance to dig. This notification requirement would apply to the Project because of the proposed excavation activities.

Transportation of Hazardous Materials and Wastes

The transport of hazardous materials is regulated by the California Highway Patrol under the California Vehicle Code. Specific requirements related to hazardous materials are specified in CCR Title 13, Division 2, Chapter 6. These regulations specify container types, packaging requirements, and placarding requirements as well as requirements for licensing and training for truck operators and chemical handlers.

Regulatory requirements for the transport of hazardous wastes in California are specified in CCR Title 22, Division 4.5, Chapters 13 and 29. In accordance with these regulations, all hazardous waste transporters must have identification numbers, which are used to identify the hazardous waste handler and to track the waste from its point of origin to its final disposal disposition. This number, issued by either the USEPA or DTSC, depends on whether the waste is classified as hazardous by federal regulations or only under California regulations. Hazardous waste transporters must also comply with the California Vehicle Code, California Highway Patrol regulations (CCR Title 13). A hazardous waste manifest is required for transport of hazardous wastes. The hazardous waste manifest documents the legal transport and disposal of the waste, and is signed by the generator and transporter(s) of the waste as well as the disposal facility. California regulations specify cleanup actions that must be taken by a hazardous waste transporter in the event of a discharge or spill, and for the safe packaging and transport of hazardous wastes.

3.7.2.3 Local

Table 2-10 in Chapter 2, *Project Description*, identifies the approvals from Santa Cruz County or the City of Watsonville required for the Project. **Table 3.7-2** presents pertinent local plans and/or policies regarding hazardous materials to support County and City consideration of project consistency with general policies.[8] In some cases, local policies are used in this EIR as criteria to determine the significance of physical effects on the environment (e.g., Impact NOI-1 in Section 3.8, Noise and Vibration).

[8] California Government Code Section 53091 exempts agencies like PV Water from complying with local building and zoning ordinances when locating or constructing facilities for the production, generation, storage, treatment, or transmission of water. California Government Code Section 65402(c) requires that PV Water notify cities and counties of its plans to construct projects or to acquire or dispose of property. The planning agency then has 40 days to determine project consistency with its general plan. If the planning agency disapproves, the disapproval may be overruled by PV Water.

TABLE 3.7-2
LOCAL PLANS AND POLICIES RELEVANT TO THE PROJECT

Relevant Goals, Objectives, and Policies
CITY OF WATSONVILLE PLANS AND POLICIES
Watsonville General Plan
Goal 9.11: Hazardous Materials. Protect the air, water, soil, and biotic resources from damage by exposure to hazardous materials through aggressive management of hazardous materials.
Policy 9.1: Hazardous Materials. The City shall protect the natural environment through aggressive enforcement and compliance with hazardous materials plans.
SANTA CRUZ COUNTY PLANS AND POLICIES
Santa Cruz County General Plan/Local Coastal Program
Policy 6.6.1: Hazardous Materials Ordinance. Maintain the County's Hazardous Materials ordinance, placing on users of hazardous and toxic materials the obligation to eliminate or minimize the use of such materials wherever possible, and in all cases to minimize the release, emission, or discharge of hazardous materials to the environment, and [to] properly handle all hazardous materials and to disclose their whereabouts. Further, maintain the County's ordinance relating to ozone-depleting compounds. Ensure that any amendment of existing ordinance provisions is based on a finding that the amendments will provide protection to the environment and the community against toxic hazards that is equal to or stronger than the existing provisions.
Santa Cruz County Code
Santa Cruz County Code, Title 7 Health and Safety, Chapter 7.100 Hazardous Materials – Hazardous Waste – Underground Storage Tanks: Chapter 7.1 of the Santa Cruz County Code provides definitions, permit requirements, standards for Hazardous Materials Management Plans, and uses, handling, and storage responsibilities of hazardous materials, hazardous waste, and underground storage tanks. The Health Officer of Santa Cruz County or his/her representative is responsible for enforcing the regulations in this chapter.

SOURCE: City of Watsonville, Watsonville 2005 General Plan, Adopted May 24, 1994; Santa Cruz County, 1994 General Plan and Local Coastal Program for the County of Santa Cruz, California, 1994.

3.7.3 Impacts and Mitigation Measures

3.7.3.1 Significance Criteria

In accordance with the California Environmental Quality Act (CEQA), state CEQA Guidelines (including Appendix G), relevant plans, policies, and/or guidelines, and agency standards, the Project could have a significant impact if it were to:

- Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials;
- Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment;
- Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school;
- Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment;

- For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area;
- Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan; and/or
- Expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires.

Relating to wildfire, the Project could have a significant impact if it were located in or near state responsibility areas or lands classified as very high fire hazard severity zone and it were to:

- Substantially impair an adopted emergency response plan or emergency evacuation plan;
- Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire;
- Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or on going impacts to the environment; and/or
- Expose people of structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes.

The following topics are not analyzed further in this section for the reasons described below:

- ***Safety hazards from public airports.*** The nearest public airport, the Watsonville Municipal Airport, is located over two miles from Project components. Therefore, this criterion is not applicable.
- ***Exposure to wildland fires.*** The Project sites are located in urban and agricultural areas and are not located within a high or very high fire hazard severity zone. Therefore, this criterion is not applicable.
- ***Be located in or near state responsibility areas classified as very high fire hazard severity zone.*** The Project sites are not located within identified high fire hazards areas and are in areas classified as Local Responsibility Area Unzoned. Project sites similarly are not within Generalized Critical Fire Hazard Areas mapped by Santa Cruz County. Therefore, this criterion and related criteria are not applicable.

3.7.3.2 Methodology

As described in Section 3.1, this EIR provides an independent analysis of the Project's potential environmental impacts. **Table 3.7-3** presents mitigation measures from the 2014 BMP Update PEIR adopted by the Board of Directors (Resolution 2014-05) for the purpose of reducing impacts related to hazards and hazardous materials. These adopted mitigation measures are considered part of the College Lake Project and thus are considered prior to any significance determinations. Potential impacts are evaluated in the following section. If warranted, additional mitigation is included and takes the form of (1) modifications to update the mitigation measures presented in Table 3.7-3 to reflect current conditions and site-specific impacts; or (2) new mitigation measures to replace or augment an adopted mitigation measure.

TABLE 3.7-3
2014 BMP UPDATE PEIR MITIGATION MEASURES – HAZARDS AND HAZARDOUS MATERIALS

HM-1: Prior to initiation of earthwork activities, [PV Water] shall perform soil testing on agricultural sites proposed for development and analytically test for pesticide residuals and pesticide-related metals arsenic, lead, and mercury. If contamination is identified in the soil samples above applicable levels, [PV Water] shall prepare a Site Management Plan (SMP) to establish protocols/guidelines for the contractor including: identification of appropriate health and safety measures while working in contaminated areas; soil reuse; handling, and disposal of any contaminated soils; and agency notification requirements. The SMP shall be subject to the review and approval of the appropriate regulatory agency.
HM-2: During the design phase of the proposed pipeline alignment from College Lake to Coastal Distribution System (CDS), [PV Water] shall perform a Phase I Environmental Site Assessment for the alignment to determine the potential for encountering hazardous materials contamination in soils to be excavated and identify appropriate recommendations. Appropriate health and safety measures shall be identified as needed for worker safety, soil handling, and disposal of contaminated soils.
SOURCE: Pajaro Valley Water Management Agency, Resolution No. 2014-05, adopted April 16, 2014.

3.7.3.3 Impacts and Mitigation Measures

Impact HAZ-1: Project construction and operation could result in a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials. (*Less than Significant*)

Construction Impacts

Project construction would require the use of routine hazardous materials such as fuels, lubricants, and solvents for construction vehicles and equipment. Without adequate management, the storage and use of hazardous materials at the Project site and staging areas could result in the accidental release of small quantities of hazardous materials, which could result construction worker exposure, degradation of soils, and/or entrainment in stormwater runoff affecting the downstream environment.

Implementation of adopted Mitigation Measure HM-1 would require the Pajaro Valley Water Management Agency (PV Water) or its contractor to test agricultural soil sites for pesticide residuals and metals prior to initiation of earthwork activities, and to implement a Site Management Plan if soil contamination is above applicable environmental screening levels. As described in Section 3.3, Surface Water, Groundwater, and Water Quality, the Construction General Stormwater Permit requires implementation of a Stormwater Pollution Prevention Plan for projects that disturb one or more acres of land. This plan would include best management practices to minimize the risk of a hazardous materials release during construction activities. The best management practices would include protection measures for the temporary on-site storage of fuel and other hazardous materials used during construction, including requirements for secondary containment and berming to prevent any release from reaching an adjacent waterway or stormwater collection system. All equipment and materials storage would be routinely inspected for leaks, and records would be maintained for documenting compliance with the storage and handling of hazardous materials. As the administering agency, PV Water would review and approve the plans prior to implementation, and would conduct periodic inspections to ensure compliance with the plans.

Regarding transport, the Project would be required to comply with the regulations of the California Highway Patrol related to the transportation of hazardous materials. With compliance of state regulations and implementation of this adopted mitigation measure, this impact would be ***less than significant***.

Operational Impacts

As shown in Table 2-4 in Chapter 2, *Project Description*, operation of the Project would include the use and storage of several chemicals at the WTP, including sodium hypochlorite for disinfection, coagulants or polymers for thickening, high purity oxygen for ozonation, hydrogen peroxide for advanced oxidation and removal of toxicity, and diesel for a standby generator. None of these materials is considered extremely hazardous. These materials would be handled and stored safely in accordance with Article 80 of the California Fire Code.

Compliance with the Hazardous Materials Release Response and Inventory Act, described in Section 3.7.2, would require PV Water to prepare a Hazardous Materials Business Plan that includes a training program for workers on the use, handling, transportation, storage, and disposal of hazardous materials. In addition, transportation of hazardous materials is regulated by the California Highway Patrol and the California Department of Transportation, as discussed in Section 3.7.2, Regulatory Framework, and operational transport of hazardous materials would be subject to these regulations. Therefore, with compliance with applicable hazardous materials regulations, the potential impacts related to the routine use, transport, and disposal of hazardous materials during operation of the Project would be ***less than significant***.

Mitigation: None required.

Impact HAZ-2: Project construction and operation could result in reasonably foreseeable conditions involving the release of hazardous materials to the environment. (*Less than Significant*)

Construction Impacts

The Project would include demolition of the existing weir structure and intake pump station at College Lake. These structures are composed of cement and wood with no painting or lights, and are not likely to contain hazardous building materials. Any universal wastes encountered during demolition would be removed and disposed of in accordance with the established regulatory framework described in Section 3.7.2. Additionally, implementation of adopted Mitigation Measure HM-1 would require PV Water or its contractor to test agricultural soil sites for pesticide residuals and metals prior to initiation of earthwork activities, and to implement a Site Management Plan if soil contamination is above applicable environmental screening levels. With compliance of state regulations and implementation of this adopted mitigation measure, this impact would be ***less than significant***.

Operational Impacts

Operation of the Project would not require the demolition of any structures with asbestos-containing materials or lead-based paint. Removal of any universal wastes would continue to comply with applicable laws and regulations.

As described in Chapter 2, *Project Description*, the operation and maintenance of Project components would require occasional site visits using vehicles that would use fuel and oil. Similar to the use of equipment during construction activities described above, PV Water and its contractors would be required to comply with numerous hazardous materials and stormwater regulations designed to ensure that hazardous materials are transported, used, stored, and disposed of in a safe manner to protect worker safety, to reduce the potential for a release of operations-related fuels or other hazardous materials to affect stormwater and downstream receiving water bodies, and to respond to accidental spills, if any. With compliance with existing regulations, this impact would be ***less than significant***.

Mitigation: None required.

Impact HAZ-3: Project construction and operation could release hazardous emissions or handle acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school. (*Less than Significant*)

Section 15186 of the CEQA Guidelines requires that the environmental document for projects that are located within one-quarter mile of a school address the use of extremely hazardous materials and emission of hazardous air emissions. Hazardous air emissions include the toxic air contaminants that are listed in Title 17 of the California Code of Regulations, Section 93000 (refer to Section 3.5, Air Quality and Greenhouse Gas Emissions). Impacts associated with toxic air contaminant emissions are addressed in Impact AQ-2 in Section 3.5, and are therefore not addressed in this section. Section 3.7.1, Setting, identified schools within one-quarter mile of Project sites. The State of California defines acutely hazardous materials as extremely hazardous materials in Section 25532(i)(2) of the Health and Safety Code. Construction of the Project would use only common hazardous materials such as paints, solvents, cements, adhesives, and petroleum products (such as asphalt, oil, and fuel). None of these materials is considered extremely hazardous. In addition, the Project would not use any extremely hazardous materials during operation. Thus, impacts related to hazardous emissions or the use of extremely hazardous materials within one-quarter mile of a school would be ***less than significant***.

Mitigation: None required.

Impact HAZ-4: The Project could be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5. (*Less than Significant with Mitigation*)

Construction Impacts

None of the Project sites are included on a list of hazardous materials sites compiled by one or more government regulatory agency (refer to figures in Appendix HAZ). However, the College Lake pipeline would be installed within roadways, and would pass through seven Geotracker Sites with a status of "Completed – Case Closed". The College Lake pipeline alignment is also adjacent to one site that has a status of open (Study Oil Card Lock Cleanup Program Site) and one site that has a status of inactive, but needing evaluation (Columbia Pac Alum Corp., Pac Extrusion Tiered Permit). Refer to Section 3.7.1, Setting, for descriptions of these sites.

In accordance with adopted Mitigation Measure HM-1, PV Water will perform soil testing on agricultural sites proposed for development (including pipeline sites). While adopted Mitigation Measure HM-2 would apply to the entire proposed pipeline alignment, because the soil testing required as part of adopted Mitigation Measure HM-1 would apply to agricultural lands along the pipeline route, PV Water shall perform a Phase I Environmental Site Assessment for all other portions of the College Lake pipeline alignment to determine the potential for encountering hazardous materials-contaminated soils to be excavated and identify appropriate recommendations. Revised adopted **Mitigation Measure HM-2** is presented below to clarify this.[9] Given the past land uses and the potential to encounter currently unknown contamination, should hazardous materials-contaminated soils be identified by either the soil testing (Mitigation Measure HM-1) or the Phase I Environmental Site Assessment (Mitigation Measure HM-2), project construction could result in a hazard to the public or the environment, a potentially significant impact. Implementation of a Health and Safety Plan (**Mitigation Measure HAZ-1a**) and a Soil Management Plan (**Mitigation Measure HAZ-1b**)[10] would reduce this impact to a less-than-significant level by implementing appropriate health and safety measures for worker safety, soil handling, and disposal of contaminated soils. Results from soil testing and the Environmental Site Assessment would inform the contents of the Health and Safety Plan and Soil Management Plan.

Additionally, adopted Mitigation Measure AQ-1 would be implemented to minimize impacts from fugitive dust emissions (refer to Section 3.5, Air Quality and Greenhouse Gases for the full text of Mitigation Measure AQ-1). Implementation of adopted Mitigation Measures HM-1, HM-2, and AQ-1, and Mitigation Measures HAZ-1a and HAZ-1b, would reduce impacts associated with encountering potentially contaminated soil or groundwater to less-than-significant levels by controlling contact with and release of these materials into the environment. Methods of control include soil testing (for areas where soil testing has not already occurred), stopping work should these materials be encountered, and use of a qualified contractor to dispose of contaminated

---

9 Text that has been revised in adopted mitigation measures is indicated with underlining where text has been added, and ~~strikethrough~~ where text has been deleted.

10 While adopted Mitigation Measure HM-1 calls for a "Site Management Plan," the typical term for a plan establishing soil management protocols is a "Soil Management Plan." Soil Management Plan is used in Mitigation Measure HAZ-1b.

materials in accordance with regulatory requirements. With implementation of these mitigation measures, this impact would be ***less than significant with mitigation***.

Operation

The Project would raise the existing weir at College Lake from 60.1 to 62.5 feet North American Vertical Datum of 1988 (NAVD88). This would prolong inundation of the lake. As indicated in Section 3.7.1, the Roy Wilson Maintenance Yard is a LUST Cleanup Site located on the west side of College Lake. The elevation of Roy Wilson Maintenance Yard is about 95 feet NAVD88. Groundwater elevations at the active yard monitoring wells have ranged from about 77 to 94 feet NAVD88 from 1995 to 2017. These elevations are all well above the existing and proposed weir elevations.

Shallow groundwater flow directions at the Roy Wilson Maintenance Yard are usually to the west, away from College Lake.[11] Proposed water management operations would not change that flow direction. The increased weir elevation would still be below all recorded groundwater elevations at the maintenance yard. It is anticipated that at most, the change in lake elevations during operation might reduce the frequency of periods during which groundwater flows toward the lake and may even eliminate the occasional eastern flow periods.

Once the construction of the Project components has been completed, there would be no other potential to encounter contaminated soil. Operation of the Project would not result in a significant impact on the public or the environment under reasonably foreseeable conditions. This impact would be ***less than significant***.

Mitigation Measure HM-2 (Revised).

Prior to initiation of earthwork activities on properties along the College Lake pipeline alignment not sampled as part of adopted Mitigation Measure HM-1, ~~During the design phase of the proposed pipeline alignment from College Lake to Coastal Distribution System (CDS), PVWMA~~ PV Water shall perform a Phase I Environmental Site Assessment for the alignment to determine the potential for encountering hazardous materials contamination in soils to be excavated and identify appropriate recommendations. Appropriate health and safety measures shall be identified as needed for worker safety, soil handling, and disposal of contaminated soils.

Mitigation Measure HAZ-1a: Health and Safety Plan (HASP).

Using information from the soil testing performed as part of adopted Mitigation Measure HM-1 and from the Phase I Environmental Site Assessment performed as part of adopted Mitigation Measure HM-2, PV Water shall require the construction contractor(s) to prepare and implement a site-specific HASP in accordance with 29 CFR 1910.120 to protect construction workers and the public during all excavation and grading activities. The HASP shall include, but is not limited to, the following elements:

1. Designation of a trained, experienced site safety and health supervisor who has the responsibility and authority to develop and implement the site HASP;

[11] Geosyntec Consultants, 2017 Annual Groundwater Monitoring Report, Roy Wilson Yard, Watsonville, California, Figure 4, June 13, 2017.

2. A summary of all potential risks to construction workers and maximum exposure limits for all known and reasonably foreseeable site chemicals based on the most recent data collection and reporting;
3. Specified personal protective equipment and decontamination procedures, if needed;
4. Emergency procedures, including route to the nearest hospital; and
5. Procedures to be followed in the event that evidence of potential soil or groundwater contamination (such as soil staining, noxious odors, debris or buried storage containers) is encountered.

These procedures shall be in accordance with hazardous waste operations regulations and specifically include, but are not limited to, the following: immediately stopping work in the vicinity of unknown discovered or suspected hazardous materials release and notifying the Santa Cruz County CUPA (415-473-7085).

Mitigation Measure HAZ-1b: Soil Management Plan (SMP).

Using information from the soil testing performed as part of adopted Mitigation Measure HM-1 and from the Phase I Environmental Site Assessment performed as part of adopted Mitigation Measure HM-2, PV Water or its contractor shall develop and implement an SMP that includes a materials disposal plan specifying how the construction contractor shall remove, handle, transport, and dispose of all excavated material in a safe, appropriate, and lawful manner. The plan shall identify protocols for training workers to recognize potential soil contamination (such as soil staining, noxious odors, debris or buried storage containers), soil testing and disposal by a qualified contractor in the event that contamination is identified, and identification of approved disposal sites (e.g., approved landfill or reuse site). Contract specifications shall mandate approval of the SMP by PV Water as well as full compliance with all applicable local, state, and federal regulations related to the identification, transportation, and disposal of hazardous materials.

Impact HAZ-5: Project construction and operation could impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan. (*Less than Significant with Mitigation*)

Construction Impacts

Project construction would not conflict with the County of Santa Cruz EMP, because the plan does not designate emergency response or evacuation routes, and the Project would not otherwise impair implementation of this plan. However, the Project could have a significant impact on implementation of emergency response or emergency evacuation if construction activities interfered with emergency response vehicle travel or restricted access to critical facilities such as hospitals or fire stations.

As discussed in Section 3.9, Transportation and Traffic, Project construction may require closure of one travel lane and shoulder, with one-way traffic control on two-lane roads, as well as temporary full road closures at Palm and Hushbeck Avenues, which could impede emergency response traffic. However, implementation of Mitigation Measure TRA-1b (Construction Traffic Control/Traffic Management Plan) introduced in Section 3.9, Transportation and Traffic, would require the construction contractor to establish methods for maintaining traffic flow in and along the subject roadway corridor and minimizing disruption to emergency vehicle access to land uses along the alignment. Specific requirements that may be included in the traffic control/traffic management plan regarding emergency access and access to public schools are identified under Mitigation Measure TRA-1b in Impact TRA-1. As a result, implementation of Mitigation Measure TRA-1b would provide adequate access such that Project construction would not interfere with emergency response or evacuation activities and this impact would be reduced to ***less than significant with mitigation***.

Operational Impacts

Upon completion of construction, all roadways would be reopened to through traffic and detours around the site would no longer be needed. Occasional maintenance vehicles would access the WTP, weir structure, lake bed; however, the vehicles would be parked off the streets, no lane closures would be required, and the potential impact related to emergency or evacuation plans would be ***less than significant***.

> **Mitigation Measure TRA-1b: Construction Traffic Control/Traffic Management Plan** (refer to Impact TRA-1 in Section 3.9, Transportation and Traffic)

Cumulative Impacts

Impact C-HAZ-1: The Project, in combination with past, present, and probable future projects in the Project area, would not result in significant adverse cumulative hazards and hazardous materials impacts. (*Less than Significant*)

The geographic scope of analysis for cumulative hazards and hazardous materials impacts encompasses and is limited to the Project sites and their immediately adjacent areas. This is because impacts relative to hazards and hazardous materials are generally site-specific and depend on the nature and extent of the hazards and hazardous materials released, and existing and future soil and groundwater conditions. For example, hazardous materials incidents tend to be limited to a smaller, more localized area surrounding the immediate spill location and extent of the release, and could only be cumulative if two or more hazardous materials releases spatially and temporally overlapped.

A significant cumulative impact related to hazards and hazardous material would occur if the incremental impacts of the project, combined in space and time with that of other projects cumulatively, would to substantially increase risk that people or the environment would be exposed to hazards and hazardous materials. As discussed above, the Project would have no impact with respect to either being within two miles of a public airport or wildland fire hazards. Accordingly, the Project could not contribute to cumulative impacts related to these topics and these topics are not discussed further.

Cumulative Impacts during Project Construction

There are numerous projects in the cumulative scenario near or adjacent to the Project that could be constructed at the same time (refer to Figure 3.1-1 in Section 3.1). Each project would be subject to the same regulatory requirements discussed in Section 3.7.2, Regulatory Framework, including the implementation of health and safety plans and soil and groundwater management plans, as needed. That is, cumulative projects involving releases of or encountering hazardous materials would all be required to remediate their respective sites to established regulatory standards. This would be the case regardless of the number, frequency, or size of the release(s), or the residual amount of chemicals present in the soil from previous spills. Therefore, while it is possible that the project and cumulative projects could result in releases of hazardous materials at the same location and time, the responsible party associated with each spill would be required to remediate site conditions to the same established regulatory standards. The potential residual effects of the project that would remain after compliance with regulatory requirements would not combine with the potential residual effects of cumulative projects to cause a significant cumulative impact because residual impacts would be highly site-specific. Accordingly, no substantial cumulative impact with respect to the use of hazardous materials would result. Compliance with existing regulations would ensure that any cumulative impacts related to exposure to hazardous materials would be ***less than significant***.

As with the Project, cumulative projects could also require temporary lane closures that could interfere with emergency plans or routes, which would be a significant cumulative impact. However, as discussed in Section 3.9, Transportation and Traffic, PV Water's construction contractor would prepare and implement a Construction Traffic Control/Traffic Management Plan that conforms to standards of the relevant local jurisdiction (City of Watsonville or Santa Cruz County). The Construction Traffic Control/Traffic Management Plan would require coordination of construction with emergency service providers, and all roads would be required to remain passable to emergency service vehicles at all times. Implementation of the Construction Traffic Control/Traffic Management Plan would provide adequate access such that project construction, in combination with other construction projects, would not interfere with emergency response or evacuation activities and this cumulative impact would be ***less than significant.***

Cumulative Impacts during Project Operations

During operation, the Project and several projects in the cumulative scenario would require the transport, use, storage, and disposal of chemicals that may be hazardous. All project facilities involving the transport, use, storage, and disposal of hazardous materials would be required to prepare and implement a Hazardous Materials Business Plan and comply with applicable regulations, including those governing containment, site layout, and emergency response and notification procedures in the event of a spill or release. Transportation and disposal of wastes, such as spent cleaning solutions, would also be subject to regulations for the safe handling, transportation, and disposal of chemicals and wastes. Such regulations include standards to which parties responsible for hazardous materials releases must return spill sites, regardless of location, frequency, or size of release, or existing background contaminant concentrations to their original conditions. Compliance with existing regulations regarding hazardous materials transport would reduce the risk of environmental or human exposure to such materials and the cumulative impacts would be ***less than significant***.

Mitigation: None required.

3.8 Noise and Vibration

This section presents an analysis of potential impacts related to noise and vibration that would result from implementation of the proposed College Lake Integrated Resources Management Project (Project). The analysis includes both site options (preferred and optional) for the water treatment plant (WTP) as well as preferred and optional pipeline alignments for the College Lake pipeline. Information from the 2014 Basin Management Plan Update Program Environmental Impact Report that remains relevant and accurate for the purposes of describing the physical or regulatory setting of noise and vibration has been incorporated as appropriate.

3.8.1 Setting

3.8.1.1 Technical Background and Noise Terminology

Noise can be generally defined as unwanted sound. Sound, traveling in the form of waves from a source, exerts a sound pressure level (referred to as sound level) that is measured in decibels (dB), with zero dB corresponding roughly to the threshold of human hearing and 120 to 140 dB corresponding to the threshold of pain.

Sound pressure fluctuations can be measured in units of hertz (Hz), which correspond to the frequency of a particular sound. Typically, sound does not consist of a single frequency, but rather a broad band of frequencies varying in levels of magnitude (sound power). The sound pressure level, therefore, constitutes the additive force exerted by a sound corresponding to the frequency/sound power level spectrum.

The typical human ear is not equally sensitive to all frequencies of the audible sound spectrum. As a result, when assessing potential noise impacts, sound is measured using an electronic filter that de-emphasizes the frequencies below 1,000 Hz and above 5,000 Hz in a manner corresponding to the human ear’s decreased sensitivity to low and extremely high frequencies instead of the frequency mid-range. This method of frequency weighting is referred to as A-weighting and is expressed in units of A-weighted decibels (dBA). Frequency A-weighting follows an international standard methodology of frequency de-emphasis and is typically applied to community noise measurements. Some representative noise sources and their corresponding A-weighted noise levels are shown on **Figure 3.8-1**.

Noise exposure is a measure of noise over a period of time. Noise level is a measure of noise at a given instant in time. Community noise varies continuously over a period of time with respect to the contributing sound sources of the community noise environment. Community noise is primarily the product of many distant noise sources, which constitute a relatively stable background noise exposure, with the individual contributors unidentifiable. The background noise level changes throughout a typical day, but does so gradually, corresponding with the addition and subtraction of distant noise sources such as traffic and atmospheric conditions. What makes community noise constantly variable throughout a day, besides the slowly changing background noise, is the addition of short duration single event noise sources (e.g., aircraft flyovers, motor vehicles, sirens), which are readily identifiable to the individual receptor. These successive additions of sound to the

COMMON OUTDOOR ACTIVITIES	NOISE LEVEL (dBA)	COMMON INDOOR ACTIVITIES
	110	Rock band
Jet flyover at 1,000 feet		
	100	
Gas lawnmower at 3 feet		
	90	
Diesel truck at 50 feet at 50 mph		Food blender at 3 feet
	80	
Noisy urban area, daytime		
Gas lawnmower at 100 feet	70	Garbage disposal at 3 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	60	
		Large business office
Quiet urban daytime	50	Dishwasher in next room
Quiet urban nighttime	40	Theater, large conference room (background)
Quiet suburban nighttime		
	30	Library
Quiet rural nighttime		Bedroom at night, concert hall (background)
	20	
		Broadcast/recording studio
	10	
	0	

SOURCE: Caltrans, 2013a

Figure 3.8-1
Typical Noise Levels

community noise environment vary the community noise level from instant to instant, requiring the measurement of noise exposure over a period of time to legitimately characterize a community noise environment and evaluate cumulative noise impacts.

This time-varying characteristic of environmental noise is described using statistical noise descriptors. The most frequently used noise descriptors are summarized below:

L_{eq}: the energy-equivalent sound level used to describe noise over a specified period of time, typically one hour. The L_{eq} is the constant sound level, which would contain the same acoustic energy as the varying sound level, during the same time period (i.e., the average noise exposure level for the given time period).

L_{max}: the instantaneous maximum noise level for a specified period of time.

L_{dn}: a 24-hour day and night A-weighted noise exposure level, which accounts for the greater sensitivity of most people to nighttime noise by weighting noise levels at night ("penalizing" nighttime noises). Noise between 10:00 p.m. and 7:00 a.m. is weighted (penalized) by adding 10 dB to take into account the greater annoyance of nighttime noises.

As a general rule, in areas where the noise environment is dominated by traffic, the L_{eq} during the peak-hour is generally within one to two decibels of the L_{dn} at that location.[1]

Effects of Noise on People

The effects of noise on people can be placed in three categories:

- Subjective effects of annoyance and dissatisfaction
- Interference with activities such as speech, sleep, and learning
- Physiological effects such as hearing loss or sudden startling

Environmental noise typically produces effects in the first two categories. Workers in industrial plants can experience noise in the last category. Because the effects of noise on people vary from person to person, it is not possible to measure the subjective effects of noise or the corresponding reactions of annoyance and dissatisfaction. A wide variation in individual thresholds of annoyance exists, and different tolerances to noise tend to develop based on an individual's past experiences with noise. Thus, an important way of predicting a human reaction to a new noise environment is the way it compares to the baseline noise condition (typically the existing environment) to which one has adapted: the so-called "ambient noise" level. In general, the more a new noise exceeds the existing ambient noise level, the less acceptable the new noise will be judged by those hearing it. Some examples of human perception of various noise levels are provided in Figure 3.8-1.

1 California Department of Transportation (Caltrans), *Technical Noise Supplement to the Traffic Noise Analysis Protocol*, September 2013.

With regard to increases in A-weighted noise levels, the following relationships occur:

- Under controlled conditions in an acoustics laboratory, the trained healthy human ear is able to discern changes in sound levels of 1 dB.
- Outside of such controlled conditions, the trained ear can detect changes of 2 dB in normal environmental noise.
- It is widely accepted that the average healthy ear, however, can barely perceive noise level changes of 3 dB.
- A change in level of 5 dB is a readily perceptible increase in noise level.
- A 10 dB change is recognized as twice as loud as the original source.[2]

These relationships occur in part because of the logarithmic nature of sound and the decibel system. Because the decibel scale is based on logarithms, two noise sources do not combine in a simple linear fashion, but rather logarithmically. For example, if two identical noise sources produce noise levels of 50 dBA, the combined sound level would be 53 dBA, not 100 dBA.

Noise Attenuation

Stationary point sources of noise, including stationary mobile sources such as idling vehicles, attenuate (lessen) at a rate between 6 dB for hard sites and 7.5 dB for soft sites for each doubling of distance from the reference measurement. Hard sites are those with a reflective surface between the source and the receiver such as parking lots or smooth bodies of water. No excess ground attenuation is assumed for hard sites and the changes in noise levels with distance (drop-off rate) is simply the geometric spreading of the noise from the source. Soft sites have an absorptive ground surface such as soft dirt, grass, or scattered bushes and trees. In addition to geometric spreading, an excess ground attenuation value of 1.5 dB (per doubling distance) is normally assumed for soft sites. Line sources (such as traffic noise from vehicles) attenuate at a rate between 3 dB for hard sites and 4.5 dB for soft sites for each doubling of distance from the reference measurement.[3]

Noise levels may also be reduced by intervening structures, such as a row of buildings, a solid wall, or a berm located between the receptor and the noise source.

Fundamentals of Vibration

As described in the Federal Transit Administration's (FTA's) *Transit Noise and Vibration Impact Assessment*, groundborne vibration can be a serious concern for nearby neighbors, causing buildings to shake and rumbling sounds to be heard.[4] In contrast to airborne noise, groundborne vibration is not a common environmental problem. It is unusual for vibration from sources such as buses and trucks to be perceptible, even in locations close to major roads. Some common sources of groundborne vibration are trains, buses and heavy trucks on rough roads, and construction activities such as blasting, sheet pile-driving, and operation of heavy earth-moving equipment.

---

[2] Ibid.

[3] Ibid.

[4] FTA, *Transit Noise and Vibration Impact Assessment (FTA-VA-90-1003-06)*, September 2018.

There are several different methods that are used to quantify vibration. The peak particle velocity (PPV) is defined as the maximum instantaneous peak of the vibration signal, which is measured in inches per second (in/sec). The PPV is most frequently used to describe vibration impacts on buildings. The root mean square (RMS) amplitude is most frequently used to describe the effect of vibration on the human body. The RMS amplitude is defined as the average of the squared amplitude of the signal. Decibel notation is commonly used to express RMS. The decibel notation acts to compress the range of numbers required to describe vibration. Typically, groundborne vibration generated by man-made activities attenuates rapidly with distance from the source of the vibration. Sensitive receptors for vibration assessment include structures (especially older masonry structures), people who spend a lot of time indoors, and vibration sensitive equipment such as hospital analytical equipment and equipment used in computer chip manufacturing.

The effects of groundborne vibration include movement of the building floors, rattling of windows, shaking of items on shelves or hanging on walls, and rumbling sounds. In extreme cases, the vibration can cause damage to buildings. Building damage is not a factor for most projects, with the occasional exception of blasting and pile-driving during construction. Annoyance from vibration often occurs when the vibration exceeds the threshold of perception by only a small margin.

3.8.1.2 Existing Noise-Sensitive Land Uses

Human response to noise varies considerably from one individual to another. The effects of noise at various levels can include interference with sleep, concentration, and communication, and may cause physiological and psychological stress and hearing loss. Given these effects, some land uses are considered more sensitive to noise levels than others due to the duration and nature of time people spend at these uses. In general, residences are considered most sensitive to noise as people spend extended periods of time in them including the nighttime hours. Therefore, noise impacts on rest and relaxation, sleep, and communication are highest at residential uses. Schools, hotels, hospitals, nursing homes, and recreational uses are also considered to be more sensitive to noise as activities at these land uses involve rest and recovery, relaxation and concentration, and increased noise levels tend to disrupt such activities. Places such as churches, libraries, and cemeteries, where people tend to pray, study, and/or contemplate, are also sensitive to noise but due to the limited time people spend at these uses, noise increase impacts are usually tolerable. Commercial and industrial uses are considered the least noise-sensitive. Below is a description of the location of sensitive receptors near Project sites. In general, the above noise-sensitive uses also apply to vibration impacts on humans.

Weir Structure and Intake Pump Station

The Project would include a weir structure with an adjustable weir, and a diversion and intake pump station facility to divert surface water from College Lake. The location of weir and intake pump station can be found in Figure 2-2 in Chapter 2, *Project Description*. Sensitive receptors near the proposed weir structure and intake pump station consist of the Our Lady Help of Christians church, St. Francis Catholic High School, Lakeview Middle School and single-family residences. The closest sensitive receptor to the proposed weir structure and pump station is Our Lady Help of Christians church, which is located approximately 340 feet east of the proposed weir structure boundary. The nearest residential community is located approximately 710 feet south-west of the proposed intake pump station boundary.

Water Treatment Plant

The Project would include a WTP to remove sediment, filter, and disinfect the diverted surface water. There are two potential locations where the proposed WTP could be constructed, which are identified as the preferred and optional sites. The location of the WTP sites can be found in Figure 2-2. Below is a description of the locations of sensitive receptors relative to each proposed WTP site.

Preferred Water Treatment Plant Site

As shown in Figure 2-2, the preferred WTP site would be located along Holohan Road. Sensitive receptors near the preferred WTP site consist of single-family residences. The closest residences to the preferred WTP site are located 40 feet southeast of the WTP boundary. Other residences located in the vicinity of the preferred WTP site are approximately 630 feet east of the site boundary.

Optional Water Treatment Plant Site

As shown in Figure 2-2, the optional WTP site would be located adjacent to the proposed intake pump station. Sensitive receptors near the optional WTP site consist of the Our Lady Help of Christians church, St. Francis Catholic High School, Lakeview Middle School and single-family residences. The closest sensitive receptors are Our Lady Help of Christians church, which is located approximately 470 feet east of the optional WTP site, and the nearest residential community (the Orchard Park neighborhood) approximately 330 feet south of the site boundary.

College Lake Pipeline

The Project would include an approximately 5.5-mile-long pipeline from the proposed WTP (both the preferred and optional site) to the existing Watsonville Area Water Recycling Facility at the Watsonville Wastewater Treatment Facility. Figures 2-3a through 2-3e show the preferred and optional pipeline alignments which generally follow existing road rights-of-way or traverse agricultural fields. Sensitive receptors along the alignments consist of single and multi-family residences and Watsonville High School. The nearest sensitive receptor to proposed trench and trenchless construction areas is approximately 25 and 35 feet, respectively.

3.8.1.3 Existing Noise Environment

The noise environment surrounding the various Project sites is influenced by vehicular traffic, such as along State Route (SR) 152, Holohan Road, and West Beach Street. Other noise sources in the vicinity of the Project sites include occasional aircraft overflight noise from the Watsonville Municipal Airport, farming activities (e.g., tractors) and residential neighborhood activities.

To quantify the existing ambient noise levels, Environmental Science Associates conducted a noise survey in the vicinity of the Project sites. The noise survey was conducted on April 4, 2018, and consisted of one 24-hour long-term measurement and ten 15-minute short-term noise measurements. **Figure 3.8-2** illustrates the location of the long-term and short-term noise measurement sites. The results of the short-term noise survey are presented in **Table 3.8-1**. The results of the long-term noise measurement survey are shown in **Table 3.8-2**. All long-term noise measurements were conducted using a Larson Davis LxT2 sound level meter and all short-term noise measurements were conducted using a Larson Davis 831 sound level meter. The noise meters were calibrated before and after each noise measurement.

TABLE 3.8-1
15-MINUTE SHORT-TERM AMBIENT NOISE MONITORING RESULTS

Short Term Measurement Site	Start Date & Time	L_{eq} (dBA)	L_{min} (dBA)	L_{max} (dBA)	Primary Noise Source(s)
ST-1 (Our Lady Help of Christians)	4/4/18 11:55 a.m.	57	38	68	Traffic along SR 152, church bells
ST-2 (near intersection of Laken Drive and Holohan Road)	4/4/18 12:16 p.m.	49	40	63	Traffic along Holohan Road
ST-3 (Lakeview Middle School)	4/4/18 12:35 p.m.	58	49	68	Traffic along SR 152
ST-4 (near intersection of SR 152 and Coleman Avenue)	4/4/18 12:59 p.m.	60	44	70	Traffic along SR 152
ST-5 (near intersection of California Street and Tuttle Avenue)	4/4/18 1:20 p.m.	59	38	76	Traffic along California Street and Tuttle Avenue
ST-6 (near intersection of SR 152 and Hushbeck Avenue)	4/4/18 1:40 p.m.	60	42	76	Traffic along SR 152 and Hushbeck Avenue
ST-7 (near intersection of SR 152 and Lincoln Street)	4/4/18 2:03 p.m.	63	44	74	Traffic along SR 152 and Lincoln Street
ST-8 (near intersection of 2nd Street and Menker Street)	4/4/18 2:28 p.m.	58	48	71	Traffic along 2nd Street
ST-9 (near Watson Street and Pine Street)	4/4/18 2:49 p.m.	54	46	67	Traffic along Pine Street
ST-10 (along West Beach Street, east of SR 1)	4/4/18 3:08 p.m.	69	53	82	Traffic along West Beach Street

SOURCE: ESA, 2018 Ambient Noise Survey for the College Lake Integrated Resources Management Project, April 4, 2018.

TABLE 3.8-2
24-HOUR LONG-TERM AMBIENT NOISE MONITORING RESULTS

Long Term Measurement Site	L_{dn} (dBA)	L_{min} (dBA)	L_{max} (dBA)	Assumed Primary Noise Source(s)
LT-1(along Holohan Road, east of the intersection of SR 152 and Holohan Road)	66	28	87	Traffic along Holohan Road

NOTES: Measurements started April 4, 2018 and concluded April 5, 2018, over a 24-hour period.

SOURCE: ESA, 2018 Ambient Noise Survey for the College Lake Integrated Resources Management Project, April 4, 2018.

SOURCE: ESA, 2016

College Lake Integrated Resources Management Project

Figure 3.8-2
Noise Measurement Locations

ESA

3.8.2 Regulatory Framework

3.8.2.1 Federal

Federal regulations establish noise limits for medium and heavy trucks (more than 4.5 tons, gross vehicle weight rating) under 40 Code of Federal Regulations, Part 205, Subpart B. The federal truck pass-by noise standard is 80 dBA at 15 meters (approximately 50 feet) from the vehicle pathway centerline. These controls are implemented through regulatory requirements on truck manufacturers.

3.8.2.2 State

The State of California establishes noise limits for vehicles licensed to operate on public roads. For heavy trucks, the State pass-by standard is consistent with the federal limit of 80 dBA at approximately 50 feet from the centerline. The State pass-by standard for light trucks and passenger cars (less than 4.5 tons, gross vehicle rating) is also 80 dBA at approximately 50 feet from the centerline. These standards are implemented through controls on vehicle manufacturers and by legal sanction of vehicle operators by State and local law enforcement officials.

3.8.2.3 Local

Table 2-10 in Chapter 2, *Project Description*, identifies the approvals from Santa Cruz County and/or the City of Watsonville required for the Project. **Table 3.8-3** presents pertinent local plans and policies regarding noise to support County and City consideration of project consistency with general policies.[5] In some cases, local policies are used in this EIR as criteria to determine the significance of physical effects on the environment (e.g., Impact NOI-1, below).

3.8.3 Impacts and Mitigation Measures

3.8.3.1 Significance Criteria

In accordance with the California Environmental Quality Act (CEQA), state CEQA *Guidelines* (including Appendix G), relevant plans, policies, and/or guidelines, and agency standards, the Project could have a significant impact if it were to:

- Generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
- Generate excessive groundborne vibration or groundborne noise levels; and/or
- For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels.

5 California Government Code Section 53091 exempts agencies like PV Water from complying with local building and zoning ordinances when locating or constructing facilities for the production, generation, storage, treatment, or transmission of water. California Government Code Section 65402(c) requires that PV Water notify cities and counties of its plans to construct projects or to acquire or dispose of property. The planning agency then has 40 days to determine project consistency with its general plan. If the planning agency disapproves, the disapproval may be overruled by PV Water.

TABLE 3.8-3
LOCAL PLANS AND POLICIES RELEVANT TO THE PROJECT

CITY OF WATSONVILLE PLANS AND POLICIES
Watsonville 2005 General Plan
Policy 12.M: Noise. The City shall utilize land use regulations and enforcement to ensure that noise levels in developed areas are kept at acceptable levels, and that future noise-sensitive land uses are protected from noise that is harmful.
Implementation Measure 12.M.1: Traffic Noise. The City shall enforce provisions of the California Vehicle Code and local ordinances to reduce vehicular noise intrusion in residential areas and near other noise sensitive land uses such as schools and hospitals.
Implementation Measure 12.M.2: Truck Routes. The City shall continue efforts to designate truck routes that bypass residential areas and other noise sensitive areas.
Implementation Measure 12.M.3: Equipment Maintenance. The City shall maintain all vehicles and mechanical equipment in peak operating condition and correctly fitted with noise control devices.
Watsonville Municipal Code
Chapter 5-8.02(a). The using, operating, or permitting to be played, used, or operated of any radio receiving set, musical instrument, phonograph, stereo, television, or other machine or device for producing or reproducing sound in such a manner as to disturb the peace, quiet, and comfort of neighboring residential inhabitants at any time with volume louder than is necessary for convenient hearing for the persons who are in the room, vehicle, or chamber in which such machine or device is operating and who are voluntary listeners thereto. The operation of any such set, instrument, phonograph, stereo, machine, or device between the hours of 10:00 p.m. and 7:00 a.m. in such a manner as to be plainly audible at a distance of fifty (50') feet from the residential building, structure, or vehicle in which it is located shall be prima facie evidence of a violation of this chapter.
SANTA CRUZ COUNTY PLANS AND POLICIES
Santa Cruz County General Plan/Local Coastal Program
Policy 6.9.1: Commercial and Industrial Development. For all new commercial and industrial developments which would increase noise levels above the maximum allowable standards of the Land Use Guidelines on Figure 6-1 [presented below as **Figure 3.8-3**], or Figure 6-2 [presented below as **Table 3.8-4**], the best available control technologies will be used to minimize noise levels. In no case shall the noise levels exceed the standard of Figure 6-2 [presented below as Table 3.8-4].
Policy 6.9.7: Construction Noise. Require mitigation of construction noise as a condition of future project approvals. The County of Santa Cruz General Plan does not specify when construction mitigation measures would be required.
Santa Cruz County Code
Section 8.30.010(C). The following factors shall be considered when determining whether a violation of the provisions of this section exists: (1) Loudness (Intensity) of the Sound a. Day and Evening Hours. For the purpose of this factor, a noise shall be automatically considered offensive[a] if it occurs between the hours of 8:00 a.m. and 10:00 p.m. and it is: i. Clearly discernible at a distance of 150 feet from the property line of the property from which it is broadcast; or ii. In excess of 75 decibels at the edge of the property line of the property from which the sound is broadcast, as registered on a sound measuring instrument meeting the American National Standard Institute's Standard S1.4-1971 (or more recent revision thereof) for Type 1 or Type 2 sound level meters, or an instrument which provides equivalent data. For this analysis, it is assumed that the County's daytime construction exterior noise standard is an hourly L_{eq} (i.e., 75 dBA L_{eq}). b. Night Hours. For purposes of this factor, a noise shall be automatically considered offensive if it occurs between the hours of 10:00 p.m. and 8:00 a.m. and it is: i. Made within 100 feet of any building or place regularly used for sleeping purposes; or ii. Clearly discernible at a distance of 100 feet from the property line of the property from which it is broadcast; or iii. In excess of 60 decibels at the edge of the property line of the property from which the sound is broadcast, as registered on a sound measuring instrument meeting the American National Standard Institute's Standard S1.4-1971 (or more recent revision thereof) for Type 1 or Type 2 sound level meters, or an instrument which provides equivalent data. For this analysis, it is assumed that the County's nighttime construction exterior noise standard is an hourly L_{eq} (i.e., 60 dBA L_{eq}).

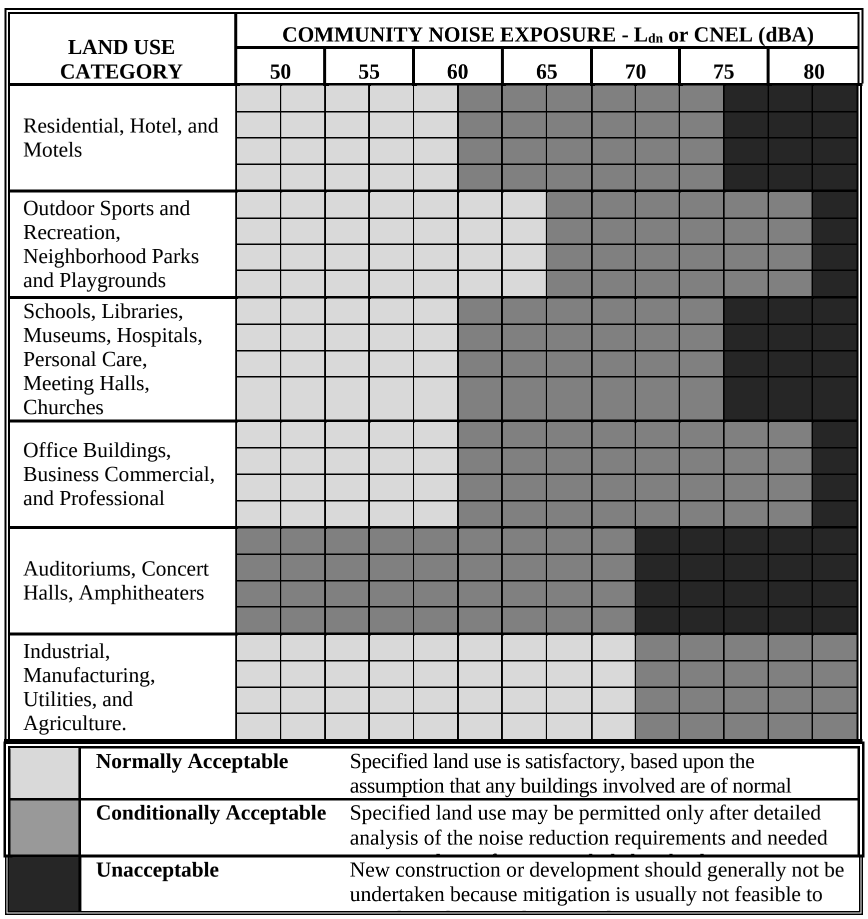
NOTES:
[a] "Offensive noise" means any noise which is loud, boisterous, irritating, penetrating, or unusual, or that is unreasonably distracting in any other manner such that it is likely to disturb people of ordinary sensitivities in the vicinity of such noise, and includes, but is not limited to, noise made by an individual alone or by a group of people engaged in any business, activity, meeting, gathering, game, dance, or amusement, or by any appliance, contrivance, device, tool, structure, construction, vehicle, ride, machine, implement, or instrument.

TABLE 3.8-4
COUNTY OF SANTA CRUZ
MAXIMUM ALLOWABLE NOISE EXPOSURE STATIONARY NOISE SOURCES[a]

Category	Daytime[e] (7:00 a.m. to 10:00 p.m.)	Nighttime[b,e] (10:00 p.m. to 7:00 a.m.)
Hourly L_{eq} - average hourly noise level dBA[c]	50	45
Maximum level, dBA[c]	70	65
Maximum Level dBA - Impulsive Noise[d]	65	60

NOTES:
a As determined at the property line of the receiving land use. When determined the effectiveness of noise mitigation measures, the standards may be applied on the receptor side of the noise barriers or other property line noise mitigation measures.
b Applies only where the receiving land use operates or is occupied during nighttime hours.
c Sound level measurements shall be made with “slow” meter response.
d Sound level measurements shall be made with “fast” meter response.
e Allowable levels shall be raised to the ambient noise levels where the ambient hourly L_{eq} is at least 10 dB lower than the allowable level. The definition of daytime and nighttime hours are different between the County of Santa Cruz’s General Plan and municipal code.

SOURCE: County of Santa Cruz, *Chapter 6: Public Safety and Noise of the County of Santa Cruz General Plan*, May 24, 1994.



SOURCE: County of Santa Cruz, Chapter 6: Public Safety and Noise of the County of Santa Cruz General Plan. May 24, 1994.

Figure 3.8-3
Land Use Compatibility for Community Noise Environment

The following topics are not analyzed further in this section for the reasons described below:

- ***Exposure of people to excess noise due to proximity to an airport land use plan or private airstrip.*** The Project sites would not result in the placement of workers in areas where they would be exposed to excessive noise levels associated with airports or airstrips. The nearest airport is the Watsonville Municipal Airport, approximately two miles to the west. The year 2020 noise contours for the Airport Master Plan indicates that the lowest (55 dBA) noise contour does not extend into the project area.[6] Therefore, the Project would have no impact related to this criterion and this issue is not discussed further below.
- ***Exposure of persons to, or generation of, excessive groundborne vibration or groundborne noise during project operations.*** Project operations and routine maintenance would not expose people to, or generate, groundborne vibration. Groundborne noise occurs when vibrations transmitted through the ground result in secondary radiation of noise. Groundborne noise is generally associated with underground railway operations and with construction activities such as blasting, neither of which would result from implementation of the Project. Operation of the Project would not involve equipment that would produce groundborne vibration. Therefore, the Project would have no impact related to this criterion and this issue is not discussed further below.

3.8.3.2 Methodology

As described in Section 3.1, this EIR provides an independent analysis of the Project's potential environmental impacts. Potential impacts associated with the Project are identified below. The analysis included in this section was developed based on data collected in the vicinity of Project sites, as well as information provided in the *County of Santa Cruz General Plan* and *City of Watsonville 2005 General Plan*, local noise ordinances and the Federal Highway Administration (FHWA) *Road Construction Noise Model*, and the FTA's *Transit Noise and Vibration Impact Assessment*.[7]

Noise

Analysis of the Project's temporary construction noise effects is based on estimates of construction equipment units and duration of use provided by Carollo Engineers. The analyses accounted for attenuation of noise levels due to distances between the location where construction activity would occur and the nearest sensitive land uses. Construction noise levels at nearby sensitive land uses were estimated using the FHWA's *Roadway Construction Noise Model* and compared to local noise standards.[8]

Neither the County of Santa Cruz nor City of Watsonville have applicable local policies or standards to quantitatively assess the significance of short-term increases in noise levels from construction activities over existing conditions. For the purpose of assessing short-term construction noise, residences exposed to noise levels during construction that exceeds 75 dBA

[6] Watsonville Municipal Airport, *Watsonville Municipal Airport Master Plan 2001-2010*, Exhibit 12, June 24, 2003.
[7] FTA, Transit Noise and Vibration Impact Assessment (FTA-VA-90-1003-06), September 2018.
[8] FHWA, *FHWA Roadway Construction Noise Model User's Guide*, January 2006.

L_{eq} during the daytime and 60 dBA L_{eq} during the nighttime hours would be considered to provoke an adverse community reaction at residential land uses.[9]

The primary noise source during Project operation would be the onsite pumps and air compressors at the proposed weir, pump station, and WTP. Noise generated by these stationary sources was calculated using reference noise levels and conceptual site plans provided by Carollo Engineers.[10] Operational noise levels associated with each of the proposed pumps and air compressors were attenuated to the nearest sensitive receptor locations and compared to local noise standards.

Vibration

For the purposes of assessing potential vibration impacts on nearby sensitive land uses, the methodology described in the California Department of Transportation's (Caltrans') *Transportation and Construction Vibration Guidance Manual* was used.[11] For adverse human reaction, the analysis applies the "severe" threshold of 0.4 in/sec PPV for continuous/frequent sources. For risk of architectural damage to historic buildings and structures, this analysis applies a threshold of 0.25 in/sec PPV. A threshold of 0.5 in/sec PPV is used to assess risk of damage for all other building types.[12]

3.8.3.3 Impacts and Mitigation Measures

Impact NOI-1: Construction of the Project would result in a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project in excess of standards established in the local general plans or noise ordinances. (*Significant and Unavoidable with Mitigation*)

The Project would involve the construction of a new weir structure and intake pump station, WTP and a 5.5-mile-long pipeline connecting the proposed WTP to the existing Watsonville Wastewater Treatment Facility. Figures 2-1 through 2-3e and Figures 2-10, 2-14, and 2-16 in Chapter 2, *Project Description*, show the location and layout of Project components. The Project components would be built over approximately 18 months, with construction beginning in 2022 and ending in 2023 (refer to Table 2-5 in Chapter 2, *Project Description*).[13] The majority of construction activities would occur during normal working hours; from 8:00 a.m. to 5:00 p.m., Monday through Saturday. However, trenchless pipeline construction could require 24 hours per day to accommodate horizontal directional drilling or jack-and-bore construction methods.

[9] Adverse community reaction is defined as the interference with the average person's speech, sleep and desire for a tranquil environment.

[10] Carollo Engineers, Civil Site Plans for Preferred WTP Site and Optional WTP Site, November 2018.

[11] Caltrans, *Transportation and Construction Vibration Guidance Manual*, September 2013.

[12] Ibid.

[13] Schedule based on construction of grading and surcharging fill pad for the preferred WTP site. The duration of surcharging for the optional WTP site would be increased by 12 to 18 months to allow for consolidation of fill pad at that site. There would be no construction activity at the site during consolidation. The remainder of the construction phase durations for the WTP would be the same for both site options.

The majority of off-road equipment and vehicle usage would be associated with the intensive earthwork and the structural phases of construction. Large construction equipment such as drill rigs, backhoes, compactors, cranes, excavators, haul trucks, and pavers would be used during all construction and demolition phases of the Project. **Table 3.8-5** shows typical noise levels produced by the types of off-road equipment that would be used during construction of the weir and intake pump station, WTP and College Lake pipeline.

The operation of each piece of equipment within the Project construction areas would not be constant throughout the day, as equipment would be turned off when not in use. Over a typical workday, the equipment would be operating at different locations and all the equipment would not operate concurrently at the same location of the Project construction area. To quantify construction-related noise exposure that would occur at the nearest sensitive receptors, it was assumed that the two loudest pieces of construction equipment would operate at the closest location of the Project sites to the nearest off-site sensitive receptors. **Table 3.8-6** presents the highest L_{max} and L_{eq} noise levels to which sensitive receptors could be exposed at each of the construction sites.

A summary of impact by Project component is provided below.

Weir Structure and Intake Pump Station

The construction activities associated with the proposed weir structure and intake pump station would occur within unincorporated Santa Cruz County. Construction activities at the Project site would occur between 7:00 a.m. to 7:00 p.m. seven days per week, within the daytime and nighttime hours identified in Section 8.30.010(C) of the County of Santa Cruz noise ordinance (see Table 3.8-3). Sensitive receptors exposed to a noise level of 75 dBA L_{eq} during the daytime or 60 dBA L_{eq} during the nighttime hours would exceed the County's noise ordinance standard.

Construction of the weir structure and intake pump station would begin in 2022 and occur over approximately 16 months excluding pre-commissioning, and taking into account a break between November and May when the site would be winterized and no construction would occur within the Salsipuedes Creek channel (refer to Table 2-5). Construction would involve dewatering; grading and excavation; pile driving; erecting concrete structures; installing piping, pumps, electrical and mechanical equipment; testing and commissioning facilities; and finish work such as erecting enclosures, painting, flooring, doors, windows, paving, landscaping, and fencing. Table 3.8-5 lists the equipment that would be used during construction.

The sensitive receptor nearest to the weir structure and intake pump station is the Our Lady Help of Christians church located approximately 340 feet east of the proposed weir structure boundary. The Our Lady Help of Christians church currently has a 7:00 a.m. mass Monday through Friday. The two loudest pieces of off-road equipment that would operate at the site during construction are an impact pile driver and excavator (see Table 3.8-5). As shown in Table 3.8-6, people worshiping at the Our Lady Help of Christians church would be exposed to L_{max} and L_{eq} construction noise levels of 74 dBA and 68 dBA, respectively, the latter of which would exceed the County of Santa Cruz's nighttime noise standard. Therefore, there would be a significant impact with respect to exposure of sensitive land uses to noise levels in excess of standards found in the local noise ordinance.

TABLE 3.8-5
REFERENCE CONSTRUCTION EQUIPMENT NOISE LEVELS (50 FEET FROM SOURCE)

Type of Equipment	L_{max}, dBA	Hourly L_{eq}, dBA/Percent Used[a]
Weir Structure and Intake Pump Station		
Excavator	85	81/40
Backhoe	80	76/40
Fork Lift	85	81/40
Impact Pile Driver	95	88/20
Crane	85	77/16
Pumps	77	74/50
Generator	82	79/50
Air Compressor	80	76/40
Water Treatment Plant		
Excavator	85	81/40
Dozers	85	81/41
Scrapers	85	81/40
Skip Loader	80	76/40
Backhoe	80	76/40
Fork Lift	85	81/40
Crane	85	77/16
Scissor Lift	85	81/40
Pumps	77	74/50
Air Compressor	80	76/40
Generator	82	79/50
Paver	85	82/50
College Lake Pipeline – Trench Pipeline Installation		
Excavator	85	81/40
Skip Loader	80	76/40
Backhoe	80	76/40
Fork Lift	85	81/40
Plate Compactor	80	73/20
Pumps	77	74/50
Air Compressor	80	76/40
Generator	82	79/50
Concrete Saw	90	83/20
Paver	85	82/50
Sweepers	80	70/10
College Lake Pipeline – Trenchless Pipeline Installation		
Pumps	77	74/50
Drill Rig	85	78/20
Vibratory Pile Driver	95	88/20
Crane	85	77/16
Backhoe	80	76/40

NOTES:
[a] "Percent used" were obtained from the FHWA Roadway Construction Noise Model User's Guide.

SOURCE: FHWA, *FHWA Roadway Construction Noise Model User's Guide*, January 2006.

TABLE 3.8-6
SUMMARY OF ESTIMATED NOISE LEVELS AT SENSITIVE RECEPTORS DURING PROJECT CONSTRUCTION

Project Component	Loudest two Pieces of Construction Equipment	Equipment Combined Noise Level at 50 feet (dBA L_{max}/ dBA L_{eq})[a]	Distance to nearest Sensitive Receptor (feet)	Attenuated Noise Level (dBA L_{max}/ dBA L_{eq})[b]
Facilities and Open Trench Pipeline Installation				
Weir Structure and Intake Pump Station	Impact Pile Driver, Excavator	95/89	340	74/68
Preferred Water Treatment Plant Site	Excavator, Dozer	88/84	40	90/86
Optional Water Treatment Plant Site	Excavator, Dozer	88/84	330	68/64
College Lake Pipeline	Concrete Saw, Excavator	91/86	25	99/94
Trenchless Pipeline Installation				
Corralitos Creek Crossing	Crane, Vibratory Pile Driver	95/88	460	71/64
	Drill Rig	85/78	460	61/54
SR 152 Crossing	Crane, Vibratory Pile Driver	95/88	35	99/92
	Drill Rig	85/78	35	89/82
Walker Street Crossing	Crane, Vibratory Pile Driver	95/88	100	87/80
	Drill Rig	85/78	100	77/70
SR 129 Crossing	Crane, Vibratory Pile Driver	95/88	670	67/60
	Drill Rig	85/78	670	57/50
SR 1 Crossing	Crane, Vibratory Pile Driver	95/88	1,150	61/54
	Drill Rig	85/78	1,150	51/44

NOTES:
[a] Reference construction equipment noise levels were obtained from Caltrans' *Roadway Construction Noise Level Model* (RCNM) (FHWA, 2006).
[b] Assumed an attenuation rate of 7.5 dB per doubling of distance (i.e., soft site).

SOURCE: FHWA, *FHWA Roadway Construction Noise Model User's Guide*, January 2006.

Implementation of **Mitigation Measure NOI-1a** would reduce construction noise exposure at the Our Lady Help of Christians church by requiring Pajaro Valley Water Management Agency (PV Water) to implement a Construction Noise Reduction Plan and restricting onsite impact pile driving activities to within the daytime hours as identified in the County of Santa Cruz noise ordinance. Implementation of Mitigation Measure NOI-1a is expected to attenuate construction noise levels by at least 5 dB. After implementation of all the measures identified in the Construction Noise Reduction Plan, the people worshiping at the church during morning mass would be expected to be exposed to a noise level of 58 dBA L_{eq} (assuming simultaneous operation of an excavator and forklift) during onsite construction activities, which would not exceed the County's nighttime construction noise standard. Therefore, this impact would be ***less than significant impact after mitigation***.

Water Treatment Plant

The construction activities associated with the WTP would occur within unincorporated Santa Cruz County. Construction activities at the WTP would occur between 8:00 a.m. to 5:00 p.m., within the daytime hours identified in Section 8.30.010(C) of the County of Santa Cruz noise ordinance (see Table 3.8-3). Sensitive receptors exposed to a noise level of 75 dBA L_{eq} would exceed the County's noise ordinance standard. Construction of the WTP would begin in 2022 and occur over approximately 16 months for the preferred WTP site (refer to Table 2-5).[14] Construction would involve grading and excavation; erecting concrete structures; installing piping, pumps, electrical and mechanical equipment; testing and commissioning facilities; and finish work such as erecting enclosures, painting, flooring, doors, windows, paving, landscaping, and fencing. Table 3.8-5 lists the equipment that would be used during construction. A summary of impacts for the preferred and optional WTP sites is provided below.

Preferred Water Treatment Plant Site

The closest sensitive receptor to the preferred WTP site is a single-family residence located approximately 40 feet southeast of the WTP boundary. As shown in Table 3.8-6, the nearest residences to the WTP boundary would be exposed to L_{max} and L_{eq} construction noise levels of 90 dBA and 86 dBA, respectively, which would exceed the County of Santa Cruz's daytime noise standard of 75 dBA L_{eq}. Therefore, there would be a significant impact with respect to exposure of sensitive receptors to noise levels in excess of standards found in the local noise ordinance.

Implementation of Mitigation Measures NOI-1a would reduce construction noise exposure at the residence near the preferred WTP site by requiring PV Water to implement a Construction Noise Reduction Plan. Implementation of Mitigation Measure NOI-1a is expected to attenuate construction noise levels by at least 5 dB by requiring PV Water to provide nearby residences with a noise complaint hotline, install intake and exhaust mufflers on construction equipment, restrict the use the impact tools, and use temporary noise barriers. After implementation of all the measures identified in the Construction Noise Reduction Plan, the nearest sensitive receptor to the preferred WTP site would be expected to be exposed to a noise level of 82 dBA L_{eq} during daytime onsite construction activities, which would still exceed the County's construction noise standard. Therefore, this impact would remain ***significant and unavoidable with mitigation***.

Optional Water Treatment Plant Site

The closest sensitive receptors to the optional WTP site consists of residences within the Orchard Park neighborhood located approximately 330 feet south of the optional WTP site boundary. As shown in Table 3.8-6, the residences within the Orchard Park Neighborhood would be exposed to L_{max} and L_{eq} construction noise levels of 68 dBA and 64 dBA, respectively, which would not exceed the County of Santa Cruz's daytime noise standard. Therefore, with respect to exposure of sensitive receptors to noise levels in excess of standards found in the local noise ordinance, this impact would be ***less than significant***.

[14] Schedule based on construction of grading and surcharging fill pad for the preferred WTP site. The duration of surcharging for the optional WTP site would be increased by 12 to 18 months to allow for consolidation of fill pad at that site. There would be no construction activity at the site during consolidation. The remainder of the construction phase durations for the WTP would be the same for both site options.

College Lake Pipeline - Trench Pipeline Installation

The majority of the pipeline segments would be installed in existing roadways and farm land using conventional open-trench construction techniques. As shown on Figure 2-3a through Figure 2-3e, the pipeline alignments would transverse unincorporated Santa Cruz County and the City of Watsonville. As described in Table 3.8-3, the City of Watsonville noise ordinance has a time-of-day restriction for machines or devices (i.e., construction). Open trench pipeline construction is not proposed to occur outside of the allowed hours specified in the City of Watsonville noise ordinance, and therefore would not conflict with the City of Watsonville noise ordinance. Open trench pipeline construction would occur within the daytime hours identified in the Santa Cruz County noise ordinance.

For this analysis, off-road equipment used during pipeline construction is assumed to operate as close as 25 feet from the nearest sensitive receptor. Table 2-5 (in Chapter 2, *Project* Description) lists construction equipment that would be used during open-trench pipeline construction. As shown in Table 3.8-6, the sensitive receptors adjacent to the pipeline alignment would be exposed to noise levels of 99 dBA L_{max} and 94 dBA L_{eq} during open-trench construction activities. While pipeline installation would be expected to proceed at a rate of approximately 100 feet per day, limiting sensitive receptor exposure to a few days, the impact would, nevertheless, be significant with respect to exposure of persons to, or generation of, noise levels in excess of local standards.

Implementation of Mitigation Measure NOI-1a would reduce construction noise levels at nearby sensitive receptors through implementation of a Construction Noise Reduction Plan. However, due to the proximity of Project construction areas to nearby sensitive receptors, construction noise reduction measures implemented under the Construction Noise Reduction Plan are unlikely to reduce construction noise from all equipment to below the County of Santa Cruz noise standard of 75 dBA L_{eq}. Therefore, this impact would remain ***significant and unavoidable with mitigation*** for open-trench pipeline construction.

College Lake Pipeline - Trenchless Pipeline Installation

Horizontal directional drilling, jack and bore, and sheet pile driving could be required during the construction of the College Lake pipeline. A vibratory pile driver would be used to install sheet piles at the boring pits and would only be used during the daytime hours. Horizontal directional drilling (described in Section 2.6.6 in Chapter 2, *Project Description*) is a tunneling construction method, that consists of a surface-mounted drill rig with tracking and steering capabilities. This method of tunneling requires continuous excavation. Consequently, pipeline construction at the locations circled on Figures 2-3a through 2-3e could occur for up to 24 hours per day and (for longer tunneling) several days in a row. Since the vibratory pile driver would be used during the construction of the boring pits, vibratory pile driving and horizontal directional drilling would not occur at the same time. A summary of impacts for proposed horizontal directional drilling are provided below.

Corralitos Creek Crossing

Horizontal directional drilling and vibratory pile driving at the Corralitos Creek Crossing would occur within unincorporated Santa Cruz County. For this analysis, noise generated during the operation of one vibratory pile driver and one crane is compared to the County's daytime noise standard of 75 dBA L_{eq} as both pieces of equipment would be operating during that time. Since horizontal directional drilling would occur 24-hours a day, the noise generated by the horizontal direction drill, operating by itself, is compared to the County's nighttime noise standard of 60 dBA L_{eq}.

There are single family residences located approximately 460 feet to the north of where horizontal directional drilling would occur during the crossing of Corralitos Creek. As shown in Table 3.8-6, these sensitive receptors would be exposed to daytime noise levels of approximately 71 dBA L_{max} and 64 dBA L_{eq} and nighttime noise levels of 61 dBA L_{max} and 54 dBA L_{eq} during Project construction. Since construction activities would not exceed the County's daytime or nighttime noise standards, impacts with respect to exposure of sensitive to noise levels in excess of standards found in the local noise ordinance would be ***less than significant***.

State Route 152 and Walker Street Crossing

Horizontal directional drilling nearing SR 152 and Walker Street would occur entirely within the City of Watsonville. As described in Table 3.8-3, the City of Watsonville noise ordinance has a time-of-day restriction for machines or devices (i.e., construction). Since horizontal directional drilling would occur outside of the allowed hours specified in the City of Watsonville noise ordinance, horizontal directional drilling near SR 152 and Walker Street would conflict with the City of Watsonville noise ordinance. Therefore, there would be a significant impact with respect to exposure of sensitive to noise levels in excess of standards found in the local noise ordinance.

Implementation of **Mitigation Measure NOI-1b** would require PV Water to provide temporary hotel accommodations for all residents who would like it within 200 feet of where nighttime drilling activities would occur, which is the approximate noise contour distance to the Santa Cruz County nighttime standard of 60 dBA L_{eq}. Although the boring site is not within the County of Santa Cruz, the County's nighttime noise standard is used to determine which sensitive receptors should be offered hotel accommodations. However, since the construction activities would occur outside of the allowed construction hours specified in the City of Watsonville noise ordinance, this impact would remain ***significant and unavoidable with mitigation***.

State Route 129 Crossing

Horizontal directional drilling near SR 129 would occur in unincorporated Santa Cruz County. There are single family residences located approximately 670 feet to the north of where horizontal directional drilling would occur during the crossing of SR 129. As shown in Table 3.8-6, these sensitive receptors would be exposed to noise levels of 60 dBA L_{max} and 53 dBA L_{eq} during the daytime hours and 57 dBA L_{max} and 50 dBA L_{eq} during the nighttime hours during Project construction. Since construction activities would not exceed the County's daytime or nighttime noise standards, impacts related to exposure of sensitive receptors to noise levels in excess of standards found in the local noise ordinance would be ***less than significant***.

State Route 1 Crossing

Horizontal directional drilling near SR 1 would occur entirely within an unincorporated area of Santa Cruz County. There are single family residences located approximately 1,150 feet to the north of where horizontal directional drilling would occur during the crossing of SR 1. As shown in Table 3.8-6, these sensitive receptors would be exposed to noise levels of 61 dBA L_{max} and 54 dBA L_{eq} during the daytime hours and 51 dBA L_{eq} and 44 dBA L_{eq} during the nighttime hours during Project construction. Since construction activities would not exceed the County's daytime or nighttime noise standards, impacts related to exposure of sensitive receptors to noise levels in excess of standards found in the local noise ordinance would be ***less than significant***.

Impact Conclusion

Project-related construction activities at the weir structure and intake pump station, optional WTP site and trenchless pipeline construction near the Corralitos Creek, SR 129 and SR 1 would either occur within the allowed construction hours and/or generate noise levels below the allowed construction noise standards identified in their respective jurisdiction's noise ordinance. Therefore, impacts at these sites would be ***less than significant***.

Construction activities at the preferred WTP site, pipeline alignments (trench construction), and trenchless pipeline construction near SR 152 and Walker Street would expose nearby sensitive receptors to noise levels that would exceed the County of Santa Cruz construction noise standard or occur outside the allowed construction hours identified in the City of Watsonville noise ordinance. Implementation of Mitigation Measure NOI-1a is expected to attenuate construction noise levels by at least 5 dB; however, noise levels would not be reduced below the County of Santa Cruz construction noise standard. In addition, construction activities at boring sites within the city limits would occur outside of the allowed hours specified in the City of Watsonville noise ordinance due to 24-hour trenchless pipeline construction. Therefore, a significant impact would occur at this these locations even with implementation of Mitigation Measures NOI-1a and NOI-1b, and as a result impacts at these Project sites would remain ***significant and unavoidable with mitigation***.

Mitigation Measure NOI-1a: Construction Noise Reduction Plan

PV Water shall develop and implement a Construction Noise Reduction Plan prior to initiating construction at the weir structure and intake pump station, the preferred WTP site, College Lake pipeline (trench construction) and trenchless construction activities near SR 152 and Walker Street. A disturbance coordinator shall be designated for the Project to implement the provisions of the plan. At a minimum, the Construction Noise Reduction Plan shall implement the following measures:

- Distribute to the potentially affected residences and other sensitive receptors within 200 feet of the Project construction site boundaries notice including a "hotline" telephone number, which shall be attended during active construction working hours, for use by the public to register complaints. The notice shall identify the noise disturbance coordinator who would be responsible for responding to any local complaints about construction noise. The disturbance coordinator would determine the reason for the noise complaints and institute actions warranted to correct the problem, if any. All complaints shall be logged noting date, time, complainant's name, nature of complaint, and any corrective action taken. The notice shall also include the construction schedule.
- All construction equipment shall have intake and exhaust mufflers recommended by the manufacturers thereof.

- The use of impact and vibratory pile drivers is limited to the daytime and evening hours permissible under the County of Santa Cruz noise ordinance. All impact pile driving activities shall be restricted to the hours of 8:00 a.m. to 10:00 p.m.
- Maintain maximum physical separation, as far as practicable, between noise sources (construction equipment) and sensitive noise receptors. Separation may be achieved by locating stationary equipment (such as generators) in areas that would minimize noise impacts on the community.
- Impact tools (e.g., jack hammers, pavement breakers) used during construction activities shall be hydraulically or electrically powered to avoid noise associated with compressed air exhaust from pneumatically powered tools to the extent feasible. Where use of pneumatic tools is unavoidable, an exhaust muffler on the compressed air exhaust shall be used.
- Use construction noise barriers such as paneled noise shields, blankets, and/or enclosures adjacent to noisy stationary and off-road equipment. Noise control shields, blankets and/or enclosures shall be made featuring a solid panel and a weather-protected, sound-absorptive material on the construction-activity side of the noise shield. This measure does not apply to pipeline construction.

Mitigation Measure NOI-1b: Off-site Accommodations for Substantially Affected Nighttime Receptors

PV Water shall offer to provide temporary hotel accommodations for all residences within 200 feet of where trenchless construction activities would occur at the SR 152 and Walker Street crossings. The accommodations shall be provided for the duration of nighttime drilling activities. PV Water shall provide accommodations reasonably similar to those of the impacted residents (e.g., in terms of number of beds).

Impact NOI-2: Operation of the Project could result in a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project in excess of standards established in the local general plan or noise ordinance. (*Less than Significant*)

The primary noise sources associated with Project operation would be onsite pumps and air compressors. Operational activities associated with the weir, intake pump station, and WTP could result in the exposure of nearby off-site sensitive receptors to noise levels that could exceed local noise standards. This analysis assumes that all pumps and air compressors would operate during both daytime and nighttime hours. **Table 3.8-7** presents the potential Project-related noise levels that sensitive receptors could be exposed to during the operation of stationary noise sources at the weir structure, intake pump station, and WTP.

The proposed weir structure, intake pump station, and WTP would be located entirely within an unincorporated area of Santa Cruz County. As shown in Table 3.8-4, the County of Santa Cruz General Plan limits stationary noise sources (e.g., pumps and air compressors) to 50 dBA L_{eq} during the daytime hours and 45 dBA L_{eq} during the nighttime hours. Since all of the proposed pumps and air compressors are assumed to operate during both the daytime and nighttime hours, the County

Santa Cruz nighttime noise standard of 45 dBA L_{eq} is used to evaluate whether the Project would generate noise levels in excess of standards establishes in the County's general plan.

As shown in Table 3.8-7, none of the sensitive receptors near the pumps and air compressor at the proposed weir structure, intake pump station, or WTP (at either the preferred or optional site) would be exposed to noise levels that exceed the applied stationary nighttime noise standard found in the County of Santa Cruz General Plan. Therefore, impacts related to exposure of persons to, or generation of, noise levels in excess of the local general plan standards would be ***less than significant***.

Mitigation: None required.

TABLE 3.8-7
SUMMARY OF OPERATIONAL NOISE EXPOSURE AT SENSITIVE RECEPTORS LOCATIONS – STATIONARY SOURCES

Noise Source	Pump Noise Level at 3 feet (dBA L_{eq})[a]	Number of pumps	Distance to nearest Sensitive Receptor (feet)[b]	Attenuated Noise Level (dBA L_{eq})[c]
Weir Structure and Intake Pump Station				
Influent pumps	85	3	400	37
Inflatable Weir Air Compressor	85	1	400	32
			Combined Noise Level	38
			County of Santa Cruz Stationary Nighttime noise Standard	45
			Exceed Threshold (Yes or No)?	No
Preferred Water Treatment Plant Site				
Coagulation chemical Building	65	2	435	12
Local Effluent Pump Station	85	2	185	43
Hypo Storage & Feed	65	2	260	20
Filter Influent Pump Station	85	5	375	40
			Combined Noise Level	45
			County of Santa Cruz Stationary Nighttime noise Standard	45
			Exceed Threshold (Yes or No)?	No
Optional Water Treatment Plant Site				
Coagulation chemical Building	65	2	580	11
Local Effluent Pump Station	85	2	480	33
Hypo Storage & Feed	65	2	370	16
Filter Influent Pump Station	85	5	370	40
			Combined Noise Level	41
			County of Santa Cruz Stationary Nighttime noise Standard	45
			Exceed Threshold (Yes or No)?	No

NOTES:
a Pump reference noise levels and conceptual site plans provided by Carollo Engineers.
b Measured distance from the nearest sensitive receptor to the Project site to the proposed onsite pump station location.
c Assumed an attenuation rate of 7.5 dB per doubling of distance (i.e., soft site).

SOURCE: ESA, 2018 Ambient Noise Survey for the College Lake Integrated Resources Management Project, April 4, 2018; Carollo Engineers, Civil Site Plans for Preferred WTP Site and Optional WTP Site, November 2018.

Impact NOI-3: Project construction would generate excessive groundborne vibration. (*Less than Significant with Mitigation*)

Human annoyance and building damage are typically the primary issues concerning temporary construction impacts from vibration. Construction activities that typically result in temporary vibration impacts include impact pile driving, the use of large bulldozers, loaded trucks, and auger drills.

For adverse human reaction, the analysis applies the "severe" threshold of 0.4 in/sec PPV for continuous/frequent intermittent sources.[15] According to the Caltrans' *Transportation and Construction Vibration Manual*, continuous/frequent intermittent sources include compactors and vibratory compaction equipment. For risk of architectural damage to historic buildings and structures, the analysis applies a threshold of 0.25 in/sec PPV. A threshold of 0.5 in/sec PPV is used to assess damage risk for all other buildings.[16] For purposes of this impact discussion, sensitive receptors include both people and structures. As discussed further in Section 3.10, Cultural Resources, there are previously recorded historic buildings immediately adjacent to the College Lake pipeline alignment. **Table 3.8-8** presents the maximum vibration levels (PPV) that nearby residences and historic structures could be exposed to during operation of onsite construction equipment at each of the Project sites.

Weir Structure and Intake Pump Station

Construction of the weir and intake pump station would require the use of an impact pile driver during construction. The nearest structure to the proposed weir and intake pump station construction area is the Our Lady Help of Christians church. During onsite impact pile driving, people at the church would be exposed to vibration level of 0.012 in/sec PPV.[17] As shown in Table 3.8-8, none of the onsite construction equipment proposed at the weir and intake pump station construction area would expose the Our Lady Help of Christians church structure to vibration levels that would exceed the applied human annoyance or building damage thresholds. Therefore, the impact would be ***less than significant***.

Water Treatment Plant (Preferred and Optional Sites)

Construction of the WTP would not require the use of construction equipment known to generate high vibration levels such as an impact pile driver. However, for this analysis it is conservatively assumed that off-road equipment used during Project construction would generate vibration levels equivalent to either a jackhammer or small dozer. The nearest residential structures to the preferred and optional WTP sites are located 40 and 470 feet, respectively, from the site boundaries. As shown in Table 3.8-8, none of the onsite construction equipment proposed at the WTP construction areas would expose nearby residential structures to vibration levels that would exceed the applied human annoyance or building damage thresholds. Therefore, the impact would be ***less than significant***.

---

[15] Caltrans, *Transportation and Construction Vibration Guidance Manual*, September 2013.
[16] Ibid.
[17] FTA, *Transit Noise and Vibration Impact Assessment (FTA-VA-90-1003-06)*, September 2018.

TABLE 3.8-8
SUMMARY OF VIBRATION LEVELS AT SENSITIVE RECEPTORS DURING CONSTRUCTION

Type of Equipment	Distance to Nearest Historic Structure/ Residence or Modern Structure (feet)	Reference Vibration level at 25 feet	Vibration Impact Contours (Feet)		
			Historic and Some Old Buildings (0.25 PPV)	Strongly Perceptible (0.4 PPV)	Older Residential Structures (0.5 PPV)
Weir Structure and Intake Pump Station					
Excavator[a]	340/340	0.035	7	5	4
Backhoe[a]		0.035	7	5	4
Fork Lift[b]		0.003	1	1	1
Impact Pile Driver		0.644	47	34	30
Crane[b]		0.003	1	1	1
Preferred Water Treatment Plant Site					
Excavator[a]	40/40	0.035	7	5	4
Dozers[b]		0.003	1	1	1
Scrapers[a]		0.035	7	5	4
Skip Loader[b]		0.003	1	1	1
Backhoe[a]		0.035	7	5	4
Fork Lift[b]		0.003	1	1	1
Crane[b]		0.003	1	1	1
Scissor Lift[b]		0.003	1	1	1
Paver[a]		0.035	7	5	4
Optional Water Treatment Plant Site					
Excavator[a]	470/470	0.035	7	5	4
Dozers[b]		0.003	1	1	1
Scrapers[a]		0.035	7	5	4
Skip Loader[b]		0.003	1	1	1
Backhoe[a]		0.035	7	5	4
Fork Lift[b]		0.003	1	1	1
Crane[b]		0.003	1	1	1
Scissor Lift[b]		0.003	1	1	1
Paver[a]		0.035	7	5	4
College Lake Pipeline - Trench Construction					
Excavator[a]	10/25	0.035	7	5	4
Skip Loader[b]		0.003	1	1	1
Backhoe[a]		0.035	7	5	4
Fork Lift[b]		0.003	1	1	1
Plate Compactor[a]		0.035	7	5	4
Paver[a]		0.035	7	5	4
Sweepers[b]		0.003	1	1	1
College Lake Pipeline - Trenchless Construction					
Drill Rig	10/35	0.089	**13**	9	8
Vibratory Pile Driver		0.17	**19**	14	12
Crane[b]		0.003	1	1	1
Backhoe[a]		0.035	7	5	4

NOTES:
Bold = Exceeds applied building or human perception threshold damage threshold.
PPV = Peak Particle Velocity
[a] Assumed the same vibration level as a jack hammer.
[b] Assumed the same vibration level as a small dozer.

SOURCE: FTA, *Transit Noise and Vibration Impact Assessment (FTA-VA-90-1003-06)*, September 2018; Caltrans, *Transportation and Construction Vibration Guidance Manual*, September 2013.

College Lake Pipeline - Trench Pipeline Installation

Open-trench construction activities along the College Lake pipeline alignments would require the use of off-road construction equipment such as excavators, backhoes and pavers. For this analysis it is conservatively assumed that off-road equipment used during Project construction would generate vibration levels equivalent to either a jackhammer or small dozer. As shown in Table 3.8-8, residential and historic structures are expected to be as close as 25 and 10 feet from the College Lake pipeline alignments during trench construction, respectively. These structures would not be exposed to vibration levels that would exceed the applied human annoyance or building damage thresholds. Therefore, the impact would be ***less than significant***.

College Lake Pipeline - Trenchless Pipeline Installation

Trenchless construction sites along the College Lake pipeline would require the use of a vibratory pile driver to install sheet piles at the pit areas and a horizontal directional drill to install pipe under roadways. During onsite construction, the nearest residences located 35 feet from onsite construction activities would be exposed to a vibration level of 0.103 in/sec PPV during vibratory pile driving and 0.053 in/sec PPV during horizontal directional drilling, which is below the applied human annoyance and modern building damage thresholds.[18] There are historic or potentially historic buildings (e.g., 200 Walker Street) located as close as 10 feet to trenchless construction at the following intersections: East Lake Avenue/Palm Avenue/Hushbeck Avenue, East Beach Street/Lincoln Street, and 2nd Street/Walker Street. These historic or potentially historic buildings could be exposed to vibration levels of 0.672 in/sec PPV during vibratory pile driving and 0.352 in/sec PPV during horizontal directional drilling, which would exceed the historic building damage threshold.[19] As shown in Table 3.8-8, the historic or potentially historic structures located potentially as close as 19 feet to the vibratory pile driver and 13 feet to the drill rig could be exposed to vibration levels that would result in building damage. Therefore, there would be a significant impact with respect to exposure of persons to, or generation of, excessive groundborne vibration. Implementation of **Mitigation Measure NOI-2** would ensure that vibration generated during the construction of the pipeline alignments would not exceed the 0.25 in/sec PPV historic building damage threshold. Therefore, this impact would be ***less than significant with mitigation***.

Mitigation Measure NOI-2: Vibration Monitoring Plan

Prior to construction, PV Water shall require the pipeline construction contractor to develop a Vibration Monitoring Plan in coordination with a structural engineer and geotechnical engineer if trenchless construction methods are used at the following intersections: East Lake Avenue/Palm Avenue/Hushbeck Avenue, East Beach Street/Lincoln Street, and 2nd Street/Walker Street. The Vibration Monitoring Plan shall include the following elements:

- To mitigate vibration, the Vibration Monitoring Plan shall include measures such that surrounding buildings will be exposed to less than 0.25 in/sec PPV for historic or potentially historic buildings to prevent building damage. Measures may include

[18] Ibid.
[19] Ibid.

restricting the use of vibratory pile driving and drill rigs from operating within 13 and 19 feet from historic structures, respectively.

- With permission of applicable property owners, conduct a pre-construction survey of buildings and other sensitive structures within the area of potential effects due to vibration-generating activities. Respond to any claims by inspecting the affected property promptly, but in no case more than five working days after the claim was filed. Any new cracks or other changes in structure will be compared to preconstruction conditions and a determination made as to whether the Project could have caused such damage. In the event that the Project is demonstrated to have caused any damage, such damage will be repaired to the pre-existing conditions.

Cumulative Impacts

Impact C-NOI-1: The Project, in combination with past, present, and probable future projects in the site vicinity, would have a cumulatively considerable impact associated with construction noise. (*Significant and Unavoidable with Mitigation*)

Construction

The geographic context for changes in the noise and vibration environment due to construction of the Project components would be localized in a rural area of Santa Cruz County and urban areas of the City of Watsonville. In order to contribute to a cumulative noise and vibration impact, another project in close proximity would have to be constructed or operational at the same time as the Project. There are numerous projects in several locations near the Project sites that are currently in the planning stages and could be constructed and operational in the foreseeable future. A list of cumulative projects located in the vicinity of the Project can be found on Figure 3.1-1. As shown on Figure 3.1-1, the closest cumulative projects to the Project are the Main Street Safety Project, Lincoln Street Safety Project, Corralitos Creek ADA Compliance Project, Highway 152 Improvements Project, Highway 152/Holohan Road/College Road Interchange Improvements Project, Elm Street Improvement Project and Ohlone Parkway Improvements Phase 2 Project.

As discussed in Impact NOI-1 and NOI-3, construction of the Project would expose existing sensitive receptors to noise levels that would conflict with Santa Cruz County's municipal code or generate vibration levels that could result in building damage to sensitive structures. If Project-related activities were to coincide with construction activities associated with a nearby cumulative project, the combined effect could result in the exposure of off-site sensitive land uses to higher noise and vibration levels than what was predicted under the Project. The construction of the cumulative projects listed in Table 3.1-1 and shown on Figure 3.1-1 could result in construction equipment operating at the same time and close proximity to those used under the Project. Therefore, the Project's contribution to cumulative construction noise and vibration impacts would be significant. Although implementation of Mitigation Measure NOI-2 would ensure that vibration generated during the construction of the pipeline alignments would not exceed the applied 0.25 in/sec PPV historic building damage threshold, construction noise generated by the Project would remain above the County of Santa Cruz construction noise standard even with this the implementation of Mitigation Measures NOI-1a and NOI-1b. Therefore, impacts at the Project sites would remain ***significant and unavoidable with mitigation***.

Operation

As discussed in Impact NOI-2, operation of the Project would not expose the nearest sensitive receptor to noise levels that would conflict with either the Santa Cruz County or City of Watsonville general plans or result in a substantial permanent increase in ambient noise levels. None of the projects identified in the cumulative scenario that would be located in close proximity to the Project area would have operational noise and themselves be expected to generate substantial sources of operational noise. Therefore, a cumulatively significant operational noise impact would not be expected, and the Project's contribution to cumulative operational noise impacts would be ***less than significant***.

> **Mitigation Measure NOI-1a: Construction Noise Reduction Plan** (refer to Impact NOI-1)
>
> **Mitigation Measure NOI-1b: Off-site Accommodations for Substantially affected Nighttime receptors** (refer to Impact NOI-1)
>
> **Mitigation Measure NOI-2: Vibration Monitoring Plan** (refer to Impact NOI-3)

This page intentionally left blank

3.9 Transportation and Traffic

This section presents an analysis of potential impacts related to transportation and traffic that would result from implementation of the proposed College Lake Integrated Resources Management Project (Project). The analysis includes both site options (preferred and optional) for the water treatment plant (WTP) as well as preferred and optional pipeline alignments for the College Lake pipeline. Information from the 2014 Basin Management Plan Update Program Environmental Impact Report (2014 BMP Update PEIR) that remains relevant and accurate for the purposes of describing the physical or regulatory setting of transportation and circulation has been incorporated as appropriate. The Project includes mitigation measures adopted by the Board of Directors to reduce the severity and magnitude of environmental effects.

3.9.1 Setting

The 2014 BMP Update PEIR Section 3.11.1 describes existing transportation and circulation conditions in the Project region. Regional environmental setting information from the 2014 BMP Update PEIR is summarized here. This section also describes transportation and traffic information specific to the Project area.

3.9.1.1 Regional and Local Roadways

The Project, which includes the College Lake water storage area, proposed weir structure and intake pump station, WTP, and College Lake pipeline, would be located in portions of the City of Watsonville (City) and unincorporated Santa Cruz County (see Figure 2-1 in Chapter 2, *Project Description*). Regional access to the various Project components would be provided via State Route (SR) 1, SR 152, and SR 129, all of which are designated as truck routes by the California Department of Transportation (Caltrans).[1] Traffic volumes and other roadway characteristics for regional roadways are provided below.[2] Refer to Figures 2-3a through 2-3e in Chapter 2 for the locations of roadways described in this section.

SR 1 is a four-lane divided freeway in the Project area. Direct access to SR 1 is provided by SR 129 and SR 152. SR 1 in the vicinity of the Project carried between 37,000 and 53,000 average daily traffic (ADT) in 2016. According to Caltrans, peak-hour congestion levels are low on SR 1 in the vicinity of the Project.[3]

SR 129 (Riverside Drive/Chittenden Road) provides east-west access through the Project area, providing connection between SR 1 (in Watsonville) and US 101. Approximately 2,000 feet east of Murphy Crossing Road (near Graniterock A.R. Wilson Quarry and Chittenden Pass), SR 129 is characterized by numerous curves, frequent changes in elevation, and narrow shoulders. In winter, rockfalls and mudslides commonly result in temporary closure of SR 129 in the gap. The majority of SR 129 is two lanes, except in downtown Watsonville, where it is four lanes. SR 129

1 Caltrans, *California Truck Network Map*, 2018.
2 Caltrans, *2016 Traffic Volumes on California State Highways*, 2017.
3 Caltrans, *State Route 1 Transportation Concept Report*, June 2017.

carried between 12,900 and 20,300 ADT in the vicinity of the Project in 2016. According to Caltrans, peak hour congestion levels are low to moderate on SR 129 in the vicinity of the Project.[4]

SR 152 provides east-west access through the Project area, stretching east from SR 1 to the Central Valley. In the western portion of the Project area, SR 152 runs through Watsonville (along Main Street, East Beach Street, Lincoln Street, and East Lake Avenue) to Hecker Pass and Santa Clara County. Due to the winding nature of SR 152 over Hecker Pass, signs are posted prohibiting trucks over 45 feet in length from using that portion of the highway. The majority of SR 152 is two lanes, except in downtown Watsonville, where it is four lanes. SR 152 carried between 16,300 and 26,700 ADT in the vicinity of the Project in 2016. According to Caltrans, peak hour congestion levels are moderate to high on SR 152 in the vicinity of the Project.[5]

Local access to the proposed weir structure and intake pump station, and the WTP would be provided primarily by Holohan Road, a two-lane road. Holohan Road extends west from SR 152 to Green Valley Road and areas along Freedom Boulevard. In addition, the College Lake pipeline would be constructed within the right-of-way of the following local roadways:

- Holohan Road
- Wagner Avenue
- Mohovy Street
- Dolores Avenue
- Martinelli Street
- California Street
- Tuttle Avenue
- Tharp Avenue
- Palm Avenue
- Hushbeck Avenue
- East and West Beach Street
- Lincoln Street
- Maple Avenue/2nd Street
- Pine Street
- Clearwater Lane or Harvest Drive[6]

Bicycle and Pedestrian Facilities

Bicycle lanes are currently present on Holohan Road in the vicinity of the weir structure and intake pump station, and the WTP.[7] There are also bicycle lanes on West Beach Street between Walker Street and Lee Road, which is along the proposed College Lake pipeline route. Existing pedestrian facilities in the vicinity of the weir structure and intake pump station and the WTP sites are limited; there are sidewalks on the north side of Holohan Road and College Road, and on the east side of SR 152 near St. Francis High School and Lakeview Middle School. Most roadways along the proposed College Lake pipeline route have sidewalks on at least one side of the roadway; portions of Beach Street and Clearwater Lane at the south end of the proposed alignment do not have any sidewalks.

---

4 Caltrans, *State Route 129 Transportation Concept Report*, October 2015.
5 Caltrans, *State Route 152 Transportation Concept Report*, June 2017.
6 If the optional pipeline route is selected, pipeline construction would occur within the Harvest Drive right-of-way between Beach Street and SR 129 instead of Clearwater Lane.
7 Santa Cruz County Regional Transportation Commission, *Santa Cruz County Bike Map*, 2016.

Public Transit

The Santa Cruz Metropolitan Transit District (Santa Cruz Metro) provides public transit service in the Project area. Santa Cruz Metro operates fixed-route bus service and Paratransit service throughout Santa Cruz County. Route 79, which operates hourly Monday through Friday between 7:30 a.m. and 5:30 p.m. and three runs on weekends, connects Pajaro and East Lake via Downtown Watsonville.[8] The nearest bus stop to the weir structure and intake pump station, and the WTP, is located approximately 500 feet to the south on the northeast corner of the SR 152/Holohan Road/College Road intersection. Route 79 stops at the Watsonville Transit Center, which provides access to other routes serving destinations throughout Santa Cruz County.

3.9.2 Regulatory Framework

3.9.2.1 Federal

Federal Aviation Administration

All airports and navigable airspace not administered by the United States Department of Defense are under the jurisdiction of the Federal Aviation Administration (FAA). Federal Regulation Title 14 Section 77 establishes the standards and required notification for objects affecting navigable airspace. In general, projects involving features exceeding 200 feet in height above ground level or extending at a ratio greater than 50:1 (horizontal to vertical) from a public or military airport runway less than 3,200 feet long out to a horizontal distance of 20,000 feet are considered potential obstructions, and require notification to the FAA. In addition, the FAA requires a congested area plan for operating a helicopter (with external load) near residential dwellings.

Transportation of Hazardous Materials

The U.S. Department of Transportation is the administering agency for the following regulations:

- Title 49 Code of Federal Regulations (CFR) Sections 171 through 177 (49 CFR 171–177), which govern the transportation of hazardous materials, the types of materials defined as hazardous, and the marking of transportation vehicles.
- Title 49 CFR 350–399 and Appendices A through G, Federal Motor Carrier Safety Regulations, which address safety considerations for the transport of goods, materials, and substances over public highways.
- Title 49 CFR 397.9, the Hazardous Materials Transportation Act of 1974, which directs the U.S. Department of Transportation to establish criteria and regulations for the safe transportation of hazardous materials.

8 Santa Cruz Metro, Route 79 Pajaro/East Lake schedule and map, effective March 9, 2018.

3.9.2.2 State

California Department of Transportation

Caltrans is responsible for planning and maintaining state routes, highways, and freeways. Caltrans maintains jurisdictional authority of SR 1, SR 129, and SR 152 in the Project area. Caltrans has developed the *Guide for the Preparation of Traffic Impact Studies*[9] for use when assessing potential traffic impacts on state facilities. This guide identifies peak hour trip generation thresholds for state facilities that, if triggered, would require the preparation of a Traffic Impact Study, the scope of which would be established in consultation with Caltrans. Since the Project would not generate a substantial number of peak hour construction or operational trips in relation to existing volumes on state facilities (refer to Impact TRA-1 discussion), it does not meet the criteria established by Caltrans to prepare a Traffic Impact Analysis. Therefore, a detailed analysis of traffic impacts on state facilities, other than that presented in the discussion of Impact TRA-1 below, is not required.

Senate Bill 743

With the adoption of the Senate Bill 375 in 2008, the State Legislature signaled its commitment to encourage land use and transportation planning decisions and investments to reduce vehicle miles traveled and thereby contribute to the reduction of greenhouse gas emissions, as required by the California Global Warming Solutions Act of 2006 (Assembly Bill 32).

On September 27, 2013, Senate Bill 743 was signed into law. Senate Bill 743 started a process that could fundamentally change transportation impact analysis as part of California Environmental Quality Act (CEQA) compliance. These changes include the elimination of auto delay, Level of Service, and other similar measures of vehicular capacity or traffic congestion as a basis for determining significant impacts in many parts of California (if not statewide). Senate Bill 743 required the Office of Planning and Research to propose revisions to the CEQA *Guidelines* establishing new criteria to “promote the reduction of greenhouse gas emissions, the development of multimodal transportation networks, and a diversity of land uses.” (Public Resources Code Section 21099(b)(1).)

The new CEQA *Guidelines* section 15064.3, subdivision (b) was adopted in December 2018 by the California Natural Resources Agency. These revisions to the CEQA *Guidelines* criteria for determining the significance of transportation impacts are primarily focused on projects within transit priority areas, and shifts the focus from driver delay to reduction of greenhouse gas emissions, creation of multimodal networks, and promotion of a mix of land uses (which in turn reduces vehicle trips). Vehicle miles traveled, or VMT, is a measure of the total number of miles driven to or from a development and is sometimes expressed as an average per trip or per person.

The newly adopted guidance provides that a lead agency may elect to be governed by the provisions of this section immediately. Beginning on July 1, 2020, the provisions of this section shall apply statewide. Santa Cruz County and the City are currently engaged in this process and have not yet formally adopted its updated transportation significance thresholds or its updated transportation impact analysis procedures. Since the regulations of SB 743 have not been

9 Caltrans, *Guide for the Preparation of Traffic Impact Studies*, December 2002.

finalized or adopted by the County or the City, automobile delay remains the measure used to determine the significance of a traffic impact. As a lead agency, Pajaro Valley Water Management Agency (PV Water) may elect to develop its own significance thresholds or may opt to use the thresholds of "host" jurisdictions (i.e., for projects within the City of Watsonville, PV Water would use the City's thresholds).

3.9.2.3 Local

Table 2-10 in Chapter 2, *Project Description*, identifies the approvals from Santa Cruz County and/or the City required for the Project. **Table 3.9-1** presents pertinent local plans and policies regarding transportation and traffic to support County and City consideration of project consistency with general policies.[10] In some cases, local policies are used in this EIR as criteria to determine the significance of physical effects on the environment (e.g., Impact NOI-1 in Section 3.8, Noise and Vibration).

City of Watsonville Trails and Bicycle Master Plan and the Santa Cruz County Bicycle Plan

The City of Watsonville Trails and Bicycle Master Plan was prepared to develop a framework for building an integrated system of pathways and bikeways that will link residents to the outdoors.[11] Building upon past planning efforts and existing facilities, the Trails and Bicycle Master Plan contains detailed trail and bikeway recommendations and guidelines, which together form a comprehensive non-vehicular circulation network. The Santa Cruz County Bicycle Plan consolidates into one document all bicycle-related County plans and projects that are currently identified in the County's General Plan, the Santa Cruz County Regional Transportation Plan, and other local documents.[12] Bicycle facilities are defined in these two planning documents using three different classifications as follows:

> **Class I Bikeway:** A dedicated off-road bicycle and/or pedestrian path (typically multi-use path), which provides for bicycle travel on a paved right-of-way completely separated from any street or highway.
>
> **Class II Bikeway:** A dedicated bike lane on a street and/or highway (not a sidewalk), with signing and pavement markings separating the bicycle lane from adjacent traffic flow.
>
> **Class III Bikeway:** Dedicated bike routes that provide for shared use with pedestrian or motor vehicle traffic and are identified by signing.

Bicycle facilities in the Project area are identified above in Section 3.9.1.1.

---

[10] California Government Code Section 53091 exempts agencies like PV Water from complying with local building and zoning ordinances when locating or constructing facilities for the production, generation, storage, treatment, or transmission of water. California Government Code Section 65402(c) requires that PV Water notify cities and counties of its plans to construct projects or to acquire or dispose of property. The planning agency then has 40 days to determine project consistency with its general plan. If the planning agency disapproves, the disapproval may be overruled by PV Water.

[11] City of Watsonville, *City of Watsonville Trails & Bicycle Master Plan for the Watsonville Scenic Trails Network*, November 2012.

[12] County of Santa Cruz, *Santa Cruz County Bicycle Plan*, March 2011.

TABLE 3.9-1
LOCAL PLANS AND POLICIES RELEVANT TO THE PROJECT

CITY OF WATSONVILLE PLANS AND POLICIES
Watsonville General Plan
Goal 10.1: Street and Highway Facilities. Plan and provide for a safe, efficient, and environmentally sensitive network of streets and highways for movement of people and goods.
Goal 10.9: Utility Routing. Ensure the adequate provision of necessary public utilities in a way which minimizes their visual impacts and potential hazards to the safety of residents.
Implementation Measure 10.B.2 SR 129: Truck Route. The City shall continue to encourage the use of SR 129 as the designated east-west truck route. Encourage the addition of two lanes from Union to Lakeview.
Implementation Measure 10.B.3 SR 152: Scenic Corridor. The City shall support the designation of SR 152 as a scenic corridor from SR 1 east to the Santa Cruz County line. To this effect, the City shall support measures to prohibit large trucks on scenic SR 152. Encourage the addition of two lanes from Holohan Road to Lincoln Street.
Watsonville Municipal Code
Title 7 (Public Works) of the Watsonville Municipal Code contains three chapters that detail the City's regulations regarding the use of roads and the construction of utilities infrastructure, including encroachments. They are: Chapter 1 (Streets Excavation), Chapter 2 (Sidewalks, Driveways, Curbs, and Gutters), and Chapter 5 (Underground Utilities). Numerous regulations may be applicable to the Project via the encroachment permit process, including regulations regarding the use of roadways, the type of vehicles and load sizes allowable on given roadways, encroachment on private property, and the construction of utilities infrastructure. The Municipal Code applies to all roads within the City's jurisdiction, and project construction must adhere to all ministerial regulations presented in the Municipal Code.
SANTA CRUZ COUNTY PLANS AND POLICIES
Santa Cruz County Code
Title 9 (Roads, Vehicles, and Traffic), Chapter 9.7 (Streets and Roads) of the Santa Cruz County Municipal Code details the County's regulations regarding the use of roads and the construction of utilities infrastructure, including encroachments. Numerous regulations may be applicable to the Project via the encroachment permit process, including regulations regarding the use of roadways, the type of vehicles and load sizes allowable on given roadways, encroachment on private property, and the construction of utilities infrastructure. The County Code applies to all roads within the County's jurisdiction, and project construction must adhere to all ministerial regulations presented in the County Code.

SOURCE: City of Watsonville, Watsonville Municipal Code, 2014. Available online at www.codepublishing.com/CA/Watsonville/. Accessed on May 14, 2018; City of Watsonville, *Watsonville 2005 General Plan*, Adopted May 24, 1994; Santa Cruz County Code, Title 9, Chapter 9.7.

3.9.3 Impacts and Mitigation Measures

3.9.3.1 Significance Criteria

In accordance with the CEQA, state CEQA *Guidelines* (including Appendix G), relevant plans, policies, and/or guidelines, and agency standards, the Project could have a significant impact if it were to:

- Conflict with an applicable program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities;
- Conflict or be inconsistent with CEQA *Guidelines* section 15064.3, subdivision (b);
- Substantially increase hazards due to a geometric design feature (e.g. sharp curves or dangerous intersections) or incompatible uses (e.g. farm equipment); and/or
- Result in inadequate emergency access.

In addition to the above-listed criteria, the following criteria are derived from common engineering practice to apply to the project-specific analysis presented herein:

- Substantially increase traffic safety hazards due to increased traffic volumes; or
- Cause substantial damage or wear of public roadways by increased movement of heavy vehicles.

The following topics are not analyzed further in this section for the reasons described below:

- ***Conflict with a program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities.*** In 2000, the Santa Cruz County Regional Transportation Commission exercised its right on behalf of the local jurisdictions in Santa Cruz County to be exempt from preparation and implementation of a Congestion Management Plan. As a result, none of the roadways in the Project area are subject to Congestion Management Plan-established Level of Service standards. Therefore, this criterion is not discussed further. Furthermore, the Project would not directly or indirectly eliminate alternative transportation corridors or facilities (e.g., bike paths, lanes, bus turnouts, etc.) both because of Project site locations and because of the short-term nature of construction activities where potential effects could occur. In addition, the Project would not include changes in policies or programs that support alternative transportation. Therefore, the Project would not conflict with adopted policies, plans, or programs supporting alternative transportation, and this significance criterion is not discussed further.
- ***Conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b).*** As discussed in Section 3.9.2, Regulatory Framework, the provisions of this section shall apply statewide in July 1, 2020. Since no VMT thresholds have been adopted yet, no further analysis is required and no impacts related to CEQA *Guidelines* section 15064.3, subdivision (b) would occur.
- *I**ncreased hazards due to a geometric design feature or incompatible uses.*** The Project would not include new design features (e.g., new facilities or obstructions within public roadways) or alterations of existing features (e.g., road realignment) that could increase operations-phase transportation hazards. In addition, traffic generated by the Project would be compatible with the mix of vehicle types (automobiles and trucks) currently using roads in the Project area. Therefore, the Project would not result in transportation hazards caused by a design feature or incompatible use, and this significance criterion is not discussed further.

3.9.3.2 Methodology

As described in Section 3.1, this EIR provides an independent analysis of the Project's potential environmental impacts. The Board of Directors (Resolution 2014-05) adopted one mitigation measure from the 2014 BMP Update PEIR for the purpose of reducing impacts related to transportation and traffic:

- **TR-1:** Conduct a preconstruction survey of road conditions on key access routes to the project sites (e.g., San Andreas Road). The pavement conditions of local streets judged to be in good condition for use by heavy truck traffic shall be monitored. Roads damaged by construction shall be repaired to a structural condition equal to, or better than, that which existed prior to construction activity.

This adopted mitigation measure is considered part of the Project and thus is considered prior to any significance determinations. Potential impacts are evaluated in the following section. If warranted, additional mitigation is included and takes the form of (1) modifications to update Mitigation

Measure TR-1 to reflect current conditions and site-specific impacts; or (2) new mitigation measures to replace or augment an adopted mitigation measure.

The evaluation of transportation and traffic impacts is based on the development assumptions for the Project, as described in Chapter 2, *Project Description*. The number of construction trips associated with the Project was quantified, taking into account the estimated construction schedule and the number of truck trips and worker trips assumed to occur in each construction phase.

Operation of the Project would add up to two new employees, which would generate approximately four new one-way daily trips. The routine maintenance activities within College Lake (e.g., sediment and debris removal, vegetation management) described Chapter 2, *Project Description*, would occur annually or semi-annually and would generate approximately 1,300 truck trips per year, or up to 33 new one-way daily trips over a 40-day period. Sediment removal would require an estimated 52 off-haul truck trips per year with a maximum of two new one-way trips per day over a 26-day period. In total, operation and maintenance would generate a maximum of 39 daily one-way vehicle trips, which is far less than would be generated by Project construction (see below). Due to the minimal amount of trips generated by operational and maintenance activities, the impact evaluation for operational activities is predominantly qualitative in nature.

Specific construction assumptions related to transportation and circulation are outlined below for each of the components that comprise the Project. The Project facilities would be constructed over a period of approximately 18 months beginning in 2022 and ending in 2023. The approximate duration of construction activities would vary by Project component as follows: WTP – 16 months[13], proposed weir structure and intake pump station – 16 months excluding pre-commissioning and taking into account a 4-month break between November and May when the site would be winterized and no construction would occur within the Salsipuedes Creek channel, College Lake pipeline – 13 months. Refer to Table 2-5 in Chapter 2, *Project Description* for more detail about construction schedule. Construction work would typically occur during normal working hours Monday through Saturday between the hours of 8:00 a.m. and 5:00 p.m. Exceptions would include construction of the proposed weir structure and intake pump station, which would occur seven days per week between the hours of 7:00 a.m. and 7:00 p.m., and trenchless pipeline construction, which could occur for up to 24 hours per day and several days in a row.

Weir Structure, Intake Pump Station, and Water Treatment Plant Construction

Trucks traveling to and from the proposed weir structure, intake pump station, and WTP construction areas are anticipated to travel to and from Holohan Road to SR 1 using SR 152 and Airport Boulevard. Construction debris and recyclable material would be transported from the Project sites to the Buena Vista Landfill. Trucks exiting the WTP and weir construction sites would travel west on Holohan Road, continue onto Airport Boulevard, turn right onto Ranport Road, and turn left onto Buena Vista Drive to arrive at the landfill. As noted in Chapter 2, *Project Description*, construction staging and laydown for the proposed weir structure and intake pump

[13] Schedule based on construction of grading and surcharging fill pad for the preferred WTP site. The duration of surcharging for the optional WTP site would be increased by 12 to 18 months to allow for consolidation of fill pad at that site. There would be no construction activity at the site during consolidation. The remainder of the construction phase durations for the WTP would be the same for both site options.

station would occur within an approximately 0.6-acre area surrounding the facilities. Construction staging and laydown for the proposed WTP would consist of the WTP site (either preferred or optional); a construction disturbance area (e.g., to accommodate heavy equipment movement for site grading) would also occur within up to 30 feet from the WTP site boundary, although Salsipuedes Creek, the Pinto Creek drainage ditch, and Holohan Road would be avoided.

College Lake Pipeline Installation

The installation of 5.5 miles of 24-inch-diameter pipeline connecting the WTP to the Coastal Distribution System would affect traffic flow by temporarily reducing the capacity of the affected roads because of lane closures. As noted above, local roadways that would be affected are: Holohan Road, Wagner Avenue, Mohovy Street, Dolores Avenue, Martinelli Street, California Street, Tuttle Avenue, Tharp Avenue, Palm Avenue, Hushbeck Avenue, East Beach Street, West Beach Street, Lincoln Street, Maple Avenue, 2nd Street, Pine Street, and Clearwater Lane or Harvest Drive.[14] Pipeline segments that would cross state highways (i.e., SR 152, SR 129, SR 1) would be constructed using a trenchless technique that would avoid lane closures on such facilities where feasible.[15] Pipeline construction is estimated to occur at installation rates of approximately 100 linear feet per day for urban areas, meaning that lane closures affecting local roadways would be temporary and short in duration.

Delivery trucks would use streets in the immediate area of the College Lake pipeline installation to access the construction corridor within the city. Staging and laydown for pipeline construction would occur primarily within the width of the construction corridor and along the proposed pipeline route.

3.9.3.3 Impacts and Mitigation Measures

Impact TRA-1: Construction of the Project would have temporary and intermittent effects on traffic and transportation conditions in the Project area. (*Less than Significant with Mitigation*)

The 2014 BMP Update PEIR identified short-term traffic increases associated with the following activities: trucks hauling equipment and materials to the site; trucks hauling excavated materials from the site; trucks importing new fill to the site; and the daily arrival/departure of construction workers to the sites. It concluded that construction of the proposed improvements would be temporary, and therefore, would not result in any long-term degradation in operating conditions or level of service for roadways. Furthermore, construction trucks hauling materials to and from the Project sites would result in short-term and intermittent reduction of roadway capacities due to slower movements and larger turning radii of the trucks compared to passenger vehicles. Overall, the 2014 BMP Update PEIR concluded that the Project would result in a less-than-significant impact with regard to temporarily increased traffic on area roadways from project generated vehicle trips by construction workers and construction vehicular activities. As such, no

[14] If the optional pipeline route is selected, pipeline construction would occur within the Harvest Drive right-of-way between Beach Street and SR 129 instead of Clearwater Lane.

[15] Trenchless construction at the Palm Avenue/SR 152/Hushbeck Avenue intersections may be infeasible based on roadway geometry.

mitigation measures were proposed. This impact determination assumed that PV Water would include Construction Traffic Minimization Practices into plans and contract specifications. Because PV Water did not adopt Construction Traffic Minimization Practices, many of the standard practices have been included as part of Mitigation Measure TRA-1b, below.

The Project would not introduce any uses to the Project area that would generate noticeable long-term changes in traffic; operational traffic would be limited to four one-way daily trips made by two new employees and infrequent trips by maintenance personnel (i.e., up to 35 one-way daily trips) to remove sediment and debris from the Project sites. Thus potential traffic and transportation effects would be confined to construction of the proposed facilities. Construction-generated traffic would be temporary and therefore would not result in any long-term degradation in operating conditions or level of service on any roadways in the Project area. The primary impacts from the movement of construction trucks would include short-term and intermittent lessening of roadway capacities due to slower movements and larger turning radii of the trucks compared to passenger vehicles.

Construction activities conducted for the Project could result in increased traffic volumes on area roadways generated by the daily arrival and departure of constructions workers, and by trucks hauling equipment and materials to and from the construction sites. As a worst-case scenario, worker and construction trips for all Project components were assumed to occur simultaneously. **Table 3.9-2** shows the total number of one-way, daily worker and truck trips that could potentially occur during the peak of construction activity. The Project would generate an estimated maximum of 110 one-way worker trips per day, and a maximum of 231 one-way truck trips per day. The import and export of fill material would represent the bulk of all construction traffic, and would only occur for abbreviated periods as indicated in the table.

TABLE 3.9-2
CONSTRUCTION WORKER AND TRUCK TRIPS

Project Component	Total Number of Days	Number of Peak Haul Days	Peak Daily One-Way Trips	
			Workers	Trucks
Weir and Intake Pump Station[a]	210	15	36	106
Treatment Plant	360	40	52	99
College Lake to CDS Pipeline	200	100	22	26
		Total	**110**	**231**

NOTES:
[a] Assumes same crew for weir and intake pump station.

SOURCE: Carollo Engineers, Request for Information, e-mail from R. Gutierrez, November 16, 2018.

However, given the different locations of the distinct Project components (especially the pipeline), increased traffic generated by construction activities associated with these temporarily overlapping construction phases generally would not use the same roadways. As such, the impact of increased traffic on traffic and transportation conditions for these Project components generally would not be additive. An exception would be the potential concurrent use of SR 1 and/or SR 152, which would be the primary routes used for regional access to all work sites by the construction workforce, and Holohan Road, which would be the primary access route for construction haul trucks and deliveries to the proposed weir structure, intake pump station, and WTP site.

Based on the existing ADT volumes on SR 1 and SR 152 noted in Section 3.9.1 and the estimated number of construction-related project trips shown in Table 3.9-2, the concurrent construction activities would increase the ADT volume on regional roadways by no more than 0.01 percent (i.e., too small of a change to be perceived by the average motorist). Traffic increases on local roads would be more noticeable, but the roadways would continue to accommodate traffic within the roadways' carrying capacity with no discernable effect on level of service. Proposed hours of construction are generally between 8:00 a.m. and 5:00 p.m. Truck trips related to off-hauling of excavated material from pipeline trenching and deliveries of equipment and materials would be dispersed over the course of the day, thus lessening the effect on traffic flow conditions. Construction workers traveling to/from the Project sites on weekdays during the hours of 7:00 to 9:00 a.m. and 4:00 to 6:00 p.m. would coincide with peak-period traffic, and therefore, would have the greatest potential to impede traffic flow. While the construction contractor for each Project component would likely schedule truck trips to avoid peak traffic hours on area roadways, dispersion of the 341 one-way construction vehicle trips (110 worker trips and 231 truck trips) over the course of the nine-hour workday would cause less-than-significant impacts on traffic flow during any specific hour. Even if all construction vehicle trips were to occur on a single roadway segment, that would still only amount to an average of an additional 38 hourly vehicle trips, which would not result in any discernable effect on roadway operations. The primary impacts from the movement of construction trucks would include short-term and intermittent lessening of roadway capacities due to slower movements and larger turning radii of the trucks compared to passenger vehicles. In addition, drivers could experience delays if they were traveling behind a construction truck.

Implementation of new **Mitigation Measures TRA-1a** and **TRA-1b**, as outlined below, would require compliance with local road encroachment permit conditions, preparation of a Traffic Control Plan, identification of roadways that require special construction techniques, development of a circulation and detour plan, and consultation with local transit service providers. With implementation of Mitigation Measures TRA-1a and TRA-1b, impacts related to temporary and intermittent effects on traffic and transportation conditions in the Project area would be reduced to ***less than significant***.

Mitigation Measure TRA-1a: Encroachment Permits

PV Water shall require the construction contractor to obtain any necessary road encroachment permits from the appropriate local jurisdiction (i.e., City of Watsonville, Santa Cruz County) prior to constructing each Project component and shall comply with the conditions of approval attached to all Project permits and approvals.

Mitigation Measure TRA-1b: Construction Traffic Control/Traffic Management Plan

PV Water shall require the construction contractor to prepare a Construction Traffic Control/Traffic Management Plan and submit it to the appropriate local jurisdiction (i.e., City of Watsonville, Santa Cruz County) for review and approval prior to construction. The plan shall be prepared in accordance with professional engineering standards and may include, but not be limited to, the following elements as appropriate:

- Identify hours of construction for each Project component.

- Schedule truck trips outside of peak morning and evening commute hours when feasible to minimize adverse impacts on traffic flow if agencies with jurisdiction over the affected roads identify highly congested roadway segments during their review of the encroachment permit applications. Haul routes that minimize truck traffic on local roadways and residential streets shall be used.
- Develop circulation and detour plans to minimize impacts on local street circulation. This may include the use of signing and flagging to guide vehicles, bicyclists, and pedestrians through and/or around the construction zone.
- Control and monitor construction vehicle movements by enforcing current standard construction specifications as defined by the appropriate local jurisdiction (i.e., City of Watsonville, Santa Cruz County) through periodic onsite inspections by the construction contractor.
- Install traffic control devices where traffic conditions warrant, as specified in the applicable jurisdiction's standards (e.g., the *California Manual of Uniform Traffic Controls for Construction and Maintenance Work Zones*).
- Perform construction that crosses on-street and off-street bikeways, sidewalks, and other walkways in a manner that allows for safe access for bicyclists and pedestrians. Alternatively, provide safe detours to reroute affected bicycle/pedestrian traffic.
- Consult with the Santa Cruz Metro at least one month prior to construction to coordinate bus stop relocations (as necessary) and to reduce potential interruption of transit service.
- Comply with roadside safety protocols to reduce the risk of accidents, as defined in the *Caltrans Division of Construction Code of Safe Practices* and the *California Manual of Uniform Traffic Controls for Construction and Maintenance Work Zones*. Provide "Road Work Ahead" warning signs and speed control (including signs informing drivers of state-legislated double fines for speed infractions in a construction zone) to achieve required speed reductions for safe traffic flow through the work zone.
- Store all equipment and materials in designated contractor staging areas.
- Encourage construction crews to park at staging areas to limit lane closures in the public rights-of-way.
- Include a plan and implementation process for notifications and a process for communication with affected residents and businesses prior to the start of construction. Advance public notification shall include posting of notices and appropriate signage of construction activities at least one week in advance. The written notification shall include the construction schedule, the exact location and duration of activities within each street (i.e., which lanes and access point/driveways would be blocked on which days and for how long), and a toll-free telephone number for receiving questions or complaints.
- Include a plan and implementation process to coordinate all construction activities with emergency service providers in the area at least one month in advance. Emergency service providers shall be notified of the timing, location, and duration of construction activities. All roads shall remain passable to emergency service vehicles at all times.

- Include a plan and implementation process to coordinate all construction activities with the Pajaro Valley Unified School District at least two months in advance. The Pajaro Valley Unified School District shall be notified of the timing, location, and duration of construction activities. PV Water shall coordinate with the Pajaro Valley Unified School District to identify peak circulation periods at schools along the College Lake pipeline alignment (i.e., the arrival and departure of students), and require their contractor to avoid construction and lane closures during those periods, if feasible. The construction contractor for each Project component shall be required to ensure that construction of the Project component does not inhibit vehicle, bicycle, pedestrian, and/or school bus service through inclusion of such provisions in the construction contract. The assignment of temporary crossing guards at designated intersections may be needed to enhance pedestrian safety during Project construction.
- Identify all roadway locations where special construction techniques (e.g., trenchless pipeline installation or night construction) will be used to minimize impacts on traffic flow. Require all open trenches and pits be covered with metal plates at the end of each workday to accommodate traffic and access.

Impact TRA-2: Construction of the Project would temporarily disrupt circulation patterns near sensitive land uses (schools, hospitals, fire stations, police stations, and other emergency providers). (*Less than Significant with Mitigation*)

The Project would result in temporary effects on traffic flow, particularly with pipeline construction within a road right-of-way. Open-trench pipeline construction within road rights-of-way would require the closure of one travel lane and shoulder (or parking lane), with one-way traffic control around the construction area on two-lane roads. Trenchless (i.e., horizontal directional drilling, jack and bore) pipeline construction would also require the closure of one travel lane and shoulder, but for much shorter segments of roadway that would accommodate the entry and exit points. The exception is the intersection of East Lake Avenue/Palm Avenue/Hushbeck Avenue, where geometric constraints may require full roadway closures at Palm Avenue and Hushbeck Avenue at the pipeline entry and exit points. These temporary full-road closures could last for up to one week, although the roadways would be open during non-construction hours using metal plates to cover the pits. Pipeline construction within or across streets could result in delays for emergency vehicle access, and would also obstruct pedestrian, bicycle, and vehicle access to schools. Construction along the pipeline alignments could cause delays to school buses and limit access to school bus stops.

Construction of the proposed weir structure, intake pump station, and WTP would not directly interfere with circulation patterns near sensitive land uses (i.e., schools, hospitals, fire stations, police stations, or other emergency providers) because no such uses are located adjacent to these proposed facilities. However, construction could indirectly disrupt circulation patterns near sensitive land uses, as haul routes could pass by sensitive land uses, and traffic may divert to roadways with sensitive land uses due to construction activity.

As stated previously in the discussion of Impact TRA-1, implementation of Mitigation Measure TRA-1b would require PV Water to coordinate with the Pajaro Valley Unified School

District prior to construction regarding construction schedule in the vicinity of schools and school access routes during construction. In addition, it would require the construction contractor to establish methods for maintaining traffic flow in and along the subject roadway corridor and minimizing disruption to emergency vehicle access to land uses along the alignment. Specific requirements that may be included in the traffic control/traffic management plan regarding emergency access and access to public schools are identified under Mitigation Measure TRA-1b. With implementation of Mitigation Measure TRA-1b, impacts related to temporary effects on emergency access and access to public schools would be mitigated to ***less than significant***.

Mitigation Measure TRA-1b: Construction Traffic Control/Traffic Management Plan (refer to Impact TRA-1)

Impact TRA-3: Construction of the Project would have temporary effects on alternative transportation or alternative transportation facilities in the Project area. (*Less than Significant with Mitigation*)

The Project would not result in any long-term impact on demand for alternative transportation or on alternative transportation facilities (i.e., for transit and bicyclists). However, pipeline construction along Project area roadways could disrupt bicycle facilities (i.e., Holohan Road and West Beach Street) and access to bus stops and slow bus movements for bus routes provided by Santa Cruz Transit; see Public Transit discussion in Section 3.9.1.1.

As stated previously in the discussion of Impact TRA-1, implementation of Mitigation Measure TRA-1b would require the construction contractor to establish methods for minimizing construction effects on transit service. Specific requirements that may be included in the traffic control/traffic management plan are identified under Mitigation Measure TRA-1b. With implementation of Mitigation Measure TRA-1b, impacts related to effects on alternative transportation or alternative transportation facilities would be mitigated to ***less than significant***.

Mitigation Measure TRA-1b: Construction Traffic Control/Traffic Management Plan (refer to Impact TRA-1)

Impact TRA-4: Construction of the Project could temporarily increase the potential for accidents on Project area roadways. (*Less than Significant with Mitigation*)

The Project would not alter the permanent configuration (alignment) of area roadways, and would not introduce types of vehicles that are not already traveling on area roads. However, construction zones in the public right-of-way and heavy equipment operating adjacent to or within a road right-of-way would increase the potential for accidents. Construction-generated trucks on Project area roadways could interact with other vehicles. Potential conflicts could also occur between construction traffic and alternative modes of transportation (e.g., bicyclists and buses).

As stated previously in the discussion of Impact TRA-1, implementation of Mitigation Measure TRA-1b requires the contractor to prepare a traffic control/traffic management plan in accordance with professional engineering standards prior to construction, including compliance with roadside safety protocols, so as to reduce the risk of accidents. Specific requirements that may be included in the traffic management plan are identified under Mitigation Measure TRA-1b. Thus, implementation of Mitigation Measure TRA-1b would ensure temporary increases in the potential for accidents would be mitigated to ***less than significant***.

Mitigation Measure TRA-1b: Construction Traffic Control/Traffic Management Plan (refer to Impact TRA-1)

Impact TRA-5: Construction of the Project could increase wear-and-tear on the designated haul routes used by construction vehicles to access the Project sites. (*Less than Significant*)

This impact criterion was evaluated in the 2014 BMP Update PEIR. The 2014 BMP Update PEIR noted that local-serving roads, such as Holohan Road, may not be built with a pavement thickness that would withstand large heavy truck volumes. The projected increase in use of this or other local roadways by heavy trucks could result in significant wear on these roadways. The impact analysis conducted in the 2014 BMP Update PEIR for this impact criterion adequately addresses potential wear-and-tear impacts that could occur to local roadways as a result of increased truck volumes associated with construction of the Project. Implementation of adopted Mitigation Measure TR-1 from the 2014 BMP Update PEIR would reduce impacts to ***less than significant***.

Mitigation: None required.

Cumulative Impacts

Impact C-TRA-1: The Project, in combination with past, present, and probable future projects in the Project area, would have cumulatively considerable impacts on transportation and traffic. (*Less than Significant with Mitigation*)

The cumulative analysis of transportation and traffic impacts uses a list-based approach and identifies probable future projects that could contribute to a cumulative impact. The geographic scope for this analysis is the roadway network in the vicinity of the Project sites that would be affected by the Project.

Project Construction

Impacts on traffic associated with construction (e.g., an intermittent reduction in street and intersection operating capacity, potential conflicts with pedestrians/ bicyclists, overlap with construction of nearby related projects) are typically considered as potential short-term impacts. As noted above, the Project would result in significant traffic impacts during construction activities. However, implementation of Mitigation Measures TRA-1a, TRA-1b, and adopted Mitigation Measure TR-1 from the 2014 BMP Update PEIR, construction impacts on transportation and traffic would be reduced to less-than-significant levels. Each of the identified cumulative projects listed in Table 3.1-1 (see Section 3.1.3.2, Approach to Cumulative Impact Analysis in this EIR) would be required to comply with jurisdictional requirements regarding haul routes and would implement mitigation measures and/or include project characteristics, such as traffic controls and scheduling, notification, and safety procedures, to reduce potential traffic impacts during construction. In addition, many of the cumulative projects, like the Project, would likely restrict construction truck traffic and deliveries to off-peak hours to the extent feasible. Accordingly, Project-related contributions to cumulative construction traffic conditions during construction would be ***less than significant with mitigation***.

Project Operations

As discussed above in the impact discussion of the Project, operation and maintenance associated with the Project would result in a minimal amount of daily vehicle trips. This is due to the fact that the Project, once constructed, would require infrequent and minor maintenance, which would not result in any discernable effect on study area roadway operations. Additionally, operation of the Project would not alter the permanent configuration (alignment) of area roadways or introduce any barriers to travel. For these reasons, the Project would not result in any operational impacts and could not cause or contribute to any cumulative effects related to these transportation and traffic topics. Accordingly, Project-related contributions to cumulative construction traffic conditions during operation would be ***less than significant.***

> **Mitigation Measure TRA-1a: Encroachment Permits** (refer to Impact TRA-1)
>
> **Mitigation Measure TRA-1b: Construction Traffic Control/Traffic Management Plan** (refer to Impact TRA-1)

3.10 Cultural Resources

This section presents an analysis of potential impacts related to cultural resources that would result from implementation of the proposed College Lake Integrated Resources Management Project (Project). The analysis includes both site options (preferred and optional) for the water treatment plant as well as preferred and optional pipeline alignments for the College Lake pipeline. Information from the 2014 Basin Management Plan Update Program Environmental Impact Report (2014 BMP Update PEIR) that remains relevant and accurate for the purposes of describing the physical or regulatory setting of cultural resources has been incorporated as appropriate. The Project includes mitigation measures adopted by the Board of Directors to reduce the severity and magnitude of potential environmental effects.

3.10.1 Setting

The 2014 BMP Update PEIR Section 3.5.1 generally describes existing cultural resources in the Project region including archaeology and ethnography. This section describes aspects of the physical environmental setting salient to cultural resources for the Project area.

3.10.1.1 Geologic Setting

The California coast has undergone dramatic landscape changes since humans began to inhabit the region more than 10,000 years ago. Rising sea levels and increased sedimentation into streams and rivers are among the changes.[1] In many places, the interface between older land surfaces and Holocene-age[2] landforms are marked by a well-developed buried soil profile (or "paleosol"). Paleosols preserve the composition and character of the earth's surface prior to subsequent sediment deposition; thus, paleosols have the potential to preserve archaeological resources if the area was occupied or settled by humans.[3] Because human populations have grown since the arrival of the area's first inhabitants, younger paleosols (ca. 4,000 years ago to present) are more likely to yield archaeological resources than older Quaternary paleosols.[4]

The Project is located within the Pajaro Valley in southern Santa Cruz County, California. The basin is bounded on the west by Monterey Bay, on the east by the San Andreas Fault, on the north by hills composed of Pliocene-aged[5] marine sediments of the Purisima Formation, and on the south by hills composed of the Pleistocene-aged[6] Aromas Sands Formation. The basin is underlain by pre-Pliocene bedrock, which is covered in places by more than 1,200 meters (4,000 feet) of unconsolidated marine and terrestrial deposits that range in age from the Pliocene

---

1 Helley, E., K. LaJoie, W. Spangle and M. Blair, *Flatland deposits of the San Francisco Bay Region*, CA–their geology and engineering properties and their importance to comprehensive planning. Geological Survey Professional Paper 943, United States Department of the Interior. Washington, D.C., 1979.

2 The Holocene Epoch is a period of geologic time that spans from the end of the last Ice Age (approximately 11,000 years ago) up to the present time.

3 Meyer, J., and J. Rosenthal, *Geoarchaeological Overview of the Nine Bay Area Counties in Caltrans District 4.* Prepared for Caltrans District 4, 2007.

4 The Quaternary Period is a broad length of geologic time spanning from 2.6 million years ago up to the present time.

5 The Pliocene Epoch is a period of geologic time that spans from 5.3 million to 2.6 million years ago.

6 The Pleistocene Epoch is a period of geologic time that spans from 2.6 million to 11,000 years ago.

to recent.[7] The basin is characterized by the Pajaro River, its tributaries, and a series of sloughs and shallow lakes. The headwaters of the river are within the Diablo Range to the east, and the mainstem is joined by tributaries from the Gabilan Mountains in the south, including the San Benito River, and the Santa Cruz Mountains in the north. Historically, much of the Pajaro River floodplain was tidally influenced. Although some portions remain tidally influenced large areas of the slough system and floodplain have been channelized and drained to create farmland.

Three geologic deposits are present within the Project area: Pleistocene-aged fluvial facies (*Qwf*); Holocene-aged older floodplain deposits (*Qof*); and Holocene-aged younger floodplain deposits (*Qyf*).[8] The vast majority of the Project is underlain by older and younger floodplain deposits.

Pleistocene-aged (quaternary) fluvial facies (*Qwf*) are terrace deposits of Watsonville and consist of semiconsolidated, moderately to poorly sorted silt, sand, silty clay, and gravel, which may be more than 200 feet thick. Gravel, approximately 50 feet thick, is generally present 50 feet below the surface of the deposit. The upper 5 to 15 feet of the unit is moderately indurated (hardened) owing to clay and iron oxide cementation in weathered zone.

Holocene-aged older floodplain deposits (*Qof*) consist of unconsolidated, fine-grained sand, silt, and clay. Deposits are more than 200 feet thick beneath parts of the Pajaro River flood plain. The lower parts of these deposits include large amounts of gravel, which provide groundwater for the uses within the Pajaro Valley.

Holocene-aged younger floodplain deposits (*Qyf*) consist of unconsolidated, fine-grained, heterogeneous deposits of sand and silt, commonly containing relatively thin, discontinuous layers of clay. The thickness of the unit is generally less than 20 feet.

3.10.1.2 Prehistoric Setting

Archaeologists have developed individual, cultural, chronological sequences tailored to the archaeology and material culture of each subregion of California. Each of these sequences is based principally on the presence of distinctive cultural traits and stratigraphic separation of deposits. Jones et al.[9] provide a framework for the interpretation of the Central Coast and the Monterey Bay Area. The authors divide human history on the Central Coast into six broad periods: the Paleo-Indian Period (pre-8000 B.C.), the Early Archaic Period (8000 to 3500 B.C.), the Early Period (3500 to 600 B.C.), the Middle Period (600 B.C. to A.D. 1000), the Middle/Late Transition Period (1000 to 1250 A.D.), and the Late Period (A.D. 1250–1769). The periods have been largely defined on the basis of distinctive bead types; typological analysis and radiocarbon dating of Olivella beads show the bead sequence in the Monterey Bay Area as generally similar to those of the California Central Valley and the Santa Barbara Coast. Economic patterns, stylistic aspects, and regional phases further subdivide cultural periods into shorter phases. This scheme

---

7 Muir, K.S., *Preliminary Report on Geology and Ground Water of the Pajaro Valley Area*, Santa Cruz and Monterey Counties, California. Open-File Report 73-199. U.S. Geological Survey, Menlo Park, California, 1972.

8 Brabb, E.E., *Geologic map of Santa Cruz County, California*: a digital database: U.S. Geological Survey, Open-File Report OF-97-489, scale 1:62,500, 1997.

9 Jones, T.L., N.E. Stevens, D.A. Jones, R.T. Fitzgerald, and M.G. Hylkema, The Central Coast: A Midlatitude Milieu. In *Prehistoric California: Colonization, Culture, and Complexity*. Edited by T.L. Jones and K.A. Klar, pp. 125–146, AltaMira Press, 2007.

uses economic and technological types, socio-politics, trade networks, population density, and variations of artifact types to differentiate between cultural periods.

Evidence of human habitation during the Paleo-Indian Period, characterized by big-game hunters occupying broad geographic areas, has not yet been discovered in the Monterey Bay Area. The oldest known occupation of the Monterey Bay area dates from ca. 5000 B.C., however data representing this earliest occupation are limited. The Early Archaic Period is represented by the Millingstone Culture (8000 to 3500 B.C.) and is marked by large numbers of handstones and/or millingslabs, crude core and cobble-core tools, and less abundant flake tools and large side-notched projectile points. Millingstone components have been identified at locations in Monterey County near Elkhorn Slough and Monterey Peninsula. Faunal remains indicate that Millingstone people exploited shellfish, fish, birds, and mammals, and with a majority of Millingstone sites less than 25 kilometers from the shoreline there appears to have been a focus on shellfish consumption. Virtually all of the earliest known sites have been identified on the shore or in pericoastal valleys.

The Early and Middle Periods are represented by the Hunting Culture (3500 B.C. to A.D. 1250), which was marked by large quantities of stemmed and notched projectile points. During the Early Period (3500 to 600 B.C.), the first cut shell beads and the mortar and pestle are documented in burials, indicating the beginning of a shift from mobility to sedentism. During the Middle Period, (600 B.C. to A.D. 1000), geographic mobility may have continued, although groups began to establish longer-term base camps in localities from which a more diverse range of resources could be exploited. The first rich middens are recorded from this period. The addition of milling tools, obsidian and chert concave-base projectile points, and the occurrence of sites in a wider range of environments suggest that the economic base was more diverse and required logistical hunting techniques. Coastal habitation was still preferred but large Hunting Culture middens have also been identified in inland valleys.

The Late Period (A.D. 1250–1769) is distinguished from the Hunting Culture by large amounts of Desert side-notched and Cottonwood arrow points, small bifacial bead drills, bedrock mortars, hopper mortars, distinct Olivella bead types, and steatite disk beads. These assemblages represent social complexity developed toward lifeways of large, central villages with resident political leaders and specialized activity sites. This differs dramatically from the Hunting Culture materials and may represent developments associated with population increase, environmental changes, and ethnic migrations.

3.10.1.3 Historic Setting

Spanish incursions into the Monterey Bay region began in the early seventeenth century when the Sebastian Vizcaino expedition arrived at Monterey in 1602. It was not until over a century later that the Spanish government began to take an active interest in colonizing what was then known as Alta California. Captain Gaspar de Portola led a land expedition to Monterey by way of the coast in 1769.[10] The first Spanish exploration of the Salinas Valley followed in 1774, when Don

[10] Hoover, M. B., H. E. Rensch, E. G. Rensch, W. N. Abeloe, *Historic Spots in California.* Revised by Douglas E. Kyle. Stanford University Press, Palo Alto, CA, 2002.

Juan Bautista de Anza's expedition established a route through the valley to Monterey. This route was known as El Camino Real, or the Royal Road.[11]

Spanish control of California ended with Mexican independence in 1821. In 1834 the Mexican government secularized the Spanish missions. In Santa Cruz County, 21 land grants were made to Mexican settlers. Most grantees used their land to establish ranches with enormous free-ranging herds of horses and Spanish cattle, as it was cattle that powered the Californio[12] economy. Cattle hides and tallow were the medium of exchange in business transactions among the Californios and with many trading ships that came from the American east coast.[13]

The 1848 Treaty of Guadalupe Hidalgo brought Alta California under control of the United States of America. News of the Gold Rush that same year sparked a huge migration into California. Due to the rapid influx of settlers into the area, legal determinations of ownership of lands awarded by Spanish or Mexican authorities were often disputed. The new American government passed the Land Act of 1851, which placed the burden of proof-of-ownership to the grantees so that the few Native Americans who had received grants lost their title, as did many of the Hispanic owners. By congressional action, a board of Land Commissioners heard grant claims; their decision was then appealed in Federal Courts.[14]

History of the Project Area

Cattle and sheep ranching dominated the area until the 1880s. During this time, free-range, comparatively wild Spanish cattle were replaced by American breeds of livestock and dairy cows. Fencing with wooden posts and barbed wire became a prominent feature across the landscape. Agriculture in the area became more intensive when farming shifted to wheat and barley cultivation. Early crops also included sugar beets and alfalfa. Apple orchards were the dominant crop in the Pajaro Valley for much of the 20th Century. While apple orchards remain, the majority of agriculture in the Pajaro Valley has been replaced by crops that can be harvested more than once a year, including berries and vegetables. After World War II, Watsonville also became a frozen-food processing center.[15]

The development of railroads, including the Southern Pacific and regional lines such as the Monterey and Salinas Valley Railroad and the Pajaro Valley Consolidated Railroad, allowed for distribution and improved marketing for the Central Coast Region. By the 1890s, Watsonville had

[11] Breschini, Gary S., and Trudy Haversat, *Preliminary Archaeological Report and Cultural Resources Management Plan for Two Proposed School Sites, Watsonville, Santa Cruz County, California*. Report on file at Northwest Information Center, 1989; Breschini, Gary S., and Trudy Haversat, *Archaeological Investigations at CA-SCR-44, Northeast of Watsonville, Santa Cruz County, California.* Report on file at Northwest Information Center, 1989.

[12] Spanish speaking, Catholic persons of Latin American descent born in Alta California between 1769 and 1848

[13] Hoover, M. B., H. E. Rensch, E. G. Rensch, W. N. Abeloe, *Historic Spots in California.* Revised by Douglas E. Kyle. Stanford University Press, Palo Alto, CA, 2002; Breschini, Gary S., and Trudy Haversat, *Preliminary Archaeological Report and Cultural Resources Management Plan for Two Proposed School Sites, Watsonville, Santa Cruz County, California*. Report on file at Northwest Information Center, 1989; Breschini, Gary S., and Trudy Haversat, *Archaeological Investigations at CA-SCR-44, Northeast of Watsonville, Santa Cruz County, California.* Report on file at Northwest Information Center, 1989.

[14] Ibid.

[15] National Museum of American History, Delivering the Goods. Accessed on April 28, 2018. Available online at http://amhistory.si.edu/onthemove/exhibition/exhibition_3_1.html.

a thriving freight business, serving the needs of the Pajaro Valley's agricultural commerce. Local farmers and fruit packing houses shipped strawberries, apples, and other fruits and vegetables to market at San Francisco and beyond. The development of the refrigerator car allowed produce to be shipped as far as Chicago and New York, opening up new markets to Pajaro Valley's farmers.[16] By 1901, the coast route was open and running between San Francisco and Los Angeles, further opening up distribution routes.

A port was established in the Pajaro Valley for a brief 11-year-period from 1902 to 1913, with an associated double-track railroad running approximately along the present route of Beach Road (within the College Lake pipeline route). The port suffered extensive damage in 1904 and 1912, and by 1913 had completely folded.[17]

Numerous ethnic groups have called Watsonville and the Pajaro Valley home since the mid-1800s, including those of Slavic, Chinese, Japanese, Filipino, and Mexican descent. Slavic groups entered the area as agriculture boomed after development of the railroads, first meeting the need for field labor and later entering the buying, shipping, and farming markets. At one point they controlled at least one-third of the orchards in and around Watsonville.[18]

The Chinese entered the area after the Gold Rush and railroad-buildings eras, establishing fishing villages and providing field labor. By the mid-1880s, a Chinatown had been established in Watsonville along Main Street and Union Street to Maple Avenue[19] (adjacent to the College Lake pipeline route). After the Chinese exclusion Act of 1882, availability of Chinese labor declined.[20]

The Japanese first immigrated into the area around 1892 on lumber-cutting contracts, but soon began to fill the need of low cost farm labor left vacant by declining Chinese populations. The National Origins Act of 1924 restricted Japanese immigration, again leading to a decline in low cost farm labor.[21] In 1942, the Japanese were moved to internment camps for the duration of World War II. While many were reluctant to return to Pajaro Valley after the end of the war due to anti-Japanese sentiments, the establishment of a hostel at the first Buddhist Church and Japanese Language Buildings encouraged them to return, and they established strawberry and flower growing industries.[22]

---

16 National Museum of American History, Watsonville Railroad Freight Yards. Accessed April 28, 2018. Available online at http://amhistory.si.edu/onthemove/collection/object_384.html.

17 Edwards, Rob, and Mary Ellen Farley, *An Assessment of the Cultural Resources of the Lower Pajaro River Basin, California, with Selected Preliminary Field Study*. Prepared for the U.S. Army Corp of Engineers, San Francisco. Document on file at Northwest Information Center, 1974.

18 Ibid.

19 Sanborn Fire Insurance Maps, Watsonville, Sheet 2, 1886. Accessed on April 28, 2018. Available online at https://www.lapl.org/collections-resources/research-and-homework#S.

20 National Museum of American History, Delivering the Goods. Accessed April 28, 2018. Available online at http://amhistory.si.edu/onthemove/exhibition/exhibition_3_1.html.

21 National Museum of American History, Delivering the Goods. Accessed April 28, 2018. Available online at http://amhistory.si.edu/onthemove/exhibition/exhibition_3_1.html.

22 Edwards, Rob, and Mary Ellen Farley, *An Assessment of the Cultural Resources of the Lower Pajaro River Basin, California, with Selected Preliminary Field Study*. Prepared for the U.S. Army Corp of Engineers, San Francisco. Document on file at Northwest Information Center, 1974.

Filipino immigrants first entered Pajaro Valley in the 1920s after the expiration of Hawaiian sugar contracts and to fill the need for low cost farm labor. By January 1930, anti-Filipino sentiments prompted the Northern Monterey County Chamber of Commerce to publicly state that whites had a supreme right to inhabit the county, setting off a race riot. On January 22, a mob of 700 whites attacked Filipinos in their homes, killing one Filipino man. In 1934, a Repatriation Bill offered to pay Filipinos their passage back to the Philippines, but most declined the offer and stayed in Pajaro Valley. Many were later drafted in World War II.[23]

Mexican farm laborers became an increasingly important source of labor after the 1920s. During World War II, the United States encouraged Mexican immigration through the issuance of short-term agricultural labor contracts in anticipation of labor shortages due to the war. By the time the program ended in 1964, Mexicans had become the dominant source of farm labor in the Watsonville region. Today, Watsonville’s population is approximately 70 percent Latino, and they continue to provide over 90 percent of the farm labor.[24]

During the Great Depression in the 1930s, many families migrated from the Dust Bowl of Oklahoma and the surrounding area to Pajaro Valley in search of work, establishing camps along the river banks. Competition between out-of-work white migrants and ethnic laborers led to an eruption of violence, and eventually more offers to provide free transport home to Mexicans and Filipinos who shared the same economic and labor profile.[25]

3.10.1.4 Identification of Historical and Archaeological Resources

Previously Recorded Archaeological Resources

Records searches for the Project were conducted through the California Historical Resources Information System (CHRIS) Northwest Information Center (NWIC) housed at Sonoma State University on June 22, 2017 (File No. 16-2078) and August 4, 2017 (File No. 17-0246) and updated on September 19, 2017 (File No. 17-0246) and April 25, 2018 (File No. 17-2410).[26]

The records search results indicate that 138 cultural resources studies have been conducted within a one-half-mile radius of the Project sites. Approximately 70 percent of the one-half mile records search radius has been included in previous cultural resources surveys. Of the previous studies, 22 overlap the Project area. Approximately 35 percent of the Project area has been included in previous cultural resources studies.

---

[23] Ibid.

[24] National Museum of American History, Delivering the Goods. Accessed April 28, 2018. Available online at http://amhistory.si.edu/onthemove/exhibition/exhibition_3_1.html.

[25] Edwards, Rob, and Mary Ellen Farley, *An Assessment of the Cultural Resources of the Lower Pajaro River Basin, California, with Selected Preliminary Field Study*. Prepared for the U.S. Army Corp of Engineers, San Francisco. Document on file at Northwest Information Center, 1974.

[26] Ehringer, C., C. Lockwood, M. Loder, and F. Clark, *College Lake Integrated Resources Management Project, City of Watsonville and Unincorporated Santa Cruz County, California: Cultural Resources Assessment Report*, prepared for Pajaro Valley Water Management Agency, prepared by ESA, June 2018.

The records search results indicate that seven archaeological resources have been previously recorded within a one-half-mile radius of the Project sites, including four prehistoric archaeological resources (CA-SCR-107, -150, -286, and -295); two multicomponent archaeological resources (CA-SCR-44/H and -104/H); and one informal resource (Site X – possible site). In addition, two resources within the one-half-mile radius but not on file at NWIC include one prehistoric archaeological site (CL-2) and one historic-period archaeological site (P-1H).[27]

Of the nine resources, two (CA-SCR-44/H and CA-SCR-150) overlap a Project component (new lake storage area). CA-SCR-44/H is a multicomponent site consisting of a prehistoric component with Native American burials and a historic component. The prehistoric component of CA-SCR-44/H has been previously recommended eligible for listing in the National Register and California Register under Criterion D/4.[28] Refer to Section 3.10.2 for a discussion of the criteria related to eligibility for listing in the National Register and California Register. CA-SCR-150 is a prehistoric archaeological site with a scatter of shell, flaked stone, and groundstone. CA-SCR-150 does not appear to have been previously evaluated for listing in the National Register or California Register.[29]

Previously Recorded Historic Architectural Resources

A review of NWIC files and the Historic Property Data File for Santa Cruz County indicated that 43 historic resources (primarily residential and commercial structures) have been previously documented within or adjacent to Project components.[30] One resource (P-44-000395 – Watsonville Historic District) overlaps the College Lake pipeline route. The Watsonville Historic District encompasses the City of Watsonville boundary. The Watsonville Historic District has not been evaluated for listing in the National Register or California Register, nor have contributors and non-contributors been identified.

Cultural Resources Survey

A cultural resources survey of the Project area was conducted on April 12-13, 2018. Approximately 10 percent of the Project area was subject to systematic survey, with ground surface visibility varying from 50 to 100 percent. Approximately 5 percent of the Project area was subject to opportunistic survey, with ground surface visibility varying from 25 to 50 percent. Approximately 25 percent of the Project area was subject to windshield survey (conducting a survey from a

---

[27] Holson, John, Heather Price, and John Edwards, *Cultural Resources Survey for the Pajaro Valley Water Management Agency Distribution Pipeline*, prepared for Environmental Science Associates, prepared by Pacific Legacy, Inc., March, 1999.

[28] Breschini, Gary S., and Mary Doane, *Preliminary Cultural Resources Assessment and Mitigation Plan for Assessor's Parcel Number 051-501-016, Watsonville, Santa Cruz County, California*, prepared for Land Use Planning, Inc, document on file at Northwest Information Center, 1999.

[29] Stafford, Jean, *Site Record for CA-SCR-150*, document on file at the Northwest Information Center, 1976; Edwards, Rob, P. Cave, J. Fruitt, C. Phipps, M. Abby, S. Abrams, B. Anderson, J. Baker, J. Breman, C. Corey, J. Dillon, P. Duquette, *Site Record Update for CA-SCR-150*, document on file at Northwest Information Center, 1994; Holson, John, Heather Price, and John Edwards, *Cultural Resources Survey for the Pajaro Valley Water Management Agency Distribution Pipeline*, prepared for Environmental Science Associates, prepared by Pacific Legacy, Inc., March, 1999.

[30] Ehringer, C., C. Lockwood, M. Loder, and F. Clark, *College Lake Integrated Resources Management Project, City of Watsonville and Unincorporated Santa Cruz County, California: Cultural Resources Assessment Report*, prepared for Pajaro Valley Water Management Agency, prepared by ESA, June 2018.

vehicle). Approximately 60 percent of the Project area was not surveyed due to access limitations, no visible native ground surface, or inundation. All resources meeting the California Office of Historic Preservation's 45-year-old age threshold for consideration as historical resources were documented on California Department of Parks and Recreation 523 series forms.

A total of five newly identified historic architectural resources meeting the California Office of Historic Preservation's 45-year-old age threshold were documented during the 2018 survey: ESA-Built-001 (pump intake house and weir), ESA-Built-002 (76 Holohan Road – residence), ESA-Built-003 (38 Holohan Road – agricultural buildings), ESA-Built-004 (canal segment), and ESA-Built-005 (railroad spur). These resources were evaluated for listing in the National Register and California Register and found ineligible.[31] No archaeological resources were identified as a result of the survey.

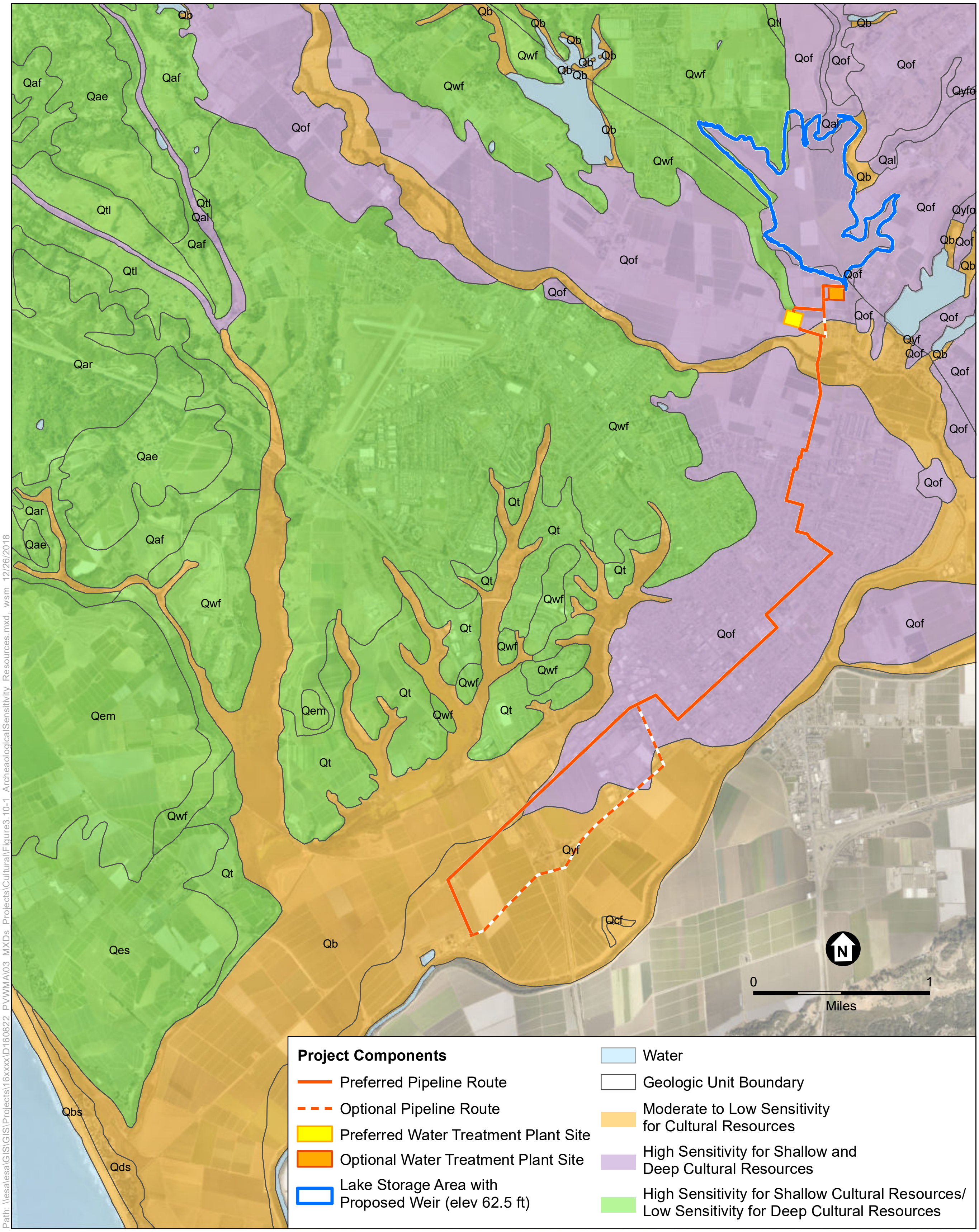
3.10.1.6 Geoarchaeological Review

The geoarchaeological study was based on a review of previously recorded archaeological sites obtained through records searches at the CHRIS-NWIC, a literature review, and a review of geologic maps, soils maps, and historical aerial photos and maps covering the Project area.[32] The geoarchaeological review indicates that the majority of the Project area is considered to have a high sensitivity for prehistoric archaeological resources and that these resources could be shallowly or deeply buried. As indicated on **Figure 3.10-1**, areas with moderate to low sensitivity for cultural resources are shaded orange; areas with high sensitivity for shallow (less than one meter below ground surface) and deep (greater than one meter below ground surface) cultural resources are shaded purple; and areas with high sensitivity for shallow cultural resources but low sensitivity for deep cultural resources are shaded green. Most of the previously identified cultural resources on file at the CHRIS-NWIC correspond to the green or purple shaded areas on Figure 3.10-1.

Areas that have the highest probability to contain significant resources are within 200 meters (656 feet) of the high water mark of the College Lake water storage area based on the distribution of known archaeological sites and Holocene depositional history of the College Lake area. Areas that have a relatively lower, though still moderate, probability to contain significant deposits include the low-lying floodplain area.

[31] These resources are not recommended for listing under either National Register or California Register criteria based on lack of significant associations with events or persons, lack of distinctive architecture, and because the sites are unlikely to yield significant information. For details, refer to Ehringer, C., C. Lockwood, M. Loder, and F. Clark, *College Lake Integrated Resources Management Project, City of Watsonville and Unincorporated Santa Cruz County, California: Cultural Resources Assessment Report*, prepared for Pajaro Valley Water Management Agency, prepared by ESA, June 2018.

[32] Ehringer, C., C. Lockwood, M. Loder, and F. Clark, *College Lake Integrated Resources Management Project, City of Watsonville and Unincorporated Santa Cruz County, California: Cultural Resources Assessment Report*, prepared for Pajaro Valley Water Management Agency, prepared by ESA, June 2018.



Path: \\esa\esa\GIS\GIS\Projects\16xxxx\D160822_PVWMA\03_MXDs_Projects\Cultural\Figure3.10-1_ArchaeologicalSensitivity_Resources.mxd, wsm 12/26/2018

SOURCE: USGS, 1997; ESA, 2017

College Lake Integrated Resources Management Project

Figure 3.10-1
Archaeological Sensitivity

ESA

3.10.2 Regulatory Framework

3.10.2.1 Federal and State

Historic Resources, Archaeological Resources, and Human Remains

National Historic Preservation Act

The principal federal law addressing historic properties is the National Historic Preservation Act (NHPA), as amended (54 United States Code of Laws 300101 et seq.), and its implementing regulations (36 Code of Federal Regulations [CFR] Part 800). Section 106 requires a federal agency with jurisdiction over a proposed federal action (referred to as an "undertaking" under the NHPA) to take into account the effects of the undertaking on historic properties, and to provide the Advisory Council on Historic Preservation an opportunity to comment on the undertaking.

The term "historic properties" refers to "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register" (36 CFR Part 800.16(*l*)(1)). The implementing regulations (36 CFR Part 800) describe the process for identifying and evaluating historic properties, for assessing the potential adverse effects of federal undertakings on historic properties, and seeking to develop measures to avoid, minimize, or mitigate adverse effects. The Section 106 process does not require the preservation of historic properties; instead, it is a procedural requirement mandating that federal agencies take into account effects to historic properties from an undertaking prior to approval.

The steps of the Section 106 process are accomplished through consultation with the State Historic Preservation Officer, federally-recognized Indian tribes, local governments, and other interested parties. The goal of consultation is to identify potentially affected historic properties, assess effects to such properties, and seek ways to avoid, minimize, or mitigate any adverse effects on such properties. The agency also must provide an opportunity for public involvement (36 CFR 800.1(a)). Consultation with Indian tribes regarding issues related to Section 106 and other authorities (such as the National Environmental Policy Act and Executive Order No. 13007) must recognize the government-to-government relationship between the Federal government and Indian tribes, as set forth in Executive Order 13175, 65 FR 87249 (November 9, 2000), and Presidential Memorandum of November 5, 2009.

National Register of Historic Places

The National Register of Historic Places (National Register) was established by the NHPA of 1966, as "an authoritative guide to be used by federal, State, and local governments, private groups and citizens to identify the Nation's historic resources and to indicate what properties should be considered for protection from destruction or impairment" (36 CFR 60.2).[33] The National Register recognizes a broad range of cultural resources that are significant at the national, state, and local levels and can include districts, buildings, structures, objects, prehistoric archaeological sites, historic-period archaeological sites, traditional cultural properties, and

33 U.S. Department of the Interior, National Park Service, *How to Apply the National Register Criteria for Evaluation*, National Register Publications, Washington D.C., 2002.

cultural landscapes. As noted above, a resource that is listed in or eligible for listing in the National Register is considered “historic property” under Section 106 of the NHPA.

To be eligible for listing in the National Register, a property must be significant in American history, architecture, archaeology, engineering, or culture. Properties of potential significance must meet one or more of the following four established criteria:

A. Are associated with events that have made a significant contribution to the broad patterns of our history;

B. Are associated with the lives of persons significant in our past;

C. Embody the distinctive characteristics of a type, period, or method of construction or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

D. Have yielded, or may be likely to yield, information important in prehistory or history.

In addition to meeting one or more of the criteria of significance, a property must have integrity. Integrity is defined as “the ability of a property to convey its significance”.[34] The National Register recognizes seven qualities that, in various combinations, define integrity. The seven factors that define integrity are location, design, setting, materials, workmanship, feeling, and association. To retain historic integrity a property must possess several, and usually most, of these seven aspects. Thus, the retention of the specific aspects of integrity is paramount for a property to convey its significance.

Ordinarily religious properties, moved properties, birthplaces or graves, cemeteries, reconstructed properties, commemorative properties, and properties that have achieved significance within the past 50 years are not considered eligible for the National Register unless they meet one of the Criteria Considerations, in addition to meeting at least one of the four significance criteria above (A-D) and possessing integrity.[35]

California Environmental Quality Act

The California Environmental Quality Act (CEQA) is the principal statute governing environmental review of projects occurring in the state and is codified in Public Resources Code Section 21000 et seq. CEQA requires lead agencies to determine if a proposed project would have a significant effect on the environment, including significant effects on historical or unique archaeological resources. Under CEQA (Section 21084.1), a project that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment.

The CEQA *Guidelines* (California Code of Regulations Title 14, Section 15064.5) recognize that historical resources include: (1) a resource listed in, or determined to be eligible by the State Historical Resources Commission, for listing in the California Register of Historical Resources (California Register); (2) a resource included in a local register of historical resources, as defined

[34] Ibid.
[35] Ibid.

in Public Resources Code Section 5020.1(k) or identified as significant in a historical resource survey meeting the requirements of Public Resources Code Section 5024.1(g); and (3) any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California by the lead agency, provided the lead agency's determination is supported by substantial evidence in light of the whole record. The fact that a resource does not meet the three criteria outlined above does not preclude the lead agency from determining that the resource may be a historical resource as defined in Public Resources Code Sections 5020.1(j) or 5024.1.

If a lead agency determines that an archaeological site is a historical resource, the provisions of Section 21084.1 of CEQA and Section 15064.5 of the CEQA *Guidelines* apply. If an archaeological site does not meet the criteria for a historical resource contained in the CEQA *Guidelines*, then the site may be treated in accordance with the provisions of Section 21083, which is as a unique archaeological resource. As defined in Section 21083.2 of CEQA a "unique" archaeological resource is an archaeological artifact, object, or site, about which it can be clearly demonstrated that without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

- Contains information needed to answer important scientific research questions and there is a demonstrable public interest in that information;
- Has a special and particular quality such as being the oldest of its type or the best available example of its type; or
- Is directly associated with a scientifically recognized important prehistoric or historic event or person.

If an archaeological site meets the criteria for a unique archaeological resource as defined in Section 21083.2, then the site is to be treated in accordance with the provisions of Section 21083.2, which state that if the lead agency determines that a project would have a significant effect on unique archaeological resources, the lead agency may require reasonable efforts be made to permit any or all of these resources to be preserved in place (Section 21083.1(a)). If preservation in place is not feasible, mitigation measures shall be required. The CEQA *Guidelines* note that if an archaeological resource is neither a unique archaeological nor a historical resource, the effects of the project on those resources shall not be considered a significant effect on the environment (CEQA *Guidelines* Section 15064.5(c)(4)).

A significant effect under CEQA would occur if a project results in a substantial adverse change in the significance of a historical resource as defined in CEQA *Guidelines* Section 15064.5(a). Substantial adverse change is defined as "physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of a historical resource would be materially impaired" (CEQA *Guidelines* Section 15064.5(b)(1)). According to CEQA *Guidelines* Section 15064.5(b)(2), the significance of a historical resource is materially impaired when a project demolishes or materially alters in an adverse manner those physical characteristics that:

A. Convey its historical significance and that justify its inclusion in, or eligibility for, inclusion in the California Register;

B. Account for its inclusion in a local register of historical resources pursuant to Section 5020.1(k) of the Public Resources Code or its identification in a historical resources survey meeting the requirements of Section 5024.1(g) of the Public Resources Code, unless the public agency reviewing the effects of the project establishes by a preponderance of evidence that the resource is not historically or culturally significant; or

C. Convey its historical significance and that justify its eligibility for inclusion in the California Register as determined by a Lead Agency for purposes of CEQA.

In general, a project that complies with the *Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings*[36] is considered to have mitigated its impacts to historical resources to a less-than-significant level (CEQA *Guidelines* Section 15064.5(b)(3)).

California Register of Historical Resources

The California Register is "an authoritative listing and guide to be used by State and local agencies, private groups, and citizens in identifying the existing historical resources of the State and to indicate which resources deserve to be protected, to the extent prudent and feasible, from substantial adverse change" (Public Resources Code Section 5024.1(a)). The criteria for eligibility for the California Register are based upon National Register criteria (Public Resources Code Section 5024.1(b)). Certain resources are determined by the statute to be automatically included in the California Register, including California properties formally determined eligible for, or listed in, the National Register.

To be eligible for the California Register, a prehistoric or historic-period property must be significant at the local, state, and/or federal level under one or more of the following four criteria:

1. Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
2. Is associated with the lives of persons important in our past;
3. Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
4. Has yielded, or may be likely to yield, information important in prehistory or history.

A resource eligible for the California Register must meet one of the criteria of significance described above, and retain enough of its historic character or appearance (integrity) to be recognizable as a historical resource and to convey the reason for its significance. It is possible that a historic resource may not retain sufficient integrity to meet the criteria for listing in the National Register, but it may still be eligible for listing in the California Register.

---

36 U.S. Department of the Interior, National Park Service, Technical Preservation Services, *The Secretary of the Interior's Standards for the Treatment of Historic Properties*, authored by Kay D. Week and Anne E. Grimmer, 1995, revised by Anne E. Grimmer, 2017.

Additionally, the California Register consists of resources that are listed automatically and those that must be nominated through an application and public hearing process. The California Register automatically includes the following:

- California properties listed on the National Register and those formally determined eligible for the National Register;
- California Registered Historical Landmarks from No. 770 onward; and
- Those California Points of Historical Interest that have been evaluated by the State Office of Preservation and have been recommended to the State Historical Commission for inclusion on the California Register.

Other resources that may be nominated to the California Register include:

- Historical resources with a significance rating of Category 3 through 5 (those properties identified as eligible for listing in the National Register, the California Register, and/or a local jurisdiction register);
- Individual historical resources;
- Historical resources contributing to historic districts; and
- Historical resources designated or listed as local landmarks, or designated under any local ordinance, such as an historic preservation overlay zone.

California Health and Safety Code Section 7050.5

California Health and Safety Code Section 7050.5 requires that in the event human remains are discovered, the County Coroner be contacted to determine the nature of the remains. In the event the remains are determined to be Native American in origin, the Coroner is required to contact the Native American Heritage Commission within 24 hours to relinquish jurisdiction.

California Public Resources Code Section 5097.98

California Public Resources Code Section 5097.98 provides procedures in the event human remains of Native American origin are discovered during project implementation. Public Resources Code Section 5097.98 requires that no further disturbances occur in the immediate vicinity of the discovery, that the discovery is adequately protected according to generally accepted cultural and archaeological standards, and that further activities take into account the possibility of multiple burials. Public Resources Code Section 5097.98 further requires the Native American Heritage Commission, upon notification by a County Coroner, designate and notify a Most Likely Descendant (MLD) regarding the discovery of Native American human remains. Once the MLD has been granted access to the site by the landowner and inspected the discovery, the MLD then has 48 hours to provide recommendations to the landowner for the treatment of the human remains and any associated grave goods.

In the event that no descendant is identified, or the descendant fails to make a recommendation for disposition, or if the land owner rejects the recommendation of the descendant, the landowner may, with appropriate dignity, reinter the remains and burial items on the property in a location that will not be subject to further disturbance.

California Government Code Sections 6254(r) and 6254.10

These sections of the California Public Records Act were enacted to protect archaeological sites from unauthorized excavation, looting, or vandalism. Section 6254(r) explicitly authorizes public agencies to withhold information from the public relating to "Native American graves, cemeteries, and sacred places maintained by the Native American Heritage Commission." Section 6254.10 specifically exempts from disclosure requests for "records that relate to archaeological site information and reports, maintained by, or in the possession of the Department of Parks and Recreation, the State Historical Resources Commission, the State Lands Commission, the Native American Heritage Commission, another state agency, or a local agency, including the records that the agency obtains through a consultation process between a Native American tribe and a state or local agency."

3.10.2.2 Local

Table 2-10 in Chapter 2, *Project Description*, identifies the approvals from Santa Cruz County and/or the City of Watsonville required for the Project. **Table 3.10-1** presents pertinent local plans and policies regarding cultural resources to support County and City consideration of project consistency with general plan policies.[37] In some cases, local policies are used in this EIR as criteria to determine the significance of physical effects on the environment (e.g., Impact NOI-1 in Section 3.8, Noise and Vibration).

3.10.3 Impacts and Mitigation Measures

3.10.3.1 Significance Criteria

In accordance with the CEQA, state CEQA *Guidelines* (including Appendix G), relevant plans, policies, and/or guidelines, and agency standards, the Project could have a significant impact if it were to:

- Cause a substantial adverse change in the significance of a historical resource pursuant to in Section 15064.5;[38]
- Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5; and/or
- Disturb any human remains, including those interred outside of formal cemeteries.

---

37 California Government Code Section 53091 exempts agencies like PV Water from complying with local building and zoning ordinances when locating or constructing facilities for the production, generation, storage, treatment, or transmission of water. California Government Code Section 65402(c) requires that PV Water notify cities and counties of its plans to construct projects or to acquire or dispose of property. The planning agency then has 40 days to determine project consistency with its general plan. If the planning agency disapproves, the disapproval may be overruled by PV Water.

38 Refer to Section 3.10.2.1, above, for information about Section 15064.5.

TABLE 3.10-1
LOCAL PLANS AND POLICIES RELEVANT TO THE PROJECT

CITY OF WATSONVILLE PLANS AND POLICIES
Watsonville General Plan
Goal 9.10; Archaeological Resources. Identify and protect prehistoric resources for their scientific, educational, and cultural values.
Policy 9.H: Archaeological Resources. The City shall foster and provide for the preservation of cultural resources and artifacts of historic and prehistoric human occupation within the Pajaro Valley.
SANTA CRUZ COUNTY PLANS AND POLICIES
Santa Cruz County General Plan/Local Coastal Program
5.19.1: Evaluation of Native American Cultural Sites. Protect all archaeological resources until they can be evaluated. Prohibit any disturbance of Native American Cultural Sites without an appropriate permit. Maintain the Native American Cultural Sites ordinance.
5.19.2; Site Surveys. Require an archaeological site survey (surface reconnaissance) as part of the environmental review process for all projects with very high site potential as determined by the inventory of archaeological sites, within the Archaeological Sensitive Areas, as designated on General Plan and Local Coastal Program Resources and Constraints Maps filed in the Planning Department.
5.19.3; Development Around Archaeological Resources. Protect archaeological resources from development by restricting improvements and grading activities to portions of the property not containing these resources, where feasible, or by preservation of the site through project design and/or use restrictions, such as covering the site with earthfill to a depth that ensures the site will not be disturbed by development, as determined by a professional archaeologist.
5.19.4: Archaeological Evaluations. Require the applicant for development proposals on any archaeological site to provide an evaluation, by a certified archaeologist, of the significance of the resource and what protective measures are necessary to achieve General Plan and Local Coastal Program Land Use Plan objectives and policies.
5.19.5: Native American Cultural Sites. Prohibit any disturbance of Native American Cultural Sites without an archaeological permit.
5.20.3: Development Activities. For development activities on property containing historic resources, require protection, enhancement and/or preservation of the historic, cultural, architectural, engineering or aesthetic values of the resource as determined by the Historic Resources Commission. Immediate or substantial hardship to a project applicant shall be considered in establishing project requirements.

SOURCE: City of Watsonville, Watsonville 2005 General Plan, Adopted May 24, 1994; County of Santa Cruz, 1994 General Plan/Local Coastal Program, Chapter 5 – Conservation and Open Space, Effective December 19, 1994; County of Santa Cruz, Santa Cruz County Code, Chapter 16.40 Native American Cultural Sites, October 2, 2018.

3.10.3.2 Methodology

As described in Section 3.1, this EIR provides an independent analysis of the Project's potential environmental impacts. **Table 3.10-2** presents mitigation measures from the 2014 BMP Update PEIR that were adopted by the Board of Directors (Resolution 2014-05) for the purpose of reducing impacts related to cultural resources. These adopted mitigation measures are considered part of the College Lake Project and thus are considered prior to any significance determinations. Potential impacts are evaluated in the following section. If warranted, additional mitigation is included and takes the form of (1) modifications to update the mitigation measures presented in Table 3.10-2 to reflect current conditions and site-specific impacts; or (2) new mitigation measures to replace or augment an adopted mitigation measure.

TABLE 3.10-2
2014 BMP UPDATE PEIR MITIGATION MEASURES – CULTURAL RESOURCES

CR-1a: Final pipeline and facility plans shall locate facilities and pipeline alignments away from identified and recorded archaeological sites in each component area based on a site reconnaissance and archaeological investigation conducted by a qualified archaeologist at the time site-specific construction plans are developed. The archaeologist shall identify the areal extent of potential recorded sites, assess potential significance to identified resources, recommend adjustment to siting of improvements, facilities and/or pipeline alignments, if necessary, and provide other recommendations to avoid impacts to identified significant resources. If a significant or potentially significant archaeological or historic resource is identified pursuant to the definitions in the State CEQA Guidelines as identified above, the consulting archaeologist shall develop an appropriate mitigation plan for the cultural resource. Possible mitigation measures for important cultural resources may include monitoring by a qualified archaeologist during construction at identified sensitive sites, documentation and recordation of the resource, recovery and relocation, or stabilization of the resource.
CR-1b: The cultural resource boundaries of potentially significant sites shall be marked as exclusion zones both on ground and on construction maps prior to the commencement of construction activities on component sites. Construction supervisory personnel shall be notified of the existence of cultural resources in each component area and will be required to keep personnel and equipment away from these cultural resources sites. During construction and operational phases, personnel and equipment will be restricted to each surveyed corridor for each component.
CR-1c: Should any as yet undiscovered cultural resources be uncovered at any component site, such as structural features, or unusual amounts of bone or shell, artifacts, human remains, or architectural remains be encountered during any development activities, work will be suspended and PV Water staff will be contacted. A qualified professional archaeologist shall be retained and will perform any necessary investigations to determine the significance of the find. PV Water will then implement any mitigation deemed necessary for the recordation and/or protection of the cultural resources. In addition, pursuant to Sections 5097.97 and 5097.98 of the State Public Resources Code and Section 7050.5 of the State Health and Safety Code, in the event of the discovery of human remains, all work must be halted and the County Coroner shall be immediately notified. If the remains are determined to be Native American, guidelines of the Native American Heritage Commission shall be adhered to in the treatment and disposition of the remains.
SOURCE: Pajaro Valley Water Management Agency, Resolution No. 2014-05, adopted April 16, 2014.

In accordance with adopted Mitigation Measure CR-1a, ESA conducted a cultural resources constraints analysis to identify cultural resources within or near Project components. The analysis was conducted to provide an initial assessment of Project components' potential to impact cultural resources and to provide recommendations to avoid or lessen impacts to known cultural resources under Section 106 of the National Historic Preservation Act of 1966 (Section 106) and CEQA, and also provides recommendations regarding future identification and evaluation of unknown resources. Pajaro Valley Water Management Agency (PV Water) used information from that analysis in identifying sites for the Project components in order to avoid or reduce potential impacts to known cultural resources.[39]

3.10.3.3 Impacts and Mitigation Measures

Impact CUL-1: The Project could cause a substantial adverse change in the significance of a historical resource pursuant to CEQA *Guidelines* Section 15064.5. (*Less than Significant with Mitigation*)

The following discussion focuses on architectural resources. Archaeological resources, including archaeological resources that are potentially historical resources according to CEQA *Guidelines* Section 15064.5, are addressed under Impact CUL-2.

No historical resources would be directly impacted by the Project. While the College Lake pipeline traverses the Watsonville Historic District (which is considered to be a historical

[39] Ehringer, C. Letter to Brian Lockwood, Pajaro Valley Water Management Agency, July 2017.

resource by PV Water pursuant to CEQA *Guidelines* Section 15064.5(a)(4)), pipeline construction would be limited to existing paved road right-of-ways, and would not directly result in a substantial adverse change to historical resources. Newly identified resources ESA-Built-001, -002, -003, -004, and -005 were found ineligible for listing in the National Register and California Register and do not qualify as historical resources under CEQA.

There is, however, a potential for the Project to result in indirect effects to adjacent historical resources. Numerous previously documented historic architectural resources qualifying as, or potentially qualifying as, historical resources are located adjacent to Project components, the construction of which has the potential to cause vibratory effects (particularly the College Lake pipeline within city streets in Watsonville). In addition, based on a review of historic aerial photographs, there are numerous other undocumented historic-age buildings adjacent to the College Lake pipeline.

The distance between all historic-age buildings and areas of Project construction was measured to determine if such buildings fell within the vibration impact contours for each type of construction equipment that would be used during construction (refer to Table 3.8-9 in Section 3.8, Noise and Vibration). With the exception of one building (200 Walker Street), no historic architectural resources are within the range that exceeds applied building damage thresholds. 200 Walker Street has not been previously evaluated for listing in the National Register or California Register, but is considered to be a historical resource by PV Water pursuant to CEQA *Guidelines* Section 15064.5(a)(4).

Historical resources located within 19 feet of a vibratory pile driver and 13 feet of a drill rig would be exposed to vibration levels expected to cause building damage, and the Project could result in a substantial adverse change in the significance of these resources. With implementation of **Mitigation Measure NOI-2**, which **(**among other things) would ensure that vibration generated during pipeline construction would not exceed a performance standard of 0.25 inches per second peak particle velocity (the threshold for historic buildings), this impact would be ***less than significant***.

> **Mitigation Measure NOI-2: Vibration Monitoring Plan** (refer to Impact NOI-3 in Section 3.8, Noise and Vibration)

Impact CUL-2: The Project could cause a substantial adverse change in the significance of an archaeological resource, including those determined to be a historical resource defined in Section 15064.5 or a unique archaeological resource defined in Public Resources Code 21083.2. (*Less than Significant with Mitigation*)

This section discusses archaeological resources that are potentially historical resources according to CEQA *Guidelines* Section 15064.5 as well as unique archaeological resources defined in Public Resources Code Section 21083.2(g).

Two previously recorded archaeological sites (CA-SCR-44/H and CA-SCR-150) overlap slightly with the proposed lake storage area. CA-SCR-44/H has been previously recommended eligible for listing in the National Register and California Register under Criterion D/4 (data potential) and is considered a historical resource pursuant to CEQA *Guidelines* Section 15064.5(a)(3). CA-SCR-150 has not been previously evaluated for listing in the National Register or California Register, but has been determined by PV Water to be a historical resource pursuant CEQA *Guidelines* Section 15064.5(a)(4). Neither site would be subject to direct impacts from Project-related ground disturbance, but there is potential for indirect impacts due to prolonged water storage compared to existing conditions and erosion.

There is also a potential for the Project to encounter buried archaeological resources during Project-related ground disturbance. The Project area is generally considered to have a moderate to high sensitivity for buried prehistoric archaeological resources, and the geoarchaeological review indicated that these resources could be shallowly or deeply buried. As indicated on Figure 3.10-1, areas with moderate to low sensitivity for cultural resources are shaded orange; areas with high sensitivity for shallow and deep cultural resources are shaded purple; and areas with high sensitivity for shallow cultural resources but low sensitivity for deep cultural resources are shaded green.

The areas with the highest potential to encounter historic-period archaeological resources includes the area along Maple Street/2nd Street between Main Street and Union Street where the original Chinatown was located in the mid-1880s. There may also be traces of the railroad line related to the Watsonville Railroad and Navigation Company's wharf at Palm Beach that once ran along the present route of Beach Road.

The Project has the potential to result in a substantial adverse change in the significance of an archaeological resource since there is potential for indirect impacts to known archaeological resources due to prolonged inundation and erosion, and to unknown archaeological resources from ground disturbance, which would extend up to 30 feet in depth. With implementation of **Mitigation Measures CUL-1a through CUL-1i**, which require retention of a qualified archaeologist, pre-construction surveys, development of a cultural resources monitoring and mitigation program, construction worker cultural resources sensitivity training, archaeological and Native American monitoring, treatment of inadvertent discoveries, and long-term monitoring of CA-SCR-44/H and CA-SCR-150, impacts to archaeological resources would be reduced to ***less than significant***.

Mitigation Measure CUL-1a: Retention of a Qualified Archaeologist

Prior to start of any ground-disturbing activities (i.e., demolition, pavement removal, pot-holing or auguring, boring, drilling, grubbing, vegetation removal, brush clearance, weed abatement, grading, excavation, trenching, or any other activity that has potential to disturb soil), PV Water shall retain a qualified archaeologist meeting the Secretary of the Interior's Professional Qualifications Standards for archaeology (codified in 36 CFR Part 61; 48 FR 44738-44739) to oversee and ensure that all mitigation related to archaeological resources is carried out.

Mitigation Measure CUL-1b: Pre-Construction Phase I Cultural Resources Survey

Prior to the start of any ground-disturbing activity, the qualified archaeologist shall conduct a pre-construction Phase I Cultural Resources Survey of all areas that have not been previously surveyed within the last five years. The survey shall document resources potentially qualifying as historical resources or unique archaeological resources under CEQA. The qualified archaeologist shall document the results of the survey in a Phase I Cultural Resources Survey Report that follows *Archaeological Resource Management Reports (ARMR): Recommended Contents and Format*.[40] The qualified archaeologist shall also prepare Department of Parks and Recreation 523 forms for resources encountered during the survey, which shall be appended to the report. If historic architectural resources are encountered that could potentially be impacted by the Project, the qualified archaeologist shall consult with a Qualified Architectural Historian meeting the Secretary of the Interior's Professional Qualifications Standards for architectural history (codified in 36 CFR Part 61; 48 FR 44738-44739). The qualified archaeologist shall submit the draft Phase I Cultural Resources Survey Report to PV Water at least 90 days prior to the start of ground disturbance. The qualified archaeologist shall submit the final Phase I Cultural Resources Survey Report to the Northwest Information Center.

In the event resources potentially qualifying as historical resources or unique archaeological resources under CEQA are identified during the survey, avoidance and preservation in place shall be the preferred manner of mitigating impacts to the resources. Preservation in place maintains the important relationship between artifacts and their archaeological context and also serves to avoid conflict with traditional and religious values of groups who may ascribe meaning to the resource. Preservation in place may be accomplished by, but is not limited to, avoidance, incorporating the resource into open space, capping, or deeding the site into a permanent conservation easement. If avoidance of archaeological resources is determined by PV Water to be infeasible in light of factors such as the nature of the find, Project design, costs, and other considerations, then the portion of the resource within the Area of Direct Impact shall be subject to presence/absence testing and if potentially significant deposits are identified, the resource shall be evaluated for significance under all four National Register/California Register Criteria (A/1-D/4). If a resource is found to be significant (i.e., meets the definition for historical resource in CEQA *Guidelines* Section 15064.5(a) or unique archaeological resource in Public Resources Code Section 21083.2(g)), the qualified archaeologist shall develop an Archaeological Data Recovery and Treatment Plan for the resource. When assessing significance and developing treatment for resources that are Native American in origin, the qualified archaeologist and PV Water shall consult with the appropriate Native American representatives.

Mitigation Measure CUL-1c: Development of a Cultural Resources Monitoring and Mitigation Program

The qualified archaeologist shall prepare a Cultural Resources Mitigation and Monitoring Program (CRMMP) based on the final approved Project design plans. The CRMMP shall be submitted to PV Water at least 60 days prior to the start of any ground-disturbing activities. The CRMMP shall include:

- *Provisions for Archaeological Monitoring.* The CRMMP shall outline the archaeological monitor(s) responsibilities and requirements (refer to Mitigation Measure CUL-1f). The qualified archaeologist, in consultation with PV Water, shall have the ability to modify monitoring frequencies (i.e., either increase, decrease, or discontinue entirely) at all locations described below, based on soil observations (if it

[40] State Office of Preservation. *Archaeological Resource Management Reports (ARMR): Recommended Contents and Format*, 1990.

is determined that the likelihood of encountering intact significant resources is low due to disturbances or soil types, monitoring may be decreased or cease entirely) or discoveries (discovery of archaeological resources may warrant increased frequency of monitoring).

- Full-time archaeological monitoring shall be required during all ground disturbance in the following locations:
  - Areas shaded purple and green on Figure 3.10-1 of the College Lake Integrated Resources Management Project EIR that are within agricultural fields (i.e., not within paved roadway right-of-ways).
  - The area along Maple Street/2nd Street between Main Street and Union Street within the City of Watsonville.
  - Within 100 feet of Environmentally Sensitive Areas established through implementation of Mitigation Measure CUL-1e.
- Part-time archaeological monitoring consisting of one 8-hour day per week shall be conducted during ground disturbance in the following locations (as noted above, the frequency of monitoring may be modified if conditions warrant):
  - Areas shaded purple on Figure 3.10-1 of the College Lake Integrated Resources Management Project EIR that are within paved roadway right-of-ways (i.e., not within agricultural fields), with the exception of area along Maple Street/2nd Street between Main Street and Union Street, which requires full-time monitoring as outlined above.
  - Areas shaded orange on Figure 3.10-1 of the College Lake Integrated Resources Management Project EIR that are within agricultural fields (i.e., not within paved roadway right-of-ways).
- Part-time archaeological monitoring consisting of one 4-hour day per week shall be conducted during ground disturbance in the following locations (as noted above, the frequency of monitoring may be modified if conditions warrant):
  - Areas shaded orange on Figure 3.10-1 of the College Lake Integrated Resources Management Project EIR that are within paved roadway right-of-ways (i.e., not within agricultural fields).

- *Procedures for Discovery of Archaeological Resources.* Procedures to be implemented in the event of an archaeological discovery shall be fully defined in the CRMMP, and shall include stop-work and protective measures, notification protocols, procedures for significance assessments, and appropriate treatment measures, and shall address procedures for when an archaeological monitor is present, and when one is not present. The CRMMP shall state avoidance or preservation in place is the preferred manner of mitigating impacts to historical resources and unique archaeological resources, but shall provide procedures to follow should PV Water determine that avoidance is infeasible in light of factors such as the nature of the find, Project design, costs, and other considerations. See also Mitigation Measure CUL-1h.

If, based on the recommendation of the qualified archaeologist, it is determined that a discovered archaeological resource constitutes a historical resource or unique archaeological resource pursuant to CEQA and data recovery through excavation is the only feasible mitigation available, an Archaeological Resources Data Recovery and Treatment Plan shall be prepared and implemented by the qualified archaeologist in coordination with PV Water that provides for the adequate recovery of the scientifically consequential information contained in the archaeological resource. PV Water, or its designee, shall consult with appropriate Native American representatives in determining treatment of resources that are Native American in origin to ensure cultural values ascribed to the resource, beyond those that are scientifically important, are considered.

- *Procedures for Discovery of Human Remains and Associated Funerary Objects.* The CRMMP shall outline the protocols and procedures to be followed in the event that human remains and associated funerary objects are encountered during construction. These shall include stop-work and protective measures, notification protocols, and compliance with California Health and Safety Code Section 7050.5 and Public Resources Code Section 5097.98 (refer to Mitigation Measure CUL-2).

- *Reporting Requirements.* The CRMMP shall outline provisions for weekly, monthly, and final reporting. The qualified archaeologist shall prepare weekly status reports detailing activities and locations observed (including maps) and summarizing any discoveries for the duration of monitoring to be submitted to PV Water via e-mail for each week in which monitoring activities occur. Monthly progress reports summarizing monitoring efforts shall be prepared and submitted to PV Water for the duration of ground disturbance. The qualified archaeologist shall prepare a draft Archaeological Resources Monitoring Report and submit it to PV Water within 60 days after completion of the monitoring program or of treatment for significant discoveries should treatment extend beyond the cessation of monitoring. The final Archaeological Resources Monitoring Report shall be submitted to PV Water within 30 days of receipt of PV Water comments. The qualified archaeologist shall also submit the final Archaeological Resources Monitoring Report to the Northwest Information Center. If human remains are encountered, a confidential report documenting all activities shall be submitted to the California Native American Heritage Commission within 90 days after completion of any treatment (refer to Mitigation Measure CUL-2).

- *Curation Requirements.* Disposition of Native American archaeological materials shall be determined through consultation between Native American representatives, the qualified archaeologist, and PV Water. Disposition of human remains and associated funerary objects shall be determined through consultation between the Most Likely Descendant, landowner, and PV Water (refer to Mitigation Measure CUL-2).

Any historic-period archaeological materials that are not Native American in origin shall be curated at a repository accredited by the American Association of Museums that meets the standards outlined in 36 CFR 79.9. If no accredited repository accepts the collection, then it may be curated at a non-accredited repository as long as it meets the minimum standards set forth by 36 CFR 79.9. If neither an accredited nor a non-accredited repository accepts the collection, then it may be offered to a public, non-profit institution with a research interest in the materials, or donated to a local school or historical society in the area for educational purposes, to be determined by the qualified archaeologist in consultation with PV Water.

- *Protocols for Native American Monitoring and Input.* The CRMMP shall outline the role and responsibilities of Native American Tribal representatives. It shall include communication protocols, an opportunity and timelines for review of cultural resources documents related to discoveries that are Native American in origin, and provisions for Native American monitoring. The CRMMP shall include provisions for full-time Native American monitoring of ground disturbance in the purple and green shaded areas shown on Figure 3.10-1 of the College Lake Integrated Resources Management Project EIR within agricultural fields (i.e., not within paved roadway right-of-ways), as well as during any subsurface investigation and data recovery for discovered resources that are Native American in origin (refer to Mitigation Measures CUL-1g).

Mitigation Measure CUL-1d: Construction Worker Cultural Resources Sensitivity Training Program

A worker cultural resources sensitivity training program shall be implemented for the Project. Prior to any ground-disturbing activity, an initial sensitivity training session shall be provided by the qualified archaeologist to all project employees, contractors, subcontractors, and other professionals prior to their involvement in any ground-disturbing activities, with subsequent training sessions occurring on a monthly basis to accommodate new personnel becoming involved in the Project (subsequent sessions can be coordinated with other Worker Environmental Awareness Program or safety training that may be required). Construction personnel shall be informed of the sensitivity of the Project area and given a tutorial providing information on how to identify the types of resources that may be encountered. They shall be instructed on the proper procedures to be enacted in the event of an inadvertent discovery of archaeological resources or human remains, confidentiality of discoveries, and safety precautions to be taken when working with cultural resources monitors. PV Water shall make it a requirement that construction personnel are made available for and attend training sessions and retain documentation demonstrating attendance.

Mitigation Measure CUL-1e: Designation of Environmentally Sensitive Areas

Prior to the start of ground disturbance, the portion of the boundary of CA-SCR-44/H nearest Project-related activities shall be marked as an Environmentally Sensitive Area. This area shall not be marked as an archaeological resource, but shall be designated as an “exclusion zone” on Project plans and protective fencing in order to discourage unauthorized disturbance or collection of artifacts. The qualified archaeologist, or his/her designee, shall periodically inspect this area for the duration of Project activities in the vicinity to ensure that protective fencing remains intact and no incursions into the exclusion zone have occurred. Upon completion of all Project-related activities in the vicinity, all protective fencing and signage shall be removed.

Mitigation Measure CUL-1f: Archaeological Monitoring

Project-related ground disturbance shall be subject to archaeological monitoring as outlined in Mitigation Measure CUL-1c. The archaeological monitor(s) shall be familiar with the types of resources that could be encountered and shall work under the direct supervision of the qualified archaeologist. The archaeological monitor(s) shall keep daily logs detailing the types of activities and soils observed, and any discoveries. Archaeological monitor(s) shall have the authority to halt and re-direct ground disturbing activities in the event of a discovery until it has been assessed for significance and treatment implemented, if necessary, based on the recommendations of the qualified archaeologist in coordination with PV Water, and the Native American representatives in the event the resource is Native American in origin, and in accordance with the protocols and procedures outlined in the CRMMP (refer to Mitigation Measure CUL-1c). The qualified archaeologist shall have the authority to modify monitoring frequencies based on soil observations and/or discoveries.

Mitigation Measure CUL-1g: Native American Monitoring

Prior to the start of any ground-disturbing activity, PV Water shall retain a qualified Native American monitor to provide monitoring services as outlined in Mitigation Measure CUL-1c. The Native American monitor shall be from a Tribe that is culturally and geographically affiliated with the Project area (according to the California Native American Heritage Commission contact list for this project). If resources of Native American origin are discovered, the Native American monitor shall provide monitoring services in accordance with protocols and procedures outlined in the CRMMP (refer to Mitigation Measure CUL-1c).

Mitigation Measure CUL-1h: Inadvertent Discovery of Archaeological Resources

In the event that archaeological resources are encountered during ground disturbance, all activity in the vicinity of the find shall cease (within 100 feet), and the protocols and procedures for discoveries outlined in the CRMMP shall be implemented (refer to Mitigation Measure CUL-1c). The discovery shall be evaluated for potential significance by the qualified archaeologist. If the qualified archaeologist determines that the resource may be significant, the qualified archaeologist shall develop an appropriate treatment plan for the resource in accordance with the CRMMP (refer to Mitigation Measure CUL-1c). When assessing significance and developing treatment for resources that are Native American in origin, the qualified archaeologist and PV Water shall consult with the appropriate Native American representatives. The qualified archaeologist shall also determine if work may proceed in other parts of the Project area while treatment for cultural resources is being carried out, and whether additional archaeological and/or Native American monitoring is warranted.

Mitigation Measure CUL-1i: Long-Term Monitoring of CA-SCR-44/H and CA-SCR-150

PV Water shall retain a qualified archaeologist to conduct quarterly inspections of the portions of CA-SCR-44/H and CA-SCR-150 that overlap with the proposed lake storage area to ensure that lake water levels are not resulting in site erosion. If erosion or other indirect impacts are noted, PV Water shall work with the qualified archaeologist to develop a plan to protect the site(s) from further damage, or a plan to conduct data recovery of the affected portion(s) if protective measures are determined by PV Water to be infeasible. Quarterly inspections shall be conducted for two years, after which time they shall be reduced to semi-annual inspections for an additional three years. If after five years no erosion or other indirect impacts are noted, the long-term monitoring program shall be discontinued. After each inspection, the qualified archaeologist shall prepare a memorandum documenting the results of the inspection with photographs. Memoranda shall be submitted to PV Water within 30 days of the completion of each inspection.

Impact CUL-3: The Project could disturb human remains, including those interred outside of formal cemeteries. (*Less than Significant with Mitigation*)

There are archaeological sites with Native American burials, as well as formal cemeteries, in the vicinity of the Project. None of the sites or cemeteries overlap with proposed ground-disturbing activities and it is not anticipated that the Project would disturb human remains associated with these resources. However, given the prehistoric occupation of the area and the high sensitivity for buried prehistoric resources, there is a potential for Project-related ground disturbance to disturb human remains, including those outside of formal cemeteries. With implementation of **Mitigation Measure CUL-2**, which requires halting work and complying with Public Resources Code Section 5097.98 and Health and Safety Code Section 7050.5, impacts to human remains would be ***less than significant***.

Mitigation Measure CUL-2: Inadvertent Discovery of Human Remains

If human remains are encountered, then PV Water shall halt work in the vicinity (within 100 feet) of the discovery and contact the County Coroner in accordance with Public Resources Code Section 5097.98 and Health and Safety Code Section 7050.5. If the County Coroner determines the remains are Native American, then the Coroner shall notify the California Native American Heritage Commission in accordance with Health and Safety Code subdivision 7050.5(c), and Public Resources Code Section 5097.98. The California Native American Heritage Commission shall designate a Most Likely Descendant for the remains pursuant to Public Resources Code Section 5097.98. Until the landowner has conferred with the Most Likely Descendant, the contractor shall ensure the immediate vicinity where the discovery occurred is not disturbed by further activity, is adequately protected according to generally accepted cultural or archaeological standards or practices, and that further activities take into account the possibility of multiple burials. If human remains are encountered, the qualified archaeologist, in consultation with the Most Likely Descendant shall prepare a confidential report documenting all activities and it shall be submitted to the California Native American Heritage Commission within 90 days after completion of any treatment.

Cumulative Impacts

Impact C-CUL-1: The Project, in combination with past, present, and probable future projects in the Project area, could have cumulatively considerable impacts on cultural resources. (*Less than Significant with Mitigation*)

This section presents an analysis of the cumulative effects of the Project in combination with other past, present, and probable future projects that could cause cumulatively considerable impacts. Related projects in the vicinity of the Project are presented in Table 3.1-1 and Figure 3.1-1 in Section 3.1 of this EIR.

The geographic scope for cumulative impacts to cultural resources (i.e., historical resources, unique archaeological resources, and human remains) consists of the Pajaro Valley. This geographic scope of analysis is appropriate because the historical resources, unique archaeological resources, and human remains within this area are similar and share a common heritage with the resources in the vicinity of the Project. The temporal scope for cumulative impacts to cultural resources encompasses both the short-term and long-term cumulative impacts of the Project, in conjunction with other cumulative projects in the area.

Historical Resources (not including archaeological resources)

Cumulative impacts to historical resources evaluate whether impacts of the Project and related projects, when taken as a whole, substantially diminish the number of historical resources within the same or similar context or property type. Although impacts to historical resources tend to be site specific, cumulative impacts may involve resources that are examples of the same style or property type as those within the Project area. Cumulative impacts would also occur if the Project and related projects cumulatively affect historical resources in the immediate vicinity.

No historical resources would be directly affected by the Project. As described above under Impact CUL-1, use of certain construction equipment (e.g., vibratory pile drivers or drill rigs) less than 20 feet from historic resources (such as those with the Watsonville Historic District) could cause building damage, potentially resulting in a substantial adverse change in the significance of historical resources. Other projects within the Watsonville Historic District, such as the Main Street Improvement Project and Lincoln Street Safety Project, could also result in indirect effects to historical resources. The incremental impact of the Project combined with those of the cumulative projects could result in a significant cumulative impact on historical resources. However, Mitigation Measure NOI-2 (Vibration Monitoring Plan, described above) would ensure that the Project's contribution toward cumulative effects on historical resources would not be cumulatively considerable.

Archaeological Resources

Table 3.1-1 and Figure 3.1-1 present multiple projects that would result in ground disturbance, including those within areas of high archaeological sensitivity, are proposed throughout the geographic scope of analysis. Cumulative impacts to archaeological resources could occur if any of these projects, in conjunction with this Project, would have impacts on archaeological resources that, when considered together, would be significant.

As described above under Impact CUL-2, two archaeological resources (CA-SCR-44/H and CA-SCR-150) partially overlap with the proposed lake storage area and could potentially be adversely affected due to prolonged inundation and erosion; and there is the potential for impacts to unknown archaeological resources during ground disturbance. Other projects described in Table 3.1-1 that include ground disturbance could result in similar impacts to known and unknown archaeological resources. The incremental impact of the Project combined with those of the cumulative projects could result in a significant cumulative impact on archaeological resources. However, Mitigation Measures CUL-1a through CUL-1i (described above) would ensure that the Project's contribution toward cumulative effects on archaeological resources would not be cumulatively considerable.

Human Remains

As noted, multiple projects that would result in ground disturbance are proposed throughout the geographic scope of analysis (refer to Table 3.1-1 and Figure 3.1-1 for projects). Cumulative impacts to human remains could occur if any of these projects, in conjunction with this Project, would have impacts on human remains that, when considered together, would be significant.

As described above under Impact CUL-3, given the prehistoric occupation of the area and the high sensitivity for buried prehistoric resources, there is a potential for Project-related ground disturbance to disturb undocumented human remains, including those outside of formal cemeteries. Other projects in the cumulative scenario that include ground disturbance could result in similar impacts to human remains. The incremental impact of the Project combined with those of the cumulative projects could result in a cumulative impact on human remains. However, Mitigation Measure CUL-2, which requires halting work and complying with Public Resources Code Section 5097.98 and Health and Safety Code Section 7050.5, would ensure that the Project's contribution toward cumulative effects on human remains would not be cumulatively considerable.

Mitigation Measure NOI-2: Vibration Monitoring Plan (refer to Impact NOI-4 in Section 3.8, Noise and Vibration)

Mitigation Measure CUL-1a: Retention of a Qualified Archaeologist (refer to Impact CUL-2)

Mitigation Measure CUL-1b: Pre-Construction Phase I Cultural Resources Survey (refer to Impact CUL-2)

Mitigation Measure CUL-1c: Development of a Cultural Resources Monitoring and Mitigation Program (refer to Impact CUL-2)

Mitigation Measure CUL-1d: Construction Worker Cultural Resources Sensitivity Training Program (refer to Impact CUL-2)

Mitigation Measure CUL-1e: Designation of Environmentally Sensitive Areas (refer to Impact CUL-2)

Mitigation Measure CUL-1f: Archaeological Monitoring (refer to Impact CUL-2)

Mitigation Measure CUL-1g: Native American Monitoring (refer to Impact CUL-2)

Mitigation Measure CUL-1h: Inadvertent Discovery of Archaeological Resources (refer to Impact CUL-2)

Mitigation Measure CUL-1i: Long-Term Monitoring of CA-SCR-44/H and CA-SCR-150 (refer to Impact CUL-2)

Mitigation Measure CUL-2: Inadvertent Discovery of Human Remains (refer to Impact CUL-3)

This page intentionally left blank

3.11 Tribal Cultural Resources

This section presents an analysis of potential impacts related to tribal cultural resources that would result from implementation of the proposed College Lake Integrated Resources Management Project (Project). The analysis includes both site options (preferred and optional) for the water treatment plant as well as preferred and optional pipeline alignments for the College Lake pipeline. Because Tribal Cultural Resources were not analyzed in the 2014 Basin Management Plan Update Program Environmental Impact Report (2014 BMP Update PEIR), there are no adopted mitigation measures to be considered part of the Project for this environmental resource.

3.11.1 Setting

3.11.1.1 Ethnographic Setting

Based on a compilation of ethnographic, historic, and archaeological data, Milliken et al.[1] describes a group known as the Ohlone, who once occupied the general vicinity of the Project sites. While traditional anthropological literature portrayed the Ohlone peoples as having a static culture, it is now better understood that many variations of culture and ideology existed within and between villages. While these static descriptions of separations between native cultures of California make it an easier task for ethnographers to describe past behaviors, this masks Native adaptability and self-identity. California's Native Americans never saw themselves as members of larger cultural groups, as described by anthropologists. Instead, they saw themselves as members of specific villages, perhaps related to others by marriage or kinship ties, but viewing the village as the primary identifier of their origins.

Levy[2] describes the language group spoken by the Ohlone, known as "Costanoan." This term is originally derived from a Spanish word designating the coastal peoples of Central California. Today Costanoan is used as a linguistic term that references to a larger language family spoken by distinct sociopolitical groups that spoke at least eight languages (as different as Spanish is from French) of the same Penutian language group. The Ohlone once occupied a large territory from San Francisco Bay in the north to the Big Sur and Salinas Rivers in the south. The Project is in the greater Rumsen-speaking tribal area; their territory extended from Point Sur northward to the lower Pajaro River, and included the present-day cities of Monterey, Seaside, Marina, and Carmel. Dialects of the Rumsen language were spoken by four independent local tribes, including Rumsen in Monterey, Ensen of the Salinas vicinity, Calenda Ruc of the central shoreline of Monterey Bay, and Sargentaruc of the Big Sur Coast. Five villages were present in Rumsen territory at the time of Spanish contact: Achasta, Tucutnut, Soccorronda, Echilat and Ichxenta.[3]

---

1 Milliken, Randall; Shoup, Laurence H., and Beverly R. Ortiz, Ohlone/Costanoan Indians of the San Francisco Peninsula and their Neighbors, Yesterday and Today. Report prepared by: Archaeological and Historical Consultants. Prepared for National Park Service, 2009.

2 Levy, R., Costanoan. In California, edited by R.F. Heizer, pp. 485–495. Handbook of North American Indians, Volume 8. William G. Sturtevant, general editor. Smithsonian Institution, Washington D.C., 1978.

3 Milliken, Randall; Shoup, Laurence H., and Beverly R. Ortiz, Ohlone/Costanoan Indians of the San Francisco Peninsula and their Neighbors, Yesterday and Today. Report prepared by: Archaeological and Historical Consultants. Prepared for National Park Service, 2009.

Ohlone engaged in hunting and gathering. Their territory encompassed both coastal and open valley environments that contained a wide variety of resources, including grass seeds, acorns, bulbs and tubers, bear, deer, elk, antelope, a variety of bird species, and rabbit and other small mammals. The Ohlone acknowledged private ownership of goods and songs, and village ownership of rights to land and/or natural resources; they appear to have aggressively protected their village territories, requiring monetary payment in the form of clamshell beads for access rights, and even shooting trespassers if caught. After European contact, Ohlone society was severely disrupted by missionization, disease, and displacement. Today, the Ohlone, while not federally recognized, still have a strong presence in the Monterey Bay Area, and are highly interested in their historic and prehistoric past.

3.11.1.2 Identification of Tribal Cultural Resources

Tribal Cultural Resources Definition

Tribal cultural resources are defined as sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe that are either included or determined to be eligible for inclusion in the California Register of Historical Resources (California Register) or included in a local register of historical resources, or a resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant. A cultural landscape that meets these criteria is a tribal cultural resource to the extent that the landscape is geographically defined in terms of the size and scope of the landscape. Historical resources, unique archaeological resources, or non-unique archaeological resources may also be tribal cultural resources if they meet these criteria.

Refer also to Section 3.11.3.1, Significance Criteria, for additional detail regarding this definition.

Native American Heritage Commission

The California Native American Heritage Commission (NAHC) maintains a confidential Sacred Lands File (SLF) that contains sites of traditional, cultural, or religious value to the Native American community. The NAHC was contacted on April 5, 2018 to request a search of the SLF for the Project. The NAHC responded to the request in a letter dated April 24, 2018 indicating that a search of the SLF returned negative results.

Native American Outreach

No California Native American Tribes have requested notification of projects under the jurisdiction of Pajaro Valley Water Management Agency (PV Water) as required by Public Resources Code Section 21080.3.1(b)[4], and formal consultation was not conducted. However, PV Water conducted informal Native American outreach in the form of certified letters, phone calls, and e-mail to solicit information and concerns about the Project and sensitive resources in the vicinity.

[4] Section 3.11.2.1 summarizes the consultation requirements of Public Resources Code Section 21080.3 and related code sections.

Letters were sent via certified mail on September 20, 2017 to all individuals listed on the NAHC contact list for the Project and follow-up phone calls were conducted on October 16, 2017. Follow-up e-mails were sent on April 18, 2018, informing recipients of Project updates and requesting additional information or concerns regarding Native American cultural resources that could be affected by the Project.

The respondents generally expressed concerns about prehistoric archaeological resources and human remains, and requested monitoring of ground disturbance. Aspects of their requests (such as establishment of Environmentally Sensitive Areas and provisions for Native American monitoring) have been incorporated into mitigation measures outlined in Section 3.10, Cultural Resources. None of the respondents identified a tribal cultural resource as defined by Public Resources Code Section 20174 within the Project area. **Table 3.11-1** summarizes the results of all outreach and specific comments provided by each respondent.

3.11.2 Regulatory Framework

3.11.2.1 Federal and State

Assembly Bill 52 and Related Public Resources Code Sections

Assembly Bill (AB) 52 was approved by California State Governor Edmund Gerry "Jerry" Brown, Jr. on September 25, 2014. The act amended California Public Resources Code Section 5097.94, and added Public Resources Code Sections 21073, 21074, 21080.3.1, 21080.3.2, 21082.3, 21083.09, 21084.2, and 21084.3. AB 52 applies specifically to projects for which a Notice of Preparation or a Notice of Intent to Adopt a Negative Declaration or Mitigated Negative Declaration will be filed on or after July 1, 2015. The primary intent of AB 52 was to include California Native American Tribes early in the environmental review process and to establish a new category of resources related to Native Americans that require consideration under the California Environmental Quality Act (CEQA), known as tribal cultural resources. Public Resources Code Section 21074(a)(1) and (2) defines tribal cultural resources as "sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American Tribe" that are either included or determined to be eligible for inclusion in the California Register or included in a local register of historical resources, or a resource that is determined to be a tribal cultural resource by a lead agency, in its discretion and supported by substantial evidence. On July 30, 2016, the California Natural Resources Agency adopted the final text for tribal cultural resources update to Appendix G of the CEQA Guidelines, which was approved by the Office of Administrative Law on September 27, 2016.

Public Resources Code Section 21080.3.1 requires that within 14 days of a lead agency determining that an application for a project is complete, or a decision by a public agency to undertake a project, the lead agency provide formal notification to the designated contact, or a tribal representative, of California Native American Tribes that are traditionally and culturally affiliated with the geographic area of the project (as defined in Public Resources Code Section 21073) and who have requested in writing to be informed by the lead agency (Public Resources Code Section 21080.3.1(b)). Tribes interested in consultation must respond in writing within 30 days from receipt of the lead agency's formal notification and the lead agency must

TABLE 3.11-1
NATIVE AMERICAN OUTREACH

Individual	Affiliation	Date(s) Letter Sent	Date(s) of Follow-up Phone Call	Date(s) Follow-up E-mail Sent	Comments
Rosemary Cambra	Chairperson, Muwekma Ohlone Indian Tribe of the San Francisco Bay Area	9/20/17	10/16/17	-	Unable to reach Chairperson Cambra. The letter was returned (return to sender/unable to forward). Her voice message mailbox was full and could not accept additional voicemail. The other number provided by the NAHC has been disconnected.
		-	-	4/18/2018	No response to date.
Valentin Lopez	Chairperson, Amah Mutsun Tribal Band	9/20/17	10/23/17	-	Chairperson Lopez requested formal consultation with PV Water, including a site visit, maps, and the scope of the Project. He also noted that the Project area is highly sensitive for the presence of prehistoric resources. Via an e-mail to PV Water dated 12/12/2017, Chairperson Lopez requested consultation regarding the construction of new recharge basins, weirs, intake pump stations, and associated pipelines, which are within the Tribe's traditional tribal territory. He further requested that a Native American monitor be used for any ground disturbance within 400 feet of known archaeological sites.
		-	-	4/18/2018	In an e-mail dated 4/25/2018, Chairperson Lopez requested: (1) research on the natural waterways before European contact (pre-contact) to determine where they are in relationship to the Project area since ancestors lived along these waterways; (2) Native American monitoring by his Tribe for ground disturbance within 400 feet of pre-contact waterways; and (3) notification of all finding of cultural materials.
Patrick Orozco	Chairman, Costanoan Ohlone Rumsen-Mutsen Tribe	9/20/17	10/17/17	-	Chairman Orozco expressed concern regarding the number of previously documented and undocumented archaeological resources within the Project footprint. He recommended that all archaeological sites be avoided and that environmentally sensitive areas with 100 to 200-foot buffers be established around the archaeological sites prior to Project implementation. Chairman Orozco also requested that a more detailed map of the Project components be sent to him via e-mail.
		-	-	4/18/2018	No response to date.
Ann Marie Sayers	Chairperson, Indian Canyon Mutsun Band of Costanoan	9/20/17	10/16/17	-	Chairperson Sayers recommended archaeological and Native American monitoring for all Project-related earth moving. She also inquired about the feasibility of reinterring human remains on site, should they be encountered. She was very concerned about the disposition of human remains and would like them reinterred as close to where they were discovered as possible. She also inquired about where artifacts would be housed, should they be recovered. She also expressed an interest in speaking with PV Water regarding her concerns.
		-	-	4/18/2018	No response to date.
Irenne Zwierlein	Chairperson, Amah Mutsun Tribal Band of Mission San Juan Bautista	9/20/17	10/16/17	-	Chairperson Zwierlein recommended that the equipment operators on site undergo training on how to identify archaeological resources and what to do when they are identified. She also recommended that monitors be present on site during Project-related construction activities.
		-	-	4/18/2018	No response to date.

begin consultation within 30 days of receiving the tribe's request for consultation (Public Resources Code Sections 21080.3.1(d) and 21080.3.1(e)).

Public Resources Code Section 21080.3.2(a) identifies the following as potential consultation discussion topics: the type of environmental review necessary; the significance of tribal cultural resources; the significance of the project's impacts on the tribal cultural resources; project alternatives or appropriate measures for preservation; and mitigation measures. Consultation is considered concluded when either: (1) the parties agree to measures to mitigate or avoid a significant effect, if a significant effect exists, on a tribal cultural resource; or (2) a party, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached (Public Resources Code Section 21080.3.2(b)).

If a California Native American tribe has requested consultation pursuant to Section 21080.3.1 and has failed to provide comments to the lead agency, or otherwise failed to engage in the consultation process, or if the lead agency has complied with Section 21080.3.1(d) and the California Native American tribe has failed to request consultation within 30 days, the lead agency may certify an EIR or adopt a Mitigated Negative Declaration (Public Resources Code Section 21082.3(d)(2) and (3)).

Public Resources Code Section 21082.3(c)(1) states that any information, including, but not limited to, the location, description, and use of the tribal cultural resources, that is submitted by a California Native American tribe during the environmental review process shall not be included in the environmental document or otherwise disclosed by the lead agency or any other public agency to the public without the prior consent of the tribe that provided the information. If the lead agency publishes any information submitted by a California Native American tribe during the consultation or environmental review process, that information shall be published in a confidential appendix to the environmental document unless the tribe that provided the information consents, in writing, to the disclosure of some or all of the information to the public.

California Government Code Sections 6254(r) and 6254.10

Section 6254(r) explicitly authorizes public agencies to withhold information from the public relating to "Native American graves, cemeteries, and sacred places maintained by the Native American Heritage Commission." Section 6254.10 specifically exempts from disclosure requests for "records that relate to archaeological site information and reports, maintained by, or in the possession of the Department of Parks and Recreation, the State Historical Resources Commission, the State Lands Commission, the Native American Heritage Commission, another state agency, or a local agency, including the records that the agency obtains through a consultation process between a Native American tribe and a state or local agency."

3.11.2.2 Local

Table 2-10 in Chapter 2, *Project Description*, identifies the approvals from Santa Cruz County and/or the City of Watsonville required for the Project. **Table 3.11-2** presents pertinent local plans and policies regarding geology and soils to support County and City consideration of project consistency with general policies.[5] In some cases, local policies are used in this EIR as criteria to determine the significance of physical effects on the environment (e.g., Impact NOI-1 in Section 3.8, Noise and Vibration).

TABLE 3.11-2
LOCAL PLANS AND POLICIES RELEVANT TO THE PROJECT

SANTA CRUZ COUNTY PLANS AND POLICIES
Santa Cruz County General Plan/Local Coastal Program
5.19.1 Evaluation of Native American Cultural Sites. Protect all archaeological resources until they can be evaluated. Prohibit any disturbance of Native American Cultural Sites without an appropriate permit. Maintain the Native American Cultural Sites ordinance.
5.19.5 Native American Cultural Sites. Prohibit any disturbance of Native American Cultural Sites without an archaeological permit.
Santa Cruz County Municipal Code
16.40 Native American Cultural Sites ***16.40.030 Archaeological assessments required.*** A. Archaeological Survey. An archaeological survey shall be required for any discretionary project which will result in ground disturbance and which will be located within a mapped archaeological sensitive area. In addition, an archaeological survey shall be required for any project which will result in ground disturbance within 500 feet of a recorded Native American cultural site. The archaeological survey shall be prepared according to procedures established by the Planning Director. B. Archaeological Report. An archaeological report shall be required prior to the issuance of any project permits when a project site contains a culturally significant Native American cultural site and when development of the project will result in the disturbance of that site. In some cases, an archaeological report may be required before an archaeological site development permit is issued, pursuant to SCCC 16.40.050. ***16.40.040 Site discovered during excavation or development.*** A. Presence of Artifacts and/or Human Remains. Any property owner who, at any time in the preparation for or process of excavating or otherwise disturbing the ground, discovers any human remains of any age, or any artifact or other evidence of a Native American cultural site which reasonably appears to exceed 100 years of age, shall: 1. Cease and desist from all further excavations and disturbances within 200 feet of the discovery. 2. Arrange for staking completely around the area of discovery by visible stakes no more than 10 feet apart, forming a circle having a radius of no less than 100 feet from the point of discovery; provided, however, that such staking need not take place on adjoining property unless the owner of the adjoining property authorizes such staking. 3. Notify the Sheriff-Coroner of the discovery if human remains have been discovered. Notify the Planning Director if the discovery contains no human remains. 4. Grant all duly authorized representatives of the Coroner and the Planning Director permission to enter onto the property and to take all actions consistent with this chapter. B. Recent Human Remains. If the Coroner determines that the remains are of recent origin, and that they are not a part of a site, then the provisions of this chapter shall no longer apply, and the Coroner shall notify the property owner when excavation or development may proceed. If the Coroner determines that the remains are not obviously of recent origin, the Coroner shall forthwith notify the Planning Director of the discovery of said remains. C. Property Inspection. Upon notification of the discovery, the Planning Director shall arrange for an inspection of the property. Said inspection shall take place within 72 hours of notice to the Director of the discovery. A representative of local Native California Indian groups, such as N.I.C.P.A., and the property owner shall be notified of the time of the inspection and both may accompany the Director and his/her representative at all times on the property. The purpose of the inspection shall be to determine whether the discovery is a site of cultural significance.

SOURCE: County of Santa Cruz, *1994 General Plan/Local Coastal Program, Chapter 5 – Conservation and Open Space*, Effective December 19, 1994; County of Santa Cruz, Santa Cruz County Code, Chapter 16.40 Native American Cultural Sites, October 2, 2018.

[5] California Government Code Section 53091 exempts agencies like PV Water from complying with local building and zoning ordinances when locating or constructing facilities for the production, generation, storage, treatment, or transmission of water. California Government Code Section 65402(c) requires that PV Water notify cities and counties of its plans to construct projects or to acquire or dispose of property. The planning agency then has 40 days to determine project consistency with its general plan. If the planning agency disapproves, the disapproval may be overruled by PV Water.

3.11.3 Impacts and Mitigation Measures

3.11.3.1 Significance Criteria

In accordance with the CEQA, state CEQA Guidelines (including Appendix G), relevant plans, policies, and/or guidelines, and agency standards, the Project could have a significant impact if it were to:

- Cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:
  - Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code Section 5020.1(k), or
  - A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.

3.11.3.2 Methodology

As described in Section 3.1, this EIR provides an independent analysis of the Project's potential environmental impacts. Because Tribal Cultural Resources were not analyzed in the 2014 BMP Update PEIR, there are no adopted mitigation measures to be are considered part of the Project for this environmental resource.

3.11.3.3 Impacts and Mitigation Measures

Impact TCR-1: The Project would not result in a substantial adverse change in the significance of a tribal cultural resource. (*No impact*)

No tribal cultural resources as defined in Public Resources Code Section 21074 and listed or eligible for listing in the California Register or local register were identified to be present within the Project area. As such, there would be no environmental impacts to tribal cultural resources as a result of the Project.

Mitigation: None required.

Impact TCR-2: The Project would not result in a substantial adverse change in the significance of a tribal cultural resource. (*No impact*)

No tribal cultural resources as defined in Public Resources Code Section 21074 and that have been determined by the lead agency to be significant pursuant to Public Resources Code Section

5024.1 were identified to be present within the Project area. As such, there would be no environmental impacts to tribal cultural resources as a result of the Project.

Mitigation: None required.

Cumulative Impacts

Impact C-TCR-1: The Project, in combination with past, present, and probable future projects in the Project area, would not result in significant adverse cumulative tribal cultural resources impacts. (*No Impact*)

Because the Project would not adversely affect tribal cultural resources, it would not contribute to any cumulative effects on tribal cultural resources.

Mitigation: None required.

3.12 Energy, Utilities, Public Services, and Recreation

This section presents an analysis of potential impacts related to energy, utilities, and public services that would result from implementation of the proposed College Lake Integrated Resources Management Project (Project). The analysis includes both site options (preferred and optional) for the water treatment plant (WTP) as well as preferred and optional pipeline alignments for the College Lake pipeline. Information from the 2014 Basin Management Plan Update Program Environmental Impact Report (2014 BMP Update PEIR) that remains relevant and accurate for the purposes of describing the physical or regulatory setting of energy, utilities, and public services has been incorporated as appropriate. The Project includes mitigation measures adopted by the Board of Directors to reduce the severity and magnitude of potential environmental effects. For impacts regarding emergency access, refer to Section 3.9, Transportation and Traffic.

3.12.1 Setting

3.12.1.1 Energy

Pacific Gas & Electric Co. (PG&E) provides gas and electric service to the Pajaro Valley area. The PG&E power mix for 2016 was as follows: 33 percent eligible renewables, 24 percent nuclear, 17 percent natural gas, 12 percent large hydroelectric, and 14 percent unspecified power.[1] Natural gas is measured in British thermal units (BTUs), while electricity is measured in kilowatt hours (kWh). In 2016, total natural gas consumption in Santa Cruz County was 49.96 million BTUs, and total energy electricity consumption in Santa Cruz County was 1,224.13 million kWh.[2]

3.12.1.2 Utilities

Water, Wastewater, and Stormwater

Six water districts supply water in the Pajaro Valley: City of Watsonville, Pajaro/Sunny Mesa Community Services District, California Water Service, Pajaro Valley Water Management Agency (PV Water), Aromas Water District, and the Soquel Creek Water District.[3] The City of Watsonville Wastewater Treatment Facility collects and treats wastewater for the southern portion of Santa Cruz County (Watsonville, Freedom, and parts of Corralitos) and the northern portion of Monterey County (Pajaro), and has the capacity to treat 12 million gallons per day (mgd) average dry weather flow of wastewater to a secondary level of treatment. PV Water, in collaboration with the City of Watsonville, treats up to 4,000 acre-feet per year (approximately 7.5 mgd) to tertiary, Title 22 standards for recycled water. Santa Cruz County and the City of Watsonville maintain pipelines for stormwater drainage throughout the Pajaro Valley. Refer also

[1] PG&E, Delivering low-emission energy, 2018. Available online at https://www.pge.com/en_US/about-pge/environment/what-we-are-doing/clean-energy-solutions/clean-energy-solutions.page. Accessed on May 2, 2018.

[2] California Energy Commission, Electricity Consumption by County, Santa Cruz County, Total, 2016. Available online at http://www.ecdms.energy.ca.gov/elecbycounty.aspx. Accessed on May 2, 2018; California Energy Commission, Gas Consumption by County, Santa Cruz County, Total, 2016. Available online at http://www.ecdms.energy.ca.gov/gasbycounty.aspx. Accessed on May 2, 2018.

[3] Although the majority of Soquel Creek Water District's service area is outside of PV Water's Statutory Boundary, it provides water service to an area within the PV Water boundary.

to Section 3.6.1 of the 2014 BMP Update PEIR, incorporated by reference, for additional environmental setting information related to water, wastewater, and storm drains in the Project area.

Solid Waste

Solid waste generated during Project construction, as well as sediment removed from water during the treatment process (described in Chapter 2, *Project Description*), would be disposed of at Buena Vista Landfill, which is operated by Santa Cruz County and located at 1231 Buena Vista Drive in Watsonville. The Buena Vista Landfill is a Class III landfill operating under State of California Solid Waste Facilities Permit, and accepts an average of 350 tons of solid waste per day. According to the County of Santa Cruz, the landfill has a remaining capacity of about 2.5 million cubic yards, or 10 to 12 years of continued use.[4]

Other Utilities

As described in the 2014 BMP Update PEIR beginning on page 3.6-2, AT&T, Pacific Gas and Electric Company, Caltrans, and Union Pacific Railroad maintain utilities within the PV Water service area.

3.12.1.3 Public Services

Fire Protection and Emergency Services

The Watsonville Fire Department services the City of Watsonville and areas around Watsonville, with a total service area of approximately 14 square miles and 60,000 residents.[5] The Watsonville Fire Department has two stations: Station 1 is located at 115 2nd Street in Watsonville, approximately 2.5 miles south of College Lake, and Station 2 is located at 370 Airport Boulevard in Watsonville, approximately 2.9 miles east of College Lake.

Portions of unincorporated Santa Cruz County north of the City of Watsonville are also served by Pajaro Valley Fire Protection District. The Pajaro Valley Fire Protection District has two type 1 engines, one type 1 water tender, and one station located at 562 Casserly Road, approximately 3.3 miles north of College Lake.[6]

The California Department of Forestry and Fire Protection is the State of California's agency responsible for fire protection in State Responsibility Areas of California. Because the Project area is not within a State Responsibility Area, it would not directly be served by the California Department of Forestry and Fire Protection.

---

4 E-mail communication between K. Kolassa, County of Santa Cruz, and A. Maudru, Environmental Science Associates, regarding remaining capacity at Buena Vista Landfill, March 26, 2018.

5 Watsonville Fire Department, Area We Serve, 2018. Available online at https://cityofwatsonville.org/470/Area-We-Serve. Accessed April 25, 2018.

6 Pajaro Valley Fire Protection District, Serving the greater Pajaro Valley, November 2013. Available online at http://pajarovalleyfire.com/. Accessed on April 25, 2018.

Police and Criminal Justice Services

The Watsonville Police Department is staffed with 68 sworn police officers and 20 professional staff.[7] The police station is located at 215 Union Street in Watsonville, approximately 2.4 miles south of College Lake. Project sites in Unincorporated Santa Cruz county are under the jurisdiction of the Santa Cruz County Sheriff. The closest office to the Project is the South County Sheriff's Service Center at 790 Green Valley Road, approximately 1.2 miles north of College Lake.[8]

Public Education Services

The City of Watsonville is served by the Pajaro Valley Unified School District. There are 16 public elementary schools, 9 secondary schools, and 9 charter schools in the District.[9] The following schools are located within one-quarter mile of Project components: Ann Soldo Elementary, MacQuiddy Elementary, Mintie White Elementary, Radcliff Elementary, E.A. Hall Middle School, Lakeview Middle School, Watsonville High School, Ceiba College Prep Academy, and Linscott Charter.

Parks and Recreational Facilities

The City of Watsonville has 26 parks, totaling 143 acres of park land. The following parks are within one-quarter mile of Project components: Brentwood Park, City Plaza Park, Franich Park, Marinovich Park, Riverside Mini Park, and Victorian Park.[10] The City of Watsonville also provides public access to more than 7 miles of trail with 29 entrances. The College Lake pipeline would be within one-quarter mile of trails along Watsonville Slough and Struve Slough.[11]

3.12.2 Regulatory Framework

3.12.2.1 Federal and State

There have been no substantial changes in the federal or state regulations, policies, or plans relevant to the Project from the discussion set forth in the 2014 BMP Update PEIR, Section 3.6, Energy, Utilities, and Services (p. 3.6-2), which is incorporated by reference. The following descriptions supplement the information provided in the 2014 BMP Update PEIR.

7 Watsonville Police Department, Department Structure & Facts, 2018. Available online at https://www.cityofwatsonville.org/210/Department-Structure-Facts. Accessed on April 26, 2018.

8 County of Santa Cruz, Santa Cruz County Sherriff's Office, 2019. Available online at http://www.scsheriff.com/Home/MyCommunity/SouthCounty.aspx. Accessed on April 4, 2019.

9 Pajaro Valley Unified School District, Schools, 2018. Available online at http://www.pvusd.net/. Accessed on April 27, 2018.

10 City of Watsonville, Parks & Community Services, City Parks, no date. Available online at https://www.cityofwatsonville.org/1207/City-Parks. Accessed on May 16, 2018.

11 City of Watsonville, Parks & Community Services, Watsonville Slough Trails, March 23, 2018. Available online at https://www.cityofwatsonville.org/DocumentCenter/View/2912/Watsonville-Slough-Trails-Map-PDF. Accessed on May 16, 2018.

Energy and Utilities

National Energy Conservation Policy Act

The National Energy Conservation Policy Act serves as the underlying authority for federal energy management goals and requirements. Signed into law in 1978, it has been regularly updated and amended by subsequent laws and regulations. This act is the foundation of most federal energy requirements.

National Energy Policy Act of 2005

The National Energy Policy Act of 2005 sets equipment energy efficiency standards and seeks to reduce reliance on non-renewable energy resources and provide incentives to reduce current demand on these resources. For example, under the act, consumers and businesses can attain federal tax credits for purchasing fuel-efficient appliances and products, including hybrid vehicles; constructing energy-efficient buildings; and improving the energy efficiency of commercial buildings. Additionally, tax credits are available for the installation of qualified fuel cells, stationary microturbine power plants, and solar power equipment.

Executive Order 13423 (Strengthening Federal Environmental, Energy, and Transportation Management), signed in 2007, strengthens the key energy management goals for the federal government and sets more challenging goals than the Energy Policy Act of 2005. Executive Order 13693, which revoked Executive Order 13423, continued to promulgate the policy of the United States that agencies shall increase efficiency and improve their environmental performance, and requires principal federal agencies to ensure regional agency actions consider and are consistent with, sustainability and climate preparedness priorities of States, local governments, and tribal communities where agency facilities are located.

California Energy Action Plan

The State of California's *2008 Energy Action Plan Update*[12] updates the *2005 Energy Action Plan II*.[13] The plan maintains the goals of the original *Energy Action Plan*, describes a coordinated implementation plan for state energy policies, and identifies specific action areas to ensure that California's energy is adequate, affordable, technologically advanced, and environmentally sound. First-priority actions to address California's increasing energy demands are to promote energy efficiency, demand response (i.e., reducing customer energy usage during peak periods to address power system reliability and support the best use of energy infrastructure), and use of renewable power sources. To the extent that these strategies are unable to satisfy increasing energy and capacity needs, the plan supports clean and efficient fossil fuel-fired generation. Passage of Assembly Bill (AB) 32, the California Global Warming Solutions Act of 2006, substantially influences the state's energy policies; for that reason, the Energy Action Plan has not been updated since 2008.

[12] California Energy Commission, *2008 Update Energy Action Plan*, February 2008.
[13] California Energy Commission, California Public Utilities Commission, *Energy Action Plan II*, September 21, 2005.

Assembly Bill 32

California AB 32,[14] the Global Warming Solutions Act of 2006, is the cornerstone of state efforts to reduce greenhouse gas (GHG) emissions. As described in greater detail in Section 3.5, Air Quality and Greenhouse Gases, the law requires the California Air Resources Board to establish a statewide GHG emissions cap for 2020 based on 1990 emission levels, develop a mandatory reporting program of GHG emissions, adopt regulations for discrete early actions to reduce GHG emissions, prepare a scoping plan to identify how emissions reductions will be achieved, and adopt a regulation that establishes a market-based compliance mechanism (also referred to as "Cap and Trade").

2016 California Green Building Standards Code

The provisions of the 2016 California Green Building Standards Code apply to the planning, design, operation, construction, use and occupancy of every newly constructed building or structure, unless otherwise indicated in the code, throughout the State of California. Section 5.408, Construction Waste Reduction, Disposal, and Recycling, of the 2016 California Green Building Standards Code requires nonresidential development to meet a local construction and demolition waste management ordinance or recycle and/or salvage for reuse a minimum of 65 percent of the nonhazardous construction and demolition waste in accordance with one of the following:

- **Construction waste management plan.** The construction waste management plan must identify the construction and demolition waste materials to be diverted and how they will be sorted, the amount of construction and demolition waste materials diverted (calculated by weight or volume), and diversion facilities where construction and demolition waste materials will be taken.
- **Waste management company.** A waste management company that can provide verifiable documentation that the percentage of construction and demolition waste material diverted from the landfill complies with this section may be utilized.
- **Waste stream reduction alternative.** The combined weight of new construction disposal that does not exceed two pounds per square foot of building area may be deemed to meet the 65 percent minimum requirement as approved by the enforcing agency.

Santa Cruz County's Building Regulations (Santa Cruz County Code, Chapter 12.10) adopts the 2016 California Green Building Standards Code, with exceptions, additions, and deletions as provided in Santa Cruz County Code Section 12.10.250.

California Integrated Waste Management Act – Waste Diversion

The California Integrated Waste Management Act of 1989,[15] enacted through AB 939 and modified by subsequent legislation, requires all California cities and counties to implement programs to divert at least 50 percent of all solid waste generated by the year 2000 and establishes the goal of diverting at least 75 percent of generated waste (based on per capita disposal rates) by 2020. A jurisdiction's diversion rate is the percentage of its total waste that it diverts from disposal through reduction, reuse, recycling, and composting programs. The law

[14] AB 32 is codified in California Health and Safety Code Division 25.5, Sections 38500 et seq.
[15] California Public Resources Code Division 30, Sections 40000-49620.

requires all California counties in coordination with their respective cities to develop and implement integrated waste management plans. As part of their integrated waste management plans, counties must ensure that a minimum of 15 years of disposal capacity is available to serve the county and its cities. Since 2007, the achievement of waste diversion rates has been measured based on per capita disposal rates, expressed in pounds per person per day of wastes disposed of in landfills. To achieve the target waste diversion rates, the California Department of Resources Recycling and Recovery has established a target disposal rate of 7.9 pounds per person per day in Watsonville in 2016.[16]

California Energy Commission

The California Energy Commission (CEC) was established by the Warren-Alquist Act in 1974 and is the State's primary energy policy and planning agency.[17] The CEC has five major responsibilities: forecasting future energy needs and keeping historical energy data; licensing thermal power plants 50 megawatts or larger; promoting energy efficiency through appliance and building standards; developing energy technologies and supporting renewable energy; and planning for and directing state response to energy emergencies.

Administered by the CEC, the California Energy Action Plan (EAP) was adopted in 2003 and a second EAP was adopted by both the CEC and the California Public Utilities Commission (CPUC) in 2005.[18] The EAP established shared goals and specific actions to ensure that adequate, reliable, and reasonably priced electrical power and natural gas supplies are achieved and provided through policies, strategies, and actions that are cost-effective and environmentally sound for California's consumers and taxpayers. Also, incorporated in the EAP are specific actions reflecting the importance of transportation fuels to California's economy and the need to mitigate the environmental impacts caused by their use, as well as the importance of taking actions in the near term to mitigate California's contributions to climate change from the electricity, natural gas, and transportation sectors. In 2008, the EAP was updated to expand on the State's actions in the context of global climate change and include the passage of AB 32, the California Global Warming Solutions Act of 2006.[19]

California Public Utilities Commission

The CPUC was established in 1911 as the Railroad Commission and was expanded in 1912 to regulate privately owned electric, natural gas, telecommunications, water, railroad, and marine transportation companies, including PG&E. The CPUC's mission is to ensure that consumers

---

[16] California Department of Resources Recycling and Recovery (CalRecycle), Jurisdiction Diversion/Disposal Rate Detail for Watsonville, Reporting Year 2016, 2018. Available online at http://www.calrecycle.ca.gov/LGCentral/reports/diversionprogram/JurisdictionDiversionDetail.aspx?JurisdictionID=566&Year=2016. Accessed on May 2, 2018.

[17] CEC, *The California Energy Commission Core Responsibilities*, 2015. Available online at http://www.energy.ca.gov/commission/fact_sheets/documents/core/CEC-Core_Responsibilities.pdf. Accessed on September 1, 2017.

[18] CEC, *State of California Energy Action Plan*, 2017c. Available online at http://www.energy.ca.gov/energy_action_plan/. Accessed on September 6, 2017.

[19] Ibid.

receive safe and reliable utility services at reasonable rates, protect against fraud, and promote the health of California's economy.[20]

California Independent System Operator

The California Independent System Operator was established in 1998 and is a non-profit organization that independently manages the flow of electricity in California. It provides open access to the grid, ensuring equal access and a competitive energy market. In addition, it facilitates over 28,000 market transactions each day to ensure that enough power is available to meet demands.[21]

Utility Notification Requirements

The regulations in Title 8 California Code of Regulations Section 1541 require excavators to determine the approximate locations of subsurface installations, such as sewer, telephone, fuel, electric, and water lines (or any other subsurface installations that may reasonably be encountered during excavation work) prior to opening an excavation. The California Government Code (Sections 4216 *et seq*.) requires owners and operators of underground utilities to become members of and participate in a regional notification center. According to Section 4216.1, operators of subsurface installations who are members of, participate in, and share in the costs of a regional notification center, such as Underground Services Alert of Southern California, more commonly referred to as DigAlert, are in compliance with this section of the code. DigAlert receives planned excavation reports from public and private excavators and transmits those reports to all participating members that may have underground facilities at the location of excavation. Members will mark or stake their facilities, provide information, or give clearance to dig. This notification requirement would apply to the Project because of the proposed excavation activities.

Public Services

California Master Mutual Aid Agreement

The California Master Mutual Aid Agreement is a framework agreement between the State of California and local governments for aid and assistance by the interchange of services and facilities, including but not limited to fire, police, medical and health, communication, and transportation services and facilities to cope with the problems of rescue, relief, evacuation, rehabilitation, and reconstruction.

California Fire Code

State fire regulations are set forth in Sections 13000, et seq. of the California Health and Safety Code, which includes regulations concerning building standards (as set forth in Title 24 of the California Code of Regulations, the California Building Code), fire protection and notification systems, fire protection devices (such as fire extinguishers and smoke alarms), high-rise building and child care facility standards, and fire suppression training.

---

[20] California Public Utilities Commission (CPUC), *About the California Public Utilities Commission*, 2017. Available online at http://www.cpuc.ca.gov/aboutus/. Accessed on September 6, 2017.

[21] California Independent System Operator, Understanding the ISO, 2017. Available online at https://www.caiso.com/about/Pages/OurBusiness/Default.aspx. Accessed on September 12, 2017.

3.12.2.2 Local

Table 2-10 in Chapter 2, *Project Description*, identifies the approvals from Santa Cruz County and/or the City of Watsonville required for the Project. **Table 3.12-1** presents pertinent local plans and policies regarding energy, utilities, and public services to support County and City consideration of project consistency with general policies.[22] In some cases, local policies are used in this EIR as criteria to determine the significance of physical effects on the environment (e.g., Impact NOI-1 in Section 3.8, Noise and Vibration).

TABLE 3.12-1
LOCAL PLANS AND POLICIES RELEVANT TO THE PROJECT

Relevant Goals, Objectives, and Policies
CITY OF WATSONVILLE PLANS AND POLICIES
Watsonville 2005 General Plan
Goal 9.12: Energy. Promote the conservation of energy and the use of alternative energy resources in transportation and residential, commercial, and industrial development.
Policy 9.J: Energy. The City shall strive to reduce non-renewable energy resource consumption and promote the use of alternative energy resources.
Implementation measure 11.C.3 Pajaro Valley Water Management Agency (PV Water) - The City shall participate in development of the Basin Management Plan (BMP) being prepared by the PV Water in 1991 and 1992.
Watsonville Municipal Code
Chapter 8-9.101: Adoption of the California Fire Code. That portion of the 2016 California Fire Code that imposes substantially the same requirements as are contained in the International Fire Code, 2015 Edition, published by the International Code Council and the California Building Standards Commission with errata, together with those portions of the International Fire Code, 2015 Edition, including Appendices B, BB, C, CC, I and N as published by the International Code Council not included in the California Fire Code, as deleted, added to, excepted, modified or amended, are adopted by this reference into this code, and are collectively declared to be the Fire Code of the City of Watsonville, in the State of California.
Chapter 8-17: California Energy Code. The 2016 California Energy Code (Part 6, Title 24 of the California Code of Regulations) is adopted as the Energy Code of the City of Watsonville.
SANTA CRUZ COUNTY PLANS AND POLICIES
Santa Cruz County General Plan/Local Coastal Program
Objective 7.27: Public Services and Facilities. To promote the improvement of public services and facilities in areas already committed to development, and to spread the costs of needed services and facilities equitably among present and future residents and others who benefit.
Policy 7.25.7: Hazardous Wastes and Environmental Damaging Compounds in Landfills. Prohibit the disposal of radioactive waste, hazardous waste and ozone depleting compounds in County landfills.

SOURCE: City of Watsonville, Watsonville Municipal Code, 2014. Available online at www.codepublishing.com/CA/Watsonville/. Accessed on May 14, 2018; City of Watsonville, Watsonville 2005 General Plan, Adopted May 24, 1994; Santa Cruz County, *1994 General Plan and Local Coastal Program for the County of Santa Cruz, California*, 1994.

[22] Government Code Section 53091 exempts agencies like PV Water from complying with local building and zoning ordinances when locating or constructing facilities for the production, generation, storage, treatment, or transmission of water. California Government Code Section 65402(c) requires that PV Water notify cities and counties of its plans to construct projects or to acquire or dispose of property. The planning agency then has 40 days to determine project consistency with its general plan. If the planning agency disapproves, the disapproval may be overruled by PV Water.

Zero Waste Plan for Santa Cruz County

The County of Santa Cruz has a history of progressive waste management policies, programs and facilities dating back to November 1999. The County of Santa Cruz met a 75 percent diversion rate goal in 2010 and continues to be a leader in the reduction in the amount of waste being disposed as well as spearheading efforts to minimize upstream impacts on materials through sustainable manufacturing and consumerism.

Zero Waste is a systems approach to avoid the creation of waste that follows a hierarchy, focusing first on reducing the volume and toxicity of waste by elimination, then focusing on reusing materials and products for their original intended uses, and then for alternative uses, before recycling. Zero Waste encourages local and regional public-private partnerships to provide the infrastructure and services needed to accomplish all of these functions. In a Zero Waste system, any materials that cannot be easily and conveniently reduced, reused, recycled or composted are either returned to the manufacturer directly or through retail channels, or no longer used. The Zero Waste Plan is intended to guide County of Santa Cruz officials in the planning and decision making process to achieve Zero Waste goals.[23]

3.12.3 Impacts and Mitigation Measures

3.12.3.1 Significance Criteria

In accordance with the California Environmental Quality Act (CEQA), state CEQA Guidelines (including Appendix G), relevant plans, policies, and/or guidelines, and agency standards, the Project could have a significant impact if it were to:

- Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation;
- Conflict with or obstruct a state or local plan for renewable energy or energy efficiency;
- Require or result in the relocation or construction of new or expanded water, wastewater treatment or stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects;
- Have insufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years;
- Result in a determination by the wastewater treatment provider which serves or may serve the project that it has inadequate capacity to serve the project’s projected demand in addition to the provider’s existing commitments;
- Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals;

[23] County of Santa Cruz, Department of Public Works, Zero Waste Plan for Santa Cruz County, 2015.

- Fail to comply with federal, state, and local management and reduction statutes and regulations related to solid waste.

- Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:

  – Fire protection;
  – Police protection;
  – Schools;
  – Parks; or
  – Other public facilities.

- Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated; and/or

- Include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment.

The following topics are not analyzed further in this section for the reasons described below:

- ***Require or result in the relocation or construction of new or expanded water, wastewater treatment or stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects.*** The Project includes construction of a WTP. PV Water proposes to construct solids drying beds to allow solids to settle out of the water prior to offhaul to the landfill. Decant water from the solids drying beds would be recycled to the head of the WTP treatment process. As a back-up to this process, settled solids may need to be diverted to the local sewer and a connection will be provided for this purpose. PV Water would comply with Salsipuedes Sanitary District and City of Watsonville water quality requirements for discharge of the solids. The City of Watsonville's Wastewater Treatment Facility has capacity for secondary treatment of 12.1 mgd and tertiary treatment of 7.7 mgd, which is sufficient capacity to accommodate settled solids occasionally diverted from operation of the Project.[24] The Project does not require relocation, construction, or expansion of stormwater drainage, electric power, natural gas, or telecommunications facilities. In addition, the Project would not induce significant population growth either directly (by constructing housing) or indirectly (for example, by reducing flood risk in currently undeveloped areas into which additional housing could be built). For these reasons, this criterion is not applicable to the Project.

- ***Have insufficient water supplies available to serve the Project and reasonably foreseeable future development during normal, dry, and multiple dry years.*** During construction, the Project would intermittently use water for dust control, pressure washing, and cement mixing. In total, construction processes would require about 3 million gallons of water spread out

[24] City of Watsonville, Public Works and Utilities, Wastewater Division, 2019. Available online at https://cityofwatsonville.org/812/Wastewater-Division. Accessed on January 17, 2019.

over the 18-month construction period.[25] Construction would also use relatively small amounts of potable water for some site needs such as drinking water, hand-washing, and other on-site sanitary needs. The small increase in potable water use would be temporary, terminating with the completion of construction. Water supplies are planned such that short-term spikes in potable use can be accommodated during normal, dry, and multiple dry years. For these reasons, this criterion is not applicable to the Project.

- ***Result in a determination by the wastewater treatment provider that would serve the project that it has inadequate capacity to serve the project's projected demand in addition to the provider's existing commitments during operation.*** During Project construction, new sources of wastewater discharges would include wastewater resulting from sanitary needs of construction workers. As described in Chapter 2, Project Description, the maximum construction work force would be approximately 26 workers per day. Assuming that each worker would generate 2.81 gallons per day of wastewater,[26] the total increase in wastewater volumes would be less than 0.001 mgd, an increase well within the dry weather capacity of the existing wastewater system. The Project would generate even less wastewater during operations due to minimal number of staff necessary to operate the facilities proposed as part of the Project. For these reasons, this criterion is not applicable to the Project.
- ***Include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment.*** The Project does not include recreational facilities at this time and would not require the construction or expansion of recreational facilities because it does not displace any existing facilities. Inclusion of recreational facilities may be revisited in the future and would be separately subject to CEQA if proposed. For these reasons, this criterion is not applicable to the Project.

3.12.3.2 Methodology

As described in Section 3.1, this EIR provides an independent analysis of the Project's potential environmental impacts. **Table 3.12-2** presents mitigation measures from the 2014 BMP Update PEIR adopted by the Board of Directors (Resolution 2014-05) for the purpose of reducing impacts related to energy, utilities and public services. These adopted mitigation measures are considered part of the Project and thus are considered prior to any significance determinations. Potential impacts are evaluated in the following section. If warranted, additional mitigation is included and takes the form of (1) modifications to update the mitigation measures presented in Table 3.12-2 to reflect current conditions and site-specific impacts; or (2) new mitigation measures to replace or augment an adopted mitigation measure.

---

[25] Schedule based on construction of grading and surcharging fill pad for the preferred WTP site. The duration of surcharging for the optional WTP site would be increased by 12 to 18 months to allow for consolidation of fill pad at that site. There would be no construction activity at the site during consolidation. The remainder of the construction phase durations for the WTP would be the same for both site options.

[26] This calculation is based on compliance with the 2013 California Green Building Code water use baseline values provided in Table 5.3003.2.2 of the code. Construction workers are assumed to flush twice per day and the water use includes 1.28 gallons per flush and use of 0.125 gallons per flush for handwashing. The total per construction worker water use for sanitary purposes is 2.81 gallons per day.

Table 3.12-2
2014 BMP Update PEIR Mitigation Measures – Energy, Utilities, Public Services, and Recreation

ES-1: A study to identify utilities along proposed alignments will be conducted by PVWMA during pre- design states of projects. The following mitigation measures are required for segments identified in final design as having potential conflicts with significant utilities:

a. Utility excavation and encroachment permits would be required from the appropriate agencies, including the Public Works Departments of Santa Cruz County, City of Watsonville, Caltrans, and Union Pacific Railroad. These permits include measures to minimize utility disruption. PVWMA and its contractors shall comply with permit conditions. Permit requirements shall be included in construction contract specifications.
b. Utility locations would be verified through field survey (potholing) and use of an underground locating service.
c. A detailed engineering and construction plan shall be prepared as part of the design plans and specifications. This plan shall include procedures for the excavation, support, and fill of areas around utility cables and pipes. All affected utility services would be notified of PVWMA construction plans and schedule. Arrangements would be made with these entities regarding protection, relocation, or temporary disconnection of services.
d. In areas where the pipeline would parallel wastewater mains, engineering and construction plans shall include trench wall support measures to guard against trench wall failure, and possible resulting loss of structural support for the wastewater main.

Residents and businesses in the project area shall be notified in writing by the contractor of planned utility service disruption two to four days in advance, in conformance with state and County standards.

ES-2: PVWMA shall include in its construction specifications a requirement for the contractor to provide plans for recovering, reusing, and recycling construction, demolition, and excavation wastes and providing for composting of plant material, where feasible.

SOURCE: Pajaro Valley Water Management Agency, 2014. Resolution No. 2014-05, adopted April 16, 2014.

3.12.3.3 Impacts and Mitigation Measures

Impact EUP-1: Implementation of the Project could result in wasteful, inefficient, or unnecessary consumption of energy during Project construction or operation, or conflict with or obstruct a state or local plan for renewable energy or energy efficiency. (*Less than Significant*)

Construction

Construction of the Project components would result in indirect energy consumption from construction traffic and the use of construction materials. Although the precise amount of construction-related energy demand cannot be predicted at this time, the primary energy demand during construction would occur from use of gasoline and diesel-powered mobile construction equipment and vehicles to transport workers and materials to and from the construction sites. Electricity would also be used for construction lighting, field services, and electrically driven construction devices such as air compressors, pumps and other equipment. Although Project construction would result in increased indirect energy consumption, the amount of transportation fuel and potential electricity use required for Project construction is not considered an inefficient or wasteful use of energy as fuel use would be consistent with current construction and manufacturing practices, energy standards that promote strategic planning, and building standards that reduce consumption of fossil fuels and enhance energy efficiency. During construction, the Project would comply with regulations in Section 3.12.2, and would not obstruct any state or local plans for renewable energy or energy efficiency. Therefore, the impact would be ***less than significant***.

Operation

Implementation of the Project would result in direct energy consumption associated with operations from an incremental increase in the demand for electrical energy. PV Water would divert a maximum of 3,000 acre-feet (978 million gallons) of water per year. The intake pump station would require .0071 kWh per gallon of water (1,662,000 kWh per year) to pump water from College Lake to the Coastal Distribution System.[27] Although there are existing PG&E power lines located near the proposed facilities, operation of the Project would require PG&E to provide a service connection. A transformer would be needed, from which a power conduit would be routed underground to the electrical building for the facilities which would house the motor control center and electrical panels. The transformer would be located at the electrical building at the WTP. Construction of the WTP at the preferred WTP site could require an additional transformer and switchgear at the intake pump station and weir structure due to its farther distance than the optional WTP site.[28]

Operation of the Project would add up to two new employees, which would generate approximately four new one-way daily trips (1,040 annual trips). The routine maintenance activities within College Lake (e.g., sediment and debris removal, vegetation management) described in Chapter 2, *Project Description*, would occur annually or semi-annually and would generate approximately 1,300 truck trips per year. Sediment removal at the WTP would require 52 off-haul truck trips per year.

While the Project would increase electricity demands and truck trips, as described above, the amount of transportation fuel and potential electricity use required for Project operation is not considered an inefficient or wasteful use of energy as fuel use would be consistent with current construction and manufacturing practices, energy standards that promote strategic planning, and building standards that reduce consumption of fossil fuels and enhance energy efficiency. Additionally, the Project would relieve groundwater overdraft in the Pajaro Valley, so energy use during operation would not be wasteful. During operation, the Project would comply with regulations in Section 3.12.2, and would not obstruct any state or local plans for renewable energy or energy efficiency. For these reasons, this impact is ***less than significant***.

Mitigation: None required.

Impact EUP-2: Project construction and operation could result in a substantial adverse effect related to generating solid waste in excess of state or local standards, or in excess of the capacity of local infrastructure, or otherwise impairing the attainment of solid waste reduction goals. (*Less than Significant*)

Construction

The Project would generate solid waste requiring disposal from excavation and other earthwork activities. Construction activities would also include demolition of the existing weir structure and

---

[27] Carollo Engineers, Request for Information, e-mail from R. Gutierrez, November 16, 2018.
[28] Ibid.

pump station. Material types to be disposed of are expected to include dirt, soil, rock, concrete, metal (e.g., rebar) and wood.

As described in Table 2-7 in Chapter 2, *Project Description*, after excavated soil has been reused as fill, the total volume of materials to be off-hauled and disposed of could be as high as approximately 30,300 cubic yards. The operating solid waste disposal facility that would receive these materials is the Buena Vista Landfill. As explained in Section 3.12.1.2, the remaining capacity of this facility is approximately 2.5 million cubic yards.[29] There is thus adequate permitted capacity at the facility for the volumes and types of solid waste that would be generated. Additionally, in accordance with adopted Mitigation Measure ES-2, PV Water would include in its construction specifications a requirement for the contractor to provide plans for recovering, reusing, and recycling construction, demolition, and excavation waste and providing composting of plant material, where feasible. Project construction would also comply with regulations in Section 3.12.2, like Section 5.408 of the 2016 California Green Building Code, to ensure that solid waste is not generated in excess of state or local standards. With implementation of adopted Mitigation Measure ES-2 and compliance with regulations in Section 3.12.2, the impact would be ***less than significant***.

Operation

During operations, the Project would generate approximately 200,000 pounds (468 cubic yards) of sediment from the WTP and 11,500 cubic yards per year of sediment and other debris from maintenance activities within the lake basin. Sediment and debris would be taken to Buena Vista Landfill. As discussed above, the facility is permitted for all types of waste that would be generated by Project operation and has a capacity of approximately 2.5 million cubic yards, which is sufficient to accommodate Project operational waste. Project operation would also comply with regulations in Section 3.12.2 to ensure that solid waste is not generated in excess of state or local standards. The impact would be ***less than significant***.

Mitigation: None required.

Impact EUP-3: The Project would comply with federal, state, and local management and reduction statutes and regulations related to solid waste. (*Less than Significant*)

Construction

Buena Vista Landfill, where disposal and recycling of construction and demolition debris would occur, is permitted for all types of waste that would be generated by Project construction. As discussed in Section 3.12.2, the California Integrated Waste Management Act of 1989 requires municipalities to divert at least 50 percent of all solid waste generated by the year 2000 and establishes the goal of diverting at least 75 percent of generated waste (based on per capita disposal rates) by 2020. In addition, Section 5.408 of the 2016 California Green Building Standards Code requires all nonresidential construction and demolition projects to reuse or recycle at least 65 percent of materials generated. The Zero Waste Plan for Santa Cruz County ensures Santa

[29] E-mail communication between K. Kolassa, County of Santa Cruz, and A. Maudru, Environmental Science Associates, regarding remaining capacity at Buena Vista Landfill, March 26, 2018.

Cruz County's compliance with state recycling mandates and provides residents and businesses with information on Zero Waste Policy objectives, local recycling facilities, programs to assist with waste diversion, and green practices in schools and other areas of the county.[30]

Consistent with the 2016 California Green Building Standards Code and adopted Mitigation Measure ES-2, PV Water would require contractors to provide plans for recovering, reusing, and recycling construction, demolition, and excavation wastes and compost plant material, where feasible. Project construction would be in compliance with state or local statutes related to solid waste by reusing or recycling at least 65 percent of materials generated during construction and demolition, and disposing of additional debris at a landfill that is permitted for the waste and has adequate capacity. With implementation of these practices and adopted Mitigation Measure ES-2, the impact would be ***less than significant***.

Operation

Refer to the operations discussion under Impact EUP-2, for operational solid waste quantities. Sediment and other debris removed during routine operations and maintenance activities would be sent to Buena Vista Landfill for disposal. This disposal would not result in an inconsistency or violation of permit conditions at this facility because the facility is permitted and has adequate capacity to accept these non-hazardous wastes. Project operations would also comply with the Zero Waste Plan for Santa Cruz County, which ensures Santa Cruz County's compliance with state recycling mandates. Through compliance with applicable permits and federal, state, and local statutes related to solid waste, this impact would be ***less than significant***.

Mitigation: None required.

Impact EUP-4: The Project could result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, or increase the demand for new or increased staff and/or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for public services including, fire protection, police protection, schools, or other public facilities. *(Less than Significant)*

Construction

The Project sites currently receive services from the providers identified in Section 3.12.1, Setting. As described in Chapter 2, *Project Description*, construction of each Project component would occur over a period of several months at each site and would employ 11 to 26 construction workers. Construction workers would likely come from within Santa Cruz County or Monterey County. Construction workers who are residents of Santa Cruz County are currently being served by the existing county and individual city/town services, and thus would not represent an increase in demand for these services. While it is possible that some workers might temporarily relocate from other areas, the Project is not expected to result in a substantial increase in the local population and

---

30 County of Santa Cruz, Department of Public Work, *Zero Waste Plan for Santa Cruz County*, 2015.

thus not expected to result in increased response times such that new or physically altered facilities would be required to maintain service. Incidents could occur during construction requiring law enforcement, fire protection, or emergency medical services. However, this analysis presumes that any incremental increase in demand for these services during construction would be temporary, could be accommodated by existing services, and would not require construction of new or physically altered facilities to maintain service. Therefore, the impact of Project construction on public services would be ***less than significant***.

Operation

The Project does not involve the construction of residences or businesses and would require a minimal increase in maintenance staff (two staff members); therefore, the Project would not result in a substantial permanent increase in the local population. The Project facilities would be constructed in compliance with all applicable fire codes and public safety standards. Operation of the Project thus would not result in substantial increases in demand for public services, including law enforcement, fire protection, emergency medical services, schools or libraries. Therefore, operation of the Project would not require new or physically altered governmental facilities, and the Project would have no impact on public services.

Because Project construction would not result in a substantial increase in the local population and Project operation would not result in a substantial permanent increase in the local population, the impact of construction and operation of the Project on public services would be ***less than significant***.

Mitigation: None required.

Impact EUP-5: The Project could increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated. (*Less than Significant*)

Construction

Temporary, direct impacts on established recreational facilities (parks and trails) and resources could result if construction activities overlapped geographically with existing recreational facilities or trails. Marinovich Park is the only recreation facility that is located directly on the College Lake pipeline route. Construction activities would have minimal impacts to this and other nearby parks and recreation facilities due to the temporary nature of the activities, and the fact that parks would remain open during construction. Construction activities would not affect nearby trails because the existing trails in the vicinity would remain open and are far from the Project sites (over one-quarter mile away). Project construction activities associated with the College Lake pipeline could temporarily affect bicycle lanes along roadways; this issue is addressed under Impact TRA-3 in Section 3.9, Transportation and Traffic.

Operation

The Project does not include new recreational facilities and would not permanently affect existing recreational resources. The Project does not include new residential or other uses that would generate increased demand for parks or other recreational facilities. The project would require a minimal increase in maintenance staff (two staff members) at PV Water, so demand at existing recreational facilities would not substantially increase as a result of Project operations; ongoing demand would continue to be met by existing parks and recreational facilities. As such, operation of the Project would have ***less-than-significant impacts*** related to direct or indirect physical deterioration of recreational resources.

Mitigation: None required.

Cumulative Impacts

Impact C-EUP-1: The Project, in combination with past, present, and probable future projects in the Project area, would not result in significant adverse cumulative energy impacts. (*Less than Significant*)

The geographic scope for the analysis of potential cumulative impacts related to energy, fuel, and water resources encompasses the Project sites and the broader region, which generally would use the same fuel, water, and energy supply sources. All projects listed in Table 3.1-1 in Section 3.1, Overview, are considered in the cumulative impact analysis for both construction and operation.

Construction

Regarding construction-phase impacts related to energy and water use, all of the projects presented in Table 3.1-1 involve some level of construction. Some of the projects (e.g., Upper Struve Slough Habitat Enhancement Project, Bryant Habert Ecological Restoration Project) have already begun or completed construction, while the majority of the projects could be under construction during some portion of the 18-month construction period of the Project. Like the Project, construction of all projects cumulatively would require the use of fuel and energy, and could also require the use of water. The amount of fuel, energy and water consumed during construction would vary by project. The projects identified in Table 3.1-1 are within Santa Cruz County or the City of Watsonville, and would be subject to the same regulatory framework as the Project for the use of fuel, water, and energy during construction. These requirements include the California Green Building Standards Code, California Energy Action Plan, and Watsonville 2005 General Plan Policy 9.J Energy. Compliance with these existing regulations by the identified cumulative projects would ensure that fuel, water, or energy resources are not used wastefully during construction, and that construction of these projects would not result in a significant adverse, cumulative impact to which the Project could contribute. Accordingly, the cumulative effect would be ***less than significant***.

Operation

Regarding operations-phase impacts related to energy and water use, many of the projects listed in Table 3.1-1 involve enhancement and/or replacement of existing roadways and related infrastructure, local trails, and habitat (e.g., Main Street Improvement Project, Lee Road Trail Connector, Middle Watsonville Slough Upland Enhancement Project); these projects generally would not increase consumption of energy and water above existing levels. Operation of the other projects listed in Table 3.1-1 would require the use of fuel, energy or water in varying quantities. For example, similar to the Project, pump stations, transformers, and other equipment that could be installed as part of the cumulative projects would use fuel, but these uses are generally required by safety regulations. As indicated above, the projects identified in Table 3.1-1 are within Santa Cruz County or the City of Watsonville and would be subject to the same regulatory framework as the Project for the use of fuel, water, and energy during operations. At a minimum, applicable regulations would include current State standards regarding energy consumption and conservation (e.g., energy efficiency standards and green building standards in Title 24 of the California Code of Regulations). The application of local energy and water efficiency requirements would vary by project type, size, and sponsor. Compliance with applicable energy and water use regulations would ensure that the identified cumulative projects in the region would not result in wasteful use of these resources. As a result, there would not be a significant cumulative impact from the wasteful use of fuel, energy, or water to which the Project could contribute. Accordingly, the cumulative effect would be ***less than significant***.

Mitigation: None required.

Impact C-EUP-2: The Project, in combination with past, present, and probable future projects in the Project area, would not result in significant adverse cumulative utilities impacts. (*Less than Significant*)

The geographic scope for the analysis of potential cumulative impacts related to utilities encompasses the Project sites and the areas served by the City of Watsonville (water, wastewater, and stormwater), Buena Vista Landfill (solid waste), and other utilities described in Section 3.12.1.2. All projects listed in Table 3.1-1 in Section 3.1, Overview, are considered in the cumulative impact analysis for both construction and operation.

Construction and Operation

As discussed in Section 3.12.3.1, the Project would have no impact with respect to the following topics. The Project would not contribute to cumulative impacts related to these topics because it would not

- Require or result in the relocation or construction of new or expanded water, wastewater treatment or stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which would cause significant environmental effects;
- Have insufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years; or

- Result in a determination by the wastewater treatment provider which serves or may serve the project that it has inadequate capacity to serve the project's projected demand in addition to the provider's existing commitments.

As discussed in Impact EUP-3, Section 5.408 of the 2016 California Green Building Standards Code requires all nonresidential construction and demolition projects to reuse or recycle at least 65 percent of materials generated and adopted Mitigation Measure ES-2, PV Water would require contractors to provide plans for recovering, reusing, and recycling construction, demolition, and excavation wastes and compost plant material, where feasible. During operation, the project would also implement measures to achieve zero waste in accordance with the Zero Waste Plan for Santa Cruz County as discussed in Impact EUP-3. All projects within Santa Cruz County would be required to implement these or similar regulatory requirements, and there is sufficient landfill capacity at Buena Vista Landfill as discussed in Impacts EUP-2 and EUP-3. Therefore, cumulative impacts related to generating solid waste in excess of State or local standards, exceeding landfill capacity, impairing the attainment of solid waste reduction goals, and compliance with federal, state, or local management and reduction statutes and regulations related to solid waste would be ***less than significant***.

Mitigation: None required.

Impact C-EUP-3: The Project, in combination with past, present, and probable future projects in the Project area, would not result in significant adverse cumulative public services impacts. (*Less than Significant*)

The geographic scope for the analysis of potential cumulative impacts related to public services encompasses the Project sites and areas served by the public service provider described in Section 3.12.1.3. All projects listed in Table 3.1-1 in Section 3.1, Overview, are considered in the cumulative impact analysis for both construction and operation.

Construction and Operation

Some of these projects identified in Table 3.1-1 would be under construction at the same time as the Project (Pajaro River Flood Risk Management Study, Corralitos Creek ADA Compliance). Incidents could occur during construction requiring law enforcement, fire protection, or emergency medical services. However, the Watsonville Fire Department includes two stations and the Pajaro Valley Fire Protection District has one station to serve the area, and the Watsonville Police Department has 68 sworn police officers. As described in Impact EUP-4, any incremental increase in demand for these services during construction would be temporary and could be accommodated by existing services. Additionally, the Project does not involve the construction of residences or businesses and would require a minimal increase in maintenance staff and would therefore not result in a substantial permanent increase in the local population. Project construction and operation would not result in a substantial increased need for law enforcement or fire protection services, and therefore would not considerably contribute to cumulative impacts resulting from the construction of new or physically altered governmental facilities that are not already planned. Therefore, the Project's contribution to public services impacts would be ***less-than-significant***.

Mitigation: None required.

Impact C-EUP-4: The Project, in combination with past, present, and probable future projects in the Project area, would not result in significant adverse cumulative recreational impacts. (*Less than Significant*)

The geographic scope for the analysis of potential cumulative impacts related to recreation encompasses the Project sites and recreational facilities within one quarter mile of the Project sites (Section 3.12.1.3 lists these facilities). All projects listed in Table 3.1-1 in Section 3.1, Overview, are considered in the cumulative impact analysis for both construction and operation.

Construction

Because the Project would not include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment, it would not contribute to any cumulative effects related to this impact.

Some of the projects identified in Table 3.1-1 would be under construction at the same time as the Project (such as the Pajaro River Flood Risk Management Study and Corralitos Creek ADA Compliance projects), and could result in short-term disruption of recreational facilities. The Project may include temporary impacts to Marinovich Park during construction of the College Lake pipeline, but because the park would remain open during construction, the use of the facility is not expected to be shifted to other recreational facilities with the City of Watsonville or in neighboring jurisdictions. Construction of Project components would occur during the same time frame and in the same vicinity as some other planned and proposed projects, which could cause temporary park closures or disruptions to bicycles lanes, and shift public access and recreational use to other facilities. This increased use of those facilities could cause congestion or other adverse effects. However, given the brief construction period of the College Lake pipeline (13 months) and the dynamic nature of the construction corridor (construction staging would move as pipeline construction progresses), there is a low probability of other projects listed in Table 3.1-1 that may include park closures or disruptions to bicycle lanes occurring simultaneously with this Project. Project construction activities associated with the College Lake pipeline are further addressed in Section 3.9, Transportation and Traffic. The Project in combination with other projects in the cumulative scenario would have a ***less–than-significant*** impact related to recreation.

Operation

The Project does not include new residential or other uses that would generate increased demand for parks or other recreational facilities and would require a minimal increase in maintenance staff. Project operation would not substantially increase the use of existing neighborhood and regional parks or other recreational facilities, and substantial physical deterioration of those facilities would not occur. Therefore, the Project's contribution to impacts related to recreational facilities would be ***less than significant***.

Mitigation: None required.

3.13 Aesthetic Resources

This section presents an analysis of potential impacts related to aesthetic resources that would result from implementation of the proposed College Lake Integrated Resources Management Project (Project). The analysis includes both site options (preferred and optional) for the water treatment plant (WTP) as well as preferred and optional pipeline alignments for the College Lake pipeline. Information from the 2014 Basin Management Plan Update Program Environmental Impact Report (2014 BMP Update PEIR) that remains relevant and accurate for the purposes of describing the physical or regulatory setting of aesthetic resources has been incorporated as appropriate. The Project includes mitigation measures adopted by the Board of Directors to reduce the severity and magnitude of potential environmental effects.

3.13.1 Setting

3.13.1.1 Concepts and Terminology

Visual or aesthetic resources are generally defined as both the natural and built features of the landscape that contribute to the public viewer's experience and appreciation of the environment. Depending on the extent to which a project's presence would alter the perceived visual character and quality of the environment, a visual or aesthetic impact may occur. Familiarity with the following terms and concepts will aid the reader in understanding the content of this section.

Visual Character is a general description of the visual attributes of a particular land use setting. The purpose of defining the visual character of an area is to provide the context within which the visual quality of a particular site or locale is most likely to be perceived by the viewing public.

Visual Quality is defined as the overall visual impression or attractiveness of a site or locale as determined by its particular landscape characteristics and aesthetic qualities (such as color, variety, vividness, coherence, uniqueness, harmony, and pattern). For this analysis, the visual quality of a site or locale is defined according to three levels:

- ***Low.*** The location is lacking in natural or cultural visual resource amenities typical of the region. A site with low visual quality will have aesthetic elements that are relatively unappealing and perceptibly uncharacteristic of the surrounding area.

- ***Moderate.*** The location is typical or characteristic of the region's natural or cultural visual amenities. A site with moderate visual quality maintains the visual character of the surrounding area, with aesthetic elements that do not stand out as either contributing to or detracting from the visual character of an area.

- ***High.*** The location has visual resources that are unique or exemplary of the region's natural or cultural scenic amenities. A site with high visual quality is likely to stand out as particularly appealing and makes a notable positive contribution to the visual character of an area.

Viewshed. A viewshed is an area of land, water, or other urban or environmental element that is visible to the human eye from a fixed vantage point.

3.13.1.2 Regional Setting

The Project would be located in the Pajaro Valley, a region characterized by the peaks and ridges of the Coast Range to the east, and the scenic coastline of Monterey Bay to the west. The floor of the Pajaro Valley features predominantly flat topography typical of inland valley landscapes. The visual character of the Pajaro Valley can be typified as rural agricultural croplands and orchards, interspersed with meandering creeks and sloughs, small lakes, and pockets of residential and institutional development, surrounding the urbanized landscape of the City of Watsonville.

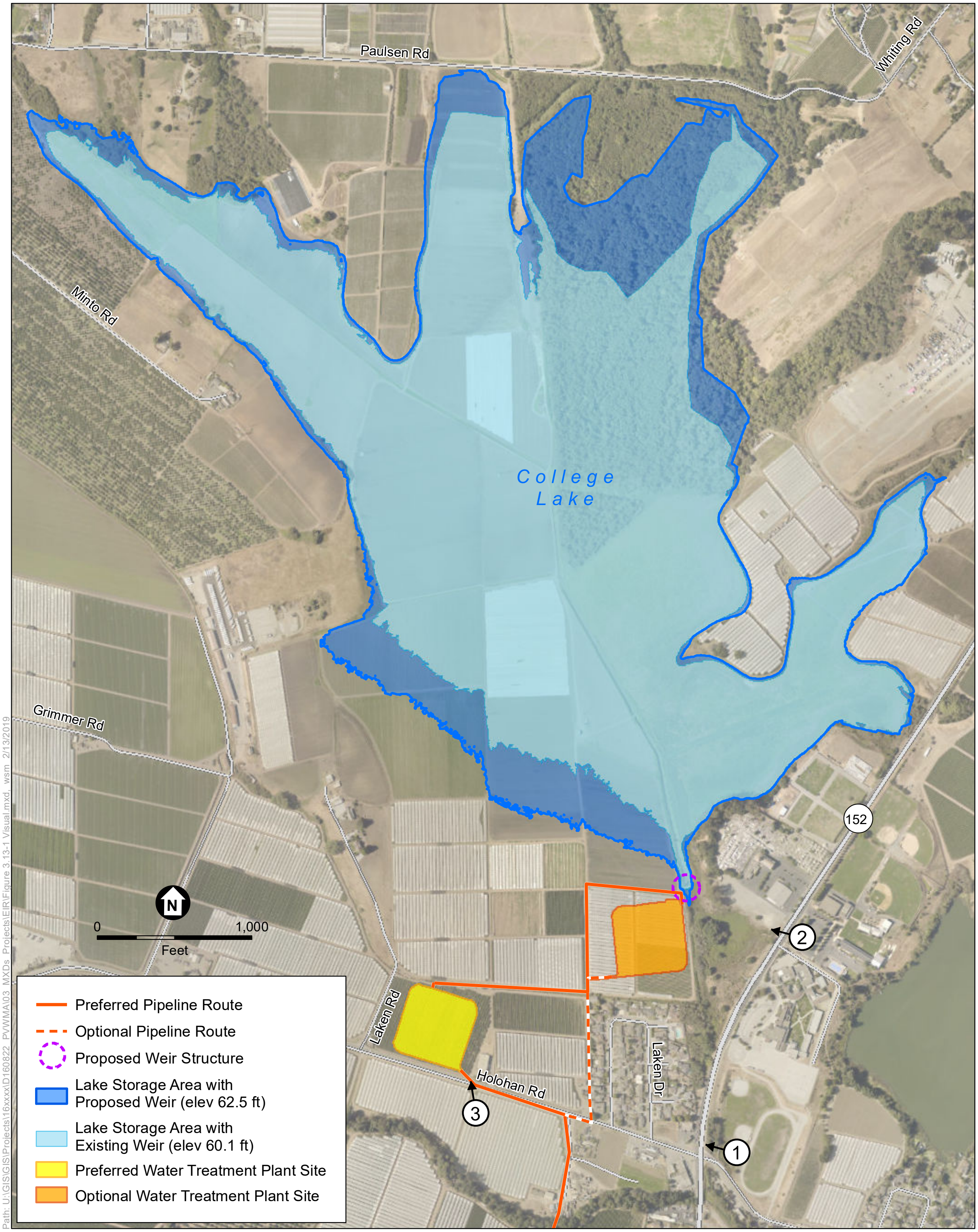
There are several designated scenic roads in the region, described below in Section 3.13.2.2.

3.13.1.3 College Lake Vicinity

Agricultural uses, including croplands, fruit tree orchards, and low-lying agricultural buildings, visually dominate the area surrounding College Lake. Rural agricultural vistas of rolling croplands, orchards, unembellished square- and rectangular-shaped agricultural buildings, and occasional silos are interspersed with built features including institutional, commercial, and residential development.

Institutional uses in the area are generally located along the State Route (SR) 152 corridor, and include Our Lady Help of Christians Catholic Church, Valley Catholic Cemetery, St. Francis Catholic High School, Lakeview Middle School, and the Santa Cruz County Fairgrounds. The Our Lady Help of Christians Catholic Church is a two-story, mission revival-style building with a four-story, rectangular bell tower clad in a beige stucco facade. The Valley Catholic Cemetery features aboveground stone crypts and mausoleums, and forms an L-shape around the church. St. Francis Catholic High School and Lakeview Middle School feature late 20th-century one- and two-story academic buildings, generally clad in beige stucco or beige brick and stucco facades. The Santa Cruz County Fairgrounds have one- and two-story exhibit and museum buildings, a grandstand and race track, and a decorative four-story tank house tower. Commercial uses are clustered in the vicinity of the intersection of SR 152 and Holohan Road. **Figure 3.13-1** presents a viewpoint map, and **Figure 3.13-2** presents a photograph (Photo 1) looking toward Holohan Road from SR 152. Commercial development in the area is typically in one-story structures in stand-alone buildings or clustered in a small strip mall. Parking generally fronts these commercial uses. Residential developments are located to the north, west, and south of College Lake. Residences in the area tend to be single-family, ranch-style homes clustered in suburban-type developments.

There is a sidewalk on the east side of SR 152, between the high school and middle school and the commercial enterprises at the intersection of SR 152 and Holohan Road. Travelers along Holohan Road in the vicinity of the Project area have views of mixed-use commercial enterprises, and a small residential development (Orchard Park) near the intersection of Holohan Road and SR 152. As motorists travel west on Holohan Road, views become more agrarian and include agricultural fields, orchards, and single-story agricultural buildings.



SOURCE: Carollo Engineers, 2017; ESRI World Imagery, 7/23/2016; ESA

College Lake Integrated Resources Management Project

Figure 3.13-1
Viewpoints Map

ESA

Photo 1: View of Holohan Road from State Route 152

Photo 2: View of Optional Water Treatment Plant Site from State Route 152

Photo 3: View of Preferred Water Treatment Plant Site from Holohan Road

SOURCE: ESA, 2018

College Lake Integrated Resources Management Project

Figure 3.13-2
Photos from Public Viewpoints

ESA

College Lake, Weir Structure, and Intake Pump Station

The visual character of College Lake itself changes seasonally, depending on rainfall patterns and farming within the basin. Annually from approximately November through April (depending upon rainfall), College Lake typically appears as an irregularly-shaped water body brownish in color due to turbidity. As described in Chapter 2, *Project Description*, Reclamation District 2049 pumps water out of College Lake in the spring and portions of the lake basin, particularly in the southwest, are converted to croplands. The dense riparian forest in the northeastern portion of College Lake provides a visual contrast to the lake, cropland, and built environment. Long-range views across College Lake include Mt. Madonna and the Santa Cruz Mountains to the north, croplands to the west and east, and the City of Watsonville to the south. The figures in **Appendix AG** depict land uses within the College Lake basin based on surveys in the summer and fall and review of aerial imagery from Google Earth (dates vary) for years 2014 through 2018. The existing weir and pump station are located in a natural depression at the southern end of College Lake and are partially visible, but not prominent, from SR 152 and other neighboring land uses.

College Lake has moderate visual quality, which varies seasonally as described above. The visual attributes of College Lake are typical of the region's agricultural visual character. Visually, College Lake is poorly exposed (i.e., there are few vantage points readily accessible to the public offering expansive views of the lake). College Lake is not readily visible from public viewsheds of nearby roadways including SR 152 and Holohan Road because it is located in a natural depression, and public views are screened by existing roadside vegetation, intervening terrain, and built structures.

Preferred Water Treatment Plant Site

The preferred WTP Site is located on Holohan Road, approximately 1,500 feet southwest of the existing weir and pump station. This site is currently operating as an orchard, and is visually characterized by symmetrical rows of apple trees (refer to Figure 3.13-2, Photo 3). An apple farming operation, characterized by one-story, utilitarian agricultural structures and including a ranch-style residence, is located on a separate parcel to the east of the orchard.

The preferred WTP site has moderate visual quality. As an apple orchard, the site has visual resources that are characteristic of the Pajaro Valley's agricultural scenic amenities. The site has high visual exposure: the orchard is adjacent to and readily visible from Holohan Road (as well as nearby residences). The site is approximately 1,700 feet from the intersection of SR 152 and Holohan Road, and would not be visible from SR 152 due to landscape elevations, established roadside and agricultural windbreak vegetation, and existing buildings.

Optional Water Treatment Plant Site

The optional WTP site is located immediately south of College Lake, just southwest of the existing weir and pump station. The site is located in a natural topographic depression, and is visually characterized by agricultural croplands, including raspberries tended beneath hoop houses (arched frames periodically covered with white textile).

The optional WTP site has moderate visual quality. The site is typical of rural agricultural land uses in the Pajaro Valley. Berry cultivation on the site blends with the visual agricultural character of the surrounding area. The aesthetic attributes of the crops do not stand out as either contributing to or detracting from the visual character of the area. Visually, the optional WTP site is poorly exposed: the site is not readily visible from public viewsheds of nearby roadways, including SR 152 (refer to Figure 3.13-2, Photo 2) because the site is located in a natural depression, and views of the site are screened by topography, existing vegetation, and built structures. Similar intermittent views of the site from Holohan Road are largely obscured by the Orchard Park development south of the site, existing vegetation, site topography, and existing berry agricultural practices. Views of the site may also be available from the half-dozen residences along Laken Drive and Laken Court closest to the site, depending on the type of fencing along the residences' northern boundary and agricultural practices on the intervening land (at present, the hoop houses covering berries grown on the land between these homes and the optional WTP site likely impede views of the site). Views of the site may also be available from a few residences northwest of the site.

3.13.2 Regulatory Framework

3.13.2.1 Federal and State

There are no applicable federal regulations related to aesthetics. The State Scenic Highway Program and the Green Building Code are discussed below.

Scenic Highway Program

In 1963, the State Legislature established the California Scenic Highway Program through Senate Bill 1467, which added Sections 260 through 263 to the Streets and Highways Code, to preserve and enhance the natural beauty of California. The State Highway System includes highways that either are eligible for designation as Scenic Highways or have been designated as such. There are no officially designated Scenic Highways within the County of Santa Cruz or the City of Watsonville, although SR 1 and SR 152, which extend through the Pajaro Valley, are both eligible for the official State Scenic Highway designation.[1] Santa Cruz County and City of Watsonville scenic road designations are discussed below.

California Green Building Standards Code

The California Green Building Standards Code includes mandatory regulations for exterior light sources to reduce the amount of light and glare that extends beyond a property. Non-residential mandatory measures contained in Section 5.106.8, Light Pollution Reduction, require that exterior lights be shielded or meet "cutoff" lighting standards and meet specified backlight, uplight, and glare ratings designed to limit the amount of light that escapes beyond a site's boundary.

[1] California Department of Transportation (Caltrans), *California Scenic Highway Mapping System*, Santa Crux County. Available online at http://www.dot.ca.gov/hq/LandArch/16_livability/scenic_highways/index.htm. Accessed on March 26, 2018.

3.13.2.2 Local

Table 2-10 in Chapter 2, *Project Description*, identifies the approvals from Santa Cruz County and the City of Watsonville required for the Project. **Table 3.13-1** presents pertinent local plans and policies regarding the protection of visual resources to support County and City consideration of Project consistency with general policies.[2] In some cases, local policies are used in this EIR as criteria to determine the significance of physical effects on the environment (e.g., Impact NOI-1 in Section 3.8, Noise and Vibration).

TABLE 3.13-1
LOCAL PLANS AND POLICIES RELEVANT TO THE PROJECT

CITY OF WATSONVILLE PLANS AND POLICIES[a]
Watsonville General Plan
Goal 5.1: Visual Resources. Preserve and enhance the built and natural visual resources within Watsonville.
Goal 5.2: Community Appearance. Blend new development with recognized values of community appearance and scenic qualities, and ensure that new development enhances, rather than detracts from, its surroundings.
Goal 5.5: Viewscape. Preserve scenic rural qualities surrounding the urbanized portions of the Planning Area.
Goal 5.9 Scenic Corridors. Protect and enhance the views of and from the scenic streets and highways in Watsonville and the Planning Area.
Goal 5.10: Natural Scenic Resources. Conserve and enhance natural resources that contribute to the visual, recreational, and educational aesthetics of Watsonville. Such resources include: wetlands, sloughs, rivers, lakes, hillsides and stands of vegetation.
Policy 5.A.5: Scenic Resources. The City shall, through its design review process, consider the impact of the development on both the visual quality of the built environment and the scenic quality of natural features including sloughs, wetlands, rivers, lakes, hillsides and stands of vegetation.
SANTA CRUZ COUNTY PLANS AND POLICIES[a]
Santa Cruz County General Plan/Local Coastal Program
Objective 5.10a: Protection of Visual Resources. To identify, protect and restore the aesthetic values of visual resources.
Objective 5.10b: New Development in Visual Resource Areas. To ensure that new development is appropriately designed and constructed to have minimal to no adverse impact upon identified visual resources.
Policy 5.10.2: Development within Visual Resource Areas. Recognize that visual resources of Santa Cruz County possess diverse characteristics and that the resources worthy of protection may include, but are not limited to, ocean views, agricultural fields, wooded forests, open meadows, and mountain hillside views. Require projects to be evaluated against the context of their unique environment and regulate structure height, setbacks and design to protect these resources consistent with the objectives and policies of this [visual resources] section.
Policy 5.10.3: Protection of Public Vistas. Protect significant public vistas as described in policy 5.10.2 from all publicly used roads and vista points by minimizing disruption of landform and aesthetic character caused by grading operations, timber harvests, utility wires and poles, signs, inappropriate landscaping and structure design. Provide necessary landscaping to screen development which is unavoidably sited within these vistas.
Policy 5.10.4: Preserving Natural Buffers. Preserve the vegetation and landform of natural wooded hillsides, which serve as a backdrop for new development.
Policy 5.10.5: Preserving Agricultural Vistas. Continue to preserve the aesthetic value of agricultural vistas. Encourage development to be consistent with the agricultural character of the community. Structures appurtenant to agricultural uses on agriculturally designated parcels shall be considered to be compatible with the agricultural character of surrounding areas.

[2] California Government Code Section 53091 exempts agencies like PV Water from complying with local building and zoning ordinances when locating or constructing facilities for the production, generation, storage, treatment, or transmission of water. California Government Code Section 65402(c) requires that PV Water notify cities and counties of its plans to construct projects or to acquire or dispose of property. The planning agency then has 40 days to determine project consistency with its general plan. If the planning agency disapproves, the disapproval may be overruled by PV Water.

TABLE 3.13-1 (CONTINUED)
LOCAL PLANS AND POLICIES RELEVANT TO THE PROJECT

SANTA CRUZ COUNTY PLANS AND POLICIES (cont.)
Santa Cruz County General Plan/Local Coastal Program (cont.)
Policy 5.10.11: Development Visible from Rural Scenic Roads. In the viewsheds of rural scenic roads, require new discretionary development, including development envelopes in proposed land divisions, to be sited out of public view, obscured by natural landforms and/or existing vegetation. Where proposed structures on existing lots are unavoidably visible from scenic roads, identify those visual qualities worthy of protection and require the siting, architectural design and landscaping to mitigate the impacts on those visual qualities.
Policy 5.10.13: Landscaping Requirements. All grading and land disturbance projects visible from scenic roads shall conform to the following visual mitigation conditions: a) Blended contours of the finished surface with the adjacent natural terrain and landscape to achieve a smooth transition and natural appearance; and b) Incorporate only characteristic or indigenous plant species appropriate for the area.
Objective 8.5: Commercial and Industrial Design. To achieve a well-defined hierarchy of neighborhood, community and regional commercial and industrial areas which harmonize and complement the unique characteristics of each neighborhood they serve, through coordinated circulation systems and architectural style, and appropriate landscaping and signage.
Policy 8.5.1: Concentrate Commercial Uses. Contain commercial and industrial uses in designated areas, avoiding new strip commercial uses, to minimize impacts on residential areas, adjacent roads, and property, and on the scenic setting of the County.
Policy 8.5.2: Commercial Compatibility with Other Uses. Ensure compatibility of commercial and industrial use with adjacent uses through application of the Site Architectural and Landscape Design Review or similar ordinance. Give careful attention to landscaping, signing, access, site and building design, visual impacts, drainage, parking, on site circulation, traffic patterns, and where applicable, availability of water, sewage system capacity, fencing and mitigation of potential nuisance factors, visual aspects, and traffic problems.
Objective 8.6: Building Design. To encourage building design that addresses the neighborhood and community context; utilizes scale appropriate to adjacent development; and incorporates design elements that are appropriate to surrounding uses and the type of land use planned for the area.
Santa Cruz County Municipal Code
Section 13.11.072(A): Site Design. It shall be the objective of new development to enhance or preserve the integrity of existing land use patterns or character where those exist and to be consistent with village plans, community plans and coastal special community plans as they become adopted, and to complement the scale of neighboring development where appropriate to the zoning district context. New development, where appropriate, shall be sited, designed and landscaped so as to be visually compatible and integrated with the character of surrounding areas.
Section 13.11.072(B)(2)(a): Views. Development shall protect the public viewshed, where possible.
Section 13.11.072(B)(2)(b): Views. Development should minimize the impact on private views from adjacent parcels, wherever practicable.
Section 13.11.073, Building Design, and **Section 13.11.075, Landscaping**, provide planning and design objectives for new developments in Santa Cruz County.

NOTES:

[a] Note that the College Lake pipeline would be installed below ground; once constructed, the pipeline would be completely buried.

SOURCE: City of Watsonville, *Watsonville 2005 General Plan*, Adopted May 24, 1994; County of Santa Cruz, *1994 General Plan/Local Coastal Program, Chapter 5 – Conservation and Open Space*, Effective December 19, 1994.

Scenic Road Designations

SR 1 and SR 152 are both eligible for the official State Scenic Highway designation. Santa Cruz County and the City of Watsonville also have scenic road designations, as described in the 2014 BMP Update PEIR Section 3.1.1.2 (p. 3.1-2 *et seq.*). **Table 3.13-2** below identifies scenic roads in the vicinity of Project components.

TABLE 3.13-2
SCENIC ROAD DESIGNATIONS RELEVANT TO THE PROJECT

Scenic Road Name	Scenic Road Designation	Relevant Project Component(s)
State Route 152	• Eligible State Scenic Highway • County Scenic Road (Route 1 to Santa Clara County) • City Scenic Route (Main Street to Carlton Road)	• College Lake Water Storage Area • Weir Structure and Intake Pump Station • Optional Water Treatment Plant Site • Portions of College Lake Pipeline construction
State Route 1	• Eligible State Scenic Highway • County Scenic Road (San Mateo County to Monterey County) • City Scenic Route	• Portions of College Lake Pipeline construction
State Route 129	• County Scenic Road (Route 1 to San Benito County) • City Scenic Route (State Route 1 to Salsipuedes Creek)	
Beach Road	• County Scenic Road (State Route 1 to Palm Beach) • City Scenic Route (East Beach Street from Main Street to Beck Street)	
Main Street	• City Scenic Route (State Route 1 to the Pajaro River)	
Holohan Road[a]	• City Scenic Route (Paralleling Corralitos Creek, between Green Valley Road and East Lake Avenue)	• Water Treatment Plant • Portions of College Lake Pipeline construction

NOTES:
[a] Holohan Road is designated a City of Watsonville Scenic Route although it is outside the city boundary (the *Watsonville 2005 General Plan* includes Holohan Road in its Planning Area).

SOURCE: City of Watsonville, *Watsonville 2005 General Plan*, Chapter 5, Urban Design and Scenic Resources, 1994. Available online at https://www.cityofwatsonville.org/160/2005-General-Plan. Accessed on April 18, 2018; County of Santa Cruz, *General Plan and Local Coastal Program for the County of Santa Cruz, California*, Chapter 5, Conservation and Open Space, and Chapter 8, Community Design, 1994. Available online at http://www.sccoplanning.com/PlanningHome/SustainabilityPlanning/GeneralPlan.aspx. Accessed on April 18, 2018.

3.13.3 Impacts and Mitigation Measures

3.13.3.1 Significance Criteria

In accordance with the California Environmental Quality Act (CEQA), State CEQA *Guidelines (*including Appendix G), relevant plans, policies, and/or guidelines, and agency standards, the Project could have a significant impact if it were to:

- Have a substantial adverse effect on a scenic vista;
- Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within view of a state scenic highway;

- In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings[3], or, if the Project is in an urbanized area, conflict with applicable zoning and other regulations governing scenic quality; and/or
- Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.

3.13.3.2 Methodology

As described in Section 3.1, this EIR provides an independent analysis of the Project's potential environmental impacts. **Table 3.13-3** presents mitigation measures from the 2014 BMP Update PEIR adopted by the Board of Directors for the purpose of reducing impacts to aesthetic resources. These adopted mitigation measures are considered part of the College Lake Project and thus are considered prior to any significance determinations. Potential impacts are evaluated in the following section. If warranted, additional mitigation is included and takes the form of (1) modifications to update the mitigation measures presented in Table 3.13-3 to reflect current conditions and site-specific impacts; or (2) new mitigation measures to replace or augment an adopted mitigation measure.

TABLE 3.13-3
2014 BMP UPDATE PEIR MITIGATION MEASURES – AESTHETIC RESOURCES

AE-1a: PV Water shall use design elements to enhance visual integration of the proposed aboveground facilities with their surroundings. Proposed structures shall be painted low-glare, earth-tone colors that blend with the surrounding terrain, unless colors otherwise specified by regulatory agencies, such as purple facilities for recycled water systems.
***AE-1b*:** PV Water shall use design elements and landscaping to enhance visual integration of the College Lake pumping and filtration facilities with their surroundings. Proposed facilities shall be painted low-glare, earth-tone colors that blend closely with the surrounding terrain. Vegetation shall be planted at proposed facilities to provide screening from views of the facilities from SR 152.
***AE-1c*:** PV Water shall shield the weir with vegetation to minimize textural contrasts with the surrounding vegetation using grasses, shrubs and trees typical of the immediately surrounding area**.**
SOURCE: Pajaro Valley Water Management Agency, Resolution No. 2014-05, adopted April 16, 2014.

The visual quality impact analysis is based on review of Project maps and drawings, field observations conducted by ESA in 2017 and 2018, and review of a variety of data in the record, including the 2014 BMP Program EIR and the local plans and policies described in the preceding section. The analysis describes potential temporary (short-term) and permanent (long-term) impacts on scenic vistas or the visual character or quality of a site. Consistent with CEQA, the evaluation of impacts to visual quality focuses on publicly accessible views; effects on private views of the WTP sites (a subject raised in public comments) are discussed briefly under AES-3. The approach to evaluating the effect of the Project under each CEQA significance criterion is briefly clarified below:

- ***Have a substantial adverse effect on a scenic vista.*** For purposes of this evaluation, scenic vistas include broad, expansive, publicly-accessible views from roads in the Project area. This criterion applies only to projects that would be located on or disrupt access to a scenic vista, or result in visual changes within its viewshed. Scenic vistas may be officially recognized or

[3] Public views are those that are experienced from publicly accessible vantage point.

designated (e.g., within local planning documents or the California Department of Transportation (Caltrans) scenic highway program), or they may be informal in nature (e.g., mountain peaks or coastal bluffs). The Project's effect would be considered substantial if it would appreciably damage or remove the visual qualities that make the view unique, unobstructed, and/or exemplary.

- ***Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway.*** Damage to a scenic resource is substantial when it is reasonably perceptible to affected viewers, as seen from a scenic highway, and when it appreciably degrades one or more of the aesthetic qualities that contributes to a scenic setting. The presence of and potential damage to scenic resources in this analysis is considered along with Project-related effects on the existing visual character and quality of a site or surroundings (see next bullet).

- ***In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings, or, if the Project is in an urbanized area, conflict with applicable zoning and other regulations governing scenic quality.*** In non-urbanized areas (both WTP sites, the weir structure and intake pump station sites, portions of the College Lake pipeline), this criterion is applicable to all locations where the Project would result in either temporary or permanent visual change to public views. The Project is considered to "substantially degrade" the visual character or quality of public views of a site if it would have a strong negative influence on the public's experience and appreciation of the visual environment. As such, visual changes are always considered in the context of a site or locale's visual sensitivity (as described in the setting). Visual changes caused by the Project are evaluated in terms of their visual contrast with the area's predominant landscape elements and features, their dominance in views relative to other existing features, and the degree to which they could block or obscure public views of aesthetically pleasing landscape elements. Visual changes are also evaluated in terms of potential damage to or removal of features of the natural or built environment that contribute to a scenic public setting. The magnitude of visual change that would result in a significant impact (i.e., substantial degradation) is influenced by its degree of permanence, and is inversely related to the visual sensitivity of a site. In urbanized areas (where portions of the College Lake pipeline are proposed to go through the City of Watsonville), this criterion would be applicable if the Project would conflict with applicable zoning and other regulations governing scenic quality.

- ***Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.*** This criterion is applicable to projects that require nighttime lighting (either during construction or operation), or that involve structures or finishes that could create substantial glare.

The Project includes pipelines and other components (e.g., sedimentation basins at the WTP) that would be located at or below grade. Following construction these facilities would not be visible to the public. The potential visual effects associated with the construction of proposed below-grade components such as removal of vegetation during construction are discussed below. Landscape plans for the proposed WTP have not yet been developed for either of the site options.

3.13.3.3 Impact Evaluation

Impact AES-1: Implementation of the Project could have a substantial adverse effect on scenic vistas. *(Less than Significant with Mitigation)*

Scenic vistas in the Project area are characterized by expansive agricultural fields in the foreground framed by the Santa Cruz Mountains in the background.

Construction (Daytime)

Regarding the effects of nighttime construction on aesthetic resources, refer to Impact AES-4.

Project Components Excluding College Lake Pipeline

Construction of the proposed WTP (at either the preferred or optional site), weir structure, and intake pump station would require removal of existing vegetation, including orchards and/or crops. The construction disturbance area for the preferred WTP site is approximately 6.5 acres (including 5 acres of permanent disturbance), while the construction disturbance area for the optional WTP site is approximately 6.9 acres (including 6 acres of permanent disturbance, refer to Table 2-9 in Chapter 2). Demolition of the existing weir structure and construction of the proposed weir structure and intake pump station would require disturbance of about 0.6 acres (refer to Table 2-9 in Chapter 2). Refer to Section 3.4, Biological Resources, regarding restoration of areas used for temporary construction staging.

Construction of the Project would be visible to a large number of people at certain locations (e.g., the preferred WTP site), but less noticeable to the general public at other locations (e.g., the optional WTP site, weir structure, and intake pump station) due to distance to viewers, topography, and screening provided by existing vegetation and structures. As shown in Table 2-5 (in Chapter 2), construction of the Project is expected to last 18 months.[4] Construction would involve a variety of small- and large-scale construction equipment and a crew of up to 26 workers. Construction vehicles, materials, and equipment would be noticeable and visually unappealing; however, the equipment that would be used (listed in Table 2-6) is generally similar to or smaller in scale than equipment used regularly in the Project area, in farm fields (e.g., tractors) and for construction projects on and nearby City streets (e.g., equipment associated with roadwork and utility installation). Construction at the preferred WTP site would be visible by travelers along Holohan Road, but construction fencing around the perimeter of the preferred WTP site construction area would reduce the visual impacts of Project construction. Visual impacts related to construction of the proposed WTP, weir structure, and intake pump station would be temporary in nature, would be partially screened from view by construction fencing, and would be considered ***less than significant***.

[4] Schedule based on construction of grading and surcharging fill pad for the preferred WTP site. The duration of surcharging for the optional WTP site would be increased by 12 to 18 months to allow for consolidation of fill pad at that site. There would be no construction activity at the site during consolidation. The remainder of the construction phase durations for the WTP would be the same for both site options.

College Lake Pipeline

While it would require about 13 months to build the College Lake pipeline, construction activities at any one location would progress at about 100 feet per day in urban areas, meaning that pipeline construction on a typical City block in Watsonville would last a total of approximately 5 to 10 days. Pipeline construction through farm fields (as shown on Figures 2-3a through 2-3e) would generally progress at about 250 feet per day. The equipment that would be used is generally similar to or smaller in scale than equipment used regularly in the Project area.

Given the visibility and scale of construction activities in the context of scenic vistas, degree of contrast with existing activities in the Project area, duration of construction activities, and number of affected viewers, daytime construction-phase impacts on scenic vistas from construction are considered ***less than significant.***

Operation

Visual Attributes of Project Components After Construction

- ***Weir Structure and Intake Pump station.*** The proposed weir structure and intake pump station would occupy less than one-quarter acre within a topographic depression about 25 feet downstream of the existing weir and pump station. Refer to Figure 2-10 in Chapter 2 for a site plan of the proposed facilities; refer to Table 2-3 for estimated dimensions of the Project components. The facilities would be concrete with an industrial appearance.

- ***College Lake.*** With operation of the Project, the water surface elevation within College Lake would continue to vary seasonally and be based on rainfall and demand for delivered water, although water surface elevations would be higher for longer periods of time compared to existing conditions (refer to Section 3.3, Surface Water, Groundwater, and Water Quality). As described in Chapter 2, after water levels drop, Pajaro Valley Water Management Agency (PV Water) would manage vegetation within the College Lake basin to maintain desired vegetation conditions. Activities would include disking and mowing in the lower elevations of the lake basin (i.e., below 59 feet North American Vertical Datum of **1988** [NAVD88]). Farming is expected to continue to some extent above 59 feet NAVD88 (refer to Figure 3.2-4 in Section 3.2, Land Use and Agricultural Resources). The riparian forest in the eastern portion of College Lake would persist. Consequently, under future with-Project conditions, College Lake would continue to appear seasonally as an irregularly shaped water body or as bare ground or grassy fields, depending on time or year, bordered by the dense riparian forest in the northeastern portion.

- ***Preferred WTP Site.*** The five-acre preferred WTP site is currently planted as an apple orchard. The Project would replace the orchard with the WTP. Figure 2-14 depicts the site plan for the proposed WTP at the preferred site, Figure 2-15 depicts cross-sections of the proposed structures, indicating mass and height relative to existing and final grade, and Table 2-3 indicates the approximate dimensions and height above final grade of proposed structures at the WTP site. The proposed WTP elements would consist of small industrial-style buildings and storage silos with a maximum height of up to 18 feet above finished grade, set back about 15 feet from an eight-foot-tall chain-link fence at the site boundary, paved areas, and basins. Vehicles would enter and exit the site via a driveway off of Holohan Road at the southeast corner of the property. PV Water has not yet developed a landscape plan for the proposed WTP. The construction corridor for the pipeline connecting the intake pump station to the preferred WTP site follows farm roads and the Pinto Creek ditch. The pipeline would be completely underground following construction. Removal of orchard trees required for pipeline construction could not be replanted, although the corridor could otherwise continue to be used for agriculture.

- ***Optional WTP Site*.** Raspberries, often tended beneath hoop houses periodically covered with white textile, are currently grown at the six-acre optional WTP site. Figure 2-16 depicts the site plan for the proposed WTP at the optional site, Figure 2-17 depicts cross-sections of the proposed structures indicating mass and height relative to existing and final grade, and Table 2-3 indicates the approximate dimensions and height above final grade of proposed structures at the WTP site. The proposed WTP elements at the optional WTP site would be as described above for the preferred WTP site, although the difference between existing and final grade would be greater with the optional WTP site than with the preferred WTP site in order to raise the optional WTP site out of the floodplain (refer to Figure 2-17). Vehicles would access the site from Holohan Road via a roadway west of the Orchard Park neighborhood to the southwest corner of the property.

- ***College Lake Pipeline*.** The College Lake pipeline would be completely underground following construction and generally would not affect the visual characteristics of the overlying land uses. No tree removal would be required for construction of the pipeline. Consequently, operation of the College Lake pipeline would not adversely affect scenic vistas, scenic resources, or the existing visual character of the area, and is therefore not discussed further in this section.

State Route 152

Vistas from SR 152 in the College Lake area include views of roadside trees and shrubs in the foreground intermixed with institutional and commercial built structures, and brief, intermittent views of agricultural fields through breaks in the roadside vegetation and between built structures along the highway.

College Lake, the proposed weir structure and intake pump station site, and the optional WTP site are located in a topographic depression, naturally screening the sites from views from the highway. The preferred WTP site is not visible from SR 152. Views of College Lake, the proposed weir structure and intake pump station, and the WTP at the optional WTP site from SR 152 would be brief and intermittent through a visual foreground comprised of roadside vegetation and built structures. As described above, the appearance of the College Lake basin would generally be similar to existing conditions with seasonal variations depending on time or year. The proposed weir structure and intake pump station would be larger than the existing structures, but would look similar in nature. With implementation of adopted Mitigation Measures AE-1a and AE-1b, the proposed WTP at the optional site would not appreciably damage the visual qualities of the viewshed from SR 152 given the visibility and relative scale of Project components and the ability of the adopted mitigation measures to reduce visual contrast with the surrounding area. Presented below as **Mitigation Measures AES-1a** and **AES-1b** are revised versions of Mitigation Measures AE-1a and AE-1b that address site-specific, design-specific characteristics of the Project. Adopted Mitigation Measure AE-1c, requiring that the proposed weir structure be shielded with vegetation to minimize textural contrasts with the surroundings, is not warranted given the size, scale, anticipated appearance, and location of the proposed weir structure and intake pump station relative to viewers. With implementation of

Mitigation Measures AES-1a and AES-1b, the adverse impact on scenic vistas from SR 152 would be ***less than significant with mitigation***.

Holohan Road

Although Holohan Road is located outside the City of Watsonville's boundary, it is within the City's designated Planning Area, and the City considers it a Scenic Route. Pursuant to the City of Watsonville's General Plan, Holohan Road is valued because it provides uninterrupted views of orchards and agricultural uses outside the city and the hills that form the backdrop of Pajaro Valley. Scenic vistas from Holohan Road include broad, expansive views of agricultural fields, orchards, forested wind breaks, and riparian forest in the foreground, and the Santa Cruz Mountains in the background. Foreground agrarian views along Holohan Road are somewhat disrupted by existing built features, including nearby commercial and residential uses.

College Lake, Weir Structure, Intake Pump Station, and Optional WTP Site

As described above, the appearance of the College Lake basin would generally be similar to existing conditions with seasonal variations depending on time or year. The proposed weir structure and intake pump station and optional WTP site would be largely obscured from view from Holohan Road due to existing vegetation, site topography, existing agricultural practices periodically utilizing hoop houses, and the Orchard Park residential development. As a result, these Project components would not adversely affect expansive views of scenic vistas from Holohan Road and this impact would be ***less than significant***.

Preferred WTP Site

The preferred WTP site is highly visible in the foreground of scenic vistas from Holohan Road. Without landscaping or other screening, the dominant features visible from Holohan Road would be the fence, the electrical/operation building, silos storing water treatment chemicals, and cylindrical tanks containing the pressure filters; three additional structures associated with potential future treatment operations would also be located along the Holohan Road frontage, if needed. The height of these structures would range from 2 to 18 feet above final grade. Built structures in the foreground of scenic vistas from Holohan Road are not incompatible with existing foreground features along this roadway: similar scale institutional, commercial, and residential development is located in the vicinity of the Project. However, replacing most of the foreground views of an orchard with the built facilities of the proposed WTP would have a substantial adverse effect on scenic vistas from nearby vantage points on Holohan Road. The Project would remove the scenic agrarian qualities of the orchard at this site, resulting in a significant impact on a scenic vista on Holohan Road. Consistent with the requirements of adopted Mitigation Measures AE-1a and AE-1b (in Table 3.13-3), PV Water has committed using landscaping to provide screening and design elements such as low-glare earth-tone paint to visually integrate the proposed aboveground structures of the WTP with their surroundings. Mitigation Measures AES-1a and AES-1b (below) are revised versions of adopted Mitigation Measures AE-1a and AE-1b that address site-specific, design-specific characteristics of the Project. With the incorporation of Mitigation Measures AES-1a and AES-1b, the adverse impact on scenic vistas from Holohan Road would be ***less than significant with mitigation***.

State Route 1

SR 1 in Santa Cruz County is an eligible State Scenic Highway due to its views of mountainous coast, rocky headlands, and the Pacific Ocean. Scenic vistas from SR 1 in the Project area include expansive views of agricultural fields extending toward the Pacific Ocean. College Lake pipeline construction is proposed in the vicinity of SR 1. As shown on Figures 2-3d and 2-3e (in Chapter 2), the proposed College Lake pipeline would be installed perpendicular to SR 1, either within West Beach Street (the preferred route) or adjacent to SR 129 and across open agricultural fields (the optional route). Pipeline construction occurring east of SR 1 would be visible to northbound motorists including those using the off-ramp for SR 129, while pipeline construction occurring west of the SR 1 would be visible to southbound motorists. College Lake pipeline construction would involve the use of conventional construction equipment, progressing along the alignment at a rate of between 100 and 250 feet per day; trenchless construction for the optional alignment would last about one week. Views of pipeline construction areas would be brief as motorists move past the construction site and would constitute a small portion of the expansive views available from the roadway. After pipeline installation, the pipeline would be below ground, and the natural and built environment would return to its prior appearance: streets would be repaired and agricultural fields would return to agricultural cultivation. Given the visibility and appearance of pipeline construction and the duration of views, construction of the College Lake pipeline in the vicinity of SR 1 would not have a substantial adverse effect on scenic vistas from SR 1, and the construction-related impact on scenic vistas from SR 1 would be ***less than significant***.

The following mitigation measures would replace adopted Mitigation Measures AE-1a, AE-1b, and AE-1c:

Mitigation Measure AES-1a: Aboveground Facility Treatment

PV Water shall paint or otherwise treat aboveground facilities using low-glare paint that blends with predominant color(s) of the surrounding terrain, unless colors otherwise specified by regulatory agencies. Concrete structures need not be painted.

Mitigation Measure AES-1b: Landscaping

For the preferred WTP site, PV Water shall shift the site plan northward in order to preserve orchard trees along Holohan Road and several orchard trees northeast of 116 Holohan Road, to the extent feasible and in accordance with PV Water security requirements. Where preservation of orchard trees along Holohan Road is not feasible (e.g., due to the access road and the College Lake pipeline), PV Water shall use landscaping to reduce textural contrasts and enhance visual integration of the WTP with its surroundings. Landscaping shall include shrubs and other vegetation typical of the surrounding area.

For the optional WTP site, PV Water shall use landscaping to reduce textural contrasts and enhance visual integration of the WTP with its surroundings when viewed from SR 152. Landscaping shall include shrubs and other vegetation typical of the surrounding area.

____

Impact AES-2: Implementation of the Project could substantially damage scenic resources. *(Less than Significant)*

As stated above under Section 3.13.3.2, damage to a scenic resource is substantial when it is reasonably perceptible to affected viewers, as seen from a scenic highway; and when it appreciably degrades one or more of the aesthetic qualities that contributes to a scenic setting. Scenic resources visible from segments of SR 152 and SR 1 in the vicinity of the Project include agricultural fields, the Santa Cruz Mountains, trees and natural areas, and select built structures (e.g., the historic church at Our Lady Help of Christians Catholic Church).

Construction (Daytime)

For reasons stated under Impact AES-1, daytime construction activities would not substantially damage scenic resources.

Operation

SR 152

Development of the proposed WTP at either the preferred or optional site would adversely affect agricultural fields, a scenic resource; however, only the optional WTP site is visible from SR 152. Development of the optional WTP site would replace approximately six acres of land currently planted with berries, diminishing its scenic quality. Views of the optional WTP site, proposed weir structure, and intake pump station from SR 152 would be brief and intermittent through a visual foreground of roadside vegetation and built structures (refer to Photo 2 in Figure 3.13-2). Given the existing visual quality, visibility of the optional WTP site, proposed weir structure, and intake pump station from SR 152, and adopted mitigation measures, damage to scenic resources associated with these Project components are considered ***less than significant***.

Operation of College Lake (including the water storage area component of the Project) would also affect agricultural fields. Water management operations are expected to result in land below 59 feet NAVD88 being inundated for longer periods of time, precluding farming, while less farming would occur between 59 feet NAVD88 and 63 feet NAVD88. Implementation of the Project would effectively convert one type of scenic resource to another, resulting in a reduction of seasonal agricultural fields and an increase in natural areas. Views of College Lake from SR 152 would be brief and intermittent through a visual foreground of roadside vegetation and built structures. Given the limited visibility of College Lake as well as other publicly accessible areas, and the nature of changes to land uses within the lake basin, effects on scenic resources associated with water management operations are considered ***less than significant***.

State Route 1

The only Project component visible from SR 1, the College Lake pipeline, would be completely underground following construction and generally would not affect the visual characteristics of the overlying land uses. Consequently, operation of the Project would not affect scenic resources seen from SR 1 and this impact would be ***less than significant***.

Impact AES-3: Implementation of the Project could degrade the existing visual character or quality of public views of the sites in non-urbanized areas. *(Less than Significant with Mitigation)*

Construction (Daytime)

For reasons stated under Impact AES-1, daytime construction would not substantially degrade the existing visual character or quality of public views of Project sites in non-urbanized areas (both WTP sites, the weir structure and intake pump station sites, portions of the College Lake pipeline). Construction of the College Lake pipeline within the City of Watsonville would progress at about 100 feet per day, meaning that pipeline construction on a typical city block in Watsonville would last 5 to 10 days. The equipment that would be used is generally similar to or smaller in scale than equipment used regularly in the Project area. Pipeline construction would be temporary in nature, and would not conflict with applicable zoning and other regulations governing scenic quality, including the State Scenic Highway Program. For these reasons, this impact would ***less than significant*** during Project construction.

Operation

College Lake, Weir Structure, and Intake Pump Station

As described above, College Lake has moderate visual quality. Because the location of the proposed weir structure and intake pump station is within a natural depression, topography shields the area from public view. The visual attributes of the site are typical of the region's agricultural visual character. College Lake and the proposed weir structure and intake pump station areas are poorly exposed to public view. With moderate visual quality and poor exposure, the sites are considered to have moderate visual sensitivity.

Weir Structure and Intake Pump Station. The proposed weir structure and intake pump station would appear as small-scale human-made structures. As such, these facilities would not be inconsistent in appearance with the varied development nearby, which includes the existing weir and pump station about 25 feet upstream, as well as residential, institutional, commercial, and agricultural uses. Given that the site has moderate visual quality, poor exposure, and moderate visual sensitivity, these Project components would not have a substantial adverse effect on the visual character or quality of the public views of the site and its surroundings. Consequently, the effects of the proposed weir structure and intake pump station on the visual character and quality of public views of the site are considered ***less than significant***.

College Lake. The visual character of College Lake with proposed water management operations would continue to have moderate visual quality and be poorly exposed to public views. Consequently, impacts to the existing visual character and quality of public views of College Lake under future with-Project conditions are considered ***less than significant***.

Preferred Water Treatment Plant Site

The preferred WTP site located adjacent to Holohan Road is a highly visible site. This site has moderate visual quality and high exposure from Holohan Road, and is thus considered to have moderate to high visual sensitivity. The proposed structures, basins, and paving would permanently change the visual character of the site from a rural, agrarian apple orchard to a developed site. Given that the site has moderate visual quality, high exposure, and moderate to high visual sensitivity, altering the visual character of the site from an orchard to a WTP would result in a substantial degradation of the existing visual character of the site and a significant adverse impact. Implementation of Mitigation Measures AES-1a and AES-1b would help enhance visual integration of the proposed aboveground facilities with the existing visual character of the area, partially screening structures from public view and reducing textural contrasts with the surroundings. Thus, the impact on existing visual character and quality of public views of the preferred WTP site would be reduced to ***less than significant with mitigation***.

Views of the preferred WTP site are also available from nearby residences. The inset on Figure 2-14 in Chapter 2 shows residences nearest the preferred WTP site. Figure 2-15 in Chapter 2 shows cross-sections of the WTP at the preferred site depicting existing and finished grade and the height of proposed features at the WTP. Table 2-3 in Chapter 2 identifies the height above finished grade for the various structures at the WTP. Implementation of aboveground facility treatments and landscaping included in Mitigation Measures AES-1a and AES-1b would also help visually integrate the WTP at the preferred site in views from neighboring residences along Holohan Road.

Optional Water Treatment Plant Site

The optional WTP site has moderate visual quality, with limited and brief exposure from SR 152, and is thus considered to have moderate visual sensitivity. Views of the existing site are limited by topography, roadside vegetation, and existing built structures. The proposed structures, basins, and paving would permanently change the visual character of the site from agricultural crop use to a developed site. With implementation of Mitigation Measures AES-1a and AES-1b, the visual character of the optional WTP site would be consistent with the existing visual character of the area and this impact would be ***less than significant with mitigation***.

Views of the site may also be available from the half-dozen residences along Laken Drive and Laken Court closest to the site, as well as from a few residences northwest of the site. The optional WTP site is about 200 feet north of the nearest properties on Laken Drive. Although the existing ground elevation at the optional site is about 3 feet lower in elevation than Laken Drive, development of the optional WTP site would require a fill pad to raise the WTP above flood elevation. Figure 2-17 in Chapter 2 presents cross-sections of the WTP at the optional site, and depicts existing and finished grades as well as the heights of proposed structures (refer to Figure 2-16 for the locations of the cross-sections). Table 2-3 in Chapter 2 identifies the height above finished grade for the various structures at the WTP. Several structures along the southern border of the WTP site would be 15 to 23 feet above the finished grade and could be visible from homes along Laken Drive and Laken Court (see Table 2-3 and Figure 2-17). The fact that these homes are single story and have fencing along the northern borders of their properties would limit visibility of these features from the residences. Implementation of aboveground facility treatments and landscaping included in Mitigation Measures AES-1a and AES-1b would help visually integrate the WTP at the optional site in views from neighboring residences.

Mitigation Measures AES-1a: Aboveground Facility Treatment and **Mitigation Measure AES-1b: Landscaping** (refer to Impact AES-1)

Impact AES-4: Project components could introduce significant new sources of light or glare. ***(Less than Significant with Mitigation)***

Construction

Generally, construction of the Project would take place during daytime hours, and would not require construction lighting. However, as described in Section 2.6.1.2, Construction Hours, exceptions to standard construction hours would include weir structure and intake pump station construction and trenchless pipeline construction due to seasonal constraints on these construction efforts. Proposed weir structure and intake pump station construction could occur seven days a week between 7:00 a.m. and 7:00 p.m., and may require some morning and late afternoon lighting depending upon ambient light conditions. Similarly, potential trenchless pipeline construction (refer to Figures 2-3a through 2-3e) could require construction for up to 24 hours per day for up to several days in a row. Construction-related lighting would be temporary in duration. Implementation of **Mitigation Measure AES-2** would require PV Water or its contractor to use shielded and hooded outdoor construction lighting directed to the area where the lighting would be required to minimize ambient light during Project construction. With the implementation of Mitigation Measure AES-2, visual impacts related to construction lighting would be ***less than significant with mitigation***.

Operation

Existing residential, commercial, and institutional uses in the areas have existing lighting. Exterior security lighting proposed at the WTP facilities, weir structure, and intake pump station would be limited to security lighting. The proposed WTP would also include interior lighting that would be used during operation and maintenance activities described in Section 2.7 in Chapter 2, *Project Description*. Because lighting for these Project components would be required to comply with the California Green Building Standards Code, the amount of light that could extend beyond property boundaries would be limited. While exterior lighting could be visible from some nearby residences at either proposed WTP site (preferred or optional), new lighting sources would not substantially increase ambient light in the Project area. As identified in adopted Mitigation Measures AE-1a and AE-1b, proposed facilities would be painted in low-glare, earth-tone colors that blend closely with the surrounding terrain, further reducing the potential introduction of a new source of glare. This impact relating to the operational phase of the Project is ***less than significant***.

Mitigation Measure AES-2: Construction Lighting

PV Water shall require contractors to direct nighttime lighting used during construction away from residential areas, use the minimum amount of night lighting necessary for construction and safety, and shield and hood outdoor lighting to prevent light spillover effects during Project construction.

Cumulative Impacts

Impact C-AES-1: The Project, in combination with past, present, and probable future projects in the Project area, would not result in significant adverse cumulative aesthetic impacts. (*Less than Significant*)

The cumulative analysis of aesthetic impacts uses a list-based approach and identifies probable future projects in the vicinity of the Project that could contribute to a cumulative impact. The geographic scope for the analysis of cumulative aesthetic impacts includes the viewsheds affected by the Project components near College Lake itself (as indicated in the preceding text, once constructed the College Lake pipeline would be entirely below ground). Table 3.1-1 and Figure 3.1-1 in Section 3.1, Overview, provide descriptions and locations of potential cumulative projects in the vicinity of the College Lake Project. The following cumulative projects are located near College Lake viewsheds affected by the Project:

- Corralitos Creek ADA Compliance (Caltrans)
- State Route 152 Improvements (Caltrans)
- State Route152/Holohan Road/College Road Intersection Improvements (Santa Cruz County)

These projects are numbered 11, 12 and 13 on Figure 3.1-1. The Corralitos Creek ADA Compliance Project involves construction of a pathway on a segment of SR 152 that would have no view of any Project components. The other improvements include operational and geometric (widening) improvements at the intersection of SR 152 and Holohan Road, and drainage and transportation management system improvements to SR 152. None of these projects is expected to substantially alter views affected by the Project because of the nature of the projects and their location. Consequently, cumulative impacts to aesthetic resources would be ***less than significant***.

Mitigation: None required.

This page intentionally left blank

CHAPTER 4
Other CEQA Issues

4.1 Significant Unavoidable Impacts

In accordance with Section 21100(b)(2)(A) of the California Environmental Quality Act (CEQA) and with Sections 15126(b) and 15126.2(b) of the CEQA *Guidelines*, the purpose of this section is to identify Project-related environmental impacts that could not be eliminated or reduced to a less-than-significant level with implementation of mitigation measures identified in Chapter 3, *Environmental Setting, Impacts, and Mitigation Measures*. With the exceptions described below, all Project impacts would either be less than significant or reduced to less-than-significant levels with implementation of the identified mitigation measures:

- **Conversion of Important Farmland.** The Project would result in the conversion of Important Farmland to non-agricultural use. Even with implementation of Mitigation Measures LU-1a (Promote Farming), LU-1b (Compensate for Conversion of Important Farmland), and LU-1c (Replacement of Topsoil), these impacts would be significant and unavoidable on a project-specific and cumulative basis. (Impacts LU-1 and C-LU-1)

- **Exceedance of Construction Noise Standards.** Construction activities at the preferred WTP site, pipeline alignments (trench construction within 25 feet of residences and trenchless pipeline construction at select locations) would expose nearby sensitive receptors to noise levels that would exceed the County of Santa Cruz construction noise standard, or would occur outside the allowed construction hours identified in the City of Watsonville noise ordinance. Implementation of Mitigation Measure NOI-1a (Construction Noise Reduction Plan) is expected to attenuate construction noise levels; however, noise levels would not be reduced below the County construction noise standard. In addition, construction activities at boring sites within the city limits would occur outside of the allowed hours specified in the City of Watsonville noise ordinance (trenchless construction techniques require 24-hour construction). Therefore, impacts at these Project component locations would remain significant and unavoidable on a project-specific and cumulative basis even with implementation of Mitigation Measures NOI-1a (Construction Noise Reduction Plan) and NOI-1b (Off-site Accommodations for Substantially Affected Nighttime Receptors). (Impacts NOI-1 and C-NOI-1)

4.2 Significant Irreversible Environmental Changes

In accordance with CEQA Section 21100(b) (2) (B) and CEQA Guidelines Sections 15126(c) and 15126.2(c), the purpose of this section is to identify significant irreversible environmental changes that would be caused by the Project. Construction and operational impacts associated with implementation of the Project would result in an irretrievable and irreversible commitment of natural resources through the use of fossil fuels and construction materials. The Project would require the commitment of energy resources to fuel and maintain construction equipment (such as gasoline, diesel, and oil) during the construction period. Project construction would commit resources, such as concrete and steel, to be used for the proposed facilities and related improvements. Operation of project facilities would result in irreversible changes associated with increased energy demand due to energy usage and greenhouse gas emissions from operation of the Project facilities.

4.3 Areas of Known Controversy and Issues to be Resolved

Pursuant to CEQA *Guidelines* Section 15123(b)(1), environmental impact reports (EIRs) are required to identify areas of controversy known to the lead agency including issues raised by agencies and the public. Pajaro Valley Water Management Agency distributed a Notice of Preparation (NOP) to agencies and interested parties to begin the formal CEQA scoping process for the Project on November 28, 2017 and held two public meetings on Tuesday, December 12, 2017, to receive comments on the scope of the EIR. Issues raised in comments on the NOP and in the public meetings included the following:

- Adverse effects on farmland;
- Adverse effects on biological resources;
- Flooding in nearby communities;
- Alternatives to the Project;
- Project-related noise; and
- Effects on Reclamation District 2049 (RD 2049).

Refer to **Appendix NOP**, which contains all written comments received on the NOP.

Assuming the Board of Directors certifies the EIR as complete and adequate under CEQA, issues to be resolved would include selection of the WTP site and the College Lake pipeline alignment in the vicinity of SR 1; acquisition of properties, easements and/or rights-of-way; and disposition of RD 2049. As part of Project approval, the Board of Directors is expected to select a site for the WTP. The Board of Directors will base their decision on the contents of this EIR, including pertinent public comments on the Draft EIR as well as other information in the administrative record. The proposed College Lake pipeline alignment will be selected during the design phase of the Project. Regarding the acquisition of properties, easements and/or rights-of-way and the disposition of RD 2049, these issues are addressed in Section 2.8 in Chapter 2, *Project Description*.

CHAPTER 5
Alternatives

5.1 CEQA Requirements

This chapter presents the California Environmental Quality Act (CEQA) alternatives analysis for the proposed College Lake Integrated Resources Management Project (Project or College Lake Project). The CEQA *Guidelines*, Section 15126.6(a), state that an environmental impact report (EIR) must describe and evaluate a reasonable range of alternatives to the Project that would feasibly attain most of the project's basic objectives but would avoid or substantially lessen any identified significant adverse environmental effects of the project. Specifically, the CEQA *Guidelines* (Section 15126.6) set forth the following criteria for selecting and evaluating alternatives:

- **Identifying Alternatives.** The selection of alternatives is limited to those that would avoid or substantially lessen any of the significant environmental effects of the project, are feasible, and would attain most of the basic objectives of the project. Factors that may be considered when addressing the feasibility of an alternative include site suitability, availability of infrastructure, general plan consistency, other plans or regulatory limitations, jurisdictional boundaries, economic viability, and whether the proponent can reasonably acquire, control, or otherwise have access to an alternative site. An EIR need not consider an alternative whose impact cannot be reasonably ascertained and whose implementation is remote and speculative. The specific alternative of "no project" must also be evaluated.

- **Range of Alternatives.** An EIR need not consider every conceivable alternative, but must consider and discuss a reasonable range of feasible alternatives in a manner that will foster informed decision-making and public participation. The "rule of reason" governs the selection and consideration of EIR alternatives, requiring that an EIR set forth only those alternatives necessary to permit a reasoned choice. The lead agency (Pajaro Valley Water Management Agency [PV Water]) is responsible for selecting a range of project alternatives to be examined and for disclosing its reasons for the selection of the alternatives.

- **Evaluation of Alternatives.** EIRs are required to include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the Project. Matrices may be used to display the major characteristics and the potential environmental effects of each alternative. If an alternative would cause one or more significant effects that would not result from the project as proposed, the significant effects of the alternative must be discussed, but in less detail than the significant effects of the project.

5.2 Alternatives Screening and Selection

5.2.1 Previous Alternatives Screening and Analyses

This EIR incorporates by reference the alternatives analyses conducted for the 2014 Basin Management Plan Update Program EIR (2014 BMP Update PEIR),[1] which in turn incorporates by reference all alternative analyses conducted in EIRs on PV Water's Basin Management Plans (BMPs) and local water supply projects preceding the 2014 BMP Update PEIR, including the 1993 BMP EIR,[2] the 1999 Local Water Supply EIR,[3] and the 2002 Revised BMP EIR,[4] each of which evaluated preliminary versions of the College Lake Project. **Appendix ALTS** of this EIR includes 2014 BMP Update PEIR Chapter 5, *Alternatives to the BMP Update*. Appendix ALTS summarizes the alternatives analyses of the EIRs listed above and also describes and evaluates the following alternatives:

- **No Project.** This alternative was defined as no implementation of any plans, policies, programs, projects or components by PV Water or others to meet the BMP objectives.
- **Demand Management Only.** This alternative assumed that only mandatory basin-wide pumping controls would be implemented to meet the BMP objectives.
- **Water Supply Facilities Alternatives.** This was a category of alternatives to the individual BMP projects and programs evaluated in the 2014 BMP Update PEIR, including the following: Coastal Distribution System Expansion; Winter Recycled Water Deep Aquifer Storage and Recovery (ASR); River Conveyance of Water for Recharge at Murphy Crossing; San Benito County Groundwater Demineralization at Watsonville WWTP; Expanded College Lake, Pinto Lake, Corralitos Creek, Watsonville Slough, and ASR; Seawater Desalination; and Bolsa De San Cayetano with Pajaro River Diversion.
- **Alternative Locations for BMP Update Components.** This alternative analyzed the potential for each project/program of the BMP Update to be located at a different site while still meeting BMP objectives. The projects/programs considered in this alternative included conservation, recycled water storage and treatment, Harkins Slough Recharge Facilities Upgrades, Watsonville Slough with Recharge Basins, Alternative Sloughs, College Lake with Inland Pipeline to CDS, and Murphy Crossing with Recharge Basins.

The 2014 BMP Update PEIR alternative analysis concluded that the proposed BMP Update would best meet the BMP Update objectives and would likely result in fewer and less severe environmental impacts overall.

The alternatives considered in the 2014 BMP Update PEIR addressed two potential projects specifically involving College Lake. The Expanded College Lake, Pinto Lake, Corralitos Creek, Watsonville Slough, and ASR would involve increasing the storage capacity of College Lake to 4,600 acre-feet with a main dam and saddle dam; increasing water supplies to College Lake by

[1] PV Water, *Final Environmental Impact Report for the Basin Management Plan Update*, February 2014. This document is available for review at PV Water's offices, 36 Brennan Street, Watsonville, CA 95076.

[2] PV Water, *PVWMA Basin Management Plan*, 1993.

[3] PV Water, *PVWMA Local Water Supply and Distribution Environmental Impact Report*, 1999.

[4] PV Water, *PVWMA 2002 Revised Basin Management Plan*, 2002.

diverting water from Corralitos Creek, Pinto Lake, and Watsonville Slough; and storing water seasonally in the groundwater basin via injection (ASR). The analysis in the 2014 BMP Update PEIR concluded that while that potential project may be technically feasible and could assist in meeting most of the basic objectives of the BMP Update, it would have the same or greater impacts as the College Lake Project and may not be financially feasible. With regard to alternative locations, the 2014 BMP Update PEIR concluded that the College Lake Project "cannot be replicated in another location due to uniqueness of the College Lake hydrologic conditions. Specifically, the lake is already seasonally drained by the Reclamation District [(RD) 2049] creating the potential for diversion of that water for another beneficial use …. As evidenced by the previous alternatives analyses, these conditions cannot be replicated at another location, making an alternative location infeasible."

This EIR is based in part on information on the Project that was not available when the 2014 BMP Update PEIR was prepared. In some cases, the severity and magnitude of impacts (e.g., conversion of Important Farmland) are greater than those identified in the 2014 BMP Update PEIR. In light of this, some alternatives screened out in the 2014 BMP Update EIR and/or identified in the BMP Update itself were reconsidered during the alternatives screening process.

5.2.2 Water Treatment Plant and College Lake Pipeline Location Alternatives

This EIR evaluates in equal detail two alternative sites for the water treatment plant (WTP) and two alternative alignments for the College Lake pipeline in the vicinity of State Route (SR) 1. These alternatives are described and evaluated in detail in Chapters 2 and 3. Section 5.4 presents a comparison of the environmental effects of these alternatives.

5.2.3 Additional Alternatives Screening Conducted for the College Lake Project

The additional alternatives screening process conducted for this EIR involved reviewing significant impacts attributable to the Project's implementation; identifying potentially impact-reducing or impact-avoidance concepts or strategies, including consideration of alternatives identified subsequent to the 2014 BMP Update PEIR; and screening out potential alternatives that failed to meet the following criteria:

- *Is the alternative potentially feasible?*
- *Does the alternative reduce the severity of one or more of the project's significant adverse impacts?*
- *Does the alternative meet most of the basic objectives of the project?*
- *Does the alternative foster informed decision-making and public participation?*

5.2.3.1 Summary of Significant Impacts

Consistent with CEQA,[5] PV Water incorporated consideration of environmental impacts as well as environmental benefits into conceptualization, planning and design for the Project as proposed. This included evaluation of the project in the 2014 BMP Update PEIR and subsequent adoption of mitigation measures to avoid or reduce the Project's significant impacts, additional consideration of environmental constraints during Project planning and siting, and input from regulators and biological resource experts.[6]

The alternatives analysis is intended to focus on eliminating, or reducing in magnitude or severity, impacts identified in this Draft EIR as significant and unavoidable. As described in Chapter 3, the Project was determined to have significant and unavoidable impacts related to the conversion of Important Farmland and construction-phase noise, as described below:

- **Conversion of Important Farmland.** The Project would result in the conversion of Important Farmland to non-agricultural use. Even with implementation of Mitigation Measures LU-1a (Promote Farming), LU-1b (Compensate for Conversion of Important Farmland), and LU-1c (Replacement of Topsoil), these impacts would be significant and unavoidable on a project-specific and cumulative basis. (Impacts LU-1 and C-LU-1)

- **Exceedance of Construction Noise Standards.** Construction activities at the preferred WTP site, pipeline alignments (trench construction within 25 feet of residences and trenchless pipeline construction at select locations) would expose nearby sensitive receptors to noise levels that would exceed the County of Santa Cruz construction noise standard, or would occur outside the allowed construction hours identified in the City of Watsonville noise ordinance. Implementation of Mitigation Measure NOI-1a (Construction Noise Reduction Plan) is expected to attenuate construction noise levels; however, noise levels would not be reduced below the County construction noise standard. In addition, construction activities at boring sites within the city limits would occur outside of the allowed hours specified in the City of Watsonville noise ordinance (trenchless construction techniques require 24-hour construction). Therefore, impacts at these Project component locations would remain significant and unavoidable on a project-specific and cumulative basis even with implementation of Mitigation Measures NOI-1a and NOI-1b (Off-site Accommodations for Substantially Affected Nighttime Receptors) (Impacts NOI-1 and C-NOI-1)

All other significant impacts could be reduced to less-than-significant levels through the incorporation of mitigation measures, including the following impact areas (refer to Chapter 3 for details):

- Surface Water, Groundwater, and Water Quality
- Biological Resources
- Geology and Soils
- Hazards and Hazardous Materials
- Noise and Vibration
- Transportation and Traffic
- Cultural Resources
- Aesthetics

---

5 CEQA *Guidelines* Section 15004(b)(1).

6 PV Water participated in College Lake Multi-Objective Management Project planning process described in *College Lake Multi-Objective Management Project Final Report* (RCD-SCC, prepared by cbec, November 14, 2014), as did several resource agencies, and wildlife strategies (e.g., bypass flow requirements) identified through that process have been incorporated into the College Lake Project.

5.2.3.2 Strategies and Concepts to Reduce Significant Impacts

Strategies identified to reduce the magnitude or severity of impacts on Important Farmland, based on an understanding of the scope and nature of the Project's impacts and the findings of previous alternatives analyses include:

- ***Lower weir.*** Construct the proposed weir with a maximum crest height similar to the existing weir (60.1 feet instead of 62.5 feet).
- ***Early drawdown.*** Allow early drawdown of College Lake through direct releases to Salsipuedes Creek.
- ***Deepen or recontour lake.*** Deepen College Lake to reduce the areal extent of inundation without reducing water storage capacity.

Regarding strategies to address construction-phase noise impacts through an alternative, the impacts are associated with the preferred WTP site and pipeline construction. The severity of noise impacts associated with construction activities at the preferred WTP site is primarily due to the site's proximity to the nearest sensitive receptor (a residence located 40 feet away). The EIR already includes an alternative that renders this impact less than significant: the optional WTP site (over 300 feet from the nearest sensitive receptor). With respect to trenchless pipeline construction within the City of Watsonville, the California Department of Transportation generally does not allow open-trench pipeline construction within state highways; consequently, the pipeline would have to be tunneled at highway crossings, necessitating nighttime construction work. With respect to unavoidable noise impacts from trench construction for the College Lake pipeline, the severity of the impact is due to the use of particularly noisy equipment (pavement saws and excavators) as close as 25 feet from sensitive receptors. The duration of the impact would be relatively short, occurring intermittently when that particular piece of equipment is in use, and would not be expected to occur during more than 1 or 2 days within 25 feet of any single residence. For these reasons, no other strategies (beyond the optional WTP site) for reducing construction-phase noise impacts through an alternative were identified.

5.2.3.3 Alternatives Identified Subsequent to the 2014 BMP Update PEIR

College Lake Multi-Objective Management Project

Alternatives screening for this EIR also included consideration of alternatives identified and evaluated in the *College Lake Multi-Objective Management Project Final* Report, which included consideration of the strategies identified above to reduce the effects of water management on agriculture. [7] In 2014, the Resource Conservation District of Santa Cruz County received Integrated Regional Water Management funding and retained cbec, inc. eco engineering (cbec) to conduct the College Lake Multi-Objective Management Project. Under the direction of a Steering Committee that included PV Water and the County of Santa Cruz, cbec reviewed and reported on existing studies, conducted hydrologic and hydraulic modeling, developed water

[7] RCD-SCC, *College Lake Multi-Objective Management Project Final Report*, prepared by cbec, November 14, 2014.

budgets, and solicited expert stakeholder and community input to develop and evaluate multiple alternatives for the management of College Lake. The guiding principles for developing the College Lake Multi-Objective Management Project were to advance the goals of the Pajaro River Watershed Integrated Watershed Management Plan and to address specific objectives regarding water supply, agriculture, flood management, and wildlife.[8] The study used hydrologic and hydraulic modeling to analyze the ability of alternative management plans and physical configurations to meet stated goals and objectives.

The study developed four management alternatives focused on each management strategy (e.g., agriculture, fish and wildlife, flood control, and water supply) as an initial step toward the development of multi-objective alternatives capable of meeting the objectives of multiple management strategies. The report indicated that the greatest challenge to developing multi-objective alternatives was regarding the timing of the drawdown of the lake: in order to maximize the growing season (for the local agriculture alternative) the drawdown must occur in the spring, and this directly conflicts with the needs of steelhead, migratory waterfowl, and water supply.[9]

Other Suggestions for Alternatives

Comments received during circulation of the NOP for the Project (presented in Appendix NOP of this EIR) included general requests for an alternative that would reduce the Project's impacts on agriculture as well as suggestions for specific alternatives, including the following:

- Combine continued operation of RD 2049 facilities with water supply diversions;
- Divide lake into different management areas;
- Deepen the College Lake basin; and
- Location alternatives for water storage (i.e., storing College Lake water in recharge basins, Harkins Slough, or idled rail cars), the WTP, and College Lake pipeline.

Members of the Board of Directors also expressed an interest in a lake deepening alternative that was suggested by a commenter on the NOP and mentioned above.

5.2.3.4 Screening Results

After considering the scope and severity of the Project's impacts and screening potential alternatives, including those previously evaluated or suggested, an alternative from the *College Lake Multi-Objective Management Project Final Report* (referred to in that report as Multi-Objective Alternative 3A) was determined to satisfy CEQA criteria for inclusion in the EIR. The alternative, described below in Section 5.3.2, is referred to as the Farmland Preservation-Lake Deepening Alternative. Other potential alternatives were eliminated from further consideration

---

8 PV Water, San Benito County Water District, Santa Clara Valley Water District, *Pajaro River Watershed Integrated Regional Water Management Plan*, June 2006.

9 RCD-SCC, *College Lake Multi-Objective Management Project Final Report*, prepared by cbec, page 41, November 14, 2014.

for CEQA purposes. Please refer to Section 5.5 for more information on other alternatives considered and the reasons each was eliminated from further consideration.

5.3 Selected CEQA Alternatives Evaluated in this Chapter

The alternatives to the Project selected for analysis in this EIR are:

- No Project Alternative
- Farmland Preservation-Lake Deepening Alternative

5.3.1 No Project Alternative

5.3.1.1 Description

As required by CEQA *Guidelines* Section 15126.6(e), the No Project Alternative is evaluated to allow decision-makers to compare the environmental effects of approving the project with the effects of not approving the project.

The No Project Alternative is defined as no College Lake Project. None of the actions described in Chapter 2, including construction and operation of the weir structure and intake pump station, WTP, and College Lake pipeline would occur. RD 2049 would presumably continue to pump College Lake dry in the spring so the lakebed could be used for crop production from July through October.

Groundwater, recycled water, and Harkins Slough diversions would continue to provide water for agricultural irrigation. Industrial, commercial, and domestic residential use of groundwater and limited surface water within the City of Watsonville and beyond would continue. PV Water would continue to pursue the Harkins Slough Recharge Facilities Upgrades and Watsonville Slough with Recharge Basins Projects. Because the College Lake Project represents the largest single source of surface water proposed as part of the 2014 BMP Update PEIR, PV Water would have to pursue other options in order to help balance the groundwater basin, prevent further seawater intrusion, and meet water supply needs. These actions would be necessary in accordance with the Agency's mission, its commitments to implement the BMP Update, and its obligations as the designated Groundwater Sustainability Agency under the Sustainable Groundwater Management Act, California Water Code Section 10723. Other options could include one or more of the components of the Water Supply Facilities Alternative presented in the 2014 BMP Update PEIR.

5.3.1.2 Ability to Meet the Project's Objectives

Table 5-1 summarizes the ability of the College Lake Project and the No Project and Farmland Preservation – Lake Deepening Alternatives to meet the Project objectives.

TABLE 5-1
SUMMARY OF ABILITY OF PROJECT AND ALTERNATIVES TO MEET PROJECT OBJECTIVES

Objectives from the 2014 BMP Update PEIR	College Lake Project	No Project	Farmland Preservation – Lake Deepening
	Would the project or alternative meet the objective?		
Prevent seawater intrusion, long-term groundwater overdraft, land subsidence, and water quality degradation.	Yes	No	Yes
Manage existing and supplemental water supplies to control overdraft and provide for present and future water needs.	Yes	No	Yes
Create a reliable, long-term water supply, which has been identified as an important cornerstone of the long-term economic vitality of the Pajaro Valley.	Yes	No	Yes
Develop water conservation programs.[a]	No	No	No
Recommend a program that is cost effective and environmentally sound.	Yes	No	Partial[b]
Project Specific Objectives for the College Lake Project			
Design and implement reliable facilities to help achieve sustainable groundwater management of the Pajaro Valley Groundwater Subbasin by 2040, taking into account potential future hydrologic changes, including those associated with climate change.	Yes	No	Yes
Substantially contribute to the Pajaro Valley's water supply needs in a timely manner, consistent with the Basin Management Plan Update implementation goals.	Yes	No	Yes
Use locally controlled surface water for agricultural purposes to offset groundwater pumping in a manner consistent with habitat preservation and enhancement, and in coordination with resource agencies, the public, and other stakeholders.	Yes	No	Yes
Make efficient use of, and leverage federal, state, and local investments in, existing Agency infrastructure.	Yes	No	Yes

Notes:

a While the Project and Farmland Preservation-Lake Deepening Alternative would conserve groundwater by creating a reliable source of surface water to offset groundwater pumping, PV Water's water conservation programs are designed to reduce water use in the Pajaro Valley. Information on PV Water's water conservation programs is available at https://www.pvwater.org/.

b Refer to Section 5.3.2.2.

The No Project Alternative would fail to meet any of the Project or BMP Update objectives. The No Project Alternative would not: prevent seawater intrusion, long-term groundwater overdraft, land subsidence and water quality degradation; manage existing and supplement water supplies to control overdraft and provide for present and future water needs; create a reliable, long-term water supply; develop water conservation programs; or recommend a program that is cost effective and environmentally sound. The No Project Alternative would also not design and implement reliable facilities to help achieve sustainable groundwater management of the Pajaro Valley Groundwater Subbasin by 2040, substantially contribute to the Pajaro Valley's water supply needs in a timely manner, use locally controlled surface water for agricultural purposes to offset groundwater pumping in a manner consistent with habitat preservation and enhancement, and in coordination with resource agencies, the public, and other stakeholders; or make efficient use of, and leverage federal, state, and local investments in, existing Agency infrastructure.

5.3.1.3 Evaluation

If the College Lake Project is not implemented, then none of the environmental impacts attributable to the Project (described in Chapter 3) would occur, including the significant and unavoidable impacts on Important Farmland and from construction noise.

As described in Section 3.4, Biological Resources, juvenile steelhead, a federal threatened species, have been shown to rear in College Lake in the winter and spring prior to their emigration to the ocean as smolts. The peak time of smolt emigration is April and May. Under current management practices, RD 2049 drains College Lake starting around mid-March each year to allow for farming on the lake bottom. This action lowers the water surface elevation of the lake below the elevation of the existing weir and prevents juvenile steelhead from migrating to the ocean. Juvenile steelhead become trapped immediately upstream of the weir, exposing them to rapidly declining water levels and dissolved oxygen concentrations, increased water temperatures, predation pressures, and potential pump entrainment or impingement. Moreover, as the lake continues to be drawn down over a period of several weeks, the pumped water becomes increasingly turbid. This high turbidity may have adverse effects on steelhead migrating through Salsipuedes Creek from the Corralitos Creek basin. The proposed fish bypass flows, weir design with fish passage, and water management operations associated with the Project would mitigate these adverse effects. In contrast, the adverse existing conditions for steelhead would be expected to persist under the No Project Alternative.

If the College Lake Project is not implemented and its supply is not replaced by another project, the Basin's overdraft condition is anticipated to continue. Seawater intrusion would presumably continue to advance beneath the coastal lands. On coastal acreage that does not receive delivered water, irrigation with groundwater would continue until the salt content in the soils builds up to the point where existing agricultural crops typical of the area could not grow. Production of more salt tolerant crops may occur; however, the economy of the area could change. Wells would likely become unsuitable over time and lands would be fallowed, resulting in a significant loss of active farmland.

Implementation of any projects to replace the College Lake water supply would result in other, potentially more severe impacts on the environment. Refer to Sections 5.5 and 5.7 in the 2014 BMP Update PEIR (presented in Appendix ALTS of this EIR) for a description of impacts associated with the projects comprising the Water Supply Facilities Alternative.

5.3.2 Farmland Preservation-Lake Deepening Alternative

5.3.2.1 Description

This alternative involves deepening parts of College Lake and depositing the excavated materials to raise other parts of the lakebed. This alternative would effectively reduce the areal extent of College Lake water surface compared to that of the Project, resulting in a reduction of wetted area on June 1 during the modeled water years, thus increasing the amount of acreage suitable for farming compared to those of the Project. **Table 5-2** summarizes key characteristics of this alternative in comparison to the Project.

Project Components. The Farmland Preservation-Lake Deeping Alternative would include the same components as the Project, including the proposed weir structure, intake pump station, and the College Lake pipeline. Implementation of this alternative would preclude construction of the WTP at the optional site due to a portion of the site being within the fill area (refer to Figure 5-2). Like the Project, mitigation measures from the 2014 BMP Update PEIR adopted by the Board of Directors would apply to this alternative.

Physical Configuration. A 78.5-acre area at the deepest part of College Lake would be lowered (excavated) by approximately 2.3 feet. The excavated material would be deposited in the southwestern portion of the lake at depths up to 6.2 feet; a transition between these two zones would be included. **Figure 5-1** shows a graphical comparison between this alternative and the Project and the resulting water depths at a lake level of 62.5 feet North American Vertical Datum of 1988 (NAVD88). At this elevation, the water surface area would be approximately 256 acres for this alternative, as opposed to 285 acres in the College Lake Project, resulting in a reduction of storage area of approximately 30 acres. The excavation would increase the lake volume below 60 feet NAVD88 by 88 acre-feet and increase the lake volume at 62.5 feet NAVD88 by 35 acre-feet. This alternative would result in a yield of approximately 1,900 to 2,350 acre-feet per year (AFY).

Construction. Construction activities for the Farmland Preservation-Lake Deepening Alternative would be the same as the Project, with the addition of the lake deepening. Approximately 260,000 cubic yards of materials would be excavated from the lake basin and moved approximately 0.2 miles to the southwestern bank of the lake. Cut and fill would be balanced, so no off-haul of material would be required. It is assumed that excavation and fill operations would occur when the weir structure and pump station were being constructed, after College Lake has been emptied and after the smolt outmigration season.

Operations and Maintenance. Operations and maintenance activities for the Farmland Preservation-Lake Deepening Alternative would generally be the same as the Project, but the topographic changes would reduce the inundation area and alter the configuration of proposed maintenance areas within the southwestern portion of the lake, as shown on **Figure 5-2**. Figure 5-2 shows Important Farmland that would be preserved through implementation of the Farmland Preservation – Lake Deeping Alternative in comparison to the College Lake Project.

5.3.2.2 Ability to Meet the Project's Objectives

Table 5-1 summarizes the ability of the Farmland Preservation-Lake Deepening Alternative to meet the project objectives. As shown, this alternative would meet almost all of the project's objectives. The earthwork (as well as changes needed to the tile drains in the lake) would increase capital costs in comparison to the Project. (A cost estimate has not been developed for the alternative, but the costs of moving 260,000 cubic yards of material within the College Lake basin would be in addition to the capital costs of the Project.) That, coupled with adverse effects on biological resources, would diminish this alternative's ability to meet the following objective compared to the Project: *Recommend a program that is cost effective and environmentally sound.* The complexities of permitting this alternative could also delay implementation.

TABLE 5-2
KEY FEATURES OF FARMLAND PRESERVATION – LAKE DEEPING ALTERNATIVE IN COMPARISON TO THE PROJECT

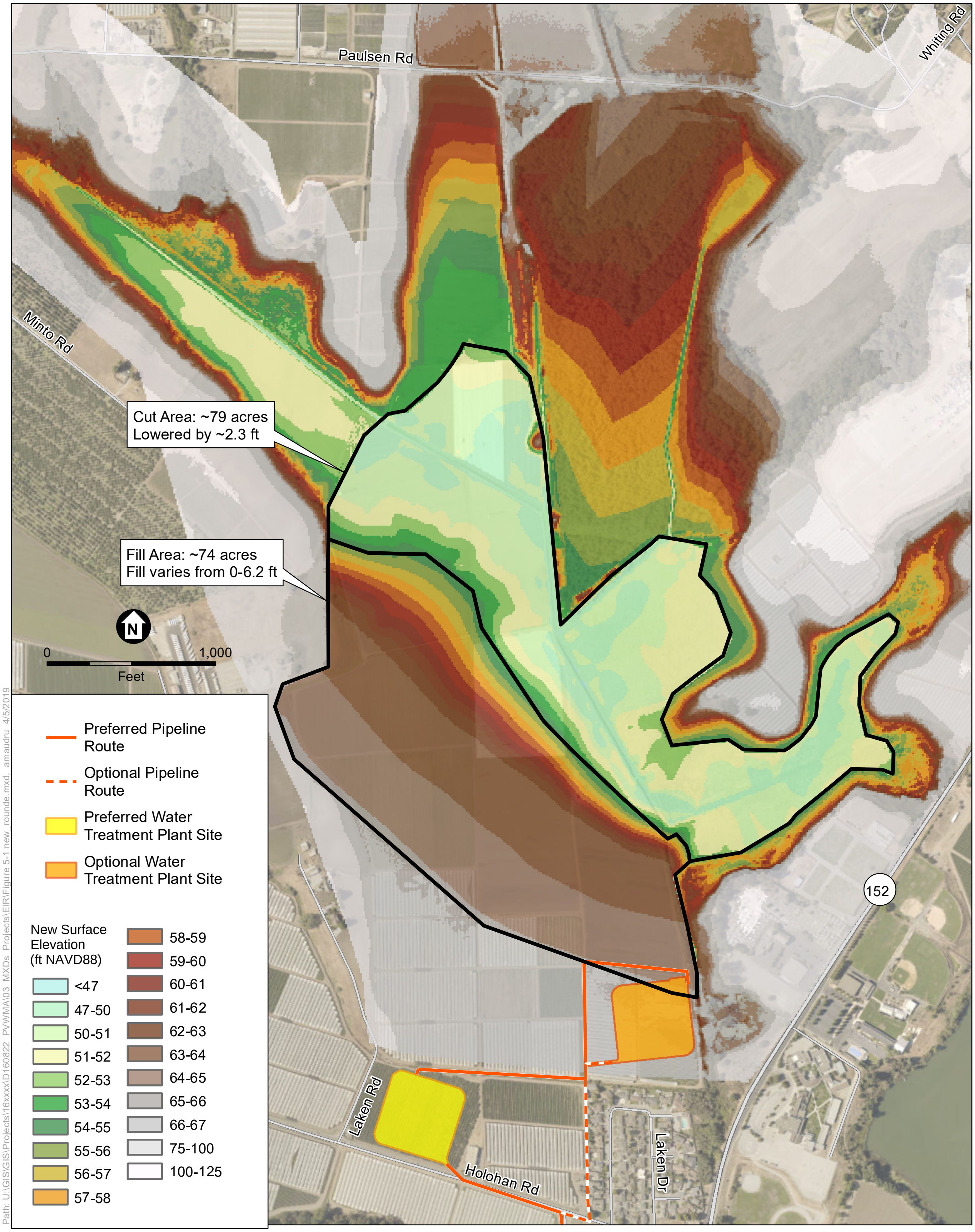
Key Feature		College Lake Project		Farmland Preservation – Lake Deepening Alternative
Annual Yield	Normal Range[a]	Approximately 1,800 to 2,300 AFY		Approximately 1,900 to 2,350 AFY
	Maximum	3,000 AFY		Same as Project
Storage Capacity (at 62.5 feet NAVD88)		Approximately 1,800 AF		Approximately 1,800 AF
Water Surface Area (at 62.5 feet NAVD88)		285 acres		256 acres
Components		Weir Structure, Intake pump station, water treatment plant, pipelines		Same as Project
Operations and Maintenance	**Fish Passage, Bypass of Casserly Creek Flows:**[b]	**Adult Steelhead Migration** Dec. 15 – Mar. 31	**Smolt Outmigration** Apr. 1 – May 31	
	Minimum flow between Corralitos-Salsipuedes Confluence and Pajaro River	21 cfs	8 cfs	
	Minimum flow at weir[c] and in Salsipuedes Creek between weir and Corralitos Creek	1.8 cfs	1.0 cfs	
	Minimum lake level	59.5 feet	59.3 feet	
	Flood Hazards	Weir height during wet season would be managed so as not to exacerbate upstream or downstream flooding (refer to Section 2.7, Operations and Maintenance)		Weir would be managed consistent with Project; Altered topography would alter flooding patterns. Refer to discussion under Section 5.3.2.3.
	Water supply diversions	• Dec. 15 – May 31: would occur after minimum lake level and proposed fish passage flows have been achieved, and would be based on demand • May 31 – Dec. 14: would occur based on demand, considering water supply portfolio priorities		Same as Project
	Maintenance	• Periodic inspections and maintenance of Project components • Within College Lake Basin at/below 63 feet NAVD88 - Sediment and debris removal - Vegetation maintenance (disking/tilling, trimming and mowing, removal) - Vector control		Same management practices as Project but over a smaller area (because the footprint of the water management area would be smaller).

NOTES:

AFY = acre-feet per year AF = acre-feet cfs = cubic feet per second

a Average water yield for College Lake would vary year to year, depending on hydrologic conditions (e.g., rainfall), weir operations, and water demand.
b Instream flow requirements based on critical riffle surveys conducted in 2017 and 2018. Each minimum flow requirement would be the number specified in this table or the flow resulting from bypassing the total inflow into College Lake, whichever is less. Minimum flow between the Corralitos Creek-Salsipuedes Creek confluence and Pajaro River is for the combined flow from Corralitos Creek and College Lake. Refinements to fish passage assumptions and modeling may occur during permitting based on agency consultations.
c The minimum flows may be refined during design phase of the proposed weir and fish passage structure.

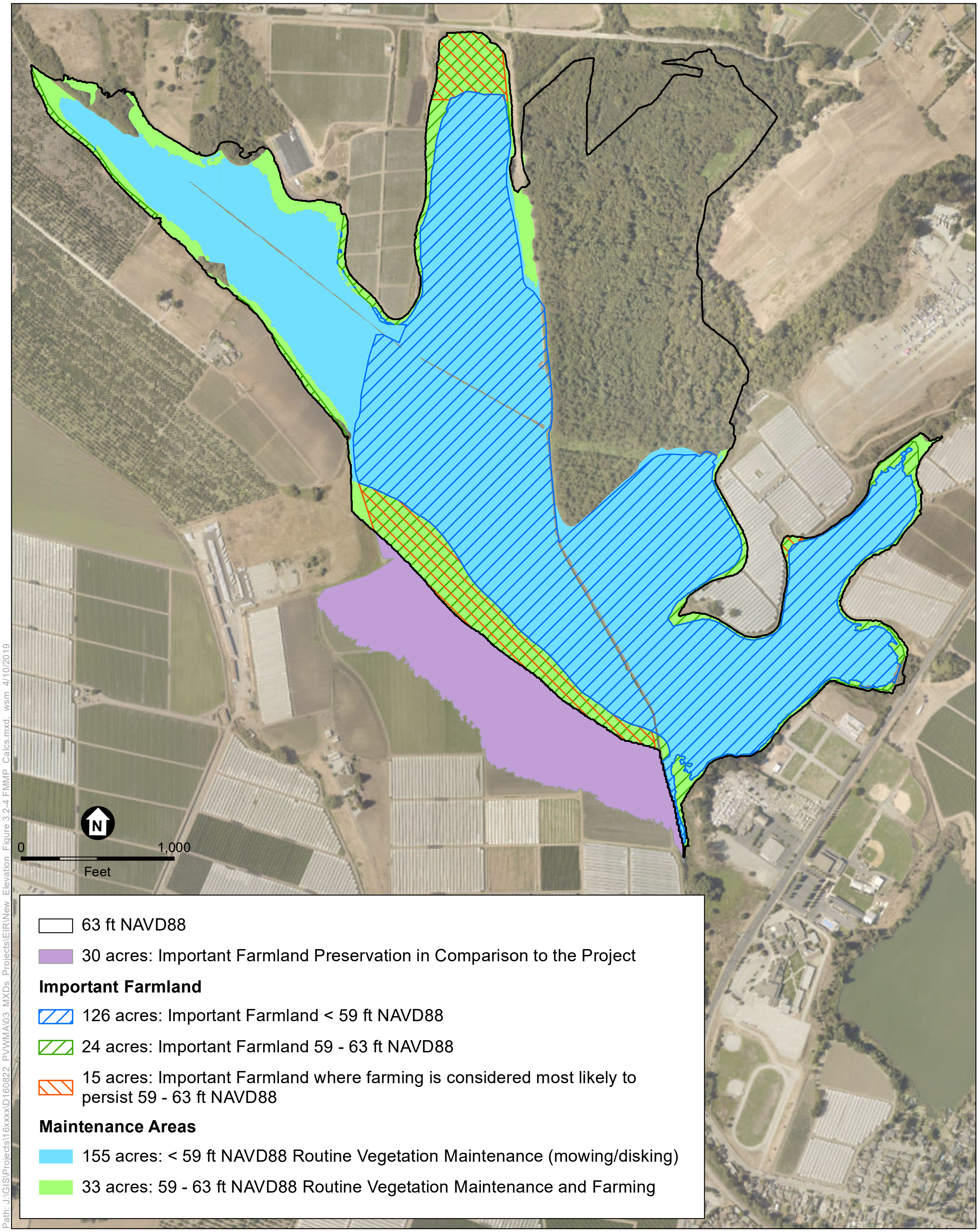
SOURCES: cbec, *College Lake Integrated Resources Management Project, Hydrologic and Hydraulic Modeling Technical Memorandum*, November 2018; E-mail correspondence from L. Tillmann, cbec, Information regarding Farmland Preservation – Lake Deepening Alternative, February 22, 2019.



SOURCE: cbec eco engineering, inc., 2019; ESRI World Imagery, July 23, 2016; ESA

College Lake Integrated Resources Management Project

Figure 5-1
Modified Topography for Farmland Preservation - Lake Deepening Alternative



SOURCE: cbec inc. eco engineering, 2019; ESA, 2019, California Department of Conservation, 2016

Notes: 1. Numbers are rounded to the nearest acre.
2. NAVD88 = North American Vertical Datum of 1988

ESA

College Lake Integrated Resources Management Project

Figure 5-2

Farmland Preservation - Lake Deepening Alternative: Effects on Important Farmland

5.3.2.3 Evaluation

Table 5-3 compares the significant impacts of the Project with those of the Farmland Preservation – Lake Deepening Alternative. The table also lists impacts that would be less than significant for the Project but would be worse with this alternative. Impacts not listed in this table would be less than significant (or no impact) for the Project and the alternative. The primary differences between the environmental impacts of the Project and the Farmland Preservation-Lake Deepening Alternative are addressed below.

- ***Important Farmland.*** Figure 5-2 indicates land (shaded in lavender) that would essentially be raised above the 63-foot NAVD88 contour and therefore preserved for farming. Taking into account the potential of additional conversion of Important Farmland due to parcel division or fragmentation, this alternative could preserve up to an additional 36 acres of Important Farmland compared to the Project.

- ***Flooding.*** The placement of fill would constrict (narrow) the channel between College Lake and Salsipuedes Creek. As a result, implementation of this alternative would incrementally increase water surface elevations during the 10-year flood event along Salsipuedes Creek south of the weir, and during the 100-year flood event along Casserly Creek, Salsipuedes Creek upstream of the Corralitos Creek confluence, and at Corralitos Creek.

- ***Biological Resources***. The earthwork and topographic changes associated with this alternative would adversely affect special status terrestrial and aquatic species (including steelhead), sensitive natural communities (state and federally protected wetlands), and the movement of wildlife (waterfowl, shorebirds and other wildlife) to a greater degree than with the Project. Cut and fill would increase the area of disturbance by about 153 acres. Impacts to state and federally protect wetlands would be greater than with the Project and would require a much larger area of compensatory mitigation. Because the area of farmed wetland between about 59 feet and 63 feet NAVD88 would be smaller, there would be a reduced benefit to migratory wildlife in the spring and early summer. The decrease in the extent of shallow water habitat may also adversely affect steelhead rearing habitat in comparison to the Project.

- ***Air Quality***. The use of additional diesel-powered off-road construction equipment to move 260,000 cubic yards of material (as well as on-road truck trips) would substantially increase ozone precursor emissions such as nitrogen oxides (NOx), particulate matter, diesel particulate matter (a toxic air contaminant), and greenhouse gas emissions compared to the Project. Project-related construction emissions of NOx in the first year of construction are projected to be 102 pounds per day compared to a significance threshold of 137 pounds per day (see Table 3.5-6 in Section 3.5, Air Quality and Greenhouse Gas Emissions). The additional NOx emissions from earthwork under this alternative could exceed the NOx significance threshold. In addition, more dust would be generated under this alternative compared to the Project.

- ***Cultural and Paleontological Resources***. Given the area's sensitivity for cultural resources, the excavation of 260,000 cubic yards of material would increase the likelihood of disturbing archeological and paleontological resources compared to the Project.

TABLE 5-3
COMPARISON OF ENVIRONMENTAL IMPACTS OF PROJECT TO FARMLAND PRESERVATION-LAKE DEEPENING ALTERNATIVE

Environmental Resource	College Lake Project	Farmland Preservation – Lake Deepening Alternative
Land Use and Agricultural Resources	**Impact LU-1:** The Project would convert Important Farmland to non-agricultural use and could involve changes in the existing environment which, due to their location or nature, could result in conversion of Important Farmland to non-agricultural use. (Significant and Unavoidable with Mitigation)	**Less than the Project.** Like the Project, implementation of this alternative would result in the conversion of Important Farmland but to a lesser degree. The earthwork associated with this alternative would deepen the lake, and add fill to the southwestern portion of the lake, resulting in a reduction in the amount of Important Farmland inundated during water management operations. Under this alternative, the placement of fill in the southwestern area of the lake would raise about 30 acres of farmland above the 63-foot NAVD88 contour, and thus above the influence of water management actions. As indicated in Table 3.2-4 in Section 3.2, Land Use and Agricultural Resources, the Project could result in conversion of up to about 198 acres of Important Farmland, taking into account additional conversion of Important Farmland that could occur through the division or fragmentation of parcels. Under this alternative, the amount of Important Farmland that could be converted would be reduced by an estimated 36 acres (taking into consideration the potential for additional conversion through the division or fragmentation of parcels). Like the Project, implementation of Mitigation Measures LU-1a, LU-1b, and LU-1c could reduce this impact, but it would still be considered unavoidable.
	Impact C-LU-1: The Project, in combination with past, present, and probable future projects in the Project area, would have a cumulatively considerable impact on the conversion of Important Farmland to non-agricultural use. (Significant and Unavoidable with Mitigation)	**Less than the Project.** For reasons stated under Impact LU-1, this alternative's contributions on the cumulative conversion of Important Farmland in the Pajaro Valley would still be cumulatively considerable, but would be less than with the Project.
Hydrology and Water Quality	**Impact HYD-1:** Project construction could violate water quality standards and/or waste discharge requirements, or otherwise substantially degrade surface or groundwater quality. (Less than Significant with Mitigation)	**Similar to the Project.** Due to the earthwork associated with this alternative, a larger area would be required to implement stormwater best management practices pursuant to the Construction General Permit. Pipeline locations would remain the same. Like the Project, implementation of Mitigation Measures BR-1b and HYD-1 would reduce impacts to water quality associated with construction of the College Lake pipeline.
	Impact HYD-2: Project operations could adversely affect surface water quality. (Less than Significant with Mitigation)	**Similar to the Project.** This alternative would retain similar volumes of water within College Lake for a similar period of time as the Project. Bypass of water would be conducted for similar reasons, and would be required to adhere to waste discharge requirements. Similar volumes of water would flow downstream to support fish passage. Pipeline locations would remain the same. Like the Project, implementation of Mitigation Measures HYD-2a and HYD-2b would be required to reduce impacts associated with operation of this alternative.
	Impact HYD-4: The Project would alter drainage patterns, changing erosion and sedimentation patterns in College Lake and downstream water bodies. (Less than Significant with Mitigation)	**Similar to the Project** Weir operations would be unchanged compared to the Project. Similar volumes of water would flow downstream to support fish passage. Pipeline locations would remain the same. Like the Project, implementation of Mitigation Measure HYD-2b would reduce impacts associated with the College Lake pipeline crossing of Pinto Creek.
	Impact HYD-5: The Project would not substantially increase the rate or amount of surface runoff, but would impede or redirect flood flows and alter the seasonality of surface runoff. (Less than Significant with Mitigation) Of note: The College Lake Project would not result in any changes in water surface elevation greater than 0.1 foot during the 10-year flood event. The College Lake Project would not result in changes in water surface elevation greater than 0.1 foot during the 100-year flood event with the exception of the vicinity of the proposed weir structure in Salsipuedes Creek (where an increase of 0.1 foot could occur).	**Greater than the Project** This alternative would result in a more constricted (narrower) channel between College Lake and Salsipuedes Creek due to the proposed location of fill west of Salsipuedes Creek. Consequently, this alternative would result in changes in the water surface elevation of the 10-year and 100-year flood events. This alternative would differ from the Project because it would result in a 0.1-foot increase in water surface elevation along Salsipuedes Creek south of the proposed weir during the 10-year event. This alternative would also differ from the Project because it would result in a 0.1-foot increase in flood water surface elevation along Casserly Creek and Salsipuedes Creek upstream of the Corralitos confluence, and a 0.2-foot increase in flood water surface elevation at Corralitos Creek during the 100-year event. This would be a significant impact that would require mitigation.
	Impact HYD-6: The Project could conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan. (Less than Significant with Mitigation)	**Similar to the Project** This alternative would implement similar construction and operations water quality controls, and, like the College Lake Project, would support sustainable groundwater management of the Pajaro Valley Groundwater Basin. Like the Project, implementation of Mitigation Measures BR-1b, HYD-1, HYD-2a, and HYD-2b would reduce this alternative's effects on water quality so that the project would not conflict with a water quality control plan.
	Impact C-HYD-1: The Project, in combination with past, present, and probable future projects in the Project area, would not result in significant adverse cumulative hydrology impacts. (Less than Significant)	**Greater than the Project** This alternative would result in a slightly higher (by 0.1 foot) flood water surface elevation along Salsipuedes Creek upstream of the Corralitos Creek confluence during the 10-year event, which could combine with increases in water surface elevation caused by the United States Army Corps of Engineers' (USACE's) project (refer to project 7 in Table 3.1-1) to result in a significant (greater than 0.1 foot) increase in water surface elevation along Salsipuedes Creek, a potentially significant impact. This alternative would also result in a slightly higher (by 0.1 foot) flood water surface elevation along Salsipuedes Creek during the 100-year event, which could combine with the increase in water surface elevation caused by the USACE project. Flood water surface elevations caused by this alternative could also combine with the increase in flood water surface elevation due to the USACE project along Corralitos Creek, a potentially significant impact.
Biological Resources	**Impact BR-1:** Construction of Project components could result in a substantial adverse effect on special-status species. (Less than Significant with Mitigation)	**Greater than the Project** The cut and fill of 260,000 cubic yards of material within the lakebed would increase the construction disturbance area by about 153 acres. Construction-phase impacts on special-status habitat would increase both spatially and temporally. Like the Project, implementation of adopted Mitigation Measures BIO-1b, 2a through 2k, and HWQ-1, implementation of revised adopted Mitigation Measures BIO-1c and 1d, and implementation of Mitigation Measures BR-1a through 1d would mitigate these impacts to less than significant. Habitat-related changes are discussed below under Impact BR-2. The alteration of topography within the lakebed would reduce the total habitat area available for use by migratory wildlife species, especially waterfowl and shorebirds, following the receding water level in the spring and early summer and prior to crop planting. This alternative would not likely exacerbate the Project's effects on habitat for steelhead, California red-legged frog, or western pond turtle because the affected areas are currently used for summer farming and do not support suitable habitat for these species. The total volume of water and period of available aquatic habitat for steelhead would not substantially differ from the College Lake Project.

TABLE 5-3 (CONTINUED)
COMPARISON OF ENVIRONMENTAL IMPACTS OF PROJECT TO FARMLAND PRESERVATION-LAKE DEEPENING ALTERNATIVE

Environmental Resource	College Lake Project	Farmland Preservation – Lake Deepening Alternative
	Impact BR-2: Construction of Project components would result in a substantial adverse effect on riparian habitat or other sensitive natural community or on state or federally protected wetlands or waters through direct removal, filling, hydrological interruption, or other means. (Less than Significant with Mitigation)	**Greater than the Project** Ground disturbance for the cut and fill of 260,000 cubic yards of material in areas of farmed wetland and seasonal wetland in the existing lakebed would be a temporary impact, and the deepened area that would provide increased storage capacity would continue to support aquatic resources after construction, although the attributes of the aquatic resources may substantially change based on the changes in topography, which would result in changes in inundation frequency and duration and thus plant species composition (or lack of vegetative cover). The fill area (shown on Figure 5-2) would mostly be above the threshold wetland hydrology elevation of 63.5 feet (NAVD88; see Figure 5-1) and would no longer support wetland conditions, resulting in a net loss of aquatic resources. While the water surface area of the College Lake Project at 62.5 feet NAVD88 would be 285 acres, the water surface area of this alternative would be 256 acres; a reduction of similar magnitude would be seen at 63.5 feet (NAVD88). Ultimately, changes in the physical and biological conditions of farmed wetlands in areas where fill would be placed are considered minor since these areas would continue to be used for agriculture during the growing season. However, due to the more substantial decrease in total area that would support wetland conditions under this alternative, impacts to state and federally protected wetlands would be greater than the Project. While implementation of Mitigation measures BIO-1c (revised) and BIO-1d (revised) would address this impact, a much larger area of compensatory mitigation would be required to reduce this impact to less than significant. Because weir design, construction and operation would be the same as the Project, this alternative would have the same less-than-significant impacts to sensitive natural communities in Salsipuedes Creek, Pajaro River, and Pajaro Lagoon.
	Impact BR-3: Construction of Project components could interfere substantially with the movement of any native resident or migratory wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites. (Less than Significant)	**Greater than the Project** As described under Impact BR-2, this alternative would reduce the total area supporting wetland hydrology compared with the Project; therefore, the area of farmed wetlands between 59 feet and 63.5 feet (NAVD88) that would be used by migratory wildlife species, especially waterfowl and shorebirds, following the receding water level in the spring and early summer and prior to crop planting would also be reduced (refer to the green-shaded areas in Figure 5-2). This reduction in the area providing suitable conditions for movement and migration of waterfowl, shorebirds, and other wildlife, would be greater (and thus more adverse) than the Project. If the earthwork associated with the topographic modifications were to occur during the migratory season, it may impede the use of College Lake for bird movement and migration due to habitat- and equipment-related disturbances such as dust and noise. Similarly, under this alternative, construction within College Lake may affect the use of nursery sites. Although current farming activities include the use of farm equipment for tilling, disking, planting, and harvest throughout the summer months, earthwork associated with the topographic modifications could be more disruptive because of the greater scale of site disturbance.
Biological Resources (cont.)	**Impact BR-4:** Project operations could result in a substantial adverse effect on riparian habitat or other sensitive natural community or on state or federally protected wetlands waters through direct removal, filling, hydrological interruption, or other means. (Less than Significant)	**Similar to the Project** The cut and fill of 260,000 CY of material within College Lake would substantially alter the topography in a large portion of the lake basin. As discussed above under Impact BR-2, this would effectively reduce the total area that would support wetland hydrology in favor of keeping more area above 63 feet (NAVD88). However, once this construction-related conversion has taken place, water operations within College Lake would be the same as the Project. The same frequency and duration of inundation would be seen at the same elevations, since weir operations would be the same. Impacts to sensitive natural communities in Salsipuedes Creek, Pajaro River, and Pajaro Lagoon would be similar to the Project; releases for fish passage would be the same as the Project.
	Impact BR-5: Project operations could result in a substantial adverse effect on terrestrial special-status species. (Less than Significant with Mitigation)	**Similar to the Project** The lowest elevations within the lake basin, as well as the areas between elevations 59 feet and 63 feet NAVD88 (Figure 5-2) would still be routinely maintained and therefore impacts to special-status species during maintenance activities would be similar to the College Lake Project. Like the Project, this impact could be mitigated with Implementation of revised adopted Mitigation Measures BIO-2i, 2j and 2k.
	Impact BR-6: Project operations could result in a substantial adverse effect on special-status fish species. (Less than Significant with Mitigation)	**Potentially Greater than the Project** Under existing and Project conditions, the lake provides a balanced mix of shallow (less than 4 feet deep) and deep (greater than 6 feet deep) winter and spring habitat that has been shown to provide highly productive juvenile steelhead rearing habitat. Under the lake deepening alternative, the extent of shallow water habitat would decrease by an estimated 9-21% and the extent of deep water habitat would increase. Deep water habitat provides valuable juvenile steelhead refuge from avian predators, but shallow water habitat typically provides greater foraging opportunities. The degree to which the change in water depths under the lake deepening alternative would affect steelhead rearing habitat productivity is unknown, but qualitatively, the decrease in shallow water habitat may result in an adverse effect on special-status fish winter and spring rearing habitat quality in College Lake. The lake deepening alternative would include an area of approximately 78.5 acres that would remain inundated through the summer. This is the same inundation period as the Project and would therefore have the same effect on populations of non-native predatory fish as the Project.
	Impact BR-7: Project operations could interfere substantially with the movement of native resident or migratory wildlife species or with established native resident or migratory wildlife corridors or impede the use of native wildlife nursery sites. (Less than Significant)	**Same as the Project** Water operations under the lake deepening alternative would be the same as the College Lake Project; therefore, the same inundation periods and drawdown schedule can be expected within the various elevation ranges. The continuation of farming in the farmland preservation area (Figure 5-2) does not represent a change from existing conditions because these areas are currently used for agricultural production and would be used for agricultural production with the Project as well. Construction-related changes to total available habitat for wildlife movement and migration are addressed above in BR-3.

TABLE 5-3 (CONTINUED)
COMPARISON OF ENVIRONMENTAL IMPACTS OF PROJECT TO FARMLAND PRESERVATION-LAKE DEEPENING ALTERNATIVE

Environmental Resource	College Lake Project	Farmland Preservation – Lake Deepening Alternative
Air Quality and Greenhouse Gases	**Impact AIR-1**: Construction and operational activities associated with the Project could generate criteria air pollutants emissions that would conflict with implementation of the Clean Air Plan. (Less than Significant)	**Greater than the Project.** With this alternative, the use of diesel-powered off-road construction equipment to cut and fill of 260,000 cubic yards of material within the lakebed would substantially increase ozone precursor emissions such as nitrogen oxides (NOx), particulate matter, diesel particulate matter (a toxic air contaminant), and greenhouse gas emissions, and would also incrementally increase these emissions from on-road truck trips. Project-related construction emissions of NOx in the first year of construction are projected to be 102 pounds per day compared to a significance threshold of 137 pounds per day. The additional NOx emissions under this alternative could exceed the significance threshold. Potential mitigation measures to reduce this impact include requiring contractors to use cleaner construction equipment (e.g., equipment that conforms to Air Resources Board Tier 3 or Tier 4 emissions standards). In addition, more dust would be generated under this alternative, which would be mitigated through implementation of adopted Mitigation Measure AQ-1. With this alternative, operations-phase emissions would similar to the Project.
Air Quality and Greenhouse Gases (cont.)	**Impact AIR-2**: The Project could expose sensitive receptors to substantial levels of pollutants. (Less than Significant)	**Greater than the Project.** For reasons described under Impact AIR-1, toxic air contaminant emissions such as diesel particulate matter would be greater under this alternative than with the Project, but this impact likely would remain less than significant.
	Impact AIR-4: The Project could lead to an increase of GHG emissions that are associated with global climate change; however, not at a cumulatively considerable level. (Less than Significant)	**Greater than the Project.** For reasons described under Impact AIR-1, greenhouse gas emissions would be greater under this alternative than with the Project, but this impact likely would remain less than significant.
Geology and Soils	**Impact GEO-3:** The Project could be located on a geologic unit or soil that becomes unstable as a result of the Project or that could potentially result in landslide, lateral spreading, subsidence, liquefaction, or collapse for reasons caused or exacerbated by the Project. (Less than Significant)	**Similar to the Project.** Grading for this alternative would result in relatively steep slopes at the southern end of College Lake, which could increase slope instability in that location; however, similar to the Project, this alternative would be required to be designed in accordance with recommendations from a site-specific geotechnical report that addresses earthwork, along with other aspects of design.
	Impact GEO-5: The Project could directly or indirectly destroy a unique paleontological resource or site or unique geologic feature. (Less than Significant with Mitigation)	**Greater than the Project.** The likelihood that paleontological resources would be encountered could be incrementally greater under this alternative given the additional excavation. Like the Project, implementation of Mitigation Measure GEO-1 could reduce this impact to a less-than-significant level.
	Impact C-GEO-1: The Project, in combination with past, present, and probable future projects in the Project area, could have cumulatively considerable impacts on a unique paleontological resource. (Less than Significant with Mitigation)	**Greater than the Project.** For reasons stated above under Impact GEO-5, the Project's contribution to this cumulative impact could be incrementally greater.
Hazards and Hazardous Materials	**Impact HAZ-4:** The Project could be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5. (Less than Significant with Mitigation)	**Same as the Project.** This impact is associated with excavation for the College Lake pipeline, which would be the same under the Project and this alternative, and could be mitigated through implementation of adopted Mitigation Measures HM-1 and HM-2, and Mitigation Measures HAZ-1a and HAZ-1b.
	Impact HAZ-5: Project construction and operation could impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan. (Less than Significant with Mitigation)	**Same as the Project**. This impact is associated with construction of the College Lake pipeline in roadways, which would be the same under the Project and this alternative, and could be mitigated through implementation of Mitigation Measure TRA-1b.
Noise and Vibration	**Impact NOI-1:** Construction of the Project would result in a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plans or noise ordinances. (Significant and Unavoidable with Mitigation)	**Same as the Project.** This impact is associated with construction activities at the preferred WTP site and the College Lake pipeline, which would be the same under the Project and this alternative. Construction equipment used for earthwork associated with this alternative would generate additional noise, but the activities would not be close enough to any receptors to exceed County of Santa Cruz construction noise standards.
	Impact NOI-3: Project construction would generate excessive groundborne vibration. (Less than Significant with Mitigation)	**Same as the Project.** This impact is associated with trenchless pipeline construction near historic structures, which would be the same under the Project and this alternative, and could be mitigated with implementation of Mitigation Measure NOI-2.
	Impact C-NOI-1: The Project, in combination with past, present, and probable future projects in the Project area, would have a cumulatively considerable impact associated with construction noise. (Significant and Unavoidable with Mitigation)	**Same as the Project.** For reasons stated under Impact NOI-1 and NOI-2, this alternative's contributions to cumulative construction-phase noise impacts would be the same as with the Project: cumulatively considerable.
Traffic and Transportation	**Impact TRA-1:** Construction of the Project would have temporary and intermittent effects on traffic and transportation conditions in the Project area. (Less than Significant with Mitigation)	**Similar to the Project.** Although there would be an incrementally greater number of construction vehicles associated with earthwork, because cut and fill would balance within the lake basin, the magnitude of this impact for this alternative would be similar to the Project and could be mitigated through implementation of Mitigation Measures TRA-1a and 1b.
	Impact TRA-2: Construction of the Project would temporarily disrupt circulation patterns near sensitive land uses (schools, hospitals, fire stations, police stations, and other emergency providers). (Less than Significant with Mitigation)	**Similar to the Project.** Because this impact is primarily associated with in-street pipeline construction, and for reasons stated under Impact TRA-1, this impact would be similar to the Project and could be mitigated through implementation of Mitigation Measures TRA-1a and 1b.

TABLE 5-3 (CONTINUED)
COMPARISON OF ENVIRONMENTAL IMPACTS OF PROJECT TO FARMLAND PRESERVATION-LAKE DEEPENING ALTERNATIVE

Environmental Resource	College Lake Project	Farmland Preservation – Lake Deepening Alternative
	Impact TRA-3: Construction of the Project would have temporary effects on alternative transportation and alternative transportation facilities in the Project area. (Less than Significant with Mitigation)	**Similar to the Project.** Because this impact is primarily associated with in-street pipeline construction, and for reasons stated under Impact TRA-1, this impact would be similar to the Project and could be mitigated through implementation of Mitigation Measures TRA-1a and 1b.
	Impact TRA-4: Construction of the Project would temporarily increase the potential for accidents on Project area roadways. (Less than Significant with Mitigation)	**Similar to the Project.** Because this impact is primarily associated with in-street pipeline construction, and for reasons stated under Impact TRA-1, this impact would be similar to the Project and could be mitigated through implementation of Mitigation Measures TRA-1a and 1b.
	Impact C-TRA-1: The Project, in combination with past, present, and probable future projects in the Project area, would have cumulatively considerable impacts on transportation and traffic. (Less than Significant with Mitigation)	**Similar to the Project.** For reasons stated in the preceding impacts, this alternative's contributions to cumulative transportation and traffic impacts would be the same as the Project: less than significant with mitigation.
Cultural Resources	**Impact CUL-1:** The Project could cause a substantial adverse change in the significance of a historical resource pursuant to CEQA Guidelines Section 15064.5. (Less than Significant with Mitigation)	**Same as the Project.** This impact is associated with trenchless pipeline construction near historic structures, which would be the same under the Project and this alternative and could be mitigated with implementation of Mitigation Measure NOI-2.
	Impact CUL-2: The Project could cause a substantial adverse change in the significance of an archaeological resource, including those determined to be a historical resource defined in Section 15064.5 or a unique archaeological resource defined in Public Resources Code 21083.2. (Less than Significant with Mitigation)	**Greater than the Project.** Because College Lake has high sensitivity for archeological resources (two previously recorded archaeological sites overlap slightly with the proposed inundation area), excavation within the lake basin would increase the likelihood of disturbing such resources. Like the Project, this impact could be mitigated through implementation of Mitigation Measures CUL-1a through CUL-1i.
	Impact CUL-3: The Project could disturb human remains, including those interred outside of formal cemeteries. (Less than Significant with Mitigation)	**Greater than the Project.** Because College Lake has high sensitivity for cultural resources, and archeological resources containing human remains have been found adjacent to the lake, excavation within the lake basin would increase the likelihood of disturbing human remains. Like the Project, this impact could be mitigated through implementation of Mitigation Measures CUL-2 for this alternative.
	Impact C-CUL-1: The Project, in combination with past, present, and probable future projects in the Project area, could have cumulatively considerable impacts on cultural resources. (Less than Significant with Mitigation)	**Greater than the Project.** For reasons stated under Impacts CUL-2 and CUL-3, potential contribution to cumulative impacts to archaeological resources would be incrementally greater under this alternative.
Aesthetics	**Impact AES-1:** Implementation of the Project could have a substantial adverse effect on scenic vistas. (Less than Significant with Mitigation)	**Similar to the Project with Preferred WTP Site.** This impact on scenic vistas viewed from Holohan Road associated with the WTP at the preferred site under this alternative would be the same as under the Project and could be mitigated with implementation of Mitigation Measures AES-1a and AES-1b. Changes in landform would not be expected to meaningfully alter publicly accessible views of the lake given the location and scale of proposed changes and limited viewing opportunities.
	Impact AES-3: Implementation of the Project could degrade the existing visual character or quality of public views of the sites in non-urbanized areas. (Less than Significant with Mitigation)	**Same as the Project with Preferred WTP Site.** This impact, based on degradation of the visual character of the preferred WTP site, is the same under this alternative and the Project and could be mitigated with implementation of Mitigation Measure AES-1a.
	Impact AES-4: Project components could introduce significant new sources of light or glare during construction. (Less than Significant with Mitigation)	**Same as the Project with Preferred WTP Site.** This impact, based on nighttime lighting required for construction of the weir structure and intake pump station and trenchless pipeline construction, is the same under this alternative as the Project and would be mitigated through implementation of Mitigation Measure AES-2.

5.4 Comparison of Alternatives

The text below presents a comparison of the options considered for the WTP and College Lake pipeline components of the Project, as well as a comparison of the Project with the alternatives described and evaluated in this chapter.

5.4.1 Comparison of Preferred and Optional WTP Sites

This EIR analyzes two potential WTP sites at the following locations:

- Preferred WTP Site: North of Holohan Road between Laken Drive and Grimmer Road, southwest of College Lake (within Assessor Parcel Number 051-101-47).
- Optional WTP Site: West of the proposed weir structure (within Assessor Parcel Number 051-441-24).

As indicated in Chapter 2, PV Water prefers the WTP site on Holohan Road for geotechnical reasons. Refer to Figure 2-2 for the locations of the two WTP site options.

The preferred WTP site, shown on Figures 2-14 and 2-15, would occupy approximately five acres. The optional WTP site, shown on Figures 2-16 and 2-17, would occupy six acres. Development of the optional WTP site would require an elevated fill pad to raise the WTP site above flood elevation, which would require more area than the preferred WTP site. As shown on Figures 2-14 and 2-16, the configuration of the WTP at either site would be similar. The construction phase durations of the WTP at both sites would be the same with the exception of surcharging for the optional WTP site which would be increased by 12 to 18 months to allow for consolidation of fill pad at that site (there would be no construction activity at the site during consolidation).

Construction of the WTP at either site would have significant and unavoidable impacts due to conversion of Important Farmland. On the basis of direct impacts on Important Farmland, the preferred WTP site would affect one less acre of Important Farmland than the optional WTP site. Taking into account the additional conversion of Important Farmland that could occur through the division or fragmentation of parcels, construction of the WTP at the optional site could increase to total conversion of Important Farmland by an estimated 4.8 acres (see Table 3.2-4 in Section 3.2).

Because the optional WTP site is within a floodplain, there is a potential higher risk of flooding than at the preferred WTP site. Regardless of which WTP site is selected, PV Water would implement adopted Mitigation Measure HWQ-4 from the 2014 BMP Update PEIR which would require that facilities be designed to comply with FEMA and County of Santa Cruz requirements to floodproof the facilities and not exacerbate upstream or downstream flood hazards on other properties.

Construction of the WTP at the preferred site would result in two significant impacts that would not occur at the optional WTP site. Short-term noise impacts due to construction would result in short-term exceedances of the County’s noise standard at the nearest sensitive receptor, a significant and unavoidable impact at the preferred WTP site even after implementation of

Mitigation Measure NOI-1a. Development of the WTP at the preferred site would also have long-term significant impact on aesthetic resources, but these impacts could be mitigated to less-than-significant levels with implementation of Mitigation Measures AE-1a and AE-1b.

Overall, given the difference in impact severity, magnitude and duration, the preferred WTP site is considered environmentally superior to the optional WTP site.

5.4.2 Comparison of Preferred and Optional Pipeline Alignments

As described in Section 2.2, Project Location, the proposed College Lake pipeline would extend from the proposed WTP to the CDS and the Recycled Water Facility at the Watsonville Wastewater Treatment Facility (refer to Figures 2-3a through 2-3e). The proposed College Lake pipeline alignment follows existing developed road rights-of-way and agricultural land. This EIR analyzes two potential pipeline alignments at the SR 1 crossing: the preferred pipeline alignment is in West Beach Street and the optional pipeline alignment goes through agricultural land south of West Beach Street. The optional pipeline alignment was included because the number and location of existing utilities in this segment of West Beach Street could complicate or preclude pipeline construction. There are environmental tradeoffs between the preferred and optional pipeline alignment with respect to temporary, significant, mitigable impacts to farmland, transportation, and noise.

Unlike the preferred pipeline alignment at the SR 1 crossing, the optional pipeline route would have a temporary significant impact on disruption of agricultural use during project construction that could be mitigated with implementation of Mitigation Measure LU-1c. Following cessation of pipeline construction activities, farming could resume within the construction corridor; however, trees with roots extending more than three feet below ground would be prohibited above the pipeline because deep roots could damage the pipeline and its cover. Replacing topsoil would prevent a long-term adverse effect on Important Farmland resulting from pipeline construction.

Because the preferred pipeline alignment would be installed in Beach Street instead of farmland, temporary, intermittent impacts on traffic and transportation conditions and alternative transportation modes, and the potential for accidents on Project area roadways, would be greater with the preferred pipeline alignment, but could be mitigated with implementation of Mitigation Measures TRA-1, TRA-3, and TRA-4. Construction along the optional pipeline alignment would require trenchless construction at two additional locations (one at the SR 129 crossing and one at the SR 1 crossing). As explained under Impact NOI-1 in Section 3.8, Noise and Vibration, since construction activities at the SR 129 and SR 1 crossings would not exceed the County's daytime or nighttime noise standards, impacts related to exposure of sensitive receptors to noise levels in excess of standards found in the local noise ordinance would be less than significant at these crossings for both the preferred and optional pipeline alignment.

Given the trade-offs in temporary construction-phase impacts between the preferred and optional College Lake pipeline alignments, neither is considered environmentally superior to the other.

5.4.3 Comparison of Project Alternatives and Environmentally Superior Alternative

The CEQA *Guidelines* require the identification of an environmentally superior alternative to the Project (Section 15126.6[e]). If it is determined that the "no project" alternative would be the environmentally superior alternative, then the EIR shall also identify an environmentally superior alternative among the other project alternatives (Section 15126.6[3]).

Compared to the Project as proposed, the No Project alternative's adverse existing conditions for steelhead would be expected to persist, overdraft and seawater intrusion conditions would continue within the Pajaro Valley Groundwater Basin, potentially resulting in land fallowing and significant loss of farmland. Implementation of projects to replace the College Lake Project would result in other, potentially more severe environmental impacts than those associated with the Project as proposed. For these reasons, the No Project Alternative is not considered the environmentally superior alternative.

There are trade-offs, in terms of environmental impacts, between the Farmland Preservation-Lake Deepening Alternative and the Project. The Farmland Preservation-Lake Deepening Alternative would reduce the conversion of Important Farmland. This is a significant and unavoidable impact even with Mitigation Measures LU-1a (Promote Farming), LU-1b (Compensate for Conversion of Important Farmland), and LU-1c (Replacement of Topsoil) because of uncertainties associated with implementing agricultural easements to compensate for conversion of Protected Farmland. However, this alternative would also worsen impacts associated with biological resources, flooding, air quality, and cultural resources. In particular, the magnitude of impacts to state and federally protected wetlands would require a substantially larger area of compensatory mitigation to reduce the impact, complicating permitting. In addition, this alternative would incrementally increase water surface elevations in certain areas under the 10- and 100-year flood events.

5.5 Alternatives Considered but Eliminated from Further Analysis

5.5.1 Lower Weir Alternative

5.5.1.1 Description

This alternative was considered as a potential means of reducing the magnitude of loss of Important Farmland associated with water management operations. A Lower Weir Alternative would be the same as the Project with the exception that the proposed weir would be built to and operated at 60.1 feet NAVD88 (i.e., the elevation of the existing weir without sand bags) instead of having the ability to be raised to 62.5 feet NAVD88. Water management operations would otherwise be the same as the Project with respect to (for example) bypass flows and minimum lake level requirements for fish passage, water supply diversions, and maintenance activities. The Lower Weir Alternative would include the same components as the Project, including a proposed weir structure, intake pump station, WTP, and the College Lake pipeline. Like the Project, mitigation measures from the 2014 BMP Update PEIR that were adopted by the Board of Directors would apply to this alternative.

This potential alternative was fully modeled by cbec and results are presented in Appendix HYD of this EIR. Modeling indicates that keeping the weir at 60.1 feet NAVD88 would reduce the Project yield by 500 to 600 AFY, on average.

5.5.1.2 Reasons for Rejection

This alternative would result in a substantial reduction in yield compared to the Project, compromising its abilities to satisfy the basic objectives of the Project and requiring that PV Water ultimately implement one or more additional projects to make up for this reduction in water supply. In addition, as discussed in Section 3.2, Land Use and Agricultural Resources, a key factor in estimating the conversion of Important Farmland caused by water management operations is the projected water surface elevation, as well as anticipated groundwater levels, around June 1. As with the Project, until May 31, the water surface elevation within College Lake would be at kept at approximately 59 feet NAVD88 to support fish passage during all water year types. Because of this factor and anticipated groundwater elevations, this alternative would not be expected to substantially reduce the potential conversion of Important Farmland in comparison to the Project or the Farmland Preservation-Lake Deepening Alternative. (Note that if water levels in the lake were operated solely for fish passage Important Farmland below approximately 59 feet NAVD88 would convert.) For these reasons, this alternative was eliminated from further consideration.

5.5.2 Continuation of Reclamation District 2049 Facilities and Operations; PV Water Acquires College Lake Water from Reclamation District 2049

5.5.2.1 Description

RD 2049 (referred to in this EIR by its legal name but self-identified as College Lake Reclamation District [CLRD] in the letter submitted on its behalf) requested that this EIR include an alternative involving PV Water contracting with RD 2049 “acquiring water from the continued reclamation and use of agricultural resource utilizing CLRD’s ongoing improvements and operations.” RD 2049 asserts that the Project’s objectives “can be adequately satisfied without significantly altering CLRD’s current improvements and operations,” and that it “regularly pumps enough water out of College Lake to provide the amount of water the project seeks to pipe down to the [CDS].” RD 2049’s letter puts forth the following regarding this proposed alternative:

- The alternative is required to comply with one of the objectives of PV Water established by the State legislature that “[a]gricultural uses shall have priority over other uses under this act within the constraints of state law.”
- “[PV Water’s] contract with CLRD shall require that a CLRD determine the date of commencement and rate of pumping and draining of College Lake in the manner it has done for the past 98 years….”

- "There would be no increased area of inundation at College Lake … and no reduction in the annual number of crop cycles. Therefore, there would be no reduction in agricultural productivity due to implementation of the Project utilizing current CLRD improvements and operations."
- "Adverse environmental impacts to biological resources such as steelhead and waterfowl will be substantially reduced or eliminated."

5.5.2.2 Reasons for Rejection

The suggested alternative is not supported by any objective evidence or credible analysis, and moreover does not provide the essential water storage function associated with the Project as proposed; consequently, it could not feasibly provide the water supply when it is needed: during the irrigation season. Implementation of this alternative without significantly altering RD 2049's current improvements and operations would continue to result in the adverse effects to steelhead described under the No Project Alternative. The National Marine Fisheries Service and California Department of Fish and Wildlife have expressed concern regarding the impact of current operations on steelhead. This alternative would also be inconsistent with the Project objective to use surface water for agricultural purposes in a manner consistent with habitat preservation and enhancement, and in coordination with resource agencies. For these reasons, this alternative was eliminated from further consideration.

5.5.3 Basin Management Plan Update Alternatives

5.5.3.1 Description

As part of the BMP Update, PV Water considered several alternatives related to surface water that either involved College Lake or represented a potential alternative water supply and storage project. [10] Appendix B of the BMP Update lists 44 projects that were identified by the Ad Hoc BMP Committee. Of these, several were revisited as part of the alternatives screening for this EIR. These alternatives include the following:

- **S-4: Expanded College Lake, Pinto Lake, Corralitos Creek, Watsonville Slough, and Aquifer Storage and Recovery.** This project is similar to College Lake Project as it would increase the total storage capacity of College Lake (to 5,600 acre-feet), add a seasonal storage component, and require construction of several of the same facilities (e.g., weir, pump station). This project would increase the water supplies to College Lake by diverting water from Corralitos Creek, Pinto Lake, and Watsonville Slough, and providing ASR injection during the winter, and recovery during the summer. A filtration and disinfection system (similar to the proposed WTP) would treat water from College Lake prior to entering the distribution pipeline. Two pipelines would be required; one to convey filtered water to the injection system wells, and a second to convey water from Watsonville Slough to College Lake in the winter and to convey College Lake and well water to the CDS during the irrigation season. This project would include the construction of College Lake main dam and saddle dam, filtration and disinfection facilities, pump stations, ASR wells, and approximately 15 miles of new conveyance pipeline.

[10] PV Water, *Basin Management Plan Update*, Final, February 2014.

- **S-5: Bolsa de San Cayetano Dam with Pajaro River Diversion.** This project consists of two options. In Option 1, Bolsa De San Cayetano Dam and Reservoir would be constructed for storage of up to 5,000 acre-feet of Pajaro River water, which would be diverted and pumped to the reservoir in the winter and used to meet irrigation demand in the summer. The dam and reservoir site would be located in Monterey County on the south side of the Pajaro River and adjacent to Trafton Road, and is surrounded by 100- to 150-feet high terrace upland that has been eroded from a canyon. The earth fill dam would be located across the mouth of the canyon to form the reservoir. A small saddle dam would also be constructed on the north ridge. The Pajaro River diversion would consist of an infiltration gallery, filtration system, and pump station facilities (similar to the College Lake Project). The diversion would be located approximately 0.5 miles upstream of the confluence of Salsipuedes Creek and the Pajaro River. It is assumed the water would need to be filtered and disinfected after storage to meet user requirements. Option 2 involves using the Bolsa De San Cayetano Dam and Reservoir for both surface water and recycled water storage. In addition to the infrastructure needed for Option 1, Option 2 would also include lining the reservoir to comply with Regional Water Quality Control Board requirements for surface storage of recycled water. Having the availability to store recycled water increases the average project yield due to insufficient surface water being available for diversion in some years. Option 1's yield would be 3,500 AFY, while Option 2's would be 4,500 AFY.

- **S-9: College Lake Aquifer Storage and Recovery in Winter.** This project would filter and disinfect diverted water from College Lake during the winter through a new pipeline to groundwater injection wells. The facilities for this project would include injection wells, approximately one and a half miles of new 12-inch water main, a new pump station, a membrane filtration plant with disinfection, and monitoring wells. It is assumed membrane filtration would be needed to treat College Lake water for groundwater injection. Nitrate levels must meet the Surface Water Treatment Rule and UV disinfection may be required to meet Surface Water Treatment Rule Trihalomethane limits. This project's yield would be 1,000 AFY.

- **S-10: Dams at Bolsa and Strawberry Hills with Pajaro Diversion.** This project involves the construction of earth fill dams across two natural depression areas south of the Pajaro River for the storage of water diverted from the river during winter months. Site 1 would use a portion of the Bolsa de Cayetano Canyon's natural depression and would have a capacity of approximately 680 acre-feet. This southeastern portion the Bolsa Canyon would require the construction of a 75-foot high earth dam with a crest length of 1,200 feet, a spillway, and outlet works. Site 2 uses a smaller natural depression located on the Strawberry Hills Forever, LLC property south of Jensen Road, and has the capacity of approximately 130 acre-feet. The Strawberry Hills site would require a 25-foot high earth dam with a crest length of 500 feet, spillway, and outlet works. Similar to the College Lake Project, each location would require a pump station, filtration and disinfection system, and pipelines to connect to the CDS. The diversion facilities would consist of filtration facilities and a pumping station located approximately 0.5 miles upstream of the confluence of Salsipuedes Creek and the Pajaro River. This project's yield would be 810 AFY.

- **S-12: College Lake to Recycled Water Treatment Plant in Summer.** Similar to the College Lake Project, this project would divert water from College Lake to be used for irrigation along the CDS. Water from College Lake and Pinto Lake would be diverted to the Watsonville sanitary sewer collection system during the summer for conveyance to the Watsonville Wastewater Treatment Facility, where it would be treated and pumped into the CDS. Approximately 4.3 miles of new pipe, dedicated to transmitting College Lake water to the existing sewer, would need to be constructed. The project would also include a pump station, filtration facility, sewer system upgrades, and a 1 million-gallon storage tank. The recycled WTP at the Watsonville Wastewater Treatment Facility would need to be expanded to meet increased flow volumes from this project. This project's yield would be 2,000 AFY.

- **S-14: Partial College Lake to Recycled Water Treatment Plant in Summer.** Similar to the College Lake Project, this project would divert water from College Lake to be used for irrigation along the CDS. This project would divert water from College Lake to the Watsonville sanitary sewer collection system during the summer for conveyance to the Watsonville Wastewater Treatment Facility, where it would be treated and pumped into the CDS. This project is sized to use the existing capacity of the recycled WTP and not require treatment expansion. Option 1 involves adding sufficient sewer capacity (4.3 miles of new sewer) to enable the unused nighttime treatment plant capacity to be fully utilized. Option 2 involves adding a relatively short length of new sewer (1.2 miles) to minimize construction costs and use a portion of the unused nighttime treatment plant capacity. The project would include the new conveyance pipeline, a pump station, and sewer system upgrades. Option 1's yield would be 460 AFY, while Option 2's would be 170 AFY.

- **S-20: College Lake with Pipeline to Adjacent Farmland.** Similar to the College Lake Project, this project would divert water from College Lake to be used for agricultural irrigation. Instead of water being sent to the CDS, this project would divert water from College Lake and Pinto Lake during the summer through a new pipeline to inland growers. Like the College Lake Project, the water pumped out of College Lake would go through filtration and disinfection at the lake prior to entering the pipeline. Construction would include approximately four miles of new 18-inch water main, a new pump station, and a filtration plant with disinfection. This project's yield would be 2,400 AFY.

- **SEA-1: Saltwater Desalination.** This project includes construction and operation of a seawater desalination facility north of the State Route 1 and Elkhorn Slough crossing in unincorporated Monterey County that would produce potable water from seawater. This project consists of a seawater intake and pipeline, desalination plant, brine discharge and outfall facilities, product water conveyance pipelines to the recycled WTP clearwell and three City of Watsonville potable wells (8-miles of 24-inch pipe), and storage facilities. The treated water would be used for agricultural irrigation during the irrigation season via an expanded CDS, and as potable water for the City of Watsonville during the winter months. This project's yield would be 7,500 AFY (6,500 AFY for coastal agriculture and 1,000 AFY for potable water for the City of Watsonville).

5.5.3.2 Reasons for Rejection

Of these projects, College Lake ASR in Winter, Dams at Bolsa and Strawberry Hills with Pajaro Diversion, College Lake to Recycled Water Treatment Plant in Summer, Partial College Lake to Recycled Water Treatment Plant in Summer, and College Lake with Pipeline to Adjacent Farmland were eliminated from further consideration in the BMP Update due to one or more of the following reasons: high capital costs, implementation timeline (i.e., 10 or more years to implement), environmental effects/regulatory uncertainty, and/or low yield. The BMP Update indicates that PV Water could potentially add the following projects to the BMP Update in the future if needed: Expanded College Lake, Pinto Lake, Corralitos Creek, Watsonville Slough, and Aquifer Storage and Recovery; Bolsa de San Cayetano Dam with Pajaro River Diversion; and/or Saltwater Desalination. These projects were evaluated as alternatives in the 2014 BMP Update

PEIR and rejected for one or more of the following reasons: having the same or greater environmental effects, being financial infeasible, and/or having greater difficulty achieving regulatory compliance.

These eight alternatives were revisited to see if any could result in conversion of no or fewer acres of Important Farmland compared to the Project. Among these alternatives, the following could do so: Bolsa de San Cayetano Dam with Pajaro River Diversion (S-5), Dams at Bolsa and Strawberry Hills with Pajaro Diversion (S-10), College Lake to Recycled Water Treatment Plant in Summer (S-12), and Partial College Lake to Recycled Water Treatment Plant in Summer (S-14). All of these projects would be considered infeasible based on being cost prohibitive or not being as cost effective as the selected alternatives. Moreover, S-5, S-10, and S-14 would not meet the following basic objectives: not preventing long-term groundwater overdraft because of low yield, not being cost effective and environmentally sound, not helping to achieve sustainable groundwater management by 2040, and not substantially contributing to the Pajaro Valley's water supply needs in a timely manner.

5.5.4 Multi-Objective and Early Drawdown Alternatives

5.5.4.1 Description

As described in Section 5.2, the *College Lake Multi-Objective Management Project Final Report* identified three basic alternatives (Multi-Objective Alternatives 1, 2 and 3) each with two different operating scenarios (A, involving extended inundation of College Lake and B, involving a drawdown of lake levels in June).[11] **Table 5-4** presents a basic description of each of these alternatives and the operating scenarios. Multi-Objective Alternative 3A was retained and updated (e.g., with updated modeling), and is presented as the Farmland Preservation-Lake Deepening Alternative described earlier in this chapter. Note that the flood protection improvements at College Lake described for these alternatives that were then being contemplated by the US Army Corps of Engineers are no longer being proposed.

5.5.4.2 Reasons for Rejection

The Multi-Objective Alternatives involving operating scenario B were rejected because they do not provide the essential water storage function of the Project. Multi-Objective Alternatives 1 and 2 were rejected because neither would reduce the potential for conversion of Important Farmland compared to Multi-Objective Alternative 3A.

[11] RCD-SCC, *College Lake Multi-Objective Management Project Final Report*, prepared by cbec, November 14, 2014.

TABLE 5-4
SUMMARY OF ALTERNATIVES CONSIDERED IN COLLEGE LAKE MULTI-OBJECTIVE MANAGEMENT PROJECT FINAL REPORT[a]

	Management Strategies
Local Agriculture	**Objectives.** Provide longest growing season achievable within the lake bed (July through October), including lake bottom. Essentially represents a continuation of existing conditions.
	Physical Configuration. Same as existing conditions: 60.1-foot NAVD88 elevation existing weir with seasonal installation of 2 feet of sand bags on weir crest to prevent reverse flow; 2 pumps.
	Operations. Similar to existing conditions: pump lake dry by May 1 to 10 to allow fields, including the lake bottom, time to dry before being worked May 30 to June 7.
Water Supply	**Objectives.** Store water in lake to deliver during periods of peak agricultural irrigation demand; provide minimum instream flows required for fish passage March 15 through May 31.
	Physical Configuration. New adjustable weir, screened inlet, pump station, water treatment, pipeline to recycled water facility, coastal distribution system.
	Operations. Store water during the wet season for treatment and distribution during peak agricultural demand (yield estimated at 2,100-2,400 AFY); provide bypass flows for fish passage from March 15 to May 31.
Flood Management	**Objectives.** Prevent local flooding in a 100-year event by enhancing flood attenuating characteristics of College Lake and improving conveyance of Salsipuedes Creek downstream. *Note: USACE flood management project as currently developed is described in Table 3.1-1 in Section 3.1 of this EIR.*
	Physical Configuration. Earthen levee between Orchard Park and realigned Pinto Creek; New passive weir (elevation of 55.9 feet NAVD88) near Orchard Park; Levees and channel improvements along sections of Corralitos and Salsipuedes Creeks
	Operations Project is passive (lake level not managed). Prevent local flooding by constricting maximum outflows from College Lake during 100-year flow. Improve conveyance of Salsipuedes Creek.
Wildlife	**Objectives**. **Steelhead**: maintain or enhance conditions for adult migration and juvenile passage. **Birds:** provide range of depths to support dabbling, diving ducks through migration season; provide conditions for emergent wetland habitat, waterfowl food plants, and waterfowl and other wetland species; use adaptive management to minimize adverse effects on waterfowl, shorebirds, and prey for select predatory species.
	Physical Configuration. Include fish passage structure if a new higher weir is implemented.
	Operations. **Steelhead.** Ensure bypass flows for adults (Salsipuedes Creek or Salsipuedes and Corralitos Creeks); provide sufficient flow for smolt passage. Drain lake completely annually to control predators. Provide gradual rate of drawdown when juveniles are present. **Birds**. Manage inundation and drawdown timing (i.e., maintaining higher lake levels and adopting a slower draw-down rate) to promote emergent wetland and waterfowl habitat. Implement adaptive management to help minimize degradation of wetland habitat.

Multi-Objective Alternatives						
		Objectives Identified in Report Met?				
Physical Configuration	Operation Scenarios	Alternative	Local Agriculture	Water Supply	Flood Mgt.	Wildlife
MOA-1: Physical Configuration. Includes all components of water supply and flood management strategies and fish passage structure.	**A** Extended inundation; meets minimum lake elevation and release criteria for fish passage; water supply extractions meet 100% of demand while remaining storage in lake can support this level of extraction.	**MOA-1A**	X	√	√	√-
		MOA-1B	√--	√-	√	√-
MOA-2: Physical Configuration. One compound weir structure that combines flood management and water supply weirs plus fish passage structure. Includes all other components of water supply and flood management strategies.		**MOA-2A**	X	√	√	√-
		MOA-2B	√--	√-	√	√-
MOA-3: Physical Configuration. As described for MOA-1 plus recontouring of lake bottom: 78.5-acre area lowered by ~2-3 feet with excavated material placed in southwestern portion of lake to raise elevation. Increases lake volume below 60 feet NAVD88 by 88 acre-feet.	**B** Early Drawdown: same as A but additional pumping ("Other Release") occurs in order to drain lake by end of June.	**MOA-3A**	√--	√	√	√--
		MOA-3B	√-	√-	√	√--

NOTES:
√ = objectives are met   √- or √-- = objectives are partially met or not all objectives are met   X = objectives are not met

[a] The report also identified three preliminary alternatives that helped provide a basis for the multi-objective alternatives. The preliminary alternatives included Local Agriculture, which involved a continuation of existing conditions; Water Supply (and wildlife), which coupled the water supply strategy with a fish passage structure to meet water supply and wildlife objectives; Flood Management (and local agriculture) which combined the flood management and Local Agriculture strategies; and Natural Condition, which involved removal of existing weir with no pumping or extraction.

SOURCE: Resource Conservation District of Santa Cruz County (RCD-SCC), *College Lake Multi-Objective Management Project Final Report*, prepared by cbec, November 14 2014.

This page intentionally left blank

5.5.5 Divided Lake Alternative

5.5.5.1 Description

Two commenters on the NOP suggested that the College Lake basin be divided into two management areas, with one side functioning as a wetland, and the other functioning as a reservoir. This division would occur along the natural topography within the lake, such that when water levels are low the different areas can be managed with different goals (i.e. survival of fish, wildlife habitat, and water storage). Dividing the drainage areas with small berms and canals would allow for draining or even flooding the areas separately. These berms may be lower than the high-water level, becoming submerged when the lake is full. Pumps would be strategically placed to move water between areas. A graphic showing the divided lake is included in Appendix NOP as part of the submittal from Frank “Ted” Remde.

5.5.5.2 Reasons for Rejection

This potential alternative is based on the assumption that a conflict would result between water management operations under the Project and habitat within the lake, with division of the lake being a solution to that conflict. Refer to Section 3.4, Biological Resources, for the Project’s effects on biological resources, including wetlands and other waters of the U.S. Figure 3.4-4a in Section 3.4 shows a map of existing habitat within the lake. The analyses presented in Section 3.4 (in particular, Impacts BR-3 and BR-4) indicate that operation of College Lake as proposed is not incompatible with continued wildlife habitat within and fish passage through the lake. Consequently, this alternative is not warranted by the findings of the impact evaluation in the EIR.

This alternative was also considered in *College Lake Multi-Objective Management Project Final Report*.[12] With the lake levels that would occur with the proposed weir, the berms compartmentalizing the lake would need to be greater than six feet, depending on the area of isolation. The berms would pose the risk of overtopping during large runoff events, which could allow fish to be carried into these areas and then isolated from the stream. Standing water in the “wet” compartments could significantly impact the ability to cost-effectively farm adjacent “dry” components due to increase surface and subsurface moisture. The *College Lake Multi-Objective Management Project Final Report* considered this alternative likely infeasible due to physical constraints (berm construction and management and increased subsurface moisture).

5.5.6 Water Treatment Plant Location Alternatives

5.5.6.1 Description

Two alternative locations for the WTP have been considered:

- The southwest lot of Our Lady Help of Christian’s Church’s land

[12] RCD-SCC, *College Lake Multi-Objective Management Project Final Report*, prepared by cbec, November 14, 2014.

- A floating treatment plant within College Lake.

5.5.6.2 Reasons for Rejection

PV Water considered the southwest lot of Our Lady Help of Christian's Church's land as a potential WTP site during initial planning. This site was eliminated from further consideration because it is too small to accommodate the proposed WTP and because there are known sensitive archaeological resources at that location that site development would directly impact. The WTP requires 5 acres and the design includes sedimentation basins, solids drying beds, buildings, equipment (filters), and water treatment chemical storage. Constructing a floating treatment plant was eliminated from further consideration as infeasible based on cost and overly complex design and construction issues.

5.5.7 Water Storage Alternatives

5.5.7.1 Description

Another alternative concept considered as part of the alternative screening process was the concept of pumping water from College Lake, treating it, and conveying the treated water to basins in the vicinity of the CDS for recharge and subsequent recovery (similar to how the existing Harkins Slough project is operated). This water management approach would allow for early drawdown of College Lake and (presumably) continued farming and migratory wildlife benefits within the lake basin. At Board meetings, it was also suggested that a dam be constructed on Harkins Slough to create a reservoir to store College Lake water.

A commenter on the NOP suggested that "in the event of the need for emergency supplemental water storage, consideration could be given to using rail tank cars which are idled due to low oil demand." It was suggested that the rail tank cars be decontaminated for the purpose of water storage as the average tank car holds approximately 30,000 gallons.

5.5.7.2 Reasons for Rejection

The use of remote recharge basins or Harkins Slough as a potential alternative was eliminated from further consideration due to greater impacts on Important Farmland, biological resources, and cost. Proposed operations include keeping the water surface elevation of the lake at or above about 59 feet NAVD88 through May 31 in order to provide sufficient flows for smolt outmigration. Pumping water from College Lake after required lake level and bypass flow requirements are met would not fully restore current farming practices nor completely prevent conversion of Important Farmland from water management operations. The recharge basins would need to be located in areas with favorable hydrogeologic characteristics in order for recharge and recovery of recharged water to be productive. Moreover, land in the vicinity of the CDS that could be used for recharge basins is mapped almost entirely as Important Farmland. Consequently, the use of remote recharge basins could actually increase the amount of Important Farmland converted to other uses.

An alternative involving storage of water in rail cars was eliminated from further consideration based on infeasibility. Storing water in rail tank cars could not feasibly provide sufficient water storage in a practical manner in lieu of the Project. With implementation of the Project, PV Water could store about 1,764 acre-feet of water (when the water surface elevation is at 62.5 feet NAVD88), which is equivalent to about 575 million gallons, and deliver that water to irrigators during the growing season. Assuming a typical rail tank car has storage capacity of about 30,000 gallons, this would equate to approximately 19,000 cars.

5.5.8 Pipeline Alignment Alternatives

5.5.8.1 Description

Carollo Engineers prepared the *College Lake to CDS Pipeline Routing Study* to select a preferred route for the College Lake pipeline.[13] Factors considered included pipeline length and cost, major pipeline constraints (including the California Department of Transportation's prohibition on open-trenching in SR 129 and SR 152, geohazards, waterways, and railroad tracks), and traffic disruption. Environmental factors (presence of cultural resources, hazardous materials and sensitive land uses) was also considered. Multiple routes through the City of Watsonville as well as use of Salsipuedes Creek for conveyance, were considered. PV Water consulted with the City of Watsonville Public Works Department and the Pajaro Valley Unified School District in identifying the proposed alignment reflected in the EIR.

A commenter on the NOP suggested that the College Lake pipeline follow Salsipuedes Creek and the Pajaro River as it brings water from the WTP to the Watsonville Wastewater Treatment Facility.

5.5.8.2 Reasons for Rejection

All but one alternative alignment (the optional pipeline route shown on Figure 2-1) for the College Lake pipeline was eliminated based on one or more of the following factors: length/cost, major pipeline constraints, environmental factors, and/or input from the City of Watsonville Public Works Department or Pajaro Valley Unified School District.

A potential alignment following Salsipuedes Creek and the Pajaro River was eliminated from further consideration based on several reasons. Construction of the pipeline along the Pajaro River would increase impacts on biological resources, specifically impacts on riparian habitat. This potential alternative would also conflict with the United States Army Corps of Engineers Pajaro River Flood Risk Management Study (described in Table 3.1-1 and shown on Figure 3.1-1), which consists of levee and channel improvements on the Pajaro River and Corralitos and Salsipuedes Creek. In addition, this alignment would be about one-half mile longer than the proposed College Lake pipeline, which would increase construction costs.

[13] Carollo Engineers, *College Lake to CDS Pipeline Routing Study, Final*, August 2017.

This page intentionally left blank

CHAPTER 6
Report Preparers

6.1 Lead Agency – Pajaro Valley Water Management Agency

Brian Lockwood – *General Manager*
Casey Meusel – *Associate Hydrologist*
Jesus “Chuy” Martinez – *Water System Operations Supervisor*
Shinehah Bigham – *Water System Operator*
Marcus Mendiola – *Water Conservation and Outreach Specialist*
Marino Hernandez – *Water Resources Technician*

6.2 Program Management and Project Design

Lou Carella – *Program Manager*
Elaine Simmons – *Assistant Program Manager*
Paul Friedlander – *Lead Engineer*
Richard Gutierrez – *Design Engineer*

6.3 CEQA Consultants

6.3.1 Environmental Science Associates

Jim O’Toole – *Project Director*
Jill Hamilton – *Project Manager*
Alena Maudru – *Deputy Project Manager; Energy, Utilities, Public Services, and Recreation*
Stan Armstrong – *Noise*
Rachel Brownsey – *Biological Resources*
Brandon Carroll – *Geology and Soils*
Candace Ehringer – *Cultural Resources, Tribal Cultural Resources*
Rachel Haines – *Biological Resources*
Jyothi Iyer – *Air Quality and Greenhouse Gases*
Karen Lancelle – *Surface Water, Groundwater, and Water Quality; Hazards and Hazardous Materials*
Wes McCullough – *Graphics*
Benjamin Rigby – *Project Coordinator, Land Use and Agricultural Resources*
Shadde Rosenblum – *Transportation and Traffic*
Liza Ryan – *Biological Resources*
Chris Sanchez – *Noise*
Jill Sunahara – *Permitting Lead; Biological Resources*
Ron Teitel – *Graphics*
Tina Will – *Aesthetic Resources*

6.3.1.1 cbec, inc. eco engineering

Chris Hammersmark, PhD, PE – *Director; Project Manager*
Luke Tillman – *Ecohydrologist*

6.3.1.2 Kittleson Environmental Consulting

Gary Kittleson – *Principal*

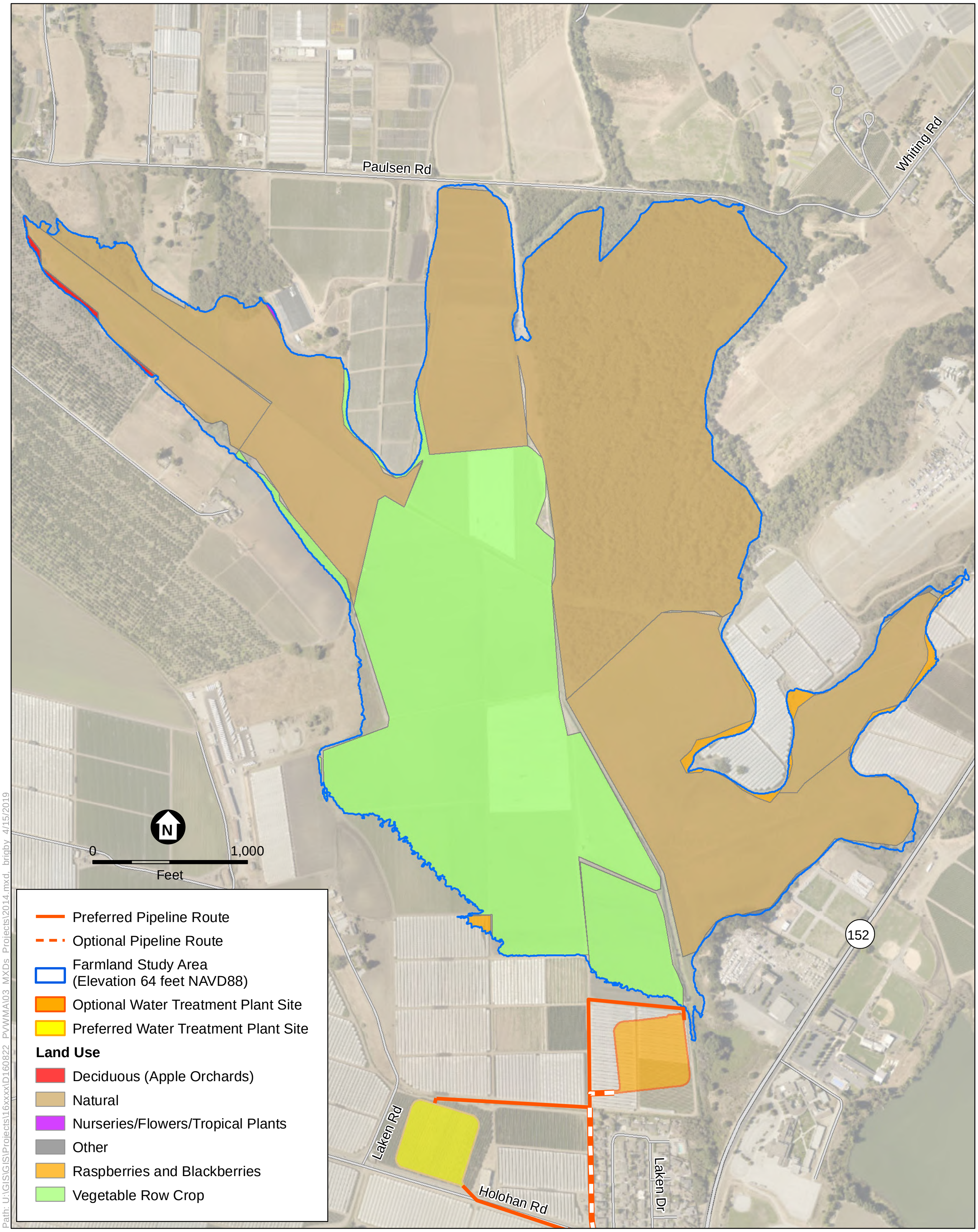
6.3.1.3 Mike Podlech

Mike Podlech – *Fisheries Biologist*

APPENDIX AG

Agricultural Land Use Maps

This appendix presents maps depicting land uses in the College Lake basin for years 2014 through 2018 below 64 feet NAVD88. Land use data is derived from annual surveys conducted by PV Water in June and July, review of Google Earth aerial photography, and annual surveys by Gary Kittleson.



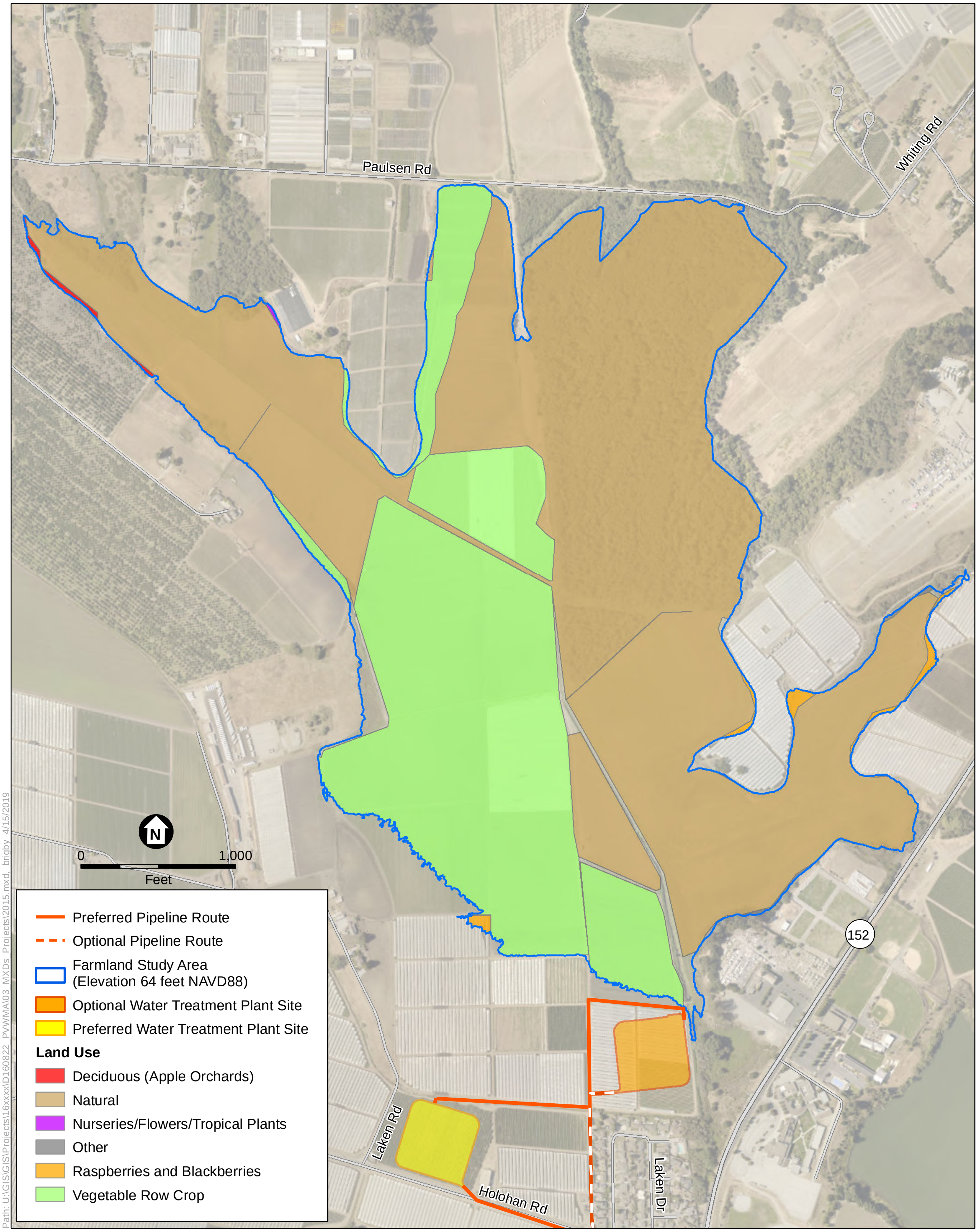
SOURCE: Carollo Engineers, 2017; ESRI World Imagery, 7/23/2016; ESA, 2018; G. Kittleson, 2018

Aerial Imagery Date: 2016

ESA

College Lake Integrated Resources Management Project

AG-1
Land Use Data
2014



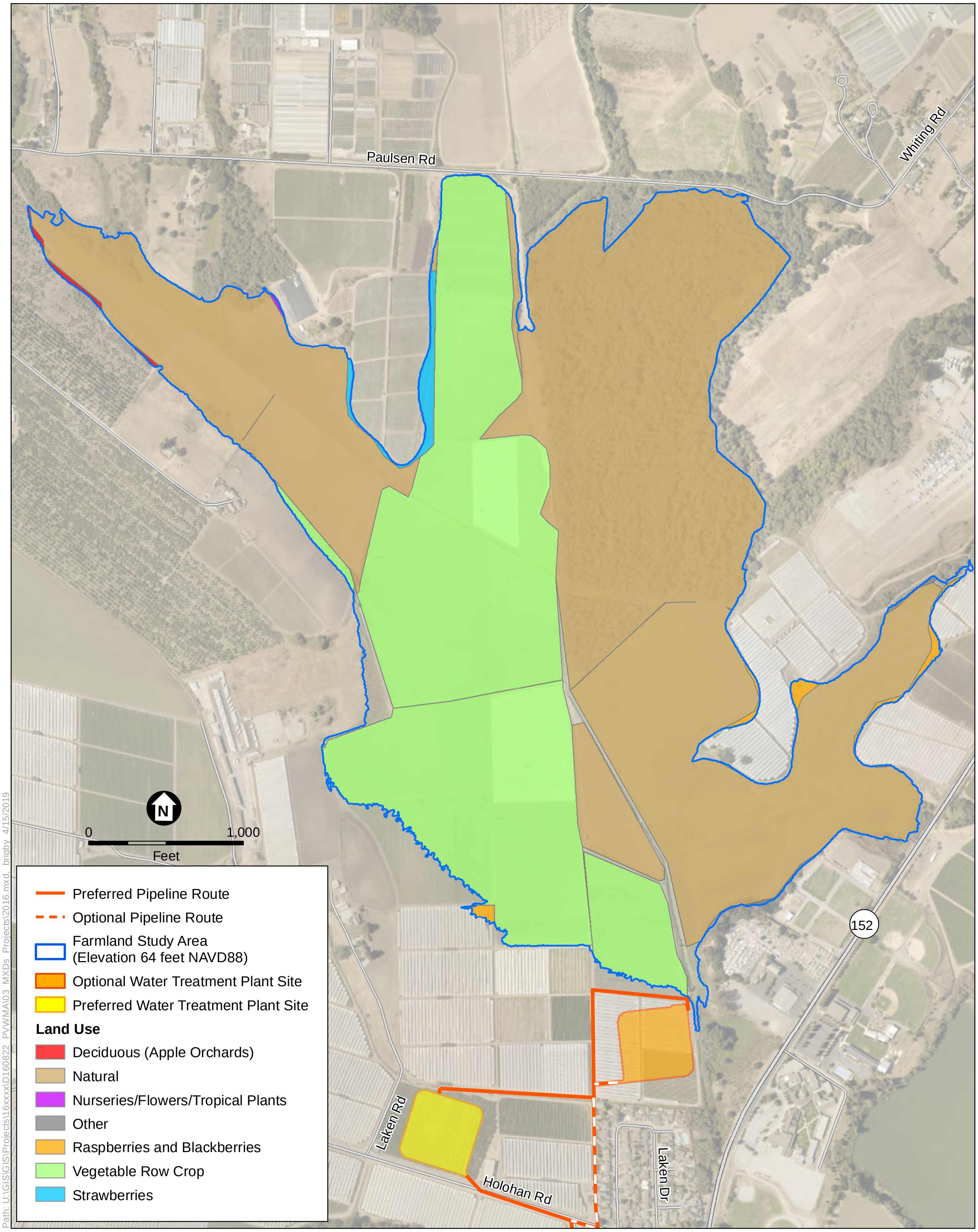
SOURCE: Carollo Engineers, 2017; ESRI World Imagery, 7/23/2016; ESA, 2018; G. Kittleson, 2018

Aerial Imagery Date: 2016

ESA

College Lake Integrated Resources Management Project

AG-2
Land Use Data
2015



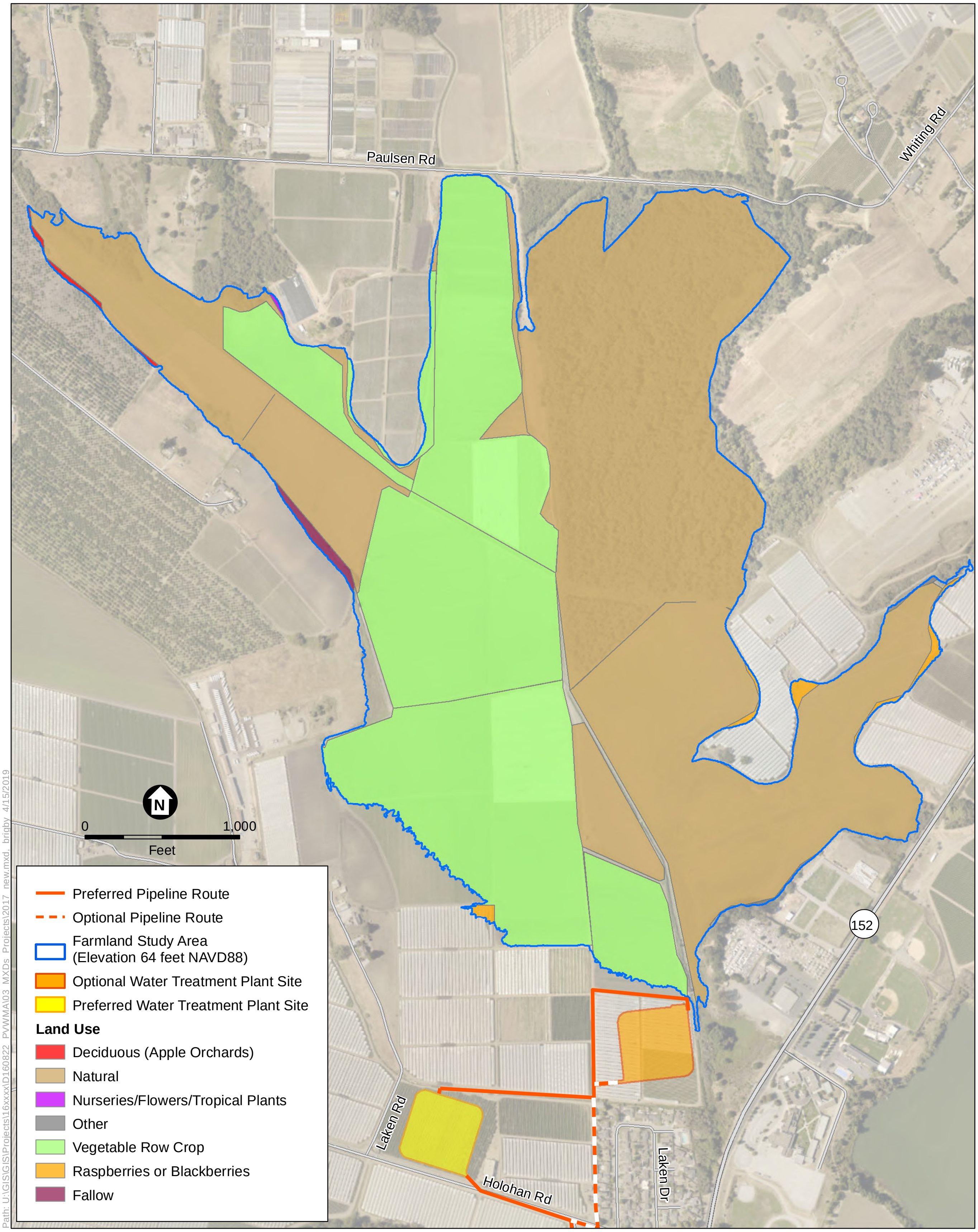
SOURCE: Carollo Engineers, 2017; ESRI World Imagery, 7/23/2016;
ESA, 2018; G. Kittleson, 2018

Aerial Imagery Date: 2016

ESA

College Lake Integrated Resources Management Project

AG-3
Land Use Data
2016



Path: U:\GIS\GIS\Projects\16xxxx\D160822_PVWMA\03_MXDs_Projects\2017_new.mxd, brigby 4/15/2019

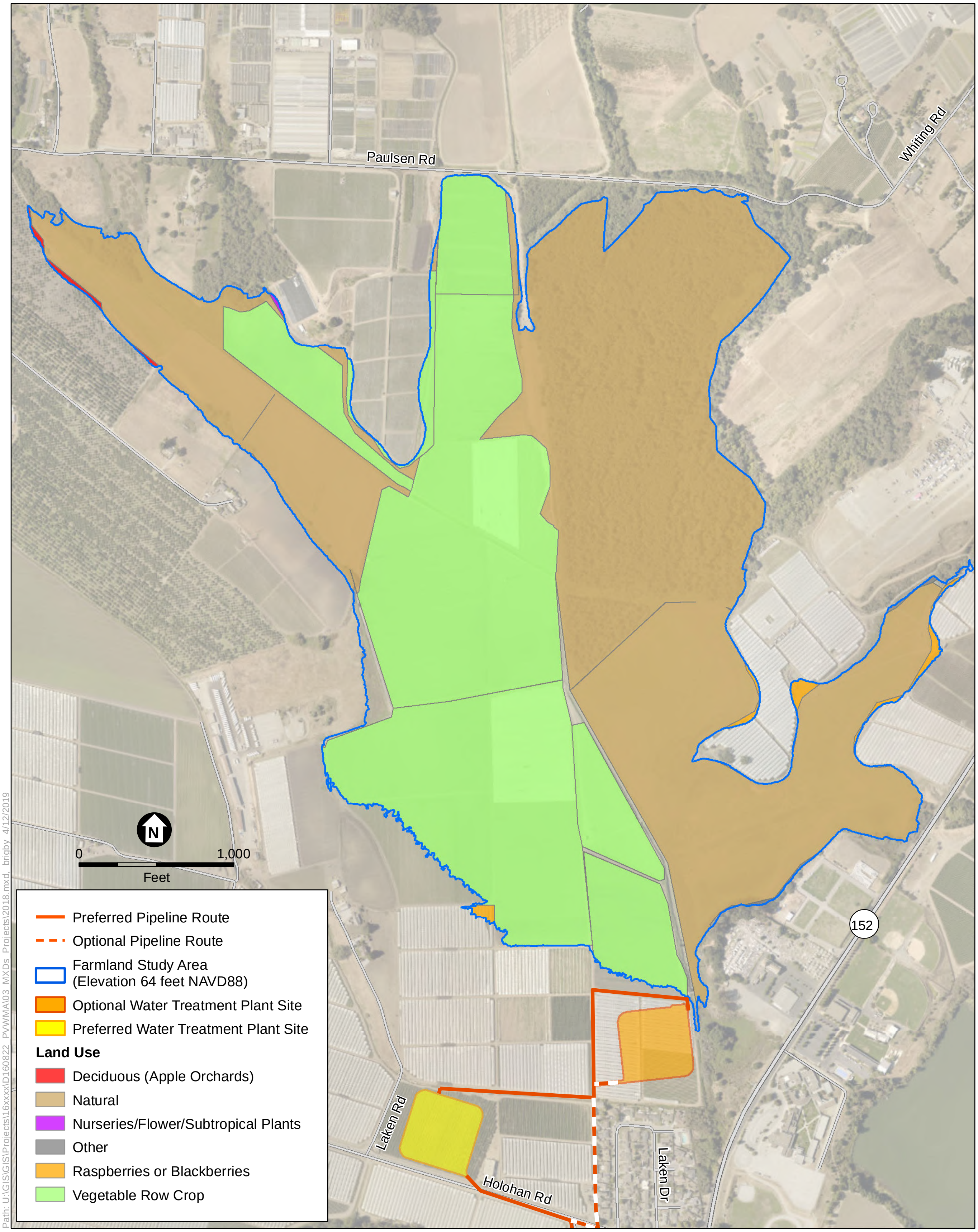
SOURCE: Carollo Engineers, 2017; ESRI World Imagery, 7/23/2016; ESA, 2018; G. Kittleson, 2018

Aerial Imagery Date: 2016

ESA

College Lake Integrated Resources Management Project

AG-4
Land Use Data
2017



SOURCE: Carollo Engineers, 2017; ESRI World Imagery, 7/23/2016; ESA, 2018; G. Kittleson, 2018

Aerial Imagery Date: 2016

ESA

College Lake Integrated Resources Management Project

AG-5
Land Use Data
2018

APPENDIX AIR

Air Quality Supporting Information

This appendix includes supporting information that was used for the analyses in Section 3.5, Air Quality and Greenhouse Gases.

Construction Vehicle Trips

	Worker	Vendor	Hauling
	trips/day	trips/day	total trips
Weir	36	6	1528
Treatment Plant	52	10.4	4520
Pipeline	22	4	2200

Construction schedule used based on Alena's email (5/7/18 2.46 pm email)

	From	To	# of workdays assuming 5 days of construction
Weir & Pump Station	10/1/2021	8/15/2022	227
Treatment Plant	4/1/2021	7/15/2022	337
Pipeline	6/1/2021	6/30/2022	283
Total	4/1/2021	8/15/2022	358

CalEEMod EMISSIONS

Average Daily emissions based on Annual Construction Emissions - Criteria Air Pollutants

	Tons over Construction Period								Average Daily Emissions (pounds/day)							
No. of Construction Days	ROG	NOx	Exhaust PM_{10}	Fugitive PM_{10}	Total PM_{10}	Exhaust $PM_{2.5}$	Fugitive $PM_{2.5}$	Total $PM_{2.5}$	ROG	NOx	Exhaust PM_{10}	Fugitive PM_{10}	Total PM_{10}	Exhaust $PM_{2.5}$	Fugitive $PM_{2.5}$	Total $PM_{2.5}$
358	1.91	18.45	0.79	1.11	1.89	0.76	0.49	1.24	10.7	103.1	4.4	6.2	10.6	4.2	2.7	6.9

Maximum Daily emissions based on Summer Construction Emissions - Criteria Air Pollutants

	Maximum Daily Emissions during Summer (pounds/day)							
Year	ROG	NOx	Exhaust PM_{10}	Fugitive PM_{10}	Total PM_{10}	Exhaust $PM_{2.5}$	Fugitive $PM_{2.5}$	Total $PM_{2.5}$
2021	10.61	102.81	4.50	2.72	7.22	4.34	0.72	5.06
2022	9.64	90.96	3.83	2.70	6.53	3.70	0.71	4.41

CONSTRUCTION EMISSIONS - GHG

Tons over Construction Period (CO_2e)	3044.2
Life of Project	25
Amortized Emissions (tons/year)	121.8

OPERATIONAL EMISSIONS

GHG Emissions Summary

Source	GHG Emissions as CO_2e (tons/year)
Backup Generator	16.3
Truck trips	4.4
Electricity	440.3
Annualized Construction	121.8
TOTAL	582.8

Indirect GHG Emissions from Electricity Generation

Source	Consumption	GHG Emission Factors (lb/MW-hr)[1]			GHG Emissions (tons/year)			
	MW-hr/year	CO_2	CH_4	N_2O	CO_2	CH_4	N_2O	CO_2e
Electricity Consumption	1662	527.9	0.033	0.004	438.7	0.03	0.00	440.3

GHG Emissions from Testing & Maintenance of Backup Generator

Source	hp	Max. Annual use (hours/year)[1]	GHG Emission Factors[2]					GHG Emissions (tons/year)			
			CO_2 (lb/hp-hr)	CH_4 (g/gal)	CH_4 (g/hp-hr)	N_2O (g/gal)	N_2O (g/hp-hr)	CO_2	CH_4	N_2O	CO_2e
Backup Generator	1340	50	0.48	0.58	0.01	0.26	0.01	16.18	0.0008	0.0004	16.3

Annual GHG Emissions from On-road Trips during Operation

Trips	Trips/month (round trips)	Trips/year[3] (round trips)	One way trips/year	One Way Trip length (miles)	Truck Trip miles per year	Emission Factors[4] (g/mile)			Total Emissions (tons/year)			
						CO_2	CH_4	N_2O	CO_2	CH_4	N_2O	CO_2e
Chemical Delivery trips	5	30	60	25	1500	1541.9038	0.0051	0.0048	2.46	0.000008	0.000007	2.46
Employee trips	40	240	480	12.5	6000	310.3598	0.0051	0.0048	1.90	0.000031	0.000029	1.90
Total GHG emissions from operational truck trips (tons/year)									4.35	0.00004	0.00004	4.36

NOTES:

1. GHG emissions factors for electricity generation in California from USEPA eGRID Summary Table 1. Available at https://www.epa.gov/sites/production/files/2018-02/documents/egrid2016_summarytables.pdf

2. CO_2 emission factor as calculated from OFFROAD2017 - ORION web database available at https://www.arb.ca.gov/orion/derived from EMFAC2014, CH_4 and N_2O emission factors for Other Large Utility Diesel equipment from Table 13.7, page 42 of the 2017 TCR Default Emission Factors available at http://www.theclimateregistry.org/wp-content/uploads/2017/05/2017-Climate-Registry-Default-Emission-Factors.pdf

3. Using an operational period of 6 months per year

4. CO_2 emission factor derived from EMFAC2014, CH_4 and N_2O emission factors from Table 13.4, page 36 of the 2017 TCR Default Emission Factors available at http://www.theclimateregistry.org/wp-content/uploads/2017/05/2017-Climate-Registry-Default-Emission-Factors.pdf

College Lake Project

Santa Cruz County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Light Industry	5.50	1000sqft	0.50	5,500.00	0
General Light Industry	0.40	1000sqft	0.50	400.00	0
General Light Industry	108.26	1000sqft	6.00	108,258.00	0
General Light Industry	0.00	1000sqft	0.00	0.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	1.8	**Precipitation Freq (Days)**	61
Climate Zone	5			**Operational Year**	2023
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Project data

Construction Phase - Data from applicant

Off-road Equipment - Project specific data

Off-road Equipment - Project data

Off-road Equipment - Data from applicant

Off-road Equipment - Data from applicant

Off-road Equipment - Data from applicant

Off-road Equipment - Data from applicant

Trips and VMT - Project data

Grading - Project data

Off-road Equipment - project data

Construction Off-road Equipment Mitigation - Tier 4

Table Name	Column Name	Default Value	New Value
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	5.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	14.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final

tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	230.00	337.00
tblConstructionPhase	NumDays	230.00	0.00
tblConstructionPhase	NumDays	20.00	227.00
tblConstructionPhase	NumDays	20.00	0.00
tblConstructionPhase	NumDays	20.00	0.00
tblGrading	AcresOfGrading	0.00	14.50
tblLandUse	LandUseSquareFeet	108,260.00	108,258.00
tblLandUse	LotAcreage	0.01	0.50
tblLandUse	LotAcreage	2.49	6.00
tblLandUse	LotAcreage	0.13	0.50
tblOffRoadEquipment	LoadFactor	0.46	0.46
tblOffRoadEquipment	OffRoadEquipmentType		Cranes
tblOffRoadEquipment	OffRoadEquipmentType		Other Construction Equipment
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentType		Plate Compactors
tblOffRoadEquipment	OffRoadEquipmentType		Sweepers/Scrubbers
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	UsageHours	6.00	0.00
tblOffRoadEquipment	UsageHours	7.00	4.00
tblOffRoadEquipment	UsageHours	7.00	0.00
tblOffRoadEquipment	UsageHours	8.00	6.00
tblOffRoadEquipment	UsageHours	8.00	4.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	8.00	6.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	7.00	4.00
tblOffRoadEquipment	UsageHours	7.00	0.00
tblOffRoadEquipment	UsageHours	8.00	4.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblTripsAndVMT	HaulingTripLength	20.00	25.00
tblTripsAndVMT	HaulingTripLength	20.00	25.00
tblTripsAndVMT	HaulingTripLength	20.00	25.00
tblTripsAndVMT	HaulingTripLength	20.00	25.00

tblTripsAndVMT	HaulingTripNumber	0.00	4,520.00
tblTripsAndVMT	HaulingTripNumber	0.00	2,200.00
tblTripsAndVMT	HaulingTripNumber	0.00	1,527.00
tblTripsAndVMT	VendorTripLength	7.30	25.00
tblTripsAndVMT	VendorTripLength	7.30	25.00
tblTripsAndVMT	VendorTripLength	7.30	25.00
tblTripsAndVMT	VendorTripLength	7.30	25.00
tblTripsAndVMT	VendorTripNumber	19.00	10.40
tblTripsAndVMT	VendorTripNumber	0.00	4.00
tblTripsAndVMT	VendorTripNumber	19.00	0.00
tblTripsAndVMT	VendorTripNumber	0.00	6.00
tblTripsAndVMT	WorkerTripLength	10.80	12.50
tblTripsAndVMT	WorkerTripLength	10.80	12.50
tblTripsAndVMT	WorkerTripLength	10.80	12.50
tblTripsAndVMT	WorkerTripLength	10.80	12.50
tblTripsAndVMT	WorkerTripLength	10.80	0.00
tblTripsAndVMT	WorkerTripLength	10.80	0.00
tblTripsAndVMT	WorkerTripNumber	48.00	52.00
tblTripsAndVMT	WorkerTripNumber	33.00	22.00
tblTripsAndVMT	WorkerTripNumber	48.00	0.00
tblTripsAndVMT	WorkerTripNumber	33.00	36.00
tblTripsAndVMT	WorkerTripNumber	10.00	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	10.6090	102.8051	100.1435	0.2303	2.7236	4.4986	7.2222	0.7163	4.3390	5.0553	0.0000	22,555.2430	22,555.2430	3.2898	0.0000	22,637.4886
2022	9.6396	90.9647	98.4742	0.2295	2.6982	3.8295	6.5277	0.7101	3.6987	4.4088	0.0000	22,469.3182	22,469.3182	3.2533	0.0000	22,550.6518
Maximum	**10.6090**	**102.8051**	**100.1435**	**0.2303**	**2.7236**	**4.4986**	**7.2222**	**0.7163**	**4.3390**	**5.0553**	**0.0000**	**22,555.2430**	**22,555.2430**	**3.2898**	**0.0000**	**22,637.4886**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	2.9115	26.1139	115.1309	0.2303	2.7236	0.3345	3.0580	0.7163	0.3309	1.0472	0.0000	22,555.2430	22,555.2430	3.2898	0.0000	22,637.4885
2022	2.8499	24.8116	114.5416	0.2295	2.6982	0.3259	3.0241	0.7101	0.3227	1.0328	0.0000	22,469.3182	22,469.3182	3.2533	0.0000	22,550.6517
Maximum	**2.9115**	**26.1139**	**115.1309**	**0.2303**	**2.7236**	**0.3345**	**3.0580**	**0.7163**	**0.3309**	**1.0472**	**0.0000**	**22,555.2430**	**22,555.2430**	**3.2898**	**0.0000**	**22,637.4885**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**71.55**	**73.72**	**-15.64**	**0.00**	**0.00**	**92.07**	**55.77**	**0.00**	**91.87**	**78.02**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Treatment Plant Construction	Building Construction	4/1/2021	7/15/2022	5	337	

2	Pipeline Construction	Trenching	6/1/2021	6/30/2022	5	283	
3	Weir & Pump Station Construction	Grading	10/1/2021	8/15/2022	5	227	
4	Weir Construction	Building Construction	10/1/2021	9/30/2021	5	0	
5	Paving	Paving	11/23/2022	11/22/2022	5	0	
6	Architectural Coating	Architectural Coating	12/21/2022	12/20/2022	5	0	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 171,237; Non-Residential Outdoor: 57,079; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Treatment Plant Construction	Air Compressors	4	1.00	78	0.48
Treatment Plant Construction	Cranes	1	4.00	231	0.29
Treatment Plant Construction	Excavators	2	6.00	158	0.38
Treatment Plant Construction	Forklifts	3	4.00	89	0.20
Treatment Plant Construction	Generator Sets	2	6.00	84	0.74
Treatment Plant Construction	Off-Highway Trucks	1	4.00	402	0.38
Treatment Plant Construction	Off-Highway Trucks	1	8.00	402	0.38
Treatment Plant Construction	Other Construction Equipment	2	4.00	172	0.42
Treatment Plant Construction	Pumps	8	6.00	84	0.74
Treatment Plant Construction	Skid Steer Loaders	1	6.00	65	0.37
Treatment Plant Construction	Tractors/Loaders/Backhoes	2	4.00	97	0.37
Treatment Plant Construction	Welders	0	0.00	46	0.45
Pipeline Construction	Air Compressors	1	1.00	78	0.48
Pipeline Construction	Excavators	1	6.00	158	0.38
Pipeline Construction	Forklifts	0	0.00	89	0.20
Pipeline Construction	Forklifts	1	2.00	89	0.20

Pipeline Construction	Generator Sets	1	6.00	84	0.74
Pipeline Construction	Off-Highway Trucks	1	2.00	402	0.38
Pipeline Construction	Off-Highway Trucks	1	8.00	402	0.38
Pipeline Construction	Other Construction Equipment	0	0.00	172	0.42
Pipeline Construction	Pumps	2	6.00	84	0.74
Pipeline Construction	Skid Steer Loaders	1	6.00	65	0.37
Pipeline Construction	Tractors/Loaders/Backhoes	1	4.00	97	0.37
Weir Construction	Air Compressors	0	0.00	78	0.48
Weir Construction	Cranes	0	0.00	231	0.29
Weir Construction	Excavators	0	0.00	158	0.38
Weir Construction	Forklifts	0	0.00	89	0.20
Weir Construction	Generator Sets	0	0.00	84	0.74
Weir Construction	Other Construction Equipment	0	0.00	172	0.42
Weir Construction	Pumps	0	0.00	84	0.74
Weir Construction	Tractors/Loaders/Backhoes	0	0.00	97	0.37
Weir Construction	Welders	0	0.00	46	0.45
Weir & Pump Station Construction	Air Compressors	1	1.00	78	0.48
Weir & Pump Station Construction	Excavators	2	6.00	158	0.38
Weir & Pump Station Construction	Forklifts	2	3.00	89	0.20
Weir & Pump Station Construction	Generator Sets	1	6.00	84	0.74
Weir & Pump Station Construction	Graders	0	0.00	187	0.41
Weir & Pump Station Construction	Pumps	4	6.00	84	0.74
Weir & Pump Station Construction	Rubber Tired Dozers	0	0.00	247	0.40
Weir & Pump Station Construction	Tractors/Loaders/Backhoes	1	4.00	97	0.37
Paving	Pavers	0	0.00	130	0.42
Paving	Paving Equipment	0	0.00	132	0.36
Paving	Rollers	0	0.00	80	0.38
Architectural Coating	Air Compressors	0	0.00	78	0.48
Weir & Pump Station Construction	Cranes	1	3.00	231	0.29

Weir & Pump Station Construction	Other Construction Equipment	1	4.00	172	0.42
Weir & Pump Station Construction	Off-Highway Trucks	0	0.00	402	0.38
Pipeline Construction	Plate Compactors	2	4.00	8	0.43
Pipeline Construction	Sweepers/Scrubbers	1	1.00	64	0.46

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Treatment Plant Construction	27	52.00	10.40	4,520.00	12.50	25.00	25.00	LD_Mix	HDT_Mix	HHDT
Pipeline Construction	13	22.00	4.00	2,200.00	12.50	25.00	25.00	LD_Mix	HDT_Mix	HHDT
Weir Construction	0	0.00	0.00	0.00	12.50	25.00	25.00	LD_Mix	HDT_Mix	HHDT
Weir & Pump Station Construction	13	36.00	6.00	1,527.00	12.50	25.00	25.00	LD_Mix	HDT_Mix	HHDT
Paving	0	0.00	0.00	0.00	0.00	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	0	0.00	0.00	0.00	0.00	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

3.2 Treatment Plant Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	5.2814	47.3751	49.5978	0.0949		2.4217	2.4217		2.3383	2.3383		9,079.4593	9,079.4593	1.6290		9,120.1845
Total	**5.2814**	**47.3751**	**49.5978**	**0.0949**		**2.4217**	**2.4217**		**2.3383**	**2.3383**		**9,079.4593**	**9,079.4593**	**1.6290**		**9,120.1845**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1210	4.9220	1.1199	0.0132	0.4478	0.0205	0.4683	0.1180	0.0196	0.1376		1,413.6055	1,413.6055	0.0540		1,414.9562
Vendor	0.0862	2.7069	0.6978	8.4900e-003	0.2394	0.0125	0.2519	0.0688	0.0119	0.0807		899.5514	899.5514	0.0246		900.1671
Worker	0.2394	0.1923	2.0421	4.9400e-003	0.4943	3.9800e-003	0.4983	0.1311	3.6800e-003	0.1348		492.0764	492.0764	0.0191		492.5538
Total	**0.4465**	**7.8212**	**3.8598**	**0.0266**	**1.1816**	**0.0369**	**1.2185**	**0.3179**	**0.0352**	**0.3531**		**2,805.2333**	**2,805.2333**	**0.0978**		**2,807.6770**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0672	5.3309	57.6876	0.0949		0.1398	0.1398		0.1398	0.1398	0.0000	9,079.4593	9,079.4593	1.6290		9,120.1845
Total	**1.0672**	**5.3309**	**57.6876**	**0.0949**		**0.1398**	**0.1398**		**0.1398**	**0.1398**	**0.0000**	**9,079.4593**	**9,079.4593**	**1.6290**		**9,120.1845**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1210	4.9220	1.1199	0.0132	0.4478	0.0205	0.4683	0.1180	0.0196	0.1376		1,413.6055	1,413.6055	0.0540		1,414.9562
Vendor	0.0862	2.7069	0.6978	8.4900e-003	0.2394	0.0125	0.2519	0.0688	0.0119	0.0807		899.5514	899.5514	0.0246		900.1671
Worker	0.2394	0.1923	2.0421	4.9400e-003	0.4943	3.9800e-003	0.4983	0.1311	3.6800e-003	0.1348		492.0764	492.0764	0.0191		492.5538
Total	**0.4465**	**7.8212**	**3.8598**	**0.0266**	**1.1816**	**0.0369**	**1.2185**	**0.3179**	**0.0352**	**0.3531**		**2,805.2333**	**2,805.2333**	**0.0978**		**2,807.6770**

3.2 Treatment Plant Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.7889	41.6920	49.0103	0.0949		2.0635	2.0635		1.9951	1.9951		9,080.2172	9,080.2172	1.6122		9,120.5210
Total	**4.7889**	**41.6920**	**49.0103**	**0.0949**		**2.0635**	**2.0635**		**1.9951**	**1.9951**		**9,080.2172**	**9,080.2172**	**1.6122**		**9,120.5210**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1136	4.5065	1.0658	0.0130	0.6022	0.0179	0.6201	0.1559	0.0171	0.1730		1,396.5211	1,396.5211	0.0536		1,397.8621
Vendor	0.0798	2.5053	0.6441	8.4100e-003	0.2395	0.0110	0.2504	0.0688	0.0105	0.0793		891.5409	891.5409	0.0240		892.1402
Worker	0.2233	0.1724	1.8666	4.7700e-003	0.4943	3.8400e-003	0.4982	0.1311	3.5500e-003	0.1347		475.0528	475.0528	0.0171		475.4800
Total	**0.4168**	**7.1842**	**3.5765**	**0.0262**	**1.3360**	**0.0327**	**1.3688**	**0.3558**	**0.0312**	**0.3870**		**2,763.1148**	**2,763.1148**	**0.0947**		**2,765.4824**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0672	5.3309	57.6876	0.0949		0.1398	0.1398		0.1398	0.1398	0.0000	9,080.2172	9,080.2172	1.6122		9,120.5210
Total	**1.0672**	**5.3309**	**57.6876**	**0.0949**		**0.1398**	**0.1398**		**0.1398**	**0.1398**	**0.0000**	**9,080.2172**	**9,080.2172**	**1.6122**		**9,120.5210**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1136	4.5065	1.0658	0.0130	0.6022	0.0179	0.6201	0.1559	0.0171	0.1730		1,396.5211	1,396.5211	0.0536		1,397.8621
Vendor	0.0798	2.5053	0.6441	8.4100e-003	0.2395	0.0110	0.2504	0.0688	0.0105	0.0793		891.5409	891.5409	0.0240		892.1402
Worker	0.2233	0.1724	1.8666	4.7700e-003	0.4943	3.8400e-003	0.4982	0.1311	3.5500e-003	0.1347		475.0528	475.0528	0.0171		475.4800
Total	**0.4168**	**7.1842**	**3.5765**	**0.0262**	**1.3360**	**0.0327**	**1.3688**	**0.3558**	**0.0312**	**0.3870**		**2,763.1148**	**2,763.1148**	**0.0947**		**2,765.4824**

3.3 Pipeline Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.0554	18.1397	18.5533	0.0400		0.8635	0.8635		0.8278	0.8278		3,824.5988	3,824.5988	0.8389		3,845.5706
Total	**2.0554**	**18.1397**	**18.5533**	**0.0400**		**0.8635**	**0.8635**		**0.8278**	**0.8278**		**3,824.5988**	**3,824.5988**	**0.8389**		**3,845.5706**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0701	2.8528	0.6491	7.6600e-003	0.2759	0.0119	0.2877	0.0724	0.0114	0.0837		819.3245	819.3245	0.0313		820.1074
Vendor	0.0331	1.0411	0.2684	3.2700e-003	0.0921	4.8000e-003	0.0969	0.0265	4.5900e-003	0.0310		345.9813	345.9813	9.4700e-003		346.2181
Worker	0.1013	0.0814	0.8640	2.0900e-003	0.2091	1.6800e-003	0.2108	0.0555	1.5600e-003	0.0570		208.1862	208.1862	8.0800e-003		208.3881
Total	**0.2046**	**3.9753**	**1.7814**	**0.0130**	**0.5771**	**0.0183**	**0.5954**	**0.1543**	**0.0175**	**0.1718**		**1,373.4920**	**1,373.4920**	**0.0489**		**1,374.7136**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.4723	2.8954	22.6562	0.0400		0.0599	0.0599		0.0599	0.0599	0.0000	3,824.5988	3,824.5988	0.8389		3,845.5706
Total	**0.4723**	**2.8954**	**22.6562**	**0.0400**		**0.0599**	**0.0599**		**0.0599**	**0.0599**	**0.0000**	**3,824.5988**	**3,824.5988**	**0.8389**		**3,845.5706**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0701	2.8528	0.6491	7.6600e-003	0.2759	0.0119	0.2877	0.0724	0.0114	0.0837		819.3245	819.3245	0.0313		820.1074
Vendor	0.0331	1.0411	0.2684	3.2700e-003	0.0921	4.8000e-003	0.0969	0.0265	4.5900e-003	0.0310		345.9813	345.9813	9.4700e-003		346.2181
Worker	0.1013	0.0814	0.8640	2.0900e-003	0.2091	1.6800e-003	0.2108	0.0555	1.5600e-003	0.0570		208.1862	208.1862	8.0800e-003		208.3881
Total	**0.2046**	**3.9753**	**1.7814**	**0.0130**	**0.5771**	**0.0183**	**0.5954**	**0.1543**	**0.0175**	**0.1718**		**1,373.4920**	**1,373.4920**	**0.0489**		**1,374.7136**

3.3 Pipeline Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.8488	15.5065	18.1924	0.0400		0.7173	0.7173		0.6893	0.6893		3,825.3566	3,825.3566	0.8340		3,846.2071
Total	**1.8488**	**15.5065**	**18.1924**	**0.0400**		**0.7173**	**0.7173**		**0.6893**	**0.6893**		**3,825.3566**	**3,825.3566**	**0.8340**		**3,846.2071**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0659	2.6120	0.6178	7.5600e-003	0.3217	0.0104	0.3320	0.0836	9.9200e-003	0.0936		809.4224	809.4224	0.0311		810.1996
Vendor	0.0307	0.9636	0.2477	3.2400e-003	0.0921	4.2200e-003	0.0963	0.0265	4.0400e-003	0.0305		342.9003	342.9003	9.2200e-003		343.1309
Worker	0.0945	0.0730	0.7897	2.0200e-003	0.2091	1.6300e-003	0.2108	0.0555	1.5000e-003	0.0570		200.9839	200.9839	7.2300e-003		201.1646
Total	**0.1911**	**3.6485**	**1.6552**	**0.0128**	**0.6229**	**0.0162**	**0.6391**	**0.1656**	**0.0155**	**0.1810**		**1,353.3066**	**1,353.3066**	**0.0475**		**1,354.4951**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.4723	2.8954	22.6562	0.0400		0.0599	0.0599		0.0599	0.0599	0.0000	3,825.3566	3,825.3566	0.8340		3,846.2071
Total	**0.4723**	**2.8954**	**22.6562**	**0.0400**		**0.0599**	**0.0599**		**0.0599**	**0.0599**	**0.0000**	**3,825.3566**	**3,825.3566**	**0.8340**		**3,846.2071**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0659	2.6120	0.6178	7.5600e-003	0.3217	0.0104	0.3320	0.0836	9.9200e-003	0.0936		809.4224	809.4224	0.0311		810.1996
Vendor	0.0307	0.9636	0.2477	3.2400e-003	0.0921	4.2200e-003	0.0963	0.0265	4.0400e-003	0.0305		342.9003	342.9003	9.2200e-003		343.1309
Worker	0.0945	0.0730	0.7897	2.0200e-003	0.2091	1.6300e-003	0.2108	0.0555	1.5000e-003	0.0570		200.9839	200.9839	7.2300e-003		201.1646
Total	**0.1911**	**3.6485**	**1.6552**	**0.0128**	**0.6229**	**0.0162**	**0.6391**	**0.1656**	**0.0155**	**0.1810**		**1,353.3066**	**1,353.3066**	**0.0475**		**1,354.4951**

3.4 Weir & Pump Station Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0677	0.0000	0.0677	7.3100e-003	0.0000	7.3100e-003			0.0000			0.0000
Off-Road	2.3450	21.3304	23.9732	0.0409		1.1380	1.1380		1.1009	1.1009		3,903.8413	3,903.8413	0.6208		3,919.3613
Total	**2.3450**	**21.3304**	**23.9732**	**0.0409**	**0.0677**	**1.1380**	**1.2057**	**7.3100e-003**	**1.1009**	**1.1082**		**3,903.8413**	**3,903.8413**	**0.6208**		**3,919.3613**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0607	2.4686	0.5617	6.6300e-003	0.4168	0.0103	0.4271	0.1064	9.8200e-003	0.1162		708.9782	708.9782	0.0271		709.6556
Vendor	0.0497	1.5617	0.4026	4.9000e-003	0.1381	7.1900e-003	0.1453	0.0397	6.8800e-003	0.0466		518.9720	518.9720	0.0142		519.3272
Worker	0.1657	0.1332	1.4138	3.4200e-003	0.3422	2.7600e-003	0.3450	0.0908	2.5500e-003	0.0933		340.6683	340.6683	0.0132		340.9988
Total	**0.2761**	**4.1634**	**2.3780**	**0.0150**	**0.8972**	**0.0202**	**0.9174**	**0.2368**	**0.0193**	**0.2561**		**1,568.6184**	**1,568.6184**	**0.0545**		**1,569.9815**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0677	0.0000	0.0677	7.3100e-003	0.0000	7.3100e-003			0.0000			0.0000
Off-Road	0.4449	1.9277	26.7678	0.0409		0.0593	0.0593		0.0593	0.0593	0.0000	3,903.8413	3,903.8413	0.6208		3,919.3613
Total	**0.4449**	**1.9277**	**26.7678**	**0.0409**	**0.0677**	**0.0593**	**0.1271**	**7.3100e-003**	**0.0593**	**0.0666**	**0.0000**	**3,903.8413**	**3,903.8413**	**0.6208**		**3,919.3613**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0607	2.4686	0.5617	6.6300e-003	0.4168	0.0103	0.4271	0.1064	9.8200e-003	0.1162		708.9782	708.9782	0.0271		709.6556
Vendor	0.0497	1.5617	0.4026	4.9000e-003	0.1381	7.1900e-003	0.1453	0.0397	6.8800e-003	0.0466		518.9720	518.9720	0.0142		519.3272
Worker	0.1657	0.1332	1.4138	3.4200e-003	0.3422	2.7600e-003	0.3450	0.0908	2.5500e-003	0.0933		340.6683	340.6683	0.0132		340.9988
Total	**0.2761**	**4.1634**	**2.3780**	**0.0150**	**0.8972**	**0.0202**	**0.9174**	**0.2368**	**0.0193**	**0.2561**		**1,568.6184**	**1,568.6184**	**0.0545**		**1,569.9815**

3.4 Weir & Pump Station Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0677	0.0000	0.0677	7.3100e-003	0.0000	7.3100e-003			0.0000			0.0000
Off-Road	2.1364	19.1085	23.8415	0.0409		0.9819	0.9819		0.9506	0.9506		3,903.6802	3,903.6802	0.6124		3,918.9891
Total	**2.1364**	**19.1085**	**23.8415**	**0.0409**	**0.0677**	**0.9819**	**1.0496**	**7.3100e-003**	**0.9506**	**0.9579**		**3,903.6802**	**3,903.6802**	**0.6124**		**3,918.9891**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0570	2.2602	0.5346	6.5400e-003	0.1912	8.9800e-003	0.2002	0.0510	8.5900e-003	0.0596		700.4097	700.4097	0.0269		701.0823
Vendor	0.0461	1.4454	0.3716	4.8500e-003	0.1382	6.3400e-003	0.1445	0.0397	6.0600e-003	0.0458		514.3505	514.3505	0.0138		514.6963

Worker	0.1546	0.1194	1.2922	3.3000e-003	0.3422	2.6600e-003	0.3449	0.0908	2.4500e-003	0.0932		328.8827	328.8827	0.0118		329.1785
Total	**0.2577**	**3.8249**	**2.1984**	**0.0147**	**0.6716**	**0.0180**	**0.6895**	**0.1814**	**0.0171**	**0.1985**		**1,543.6429**	**1,543.6429**	**0.0526**		**1,544.9570**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0677	0.0000	0.0677	7.3100e-003	0.0000	7.3100e-003			0.0000			0.0000
Off-Road	0.4449	1.9277	26.7678	0.0409		0.0593	0.0593		0.0593	0.0593	0.0000	3,903.6802	3,903.6802	0.6124		3,918.9891
Total	**0.4449**	**1.9277**	**26.7678**	**0.0409**	**0.0677**	**0.0593**	**0.1271**	**7.3100e-003**	**0.0593**	**0.0666**	**0.0000**	**3,903.6802**	**3,903.6802**	**0.6124**		**3,918.9891**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0570	2.2602	0.5346	6.5400e-003	0.1912	8.9800e-003	0.2002	0.0510	8.5900e-003	0.0596		700.4097	700.4097	0.0269		701.0823
Vendor	0.0461	1.4454	0.3716	4.8500e-003	0.1382	6.3400e-003	0.1445	0.0397	6.0600e-003	0.0458		514.3505	514.3505	0.0138		514.6963
Worker	0.1546	0.1194	1.2922	3.3000e-003	0.3422	2.6600e-003	0.3449	0.0908	2.4500e-003	0.0932		328.8827	328.8827	0.0118		329.1785
Total	**0.2577**	**3.8249**	**2.1984**	**0.0147**	**0.6716**	**0.0180**	**0.6895**	**0.1814**	**0.0171**	**0.1985**		**1,543.6429**	**1,543.6429**	**0.0526**		**1,544.9570**

OPERATIONAL EMISSIONS WERE NOT ESTIMATED USING CALEEMOD

College Lake Project

Santa Cruz County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Light Industry	5.50	1000sqft	0.50	5,500.00	0
General Light Industry	0.40	1000sqft	0.50	400.00	0
General Light Industry	108.26	1000sqft	6.00	108,258.00	0
General Light Industry	0.00	1000sqft	0.00	0.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	1.8	**Precipitation Freq (Days)**	61
Climate Zone	5			**Operational Year**	2023
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Project data

Construction Phase - Data from applicant

Off-road Equipment - Project specific data

Off-road Equipment - Project data

Off-road Equipment - Data from applicant

Off-road Equipment - Data from applicant

Off-road Equipment - Data from applicant

Off-road Equipment - Data from applicant

Trips and VMT - Project data

Grading - Project data

Off-road Equipment - project data

Construction Off-road Equipment Mitigation - Tier 4

Table Name	Column Name	Default Value	New Value
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	5.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	14.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final

tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	230.00	337.00
tblConstructionPhase	NumDays	230.00	0.00
tblConstructionPhase	NumDays	20.00	227.00
tblConstructionPhase	NumDays	20.00	0.00
tblConstructionPhase	NumDays	20.00	0.00
tblGrading	AcresOfGrading	0.00	14.50
tblLandUse	LandUseSquareFeet	108,260.00	108,258.00
tblLandUse	LotAcreage	0.01	0.50
tblLandUse	LotAcreage	2.49	6.00
tblLandUse	LotAcreage	0.13	0.50
tblOffRoadEquipment	LoadFactor	0.46	0.46
tblOffRoadEquipment	OffRoadEquipmentType		Cranes
tblOffRoadEquipment	OffRoadEquipmentType		Other Construction Equipment
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentType		Plate Compactors
tblOffRoadEquipment	OffRoadEquipmentType		Sweepers/Scrubbers
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	UsageHours	6.00	0.00
tblOffRoadEquipment	UsageHours	7.00	4.00
tblOffRoadEquipment	UsageHours	7.00	0.00
tblOffRoadEquipment	UsageHours	8.00	6.00
tblOffRoadEquipment	UsageHours	8.00	4.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	8.00	6.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	7.00	4.00
tblOffRoadEquipment	UsageHours	7.00	0.00
tblOffRoadEquipment	UsageHours	8.00	4.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblTripsAndVMT	HaulingTripLength	20.00	25.00
tblTripsAndVMT	HaulingTripLength	20.00	25.00
tblTripsAndVMT	HaulingTripLength	20.00	25.00
tblTripsAndVMT	HaulingTripLength	20.00	25.00

tblTripsAndVMT	HaulingTripNumber	0.00	4,520.00
tblTripsAndVMT	HaulingTripNumber	0.00	2,200.00
tblTripsAndVMT	HaulingTripNumber	0.00	1,527.00
tblTripsAndVMT	VendorTripLength	7.30	25.00
tblTripsAndVMT	VendorTripLength	7.30	25.00
tblTripsAndVMT	VendorTripLength	7.30	25.00
tblTripsAndVMT	VendorTripLength	7.30	25.00
tblTripsAndVMT	VendorTripNumber	19.00	10.40
tblTripsAndVMT	VendorTripNumber	0.00	4.00
tblTripsAndVMT	VendorTripNumber	19.00	0.00
tblTripsAndVMT	VendorTripNumber	0.00	6.00
tblTripsAndVMT	WorkerTripLength	10.80	12.50
tblTripsAndVMT	WorkerTripLength	10.80	12.50
tblTripsAndVMT	WorkerTripLength	10.80	12.50
tblTripsAndVMT	WorkerTripLength	10.80	12.50
tblTripsAndVMT	WorkerTripLength	10.80	0.00
tblTripsAndVMT	WorkerTripLength	10.80	0.00
tblTripsAndVMT	WorkerTripNumber	48.00	52.00
tblTripsAndVMT	WorkerTripNumber	33.00	22.00
tblTripsAndVMT	WorkerTripNumber	48.00	0.00
tblTripsAndVMT	WorkerTripNumber	33.00	36.00
tblTripsAndVMT	WorkerTripNumber	10.00	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.8257	8.0124	7.6942	0.0178	0.1915	0.3483	0.5398	0.0502	0.3359	0.3861	0.0000	1,584.4286	1,584.4286	0.2366	0.0000	1,590.3427
2022	0.6896	6.5294	7.0507	0.0163	0.1888	0.2746	0.4634	0.0494	0.2652	0.3146	0.0000	1,448.6291	1,448.6291	0.2086	0.0000	1,453.8433
Maximum	**0.8257**	**8.0124**	**7.6942**	**0.0178**	**0.1915**	**0.3483**	**0.5398**	**0.0502**	**0.3359**	**0.3861**	**0.0000**	**1,584.4286**	**1,584.4286**	**0.2366**	**0.0000**	**1,590.3427**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.2260	2.0569	8.8991	0.0178	0.1915	0.0261	0.2175	0.0502	0.0258	0.0760	0.0000	1,584.4272	1,584.4272	0.2366	0.0000	1,590.3412
2022	0.2042	1.7876	8.1816	0.0163	0.1888	0.0232	0.2121	0.0494	0.0230	0.0724	0.0000	1,448.6278	1,448.6278	0.2086	0.0000	1,453.8420
Maximum	**0.2260**	**2.0569**	**8.8991**	**0.0178**	**0.1915**	**0.0261**	**0.2175**	**0.0502**	**0.0258**	**0.0760**	**0.0000**	**1,584.4272**	**1,584.4272**	**0.2366**	**0.0000**	**1,590.3412**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**71.61**	**73.56**	**-15.84**	**0.00**	**0.00**	**92.08**	**57.18**	**0.00**	**91.88**	**78.82**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	**Start Date**	**End Date**	**Maximum Unmitigated ROG + NOX (tons/quarter)**	**Maximum Mitigated ROG + NOX (tons/quarter)**
1	**4-1-2021**	**6-30-2021**	2.2412	0.5575
2	**7-1-2021**	**9-30-2021**	2.8027	0.7299
3	**10-1-2021**	**12-31-2021**	3.7458	0.9730
4	**1-1-2022**	**3-31-2022**	3.2505	0.9059
5	**4-1-2022**	**6-30-2022**	3.2696	0.8990

6	7-1-2022	9-30-2022	0.7058	0.1810
		Highest	3.7458	0.9730

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Treatment Plant Construction	Building Construction	4/1/2021	7/15/2022	5	337	
2	Pipeline Construction	Trenching	6/1/2021	6/30/2022	5	283	
3	Weir & Pump Station Construction	Grading	10/1/2021	8/15/2022	5	227	
4	Weir Construction	Building Construction	10/1/2021	9/30/2021	5	0	
5	Paving	Paving	11/23/2022	11/22/2022	5	0	
6	Architectural Coating	Architectural Coating	12/21/2022	12/20/2022	5	0	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 171,237; Non-Residential Outdoor: 57,079; Striped Parking Area:

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Treatment Plant Construction	Air Compressors	4	1.00	78	0.48
Treatment Plant Construction	Cranes	1	4.00	231	0.29
Treatment Plant Construction	Excavators	2	6.00	158	0.38
Treatment Plant Construction	Forklifts	3	4.00	89	0.20
Treatment Plant Construction	Generator Sets	2	6.00	84	0.74
Treatment Plant Construction	Off-Highway Trucks	1	4.00	402	0.38
Treatment Plant Construction	Off-Highway Trucks	1	8.00	402	0.38

Treatment Plant Construction	Other Construction Equipment	2	4.00	172	0.42
Treatment Plant Construction	Pumps	8	6.00	84	0.74
Treatment Plant Construction	Skid Steer Loaders	1	6.00	65	0.37
Treatment Plant Construction	Tractors/Loaders/Backhoes	2	4.00	97	0.37
Treatment Plant Construction	Welders	0	0.00	46	0.45
Pipeline Construction	Air Compressors	1	1.00	78	0.48
Pipeline Construction	Excavators	1	6.00	158	0.38
Pipeline Construction	Forklifts	0	0.00	89	0.20
Pipeline Construction	Forklifts	1	2.00	89	0.20
Pipeline Construction	Generator Sets	1	6.00	84	0.74
Pipeline Construction	Off-Highway Trucks	1	2.00	402	0.38
Pipeline Construction	Off-Highway Trucks	1	8.00	402	0.38
Pipeline Construction	Other Construction Equipment	0	0.00	172	0.42
Pipeline Construction	Pumps	2	6.00	84	0.74
Pipeline Construction	Skid Steer Loaders	1	6.00	65	0.37
Pipeline Construction	Tractors/Loaders/Backhoes	1	4.00	97	0.37
Weir Construction	Air Compressors	0	0.00	78	0.48
Weir Construction	Cranes	0	0.00	231	0.29
Weir Construction	Excavators	0	0.00	158	0.38
Weir Construction	Forklifts	0	0.00	89	0.20
Weir Construction	Generator Sets	0	0.00	84	0.74
Weir Construction	Other Construction Equipment	0	0.00	172	0.42
Weir Construction	Pumps	0	0.00	84	0.74
Weir Construction	Tractors/Loaders/Backhoes	0	0.00	97	0.37
Weir Construction	Welders	0	0.00	46	0.45
Weir & Pump Station Construction	Air Compressors	1	1.00	78	0.48
Weir & Pump Station Construction	Excavators	2	6.00	158	0.38
Weir & Pump Station Construction	Forklifts	2	3.00	89	0.20
Weir & Pump Station Construction	Generator Sets	1	6.00	84	0.74

Weir & Pump Station Construction	Graders	0	0.00	187	0.41
Weir & Pump Station Construction	Pumps	4	6.00	84	0.74
Weir & Pump Station Construction	Rubber Tired Dozers	0	0.00	247	0.40
Weir & Pump Station Construction	Tractors/Loaders/Backhoes	1	4.00	97	0.37
Paving	Pavers	0	0.00	130	0.42
Paving	Paving Equipment	0	0.00	132	0.36
Paving	Rollers	0	0.00	80	0.38
Architectural Coating	Air Compressors	0	0.00	78	0.48
Weir & Pump Station Construction	Cranes	1	3.00	231	0.29
Weir & Pump Station Construction	Other Construction Equipment	1	4.00	172	0.42
Weir & Pump Station Construction	Off-Highway Trucks	0	0.00	402	0.38
Pipeline Construction	Plate Compactors	2	4.00	8	0.43
Pipeline Construction	Sweepers/Scrubbers	1	1.00	64	0.46

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Treatment Plant Construction	27	52.00	10.40	4,520.00	12.50	25.00	25.00	LD_Mix	HDT_Mix	HHDT
Pipeline Construction	13	22.00	4.00	2,200.00	12.50	25.00	25.00	LD_Mix	HDT_Mix	HHDT
Weir Construction	0	0.00	0.00	0.00	12.50	25.00	25.00	LD_Mix	HDT_Mix	HHDT
Weir & Pump Station Construction	13	36.00	6.00	1,527.00	12.50	25.00	25.00	LD_Mix	HDT_Mix	HHDT
Paving	0	0.00	0.00	0.00	0.00	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	0	0.00	0.00	0.00	0.00	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

3.2 Treatment Plant Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.5202	4.6665	4.8854	9.3500e-003		0.2385	0.2385		0.2303	0.2303	0.0000	811.3196	811.3196	0.1456	0.0000	814.9587
Total	**0.5202**	**4.6665**	**4.8854**	**9.3500e-003**		**0.2385**	**0.2385**		**0.2303**	**0.2303**	**0.0000**	**811.3196**	**811.3196**	**0.1456**	**0.0000**	**814.9587**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0120	0.4955	0.1120	1.3000e-003	0.0426	2.0300e-003	0.0446	0.0112	1.9500e-003	0.0132	0.0000	125.7343	125.7343	4.8900e-003	0.0000	125.8566
Vendor	8.6000e-003	0.2733	0.0701	8.3000e-004	0.0229	1.2400e-003	0.0241	6.6000e-003	1.1800e-003	7.7800e-003	0.0000	80.1456	80.1456	2.2300e-003	0.0000	80.2013
Worker	0.0240	0.0216	0.1938	4.6000e-004	0.0469	3.9000e-004	0.0473	0.0125	3.6000e-004	0.0128	0.0000	41.9254	41.9254	1.6400e-003	0.0000	41.9664
Total	**0.0446**	**0.7904**	**0.3758**	**2.5900e-003**	**0.1124**	**3.6600e-003**	**0.1160**	**0.0303**	**3.4900e-003**	**0.0338**	**0.0000**	**247.8053**	**247.8053**	**8.7600e-003**	**0.0000**	**248.0242**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1051	0.5251	5.6822	9.3500e-003		0.0138	0.0138		0.0138	0.0138	0.0000	811.3186	811.3186	0.1456	0.0000	814.9577
Total	**0.1051**	**0.5251**	**5.6822**	**9.3500e-003**		**0.0138**	**0.0138**		**0.0138**	**0.0138**	**0.0000**	**811.3186**	**811.3186**	**0.1456**	**0.0000**	**814.9577**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Hauling	0.0120	0.4955	0.1120	1.3000e-003	0.0426	2.0300e-003	0.0446	0.0112	1.9500e-003	0.0132	0.0000	125.7343	125.7343	4.8900e-003	0.0000	125.8566
Vendor	8.6000e-003	0.2733	0.0701	8.3000e-004	0.0229	1.2400e-003	0.0241	6.6000e-003	1.1800e-003	7.7800e-003	0.0000	80.1456	80.1456	2.2300e-003	0.0000	80.2013
Worker	0.0240	0.0216	0.1938	4.6000e-004	0.0469	3.9000e-004	0.0473	0.0125	3.6000e-004	0.0128	0.0000	41.9254	41.9254	1.6400e-003	0.0000	41.9664
Total	**0.0446**	**0.7904**	**0.3758**	**2.5900e-003**	**0.1124**	**3.6600e-003**	**0.1160**	**0.0303**	**3.4900e-003**	**0.0338**	**0.0000**	**247.8053**	**247.8053**	**8.7600e-003**	**0.0000**	**248.0242**

3.2 Treatment Plant Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.3352	2.9184	3.4307	6.6400e-003		0.1444	0.1444		0.1397	0.1397	0.0000	576.6204	576.6204	0.1024	0.0000	579.1798
Total	**0.3352**	**2.9184**	**3.4307**	**6.6400e-003**		**0.1444**	**0.1444**		**0.1397**	**0.1397**	**0.0000**	**576.6204**	**576.6204**	**0.1024**	**0.0000**	**579.1798**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	8.0300e-003	0.3222	0.0758	9.1000e-004	0.0406	1.2700e-003	0.0419	0.0105	1.2100e-003	0.0117	0.0000	88.2669	88.2669	3.4500e-003	0.0000	88.3531
Vendor	5.6600e-003	0.1796	0.0460	5.9000e-004	0.0163	7.7000e-004	0.0170	4.6900e-003	7.4000e-004	5.4300e-003	0.0000	56.4465	56.4465	1.5400e-003	0.0000	56.4850
Worker	0.0159	0.0138	0.1256	3.2000e-004	0.0334	2.7000e-004	0.0336	8.8700e-003	2.5000e-004	9.1200e-003	0.0000	28.7639	28.7639	1.0400e-003	0.0000	28.7899
Total	**0.0296**	**0.5155**	**0.2474**	**1.8200e-003**	**0.0902**	**2.3100e-003**	**0.0925**	**0.0241**	**2.2000e-003**	**0.0263**	**0.0000**	**173.4772**	**173.4772**	**6.0300e-003**	**0.0000**	**173.6280**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0747	0.3732	4.0381	6.6400e-003		9.7800e-003	9.7800e-003		9.7800e-003	9.7800e-003	0.0000	576.6197	576.6197	0.1024	0.0000	579.1791
Total	**0.0747**	**0.3732**	**4.0381**	**6.6400e-003**		**9.7800e-003**	**9.7800e-003**		**9.7800e-003**	**9.7800e-003**	**0.0000**	**576.6197**	**576.6197**	**0.1024**	**0.0000**	**579.1791**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	8.0300e-003	0.3222	0.0758	9.1000e-004	0.0406	1.2700e-003	0.0419	0.0105	1.2100e-003	0.0117	0.0000	88.2669	88.2669	3.4500e-003	0.0000	88.3531
Vendor	5.6600e-003	0.1796	0.0460	5.9000e-004	0.0163	7.7000e-004	0.0170	4.6900e-003	7.4000e-004	5.4300e-003	0.0000	56.4465	56.4465	1.5400e-003	0.0000	56.4850
Worker	0.0159	0.0138	0.1256	3.2000e-004	0.0334	2.7000e-004	0.0336	8.8700e-003	2.5000e-004	9.1200e-003	0.0000	28.7639	28.7639	1.0400e-003	0.0000	28.7899
Total	**0.0296**	**0.5155**	**0.2474**	**1.8200e-003**	**0.0902**	**2.3100e-003**	**0.0925**	**0.0241**	**2.2000e-003**	**0.0263**	**0.0000**	**173.4772**	**173.4772**	**6.0300e-003**	**0.0000**	**173.6280**

3.3 Pipeline Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1583	1.3968	1.4286	3.0800e-003		0.0665	0.0665		0.0637	0.0637	0.0000	267.1606	267.1606	0.0586	0.0000	268.6255
Total	**0.1583**	**1.3968**	**1.4286**	**3.0800e-003**		**0.0665**	**0.0665**		**0.0637**	**0.0637**	**0.0000**	**267.1606**	**267.1606**	**0.0586**	**0.0000**	**268.6255**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Hauling	5.4500e-003	0.2245	0.0508	5.9000e-004	0.0205	9.2000e-004	0.0214	5.3900e-003	8.8000e-004	6.2700e-003	0.0000	56.9687	56.9687	2.2200e-003	0.0000	57.0241
Vendor	2.5900e-003	0.0822	0.0211	2.5000e-004	6.8800e-003	3.7000e-004	7.2500e-003	1.9800e-003	3.6000e-004	2.3400e-003	0.0000	24.0969	24.0969	6.7000e-004	0.0000	24.1136
Worker	7.9400e-003	7.1500e-003	0.0641	1.5000e-004	0.0155	1.3000e-004	0.0157	4.1300e-003	1.2000e-004	4.2500e-003	0.0000	13.8660	13.8660	5.4000e-004	0.0000	13.8796
Total	**0.0160**	**0.3138**	**0.1359**	**9.9000e-004**	**0.0429**	**1.4200e-003**	**0.0443**	**0.0115**	**1.3600e-003**	**0.0129**	**0.0000**	**94.9315**	**94.9315**	**3.4300e-003**	**0.0000**	**95.0172**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0364	0.2230	1.7445	3.0800e-003		4.6100e-003	4.6100e-003		4.6100e-003	4.6100e-003	0.0000	267.1602	267.1602	0.0586	0.0000	268.6252
Total	**0.0364**	**0.2230**	**1.7445**	**3.0800e-003**		**4.6100e-003**	**4.6100e-003**		**4.6100e-003**	**4.6100e-003**	**0.0000**	**267.1602**	**267.1602**	**0.0586**	**0.0000**	**268.6252**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.4500e-003	0.2245	0.0508	5.9000e-004	0.0205	9.2000e-004	0.0214	5.3900e-003	8.8000e-004	6.2700e-003	0.0000	56.9687	56.9687	2.2200e-003	0.0000	57.0241
Vendor	2.5900e-003	0.0822	0.0211	2.5000e-004	6.8800e-003	3.7000e-004	7.2500e-003	1.9800e-003	3.6000e-004	2.3400e-003	0.0000	24.0969	24.0969	6.7000e-004	0.0000	24.1136
Worker	7.9400e-003	7.1500e-003	0.0641	1.5000e-004	0.0155	1.3000e-004	0.0157	4.1300e-003	1.2000e-004	4.2500e-003	0.0000	13.8660	13.8660	5.4000e-004	0.0000	13.8796
Total	**0.0160**	**0.3138**	**0.1359**	**9.9000e-004**	**0.0429**	**1.4200e-003**	**0.0443**	**0.0115**	**1.3600e-003**	**0.0129**	**0.0000**	**94.9315**	**94.9315**	**3.4300e-003**	**0.0000**	**95.0172**

3.3 Pipeline Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1193	1.0002	1.1734	2.5800e-003		0.0463	0.0463		0.0445	0.0445	0.0000	223.8347	223.8347	0.0488	0.0000	225.0547
Total	**0.1193**	**1.0002**	**1.1734**	**2.5800e-003**		**0.0463**	**0.0463**		**0.0445**	**0.0445**	**0.0000**	**223.8347**	**223.8347**	**0.0488**	**0.0000**	**225.0547**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	4.2900e-003	0.1721	0.0405	4.9000e-004	0.0200	6.8000e-004	0.0207	5.2100e-003	6.5000e-004	5.8500e-003	0.0000	47.1397	47.1397	1.8400e-003	0.0000	47.1858
Vendor	2.0100e-003	0.0637	0.0163	2.1000e-004	5.7600e-003	2.7000e-004	6.0400e-003	1.6600e-003	2.6000e-004	1.9300e-003	0.0000	20.0044	20.0044	5.5000e-004	0.0000	20.0180
Worker	6.2100e-003	5.3700e-003	0.0490	1.2000e-004	0.0130	1.0000e-004	0.0131	3.4600e-003	1.0000e-004	3.5500e-003	0.0000	11.2132	11.2132	4.1000e-004	0.0000	11.2233
Total	**0.0125**	**0.2411**	**0.1057**	**8.2000e-004**	**0.0388**	**1.0500e-003**	**0.0398**	**0.0103**	**1.0100e-003**	**0.0113**	**0.0000**	**78.3573**	**78.3573**	**2.8000e-003**	**0.0000**	**78.4271**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0305	0.1868	1.4613	2.5800e-003		3.8600e-003	3.8600e-003		3.8600e-003	3.8600e-003	0.0000	223.8344	223.8344	0.0488	0.0000	225.0545
Total	**0.0305**	**0.1868**	**1.4613**	**2.5800e-003**		**3.8600e-003**	**3.8600e-003**		**3.8600e-003**	**3.8600e-003**	**0.0000**	**223.8344**	**223.8344**	**0.0488**	**0.0000**	**225.0545**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Hauling	4.2900e-003	0.1721	0.0405	4.9000e-004	0.0200	6.8000e-004	0.0207	5.2100e-003	6.5000e-004	5.8500e-003	0.0000	47.1397	47.1397	1.8400e-003	0.0000	47.1858
Vendor	2.0100e-003	0.0637	0.0163	2.1000e-004	5.7600e-003	2.7000e-004	6.0400e-003	1.6600e-003	2.6000e-004	1.9300e-003	0.0000	20.0044	20.0044	5.5000e-004	0.0000	20.0180
Worker	6.2100e-003	5.3700e-003	0.0490	1.2000e-004	0.0130	1.0000e-004	0.0131	3.4600e-003	1.0000e-004	3.5500e-003	0.0000	11.2132	11.2132	4.1000e-004	0.0000	11.2233
Total	**0.0125**	**0.2411**	**0.1057**	**8.2000e-004**	**0.0388**	**1.0500e-003**	**0.0398**	**0.0103**	**1.0100e-003**	**0.0113**	**0.0000**	**78.3573**	**78.3573**	**2.8000e-003**	**0.0000**	**78.4271**

3.4 Weir & Pump Station Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					7.6900e-003	0.0000	7.6900e-003	8.3000e-004	0.0000	8.3000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0774	0.7039	0.7911	1.3500e-003		0.0376	0.0376		0.0363	0.0363	0.0000	116.8697	116.8697	0.0186	0.0000	117.3343
Total	**0.0774**	**0.7039**	**0.7911**	**1.3500e-003**	**7.6900e-003**	**0.0376**	**0.0452**	**8.3000e-004**	**0.0363**	**0.0372**	**0.0000**	**116.8697**	**116.8697**	**0.0186**	**0.0000**	**117.3343**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.0200e-003	0.0833	0.0188	2.2000e-004	0.0132	3.4000e-004	0.0136	3.3800e-003	3.3000e-004	3.7100e-003	0.0000	21.1269	21.1269	8.2000e-004	0.0000	21.1475
Vendor	1.6600e-003	0.0528	0.0135	1.6000e-004	4.4200e-003	2.4000e-004	4.6600e-003	1.2800e-003	2.3000e-004	1.5000e-003	0.0000	15.4909	15.4909	4.3000e-004	0.0000	15.5016
Worker	5.5700e-003	5.0100e-003	0.0450	1.1000e-004	0.0109	9.0000e-005	0.0110	2.8900e-003	8.0000e-005	2.9800e-003	0.0000	9.7242	9.7242	3.8000e-004	0.0000	9.7337
Total	**9.2500e-003**	**0.1411**	**0.0773**	**4.9000e-004**	**0.0285**	**6.7000e-004**	**0.0292**	**7.5500e-003**	**6.4000e-004**	**8.1900e-003**	**0.0000**	**46.3420**	**46.3420**	**1.6300e-003**	**0.0000**	**46.3828**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					7.6900e-003	0.0000	7.6900e-003	8.3000e-004	0.0000	8.3000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0147	0.0636	0.8833	1.3500e-003		1.9600e-003	1.9600e-003		1.9600e-003	1.9600e-003	0.0000	116.8695	116.8695	0.0186	0.0000	117.3342
Total	**0.0147**	**0.0636**	**0.8833**	**1.3500e-003**	**7.6900e-003**	**1.9600e-003**	**9.6500e-003**	**8.3000e-004**	**1.9600e-003**	**2.7900e-003**	**0.0000**	**116.8695**	**116.8695**	**0.0186**	**0.0000**	**117.3342**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.0200e-003	0.0833	0.0188	2.2000e-004	0.0132	3.4000e-004	0.0136	3.3800e-003	3.3000e-004	3.7100e-003	0.0000	21.1269	21.1269	8.2000e-004	0.0000	21.1475
Vendor	1.6600e-003	0.0528	0.0135	1.6000e-004	4.4200e-003	2.4000e-004	4.6600e-003	1.2800e-003	2.3000e-004	1.5000e-003	0.0000	15.4909	15.4909	4.3000e-004	0.0000	15.5016
Worker	5.5700e-003	5.0100e-003	0.0450	1.1000e-004	0.0109	9.0000e-005	0.0110	2.8900e-003	8.0000e-005	2.9800e-003	0.0000	9.7242	9.7242	3.8000e-004	0.0000	9.7337
Total	**9.2500e-003**	**0.1411**	**0.0773**	**4.9000e-004**	**0.0285**	**6.7000e-004**	**0.0292**	**7.5500e-003**	**6.4000e-004**	**8.1900e-003**	**0.0000**	**46.3420**	**46.3420**	**1.6300e-003**	**0.0000**	**46.3828**

3.4 Weir & Pump Station Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					7.6900e-003	0.0000	7.6900e-003	8.3000e-004	0.0000	8.3000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1720	1.5382	1.9192	3.2900e-003		0.0790	0.0790		0.0765	0.0765	0.0000	285.0794	285.0794	0.0447	0.0000	286.1974
Total	**0.1720**	**1.5382**	**1.9192**	**3.2900e-003**	**7.6900e-003**	**0.0790**	**0.0867**	**8.3000e-004**	**0.0765**	**0.0774**	**0.0000**	**285.0794**	**285.0794**	**0.0447**	**0.0000**	**286.1974**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	4.6300e-003	0.1858	0.0437	5.2000e-004	0.0149	7.3000e-004	0.0156	3.9700e-003	7.0000e-004	4.6700e-003	0.0000	50.9097	50.9097	1.9900e-003	0.0000	50.9594
Vendor	3.7600e-003	0.1192	0.0305	3.9000e-004	0.0108	5.1000e-004	0.0113	3.1100e-003	4.9000e-004	3.6000e-003	0.0000	37.4501	37.4501	1.0200e-003	0.0000	37.4756
Worker	0.0127	0.0110	0.1000	2.5000e-004	0.0266	2.1000e-004	0.0268	7.0600e-003	2.0000e-004	7.2600e-003	0.0000	22.9005	22.9005	8.3000e-004	0.0000	22.9212
Total	**0.0211**	**0.3159**	**0.1742**	**1.1600e-003**	**0.0522**	**1.4500e-003**	**0.0537**	**0.0141**	**1.3900e-003**	**0.0155**	**0.0000**	**111.2602**	**111.2602**	**3.8400e-003**	**0.0000**	**111.3562**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					7.6900e-003	0.0000	7.6900e-003	8.3000e-004	0.0000	8.3000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0358	0.1552	2.1548	3.2900e-003		4.7700e-003	4.7700e-003		4.7700e-003	4.7700e-003	0.0000	285.0791	285.0791	0.0447	0.0000	286.1971
Total	**0.0358**	**0.1552**	**2.1548**	**3.2900e-003**	**7.6900e-003**	**4.7700e-003**	**0.0125**	**8.3000e-004**	**4.7700e-003**	**5.6000e-003**	**0.0000**	**285.0791**	**285.0791**	**0.0447**	**0.0000**	**286.1971**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	4.6300e-003	0.1858	0.0437	5.2000e-004	0.0149	7.3000e-004	0.0156	3.9700e-003	7.0000e-004	4.6700e-003	0.0000	50.9097	50.9097	1.9900e-003	0.0000	50.9594
Vendor	3.7600e-003	0.1192	0.0305	3.9000e-004	0.0108	5.1000e-004	0.0113	3.1100e-003	4.9000e-004	3.6000e-003	0.0000	37.4501	37.4501	1.0200e-003	0.0000	37.4756

Worker	0.0127	0.0110	0.1000	2.5000e-004	0.0266	2.1000e-004	0.0268	7.0600e-003	2.0000e-004	7.2600e-003	0.0000	22.9005	22.9005	8.3000e-004	0.0000	22.9212
Total	**0.0211**	**0.3159**	**0.1742**	**1.1600e-003**	**0.0522**	**1.4500e-003**	**0.0537**	**0.0141**	**1.3900e-003**	**0.0155**	**0.0000**	**111.2602**	**111.2602**	**3.8400e-003**	**0.0000**	**111.3562**

OPERATIONAL EMISSIONS WERE NOT ESTIMATED USING CALEEMOD

OFFROAD2017 (v1.0.1) Emissions Inventory
Region Type: Air Basin
Region: North Central Coast
Calendar Year: 2021
Scenario: All Adopted Rules - Exhaust
Vehicle Classification: OFFROAD2017 Equipment Types
Units: Emissions: tons/day, Fuel Consumption: gallons/year, Activity: hours/year, HP-Hours: HP-hours/y

Region	CalYr	VehClass	MdlYr
North Central Coast	2021	ConstMin - Bore/Drill Rigs	Aggregated
North Central Coast	2021	ConstMin - Bore/Drill Rigs	Aggregated
North Central Coast	2021	ConstMin - Bore/Drill Rigs	Aggregated
North Central Coast	2021	ConstMin - Bore/Drill Rigs	Aggregated
North Central Coast	2021	ConstMin - Bore/Drill Rigs	Aggregated
North Central Coast	2021	ConstMin - Bore/Drill Rigs	Aggregated
North Central Coast	2021	ConstMin - Bore/Drill Rigs	Aggregated
North Central Coast	2021	ConstMin - Bore/Drill Rigs	Aggregated
North Central Coast	2021	ConstMin - Bore/Drill Rigs	Aggregated
North Central Coast	2021	ConstMin - Cranes	Aggregated
North Central Coast	2021	ConstMin - Cranes	Aggregated
North Central Coast	2021	ConstMin - Cranes	Aggregated
North Central Coast	2021	ConstMin - Cranes	Aggregated
North Central Coast	2021	ConstMin - Cranes	Aggregated
North Central Coast	2021	ConstMin - Cranes	Aggregated
North Central Coast	2021	ConstMin - Cranes	Aggregated
North Central Coast	2021	ConstMin - Cranes	Aggregated
North Central Coast	2021	ConstMin - Cranes	Aggregated
North Central Coast	2021	ConstMin - Crawler Tractors	Aggregated
North Central Coast	2021	ConstMin - Crawler Tractors	Aggregated
North Central Coast	2021	ConstMin - Crawler Tractors	Aggregated
North Central Coast	2021	ConstMin - Crawler Tractors	Aggregated
North Central Coast	2021	ConstMin - Crawler Tractors	Aggregated
North Central Coast	2021	ConstMin - Crawler Tractors	Aggregated
North Central Coast	2021	ConstMin - Crawler Tractors	Aggregated
North Central Coast	2021	ConstMin - Crawler Tractors	Aggregated
North Central Coast	2021	ConstMin - Crawler Tractors	Aggregated
North Central Coast	2021	ConstMin - Excavators	Aggregated
North Central Coast	2021	ConstMin - Excavators	Aggregated
North Central Coast	2021	ConstMin - Excavators	Aggregated
North Central Coast	2021	ConstMin - Excavators	Aggregated
North Central Coast	2021	ConstMin - Excavators	Aggregated
North Central Coast	2021	ConstMin - Excavators	Aggregated
North Central Coast	2021	ConstMin - Excavators	Aggregated
North Central Coast	2021	ConstMin - Excavators	Aggregated
North Central Coast	2021	ConstMin - Excavators	Aggregated
North Central Coast	2021	ConstMin - Graders	Aggregated
North Central Coast	2021	ConstMin - Graders	Aggregated

North Central Coast	2021	ConstMin - Graders	Aggregated
North Central Coast	2021	ConstMin - Graders	Aggregated
North Central Coast	2021	ConstMin - Graders	Aggregated
North Central Coast	2021	ConstMin - Graders	Aggregated
North Central Coast	2021	ConstMin - Graders	Aggregated
North Central Coast	2021	ConstMin - Graders	Aggregated
North Central Coast	2021	ConstMin - Off-Highway Tractors	Aggregated
North Central Coast	2021	ConstMin - Off-Highway Tractors	Aggregated
North Central Coast	2021	ConstMin - Off-Highway Tractors	Aggregated
North Central Coast	2021	ConstMin - Off-Highway Tractors	Aggregated
North Central Coast	2021	ConstMin - Off-Highway Tractors	Aggregated
North Central Coast	2021	ConstMin - Off-Highway Tractors	Aggregated
North Central Coast	2021	ConstMin - Off-Highway Tractors	Aggregated
North Central Coast	2021	ConstMin - Off-Highway Tractors	Aggregated
North Central Coast	2021	ConstMin - Off-Highway Tractors	Aggregated
North Central Coast	2021	ConstMin - Off-Highway Trucks	Aggregated
North Central Coast	2021	ConstMin - Off-Highway Trucks	Aggregated
North Central Coast	2021	ConstMin - Off-Highway Trucks	Aggregated
North Central Coast	2021	ConstMin - Off-Highway Trucks	Aggregated
North Central Coast	2021	ConstMin - Off-Highway Trucks	Aggregated
North Central Coast	2021	ConstMin - Off-Highway Trucks	Aggregated
North Central Coast	2021	ConstMin - Off-Highway Trucks	Aggregated
North Central Coast	2021	ConstMin - Off-Highway Trucks	Aggregated
North Central Coast	2021	ConstMin - Off-Highway Trucks	Aggregated
North Central Coast	2021	ConstMin - Other Construction Equipment	Aggregated
North Central Coast	2021	ConstMin - Other Construction Equipment	Aggregated
North Central Coast	2021	ConstMin - Other Construction Equipment	Aggregated
North Central Coast	2021	ConstMin - Other Construction Equipment	Aggregated
North Central Coast	2021	ConstMin - Other Construction Equipment	Aggregated
North Central Coast	2021	ConstMin - Other Construction Equipment	Aggregated
North Central Coast	2021	ConstMin - Other Construction Equipment	Aggregated
North Central Coast	2021	ConstMin - Other Construction Equipment	Aggregated
North Central Coast	2021	ConstMin - Other Construction Equipment	Aggregated
North Central Coast	2021	ConstMin - Pavers	Aggregated
North Central Coast	2021	ConstMin - Pavers	Aggregated
North Central Coast	2021	ConstMin - Pavers	Aggregated
North Central Coast	2021	ConstMin - Pavers	Aggregated
North Central Coast	2021	ConstMin - Pavers	Aggregated
North Central Coast	2021	ConstMin - Pavers	Aggregated
North Central Coast	2021	ConstMin - Pavers	Aggregated
North Central Coast	2021	ConstMin - Pavers	Aggregated
North Central Coast	2021	ConstMin - Paving Equipment	Aggregated
North Central Coast	2021	ConstMin - Paving Equipment	Aggregated
North Central Coast	2021	ConstMin - Paving Equipment	Aggregated
North Central Coast	2021	ConstMin - Paving Equipment	Aggregated
North Central Coast	2021	ConstMin - Paving Equipment	Aggregated
North Central Coast	2021	ConstMin - Paving Equipment	Aggregated

North Central Coast	2021	ConstMin - Paving Equipment	Aggregated
North Central Coast	2021	ConstMin - Paving Equipment	Aggregated
North Central Coast	2021	ConstMin - Paving Equipment	Aggregated
North Central Coast	2021	ConstMin - Rollers	Aggregated
North Central Coast	2021	ConstMin - Rollers	Aggregated
North Central Coast	2021	ConstMin - Rollers	Aggregated
North Central Coast	2021	ConstMin - Rollers	Aggregated
North Central Coast	2021	ConstMin - Rollers	Aggregated
North Central Coast	2021	ConstMin - Rollers	Aggregated
North Central Coast	2021	ConstMin - Rollers	Aggregated
North Central Coast	2021	ConstMin - Rough Terrain Forklifts	Aggregated
North Central Coast	2021	ConstMin - Rough Terrain Forklifts	Aggregated
North Central Coast	2021	ConstMin - Rough Terrain Forklifts	Aggregated
North Central Coast	2021	ConstMin - Rough Terrain Forklifts	Aggregated
North Central Coast	2021	ConstMin - Rough Terrain Forklifts	Aggregated
North Central Coast	2021	ConstMin - Rough Terrain Forklifts	Aggregated
North Central Coast	2021	ConstMin - Rough Terrain Forklifts	Aggregated
North Central Coast	2021	ConstMin - Rough Terrain Forklifts	Aggregated
North Central Coast	2021	ConstMin - Rubber Tired Dozers	Aggregated
North Central Coast	2021	ConstMin - Rubber Tired Dozers	Aggregated
North Central Coast	2021	ConstMin - Rubber Tired Dozers	Aggregated
North Central Coast	2021	ConstMin - Rubber Tired Dozers	Aggregated
North Central Coast	2021	ConstMin - Rubber Tired Dozers	Aggregated
North Central Coast	2021	ConstMin - Rubber Tired Dozers	Aggregated
North Central Coast	2021	ConstMin - Rubber Tired Dozers	Aggregated
North Central Coast	2021	ConstMin - Rubber Tired Dozers	Aggregated
North Central Coast	2021	ConstMin - Rubber Tired Loaders	Aggregated
North Central Coast	2021	ConstMin - Rubber Tired Loaders	Aggregated
North Central Coast	2021	ConstMin - Rubber Tired Loaders	Aggregated
North Central Coast	2021	ConstMin - Rubber Tired Loaders	Aggregated
North Central Coast	2021	ConstMin - Rubber Tired Loaders	Aggregated
North Central Coast	2021	ConstMin - Rubber Tired Loaders	Aggregated
North Central Coast	2021	ConstMin - Rubber Tired Loaders	Aggregated
North Central Coast	2021	ConstMin - Rubber Tired Loaders	Aggregated
North Central Coast	2021	ConstMin - Scrapers	Aggregated
North Central Coast	2021	ConstMin - Scrapers	Aggregated
North Central Coast	2021	ConstMin - Scrapers	Aggregated
North Central Coast	2021	ConstMin - Scrapers	Aggregated
North Central Coast	2021	ConstMin - Scrapers	Aggregated
North Central Coast	2021	ConstMin - Scrapers	Aggregated
North Central Coast	2021	ConstMin - Scrapers	Aggregated
North Central Coast	2021	ConstMin - Scrapers	Aggregated
North Central Coast	2021	ConstMin - Scrapers	Aggregated
North Central Coast	2021	ConstMin - Skid Steer Loaders	Aggregated
North Central Coast	2021	ConstMin - Skid Steer Loaders	Aggregated
North Central Coast	2021	ConstMin - Skid Steer Loaders	Aggregated
North Central Coast	2021	ConstMin - Skid Steer Loaders	Aggregated

North Central Coast	2021 ConstMin - Skid Steer Loaders	Aggregated
North Central Coast	2021 ConstMin - Skid Steer Loaders	Aggregated
North Central Coast	2021 ConstMin - Skid Steer Loaders	Aggregated
North Central Coast	2021 ConstMin - Skid Steer Loaders	Aggregated
North Central Coast	2021 ConstMin - Surfacing Equipment	Aggregated
North Central Coast	2021 ConstMin - Surfacing Equipment	Aggregated
North Central Coast	2021 ConstMin - Surfacing Equipment	Aggregated
North Central Coast	2021 ConstMin - Surfacing Equipment	Aggregated
North Central Coast	2021 ConstMin - Surfacing Equipment	Aggregated
North Central Coast	2021 ConstMin - Surfacing Equipment	Aggregated
North Central Coast	2021 ConstMin - Surfacing Equipment	Aggregated
North Central Coast	2021 ConstMin - Surfacing Equipment	Aggregated
North Central Coast	2021 ConstMin - Surfacing Equipment	Aggregated
North Central Coast	2021 ConstMin - Sweepers/Scrubbers	Aggregated
North Central Coast	2021 ConstMin - Sweepers/Scrubbers	Aggregated
North Central Coast	2021 ConstMin - Sweepers/Scrubbers	Aggregated
North Central Coast	2021 ConstMin - Sweepers/Scrubbers	Aggregated
North Central Coast	2021 ConstMin - Sweepers/Scrubbers	Aggregated
North Central Coast	2021 ConstMin - Sweepers/Scrubbers	Aggregated
North Central Coast	2021 ConstMin - Sweepers/Scrubbers	Aggregated
North Central Coast	2021 ConstMin - Sweepers/Scrubbers	Aggregated
North Central Coast	2021 ConstMin - Tractors/Loaders/Backhoes	Aggregated
North Central Coast	2021 ConstMin - Tractors/Loaders/Backhoes	Aggregated
North Central Coast	2021 ConstMin - Tractors/Loaders/Backhoes	Aggregated
North Central Coast	2021 ConstMin - Tractors/Loaders/Backhoes	Aggregated
North Central Coast	2021 ConstMin - Tractors/Loaders/Backhoes	Aggregated
North Central Coast	2021 ConstMin - Tractors/Loaders/Backhoes	Aggregated
North Central Coast	2021 ConstMin - Tractors/Loaders/Backhoes	Aggregated
North Central Coast	2021 ConstMin - Tractors/Loaders/Backhoes	Aggregated
North Central Coast	2021 ConstMin - Tractors/Loaders/Backhoes	Aggregated
North Central Coast	2021 ConstMin - Trenchers	Aggregated
North Central Coast	2021 ConstMin - Trenchers	Aggregated
North Central Coast	2021 ConstMin - Trenchers	Aggregated
North Central Coast	2021 ConstMin - Trenchers	Aggregated
North Central Coast	2021 ConstMin - Trenchers	Aggregated
North Central Coast	2021 ConstMin - Trenchers	Aggregated
North Central Coast	2021 ConstMin - Trenchers	Aggregated
North Central Coast	2021 ConstMin - Trenchers	Aggregated
North Central Coast	2021 ConstMin - Trenchers	Aggregated
North Central Coast	2021 OFF - ConstMin - Bore/Drill Rigs	Aggregated
North Central Coast	2021 OFF - ConstMin - Cement and Mortar Mixers	Aggregated
North Central Coast	2021 OFF - ConstMin - Concrete/Industrial Saws	Aggregated
North Central Coast	2021 OFF - ConstMin - Concrete/Industrial Saws	Aggregated
North Central Coast	2021 OFF - ConstMin - Dumpers/Tenders	Aggregated
North Central Coast	2021 OFF - ConstMin - Excavators	Aggregated
North Central Coast	2021 OFF - ConstMin - Other Construction Equipment	Aggregated
North Central Coast	2021 OFF - ConstMin - Pavers	Aggregated

North Central Coast	2021	OFF - ConstMin - Paving Equipment	Aggregated
North Central Coast	2021	OFF - ConstMin - Plate Compactors	Aggregated
North Central Coast	2021	OFF - ConstMin - Rollers	Aggregated
North Central Coast	2021	OFF - ConstMin - Rubber Tired Loaders	Aggregated
North Central Coast	2021	OFF - ConstMin - Signal Boards	Aggregated
North Central Coast	2021	OFF - ConstMin - Signal Boards	Aggregated
North Central Coast	2021	OFF - ConstMin - Skid Steer Loaders	Aggregated
North Central Coast	2021	OFF - ConstMin - Tractors/Loaders/Backhoes	Aggregated
North Central Coast	2021	OFF - ConstMin - Trenchers	Aggregated

ear

HP_Bin	Fuel	ROG_tpd	ROG_lb/hp-hr	CO_tpd	CO_lb/hp-hr	NOx_tpd	NOx_lb/hp-hr	CO2_tpd
25	Diesel	0	0	0	0	0	0	0
50	Diesel	2.94E-05	0.000785753	0.000188	0.005029591	0.000192	0.005124654	0.024787
75	Diesel	1.68E-05	0.000345182	0.000188	0.003865662	0.000233	0.00479801	0.028166
100	Diesel	4.7E-05	0.000215603	0.000794	0.003640998	0.000575	0.002637645	0.126422
175	Diesel	5.24E-05	0.000171892	0.000994	0.003258829	0.000542	0.001776895	0.178925
300	Diesel	6.6E-05	0.000150172	0.000522	0.001186242	0.000779	0.001771749	0.254871
600	Diesel	9.71E-05	0.000120755	0.000878	0.001091419	0.001	0.001243321	0.464938
750	Diesel	3.52E-05	0.000102112	0.00037	0.001075249	0.000326	0.000946602	0.202809
9999	Diesel	4.65E-05	0.000202454	0.000254	0.001105425	0.001022	0.004453924	0.133986
25	Diesel	9.17E-07	0.00072122	4.29E-06	0.003369233	3.84E-06	0.003021881	0.000474
50	Diesel	2.88E-05	0.001413508	0.000101	0.004955277	8.08E-05	0.003959514	0.007679
75	Diesel	7.69E-06	0.000832253	2.66E-05	0.002880394	5.81E-05	0.006281563	0.003119
100	Diesel	0.000218	0.000414901	0.001362	0.00259452	0.001925	0.003667411	0.175262
175	Diesel	0.000498	0.000315489	0.003517	0.002229457	0.005083	0.003221826	0.529491
300	Diesel	0.000624	0.000226349	0.003099	0.001124563	0.007394	0.002683284	0.923368
600	Diesel	0.000813	0.000170245	0.00652	0.001365548	0.009482	0.001985921	1.598039
750	Diesel	3.07E-05	0.000413836	0.000249	0.003345839	0.000325	0.004375395	0.024982
9999	Diesel	0.000129	0.000489797	0.001096	0.004164417	0.001468	0.005579242	0.088248
25	Diesel	0	0	0	0	0	0	0
50	Diesel	8.89E-05	0.001970332	0.000317	0.007015028	0.000242	0.005360165	0.024868
75	Diesel	1.13E-05	0.001855002	3.66E-05	0.006013474	8.94E-05	0.014690562	0.003054
100	Diesel	0.001373	0.000627057	0.008218	0.003752607	0.011554	0.005276121	1.095928
175	Diesel	0.000993	0.000413939	0.007529	0.003137164	0.010013	0.004172309	1.198325
300	Diesel	0.000935	0.000369389	0.004919	0.001944548	0.011462	0.004530678	1.262161
600	Diesel	0.002088	0.000238884	0.013621	0.001558537	0.024244	0.002774069	4.359564
750	Diesel	5.56E-05	0.000347342	0.000274	0.001712864	0.000877	0.005475889	0.079837
9999	Diesel	0.000184	0.000361684	0.000815	0.001604596	0.003035	0.005971805	0.253924
25	Diesel	2.04E-06	0.003344331	5.72E-06	0.009391503	3.88E-06	0.006379117	0.000301
50	Diesel	0.00095	0.000472096	0.007544	0.003749771	0.006628	0.003294506	0.994277
75	Diesel	2.61E-05	0.000160377	0.000462	0.002842911	0.000396	0.002438476	0.072102
100	Diesel	0.000644	0.000233774	0.008142	0.002954482	0.006571	0.002384452	1.219233
175	Diesel	0.001125	0.000183587	0.015952	0.002603021	0.010556	0.001722568	2.725023
300	Diesel	0.001101	0.000140327	0.007426	0.000946568	0.011677	0.001488501	3.489019
600	Diesel	0.001651	0.000119284	0.012571	0.000908295	0.015159	0.001095283	6.134183
750	Diesel	3.84E-05	0.000199415	0.00024	0.001245347	0.000474	0.00246191	0.086386
9999	Diesel	5.31E-05	0.000137686	0.000383	0.00099361	0.001072	0.002777016	0.171724
25	Diesel	6.45E-07	0.001783439	2.5E-06	0.006925848	1.98E-06	0.005470738	0.000191
50	Diesel	2.6E-05	0.002154708	8.85E-05	0.007326032	6.34E-05	0.005254132	0.006385

75	Diesel	1.03E-05	0.000512012	7.12E-05	0.003528785	8.54E-05	0.004232076	0.009564
100	Diesel	0.000276	0.000953	0.001215	0.004200722	0.002138	0.007392112	0.135906
175	Diesel	0.001562	0.00044684	0.011089	0.003172894	0.014966	0.004282039	1.667041
300	Diesel	0.002196	0.000297659	0.008939	0.001211421	0.026873	0.003641889	3.510355
600	Diesel	9.71E-05	0.000306901	0.000324	0.00102426	0.001273	0.004024742	0.151074
9999	Diesel	0.000114	0.000454195	0.000477	0.001904383	0.001559	0.006228305	0.119094
25	Diesel	6.91E-07	0.00389463	1.9E-06	0.010702148	1.31E-06	0.007369287	9.99E-05
50	Diesel	0.000635	0.000865366	0.003768	0.005134608	0.00316	0.004306023	0.412768
75	Diesel	0.000166	0.000300997	0.001921	0.003480925	0.001668	0.003022274	0.280203
100	Diesel	0.000221	0.000460903	0.001766	0.003685137	0.002035	0.00424659	0.243257
175	Diesel	0.000222	0.000250887	0.002736	0.003090336	0.002276	0.002570938	0.448812
300	Diesel	0.000152	0.000199373	0.000876	0.001151084	0.001625	0.002136145	0.384837
600	Diesel	0.000352	0.000141683	0.00253	0.001017896	0.003095	0.001245052	1.257064
750	Diesel	2.37E-05	0.000212903	0.000112	0.001005756	0.000182	0.001637396	0.055475
9999	Diesel	3.26E-05	0.000236965	0.000168	0.001223549	0.000475	0.003448994	0.069718
25	Diesel	6.55E-06	0.001840906	2.48E-05	0.006955052	1.61E-05	0.004527117	0.001758
50	Diesel	5.04E-05	0.000650687	0.000357	0.004611677	0.000294	0.003790157	0.038003
75	Diesel	7.24E-06	0.000268603	9.07E-05	0.003368454	5.25E-05	0.001949041	0.011957
100	Diesel	2.08E-05	0.000336044	0.000205	0.003310211	0.000184	0.002978585	0.027542
175	Diesel	0.000508	0.00023887	0.005984	0.002813212	0.004099	0.001927149	0.943922
300	Diesel	0.000919	0.000211012	0.005017	0.001152322	0.007791	0.001789443	1.925508
600	Diesel	0.003527	0.000189759	0.021107	0.001135437	0.030878	0.001661064	8.258261
750	Diesel	0.001515	0.000243112	0.009892	0.001587156	0.013569	0.002177092	2.764116
9999	Diesel	0.00225	0.000202768	0.012191	0.001098473	0.036094	0.003252245	4.939799
25	Diesel	0	0	0	0	0	0	0
50	Diesel	0.00038	0.000922472	0.001999	0.004849795	0.001846	0.004479583	0.22236
75	Diesel	4.46E-05	0.00091807	0.000205	0.00421429	0.000377	0.007769261	0.023222
100	Diesel	0.000591	0.000422925	0.004688	0.003354927	0.005504	0.003938995	0.675064
175	Diesel	0.000239	0.0003036	0.002303	0.002920488	0.002495	0.003163186	0.379903
300	Diesel	0.000265	0.000256287	0.001452	0.001404067	0.003247	0.003139668	0.502174
600	Diesel	0.000739	0.000185591	0.005474	0.001375266	0.008461	0.00212576	1.919807
750	Diesel	0.000142	0.000183152	0.000791	0.001017702	0.001701	0.002187886	0.374816
9999	Diesel	3.76E-05	0.000148296	0.000232	0.00091734	0.000777	0.003067396	0.122353
25	Diesel	0	0	0	0	0	0	0
50	Diesel	5.59E-05	0.001100522	0.000245	0.004831738	0.000213	0.004193971	0.027257
75	Diesel	9.5E-05	0.000951746	0.000377	0.003778976	0.000703	0.007041323	0.048027
100	Diesel	0.000111	0.000250248	0.001398	0.00313812	0.001285	0.002885537	0.214377
175	Diesel	0.000178	0.000238985	0.002063	0.002769928	0.001864	0.002503518	0.360483
300	Diesel	8.95E-05	0.000153269	0.000545	0.000933226	0.001313	0.002247189	0.281891
600	Diesel	1.47E-05	0.000140792	9.52E-05	0.00091339	0.000181	0.001733803	0.050453
750	Diesel	2.41E-06	0.000110493	1.95E-05	0.000891991	2.37E-05	0.001087434	0.01055
25	Diesel	0	0	0	0	0	0	0
50	Diesel	3.42E-05	0.000460774	0.000246	0.0033079	0.000226	0.003049864	0.033944
75	Diesel	6.61E-06	0.00049872	4.19E-05	0.003160281	5.79E-05	0.004365577	0.005472
100	Diesel	9.09E-05	0.000262563	0.00095	0.002745349	0.000891	0.002572425	0.143151
175	Diesel	6.91E-05	0.000189025	0.000879	0.002404682	0.000695	0.00190133	0.150841
300	Diesel	4.2E-05	0.000159617	0.000237	0.000902026	0.000515	0.001957706	0.108968

600	Diesel	4.26E-05	0.000170017	0.000227	0.000905926	0.000545	0.002172825	0.103768
750	Diesel	4.85E-06	9.14728E-05	4.03E-05	0.000759404	4.82E-05	0.000908482	0.02195
9999	Diesel	1.8E-06	7.45914E-05	1.85E-05	0.000765978	4.39E-05	0.001823049	0.009967
25	Diesel	5.86E-07	0.003245985	1.62E-06	0.008946155	1.14E-06	0.006296395	8.76E-05
50	Diesel	0.000806	0.000699452	0.004374	0.003795298	0.00414	0.003592663	0.559687
75	Diesel	1.64E-05	0.00153538	5.41E-05	0.005063393	0.000133	0.012412285	0.004674
100	Diesel	0.000567	0.000284619	0.005734	0.002878893	0.00579	0.002907203	0.870156
175	Diesel	0.000331	0.000159366	0.005013	0.002416966	0.003627	0.001748868	0.904621
300	Diesel	6.53E-05	0.000190574	0.000438	0.001278655	0.000807	0.00235294	0.149799
600	Diesel	2.56E-05	0.000127777	0.00023	0.001148292	0.000308	0.001540164	0.087872
25	Diesel	5.34E-08	0.000183671	9.46E-07	0.003254691	1.26E-06	0.004324344	0.000151
50	Diesel	4.69E-05	0.000860808	0.000225	0.004126359	0.000213	0.003902523	0.02836
75	Diesel	2.58E-06	0.001555855	8.68E-06	0.00522572	2.14E-05	0.012856465	0.000777
100	Diesel	0.000589	0.00012462	0.013485	0.002852702	0.008748	0.001850539	2.213321
175	Diesel	0.00027	0.00025076	0.002894	0.002683973	0.002442	0.002264576	0.504568
300	Diesel	7.7E-06	0.000100218	6.69E-05	0.000870453	0.000106	0.001384185	0.035962
600	Diesel	2.42E-06	8.42009E-05	2.42E-05	0.000843707	3.6E-05	0.001251839	0.013344
750	Diesel	4.61E-07	9.35776E-05	4.23E-06	0.000859599	5.82E-06	0.001182493	0.002301
25	Diesel	0	0	0	0	0	0	0
50	Diesel	4.74E-05	0.001008774	0.000244	0.005196829	0.000182	0.003866362	0.02406
75	Diesel	5.28E-05	0.001263092	0.000199	0.004759868	0.000383	0.009151161	0.019429
100	Diesel	0.000147	0.000727462	0.000756	0.003750095	0.001142	0.005661084	0.093623
175	Diesel	0.000134	0.000596757	0.000758	0.003364043	0.001313	0.005827985	0.103603
300	Diesel	0.000142	0.000573398	0.000755	0.003055227	0.001509	0.006104687	0.113778
600	Diesel	0.001153	0.000422838	0.009129	0.003349115	0.012159	0.004460657	1.261563
750	Diesel	1.67E-05	0.000213759	7.34E-05	0.000940574	0.000246	0.003149535	0.035894
25	Diesel	0	0	0	0	0	0	0
50	Diesel	0.000176	0.001061365	0.000855	0.005163652	0.000659	0.003983066	0.077792
100	Diesel	0.001807	0.000397384	0.014125	0.00310714	0.015293	0.003364058	1.893839
175	Diesel	0.002952	0.000276158	0.028598	0.002675292	0.026601	0.00248841	4.49295
300	Diesel	0.003236	0.000215913	0.015526	0.001035816	0.036267	0.002419473	6.292692
600	Diesel	0.004391	0.000212456	0.024185	0.001170262	0.043346	0.00209739	8.654315
750	Diesel	0.000342	0.000189312	0.002388	0.001323113	0.003342	0.001851389	0.757108
9999	Diesel	0.000303	0.000219268	0.001287	0.000932774	0.005224	0.003784564	0.581026
25	Diesel	0	0	0	0	0	0	0
50	Diesel	6.22E-06	0.003172369	1.82E-05	0.009303788	1.3E-05	0.006655499	0.001197
75	Diesel	3.3E-05	0.001300091	0.000127	0.005012268	0.000236	0.009293995	0.014351
100	Diesel	6.56E-05	0.000584256	0.000473	0.004212464	0.000688	0.006129946	0.063211
175	Diesel	0.000688	0.000457616	0.005489	0.003650502	0.00688	0.004575888	0.848083
300	Diesel	0.000749	0.000418465	0.003638	0.00203141	0.00838	0.004678672	1.001993
600	Diesel	0.006506	0.000295198	0.046832	0.002124876	0.074379	0.003374781	12.38906
750	Diesel	0.000258	0.000734769	0.002424	0.006915076	0.00353	0.010070105	0.19776
9999	Diesel	0.000333	0.000652087	0.003405	0.00666728	0.004349	0.008517249	0.286684
25	Diesel	0	0	0	0	0	0	0
50	Diesel	0.000293	0.000331491	0.002678	0.003025839	0.002565	0.002897283	0.423476
75	Diesel	0.000743	0.000144181	0.013706	0.002659766	0.009849	0.001911321	2.209882
100	Diesel	1.47E-05	0.00016556	0.000244	0.00274342	0.000223	0.002502385	0.037634

175	Diesel	4.52E-06	0.000127156	8.23E-05	0.002317631	4.83E-05	0.0013597	0.01519
300	Diesel	2.68E-06	8.13553E-05	2.61E-05	0.000792126	3.3E-05	0.001002012	0.014112
600	Diesel	1.21E-06	0.000127285	7.64E-06	0.000803761	1.6E-05	0.001684986	0.004081
9999	Diesel	3.17E-06	0.000246269	1.78E-05	0.001383094	4.74E-05	0.003682653	0.005525
25	Diesel	0	0	0	0	0	0	0
50	Diesel	3.32E-06	0.000334446	2.57E-05	0.002594969	2.74E-05	0.002764197	0.003923
75	Diesel	2.63E-06	0.000352486	1.86E-05	0.002494197	3.18E-05	0.004252615	0.002633
100	Diesel	1.24E-05	0.000191323	0.000148	0.002272213	0.000137	0.002115092	0.022841
175	Diesel	1.08E-05	0.000179663	0.000121	0.002014925	0.000125	0.002080032	0.021123
300	Diesel	1.76E-05	0.000148476	0.000113	0.000951396	0.000256	0.002155474	0.041651
600	Diesel	3.06E-05	8.14741E-05	0.000267	0.000711669	0.000373	0.000994087	0.13178
750	Diesel	1.68E-05	8.95044E-05	0.000126	0.000672165	0.000214	0.00114149	0.065605
9999	Diesel	7.25E-06	0.000117683	4.65E-05	0.000754271	0.000154	0.002493923	0.021607
25	Diesel	0	0	0	0	0	0	0
50	Diesel	0.000536	0.001222238	0.002592	0.0059151	0.00213	0.004861899	0.25814
75	Diesel	6.99E-05	0.000535936	0.000503	0.003863169	0.000616	0.004722674	0.069171
100	Diesel	0.000261	0.00041993	0.002323	0.003733428	0.002365	0.003800606	0.329793
175	Diesel	7.24E-05	0.000385653	0.000611	0.003254325	0.000697	0.003715292	0.099518
300	Diesel	2.1E-05	0.000186481	0.000126	0.00111858	0.00024	0.002127182	0.059765
600	Diesel	7.91E-06	0.000520094	0.000107	0.00703413	9.02E-05	0.005928678	0.008071
9999	Diesel	5.08E-06	0.000259723	2.09E-05	0.001067995	8.37E-05	0.004282302	0.01037
25	Diesel	0	0	0	0	0	0	0
50	Diesel	0.001098	0.000620257	0.007121	0.00402173	0.00614	0.003467674	0.837126
75	Diesel	0.000364	0.001312341	0.00121	0.004365501	0.002855	0.010299383	0.118627
100	Diesel	0.007126	0.000229683	0.089185	0.002874595	0.072965	0.002351809	13.3422
175	Diesel	0.000984	0.000180109	0.013762	0.002518764	0.009182	0.001680598	2.328594
300	Diesel	0.000584	0.000178307	0.003359	0.001025374	0.006665	0.002034771	1.403302
600	Diesel	0.000685	0.000146963	0.004953	0.001062053	0.006833	0.001464973	1.983068
750	Diesel	1.07E-05	0.000120284	7.71E-05	0.000864235	8.88E-05	0.000996046	0.037476
9999	Diesel	0.000222	0.000145212	0.001294	0.000847527	0.004193	0.002746608	0.654748
25	Diesel	0	0	0	0	0	0	0
50	Diesel	0.000407	0.000893741	0.002346	0.005154207	0.002242	0.004925708	0.296423
75	Diesel	2.74E-05	0.000940902	0.000141	0.004845658	0.00023	0.00790876	0.017093
100	Diesel	0.000197	0.000584622	0.001391	0.004118892	0.001834	0.005431398	0.197811
175	Diesel	3.41E-05	0.000453532	0.000277	0.003685337	0.000358	0.004766008	0.043867
300	Diesel	6.33E-05	0.000356128	0.00031	0.001744891	0.000764	0.004296096	0.104258
600	Diesel	5.77E-05	0.000234038	0.000507	0.002054533	0.000644	0.002612725	0.144876
750	Diesel	5.9E-06	7.32252E-05	8.42E-05	0.001045829	4.47E-05	0.000554924	0.047049
9999	Diesel	8.52E-06	0.001289058	0.000102	0.015391015	9.76E-05	0.014763901	0.003868
25	Diesel	1.33E-05	0.000941453	6.02E-05	0.004247664	0.000102	0.00718742	0.013469
25	Diesel	3.37E-05	0.000705808	0.000197	0.004134157	0.000255	0.005336539	0.034495
25	Diesel	1.11E-06	0.001231104	4.58E-06	0.005084326	8.47E-06	0.009413304	0.001111
50	Diesel	1.83E-05	0.000990794	0.000138	0.007451304	0.000125	0.006759399	0.017466
25	Diesel	3.44E-06	0.000472554	1.42E-05	0.001951373	2.63E-05	0.003613742	0.00345
25	Diesel	2.41E-05	0.000713189	9.96E-05	0.002945395	0.000184	0.00545321	0.024185
25	Diesel	7.78E-05	0.000750758	0.000461	0.004454562	0.00059	0.005698482	0.080292
25	Diesel	6.53E-06	0.00078866	2.69E-05	0.003254661	5E-05	0.006035543	0.006545

25	Diesel	7.73E-06	0.000666859	3.19E-05	0.002754055	5.91E-05	0.005098957	0.007752
25	Diesel	2.28E-05	0.000518992	0.000145	0.003294013	0.000173	0.003932653	0.023737
25	Diesel	0.000139	0.000686382	0.000737	0.003629354	0.001061	0.00522359	0.142509
25	Diesel	6.44E-06	0.000687009	2.66E-05	0.002837274	4.92E-05	0.005253032	0.00646
25	Diesel	0.000357	0.000988356	0.002265	0.006273035	0.002704	0.007489244	0.370993
50	Diesel	8.01E-06	0.001353851	5.95E-05	0.010049583	5.44E-05	0.009185628	0.00772
25	Diesel	0.000639	0.000699729	0.002609	0.002857711	0.004858	0.005321436	0.629101
25	Diesel	0.00012	0.000687724	0.000494	0.002840224	0.000915	0.005258493	0.120019
25	Diesel	5.64E-05	0.000934232	0.000257	0.004253155	0.00043	0.007131107	0.056947

CO2_lb/hp-hr	PM10_tpd	PM10_lb/hp-hr	PM2_5_tpd	PM2.5_lb/hp-hr	SOx_tpd	SOx_lb/hp-hr
0	0	0	0	0	0	0
0.662215705	1.2E-05	0.000321734	1.1079E-05	0.000295996	2.28E-07	6.10303E-06
0.580114339	1.3E-05	0.000268307	1.1985E-05	0.000246842	2.6E-07	5.35489E-06
0.579470995	2.55E-05	0.000116676	2.3418E-05	0.000107342	1.17E-06	5.35215E-06
0.586702126	2.39E-05	7.82739E-05	2.1961E-05	7.2012E-05	1.65E-06	5.42009E-06
0.579647173	2.37E-05	5.39463E-05	2.1823E-05	4.96306E-05	2.35E-06	5.3554E-06
0.578255841	3.32E-05	4.12854E-05	3.0539E-05	3.79826E-05	4.3E-06	5.34327E-06
0.588680937	1.22E-05	3.53521E-05	1.1205E-05	3.2524E-05	1.87E-06	5.44012E-06
0.583755407	2.49E-05	0.000108392	2.2888E-05	9.97208E-05	1.24E-06	5.39209E-06
0.372584518	2.92E-07	0.000229464	2.6854E-07	0.000211107	4.36E-09	3.42685E-06
0.376339744	8.59E-06	0.000420985	7.9028E-06	0.000387306	7.03E-08	3.4444E-06
0.337400399	5.39E-06	0.000583464	4.9618E-06	0.000536787	2.86E-08	3.0988E-06
0.333950864	0.000133	0.000253734	0.00012251	0.000233435	1.61E-06	3.07725E-06
0.335638029	0.000273	0.000172857	0.00025088	0.000159029	4.88E-06	3.09532E-06
0.335079318	0.000299	0.000108609	0.00027535	9.99201E-05	8.52E-06	3.09236E-06
0.334701373	0.000376	7.88489E-05	0.00034635	7.2541E-05	1.48E-05	3.09026E-06
0.336336712	1.68E-05	0.000226167	1.5455E-05	0.000208074	2.3E-07	3.09934E-06
0.335287617	7.02E-05	0.000266581	6.4551E-05	0.000245255	8.13E-07	3.08776E-06
0	0	0	0	0	0	0
0.551087712	2.54E-05	0.000563745	2.3404E-05	0.000518645	2.28E-07	5.04623E-06
0.502095683	6.55E-06	0.001077085	6.0281E-06	0.000990918	2.8E-08	4.59613E-06
0.500441438	0.000952	0.000434862	0.00087613	0.000400073	1.01E-05	4.61128E-06
0.499340303	0.000558	0.000232435	0.00051318	0.00021384	1.11E-05	4.60639E-06
0.498903456	0.000457	0.000180787	0.00042078	0.000166324	1.16E-05	4.60345E-06
0.498841436	0.000923	0.000105561	0.00084874	9.71163E-05	4.03E-05	4.60611E-06
0.498540509	2.53E-05	0.000158157	2.3301E-05	0.000145504	7.37E-07	4.60064E-06
0.499678785	8.41E-05	0.000165449	7.7351E-05	0.000152213	2.34E-06	4.61081E-06
0.494166874	5.41E-07	0.000889058	4.9794E-07	0.000817933	2.73E-09	4.4859E-06
0.49420556	0.000341	0.000169361	0.00031347	0.000155812	9.17E-06	4.55747E-06
0.443768576	1.74E-05	0.000107252	1.6032E-05	9.8672E-05	6.66E-07	4.09888E-06
0.442440112	0.000374	0.000135755	0.00034417	0.000124895	1.13E-05	4.08478E-06
0.444672255	0.000514	8.38614E-05	0.0004728	7.71525E-05	2.52E-05	4.10666E-06
0.444749435	0.00036	4.59117E-05	0.00033136	4.22387E-05	3.22E-05	4.10845E-06
0.443215781	0.00051	3.68271E-05	0.00046892	3.38809E-05	5.67E-05	4.09479E-06
0.448715198	1.46E-05	7.58548E-05	1.3435E-05	6.97864E-05	7.98E-07	4.14365E-06
0.444931157	2.02E-05	5.23402E-05	1.8585E-05	4.81529E-05	1.59E-06	4.1102E-06
0.528915067	2.38E-07	0.000657529	2.1865E-07	0.000604926	1.75E-09	4.84586E-06
0.52883304	7.29E-06	0.000603911	6.7085E-06	0.000555598	5.84E-08	4.8359E-06

0.473765844	5.92E-06	0.000293354	5.4481E-06	0.000269886	8.82E-08	4.36751E-06
0.469798512	0.000177	0.000610867	0.00016258	0.000561998	1.25E-06	4.31989E-06
0.476975159	0.000834	0.00023873	0.00076762	0.000219632	1.54E-05	4.39879E-06
0.475729767	0.000886	0.000120062	0.00081505	0.000110457	3.24E-05	4.39098E-06
0.477453961	3.91E-05	0.000123668	3.6E-05	0.000113774	1.39E-06	4.40669E-06
0.475715369	4.9E-05	0.000195891	4.5117E-05	0.00018022	1.1E-06	4.38696E-06
0.563131081	1.8E-07	0.001013132	1.654E-07	0.000932081	9.07E-10	5.10987E-06
0.562403024	0.000216	0.000294668	0.00019897	0.000271095	3.8E-06	5.17824E-06
0.507660379	9.23E-05	0.000167291	8.4949E-05	0.000153908	2.59E-06	4.68611E-06
0.507712459	0.000164	0.00034168	0.00015061	0.000314346	2.24E-06	4.68263E-06
0.506866267	0.000111	0.000124982	0.00010181	0.000114983	4.14E-06	4.68001E-06
0.50590953	5.6E-05	7.3661E-05	5.155E-05	6.77681E-05	3.55E-06	4.67244E-06
0.505714589	0.000105	4.23867E-05	9.6933E-05	3.89958E-05	1.16E-05	4.67207E-06
0.498565353	9.09E-06	8.16819E-05	8.3616E-06	7.51473E-05	5.12E-07	4.60421E-06
0.506566249	1.26E-05	9.14862E-05	1.1584E-05	8.41673E-05	6.44E-07	4.67758E-06
0.493882612	1.65E-06	0.000465045	1.5225E-06	0.000427842	1.61E-08	4.52055E-06
0.490738514	1.93E-05	0.000249201	1.7754E-05	0.000229265	3.5E-07	4.52099E-06
0.443916514	2.12E-06	7.87002E-05	1.9503E-06	7.24042E-05	1.1E-07	4.09757E-06
0.444827702	1.34E-05	0.000215942	1.2301E-05	0.000198666	2.54E-07	4.10432E-06
0.443748849	0.000208	9.77691E-05	0.00019133	8.99475E-05	8.71E-06	4.09676E-06
0.442272568	0.000304	6.98325E-05	0.00027971	6.42459E-05	1.78E-05	4.0838E-06
0.444251255	0.001134	6.10285E-05	0.00104371	5.61462E-05	7.63E-05	4.10262E-06
0.443478641	0.000542	8.6971E-05	0.00049871	8.00133E-05	2.55E-05	4.09415E-06
0.445094037	0.000828	7.45843E-05	0.00076154	6.86175E-05	4.56E-05	4.11009E-06
0	0	0	0	0	0	0
0.539449785	0.000144	0.000348648	0.00013221	0.000320756	2.05E-06	4.96461E-06
0.478071796	2.88E-05	0.000591876	2.645E-05	0.000544526	2.14E-07	4.39725E-06
0.483086535	0.000398	0.000284931	0.00036631	0.000262136	6.23E-06	4.45589E-06
0.481680851	0.000131	0.000165718	0.00012025	0.000152461	3.51E-06	4.44585E-06
0.485586245	0.000122	0.000118065	0.00011233	0.00010862	4.64E-06	4.48313E-06
0.48235963	0.000304	7.63735E-05	0.00027965	7.02636E-05	1.77E-05	4.45505E-06
0.482179321	5.7E-05	7.32678E-05	5.2397E-05	6.74063E-05	3.46E-06	4.45345E-06
0.483043399	1.66E-05	6.56698E-05	1.5303E-05	6.04162E-05	1.13E-06	4.4623E-06
0	0	0	0	0	0	0
0.536743365	1.71E-05	0.000337156	1.5752E-05	0.000310183	2.51E-07	4.93517E-06
0.48125503	6.81E-05	0.000682205	6.2635E-05	0.000627629	4.42E-07	4.42584E-06
0.481218456	7.25E-05	0.000162652	6.6663E-05	0.00014964	1.98E-06	4.4429E-06
0.484050096	9.12E-05	0.000122516	8.3941E-05	0.000112715	3.33E-06	4.46936E-06
0.482623345	3.85E-05	6.59592E-05	3.5443E-05	6.06824E-05	2.6E-06	4.45829E-06
0.483898069	6.25E-06	5.99003E-05	5.7458E-06	5.51082E-05	4.66E-07	4.47039E-06
0.483391796	1.05E-06	4.81249E-05	9.6627E-07	4.42749E-05	9.75E-08	4.46646E-06
0	0	0	0	0	0	0
0.457289686	1.17E-05	0.000157399	1.0749E-05	0.000144807	3.13E-07	4.21645E-06
0.412584654	4.13E-06	0.000311183	3.7973E-06	0.000286288	5.04E-08	3.80218E-06
0.413470186	5.64E-05	0.000162954	5.1904E-05	0.000149918	1.32E-06	3.81623E-06
0.41242458	3.48E-05	9.51226E-05	3.2007E-05	8.75128E-05	1.39E-06	3.80838E-06
0.413947841	1.87E-05	7.10733E-05	1.7213E-05	6.53874E-05	1.01E-06	3.8232E-06

0.414009743	1.71E-05	6.81334E-05	1.5711E-05	6.26827E-05	9.58E-07	3.82351E-06
0.413633176	1.2E-06	2.26461E-05	1.1056E-06	2.08344E-05	2.03E-07	3.82198E-06
0.413424804	7.16E-07	2.9699E-05	6.5869E-07	2.7323E-05	9.21E-08	3.82047E-06
0.485122877	1.53E-07	0.00085018	1.4121E-07	0.000782166	7.95E-10	4.40472E-06
0.485685612	0.00028	0.000242556	0.00025715	0.000223152	5.15E-06	4.47306E-06
0.43770544	9.36E-06	0.000876988	8.6152E-06	0.000806829	4.28E-08	4.00874E-06
0.436882472	0.000353	0.000177092	0.0003245	0.000162925	8.03E-06	4.03214E-06
0.436153526	0.000167	8.03753E-05	0.00015337	7.39453E-05	8.36E-06	4.0285E-06
0.436849	2.86E-05	8.34255E-05	2.6319E-05	7.67515E-05	1.38E-06	4.03416E-06
0.439043638	1.02E-05	5.07278E-05	9.3407E-06	4.66696E-05	8.12E-07	4.05601E-06
0.5205032	4.15E-08	0.000142815	3.8186E-08	0.00013139	1.4E-09	4.80776E-06
0.520174794	1.47E-05	0.000269557	1.352E-05	0.000247992	2.61E-07	4.78793E-06
0.467913083	1.45E-06	0.000872697	1.3338E-06	0.000802881	7.12E-09	4.28751E-06
0.468212078	0.000266	5.61976E-05	0.0002444	5.17018E-05	2.04E-05	4.32576E-06
0.467985042	0.000165	0.000152846	0.00015161	0.000140618	4.66E-06	4.32054E-06
0.468098463	2.44E-06	3.17437E-05	2.2437E-06	2.92042E-05	3.32E-07	4.32532E-06
0.464592249	7.71E-07	2.68549E-05	7.0964E-07	2.47065E-05	1.23E-07	4.2933E-06
0.467415149	4.1E-08	8.33551E-06	3.7745E-08	7.66867E-06	2.13E-08	4.31916E-06
0	0	0	0	0	0	0
0.511661217	1.43E-05	0.000305125	1.32E-05	0.000280715	2.21E-07	4.70555E-06
0.464515626	3.08E-05	0.000736874	2.8356E-05	0.000677924	1.78E-07	4.26336E-06
0.46424332	0.000101	0.000498745	9.2535E-05	0.000458845	8.62E-07	4.27412E-06
0.459959414	7.51E-05	0.000333427	6.9094E-05	0.000306752	9.55E-07	4.23776E-06
0.460391453	7.29E-05	0.000295082	6.7091E-05	0.000271476	1.05E-06	4.24233E-06
0.462810256	0.000543	0.00019925	0.00049968	0.00018331	1.16E-05	4.26843E-06
0.460021072	6.88E-06	8.82348E-05	6.3338E-06	8.1176E-05	3.31E-07	4.24782E-06
0	0	0	0	0	0	0
0.469832294	5.43E-05	0.000327657	4.9911E-05	0.000301444	7.15E-07	4.31752E-06
0.416585569	0.001148	0.000252431	0.00105577	0.000232237	1.75E-05	3.84169E-06
0.420302371	0.001455	0.000136098	0.00133847	0.00012521	4.15E-05	3.87906E-06
0.419808171	0.001215	8.10631E-05	0.00111788	7.4578E-05	5.81E-05	3.87598E-06
0.418759123	0.001633	7.90131E-05	0.0015023	7.26921E-05	7.99E-05	3.86637E-06
0.419474507	0.000118	6.55526E-05	0.00010885	6.03084E-05	6.99E-06	3.87356E-06
0.420962004	0.000129	9.3643E-05	0.00011891	8.61516E-05	5.36E-06	3.88657E-06
0	0	0	0	0	0	0
0.6106271	1.68E-06	0.000858095	1.5469E-06	0.000789447	1.09E-08	5.5669E-06
0.564792805	2.1E-05	0.000824537	1.9275E-05	0.000758574	1.32E-07	5.18956E-06
0.563245621	5.11E-05	0.000455746	4.7055E-05	0.000419287	5.83E-07	5.193E-06
0.56403759	0.000368	0.000245062	0.000339	0.000225457	7.82E-06	5.20346E-06
0.559444365	0.000365	0.000203707	0.00033566	0.00018741	9.25E-06	5.16197E-06
0.562125636	0.002834	0.000128601	0.00260757	0.000118313	0.000114	5.18981E-06
0.564196963	0.000144	0.000410505	0.00013238	0.000377665	1.82E-06	5.19806E-06
0.561393015	0.000174	0.000340667	0.00016005	0.000313413	2.64E-06	5.17419E-06
0	0	0	0	0	0	0
0.478404109	9.06E-05	0.0001024	8.3391E-05	9.42078E-05	3.91E-06	4.41486E-06
0.428844705	0.000395	7.67128E-05	0.00036368	7.05758E-05	2.04E-05	3.96131E-06
0.422885247	1.45E-05	0.000162985	1.3344E-05	0.000149946	3.48E-07	3.90568E-06

0.427696625	2.02E-06	5.67943E-05	1.8557E-06	5.22507E-05	1.4E-07	3.95111E-06
0.428860398	9.4E-07	2.85642E-05	8.6474E-07	2.6279E-05	1.3E-07	3.96301E-06
0.429385142	6.91E-07	7.26595E-05	6.3537E-07	6.68467E-05	3.77E-08	3.96672E-06
0.429385142	1.57E-06	0.000121742	1.441E-06	0.000112003	5.1E-08	3.96377E-06
0	0	0	0	0	0	0
0.395489341	1.34E-06	0.000134596	1.2284E-06	0.000123828	3.62E-08	3.6482E-06
0.352374743	1.91E-06	0.000255239	1.7546E-06	0.00023482	2.43E-08	3.24914E-06
0.351812921	7.42E-06	0.000114267	6.8253E-06	0.000105126	2.11E-07	3.24794E-06
0.350946072	6.12E-06	0.000101599	5.6258E-06	9.34715E-05	1.95E-07	3.24022E-06
0.350874735	8.43E-06	7.10165E-05	7.7556E-06	6.53352E-05	3.85E-07	3.24033E-06
0.350807609	1.35E-05	3.58763E-05	1.2399E-05	3.30062E-05	1.22E-06	3.24137E-06
0.35032644	8.3E-06	4.43E-05	7.6323E-06	4.0756E-05	6.06E-07	3.23672E-06
0.350766539	3.34E-06	5.42337E-05	3.0735E-06	4.9895E-05	2E-07	3.24009E-06
0	0	0	0	0	0	0
0.589121102	0.000181	0.00041275	0.00016639	0.00037973	2.37E-06	5.41641E-06
0.530724968	4.36E-05	0.000334898	4.0156E-05	0.000308106	6.38E-07	4.89353E-06
0.529978307	0.000176	0.000282138	0.00016152	0.000259567	3.04E-06	4.8895E-06
0.530368162	3.52E-05	0.000187621	3.2389E-05	0.000172611	9.18E-07	4.89396E-06
0.530368183	7.64E-06	6.78152E-05	7.0305E-06	6.239E-05	5.52E-07	4.89889E-06
0.530368299	4.56E-06	0.000299335	4.1909E-06	0.000275389	7.44E-08	4.89062E-06
0.530368299	2.41E-06	0.000123498	2.2216E-06	0.000113618	9.58E-08	4.89708E-06
0	0	0	0	0	0	0
0.472753857	0.00037	0.000208783	0.00034013	0.000192081	7.71E-06	4.35547E-06
0.427991499	0.000229	0.000824783	0.00021032	0.0007588	1.09E-06	3.92446E-06
0.430045233	0.004242	0.000136717	0.00390231	0.000125779	0.000123	3.97029E-06
0.426186475	0.000464	8.48365E-05	0.00042645	7.80496E-05	2.15E-05	3.93584E-06
0.428421787	0.000229	6.98078E-05	0.00021036	6.42232E-05	1.3E-05	3.95655E-06
0.425183592	0.000247	5.30441E-05	0.00022761	4.88006E-05	1.83E-05	3.92739E-06
0.420291366	2.13E-06	2.38818E-05	1.9591E-06	2.19712E-05	3.46E-07	3.88282E-06
0.428855618	8.5E-05	5.56713E-05	7.8196E-05	5.12176E-05	6.05E-06	3.96138E-06
0	0	0	0	0	0	0
0.651215686	0.000158	0.000346078	0.00014493	0.000318392	2.73E-06	5.99865E-06
0.587149183	1.55E-05	0.000533363	1.4285E-05	0.000490694	1.57E-07	5.40516E-06
0.585904524	0.000134	0.000397897	0.00012359	0.000366065	1.82E-06	5.40248E-06
0.583640681	1.83E-05	0.00024403	1.6874E-05	0.000224507	4.05E-07	5.3848E-06
0.586639277	3.04E-05	0.000170845	2.7934E-05	0.000157177	9.62E-07	5.41494E-06
0.587443104	2.55E-05	0.000103196	2.3414E-05	9.494E-05	1.34E-06	5.4254E-06
0.584386609	7.98E-07	9.91441E-06	7.3435E-07	9.12126E-06	4.35E-07	5.40113E-06
0.584956092	4.52E-06	0.000683868	4.1606E-06	0.000629159	3.56E-08	5.37625E-06
0.950191933	3.84E-06	0.000270635	3.5294E-06	0.000248984	1.78E-07	1.25404E-05
0.72241845	1E-05	0.000210281	9.2376E-06	0.000193459	5.17E-07	1.08263E-05
1.234795798	3.17E-07	0.000351731	2.9123E-07	0.000323593	1.41E-08	1.56672E-05
0.945129886	5.66E-06	0.000306275	5.2072E-06	0.000281773	2.26E-07	1.22182E-05
0.473916737	9.95E-07	0.000136608	9.1494E-07	0.000125679	4.38E-08	6.01311E-06
0.715328078	6.89E-06	0.000203761	6.338E-06	0.00018746	3.07E-07	9.07616E-06
0.775284553	2.29E-05	0.000220835	2.1041E-05	0.000203168	1.21E-06	1.16606E-05
0.790437682	1.91E-06	0.000230966	1.7594E-06	0.000212489	8.3E-08	1.00292E-05

0.668858905	2.21E-06	0.000190501	2.0313E-06	0.000175261	9.84E-08	8.48655E-06
0.539477727	6.76E-06	0.00015367	6.2206E-06	0.000141376	3.69E-07	8.39475E-06
0.70151333	4.06E-05	0.000199814	3.7344E-05	0.000183829	2.03E-06	9.97123E-06
0.689069642	1.84E-06	0.000196281	1.6929E-06	0.000180579	8.2E-08	8.74299E-06
1.027367666	0.000106	0.000292645	9.7223E-05	0.000269234	5.77E-06	1.59867E-05
1.304118432	2.43E-06	0.000410772	2.2372E-06	0.00037791	9.98E-08	1.6859E-05
0.689124008	0.000194	0.000212055	0.0001781	0.00019509	7.98E-06	8.74368E-06
0.689786046	3.43E-05	0.000196919	3.1522E-05	0.000181165	1.52E-06	8.75208E-06
0.943529661	1.62E-05	0.000268764	1.4924E-05	0.000247263	7.55E-07	1.25035E-05

Fuel_gpy	Total_Activity_hpy	Total_Population	Horsepower_Hours_hhpy	hp-hr/gal
0	0	0	0	0
804.1815	695.8793585	1.97823014	27324.00768	33.97742
913.8191	486.6688716	1.207761559	35443.48806	38.78611
4101.619	1898.528158	4.831046237	159262.4583	38.82917
5805.014	1491.908922	4.768575811	222625.7778	38.3506
8269.018	1543.982327	4.810222762	320981.5292	38.81737
15084.41	1410.636795	4.081401131	586946.0603	38.91077
6579.903	390.5152711	0.791292056	251495.0103	38.22169
4347.032	90.06465616	0.124940851	167552.821	38.54419
15.37655	37.14359713	0.078457694	928.5899283	60.39
249.1393	361.2790576	0.83688207	14895.39146	59.78741
101.1849	96.99262049	0.261525647	6747.763321	66.68747
5686.172	4347.897204	9.93797458	383113.2934	67.37631
17178.76	7863.960893	17.39145551	1151623.328	67.03763
29957.66	9108.596182	19.50981325	2011639.029	67.14941
51846.63	9452.366374	19.3267453	3485401.664	67.22524
810.5292	84.68031524	0.209220517	54223.0823	66.89837
2863.103	204.7917247	0.418441035	192136.2398	67.10769
0	0	0	0	0
806.8002	782.8757848	2.321111012	32940.87175	40.82903
99.09751	63.54723944	0.348166652	4440.849553	44.81293
35556.19	18287.58526	39.50530942	1598644.13	44.96106
38878.33	11746.56963	26.22855443	1751865.744	45.06021
40949.42	8972.319903	20.40256579	1846804.909	45.09966
141441.3	16582.68489	35.28088738	6379746.587	45.10527
2590.219	186.8943966	0.417799982	116903.0337	45.1325
8238.288	380.9951811	0.696333303	370967.5185	45.02969
9.760341	17.77629196	0.069772571	444.407299	45.53194
32258.23	41039.47144	56.74835776	1468664.781	45.52838
2339.26	1593.564489	2.046662083	118607.3794	50.70296
39556.68	24586.81741	38.86332206	2011662.803	50.8552
88410.39	30632.83101	52.39920084	4473558.046	50.59992
113197.4	26181.87857	45.46845878	5726783.798	50.59113
199016.8	29871.36504	47.00345534	10103326.81	50.76619
2802.687	221.5865995	0.395377902	140537.9691	50.14401
5571.404	234.0326296	0.348862855	281748.5297	50.57047
6.202585	10.55447346	0.046743103	263.8618365	42.54063
207.1649	236.1035713	0.677774998	8814.291455	42.54723

310.2881	201.432126	0.514174137	14736.39332	47.49261
4409.33	2350.850646	6.473919811	211179.0283	47.89368
54085.31	17179.67477	36.81019387	2551369.536	47.17306
113889.6	24870.16547	33.14086026	5386585.874	47.29655
4901.419	655.9869117	0.864747412	230983.0711	47.12576
3863.863	101.006311	0.14022931	182752.9244	47.29799
3.242074	5.181592281	0.022947966	129.539807	39.95585
13391.8	14180.59314	21.75467224	535773.3629	40.00757
9090.884	5680.16509	9.064446767	402923.5722	44.32171
7892.195	4394.119794	6.746702151	349759.7549	44.31717
14561.2	4087.317715	6.035315189	646388.6635	44.39115
12485.6	2585.821812	4.038842104	555298.4912	44.4751
40784.07	5069.022189	7.435141146	1814574.869	44.49225
1799.834	127.4930781	0.183583732	81226.94286	45.13025
2261.93	61.42777649	0.114739832	100469.1312	44.41744
57.02146	103.9116869	0.068211266	2597.792173	45.55815
1232.971	1956.943541	1.227802793	56531.74613	45.85004
387.9426	276.4389715	0.18189671	19663.28022	50.68606
893.5723	516.1443402	0.409267598	45198.87992	50.58223
30624.51	9840.934747	7.093971694	1552822.106	50.70521
62470.99	15047.17209	11.9369716	3178178.133	50.87446
267930.2	36039.89984	26.78429056	13570091.58	50.64787
89678.68	6857.709279	5.70700928	4549947.083	50.7361
160266.3	6390.004008	4.570154842	8101777.773	50.55197
0	0	0	0	0
7214.221	7903.393677	16.81272096	300904.1856	41.70987
753.426	486.3874486	1.606599176	35459.88334	47.06485
21901.7	12439.91017	28.03628703	1020099.824	46.57629
12325.55	3782.014322	9.254916382	575753.6792	46.71221
16292.48	3448.882732	8.598699817	754936.6745	46.33652
62286.03	7615.99104	17.24265595	2905423.879	46.64648
12160.5	923.0861748	1.855508908	567456.4788	46.66392
3969.602	202.3825499	0.429934991	184905.8638	46.58045
0	0	0	0	0
884.3294	955.1675141	2.723594523	37071.24707	41.92018
1558.197	999.8817354	2.905167491	72851.22022	46.75354
6955.21	4010.57097	10.23617608	325205.4422	46.7571
11695.47	3444.096878	9.033255168	543647.0841	46.48357
9145.657	1925.325183	4.335054616	426379.5915	46.62099
1636.905	207.1972454	0.476629042	76113.08556	46.49818
342.2752	21.24245813	0.045393242	15931.8436	46.54688
0	0	0	0	0
1101.276	1561.662329	3.353697955	54186.94577	49.20377
177.5488	144.1857196	0.362561941	9682.656071	54.53518
4644.383	2825.027018	6.231533363	252739.8151	54.41838
4893.873	1829.925539	3.988181352	266991.8108	54.55635
3535.346	822.1348982	1.767489463	192165.7973	54.35559

3366.629	453.7142899	0.997045338	182967.7555	54.34746
712.1469	60.55493229	0.113300607	38738.613	54.39694
323.3578	20.8757181	0.045320243	17598.53736	54.42436
2.841442	5.271531199	0.023346283	131.78828	46.38078
18158.43	23559.0528	68.84818946	841226.1859	46.32704
151.6352	111.5983155	0.490271949	7794.855038	51.4053
28231.25	16670.66391	50.87155132	1453969.549	51.50213
29349.45	10527.66953	29.69647236	1514085.342	51.58821
4860.078	1158.129047	3.805444178	250323.5367	51.50608
2850.925	418.0587817	1.377430715	146105.9627	51.24862
4.907937	8.486436809	0.026942143	212.1609202	43.22813
920.0945	836.4767464	3.098346498	39799.07159	43.25542
25.22018	18.28081908	0.08082643	1212.754404	48.08666
71808.77	35864.19905	128.271545	3450838.868	48.05595
16370.16	6314.54775	23.46660695	787065.4218	48.07927
1166.76	266.7296214	1.077685738	56083.38569	48.06762
432.9459	54.53828386	0.215537148	20967.73447	48.43038
74.64074	5.748876548	0.026942143	3593.047842	48.13789
0	0	0	0	0
780.5927	832.2494777	0.866259524	34326.67989	43.97515
630.366	443.433395	0.688565263	30533.89875	48.43837
3037.499	1754.399352	1.976848658	147217.7953	48.46678
3361.29	1119.629826	1.488189439	164428.217	48.91818
3691.411	826.657347	1.221648047	180407.651	48.87228
40930.01	5395.07705	7.485370762	1989888.483	48.61685
1164.529	87.56825286	0.088847131	56958.98573	48.91163
0	0	0	0	0
2523.861	2910.165251	3.426408311	120868.2962	47.89023
61443.53	38565.3353	42.57543841	3318652.621	54.01142
145768.8	52027.45028	55.84119491	7803556.287	53.53379
204159.5	52980.97766	50.63212822	10942296.25	53.59681
280779.7	45773.20876	46.99735724	15086595.76	53.73108
24563.52	2030.63354	2.153080898	1317573.543	53.63944
18850.75	1052.353811	0.902904893	1007570.944	53.4499
0	0	0	0	0
38.82056	44.21809618	0.137344808	1430.459288	36.84799
465.5956	279.2640253	0.663833239	18548.53083	39.83829
2050.811	905.5793735	1.487902087	81925.2396	39.94772
27515.11	6569.01039	14.85613007	1097622.633	39.89163
32508.57	5851.674507	14.60433125	1307467.154	40.21915
401949.3	38116.51577	80.36960348	16088949.8	40.02731
6416.103	411.2205414	1.075867663	255876.5031	39.88036
9301.158	233.4177935	0.595160835	372786.2032	40.07955
0	0	0	0	0
13739.2	14832.93178	47.66979488	646184.1762	47.03216
71697.18	53365.46813	151.1631175	3761766.4	52.46743
1220.987	855.7876276	2.670642946	64964.84696	53.20682

492.8141	170.2876762	0.638118226	25926.09859	52.60827
457.8507	117.1628308	0.401778142	24021.36876	52.46551
132.4109	14.67537166	0.047268017	6938.51572	52.40139
179.2364	9.392237861	0.047268017	9392.237861	52.40139
0	0	0	0	0
127.2869	201.5920459	0.836196314	7241.670579	56.8925
85.42367	80.92245549	0.321613967	5454.604376	63.85355
741.0633	532.7374814	1.994006594	47395.09195	63.95552
685.3018	324.6338769	1.265014936	43937.09452	64.11349
1351.314	379.7279567	1.565187972	86655.06469	64.12653
4275.444	675.1687492	2.401384285	274221.8622	64.1388
2128.469	214.7119893	0.728991658	136704.9248	64.22689
701.0081	51.34206643	0.19296838	44967.08108	64.14631
0	0	0	0	0
8375.081	8971.922977	12.84085757	319870.5543	38.19313
2244.183	1308.798868	2.272718154	95143.36563	42.39555
10699.78	5743.64823	8.181785353	454262.2975	42.45528
3228.742	857.0005132	1.204540621	136976.3934	42.42407
1939.007	392.270175	0.545452357	82260.55417	42.42407
261.8606	33.66421177	0.045454363	11109.18989	42.42406
336.4512	16.83210589	0.022727182	14273.62579	42.42406
0	0	0	0	0
27159.63	34087.50605	66.71534684	1292642.807	47.59428
3848.735	2817.941791	12.57595911	202335.7819	52.57202
432872.9	272439.6537	440.4142722	22648326.78	52.32096
75548.67	27802.65657	50.67576868	3988567.776	52.79468
45528.57	11607.16769	21.10715503	2391125.157	52.51922
64338.45	10079.15323	18.55012083	3404739.897	52.91921
1215.854	99.96405352	0.185966124	65090.9544	53.53519
21242.59	602.198785	0.976322149	1114515.452	52.46609
0	0	0	0	0
9617.128	8330.09471	21.87659267	332284.7254	34.55135
554.5706	301.0116771	1.118689398	21251.92336	38.3214
6417.752	2944.553761	9.024094475	246459.6772	38.40281
1423.222	384.0319606	1.342427277	54867.72789	38.55177
3382.532	569.4944466	1.839622565	129736.0417	38.35471
4700.329	466.6031824	1.292707749	180033.075	38.30223
1526.455	90.93499616	0.198878115	58772.41067	38.50256
125.5012	5.613271368	0.024859764	4827.413376	38.46507
438	667.95	0.83	10347.75	23.625
1124.2	3438.3	11.58	34857.5	31.00649
36.5	36.5	0.1	657	18
587.65	408.8	0.63	13490.4	22.95652
91.25	332.15	0.44	5314.4	58.24
795.7	1073.1	0.76	24681.3	31.01835
2671.8	5566.25	8.03	75602.45	28.29645
200.75	251.85	0.23	6044.4	30.10909

259.15	445.3	0.56	8460.7	32.64789
788.4	4015	6.7	32120	40.74074
4752.3	12413.65	17.84	148295.85	31.20507
219	273.75	0.26	6843.75	31.25
12369.85	43935.05	58.53	263610.3	21.31071
211.7	116.8	0.29	4321.6	20.41379
20925.45	33320.85	39.91	666417	31.8472
3996.75	5522.45	5.85	127016.35	31.77991
1890.7	1974.65	3.17	44059.15	23.30309

EMFAC2014 (v1.0.7) Emission Rates
Region Type: Air Basin
Region: North Central Coast
Calendar Year: 2023
Season: Annual
Vehicle Classification: EMFAC2011 Categories
Units: miles/day for VMT, trips/day for Trips, g/mile for RUNEX, PMBW and PMTW, g/trip for STREX, HTSK and RUNLS, g/vehicle/day for IDLEX, RE

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	Population	VMT miles/day	Trips trips/day
North Central Coast	2023	LDA	Aggregated	Aggregated	GAS	219359.7505	8561387.2	1374680
North Central Coast	2023	LDT1	Aggregated	Aggregated	GAS	12259.92812	459878.97	74637.47
North Central Coast	2023	T7 single construction	Aggregated	Aggregated	DSL	162.7674418	15790.15	0

STL and DIURN

ROG_RUNEX g/mile	ROG_IDLEX g/veh/day	ROG_STREX g/trip	ROG_HOTSOAK g/trip	ROG_RUNLOSS g/trip	ROG_RESTLOSS g/veh/day	ROG_DIURN g/veh/day	NOx_RUNEX g/mile	NOx_IDLEX g/veh/day
0.01550231	0	0.1029251	0.11995843	0.247018562	0.174926529	0.200086675	0.06545293	0
0.03245264	0	0.21993479	0.239085182	0.921139625	0.384242645	0.478387471	0.14026724	0
0.06367261	0.40543221	0	0	0	0	0	1.31476505	12.4564198

NOx_STREX	CO2_RUNEX	CO2_IDLEX	CO2_STREX	PM10_RUNEX	PM10_IDLEX	PM10_STREX	PM10_PMTW	PM10_PMBW
g/trip	**g/mile**	**g/veh/day**	**g/trip**	**g/mile**	**g/veh/day**	**g/trip**	**g/mile**	**g/mile**
0.10344684	271.616269	0	59.47107188	0.002074825	0	0.00245683	0.008000002	0.036750011
0.18939313	310.359812	0	68.61970425	0.002633248	0	0.003188929	0.008000002	0.036750011
0	1541.9038	4771.20038	0	0.004689723	0.00156215	0	0.03600001	0.061740018

PM2_5_RUNEX	PM2_5_IDLEX	PM2_5_STREX	PM2_5_PMTW	PM2_5_PMBW
g/mile	**g/veh/day**	**g/trip**	**g/mile**	**g/mile**
0.00190776	0	0.002259046	0.002000001	0.015750005
0.002421315	0	0.00293241	0.002000001	0.015750005
0.004486848	0.001494572	0	0.009000003	0.026460008

APPENDIX ALTS
Alternatives to the BMP Update

This appendix includes Section 5, Alternatives to the BMP Update, from PV Water's 2014 *Environmental Impact Report for the Basin Management Plan Update*.

5 ALTERNATIVES TO THE BMP UPDATE

5.1 INTRODUCTION

CEQA Guidelines §15126.6 requires the consideration of a range of reasonable alternatives to the Proposed Project (in this case, the BMP Update) that could feasibly attain most of the basic objectives of the project. The CEQA Guidelines further require that the discussion focus on alternatives capable of eliminating significant adverse impacts of the project or reducing them to a less-than-significant level, even if the alternative would not fully attain the project objectives or would be more costly. The range of alternatives required in an EIR is governed by the "rule of reason," which requires an EIR to evaluate only those alternatives necessary to permit a reasoned choice. An EIR need not consider alternatives that have effects that cannot be reasonably ascertained and/or are remote and speculative.

In compliance with CEQA, this section discusses the "No Project Alternative" as well as other alternatives and compares them to the Proposed BMP Update. Through a comparative analysis of the environmental impacts and merits of the alternatives, this section is focused on those alternatives capable of eliminating significant adverse environmental impacts of the project, or reducing them to a less-than-significant level.

This chapter describes and evaluates alternatives that were presented in some detail in the BMP Update. This EIR incorporates by reference all previous alternative analyses that have been conducted in previous EIRs on the PVWMA's BMPs and Local Water Supply Projects, including those evaluated in the following PVWMA EIRs:

- 1993 BMP EIR (PVWMA, 1993 at pages 11-1 through 11-36),
- 1999 Local Water Supply EIR (PVWMA/ESA, 1999 at pages 10-1 through 10-7), and
- 2002 Revised BMP EIR (PVWMA/ESA, Draft, 2001 and Final, 2002 at pages 6-1 through 6-30).

These alternatives are summarized in Section 5.2, below, and maps showing the key project locations and summaries of the environmental analyses of these alternatives from the EIRs are provided in Appendix D.

This EIR analyzes a "No Project" alternative, a demand management only alternative, Water Supply Facilities Alternatives (or structural alternatives), and an alternative considering other locations for BMP Update components. Alternatives that were not recommended in the BMP Update have been eliminated from discussion in this EIR for the reasons identified in Section 5.5. One of the reasons that alternatives may be eliminated from further consideration is if the alternative is not able to attain most of the basic objectives of the BMP Update, which are as follows:

- To prevent seawater intrusion, long-term groundwater overdraft, land subsidence, and water quality degradation;
- To manage existing and supplemental water supplies to control overdraft and to provide for present and future water needs;
- To create a reliable, long-term water supply, which has been identified as an important cornerstone of the long-term economic vitality of the Pajaro Valley;
- To develop water conservation programs; and

- To recommend a program that is cost effective and environmentally sound.

The alternatives analysis is intended to focus on eliminating, or reducing in significance, those project impacts identified in the DEIR as significant and unavoidable. The Draft EIR identified that the BMP Update would result in significant and unavoidable impacts to agricultural resources (specifically, conversion of agricultural land to non-agricultural uses). The Draft EIR determined that all other significant impacts could be reduced to a less-than-significant level through the incorporation of mitigation or project design features, including the following impact areas: aesthetics, air quality / greenhouse gas, biological resources, cultural resources, energy utilities & services, geology / soils, hazards and hazardous materials, surface water, groundwater, and water quality, and transportation / traffic.

5.2 Alternatives from Previous BMP and Local Water Supply EIRs

5.2.1 Basin Management Plan Environmental Impact Report (1993)

Proposed Project in the 1993 BMP EIR

PVWMA's first BMP EIR (hereafter, the "1993 BMP EIR") evaluated the environmental impacts of six distinct alternative plans presented in the 1993 BMP, each of which was capable of achieving the BMP 1993 objectives. The BMP Alternative 8A – College Lake, Feeder Canal, San Felipe was the preferred alternative and the proposed action analyzed in the 1993 BMP EIR. Its key feature was to develop a substitute coastal-zone water supply to groundwater pumping. Initially, water would be supplied from a 10,000 acre-feet (AF) College Lake Reservoir supplemented by water from Corralitos Creek and the Pajaro River via feeder canal. A review of likely yields from Kelly and Tynan Lakes indicated that these lakes offer minimal additional water. Further, because of the potential impacts on existing uses of the lakes that would result from water level fluctuations caused by operations, it was concluded that the Feeder Canal should be connected only to College Lake. Later, water from the San Felipe Division of the Central Valley Project (hereafter, the "San Felipe Division") would be imported in to the Basin to further augment supplies. See Appendix D-1 for a map of the facilities and additional information.

Alternatives to the 1993 BMP Proposed Project

The following summarizes other alternatives considered in the 1993 BMP EIR:

BMP Alternative 2 - This alternative included water conservation, a seawater intrusion barrier, wastewater reclamation, and the Corncob Canyon reservoir. The intrusion barrier, comprised of injection wells along the coast, using reclaimed wastewater from Watsonville, would reduce the area requiring a substitute water supply. The barrier was assumed to require a substitute supply of 2,000 AFY to serve existing pumpers in the area along the coast where the seawater intrusion barrier would create a mound for maintaining a land-to-sea hydraulic gradient.

BMP Alternative 5 - This alternative would import wastewater from Santa Cruz to Watsonville for treatment at, and distribution from, a new wastewater reclamation plant. Coastal pumping would be eliminated and substitute supplies would be made available to the coastal area.

BMP Alternative 8 - This alternative included use of College Lake, Kelly, Tynan Lakes, the Feeder Canal, and the San Felipe Division water. Coastal pumping would be eliminated and substitute supplies would be delivered to the coastal area in the Feeder Canal from College Lake and the San Felipe Division pipeline with storage in these lakes.

BMP Alternative 10 - This alternative included importation of San Felipe Division water into the Basin, which in combination with reclaimed water injected to form a seawater intrusion barrier, could enhance long-term sustainable pumping.

BMP Alternative 11 - This alternative included conservation, wastewater reclamation and reuse, and dams at Bolsa de San Cayetano and on Pescadero Creek. Coastal pumping would be eliminated and substitute supplies would be made available from wastewater reclamation and new reservoirs.

As with this EIR, the 1993 BMP included a No Project Alternative that assumed no remedial action, including no plans, policies, programs, or projects that would be undertaken by the PVWMA or others in the Basin to reduce groundwater pumping and seawater intrusion problems. In addition, the 1993 BMP EIR considered a Demand Management alternative that would use only mandatory basin-wide pumping controls for residential, agricultural, and industrial users.

A map of the key facilities and summary of conclusions of the environmental analyses of the proposed project and alternatives in the 1993 BMP EIR are included in Appendix D-1.

5.2.2 Local Water Supply and Distribution Environmental Impact Report (1999)

Proposed Project in the 1999 Local Water Supply and Distribution EIR

In March 1994, PVWMA initiated investigation to identify and define potential local water supply projects. An evaluation of 16 water sources and 47 potential sites resulted in a recommendation of further investigation of the following concepts and facilities, all of which were evaluated in the 1999 Local Water Supply and Distribution EIR (see map of key proposed project facilities and more information in Appendix D-2):

- *College Lake* – This proposed project element in the 1999 Local Water Supply and Distribution EIR was generally the same as the currently proposed College Lake with Inland Pipeline to the CDS, except for the pipeline alignments and distribution system connection points.
- *Harkins Slough* – This proposed project element is essentially the same as the existing operational Harkins Slough Managed Aquifer Recharge and Recovery project that began operations in 2002.
- *Murphy Crossing* – This 1999 proposed project element was similar to the currently proposed Murphy Crossing with Recharge Basins component except, in addition to diversion of Pajaro River water for recharge only, the water was proposed to be stored and extracted for conveyance to the coastal service area.
- *Watsonville Wastewater Reclamation Option* – This 1999 proposed project element was originally considered in future phases of the water supply project implementation because it was thought that imported water would be required to provide 5:1 dilution of recycled water. As described previously in this Draft EIR, the City of Watsonville and PVWMA completed construction and began operating the Recycled Water Project and Coastal Distribution System that is consistent with this alternative in 2009.

- *Distribution Systems/Service Areas* – The following three irrigation distribution system/service areas were considered in the 1999 Local Water Supply and Distribution EIR: (1) Coastal Service Area: adjacent to and between Highway 1 and the Pacific Ocean, approximately 8,200 acres, (2) Murphy Crossing Service Area: around Murphy Crossing, approximately 2,100 acres and, (3) Inland Service Areas: along the proposed import pipeline from Highway 1 east to Murphy Crossing and north of the Pajaro River, approximately 5,800 acres.

Alternatives to the 1999 Local Water Supply EIR Proposed Project

In the 1999 Local Water Supply and Distribution EIR, other alternatives were considered including the No Project Alternative and the Demand Management Only Alternative, both of which were described in detail in the 1993 BMP, referenced in the above section. In addition, the EIR described and evaluated the following Structural Alternatives (see map of key alternatives and more information in Appendix D-2):

- *Pajaro Recharge Canal to College Lake* – This alternative would include diversion from the Pajaro River into a 20-foot-bottom-width recharging canal that would discharge residual flows into College Lake for storage and reuse. The facility was eliminated primarily due to cost and lack of land with suitable recharge capacity in the appropriate area. In addition, the canal would cause potentially significant unavoidable impacts to migrant birds and wetlands.
- *College Lake Reservoir* - This alternative would include a 27- foot high dam be constructed at the location of the existing College Lake drainage pumphouse to create a 10,000 AF storage facility. The reservoir would be supplied with a supplemental 25 cubic feet per second (cfs) diversion from Corralitos Creek in the winter months, yielding 3,400 AFY, as well as water diverted from the Pajaro River, as described in the element above. The reservoir would also be supplied with natural runoff. The coastal distribution system would receive water through a 5-mile, 30–inch diameter pipeline along Lake Avenue and Beach Road. This element could be phased into use by initially using the existing storage capacity of College Lake (approximately 1,400 AF) and supplementing it with nearby groundwater pumping. For the proposed 1999 project and the currently proposed College Lake with Inland Pipeline to CDS, the structure of the facility was altered due to adverse impacts of raising College Lake levels that were not expected to be offset by sufficient beneficial storage capacity. In addition, this larger alternative would result in the loss of 400 acres of prime farmland.
- *College Lake Injection/Extraction Wells* – This element proposed seven wells that would inject diverted surface runoff that is currently captured in College Lake into the Aromas aquifer. The injection wells would have been south of the proposed College Lake Dam. The wells would have a conjunctive use function with the San Felipe Division project during dry years when the San Felipe Division water is reduced, the wells could be used for extraction of groundwater. In the future, the injection wells could be converted to extraction wells to supplement flows captured in College Lake for delivery in the coastal area for crop irrigation. This option was eliminated primarily because the relationship of cost and impacts to potential yield was not as efficient as with other alternative structural facilities.
- *Bolsa De San Cayetano Reservoir* – This alternative would include a 4,000 AF reservoir at Bolsa De San Cayetano. A 90- foot high dam would be constructed across the mouth of a topographic depression, south of Trafton Road. The reservoir would store tertiary-treated water produced at the Watsonville Wastewater Treatment Plant during the winter months. The reservoir would have

been supplied via a pipeline from the Plant, and stored reclaimed water would be released into the coastal distribution system. Storage would allow seasonal distribution of reclaimed water as required for direct crop irrigation reuse. At the time, this project would have required treatment upgrades at the Wastewater Treatment Plant to produce tertiary or reclaimed water.

- *Corncob Canyon Reservoir* – This element requires construction of a 21,000 AF reservoir at Corncob Canyon. A 160- foot high dam would be constructed at the intersection of Vega and Lewis Roads. In addition to the main dam, five saddle dams would also be constructed. An intake canal, pumping plant, pipeline, and associated spill outlet would be located at the main dam, and a delivery pipeline would also have been components of this element. The reservoir would be supplied with a 200 cfs surplus winter diversion off the Pajaro River, downstream of Murphy Crossing. This element would deliver 10,000 AFY to the coastal distribution system via pipeline along Garin, Elkhorn, and Trafton Roads. This option was eliminated due to impacts on existing homes and resources in the Corncob area.
- *Pescadero Reservoir* – This element requires the construction of a 20,000 AF reservoir at Pescadero Creek. A 190- foot high dam would be constructed approximately 1,500 feet upstream from the Pescadero Creek and Pajaro River confluence. Natural watershed runoff and a 75 cfs surplus winter diversion from the Pajaro River would supply the reservoir. The riverflow diversion would require a static pumping lift of approximately 200 feet. Water would be delivered through at 13- mile, 42inch diameter coastal distribution system. This element would yield 7,600 AFY, but was eliminated due to infeasibility and environmental impacts.

A map of the key facilities in the proposed project and alternatives and summary of conclusions of the environmental analyses of the proposed project and alternatives in the 1999 Local Water Supply and Distribution EIR are included in Appendix D-2.

5.2.3 Revised Basin Management Plan Environmental Impact Report (2002)

Proposed Project in the 2002 Revised BMP EIR

The 2002 Revised BMP EIR described and evaluated the following two potential projects in detail, the BMP 2000 Alternative and the Local-Only Alternative. A map of the key facilities in these proposed alternatives in Appendix D-3.

BMP 2000 Alternative – This alternative included the following components:

- *Water Conservation* – This component, based on the Water Conservation report (PVWMA, 2000), included water metering program, agricultural and urban water conservation.
- *Water Recycling* – The recycling component of the BMP 2000 Alternative included construction of tertiary treatment facilities at the Watsonville Wastewater Treatment Facility and pumping, blending, storage, and distribution facilities to offset a portion of the irrigation demands in the coastal area during the irrigation season. This facility was completed in 2009.
- *Groundwater Banking* – This alternative involves importing surface water and using it in lieu of groundwater whenever it is available, allowing for natural recharge of the groundwater basin. During droughts and dry periods when little or no surface water may be available, PVWMA would then pump the groundwater that was "saved" or "banked" during wet periods. The Groundwater Banking component of the BMP 2000 Alternative includes construction of an

inland distribution system and a pipeline to link the Pajaro Valley with the Santa Clara Conduit of the San Felipe Division facilities. The design capacity available to PVWMA in the Santa Clara Conduit is 75 cfs. The facilities associated with the Groundwater Banking component include the Import Pipeline, supplemental wells, and Inland Distribution System.

- *Harkins Slough and Murphy Crossings Projects* – as described in the 1999 EIR.
- *Coastal and Inland Distribution Systems*. A significant portion of the proposed Coastal Distribution System was built between 2006 and 2009 and is shown in **Figure 2-3** of Section 2 of this Draft EIR. The Inland Distribution System was originally proposed in the 1999 Local Water Supply and Distribution Project to include irrigation pipelines to deliver non-potable water to areas along the Central Valley Project import pipeline from Highway 1 east to Murphy Crossing and north of the Pajaro River.

Local-Only Alternative – This alternative aimed to eliminate seawater intrusion through the implementation of local water supply projects and demand management measures, without importing water from outside the basin. This alternative would implement some of the projects that are proposed under the BMP 2000 Alternative, including recycled water and water conservation, in addition to other local water supply projects, which include the following:

- *Intensified Water Conservation* – The conservation component was proposed to be similar to the BMP 2000 Alternative with expanded programs.
- *Water Recycling and Storage* – This element of the Local-Only Alternative includes many of the same aspects of the Water Recycling element of the BMP 2000 Alternative; however, it also includes year-round treatment and storage during low-demand periods.
- *Expanded College Lake with Corralitos Creek, Pinto Lake, Watsonville Slough, and Harkins Slough Diversion with Aquifer Storage and Recovery Program* – The Expanded College Lake project proposes an increase in the total storage capacity of College Lake to 4,600 AF. Water diverted from Harkins and Watsonville sloughs, Corralitos Creek, and Pinto Lake would be stored at College Lake and subsequently conveyed to the Coastal Distribution System or injected into the groundwater basin for temporary storage and subsequent recovery.
- *Coastal Distribution System* – This component was proposed to be similar to the BMP 2000.

Alternatives to the 2002 BMP EIR Proposed Project

In the 2002 Revised BMP EIR, other alternatives were considered including the following:

No Project Alternative – The 2002 EIR incorporates by reference the No Project Alternative used in the 1993 BMP, which is detailed in section 5.2.1.

Modified BMP 2000 Alternative – This alternative was developed based on input from local stakeholders. The Modified BMP 2000 Alternative involves the injection of Central Valley Project water into the groundwater basin for storage. This alternative includes the following components:

- An Import Pipeline
- Injection/Extraction Wells for Central Valley Project water
- Modified local water supply projects including: Coastal Distribution System, Conservation (Seven-Year Plan), Harkins Slough project with recharge basin and supplemental wells and

connection, Recycled Water Facility, and 54-inch Import Pipeline with injection/extraction wells for Central Valley Project water

Modified Local-Only Alternative – This alternative addresses the fundamental shortcoming of the Local-Only Alternative, that it requires a significant amount of agricultural land. This alternative adds another new recharge basin for recycled water, referred to as the Southeast Dunes recharge basin. The specific water supply, transmission, and storage projects comprising the alternative include:

- Harkins Slough Facilities
- Pinto Lake Diversion
- Watsonville Slough Diversion
- Import Central Valley Project Water
- Recycled Water Facility
- College Lake
- North Dunes recharge basin
- Southeast recharge basin

Regional Serving Alternative – At the time that this EIR was written, this alternative had not yet been developed. It was included upon request of the Soquel Creek Water District (SCWD). This alternative considers a joint water supply project between SCWD and PVWMA. PVWMA and SCWD entered into a Memorandum of Agreement (MOA) to set forth the parties' intent to work together toward development a potential project in which PVWMA would acquire and distribute a water supply of approximately 2,000 AFY to SCWD in order to meet its long-term water supply needs, and provide a new amount of water to the Pajaro Valley. If the agencies determined that a viable project could be developed between them, the agencies could enter into a binding agreement at that time.

Alternative Alignments to the Import Pipeline – PVWMA considered several pipeline route variations for the Import Pipeline. The alternative routes were proposed because of engineering design considerations and flexibility in final site selection, and are not complete alternatives to the project as their implementation would involve only construction of the Import Pipeline to bring water into the PVWMA service area.

A summary of conclusions of the environmental analyses of the proposed project and alternatives in the 2002 BMP EIR is included in Appendix D-3.

5.3 NO PROJECT ALTERNATIVE

The No Project alternative is defined as no remedial action. By definition it includes no plans, policies, programs, projects, or components that would be undertaken by the PVWMA or any other body or individual in the Basin relative to development of BMP components considered by this EIR. Groundwater, recycled water, and Harkins Slough diversions (up to 2,000 AFY) would continue to be the source of water for agricultural irrigation as described in Chapter 2. Industrial, commercial, and domestic residential use of water within the City of Watsonville would continue as in the current condition (see Chapter 2). Groundwater extraction by the City of Watsonville may increase to meet any potential higher future water demand; however, the City is implementing aggressive water conservation programs and is also planning for expansion of alternative water supplies, including surface water diversions. The City of Watsonville's stated goal regarding water demand is to have no net increase in groundwater use (Steve

Palmisano, Board of Directors/Ad Hoc BMP Committee Joint Meeting, August 2012). The Basin's overdraft condition is anticipated to continue without implementation of the BMP Update. Seawater intrusion would continue to advance beneath the coastal lands at the current rate of 1,900 AFY or higher. On coastal acreage that do not receive delivered water, irrigation with groundwater would continue until the salt content in the soils builds up to the point where existing agricultural crops typical of the area could not grow. Production of more salt tolerant crops may occur; however, the economy of the area would change. This alternative assumes with continued overdraft and encroaching seawater, wells would eventually become unusable and lands would be fallowed. . This would represent a significant impact due to loss of agricultural lands that may be affected by seawater intrusion and that are not served by the coastal distribution system.

5.4 DEMAND MANAGEMENT ONLY ALTERNATIVE

This alternative would use only demand management measures to achieve the PVWMA's water management objectives, which are to balance water use and supply in the Basin and progressively decrease seawater intrusion. The Basin would be brought into balance through mandatory basin-wide pumping controls only, for residential, agricultural, and industrial users. Groundwater modeling has indicated that it would be necessary to reduce groundwater pumping by 12,000 AFY. This 12,000 AFY represents the difference in the water budget (Inflows less Outflows = -12,000 AFY) based on the 33 Basecase simulation developed between the Agency and the USGS. The Basecase assumed 7,150 AFY of delivered water, among other things. The analysis was based on a basin-wide evaluation. Hydrometrics then tested the BMP scenarios and found that the proposed projects and programs would balance the basin and eliminate the majority of SWI Since municipal and industrial water uses comprise approximately 18 percent of current water use, the major reduction would fall on agricultural users (PVWMA, 2013). The City of Watsonville's stated goal regarding water demand is to have no net increase in groundwater use (Steve Palmisano, Board of Directors/Ad Hoc BMP Committee Joint Meeting, August 2012). This alternative would be most likely to occur if PVWMA fails to implement the BMP Update or any of its components. Without any additional BMP Update, the State Water Resources Control Board or a private entity may intervene. In this case, the State, by statutory adjudication, or the courts by judicial order, would designate an authority, possibly PVWMA, to regulate and oversee the management of water in the Basin, and may impose stringent pumping controls.

However, the Demand Management alternative would conflict with one of the primary BMP Update alternative formulation criteria and thus would not meet a key project objective: provide for needs of all Basin water users. In addition, this alternative would have significant and far worse impacts on agricultural land resources and would adversely affect the economy of the region. For this reason, a Demand Management Only alternative was not pursued in the BMP Update and is not considered further herein.

5.5 WATER SUPPLY FACILITIES ALTERNATIVES

A wide variety of structural facilities (i.e., projects or BMP components) were considered as potential projects in the BMP Update during the early phases of BMP Update development. In fact, a primary task of the BMP Update was project alternative development and screening. The project development and screening was a two-stage project review process, consisting of a fatal flaw screening, followed by a more detailed development of feasible projects. The process began with an extensive list of supplemental water supply projects that could help replenish the basin and bring it back into balance, including projects from the 2002 BMP, committee-developed projects, community group-developed projects, IRWM regional projects, and consultant-developed projects. Project summary sheets and cost estimates for 44 projects considered during the BMP Update effort are included as Appendix B of the BMP Update. Most of these projects were eliminated from consideration due to feasibility (technical and cost) considerations; however, environmental issues and regulatory constraints were also considered.

From the entire list of projects and programs, the BMP Update process narrowed this list to a ranking of fourteen programs/projects, as displayed in **Table 5-1** below. As displayed, the first seven programs/projects contain the primary components ultimately selected for evaluation as the "proposed project" within this EIR for the BMP Update. **Table 5-1** shows that with the exception of the Murphy Crossing with Recharge Basins component, the remaining programs/projects can potentially be implemented within the first 10 years of the implementation of the BMP Update (i.e., by the year 2025). The remaining selected programs/projects in the BMP Update, including the Murphy Crossing with Recharge Basins component, may be implemented after 2025 depending on the success of the primary components/projects in halting seawater intrusion. The potential environmental impacts of the seven proposed components included in the BMP Update portfolio are analyzed within this EIR at a programmatic level.

Table 5-1 BMP Update Summary of Projects and Programs

	Project or Program	Estimated Yield AFY
D-6	**Increased Recycled Water Deliveries**	**1,250**
D-7	**Conservation**	**5,000**
S-22	**Harkins Slough Recharge Facilities Upgrades**	**1,000**
R-6	**Increased Recycled Water Storage at Treatment Plant**	**750**
S-2	**Watsonville Slough with Recharge Basins**	**1,200**
S-3	**College Lake with Inland Pipeline To CDS (See Note 2)**	**2,400**[1]
S-1	*Murphy Crossing with Recharge Basins*	*500*
I-1	*CDS Expansion*	*Footnote*[2]
R-11	*Winter Recycled Water Deep Aquifer ASR*	*3,200*
S-11	*River Conveyance of Water for Recharge At Murphy Crossing*	*2,000*
G-3	*San Benito County Groundwater Demineralization at WWTP*	*3,000*
S-4	*Expanded College Lake, Pinto Lake, Corralitos Creek, Watsonville Slough, and Aquifer Storage and Recovery*	*2,000*
SEA-1	*Seawater Desalination*	*7,500*
S-5	*Bolsa De San Cayetano with Pajaro River Diversion*	*3,500*

Key:

Bold = Could be implemented within the first 10 years of the BMP (by 2025)

Italic = Could be implemented after 2025, based on ongoing adaptive management assessment.

Dark Outline = Seven projects included in proposed BMP Update (called "primary" in this section)

not outlined in bold = seven projects that potentially be added in the future if needed (called "secondary" in this section)

Notes:

1. College Lake with Inland Pipeline to CDS yield changed to a range of 2,100 to 2,400 AFY based on RCD College Lake Study (2013).
2. Since the project conveys water from other projects, it does not have a yield.

This alternative description considers implementation of one or more of the "secondary" programs/projects (i.e., those that could potentially be added in the future, if needed) for implementation instead of one or more of the five (5) components with potentially significant impacts.[1] These secondary components were not included in the primary suite of BMP Update components for various reasons during the BMP 2012 Ad Hoc Committee Alternatives Review process; therefore, they may require additional environmental review prior to implementation. However, they will be considered in this section as replacements for certain BMP Update primary components in this Alternatives Analysis to the extent that they may reduce one or more significant impacts identified in this EIR. These alternative projects/programs include:

- I-1 CDS Expansion
- R-11 Winter Recycled Water Deep Aquifer ASR
- S-11 River Conveyance of Water for Recharge At Murphy Crossing
- G-3 San Benito County Groundwater Demineralization at Watsonville WWTP
- S-4 Expanded College Lake, Pinto Lake, Corralitos Creek, Watsonville Slough, and Aquifer Storage and Recovery
- SEA-1 Seawater Desalination
- S-5 Bolsa De San Cayetano with Pajaro River Diversion

A brief summary of these alternatives is provided below and more detail is included in Appendix E, including conceptual project plan and schematics. A qualitative summary of potential environmental impacts of these programs/projects is presented in the descriptions below and a comparative analysis to the proposed BMP Update components is provided in Section 5.7.

5.5.1 CDS Expansion

The existing Coastal Distribution System (CDS) was installed to deliver water to coastal growers. Depending on the success of conservation, expansion of the CDS may be needed to expand the delivered water area and stop seawater intrusion and balance the basin. This alternative does not create additional water; therefore, it has no project yield, but rather contains the infrastructure required to deliver the water from other (existing and proposed) projects to coastal growers outside of the existing delivered water zone. The proposed alignment would extend north from the existing CDS to serve agricultural land south of Zils Road. The expanded area has an average water demand of approximately 2,000 AFY. The pipeline routing could be modified if the North Dunes recharge basin (part of the Watsonville Slough with Recharge Basin component) is built.

Potential environmental effects associated with this project would primarily be related to construction-related impacts, as the pipeline expansion would most likely be located nearly entirely within existing roadways (or unpaved agricultural roads). Potential construction-related impacts would include impacts to Air Quality, Greenhouse Gas Emissions, Noise, Erosion, and Traffic, all of which would be less than significant or could be mitigated to a less than significant level with standard mitigation. This alternative BMP Update component would be the most useful with successful implementation of one or more of the following: Conservation (thus freeing up CDS water for more agricultural land), College Lake and Inland

[1] Specifically, the Conservation and Increased Recycled Water Deliveries involve no direct physical changes to the environment and require no new physical facilities, thus no significant adverse impacts were identified for these components and alternatives to reduce impacts are not warranted.

Pipeline to CDS, Harkins Slough Recharge Facility Upgrades, or Watsonville Slough with Recharge Basins, all of which provide additional water for the use in the CDS. Without successful implementation of one of those, it would not be technically effective. This alternative component would also be more useful if the Increased Recycled Water Deliveries or the Conservation Programs do not result in their expected benefits.

5.5.2 Winter Recycled Water Deep Aquifer ASR

The Watsonville Recycled Water Treatment facilities have the capacity to produce approximately 3,200 AF of recycled water during the winter months when there is little or no irrigation demand. During the winter, this tertiary treated water would be injected into deep aquifers confined by overlying and underlying geologic formations that do not produce water. The water would then be recovered from the same wells later during times of peak demand. This alternative involves the construction of approximately eight 2,000 to 2,500-foot deep injection wells located on the western side of the CDS. The number of wells and recovery yield may vary depending on individual well site conditions.

Potential environmental impacts associated with this project would include construction-related impacts (air quality, greenhouse gas emissions, geology and soils, hydrology and water quality, noise, traffic, and utilities) due to construction of injection wells and associated pipelines and backflush facilities. The project may also potentially result in significant impacts in the following resources/issue areas:

- biological resources due to permanent or construction-related disturbance to habitat areas or direct impacts to plants or wildlife species,
- water quality and hydrology impacts due to changes in groundwater flows and quality and temporary disturbances to soils resulting in changes to water quality in surface water bodies during construction,
- geology & soils impacts due to incompatible or unstable soil properties, seismicity/faulting, and erosion,
- cultural resources due to disturbance to known or unknown resources that may be discovered during ground-disturbing activities, and
- air quality and increased GHG emissions due to higher energy demands (i.e., electricity for pumping).

This alternative may be feasible from a technical perspective, but may be more difficult to achieve regulatory and permitting requirements due to recycled water groundwater injection regulations of the RWQCB and the California Department of Public Health and would be more expensive to implement.

5.5.3 River Conveyance of Water for Recharge at Murphy Crossing

The project would convey water from an unidentified source via the Pajaro River for groundwater recharge from the eastern edge of the groundwater basin to Murphy Crossing. Unidentified water from out of the basin would be released to the Pajaro River during months of relatively low flow, commonly June through December.

The project would convey water from an unidentified source via the Pajaro River for groundwater recharge from the eastern edge of the groundwater basin to Murphy Crossing. Unidentified water from

out of the basin would be released to the Pajaro River during months of relatively low flow, commonly June through December.

This alternative would potentially result in construction-related impacts (air quality, greenhouse gas emissions, geology and soils, hydrology and water quality, noise, traffic, and utilities) due to construction of Central Valley Project pipelines and backflush facilities. The alternative may also result in significant impacts in the following resources/issue areas:

- biological resources due to permanent or construction-related disturbance to habitat areas or direct impacts to plants or wildlife species,
- water quality and hydrology impacts due to changes in groundwater flows and quality, and temporary disturbances to soils resulting in changes to water quality in surface water bodies during construction,
- geology & soils impacts due to incompatible or unstable soil properties, seismicity, faulting, and erosion,
- cultural resources due to disturbance to known or unknown resources that may be discovered during ground-disturbing activities, and
- air quality and increased GHG emissions due to higher energy demands (i.e., electricity for pumping).

Although this alternative component could assist in meeting most of the basic project objectives, it would require complex permitting efforts and agreements amongst numerous stakeholders, thus was not considered to be implementable in the near term (i.e., through 2025). It was also considered to be slightly more expensive than other alternative components.

5.5.4 San Benito County Groundwater Demineralization at Watsonville Wastewater Treatment Plant

The Santa Clara Valley Water District (SCVWD) and the San Benito County Water District (SBCWD) performed a feasibility study of desalinating groundwater within the San Juan Valley. The groundwater contains high levels of total dissolved solids (TDS) and would require treatment to reduce these levels. This alternative differs from that outlined in the feasibility study in that the desalination would occur at the Watsonville Wastewater Treatment Plant to facilitate brine management and disposal. Approximately 3,000 AFY of groundwater would be pumped from the San Juan groundwater sub-basin to the Watsonville Wastewater Treatment Plant for treatment. The project includes building seven new groundwater wells, a pump station, approximately 19-miles of conveyance pipeline, and a reverse osmosis treatment and disinfection system at the Wastewater Treatment Plant. Treated water would be discharged directly to the City of Watsonville through an existing water line running to the plant, to agricultural users through the CDS, and potentially inland agricultural users if the College Lake pipeline is constructed. The waste brine would be discharged through the Wastewater Treatment Plant's existing outfall.

Potential environmental impacts associated with this project would include construction-related impacts (air quality, greenhouse gas emissions, noise, and traffic) due to construction of injection wells, pump station, treatments systems, and associated pipelines and backflush facilities. The project potential may also result in significant impacts in the following resources/issue areas:

- biological resources due to permanent or construction-related disturbance to habitat areas or direct impacts to plants or wildlife species and to marine resources due to disposal of brine,
- water quality and hydrology impacts due to changes in groundwater flows and quality from extraction of groundwater and creation of brine evaporation ponds, and temporary disturbances to soils resulting in changes to water quality in surface water bodies during construction,
- geology & soils impacts due to incompatible or unstable soil properties, seismicity, faulting, and erosion.
- cultural resources due to disturbance to known or unknown resources that may be discovered during ground-disturbing activities, and
- air quality and increased GHG emissions due to higher energy demands (i.e., electricity for pumping).

This alternative was considered to be feasible from a technical perspective and could assist in meeting most of the basic project objectives, but may not be financially feasible and had institutional constraints due to agreements needed with SBCWD.

5.5.5 Expanded College Lake, Pinto Lake, Corralitos Creek, Watsonville Slough, and Aquifer Storage and Recovery (ASR)

College Lake is a seasonal water body in a fault-controlled depression located to the north of Holohan Road west of Highway 152, near St. Francis Cemetery. The lake captures runoff from an 11,000 acre watershed during the winter. The Expanded College Lake Project would increase the total storage capacity of College Lake to 4,600 AF, increase the water supplies to College Lake, and add a seasonal storage component. This project would divert water from Corralitos Creek, Pinto Lake, and Watsonville Slough and provide ASR injection during the winter and recovery during the summer. During the late spring, summer and fall months, Pinto Lake experiences heavy blooms of blue green algae (also known as cyanobacteria). Blue green algae blooms are an emerging health threat in the United States and many other countries. These blooms often produce toxins, which can be harmful to humans and animals. A filtration and disinfection system would treat water from College Lake prior to entering the distribution pipeline. Two pipelines would be required; one to convey filtered water to the injection system wells, and a second to convey water from the slough to College Lake in the winter and also to convey College Lake and well water to the CDS during the irrigation season. This project would include the construction of College Lake main dam and saddle dam, filtration and disinfection facilities, pump stations, ASR wells, and approximately 15 miles of new conveyance pipeline. Note: The Harkins Slough yield (1,100 AF) was included in the 2002 BMP; however, it is no longer considered as part of the suite of BMP Update components because it has already been built, and is in operation, and therefore, is considered an existing condition.

Potential environmental effects associated with this project would include construction-related impacts (air quality, greenhouse gas emissions, hydrology/water quality, noise, traffic, utilities) that would occur in a large geographic area due to the amount/extent of construction activities (including dam, wells, pipelines, pump stations, filtration facilities, and appurtenant facilities). This alternative would have the same and greater impacts than the College Lake project including impacts to biological resources (habitat, special-status plants, steelhead, and birds), hydrology, water quality, flooding, cultural resources, and geology & soils (due to incompatible or unstable soil properties, seismicity, faulting, and erosion), and potential blue green algae toxin issues at Pinto Lake that could have an unacceptable and significant human health impact. Operational emissions of air pollutants and greenhouse gas emissions would be greater than with the proposed BMP components due to the amount of pumping necessary for the various conveyance facilities.

This alternative may be feasible from a technical perspective and could assist in meeting most of the basic project objectives, but may not be financially feasible.

5.5.6 Seawater Desalination

This project includes construction and operation of a seawater desalination facility that would produce potable water from seawater. The project consists of a seawater intake structure(s) and pipeline, desalination plant, brine discharge and outfall facilities, product water conveyance pipelines to the recycled water treatment plant clearwell and three City of Watsonville potable wells (8 miles of 24-inch pipe), and storage facilities. The treated water would be used for agricultural irrigation during the irrigation season via an expanded CDS, and as potable water for the City of Watsonville during winter months.

Potential environmental effects associated with this project would include construction-related impacts (air quality, greenhouse gas emissions, noise, hydrology/water quality, traffic, and utilities) due to construction or upgrades to intake facilities, treatment plant, brine disposal facilities and product water conveyance facilities. Potentially significant and more severe operational impacts would be expected in most resource issues/topics, including aesthetic resources, air quality, biological (including marine) resources, climate change, coastal resources, cultural resources, geology & soils, greenhouse gas, utilities/services, growth inducement, and water supply/quality. This project component has numerous and more severe potentially significant environmental impacts, including due to brine disposal impacts on water quality and marine biological resources, potential marine life impingement/entrainment, and use of energy resulting in higher greenhouse gas emissions than any other alternative. If included as a BMP Update component, it could reduce the significant and unavoidable impact of the BMP Update due to conversion of agricultural land to non-agricultural uses.

This project would be more costly, more difficult to achieve regulatory compliance and permits, and result in increased impacts on the environment in the issue areas identified above.

5.5.7 Bolsa de San Cayetano with Pajaro River Diversion

This project consists of two options, one involving surface water only and one involving both surface and recycled water. Option 1 involves the construction of the Bolsa De San Cayetano Dam and Reservoir for seasonal surface water storage to allow up to 5,000 AF in peak storm flow years of Pajaro River water to be diverted and pumped to the reservoir in the winter and used to meet irrigation demand in the summer. The dam and reservoir would be located in Monterey County on the south side of the Pajaro River and adjacent to Trafton Road. The reservoir site is surrounded by 100- to 150-foot high terrace upland that has been eroded to form a canyon. The earth fill dam would be located across the mouth of the canyon to form the reservoir. A small saddle damn would also be constructed on the north ridge. The Pajaro River diversion would consist of an infiltration gallery, filtration system, and pump station facilities. The diversion would be located approximately 0.5 miles upstream of the confluence of Salsipuedes Creek and the Pajaro River. It is assumed the water would need to be filtered and disinfected after storage to meet user requirements. Option 2 involves using the reservoir for both surface water and recycled water storage. Option 2 uses the same infrastructure as Option 1 and also includes lining the reservoir as may be required by the Regional Water Quality Control Board for surface storage of recycled water. Having the availability to store recycled water increases the average project yield since some years sufficient surface water is not available for diversion.

Potential environmental effects associated with this project would include construction-related impacts (air quality, greenhouse gas emissions, hydrology/water quality, noise, traffic, and utilities) due to construction of the dam, pump station, diversion facilities, and conveyance pipelines. The construction impacts would be greater than many of the other alternative components. The project would be expected to have significant impacts to biological resources (including potential impacts to birds due to tree removal, sensitive plant species and habitat), coastal resources, hydrology, water quality, cultural resources, and geology & soils. Operational impacts due to air quality and greenhouse gas emissions would also be anticipated; however to a lesser extent that most of the other alternative components because most of the storage would be downgradient from the diversion point.

Of the fourteen alternatives carried into the last alternatives screening process, this alternative is the most expensive and thus, may not be considered feasible.

5.6 ALTERNATIVE LOCATIONS FOR BMP UPDATE COMPONENTS

This section describes the potential for each component to be located at a different location, in terms of feasibility and the ability to reduce significant impacts of the BMP Update. A brief summary of these alternatives is provided below. A qualitative analysis of potential environmental impacts of these programs/projects is presented in the descriptions below and a more detailed comparative analysis to the proposed BMP Update components is also provided.

5.6.1 Alternative Locations for Conservation

No alternative locations are needed to reduce impacts of this component as it would not result in any significant impacts.

5.6.2 Alternative Locations for Increased Recycled Water Storage at Treatment Plant

Alternative sites of adequate size are not feasibly available at or near the Recycled Water Facility site without significant and more severe impacts on agricultural land or biological resources, and/or or such sites would require cost-prohibitive property acquisition.

5.6.3 Alternative Locations for Harkins Slough Recharge Facilities Upgrades

Because this BMP Update component requires only upgrades to the existing pump station and treatment facilities, those components do not warrant relocation to reduce significant impacts. The proposed filter backwash to waste pipeline is proposed within existing roadways with very little traffic and no significant impacts that cannot be mitigated with standard construction practices; therefore, an alternative alignment is unnecessary to reduce significant impacts. Construction of a new recharge basin for the Harkins Slough Recharge Facilities Upgrades component has been identified as resulting in significant and unavoidable impacts to agricultural resources. There have been several potentially feasible recharge basin sites identified in the vicinity of the existing Harkins Slough Recharge Basin; however, the recharge basins that may be considered most feasible and least costly to construct are the Southeast Recharge Basin and the Monitoring Well #7 site due to their proximity to existing facilities. The proposed new recharge basin for this component (either the Monitoring Well #7 or the "Southeast" recharge basin), would have a significant impact on agricultural land; however, the alternative sites would also affect agricultural land (and would be similar on an acre-by-acre basis), the impacts of those basins have been evaluated in the Watsonville Slough with Recharge Basins component in Chapter 3. Other suitable sites may be presented that reduce impacts due to farmland conversion; however, currently there are no known feasible sites available. The proposed locations are currently considered the optimal locations due to soil types, hydrology, and percolation/recharge characteristics. In addition, the sites are relatively disturbed and lack quality habitat. Furthermore, feasible alternative locations that might achieve the basic project objectives may not reduce the number or severity of significant adverse impacts, assuming the same or similar design and operational characteristics. Specifically, pursuant to investigations to date, there is no environmentally superior location that could feasibly meet the BMP objectives. The conceptual design of this component minimizes the construction and operational environmental impacts of the proposed component through inclusion of the least environmentally damaging methods and facilities while still meeting the basic objectives of increasing the yield of the component up to the existing water right to maximize its benefit to the water supply portfolio and groundwater basin.

5.6.4 Alternative Locations for Watsonville Slough with Recharge Basins

The Watsonville Slough with Recharge Basins project has significant impacts in the following resource areas: agricultural resources, biological resources, geology and soils, operational and construction water quality, and traffic, all of which except agricultural resources impacts can be reduced to a less-than-significant level with mitigation. To better reduce these significant impacts beyond the mitigation measures already proposed in this EIR and/or to provide better operational characteristics / flexibility and success toward achieving groundwater basin benefits, several alternative locations for the diversion of slough water were analyzed during preparation of the Draft EIR. These include the following:

- an “off-stream” or “isolated stent” or “pond” in the general vicinity and/or associated with potential future wetland construction projects,
- a location north of the railroad tracks owned by Santa Cruz County Transportation in the vicinity of the confluence of Watsonville Slough and Hanson Slough, and
- other sloughs in the vicinity.

<u>**Off-Stream near Watsonville Slough Alternative**</u>

The physical location of the diversion point would be similar to the proposed Watsonville Slough component (i.e., within the general vicinity of the existing Harkins Slough diversion point or the area of the slough between that point and the railroad tracks to the north), but the diversion would be located "off- stream" in an isolated "stent" or "pond" area; the off-stream area may be a pond next to Watsonville Slough, or it may be an existing open-water area isolated from immediate connection with Watsonville Slough. This alternative “pond” would have a volume of between 50 and 150-acre feet (for example, 10-acres at 10-feet deep) and would require proper fish screening, CRLF screening (if possible), and turbidity/ floatables management. A similar volume in one of the other sloughs or drainage ways might also be used. Water flow would be managed into the pond through the use of self-adjustable valves. Ponds would receive diversions at high water, or (much more slowly) at lower water. Water from the pond would be sent through the treatment plant and to the recharge basins as proposed by the Watsonville Slough with Recharge Basins component. This alternative could be integrated with the NRCS-proposed wetland area at the confluence of the two sloughs. Prefiltration or treatment of water may be feasible in an isolated pond or slough. A pond on the east side of Watsonville Slough may draw in some of the moderately salty water within the 'perched aquifer' (as defined by California Department of Water Resources Bulletin 5, 1953); ponds on the west side of the slough are not as susceptible to this risk.

This alternative would have increased impacts on agricultural resources (i.e., due to conversion of agricultural land to a pond/stent system. The project also may significantly impact water quality and biological resources during operation. Construction impacts would be greater, but those are anticipated to be able to be mitigated to a less-than-significant level and operational air quality, aesthetics, noise, and traffic impacts would be similar to the Watsonville Slough with Recharge Basins component.

Based on current data and experience, PVWMA staff believes this type of project could not be feasibly planned, built and operated in the vicinity of the sloughs within the timeframes required. The ability of the pond or stent to receive adequate flows of water to feed into the filtration plant and ultimately to the recharge basins is questionable. No suitable sites have been identified within the vicinity of the existing filtration facilities and existing and proposed recharge basins.

Hanson Slough near Watsonville Slough Alternative

As part of preparation of this Draft EIR, the PVWMA BMP and EIR Team investigated in a change the point of diversion to a point in the lower reach of the Hanson Slough (i.e., within approximately ¼ mile of the Hanson Slough/Watsonville Slough junction). This alternative would require new pipelines to connect the diversion point to the Harkins Slough treatment plant site. Although it was thought to be preferable due to better water quality at this site and greater amounts of water year round, the PVWMA staff and its consultants determined that a new diversion in this location of Hanson Slough, and the connecting pipeline to the filtration plant (i.e., the pipeline would have to pass under the railroad tracks and under Watsonville Slough and/or Harkins Slough) would be prohibitively costly and potentially technically infeasible. In addition, there would be greater environmental impacts due to increased areas of construction disturbance.

This alternative would have increased impacts on agricultural resources, but could have fewer and less severe significant impacts during operation on water quality (lower salts and potentially, turbidity/sedimentation, including due to bank erosion). Biological resources impacts would be greater, including due to more temporary and permanent impacts to habitat. The same or similar impacts to red-legged frogs from construction in the sloughs and diversion impingement/entrainment of fish and other wildlife would be expected to occur with implementation of this alternative. Construction impacts would be greater, but those could all be mitigated to a less-than-significant level.

Alternative Sloughs

An alternative slough, or stormwater drainage facility, could be used as a source of diversion water for recharge. These other diversion sites would have similar facilities including pipelines to the filtration plant and recharge basins. However, this type of alternative project would not be able to use existing and upgraded Harkins Slough facilities, including recharge basin sites; therefore, this alternative does not meet the criteria for inclusion as a potential alternative. Under this alternative, significant impacts may still occur due to temporary changes to the environment: construction impacts on habitat and species; water quality and hydrology; geology and soils; utilities; noise and traffic. In addition, air quality and due operational, long-term impacts due to conversion of agricultural land to non-agricultural use, increased air quality and greenhouse gas emissions, and of entraining fish and other aquatic wildlife. Site-specific information, including project design details, would be needed to assess impact and to conclude whether impacts would be greater or less severe with implementation of this type of alternative. Construction of a similar facility on another slough, channel, or storm drain outfall would likely have greater impacts overall related to construction of new pipelines, and potentially new filtration facilities and recharge basins, depending upon the location of diversion and whether there would need to be new filtration facilities rather than use of the existing.

5.6.5 Alternative Locations for College Lake with Inland Pipeline to CDS

This project cannot be replicated in another location due to uniqueness of the College Lake hydrologic conditions. Specifically, the lake is already seasonally drained by the Reclamation District creating the potential for diversion of that water for another beneficial use with appropriate flow maintenance in downstream creeks and the Pajaro River. As evidenced by the previous alternatives analyses, these conditions cannot be replicated at another location, making an alternative location infeasible.

5.6.6 Alternative Locations for Murphy Crossing with Recharge Basins

This component of the BMP was developed as part of the 1999 Local Water Supply Project EIR (CH2M Hill, 1997, 1999a, and 1999b) and was further evaluated during development of the currently proposed BMP Update (Carollo and PVWMA, 2012) and EIR (B. Hecht and M. Woyshner, Balance Hydrologics and G. Kittleson, Kittleson Environmental Consulting, personal communication, 2013). The proposed location is the optimal location due to soil types, hydrology, and percolation/recharge characteristics of the Pajaro River at this location. In addition, the site is relatively disturbed and lacks quality habitat. Furthermore, feasible alternative locations that might achieve the basic project objectives would not reduce the number or severity of significant adverse impacts, assuming the same or similar design and operational characteristics. Specifically, pursuant to investigations to date, there is no environmentally superior location that could feasibly meet the BMP objectives.

5.7 ALTERNATIVES IMPACTS COMPARISON

The purpose of this section is to present a comparison of the alternatives and to identify the environmentally superior alternative. Consistent with the CEQA Guidelines (Section 15126.6[a]), the comparison of alternatives and determination of the environmentally superior alternative is based on the ability of the alternative to meet the basic objectives of the project while avoiding or substantially lessening any significant impacts. Consequently, this section presumes implementation of mitigation measures identified in the EIR.

5.7.1 No Project Alternative

The No Project Alternative would not have the significant environmental impacts associated with the BMP Update. However, this alternative would have significant, and in some cases, unavoidable impacts on potentially thousands of acres of agricultural lands. Furthermore, this is the only alternative that would result in a continuance of groundwater overdraft, which would become more severe, and therefore, would not meet the most basic objectives of the BMP Update. Therefore the No Project alternative would not be the environmentally superior alternative.

5.7.2 BMP Update Alternative Secondary Components

The BMP Update alternative secondary components would not directly replace the primary components (i.e., the BMP Update components described in Section 2, Project Description and evaluated in Section 3) on a one-for-one basis. An alternative for the proposed project could include any number of primary and alternative component combinations that meet the objectives of the proposed project (see Section 2) including water supply yield (see **Table 5-1**). The development of alternative components can potentially be restricted by the development of another component because of project size (including cost), geographic constraints with other projects, or timeframe for implementation.

The tables below (**5-2** through **5-5**) compare the BMP Update Alternative (Secondary) Components to the Proposed BMP Update primary components for the following impact areas:

- Agriculture and Land Use;
- Biological Resources;
- Surface Water, Groundwater & Water Quality; and,
- Construction-Related Impacts (air quality, cultural resources, geology and soils, noise, transportation / traffic, and utilities conflicts).

<u>Agriculture and Land Use</u>

Table 5-2 compares the agriculture impacts of the BMP Update alternative or "secondary" components to those found to occur with implementation of the primary BMP Update components described in Section 2, Project Description. The proposed BMP Update had significant unavoidable impacts to agricultural resources due to conversion of prime farmland for Harkins Slough Recharge Facility Upgrades, Watsonville Slough with Recharge Basins, College Lake with Inland Pipeline to CDS, and Murphy Crossing with Recharge Basins components of the BMP Update. Many of the secondary components would also have the potential to convert agricultural land to public infrastructure use, resulting in impacts that would be the same (on an acre-by-acre basis) or more severe than the proposed BMP Update. Those secondary alternatives that would result in more severe or a greater number of significant impacts are shown with "+", respectively, in **Table 5-2.** Those resulting in the same or similar impacts are shown with a "=" and those with fewer or less impacts or that would have no impact on agriculture resources are shown in with a "—". Replacing the primary components that convert agricultural land with alternative (secondary) components that do not convert agricultural land would potentially avoid or lessen significant impacts, perhaps to a less-than-significant level. Taking into account feasibility, cost, and timeframe which are critical to the BMP Update, other combinations or suites of project components may not be environmentally superior to the proposed project due to the inability to meet the BMP Update objectives or reduce agricultural impacts.

Table 5-2 Agriculture Impacts of Alternative Components Compared to Impacts of Proposed BMP Update Primary Components

	Proposed BMP Update (Primary) Component				
BMP Update Alternative (Secondary) Component	Increased Recycled Water Storage at Treatment Plant	Harkins Slough Recharge Facility Upgrades	Watsonville Slough with Recharge Basins	College Lake with Inland Pipeline to CDS	Murphy Crossing with Recharge Basins
CDS Expansion	+	+	+	+	+
Winter Recycled Water Deep Aquifer ASR	+	+	+	+	+
River Conveyance of Water for Recharge at Murphy Crossing	+	--	-	-	=
San Benito County Groundwater Demineralization at Watsonville Wastewater Treatment Plant	+	-	-	-	-
Expanded College Lake, Pinto Lake, Corralitos Creek, Watsonville Slough, and ASR	+	+	+	+	+
Seawater Desalination	=	-	-	-	-
Bolsa de San Cayetano with Pajaro River Diversion	+	+	+	+	+

Key:
+ The Alternative (Secondary) Component contains more severe and/or additional impacts due to conversion of agricultural land when compared to the Primary Component.
- The Alternative (Secondary) Component contains less severe and/or fewer impacts due to conversion of agricultural land when compared to the Primary Component.
= The Alternative (Secondary) Component due to conversion of agricultural land are similar to, or the same as, the Primary Component.

Biological Resources

Table 5-3 compares biological resources impacts of the BMP Update alternative or secondary components to those found to occur with implementation of the primary components. The proposed project had significant impacts to biological resources due to temporary and permanent direct changes to habitat for Harkins Slough Recharge Facility Upgrades, Watsonville Slough with Recharge Basins, College Lake with Inland Pipeline to CDS, and Murphy Crossing with Recharge Basins components of the BMP Update. Many of the secondary components would also have the potential to impact biological resources that would be the same or more severe than the primary components. Those secondary alternatives that would result in more severe or a greater number of impacts are shown with "+", respectively, in **Table 5-3**. Those resulting in the same or similar impacts are shown with "=" and those with fewer or less impact or no impact to agriculture are shown in with a "—". Replacing the primary components that significantly impact one biological resource with alternative (secondary) components that would not impact biological resources would potentially avoid or lessen significant impacts to those resources. Taking into account feasibility, cost, and timeframe, which are critical to the BMP Update, other combinations or suites of project components may not be environmentally superior to the proposed project due to the inability to meet the BMP Update objectives or reduce biological impacts.

Table 5-3 Biological Resources Impacts of Alternative Components Compared to Impacts of Proposed BMP Update Primary Components

	Proposed BMP Update (Primary) Component				
BMP Update Alternative (Secondary) Component	Increased Recycled Water Storage at Treatment Plant	Harkins Slough Recharge Facility Upgrades	Watsonville Slough with Recharge Basins	College Lake with Inland Pipeline to CDS	Murphy Crossing with Recharge Basins
CDS Expansion	+	-	-	-	-
Winter Recycled Water Deep Aquifer ASR	+	-	-	-	-
River Conveyance of Water for Recharge at Murphy Crossing	+	-	-	-	-
San Benito County Groundwater Demineralization at Watsonville Wastewater Treatment Plant	+	=	=	-	-
Expanded College Lake, Pinto Lake, Corralitos Creek, Watsonville Slough, and ASR	+	+	+	+	+
Seawater Desalination	+	+	+	+	+
Bolsa de San Cayetano with Pajaro River Diversion	+	+	+	+	+

Key:
+ The Alternative (Secondary) Component contains more severe and/or additional impacts to biological resources when compared to the Primary Component.
- The Alternative (Secondary) Component contains less severe and/or fewer impacts to biological resources when compared to the Primary Component.
= The Alternative (Secondary) Component impacts to biological resources are similar to, or the same as, the Primary Component.

Surface Water, Groundwater & Water Quality

Table 5-4 compares surface water, groundwater, and water quality impacts of the BMP Update alternative or secondary components to those found to occur with implementation of the primary components. The proposed BMP Update was found to have potentially significant impacts to surface water (including flooding), groundwater, and water quality resources due to temporary and permanent direct changes to water bodies and flood hazard zones in the case of the Harkins Slough Recharge Facility Upgrades, Watsonville Slough with Recharge Basins, College Lake with Inland Pipeline to CDS, and Murphy Crossing with Recharge Basins components of the BMP Update. Many of the secondary components would also have the potential to impact resources or pose a risk to people/structures that would be the same or more severe. Those secondary alternatives that would result in more severe or a greater number of impacts are shown with "+", respectively, in **Table 5-4**. Those resulting in the same or similar impacts are shown with "="; and those with fewer or less impact or no impact to surface water, groundwater, and water quality are shown in with a "—". Replacing the primary components that significantly impact these resources with alternative (secondary) components that do not impact these resources would potentially avoid or lessen significant impacts to water resources. Taking into account feasibility, cost, and timeframe, which are critical to the BMP Update success, other combinations or suites of project components may not be environmentally superior to the proposed project due to the inability to meet the BMP Update objectives or reduce these impacts.

Table 5-4 Surface Water, Groundwater & Water Quality Impacts of Alternative Components Compared to Impacts of Proposed BMP Update Primary Components

	Proposed BMP Update Primary Component				
BMP Update Alternative (Secondary) Component	Increased Recycled Water Storage at Treatment Plant	Harkins Slough Recharge Facility Upgrades	Watsonville Slough with Recharge Basins	College Lake with Inland Pipeline to CDS	Murphy Crossing with Recharge Basins
CDS Expansion	+	+	+	+	+
Winter Recycled Water Deep Aquifer ASR	=	-	-	-	-
River Conveyance of Water for Recharge at Murphy Crossing	=	-	-	-	-
San Benito County Groundwater Demineralization at Watsonville Wastewater Treatment Plant	+	+	+	+	+
Expanded College Lake, Pinto Lake, Corralitos Creek, Watsonville Slough, and ASR	+	+	+	=	+
Seawater Desalination	+	+	+	+	+
Bolsa de San Cayetano with Pajaro River Diversion	+	+	+	+	+

Key:
+ The Alternative (Secondary) Component contains more severe and/or additional impacts to Surface Water, Groundwater & Water Quality when compared to the Primary Component.
- The Alternative (Secondary) Component contains less severe and/or fewer impacts to Surface Water, Groundwater & Water Quality when compared to the Primary Component.
= The Alternative (Secondary) Component impacts to Surface Water, Groundwater & Water Quality are similar to, or the same as, the Primary Component

Construction-Related Impacts

Table 5-5 compares construction-related impacts of the BMP Update alternative or secondary components to those found to occur with implementation of the primary components. The proposed BMP Update was found to result in potentially significant impacts to air quality, noise, traffic conditions and utilities due to temporary construction activities for Increased Recycled Water Storage at Treatment Plant, Harkins Slough Recharge Facility Upgrades, Watsonville Slough with Recharge Basins, College Lake with Inland Pipeline to CDS, and Murphy Crossing with Recharge Basins components of the BMP Update. Many of the secondary components would also have the potential to have impacts in these areas that would be the same (on an acre-by-acre basis) or more severe. Those secondary alternatives that would result in more severe or a greater number of impact are shown with "+", respectively, in **Table 5-5.** Those resulting in the same or similar impacts are shown with "="; and those with fewer or less impact or no impact related to construction activities are shown in with a "—". Replacing the primary components that significantly impact the environmental during construction with alternative (secondary) components could potentially avoid or lessen significant short-term, construction impacts. Taking into account feasibility, cost, and timeframe, which are critical to the BMP Update success, other combinations or suites of BMP Update components may not be environmentally superior to the proposed project due to the inability to meet the BMP Update objectives or reduce these impacts.

Table 5-5 Construction Impacts of Alternative Components Compared to Impacts of Proposed BMP Update Primary Components

	Proposed BMP Update Primary Component				
BMP Update Alternative (Secondary) Component	Increased Recycled Water Storage at Treatment Plant	Harkins Slough Recharge Facility Upgrades	Watsonville Slough with Recharge Basins	College Lake with Inland Pipeline to CDS	Murphy Crossing with Recharge Basins
CDS Expansion	+	+	+	=	+
Winter Recycled Water Deep Aquifer ASR	+	-	+	=	+
River Conveyance of Water for Recharge at Murphy Crossing	+	-	-	-	-
San Benito County Groundwater Demineralization at Watsonville Wastewater Treatment Plant	+	-	-	-	-
Expanded College Lake, Pinto Lake, Corralitos Creek, Watsonville Slough, and ASR	+	+	+	+	+
Seawater Desalination	+	+	+	+	+
Bolsa de San Cayetano with Pajaro River Diversion	+	+	+	+	+

Key:
+ The Alternative (Secondary) Component contains more severe and/or additional construction-related impacts when compared to the Primary Component.
- The Alternative (Secondary) Component contains less severe and/or fewer construction-related impacts when compared to the Primary Component.
= The Alternative (Secondary) Component construction-related impacts are similar to, or the same as, the Primary Component.

5.8 ENVIRONMENTALLY SUPERIOR ALTERNATIVE

CEQA requires that an environmentally superior alternative to the Proposed Project be specified, if one is identified. In general, the environmentally superior alternative is supposed to minimize adverse impacts to the environment while achieving most of the basic objectives of the project. The "No Project" alternative could lessen some of the direct significant and unavoidable impacts to agricultural land (conversion of agricultural land to non-agricultural use) associated with the Proposed BMP Update. However, this alternative does not achieve the basic project objective and, in fact, the EIR analysis found that seawater intrusion conditions in the Pajaro Valley groundwater basin would continue to worsen under the No Project Alternative. CEQA Guidelines §15126.6(e)(2) states: "If the environmentally superior alternative is the 'no project' alternative, the EIR shall also identify an environmentally superior alternative among the other alternatives."

Based on the above comparative alternatives analyses, there are several secondary components or alternatives that would have less environmental impacts than specific primary components included in the portfolio of BMP Update projects for certain resource issues/topics. As shown in **Tables 5-2** through **5-5**, some secondary components could reduce environmental impacts in some topics/issues. However, each would involve trade-off environmental impacts and trade-offs related to differences in siting, design, proximity to other BMP components, technical and economic feasibility, permitting/regulatory constraints, and ability to meet basic project objectives. Alternative locations for several of the components were described in Section 5.6, Alternative Locations for BMP Update Components, that would meet the basic project objectives and would potentially reduce significant impacts were thoroughly investigated for the Watsonville Slough with Recharge Basins component, but none have yet to be defined to the extent that they can be found to be economically and technically feasible and reduce environmental impacts, as described above.

All of the alternatives involve a series of trade-offs in terms of feasibility, severity of environmental impacts, and attainment of project objectives. Based on the above analysis, there is no clear Environmentally Superior Alternative that would be capable of eliminating or avoiding the significant and unavoidable impact of loss of agricultural land and could feasibly meet the project objectives. Given the basic objectives of the project to provide a reliable water source, minimize future degradation of water resources, and prevent the long-term loss of agricultural productivity, the proposed BMP Update could be considered the Environmentally Superior Alternative for the following reasons:

1) all of the significant impacts of the project can be reduced to a less than significant level with mitigation, with the exception of conversion of agricultural land to non-agricultural uses, and

2) eliminating the most implementable and feasible BMP Update components would likely result in far greater long-term impacts to agricultural land due to continued saltwater intrusion and basin overdraft. Ultimately, the impacts of ongoing overdraft basin-wide would require pumping reductions to achieve a balanced basin, whether through regulatory pumping restrictions or adjudication.

Based on the complete record of the alternatives analyses and comparison of the proposed BMP Update components described in Section 2, Project Description to all other considered alternatives, the proposed BMP Update would feasibly meet the project objectives and would likely result in fewer and less severe environmental impacts overall, thus is considered the Environmentally Superior Alternative.

APPENDIX BIO

Biological Resources Background Material

This appendix contains background information related to Section 3.4, Biological Resources, including the following results of database queries:

1. United States Department of the Interior, Fish and Wildlife Service, Official Species List
2. California Department of Fish and Wildlife California Natural Diversity Database
3. California Native Plant Society Inventory of Rare and Endangered Plants
4. National Oceanic and Atmospheric Administration Species List
5. Table BIO-1: List of Special-Status Species with Potential to Occur in the College Lake Study Area
6. Table BIO-2: 2014-2018 College Lake Study Waterfowl Abundance

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ventura Fish And Wildlife Office
2493 Portola Road, Suite B
Ventura, CA 93003-7726
Phone: (805) 644-1766 Fax: (805) 644-3958

In Reply Refer To: October 04, 2018
Consultation Code: 08EVEN00-2019-SLI-0027
Event Code: 08EVEN00-2019-E-00057
Project Name: College Lake

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed list identifies species listed as threatened and endangered, species proposed for listing as threatened or endangered, designated and proposed critical habitat, and species that are candidates for listing that may occur within the boundary of the area you have indicated using the U.S. Fish and Wildlife Service's (Service) Information Planning and Conservation System (IPaC). The species list fulfills the requirements under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.). Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the species list should be verified after 90 days. We recommend that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists following the same process you used to receive the enclosed list. Please include the Consultation Tracking Number in the header of this letter with any correspondence about the species list.

Due to staff shortages and excessive workload, we are unable to provide an official list more specific to your area. Numerous other sources of information are available for you to narrow the list to the habitats and conditions of the site in which you are interested. For example, we recommend conducting a biological site assessment or surveys for plants and animals that could help refine the list.

If a Federal agency is involved in the project, that agency has the responsibility to review its proposed activities and determine whether any listed species may be affected. If the project is a major construction project*, the Federal agency has the responsibility to prepare a biological assessment to make a determination of the effects of the action on the listed species or critical habitat. If the Federal agency determines that a listed species or critical habitat is likely to be adversely affected, it should request, in writing through our office, formal consultation pursuant to section 7 of the Act. Informal consultation may be used to exchange information and resolve conflicts with respect to threatened or endangered species or their critical habitat prior to a written request for formal consultation. During this review process, the Federal agency may engage in planning efforts but may not make any irreversible commitment of resources. Such a commitment could constitute a violation of section 7(d) of the Act.

Federal agencies are required to confer with the Service, pursuant to section 7(a)(4) of the Act, when an agency action is likely to jeopardize the continued existence of any proposed species or result in the destruction or adverse modification of proposed critical habitat (50 CFR 402.10(a)). A request for formal conference must be in writing and should include the same information that would be provided for a request for formal consultation. Conferences can also include discussions between the Service and the Federal agency to identify and resolve potential conflicts between an action and proposed species or proposed critical habitat early in the decision-making process. The Service recommends ways to minimize or avoid adverse effects of the action. These recommendations are advisory because the jeopardy prohibition of section 7(a)(2) of the Act does not apply until the species is listed or the proposed critical habitat is designated. The conference process fulfills the need to inform Federal agencies of possible steps that an agency might take at an early stage to adjust its actions to avoid jeopardizing a proposed species.

When a proposed species or proposed critical habitat may be affected by an action, the lead Federal agency may elect to enter into formal conference with the Service even if the action is not likely to jeopardize or result in the destruction or adverse modification of proposed critical habitat. If the proposed species is listed or the proposed critical habitat is designated after completion of the conference, the Federal agency may ask the Service, in writing, to confirm the conference as a formal consultation. If the Service reviews the proposed action and finds that no significant changes in the action as planned or in the information used during the conference have occurred, the Service will confirm the conference as a formal consultation on the project and no further section 7 consultation will be necessary. Use of the formal conference process in this manner can prevent delays in the event the proposed species is listed or the proposed critical habitat is designated during project development or implementation.

Candidate species are those species presently under review by the Service for consideration for Federal listing. Candidate species should be considered in the planning process because they may become listed or proposed for listing prior to project completion. Preparation of a biological assessment, as described in section 7(c) of the Act, is not required for candidate species. If early evaluation of your project indicates that it is likely to affect a candidate species, you may wish to request technical assistance from this office.

Only listed species receive protection under the Act. However, sensitive species should be considered in the planning process in the event they become listed or proposed for listing prior to project completion. We recommend that you review information in the California Department of Fish and Wildlife's Natural Diversity Data Base. You can contact the California Department of Fish and Wildlife at (916) 324-3812 for information on other sensitive species that may occur in this area.

[*A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.]

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Ventura Fish And Wildlife Office
2493 Portola Road, Suite B
Ventura, CA 93003-7726
(805) 644-1766

Project Summary

Consultation Code: 08EVEN00-2019-SLI-0027

Event Code: 08EVEN00-2019-E-00057

Project Name: College Lake

Project Type: DEVELOPMENT

Project Description: College Lake PTO

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/36.923278155382405N121.74990211177538W

Counties: Santa Cruz, CA

Endangered Species Act Species

There is a total of 16 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

---

1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
San Joaquin Kit Fox Vulpes macrotis mutica No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/2873	Endangered

Birds

NAME	STATUS
California Condor Gymnogyps californianus Population: U.S.A. only, except where listed as an experimental population There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/8193	Endangered
California Least Tern Sterna antillarum browni No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/8104	Endangered
Least Bell's Vireo Vireo bellii pusillus There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5945	Endangered
Marbled Murrelet Brachyramphus marmoratus Population: U.S.A. (CA, OR, WA) There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/4467	Threatened
Southwestern Willow Flycatcher Empidonax traillii extimus There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6749	Endangered
Western Snowy Plover Charadrius nivosus nivosus Population: Pacific Coast population DPS-U.S.A. (CA, OR, WA), Mexico (within 50 miles of Pacific coast) There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/8035	Threatened

Reptiles

NAME	STATUS
San Francisco Garter Snake Thamnophis sirtalis tetrataenia No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/5956	Endangered

Amphibians

NAME	STATUS
California Red-legged Frog Rana draytonii There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2891	Threatened
California Tiger Salamander Ambystoma californiense Population: U.S.A. (Central CA DPS) There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2076	Threatened
Santa Cruz Long-toed Salamander Ambystoma macrodactylum croceum There is proposed critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/7405	Endangered

Fishes

NAME	STATUS
Tidewater Goby Eucyclogobius newberryi There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/57	Endangered

Flowering Plants

NAME	STATUS
Marsh Sandwort Arenaria paludicola No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/2229	Endangered
Monterey Gilia Gilia tenuiflora ssp. arenaria No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/856	Endangered
Monterey Spineflower Chorizanthe pungens var. pungens There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/396	Threatened
Santa Cruz Tarplant Holocarpha macradenia There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6832	Threatened

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

Selected Elements by Scientific Name

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Quad IS (Watsonville East (3612186) OR Watsonville West (3612187) OR Soquel (3612188) OR Chittenden (3612185) OR Moss Landing (3612177) OR Prunedale (3612176) OR San Juan Bautista (3612175) OR Gilroy (3712115) OR Mt. Madonna (3712116) OR Loma Prieta (3712117))

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Accipiter cooperii Cooper's hawk	ABNKC12040	None	None	G5	S4	WL
Adela oplerella Opler's longhorn moth	IILEE0G040	None	None	G2	S2	
Agelaius tricolor tricolored blackbird	ABPBXB0020	None	Candidate Endangered	G2G3	S1S2	SSC
Ambystoma californiense California tiger salamander	AAAAA01180	Threatened	Threatened	G2G3	S2S3	WL
Ambystoma macrodactylum croceum Santa Cruz long-toed salamander	AAAAA01082	Endangered	Endangered	G5T1T2	S1S2	FP
Aneides flavipunctatus niger Santa Cruz black salamander	AAAAD01070	None	None	G3	S3	SSC
Anniella pulchra northern California legless lizard	ARACC01020	None	None	G3	S3	SSC
Antrozous pallidus pallid bat	AMACC10010	None	None	G5	S3	SSC
Aquila chrysaetos golden eagle	ABNKC22010	None	None	G5	S3	FP
Arctostaphylos andersonii Anderson's manzanita	PDERI04030	None	None	G2	S2	1B.2
Arctostaphylos hookeri ssp. hookeri Hooker's manzanita	PDERI040J1	None	None	G3T2	S2	1B.2
Arctostaphylos pajaroensis Pajaro manzanita	PDERI04100	None	None	G1	S1	1B.1
Asio flammeus short-eared owl	ABNSB13040	None	None	G5	S3	SSC
Athene cunicularia burrowing owl	ABNSB10010	None	None	G4	S3	SSC
Balsamorhiza macrolepis big-scale balsamroot	PDAST11061	None	None	G2	S2	1B.2
Bombus caliginosus obscure bumble bee	IIHYM24380	None	None	G4?	S1S2	
Bombus crotchii Crotch bumble bee	IIHYM24480	None	None	G3G4	S1S2	
Bombus occidentalis western bumble bee	IIHYM24250	None	None	G2G3	S1	

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Calyptridium parryi var. hesseae Santa Cruz Mountains pussypaws	PDPOR09052	None	None	G3G4T2	S2	1B.1
Castilleja rubicundula var. rubicundula pink creamsacs	PDSCR0D482	None	None	G5T2	S2	1B.2
Ceanothus ferrisiae Coyote ceanothus	PDRHA041N0	Endangered	None	G1	S1	1B.1
Central Dune Scrub Central Dune Scrub	CTT21320CA	None	None	G2	S2.2	
Central Maritime Chaparral Central Maritime Chaparral	CTT37C20CA	None	None	G2	S2.2	
Centromadia parryi ssp. congdonii Congdon's tarplant	PDAST4R0P1	None	None	G3T2	S2	1B.1
Charadrius alexandrinus nivosus western snowy plover	ABNNB03031	Threatened	None	G3T3	S2S3	SSC
Chorizanthe pungens var. pungens Monterey spineflower	PDPGN040M2	Threatened	None	G2T2	S2	1B.2
Chorizanthe robusta var. robusta robust spineflower	PDPGN040Q2	Endangered	None	G2T1	S1	1B.1
Cicindela ohlone Ohlone tiger beetle	IICOL026L0	Endangered	None	G1	S1	
Cirsium fontinale var. campylon Mt. Hamilton fountain thistle	PDAST2E163	None	None	G2T2	S2	1B.2
Clarkia concinna ssp. automixa Santa Clara red ribbons	PDONA050A1	None	None	G5?T3	S3	4.3
Coastal and Valley Freshwater Marsh Coastal and Valley Freshwater Marsh	CTT52410CA	None	None	G3	S2.1	
Coastal Brackish Marsh Coastal Brackish Marsh	CTT52200CA	None	None	G2	S2.1	
Coelus globosus globose dune beetle	IICOL4A010	None	None	G1G2	S1S2	
Cordylanthus rigidus ssp. littoralis seaside bird's-beak	PDSCR0J0P2	None	Endangered	G5T2	S2	1B.1
Corynorhinus townsendii Townsend's big-eared bat	AMACC08010	None	None	G3G4	S2	SSC
Coturnicops noveboracensis yellow rail	ABNME01010	None	None	G4	S1S2	SSC
Danaus plexippus pop. 1 monarch - California overwintering population	IILEPP2012	None	None	G4T2T3	S2S3	
Dicamptodon ensatus California giant salamander	AAAAH01020	None	None	G3	S2S3	SSC
Dipodomys venustus venustus Santa Cruz kangaroo rat	AMAFD03042	None	None	G4T1	S1	

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Dudleya abramsii ssp. setchellii Santa Clara Valley dudleya	PDCRA040Z0	Endangered	None	G4T2	S2	1B.1
Elanus leucurus white-tailed kite	ABNKC06010	None	None	G5	S3S4	FP
Emys marmorata western pond turtle	ARAAD02030	None	None	G3G4	S3	SSC
Ericameria fasciculata Eastwood's goldenbush	PDAST3L080	None	None	G2	S2	1B.1
Eriogonum nortonii Pinnacles buckwheat	PDPGN08470	None	None	G2	S2	1B.3
Eryngium aristulatum var. hooveri Hoover's button-celery	PDAPI0Z043	None	None	G5T1	S1	1B.1
Erysimum ammophilum sand-loving wallflower	PDBRA16010	None	None	G2	S2	1B.2
Eucyclogobius newberryi tidewater goby	AFCQN04010	Endangered	None	G3	S3	SSC
Euphilotes enoptes smithi Smith's blue butterfly	IILEPG2026	Endangered	None	G5T1T2	S1S2	
Euphydryas editha bayensis Bay checkerspot butterfly	IILEPK4055	Threatened	None	G5T1	S1	
Falco peregrinus anatum American peregrine falcon	ABNKD06071	Delisted	Delisted	G4T4	S3S4	FP
Fritillaria liliacea fragrant fritillary	PMLIL0V0C0	None	None	G2	S2	1B.2
Gilia tenuiflora ssp. arenaria Monterey gilia	PDPLM041P2	Endangered	Threatened	G3G4T2	S2	1B.2
Helminthoglypta sequoicola consors redwood shoulderband	IMGASC2421	None	None	G2T1	S1	
Hoita strobilina Loma Prieta hoita	PDFAB5Z030	None	None	G2?	S2?	1B.1
Holocarpha macradenia Santa Cruz tarplant	PDAST4X020	Threatened	Endangered	G1	S1	1B.1
Horkelia cuneata var. sericea Kellogg's horkelia	PDROS0W043	None	None	G4T1?	S1?	1B.1
Lasiurus cinereus hoary bat	AMACC05030	None	None	G5	S4	
Lasthenia californica ssp. macrantha perennial goldfields	PDAST5L0C5	None	None	G3T2	S2	1B.2
Lavinia symmetricus subditus Monterey roach	AFCJB19026	None	None	G4T2T3	S2S3	SSC
Legenere limosa legenere	PDCAM0C010	None	None	G2	S2	1B.1

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Lessingia micradenia var. glabrata smooth lessingia	PDAST5S062	None	None	G2T2	S2	1B.2
Linderiella occidentalis California linderiella	ICBRA06010	None	None	G2G3	S2S3	
Malacothamnus arcuatus arcuate bush-mallow	PDMAL0Q0E0	None	None	G2Q	S2	1B.2
Monolopia gracilens woodland woollythreads	PDAST6G010	None	None	G3	S3	1B.2
Northern Coastal Salt Marsh Northern Coastal Salt Marsh	CTT52110CA	None	None	G3	S3.2	
Oncorhynchus mykiss irideus pop. 8 steelhead - central California coast DPS	AFCHA0209G	Threatened	None	G5T2T3Q	S2S3	
Oncorhynchus mykiss irideus pop. 9 steelhead - south-central California coast DPS	AFCHA0209H	Threatened	None	G5T2Q	S2	
Optioservus canus Pinnacles optioservus riffle beetle	IICOL5E020	None	None	G1	S1	
Pedicularis dudleyi Dudley's lousewort	PDSCR1K0D0	None	Rare	G2	S2	1B.2
Penstemon rattanii var. kleei Santa Cruz Mountains beardtongue	PDSCR1L5B1	None	None	G4T2	S2	1B.2
Pentachaeta bellidiflora white-rayed pentachaeta	PDAST6X030	Endangered	Endangered	G1	S1	1B.1
Phrynosoma blainvillii coast horned lizard	ARACF12100	None	None	G3G4	S3S4	SSC
Piperia yadonii Yadon's rein orchid	PMORC1X070	Endangered	None	G1	S1	1B.1
Plagiobothrys chorisianus var. chorisianus Choris' popcornflower	PDBOR0V061	None	None	G3T1Q	S1	1B.2
Plagiobothrys diffusus San Francisco popcornflower	PDBOR0V080	None	Endangered	G1Q	S1	1B.1
Puccinellia simplex California alkali grass	PMPOA53110	None	None	G3	S2	1B.2
Rallus obsoletus obsoletus California Ridgway's rail	ABNME05016	Endangered	Endangered	G5T1	S1	FP
Rana boylii foothill yellow-legged frog	AAABH01050	None	Candidate Threatened	G3	S3	SSC
Rana draytonii California red-legged frog	AAABH01022	Threatened	None	G2G3	S2S3	SSC
Reithrodontomys megalotis distichlis Salinas harvest mouse	AMAFF02032	None	None	G5T1	S1	
Riparia riparia bank swallow	ABPAU08010	None	Threatened	G5	S2	

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Rosa pinetorum pine rose	PDROS1J0W0	None	None	G2	S2	1B.2
Spirinchus thaleichthys longfin smelt	AFCHB03010	Candidate	Threatened	G5	S1	SSC
Streptanthus albidus ssp. peramoenus most beautiful jewelflower	PDBRA2G012	None	None	G2T2	S2	1B.2
Taricha torosa Coast Range newt	AAAAF02032	None	None	G4	S4	SSC
Taxidea taxus American badger	AMAJF04010	None	None	G5	S3	SSC
Thaleichthys pacificus eulachon	AFCHB04010	Threatened	None	G5	S3	
Trifolium buckwestiorum Santa Cruz clover	PDFAB402W0	None	None	G2	S2	1B.1
Trifolium hydrophilum saline clover	PDFAB400R5	None	None	G2	S2	1B.2
Trimerotropis infantilis Zayante band-winged grasshopper	IIORT36030	Endangered	None	G1	S1	
Tryonia imitator mimic tryonia (=California brackishwater snail)	IMGASJ7040	None	None	G2	S2	
Vireo bellii pusillus least Bell's vireo	ABPBW01114	Endangered	Endangered	G5T2	S2	

Record Count: 92

CNPS California Native Plant Society

Plant List

Inventory of Rare and Endangered Plants

58 matches found. *Click on scientific name for details*

Search Criteria

Found in Quads 3612186, 3612187, 3612188, 3612185, 3612177, 3612176, 3612175, 3712117 3712116 and 3712115;

Modify Search Criteria Export to Excel Modify Columns Modify Sort Display Photos

Scientific Name	Common Name	Family	Lifeform	Blooming Period	CA Rare Plant Rank	State Rank	Global Rank
Acanthomintha lanceolata	Santa Clara thorn-mint	Lamiaceae	annual herb	Mar-Jun	4.2	S4	G4
Arctostaphylos andersonii	Anderson's manzanita	Ericaceae	perennial evergreen shrub	Nov-May	1B.2	S2	G2
Arctostaphylos hookeri ssp. hookeri	Hooker's manzanita	Ericaceae	perennial evergreen shrub	Jan-Jun	1B.2	S2	G3T2
Arctostaphylos pajaroensis	Pajaro manzanita	Ericaceae	perennial evergreen shrub	Dec-Mar	1B.1	S1	G1
Arctostaphylos regismontana	Kings Mountain manzanita	Ericaceae	perennial evergreen shrub	Dec-Apr	1B.2	S2	G2
Balsamorhiza macrolepis	big-scale balsamroot	Asteraceae	perennial herb	Mar-Jun	1B.2	S2	G2
Calyptridium parryi var. hesseae	Santa Cruz Mountains pussypaws	Montiaceae	annual herb	May-Aug	1B.1	S2	G3G4T2
Castilleja latifolia	Monterey Coast paintbrush	Orobanchaceae	perennial herb (hemiparasitic)	Feb-Sep	4.3	S4	G4
Castilleja rubicundula var. rubicundula	pink creamsacs	Orobanchaceae	annual herb (hemiparasitic)	Apr-Jun	1B.2	S2	G5T2
Ceanothus ferrisiae	Coyote ceanothus	Rhamnaceae	perennial evergreen shrub	Jan-May	1B.1	S1	G1
Ceanothus rigidus	Monterey ceanothus	Rhamnaceae	perennial evergreen shrub	Feb-Apr(Jun)	4.2	S4	G4
Centromadia parryi ssp. congdonii	Congdon's tarplant	Asteraceae	annual herb	May-Oct(Nov)	1B.1	S2	G3T2
Chorizanthe pungens var. hartwegiana	Ben Lomond spineflower	Polygonaceae	annual herb	Apr-Jul	1B.1	S1	G2T1
Chorizanthe pungens var. pungens	Monterey spineflower	Polygonaceae	annual herb	Apr-Jun(Jul-Aug)	1B.2	S2	G2T2
	robust spineflower	Polygonaceae	annual herb	Apr-Sep	1B.1	S1	G2T1

Chorizanthe robusta var. robusta							
Cirsium fontinale var. campylon	Mt. Hamilton fountain thistle	Asteraceae	perennial herb	(Feb)Apr-Oct	1B.2	S2	G2T2
Clarkia breweri	Brewer's clarkia	Onagraceae	annual herb	Apr-Jun	4.2	S4	G4
Clarkia concinna ssp. automixa	Santa Clara red ribbons	Onagraceae	annual herb	(Apr)May-Jun(Jul)	4.3	S3	G5?T3
Clarkia lewisii	Lewis' clarkia	Onagraceae	annual herb	May-Jul	4.3	S4	G4
Cordylanthus rigidus ssp. littoralis	seaside bird's-beak	Orobanchaceae	annual herb (hemiparasitic)	Apr-Oct	1B.1	S2	G5T2
Cypripedium fasciculatum	clustered lady's-slipper	Orchidaceae	perennial rhizomatous herb	Mar-Aug	4.2	S4	G4
Dudleya abramsii ssp. setchellii	Santa Clara Valley dudleya	Crassulaceae	perennial herb	Apr-Oct	1B.1	S2	G4T2
Elymus californicus	California bottle-brush grass	Poaceae	perennial herb	May-Aug(Nov)	4.3	S4	G4
Ericameria fasciculata	Eastwood's goldenbush	Asteraceae	perennial evergreen shrub	Jul-Oct	1B.1	S2	G2
Eriogonum nortonii	Pinnacles buckwheat	Polygonaceae	annual herb	(Apr)May-Aug(Sep)	1B.3	S2	G2
Eryngium aristulatum var. hooveri	Hoover's button-celery	Apiaceae	annual / perennial herb	(Jun)Jul(Aug)	1B.1	S1	G5T1
Erysimum ammophilum	sand-loving wallflower	Brassicaceae	perennial herb	Feb-Jun	1B.2	S2	G2
Fritillaria liliacea	fragrant fritillary	Liliaceae	perennial bulbiferous herb	Feb-Apr	1B.2	S2	G2
Gilia tenuiflora ssp. arenaria	Monterey gilia	Polemoniaceae	annual herb	Apr-Jun	1B.2	S2	G3G4T2
Grindelia hirsutula var. maritima	San Francisco gumplant	Asteraceae	perennial herb	Jun-Sep	3.2	S1	G5T1Q
Hoita strobilina	Loma Prieta hoita	Fabaceae	perennial herb	May-Jul(Aug-Oct)	1B.1	S2?	G2?
Holocarpha macradenia	Santa Cruz tarplant	Asteraceae	annual herb	Jun-Oct	1B.1	S1	G1
Horkelia cuneata var. sericea	Kellogg's horkelia	Rosaceae	perennial herb	Apr-Sep	1B.1	S1?	G4T1?
Iris longipetala	coast iris	Iridaceae	perennial rhizomatous herb	Mar-May	4.2	S3	G3
Lasthenia californica ssp. macrantha	perennial goldfields	Asteraceae	perennial herb	Jan-Nov	1B.2	S2	G3T2
Legenere limosa	legenere	Campanulaceae	annual herb	Apr-Jun	1B.1	S2	G2
Lessingia hololeuca	woolly-headed lessingia	Asteraceae	annual herb	Jun-Oct	3	S3?	G3?
Lessingia micradenia var. glabrata	smooth lessingia	Asteraceae	annual herb	(Apr-Jun)Jul-Nov	1B.2	S2	G2T2
Lomatium parvifolium	small-leaved lomatium	Apiaceae	perennial herb	Jan-Jun	4.2	S4	G4

Malacothamnus arcuatus	arcuate bush-mallow	Malvaceae	perennial evergreen shrub	Apr-Sep	1B.2	S2	G2Q
Malacothamnus hallii	Hall's bush-mallow	Malvaceae	perennial evergreen shrub	(Apr)May-Sep(Oct)	1B.2	S2	G2
Micropus amphibolus	Mt. Diablo cottonweed	Asteraceae	annual herb	Mar-May	3.2	S3S4	G3G4
Monolopia gracilens	woodland woolythreads	Asteraceae	annual herb	(Feb)Mar-Jul	1B.2	S3	G3
Pedicularis dudleyi	Dudley's lousewort	Orobanchaceae	perennial herb	Apr-Jun	1B.2	S2	G2
Penstemon rattanii var. kleei	Santa Cruz Mountains beardtongue	Plantaginaceae	perennial herb	May-Jun	1B.2	S2	G4T2
Pentachaeta bellidiflora	white-rayed pentachaeta	Asteraceae	annual herb	Mar-May	1B.1	S1	G1
Piperia michaelii	Michael's rein orchid	Orchidaceae	perennial herb	Apr-Aug	4.2	S3	G3
Piperia yadonii	Yadon's rein orchid	Orchidaceae	perennial herb	(Feb)May-Aug	1B.1	S1	G1
Plagiobothrys chorisianus var. chorisianus	Choris' popcornflower	Boraginaceae	annual herb	Mar-Jun	1B.2	S1	G3T1Q
Plagiobothrys diffusus	San Francisco popcornflower	Boraginaceae	annual herb	Mar-Jun	1B.1	S1	G1Q
Puccinellia simplex	California alkali grass	Poaceae	annual herb	Mar-May	1B.2	S2	G3
Rosa pinetorum	pine rose	Rosaceae	perennial shrub	May,Jul	1B.2	S2	G2
Sidalcea malachroides	maple-leaved checkerbloom	Malvaceae	perennial herb	(Mar)Apr-Aug	4.2	S3	G3
Streptanthus albidus ssp. albidus	Metcalf Canyon jewelflower	Brassicaceae	annual herb	Apr-Jul	1B.1	S1	G2T1
Streptanthus albidus ssp. peramoenus	most beautiful jewelflower	Brassicaceae	annual herb	(Mar)Apr-Sep(Oct)	1B.2	S2	G2T2
Trifolium amoenum	two-fork clover	Fabaceae	annual herb	Apr-Jun	1B.1	S1	G1
Trifolium buckwestiorum	Santa Cruz clover	Fabaceae	annual herb	Apr-Oct	1B.1	S2	G2
Trifolium hydrophilum	saline clover	Fabaceae	annual herb	Apr-Jun	1B.2	S2	G2

Suggested Citation

California Native Plant Society, Rare Plant Program. 2018. Inventory of Rare and Endangered Plants of California (online edition, v8-03 0.39). Website http://www.rareplants.cnps.org [accessed 04 October 2018].

CalPhotos

Questions and Comments

rareplants@cnps.org

Species list run on 02/21/2018

Quad Name **Loma Prieta**
Quad Number **37121-A7**

ESA Anadromous Fish

SONCC Coho ESU (T) -
CCC Coho ESU (E) - **X**
CC Chinook Salmon ESU (T) -
CVSR Chinook Salmon ESU (T) -
SRWR Chinook Salmon ESU (E) -
NC Steelhead DPS (T) -
CCC Steelhead DPS (T) - **X**
SCCC Steelhead DPS (T) - **X**
SC Steelhead DPS (E) -
CCV Steelhead DPS (T) -
Eulachon (T) -
sDPS Green Sturgeon (T) -

ESA Anadromous Fish Critical Habitat

SONCC Coho Critical Habitat -
CCC Coho Critical Habitat - **X**
CC Chinook Salmon Critical Habitat -
CVSR Chinook Salmon Critical Habitat -
SRWR Chinook Salmon Critical Habitat -
NC Steelhead Critical Habitat -
CCC Steelhead Critical Habitat - **X**
SCCC Steelhead Critical Habitat - **X**
SC Steelhead Critical Habitat -
CCV Steelhead Critical Habitat -

Eulachon Critical Habitat -
sDPS Green Sturgeon Critical Habitat -

ESA Marine Invertebrates

Range Black Abalone (E) -
Range White Abalone (E) -

ESA Marine Invertebrates Critical Habitat

Black Abalone Critical Habitat -

ESA Sea Turtles

East Pacific Green Sea Turtle (T) -
Olive Ridley Sea Turtle (T/E) -
Leatherback Sea Turtle (E) -
North Pacific Loggerhead Sea Turtle (E) -

ESA Whales

Blue Whale (E) -
Fin Whale (E) -
Humpback Whale (E) -
Southern Resident Killer Whale (E) -
North Pacific Right Whale (E) -
Sei Whale (E) -
Sperm Whale (E) -

ESA Pinnipeds

Guadalupe Fur Seal (T) -
Steller Sea Lion Critical Habitat -

Essential Fish Habitat

Coho EFH - **X**
Chinook Salmon EFH - **X**
Groundfish EFH -
Coastal Pelagics EFH -

Highly Migratory Species EFH -

MMPA Species (See list at left)

ESA and MMPA Cetaceans/Pinnipeds
See list at left and consult the NMFS Long Beach office 562-980-4000

MMPA Cetaceans -
MMPA Pinnipeds -

Quad Name **Mount Madonna**
Quad Number **37121-A6**

ESA Anadromous Fish

SONCC Coho ESU (T) -
CCC Coho ESU (E) -
CC Chinook Salmon ESU (T) -
CVSR Chinook Salmon ESU (T) -
SRWR Chinook Salmon ESU (E) -
NC Steelhead DPS (T) -
CCC Steelhead DPS (T) -
SCCC Steelhead DPS (T) - **X**
SC Steelhead DPS (E) -
CCV Steelhead DPS (T) -
Eulachon (T) -
sDPS Green Sturgeon (T) -

ESA Anadromous Fish Critical Habitat

SONCC Coho Critical Habitat -
CCC Coho Critical Habitat -
CC Chinook Salmon Critical Habitat -
CVSR Chinook Salmon Critical Habitat -
SRWR Chinook Salmon Critical Habitat -
NC Steelhead Critical Habitat -
CCC Steelhead Critical Habitat -
SCCC Steelhead Critical Habitat - **X**

SC Steelhead Critical Habitat -
CCV Steelhead Critical Habitat -
Eulachon Critical Habitat -
sDPS Green Sturgeon Critical Habitat -

ESA Marine Invertebrates

Range Black Abalone (E) -
Range White Abalone (E) -

ESA Marine Invertebrates Critical Habitat

Black Abalone Critical Habitat -

ESA Sea Turtles

East Pacific Green Sea Turtle (T) -
Olive Ridley Sea Turtle (T/E) -
Leatherback Sea Turtle (E) -
North Pacific Loggerhead Sea Turtle (E) -

ESA Whales

Blue Whale (E) -
Fin Whale (E) -
Humpback Whale (E) -
Southern Resident Killer Whale (E) -
North Pacific Right Whale (E) -
Sei Whale (E) -
Sperm Whale (E) -

ESA Pinnipeds

Guadalupe Fur Seal (T) -
Steller Sea Lion Critical Habitat -

Essential Fish Habitat

Coho EFH -
Chinook Salmon EFH -
Groundfish EFH -

Coastal Pelagics EFH -
Highly Migratory Species EFH -

MMPA Species (See list at left)

ESA and MMPA Cetaceans/Pinnipeds
See list at left and consult the NMFS Long Beach office 562-980-4000

MMPA Cetaceans -
MMPA Pinnipeds -

Quad Name **Gilroy**
Quad Number **37121-A5**

ESA Anadromous Fish

SONCC Coho ESU (T) -
CCC Coho ESU (E) -
CC Chinook Salmon ESU (T) -
CVSR Chinook Salmon ESU (T) -
SRWR Chinook Salmon ESU (E) -
NC Steelhead DPS (T) -
CCC Steelhead DPS (T) -
SCCC Steelhead DPS (T) - **X**
SC Steelhead DPS (E) -
CCV Steelhead DPS (T) -
Eulachon (T) -
sDPS Green Sturgeon (T) -

ESA Anadromous Fish Critical Habitat

SONCC Coho Critical Habitat -
CCC Coho Critical Habitat -
CC Chinook Salmon Critical Habitat -
CVSR Chinook Salmon Critical Habitat -
SRWR Chinook Salmon Critical Habitat -
NC Steelhead Critical Habitat -
CCC Steelhead Critical Habitat -

SCCC Steelhead Critical Habitat - **X**
SC Steelhead Critical Habitat -
CCV Steelhead Critical Habitat -
Eulachon Critical Habitat -
sDPS Green Sturgeon Critical Habitat -

ESA Marine Invertebrates

Range Black Abalone (E) -
Range White Abalone (E) -

ESA Marine Invertebrates Critical Habitat

Black Abalone Critical Habitat -

ESA Sea Turtles

East Pacific Green Sea Turtle (T) -
Olive Ridley Sea Turtle (T/E) -
Leatherback Sea Turtle (E) -
North Pacific Loggerhead Sea Turtle (E) -

ESA Whales

Blue Whale (E) -
Fin Whale (E) -
Humpback Whale (E) -
Southern Resident Killer Whale (E) -
North Pacific Right Whale (E) -
Sei Whale (E) -
Sperm Whale (E) -

ESA Pinnipeds

Guadalupe Fur Seal (T) -
Steller Sea Lion Critical Habitat -

Essential Fish Habitat

Coho EFH -
Chinook Salmon EFH -

Groundfish EFH -
Coastal Pelagics EFH -
Highly Migratory Species EFH -

MMPA Species (See list at left)

ESA and MMPA Cetaceans/Pinnipeds
See list at left and consult the NMFS Long Beach office 562-980-4000

MMPA Cetaceans -
MMPA Pinnipeds -

Quad Name **Watsonville West**
Quad Number **36121-H7**

ESA Anadromous Fish

SONCC Coho ESU (T) -	
CCC Coho ESU (E) -	**X**
CC Chinook Salmon ESU (T) -	
CVSR Chinook Salmon ESU (T) -	
SRWR Chinook Salmon ESU (E) -	
NC Steelhead DPS (T) -	
CCC Steelhead DPS (T) -	**X**
SCCC Steelhead DPS (T) -	**X**
SC Steelhead DPS (E) -	
CCV Steelhead DPS (T) -	
Eulachon (T) -	
sDPS Green Sturgeon (T) -	**X**

ESA Anadromous Fish Critical Habitat

SONCC Coho Critical Habitat -	
CCC Coho Critical Habitat -	**X**
CC Chinook Salmon Critical Habitat -	
CVSR Chinook Salmon Critical Habitat -	
SRWR Chinook Salmon Critical Habitat -	
NC Steelhead Critical Habitat -	

CCC Steelhead Critical Habitat - **X**
SCCC Steelhead Critical Habitat - **X**
SC Steelhead Critical Habitat -
CCV Steelhead Critical Habitat -
Eulachon Critical Habitat -
sDPS Green Sturgeon Critical Habitat - **X**

ESA Marine Invertebrates

Range Black Abalone (E) - **X**
Range White Abalone (E) -

ESA Marine Invertebrates Critical Habitat

Black Abalone Critical Habitat -

ESA Sea Turtles

East Pacific Green Sea Turtle (T) - **X**
Olive Ridley Sea Turtle (T/E) - **X**
Leatherback Sea Turtle (E) - **X**
North Pacific Loggerhead Sea Turtle (E) - **X**

ESA Whales

Blue Whale (E) - **X**
Fin Whale (E) - **X**
Humpback Whale (E) - **X**
Southern Resident Killer Whale (E) - **X**
North Pacific Right Whale (E) - **X**
Sei Whale (E) - **X**
Sperm Whale (E) - **X**

ESA Pinnipeds

Guadalupe Fur Seal (T) - **X**
Steller Sea Lion Critical Habitat -

Essential Fish Habitat

Coho EFH - **X**

Chinook Salmon EFH -

Groundfish EFH - **X**

Coastal Pelagics EFH - **X**

Highly Migratory Species EFH - **X**

MMPA Species (See list at left)

ESA and MMPA Cetaceans/Pinnipeds
See list at left and consult the NMFS Long Beach office 562-980-4000

MMPA Cetaceans - **X**

MMPA Pinnipeds - **X**

Quad Name **Watsonville East**

Quad Number **36121-H6**

ESA Anadromous Fish

SONCC Coho ESU (T) -

CCC Coho ESU (E) -

CC Chinook Salmon ESU (T) -

CVSR Chinook Salmon ESU (T) -

SRWR Chinook Salmon ESU (E) -

NC Steelhead DPS (T) -

CCC Steelhead DPS (T) -

SCCC Steelhead DPS (T) - **X**

SC Steelhead DPS (E) -

CCV Steelhead DPS (T) -

Eulachon (T) -

sDPS Green Sturgeon (T) -

ESA Anadromous Fish Critical Habitat

SONCC Coho Critical Habitat -

CCC Coho Critical Habitat -

CC Chinook Salmon Critical Habitat -

CVSR Chinook Salmon Critical Habitat -

SRWR Chinook Salmon Critical Habitat -
NC Steelhead Critical Habitat -
CCC Steelhead Critical Habitat -
SCCC Steelhead Critical Habitat - **X**
SC Steelhead Critical Habitat -
CCV Steelhead Critical Habitat -
Eulachon Critical Habitat -
sDPS Green Sturgeon Critical Habitat -

ESA Marine Invertebrates

Range Black Abalone (E) -
Range White Abalone (E) -

ESA Marine Invertebrates Critical Habitat

Black Abalone Critical Habitat -

ESA Sea Turtles

East Pacific Green Sea Turtle (T) -
Olive Ridley Sea Turtle (T/E) -
Leatherback Sea Turtle (E) -
North Pacific Loggerhead Sea Turtle (E) -

ESA Whales

Blue Whale (E) -
Fin Whale (E) -
Humpback Whale (E) -
Southern Resident Killer Whale (E) -
North Pacific Right Whale (E) -
Sei Whale (E) -
Sperm Whale (E) -

ESA Pinnipeds

Guadalupe Fur Seal (T) -
Steller Sea Lion Critical Habitat -

Essential Fish Habitat

Coho EFH -
Chinook Salmon EFH -
Groundfish EFH -
Coastal Pelagics EFH -
Highly Migratory Species EFH -

MMPA Species (See list at left)

ESA and MMPA Cetaceans/Pinnipeds
See list at left and consult the NMFS Long Beach office 562-980-4000

MMPA Cetaceans -
MMPA Pinnipeds -

Quad Name **Chittenden**
Quad Number **36121-H5**

ESA Anadromous Fish

SONCC Coho ESU (T) -
CCC Coho ESU (E) -
CC Chinook Salmon ESU (T) -
CVSR Chinook Salmon ESU (T) -
SRWR Chinook Salmon ESU (E) -
NC Steelhead DPS (T) -
CCC Steelhead DPS (T) -
SCCC Steelhead DPS (T) - **X**
SC Steelhead DPS (E) -
CCV Steelhead DPS (T) -
Eulachon (T) -
sDPS Green Sturgeon (T) -

ESA Anadromous Fish Critical Habitat

SONCC Coho Critical Habitat -
CCC Coho Critical Habitat -
CC Chinook Salmon Critical Habitat -

CVSR Chinook Salmon Critical Habitat -
SRWR Chinook Salmon Critical Habitat -
NC Steelhead Critical Habitat -
CCC Steelhead Critical Habitat -
SCCC Steelhead Critical Habitat - **X**
SC Steelhead Critical Habitat -
CCV Steelhead Critical Habitat -
Eulachon Critical Habitat -
sDPS Green Sturgeon Critical Habitat -

ESA Marine Invertebrates

Range Black Abalone (E) -
Range White Abalone (E) -

ESA Marine Invertebrates Critical Habitat

Black Abalone Critical Habitat -

ESA Sea Turtles

East Pacific Green Sea Turtle (T) -
Olive Ridley Sea Turtle (T/E) -
Leatherback Sea Turtle (E) -
North Pacific Loggerhead Sea Turtle (E) -

ESA Whales

Blue Whale (E) -
Fin Whale (E) -
Humpback Whale (E) -
Southern Resident Killer Whale (E) -
North Pacific Right Whale (E) -
Sei Whale (E) -
Sperm Whale (E) -

ESA Pinnipeds

Guadalupe Fur Seal (T) -
Steller Sea Lion Critical Habitat -

Essential Fish Habitat

Coho EFH -
Chinook Salmon EFH -
Groundfish EFH -
Coastal Pelagics EFH -
Highly Migratory Species EFH -

MMPA Species (See list at left)

ESA and MMPA Cetaceans/Pinnipeds
See list at left and consult the NMFS Long Beach office 562-980-4000

MMPA Cetaceans -
MMPA Pinnipeds -

Quad Name **Moss Landing**
Quad Number **36121-G7**

ESA Anadromous Fish

SONCC Coho ESU (T) -	
CCC Coho ESU (E) -	**X**
CC Chinook Salmon ESU (T) -	
CVSR Chinook Salmon ESU (T) -	
SRWR Chinook Salmon ESU (E) -	
NC Steelhead DPS (T) -	
CCC Steelhead DPS (T) -	**X**
SCCC Steelhead DPS (T) -	**X**
SC Steelhead DPS (E) -	
CCV Steelhead DPS (T) -	
Eulachon (T) -	
sDPS Green Sturgeon (T) -	**X**

ESA Anadromous Fish Critical Habitat

SONCC Coho Critical Habitat -	
CCC Coho Critical Habitat -	**X**

CC Chinook Salmon Critical Habitat -
CVSR Chinook Salmon Critical Habitat -
SRWR Chinook Salmon Critical Habitat -
NC Steelhead Critical Habitat -
CCC Steelhead Critical Habitat -
SCCC Steelhead Critical Habitat - **X**
SC Steelhead Critical Habitat -
CCV Steelhead Critical Habitat -
Eulachon Critical Habitat -
sDPS Green Sturgeon Critical Habitat - **X**

ESA Marine Invertebrates

Range Black Abalone (E) - **X**
Range White Abalone (E) -

ESA Marine Invertebrates Critical Habitat

Black Abalone Critical Habitat -

ESA Sea Turtles

East Pacific Green Sea Turtle (T) - **X**
Olive Ridley Sea Turtle (T/E) - **X**
Leatherback Sea Turtle (E) - **X**
North Pacific Loggerhead Sea Turtle (E) - **X**

ESA Whales

Blue Whale (E) - **X**
Fin Whale (E) - **X**
Humpback Whale (E) - **X**
Southern Resident Killer Whale (E) - **X**
North Pacific Right Whale (E) - **X**
Sei Whale (E) - **X**
Sperm Whale (E) - **X**

ESA Pinnipeds

Guadalupe Fur Seal (T) - **X**
Steller Sea Lion Critical Habitat -

Essential Fish Habitat

Coho EFH - **X**
Chinook Salmon EFH -
Groundfish EFH - **X**
Coastal Pelagics EFH - **X**
Highly Migratory Species EFH - **X**

MMPA Species (See list at left)

ESA and MMPA Cetaceans/Pinnipeds
See list at left and consult the NMFS Long Beach office 562-980-4000

MMPA Cetaceans - **X**
MMPA Pinnipeds - **X**

Quad Name **Prunedale**
Quad Number **36121-G6**

ESA Anadromous Fish

SONCC Coho ESU (T) -
CCC Coho ESU (E) -
CC Chinook Salmon ESU (T) -
CVSR Chinook Salmon ESU (T) -
SRWR Chinook Salmon ESU (E) -
NC Steelhead DPS (T) -
CCC Steelhead DPS (T) -
SCCC Steelhead DPS (T) - **X**
SC Steelhead DPS (E) -
CCV Steelhead DPS (T) -
Eulachon (T) -
sDPS Green Sturgeon (T) -

ESA Anadromous Fish Critical Habitat

SONCC Coho Critical Habitat -
CCC Coho Critical Habitat -
CC Chinook Salmon Critical Habitat -
CVSR Chinook Salmon Critical Habitat -
SRWR Chinook Salmon Critical Habitat -
NC Steelhead Critical Habitat -
CCC Steelhead Critical Habitat -
SCCC Steelhead Critical Habitat - **X**
SC Steelhead Critical Habitat -
CCV Steelhead Critical Habitat -
Eulachon Critical Habitat -
sDPS Green Sturgeon Critical Habitat -

ESA Marine Invertebrates

Range Black Abalone (E) -
Range White Abalone (E) -

ESA Marine Invertebrates Critical Habitat

Black Abalone Critical Habitat -

ESA Sea Turtles

East Pacific Green Sea Turtle (T) -
Olive Ridley Sea Turtle (T/E) -
Leatherback Sea Turtle (E) -
North Pacific Loggerhead Sea Turtle (E) -

ESA Whales

Blue Whale (E) -
Fin Whale (E) -
Humpback Whale (E) -
Southern Resident Killer Whale (E) -
North Pacific Right Whale (E) -
Sei Whale (E) -
Sperm Whale (E) -

ESA Pinnipeds

Guadalupe Fur Seal (T) -
Steller Sea Lion Critical Habitat -

Essential Fish Habitat

Coho EFH -
Chinook Salmon EFH -
Groundfish EFH - **X**
Coastal Pelagics EFH - **X**
Highly Migratory Species EFH -

MMPA Species (See list at left)

ESA and MMPA Cetaceans/Pinnipeds
See list at left and consult the NMFS Long Beach office 562-980-4000

MMPA Cetaceans -
MMPA Pinnipeds -

Quad Name **San Juan Bautista**
Quad Number **36121-G5**

ESA Anadromous Fish

SONCC Coho ESU (T) -
CCC Coho ESU (E) -
CC Chinook Salmon ESU (T) -
CVSR Chinook Salmon ESU (T) -
SRWR Chinook Salmon ESU (E) -
NC Steelhead DPS (T) -
CCC Steelhead DPS (T) -
SCCC Steelhead DPS (T) - **X**
SC Steelhead DPS (E) -
CCV Steelhead DPS (T) -
Eulachon (T) -
sDPS Green Sturgeon (T) -

ESA Anadromous Fish Critical Habitat

SONCC Coho Critical Habitat -
CCC Coho Critical Habitat -
CC Chinook Salmon Critical Habitat -
CVSR Chinook Salmon Critical Habitat -
SRWR Chinook Salmon Critical Habitat -
NC Steelhead Critical Habitat -
CCC Steelhead Critical Habitat -
SCCC Steelhead Critical Habitat - **X**
SC Steelhead Critical Habitat -
CCV Steelhead Critical Habitat -
Eulachon Critical Habitat -
sDPS Green Sturgeon Critical Habitat -

ESA Marine Invertebrates

Range Black Abalone (E) -
Range White Abalone (E) -

ESA Marine Invertebrates Critical Habitat

Black Abalone Critical Habitat -

ESA Sea Turtles

East Pacific Green Sea Turtle (T) -
Olive Ridley Sea Turtle (T/E) -
Leatherback Sea Turtle (E) -
North Pacific Loggerhead Sea Turtle (E) -

ESA Whales

Blue Whale (E) -
Fin Whale (E) -
Humpback Whale (E) -
Southern Resident Killer Whale (E) -
North Pacific Right Whale (E) -
Sei Whale (E) -
Sperm Whale (E) -

ESA Pinnipeds

Guadalupe Fur Seal (T) -
Steller Sea Lion Critical Habitat -

Essential Fish Habitat

Coho EFH -
Chinook Salmon EFH -
Groundfish EFH -
Coastal Pelagics EFH -
Highly Migratory Species EFH -

MMPA Species (See list at left)

ESA and MMPA Cetaceans/Pinnipeds
See list at left and consult the NMFS Long Beach office 562-980-4000

MMPA Cetaceans -
MMPA Pinnipeds -

TABLE BIO-1
LIST OF SPECIAL-STATUS SPECIES WITH POTENTIAL TO OCCUR IN THE COLLEGE LAKE STUDY AREA

Common Name ***Scientific Name***	**Listing Status USFWS/CDFW/ CNPS, Other**	**General Habitat Requirements**	**Potential for Species Occurrence Within the Study Area**
Plants			
Hooker's manzanita *Arctostaphylos hookeri* subsp. *hookeri*	--/--/1B.2	Sandy in closed-cone coniferous forest, chaparral, cismontane woodland, and coastal scrub. Perennial evergreen shrub. El. 60 – 536 meters.	**Unlikely.** Coyote brush scrub habitat within the study area is limited, and moderately disturbed. Study area soils are loamy rather than sandy.
Pajaro manzanita *Arctostaphylos pajaroensis*	--/--/1B.1	Sandy soils in chaparral. Perennial evergreen shrub. El. 30 – 760 meters.	**Unlikely.** Coyote brush scrub habitat within the study area is limited, and moderately disturbed. Study area soils are loamy rather than sandy.
Marsh sandwort *Arenaria paludicola*	FE/CE/1B.1	Sandy openings in marshes and swamps (freshwater or brackish). Perennial stoloniferous (grows via runners) herb. El. 30 - 505 meters.	**Unlikely.** Suitable sandy marsh habitat is not present in the study area.
Big-scale balsamroot *Balsamorhiza macrolepis*	--/--/1B.2	Open grassy or rocky slopes in chaparral, cis-montane woodland, and valley and foothill grasslands, sometimes on serpentine. El. <1,400m.	**Low.** Grassland habitat along the margins of College Lake is periodically disturbed by mowing, tilling, and cultivation, and therefore does not provide good habitat for this species.
Deceiving sedge *Carex saliniformis*	--/--/1B.2	Coastal prairie, coastal scrub (mesic); meadows and seeps; coastal salt marshes and swamps. Perennial herb.	**Low.** Suitable habitat present at sloughs near mouth of Pajaro River.
Congdon's tarplant *Centromadia parryi subsp. congdonii*	--/--/1B.2	Valley and foothill grassland (alkaline). Annual herb.	**Low.** Suitable habitat is present in wet depressions around College Lake, but study area is regularly disced for agriculture.
Monterey spineflower *Chorizanthe pungens* var.*pungens*	FT/--/1B.2	Sandy soil in chaparral (maritime), cismontane woodland, coastal dunes, coastal scrub, and valley and foothill grassland. Annual herb. El. 3 – 450 meters.	**Unlikely.** Soils within the study area are loamy and suitable grassland communities are disturbed.
Pinnacles buckwheat *Eriogonum nortonii*	--/--/1B.3	Sandy soil often on recent burns in chaparral and valley and foothill grasslands. Annual herb. El. 300 – 975 meters.	**Unlikely.** Soils within the study area are loamy and suitable grassland communities are disturbed.
Hoover's button-celery *Eryngium aristulatum* var. *hooveri*	--/--/1B.1	Vernal pools and seasonal wetlands, occasionally alkaline. El. <50 meters	**Low.** Seasonally wet areas are present throughout College Lake, though all are regularly or periodically disturbed by mowing and/or tilling. No vernal pools are present in the study area.
Fragrant fritillary *Fritillaria liliacea*	--/--/1B.2	Coastal prairie and scrub, grasslands, often on serpentine soils. El. 3 - 410 meters.	**Unlikely.** Soils within the study area are loamy and grassland communities are disturbed by periodic mowing and/or tilling..
Loma Prieta hoita *Hoita strobilina*	--/--/1B.1	Usually serpentinite and mesic in chaparral, cismontane woodlands, and riparian woodland. Perennial herb. El. 30 - 860 meters.	**Unlikely.** Riparian forest and coyote brush scrub within the study area are not on serpentine soil.
Santa Cruz tarplant *Holocarpha macradenia*	FT/CE/1B.1	Often clay and sandy soils in coastal prairie, coastal scrub, and valley and foothill grassland. Annual herb. El. 10 - 220 meters.	**Unlikely.** Marginally suitable habitat present near College Lake, but the study area is regularly disced for agriculture and soils are loamy rather than sandy or clay.

TABLE BIO-1 (CONTINUED)
LIST OF SPECIAL-STATUS SPECIES WITH POTENTIAL TO OCCUR IN THE COLLEGE LAKE STUDY AREA

Common Name ***Scientific Name***	**Listing Status USFWS/CDFW/ CNPS, Other**	**General Habitat Requirements**	**Potential for Species Occurrence Within the Study Area**
Plants (cont.)			
Legenere *Legenere limosa*	--/--/1B.1	Vernal pools, and ponds. El. <950 meters.	**Low.** Seasonally wet areas are present throughout College Lake, though all are regularly or periodically disturbed by mowing and/or tilling. No vernal pools are present in the study area.
Arcuate bush-mallow *Malacothamnus arcuatus*	--/--/1B.2	Chaparral and cismontane woodland. Perennial evergreen shrub. El. 15 - 355 meters.	**Unlikely.** Coyote brush scrub habitat within the study area is limited, and moderately disturbed.
Hall's bush-mallow *Malacothamnus hallii*	--/--/1B.2	Chaparral and coastal scrub. Perennial evergreen scrub. El. 10 - 760 meters.	**Unlikely.** Coyote brush scrub habitat within the study area is limited, and moderately disturbed.
Dudley's lousewort *Pedicularis dudleyi*	--/CR/1B.2	Chaparral (maritime), cismontane woodland, north coast coniferous forest, and valley and foothill grasslands. Perennial herb. El. 60 – 900 meters.	**Unlikely.** Grassland communities are disturbed by periodic mowing and/or tilling
White-rayed pentachaeta *Pentachaeta bellidiflora*	FE/CE/1B.1	Cismontane woodland and valley and foothill grassland (often serpentinite). Annual herb. El. 35 – 620 meters.	**Unlikely.** Grassland communities are disturbed by periodic mowing and/or tilling and do not support serpentine soils.
Choris' popcornflower *Plagiobothrys chorisianus* var. *chorisianus*	--/--/1B.2	Mesic in chaparral, coastal prairie, and coastal scrub. Annual herb. El. 3 – 160 meters.	**Unlikely.** Marginal habitat present in wet depressions near College Lake, but the study area is regularly disced for agriculture.
San Francisco popcornflower *Plagiobothrys diffusus*	--/CE/1B.1	Coastal prairie, and valley and foothill grassland. Annual herb. El. 60 – 360 meters.	**Unlikely.** Marginal habitat present in wet depressions near College Lake, but the study area is regularly disced for agriculture.
California alkali grass *Puccinellia simplex*	--/--/1B.2	Alkaline, vernally mesic, sinks, flats, and lake margins in chenopod scrub, meadows and seeps, valley and foothill grassland, and vernal pools. El. 2 – 930 meters.	**Unlikely.** Seasonally wet areas are present throughout College Lake, though all are regularly or periodically disturbed by mowing and/or tilling. Study area soils are not alkaline.
Two-fork clover *Trifolium amoenum*	--/--/1B.1	Coastal bluff scrub and valley and foothill grassland (sometimes serpentinite). Annual herb. El. 5 – 415 meters.	**Unlikely.** Grassland communities are disturbed by periodic mowing and/or tilling and do not support serpentine soils.
Saline clover *Trifolium hydrophilum*	--/--/1B.2	Marshes and swamps, valley and foothill grassland (mesic, alkaline) and vernal pools. Annual herb. El. 0 - 300 meters.	**Unlikely.** Seasonally wet areas are present throughout College Lake, though all are regularly or periodically disturbed by mowing and/or tilling. Study area soils are not alkaline.
Invertebrates			
Ohlone tiger beetle *Cicindela ohlone*	FE/--/--	Only known from coastal terraces which support native grassland, in particular purple needle-grass and California oat grass. Only five remaining populations in the middle of Santa Cruz County.	**Unlikely.** Study area is not within range of this species.
Smith's blue butterfly *Euphilotes enoptes smithi*	FE/--	/--Coastal dunes and inland in coastal scrub, grassland, and chamise chaparral where host plants are present. Requires *Eriogonum parvifolium* and *E. latifolium* to complete its life cycle.	**Unlikely.** Coastal dune and scrub habitat is absent from the study area.

TABLE BIO-1 (CONTINUED)
LIST OF SPECIAL-STATUS SPECIES WITH POTENTIAL TO OCCUR IN THE COLLEGE LAKE STUDY AREA

Common Name *Scientific Name*	Listing Status USFWS/CDFW/ CNPS, Other	General Habitat Requirements	Potential for Species Occurrence Within the Study Area
Invertebrates (cont.)			
Bay checkerspot butterfly *Euphudryas editha bayensis*	FT/--/--	Shallow, serpentine-derived soil. The primary larvae host plant is dwarf plantain (*Plantago erecta*). The secondary host plant is purple owl's clover (*Castilleja densiflora*). Historically occurred along the ridges of the San Francisco peninsula from Twin Peaks to southern Santa Clara County.	**Unlikely.** Suitable serpentine-derived soils not present in the study area.
Fish			
Green Sturgeon - sDPS *Acipenser medirostris*	FT/--/--	Anadromous, but tend to spend more time in the ocean than most species. Spawns several times in their lives, in natal rivers every 3-5 years. Can live up to 70 years old, reaching maturity at 15 years. Ranges from Alaska to Mexico, but higher concentrations are located north of Point Conception. sDPS spawn in the Sacramento River.	**Unlikely.** Although rare straying into the Pajaro River Estuary may occur, the species has not been reported from the Pajaro River basin.
Tidewater goby *Eucyclogobius newberryi*	FE/SSC/--	Typically, an annual benthic species that occurs in loose aggregations of a few to several hundreds or thousands of individuals. Peak breeding activities in late April to May. Inhabits coastal lagoons and brackish bays at the mouth of freshwater streams. Vegetation within habitat is generally sparse.	**Observed.** Known to occur in the Pajaro River Lagoon and up to one mile upstream in the Pajaro River.
Pacific lamprey *Lampetra tridentata*	--/SSC/--	Found in Pacific Coast streams throughout California. This anadromous species requires cold, clear water and gravel substrates for spawning. Ammocoetes burrow into soft sand or mud for rearing.	**Observed.** Known to occur in Salsipuedes and Corralitos creeks, likely present in mainstem Pajaro River.
Monterey hitch *Lavinia exilicauda harengus*	--/SSC/--	Found in the Salinas and Pajaro River watersheds, this subspecies can occupy a wide variety of habitats, but is most abundant in lowland areas with large pools or in small reservoirs that mimic these conditions.	**Observed.** Known to occur in mainstem Pajaro River and upstream tributaries such as Uvas, Llagas and Pacheco creeks.
Monterey roach *Lavinia symmetricus subditus*	--/SSC/--	This subspecies occurs only in tributaries to Monterey Bay (Salinas, Pajaro, and San Lorenzo rivers). Typically found in pools with warm water, but tolerant of wide range of habitats and conditions such, including temperatures up to 35°C and dissolved oxygen as low as 1-2 parts per million. Require gravel beds or riffles for egg deposition.	**Moderate Potential.** Absent from the mainstem Pajaro River but present in upstream tributary watersheds such as Uvas Creek, Llagas Creek, etc.
Coho salmon – Central California Coast ESU *Oncorhynchus kisutch*	FE/CT/--	Spends first half of life cycle rearing and feeding in streams and small freshwater tributaries with stable gravel substrates. The remainder of life is spent foraging in estuaries and marine waters. Returns to natal streams to spawn and then die. This ESU includes naturally spawned salmon originating from rivers south of Punta Gorda, CA to Aptos Creek, as well as salmon originating from tributaries to San Francisco Bay.	**Unlikely.** This species occurs in northern Monterey Bay but does not spawn in the Pajaro River watershed.
Steelhead – South-central California Coast DPS *Oncorhynchus mykiss*	FT/--/--	Occurs in rivers and streams with gravel-bottomed, fast-flowing, well-oxygenated fresh water. Juveniles spend several years in freshwater maturing before migrating to the ocean. They remain in the ocean for 3 years before returning to freshwater to spawn. Spawning habitat consists of gravel substrates free of excessive silt. This DPS includes naturally spawned anadromous steelhead originating below natural and manmade impassable barriers from the Pajaro River to, but not including, the Santa Maria River.	**Observed.** Steelhead from this DPS are known to rear and spawn in the Pajaro River watershed, including College Lake and its tributary streams

TABLE BIO-1 (CONTINUED)
LIST OF SPECIAL-STATUS SPECIES WITH POTENTIAL TO OCCUR IN THE COLLEGE LAKE STUDY AREA

Common Name *Scientific Name*	Listing Status USFWS/CDFW/ CNPS, Other	General Habitat Requirements	Potential for Species Occurrence Within the Study Area
Fish (cont.)			
Longfin smelt *Spirinchus thaleichthys*	FC/CT,SSC/--	Anadromous smelt that occurs in the middle or bottom of water column in salt or brackish water. Concentrated in Suisun Bay, Montezuma Slough, and the lower reaches of the Sacramento and San Joaquin Rivers. May also be found throughout San Francisco Bay, Humboldt Bay, Eel river estuary and other local coastal areas. Spawning occurs in freshwater rivers, where they die afterwards.	**Unlikely.** No known occurrences in Pajaro River basin.
Eulachon *Thaleichthys pacificus*	FT/--/--	Anadromous smelt that spend most of life in the ocean, returning after 2 – 5 years to spawn in freshwater rivers. Eggs incubate in the spawning habitat of coarse sand, until larvae drift downstream to estuarine habitats. Juveniles disperse into ocean waters where they can be found on the continental shelf waters.	**Unlikely.** No known occurrences in Pajaro River basin.
Amphibians			
California tiger salamander *Ambystoma californiense*	FT/CT/--	Wintering sites occur in grasslands occupied by burrowing mammals; breeds in ponds, vernal pools, and slow-moving or receding streams.	**Unlikely.** The species has been documented to both east and west, but suitable breeding habitat is not present in the study area.
Santa Cruz long-toed salamander *Ambystoma macrodactylum croceum*	FE/CE, CFP/--	Found in dense riparian vegetation such as willows, thick coastal scrub and oak woodland. Only known from a few closely isolated ponds in Santa Cruz and Monterey Counties. Adults spend much of their lives underground utilizing tunnels of burrowing mammals such as moles and ground squirrels, moving to aquatic habitats to breed.	**Unlikely.** Dense riparian habitat is present but species has not been documented in the study area.
Santa Cruz black salamander *Aneides niger*	--/SSC/--	Occurs in mixed deciduous woodland, coniferous forests, and coastal grasslands. Found under rocks near streams, in talus, under damp logs, and other objects. Endemic to California. Found from sea level to at least 2,240 ft in elevation. Forages for insects at night during wet weather. May be active along streams all year, but stays underground during dry periods.	**Unlikely.** Suitable woodland, forest or grassland habitat for this species is not present in the study area. Known from redwood-alder riparian habitat upstream in Green Valley Creek, tributary to Casserly Creek/College Lake, 3.2 miles north of study area.
California giant salamander *Dicamptodon ensatus*	--/SSC/--	Occurs in wet coastal forests near clear, cold permeant and semi-permanent streams and seepages. Occurs from sea level to near 3,000 feet. Nocturnal but also active in daylight in wet conditions. Adults observed under covered objects such as rocks, logs and artificial cover.	**Unlikely.** Suitable wet forested habitat for this species is not present in the study area.
California red-legged frog *Rana draytonii*	FT/SSC/--	Breed in stock ponds, pools, and slow-moving streams.	**Moderate Potential.** Species has been observed in Pajaro River, in agricultural ditches connected to Pajaro Lagoon, and in upper Corralitos Creek. While there are no recorded observations, suitable breeding habitat for this species is present in the woodland along the shore of College Lake and in channels near the weir and in the creek. However, bullfrogs and non-native fish are present at these locations.
Foothill yellow-legged frog *Rana boylii*	--/SCT,SSC/--	Rarely occurs far from permanent water. Rocky streams and rivers with rocky substrate and open sunny banks in forests, chaparral, and woodlands. Sometimes found in isolated pools, vegetated backwaters, and deep, shaded, spring-fed pools. Attaches egg clusters to gravel or rocks in moving water near stream margins.	**Unlikely.** Species has been observed in Brown's Creek in the Corralitos Creek subwatershed upstream of the study area, but suitable rocky stream and riverine habitat for this species is not present in the study area.

TABLE BIO-1 (CONTINUED)
LIST OF SPECIAL-STATUS SPECIES WITH POTENTIAL TO OCCUR IN THE COLLEGE LAKE STUDY AREA

Common Name ***Scientific Name***	**Listing Status USFWS/CDFW/ CNPS, Other**	**General Habitat Requirements**	**Potential for Species Occurrence Within the Study Area**
Amphibians (cont.)			
Coast range newt *Taricha torosa*	--/SSC/--	Found in wet forests, oak forests, chaparral and rolling grasslands. Found along the coast from sea level to 4,200 feet in elevation. Terrestrial and diurnal, often seen crawling over land in the day time, becoming aquatic when breeding. Spends hot dry summer in moist habitats under woody debris, or in a rock crevices and in animal burrows.	**Unlikely.** Suitable wet forest, chaparral or grassland habitat for this species is not present in the study area.
Reptiles			
Northern California legless lizard *Anniella pulchra*	--/SSC/--	Coastal dune, valley-foothill, chaparral, and coastal scrub habitats in areas with sandy or loose loam soils.	**Unlikely.** Species known to occur in the vicinity of the study area. Though no dune or, chaparral habitat for this species is present in the study area, there is potential habitat in alluvial deposits along the Pajaro River and in dune scrub at the river mouth.
Western pond turtle *Actinemys marmorata*	--/SSC/--	Found in ponds, lakes, rivers, streams, creeks, marshes, and irrigation ditches with abundant vegetation and either rocky or muddy bottoms in woodland, forest, and grassland. In streams, prefers pools to shallower areas. Logs, rocks, cattail mats, and exposed banks required for basking. Lays eggs in sandy soils along stream or pond margins.	**Moderate Potential** Species known to occur in neighboring Pinto Lake and the Pajaro River corridor, WPT may occur seasonally at College Lake (prior to drainage) or disperse through Corralitos and Salsipuedes Creek. However, College Lake lacks logs and rocks for basking, and the species has not been observed there.
Coast horned lizard *Phrynosoma blainvillii*	--/SSC/--	Inhabits open habitats including grasslands or shrublands with loose sandy or loamy soils	**Unlikely.** This species is rare in the vicinity of the study area, but potential habitat is present in alluvial deposits along the Pajaro River.
San Francisco garter snake *Thamnophis sirtalis tetrataenia*	FE/CE,CFP	Utilizes a wide variety of habitats, preferring grasslands or wetlands near ponds, marshes and sloughs. May over winter in uplands areas away from water. Eats a wide variety of prey including amphibians and their larvae, fish, birds, and small mammals, reptiles, earthworms, slugs and leeches.	**Unlikely.** The study area is out of range of this species.
Birds			
Tricolored blackbird *Agelaius tricolor*	--/CTE, SSC/BCC (Nesting colony)	Breeding colonies observed in Sacramento Valley. Nests located over or near fresh emergent wetlands with tall, dense cattails or tules but also in thickets of willow, blackberry, wild rose, and tall herbs.	**Moderate Potential (foraging); Unlikely (nesting).** This species may occur in emergent vegetation in the study area during winter, in mixed flocks with other blackbirds. Suitable foraging habitat is present in agricultural fields and freshwater wetland habitat but there are no recent records of this species nesting in the study area vicinity.
Short-eared owl *Asio flammeus*	--/SSC/ 3503.5 (Nesting)	Open areas with few trees such as annual and perennial grasslands, prairies, dunes, meadows, irrigated lands, and saline and fresh emergent wetlands. Nests on the ground in a depression concealed by vegetation.	**Moderate Potential (foraging); Low Potential (nesting).** This species may forage over agricultural fields or grassland in the study area in winter or during migration. Grassland areas are regularly disturbed by mowing or tilling, which limits nesting potential.
Burrowing owl *Athene cunicularia*	--/SSC/BCC 3503.5 (Burrow sites and some wintering sites)	Nests and forages in low-growing grasslands and shrublands with perches and areas that support burrowing mammals.	**Moderate Potential (foraging); Low Potential (nesting).** Dense agricultural fields of the study area do not provide suitable burrowing habitat for this species, but it has been observed foraging in the vicinity. Grassland areas are regularly disturbed by mowing or tilling, which limits nesting potential.

Table BIO-1 (continued)
List of Special-Status Species with Potential to Occur in the College Lake Study Area

Common Name *Scientific Name*	Listing Status USFWS/CDFW/ CNPS, Other	General Habitat Requirements	Potential for Species Occurrence Within the Study Area
Birds (cont.)			
Golden eagle *Aquila chrysaetos*	--/CFP/BCC (Nesting & wintering)	Typically inhabits rolling foothills and mountain terrain, wide arid plateaus deeply cut by steams and canyons, open mountain slopes, cliffs and rock outcroppings, sage-juniper flats and deserts from elevations of sea level to 11,500 feet. Builds large platform nest on cliffs of all heights and in large trees in open areas. Nest size is from 10 feet across to 3 feet high of sticks, twigs, and greenery. Most are resident, but some may migrate into downslope for winter. The majority of California is in year-long range.	**Moderate Potential (foraging); Moderate Potential (nesting).** This species is occasionally observed over College Lake and has potential to nest in the mature upland eucalyptus stands near the Santa Cruz County Fairgrounds, behind Our Lady Help of Christians Catholic Church, and along the slopes above the Casserly Creek floodplain, upstream of Paulsen-Whiting Road. Eagles are commonly observed hunting ground squirrels on grazing lands along Pioneer's Road 2 miles northwest of College Lake. Closest nest occurrence is approximately 10 miles southeast near Sugarloaf Peak.
Marbled murrelet *Brachyramphus marmoratus*	FT/CE/--	Only breeds along California coast. Nests in mature, dense forests of redwood and Douglas fir. Can be seen as far as 4 – 5 miles inland. Prefers to nest in tall trees. Nests made of moss and lichen. Southernmost extent of range is in San Mateo County.	**Unlikely.** The study area is out of range of this species.
Western snowy plover *Charadrius alexandrius nivosus*	FT/SSC/BCC	Sandy coastal beaches, salt pans, coastal dredged spoils sites, dry salt ponds, salt pond levees and gravel bars. Nests in sandy substrate and forages in sandy marine and estuarine bodies.	**Unlikely.** Suitable sandy or gravelly habitat is not present in the study area, but species has been known to nest at the Pajaro River mouth.
Yellow rail *Coturnicops noveboracensis*	--/SSC/BCC	Species is extremely rare in California, although small numbers continue to be reported in isolated coastal marshes. Breeding requires sedge marsh/ meadows with moist soil and shallow standing water.	**Unlikely.** Coastal marsh habitat is not present in the study area, and species has not been reported in the vicinity.
White-tailed kite *Elanus leucurus*	--/CFP/-- (Nesting)	Inhabits herbaceous and open stages of most habitats in cismontane California. A yearly resident in coastal and valley lowlands. Nests in top of a dense oak, willow, or other tree stand 20-100 feet above ground. Prey is mostly voles and other small, diurnal mammals, occasionally birds, insects, reptiles, and amphibians. Hunts by soaring, gliding and hovering above ground.	**Observed.** Species has been observed foraging and nesting at College Lake in trees along the northern and western banks. Nearby agricultural fields and grasslands provide foraging habitat and has potential to nest in trees within the study area.
Southwestern willow flycatcher *Empidonax trailli extimus*	FE/CE/-- (Nesting)	Most often occurs in broad, open river valley or large mountain meadows with shrubby willows. Prefers extensive willow thickets on edge of wet meadows, ponds or backwaters for nesting and roosting.	**Unlikely.** Suitable willow thicket habitat is present but species has not been recorded in the vicinity of the study area.
American peregrine falcon *Falco peregrinus anatum*	--/CFP/-- (Nesting)	Breeds in woodland, forest and coastal habitats near wetlands, lakes, rivers, or other water on high cliffs, banks, dunes or mounds. Nest is a scrape on a depression nor ledge in an open site. Will nest on man-made structures, and occasionally uses tree or snag cavities. Riparian areas and coastal inland wetlands are important yearlong habitats. Hunts by swooping from flight onto flying prey. Rarely hunts from perch.	**Observed.** Species has been observed perched in the study area and foraging for smaller birds over College Lake. This species is not known to nest in the vicinity of the College lake and nesting habitat in the study area is limited.
California condor *Gymnogyps californianus*	FE/CE,CFP/--	Nests in caves on cliff faces in mountains up to 6,000 feet. Found in California's southern coastal ranges from Big Sur to Ventura County, east through the Transverse Range and southern Sierra Nevada.	**Unlikely.** Species may occasionally forage over the study area from nesting sites in Big Sur.

Table BIO-1 (continued)
List of Special-Status Species with Potential to Occur in the College Lake Study Area

Common Name *Scientific Name*	Listing Status USFWS/CDFW/ CNPS, Other	General Habitat Requirements	Potential for Species Occurrence Within the Study Area
Birds (cont.)			
Bald Eagle *Haliaeetus leucocephalus*	--/CE,CFP/--	Forages in rivers and lakes for large fish. Nests along coastal cliffs and in trees at lakes and rivers.	**Observed (hunting); Moderate Potential (nesting).** This species is regularly observed hunting over College Lake and has potential to nest in the mature upland eucalyptus stands near the Santa Cruz County Fairgrounds, behind Our Lady Help of Christians Catholic Church, and along the slopes above the Casserly Creek floodplain, upstream of Paulsen-Whiting Road.
Bryant's savannah sparrow *Passerculus sandwichensis alaudinus*	--/SSC/--	Coastal marshes and foothill grasslands within the fog belt from Humboldt Bay to Morro Bay. Nests on the ground in grass cup nests beneath dense grasses or weeds. Feeds on insects, small mollusks and seeds as seasonally available.	**Moderate Potential (foraging and nesting).** Fairly common in winter, but not in spring and summer when species is known to breed. Nesting habitat is present at the Pajaro Lagoon; nesting has not been observed at College Lake. Commonly observed in winter at College Lake, and also recorded at the Pajaro River mouth.
California Ridgway's rail *Rallus obsoletus obsoletus*	FE/CE,CFP/--	Occurs in salt marshes and tidal sloughs. Requires tidal mudflats for foraging habitat. Prefers cordgrass for cover and nesting, but can be occasionally found in bulrush and cattails.	**Unlikely.** Study area does not provide coastal salt marsh habitat for this species.
Bank swallow *Riparia riparia*	--/CT/-- (Nesting)	Vertical banks and cliffs with fine-textured or sandy soils near streams, rivers, ponds, lakes and ocean for nesting. Feeds over grassland, shrubland, savannah, and open riparian areas during nesting season.	**Unlikely.** One occurrence record in Watsonville from the 1950s along the Pajaro River is no longer active. No suitable nesting habitat present in the study area, but individuals may forage or migrate through.
Yellow warbler *Setophaga petechia*	--/SSC/BCC	Generally occupy riparian vegetation in close proximity to water along streams and in wet meadows.	**High.** Known to breed in dense willow riparian habitat along the Pajaro River. Potential to occur in riparian forest within the study area.
California least tern *Sterna antillarum browni*	FE/CE,CFP/-- (Nesting colony)	Lives along the coast with nesting habitat on open beaches free of vegetation due to the tide. Ranges from San Francisco to Baja California. Wintering in Mexico.	**Unlikely.** Nesting habitat is not present in the study area, but individuals may occur during migration at College Lake and along the Pajaro River.
Least Bell's vireo *Vireo bellii pusillus*	FE/CE/--	Nests in low, dense riparian growth along water or along dry parts of intermittent streams. Typically associated with willow, cottonwood, baccharis, and wild blackberry. This race is endemic to California and northern Baja California, and is a local summer resident below 600 meters in valley and foothill riparian habitat, and lower portions of canyons in San Benito and Monterey County. Nest is placed on slender branch of willow or other shrub.	**Unlikely.** Nearest recorded occurrences are along Highway 101 to the east, but suitable dense riparian habitat is present onsite. Not recorded in Santa Cruz County.
Mammals			
Pallid bat *Antrozous pallidus*	--/SSC/--	Day roosts are mainly in caves, crevices, and mines. Also found in buildings and under bark. Forages in open lowland areas.	**Unlikely.** Not recorded in the region but suitable roosting habitat is present along Corralitos Creek and the Pajaro River in tree hollows, snags and abandoned buildings.
Townsend's big-eared bat *Corynorhinus townsendii*	--/--/SSC	Roosts in caves, mines, buildings, or other human-made structures. Forages in open lowland areas.	**Unlikely.** Species may forage over study area but suitable roosting habitat is not present.

TABLE BIO-1 (CONTINUED)
LIST OF SPECIAL-STATUS SPECIES WITH POTENTIAL TO OCCUR IN THE COLLEGE LAKE STUDY AREA

Common Name *Scientific Name*	**Listing Status USFWS/CDFW/ CNPS, Other**	**General Habitat Requirements**	**Potential for Species Occurrence Within the Study Area**
Mammals (cont.)			
Western red bat *Lasiurus blossevilli*	--/SSC/--	Roosts in foliage of deciduous trees and shrubs near streams, open fields and orchards.	**Moderate Potential.** No records present in the region but suitable habitat is present along Corralitos Creek and the Pajaro River.
American badger *Taxidea taxus*	--/SSC/--	Most abundant in drier open stages of shrubland, grassland or forested habitats with loose, friable soil for burrowing.	**Low.** Grassland areas are regularly disturbed by mowing or tilling, which limits burrowing potential.
San Francisco Dusky-footed woodrat *Neotoma fuscipes annectens*	--/SSC/--	Occurs in wooded habitats with dense understory of native species.	**Observed.** Woodrat houses observed in willow-riparian habitat in upper College Lake. Woodrats also are present along the Pajaro River downstream of Highway 1 in dense willow-dominated riparian vegetation. Habitat is also present along Corralitos Creek.
San Joaquin kit fox *Vulpes macrotis mutica*	FE/CT/--	Annual grasslands or grassy open stages of vegetation dominated by scattered brush, shrubs, and scrub. Dens in open, level areas with loose-textured, sandy and loamy soils.	**Unlikely.** Species has not been recorded the vicinity and suitable grassland or shrubland habitat is not present.

Definitions:

Unlikely = Study area and/or immediate vicinity do not support suitable habitat for a particular species. Study area is outside of the species known range.
Low Potential = The study area and/or immediate vicinity only provide limited habitat. In addition, the species' known range may be outside of the study area.
Moderate Potential = The study area and/or immediate vicinity provide suitable habitat.
High Potential = The study area and/or immediate vicinity provide ideal habitat conditions.

Status Codes

Federal Categories (U.S. Fish and Wildlife Service):

FE = Listed as Endangered by the Federal Government
FT = Listed as Threatened by the Federal Government
FC = Candidate for Federal Listing
BCC = Bird of Conservation Concern

State Categories (California Department of Fish and Wildlife):

CE = Listed as Endangered by the State of California
CT = Listed as Threatened by the State of California
CFP = CDFW designated "Fully Protected" Species
SCE = Candidate for listing as Endangered by the State of California
SCT = Candidate for listing as Threatened by the State of California
SSC = California Species of Special Concern
CR = Listed as Rare by the State of California
3503.5 = Eggs, Nests, and Nestlings of Falconiformes and Strigiformes Protected under Section 3503.5 of the California Fish and Game Code
3511 = Fully Protected Species under Section 3511 of the California Fish and Game Code

California Rare Plant Rank (CRPR):

Rank 1B = Plants rare, threatened, or endangered in California and elsewhere
Rank 2 = Plants rare, threatened, or endangered in California, but more common elsewhere

Threat Sub-Rankings –
0.1: Seriously endangered in California (over 80% of occurrences threatened / high degree and immediacy of threat)
0.2: Fairly endangered in California (20-80% occurrences threatened/ moderate degree and immediacy of threat)
0.3: Not very threatened in California (<20% of occurrences threatened/low degree and immediacy of threat or no current threats known

SOURCES: CDFW, 2018; CNPS, 2018; USFWS, 2018.

Table BIO-2

2014-2018 College Lake Study Waterfowl Abundance

	2014					2015							2016			
Month	**Jan-14**	**Feb-14**	**Mar-14**	**Apr-14**	**Dec-14**	**Jan-15**	**Feb-15**	**Mar-15**	**Apr-15**	**May-15**	**Nov-15**	**Dec-15**	**Jan-16**	**Feb-16**	**Mar-16**	**Apr-16**
# of Surveys	**1**	**4**	**3**	**6**	**1**	**3**	**3**	**2**	**4**	**1**	**1**	**--**	**4**	**2**	**2**	**2**
Cinnamon Teal		21	42	18			10.33	33	33.5	1			3.75	7.5	6.5	5.5
Northern Shoveler		114	114.67	44.5	19	167.67	451.33	155	17.25	--			238	170.5	62.5	2.5
Gadwall	11	88.33	124	66.5	4	36.67	74.67	113.5	58.5	13			115.25	46.5	35	12
American Wigeon	1	134	67	17	18	86.33	295.67	63	1	1			475.5	800.5	475.5	41.5
Mallard	124	512.67	202.33	200.83	204	18.33	52.33	49	44.75	25	2		255	46	76.5	24
Northern Pintail		3	3	0.33		11	1						47			
Green-winged Teal	5	5	10	2.5	1	6	43	14					28.75	43	21	2.5
Canvasback		41	36.67	0.33	9	144	52.67	2					166.25	63.5	55	--
Ring-necked Duck	5	114	83	47.17	10	94	168.67	78	20.25				223.25	151.5	336.5	71.5
Bufflehead	18	13	34	0.33		67	25.67	14.5	0.5				17	6.5	8.5	--
Hooded Merganser	7	31.67	11	1.33	13	3.67	3	11.5	6.5				6.25	14	12	9.5
Ruddy Duck	11	199.67	286.67	140.5		467.67	451.67	193.5	142.5	10			214	293	277.5	117

				2017								2018						
Month	**Oct-16**	**Nov-16**	**Dec-16**	**Jan-17**	**Feb-17**	**Mar-17**	**Apr-17**	**May-17**	**Jun-17**	**Nov-17**	**Dec-17**	**Jan-18**	**Feb-18**	**Mar-18**	**Apr-18**	**May-18**	**Jun-18**	**Jul-18**
# of Surveys	**9**	**4**	**2**	**2**	**2**	**3**	**3**	**7**	**3**	**1**	**2**	**4**	**3**	**3**	**5**	**9**	**3**	**1**
Cinnamon Teal					6	1.33	4.33	1			2.5	0.75	10.67	16.67	9.2	1.33	0.67	
Northern Shoveler	8.56	14.5	128	109.5	9	3.33	0.33			62	26.5	289	198.33	189.67	9.6	1.56	0.67	
Gadwall	5.67	23.25	24	20	11	11	8.67	2.43	3		21	28.75	60.33	103	16.2	12.11	19.67	
American Wigeon	3.11	37.5	82	203	46					29	32.5	15	75	138.67	2	0.11		
Mallard	127.78	205.75	94	15.5	51.5	22.67	5	19.86	36	80	182	48.75	57	36.67	21	17.44	20.33	17
Northern Pintail	0.22	0.5	27	18	3.5						10.5	20	1.33			0.11		
Green-winged Teal	5		23	47.5	5		2				20.5	35	56	16.33				
Canvasback		14	24	120	17.5					1		7.5						
Ring-necked Duck	1	2.75	46	253.5	70	70.33	40.67					79.25	114	3.33	3.4	0.22	0.33	
Bufflehead				36.5	2.5							0.5	1.67	3.33		0.11		
Hooded Merganser		0.5	6	2.5	19	21.33	3			7		6.25	7	25	13.2	0.33	0.33	
Ruddy Duck	1.44	11	206	474	196.5	101.67	27	8.86	1.33	35	18	146	323.67	319	51.4	15.33	1	

APPENDIX HAZ
Hazardous Materials in the Project Area

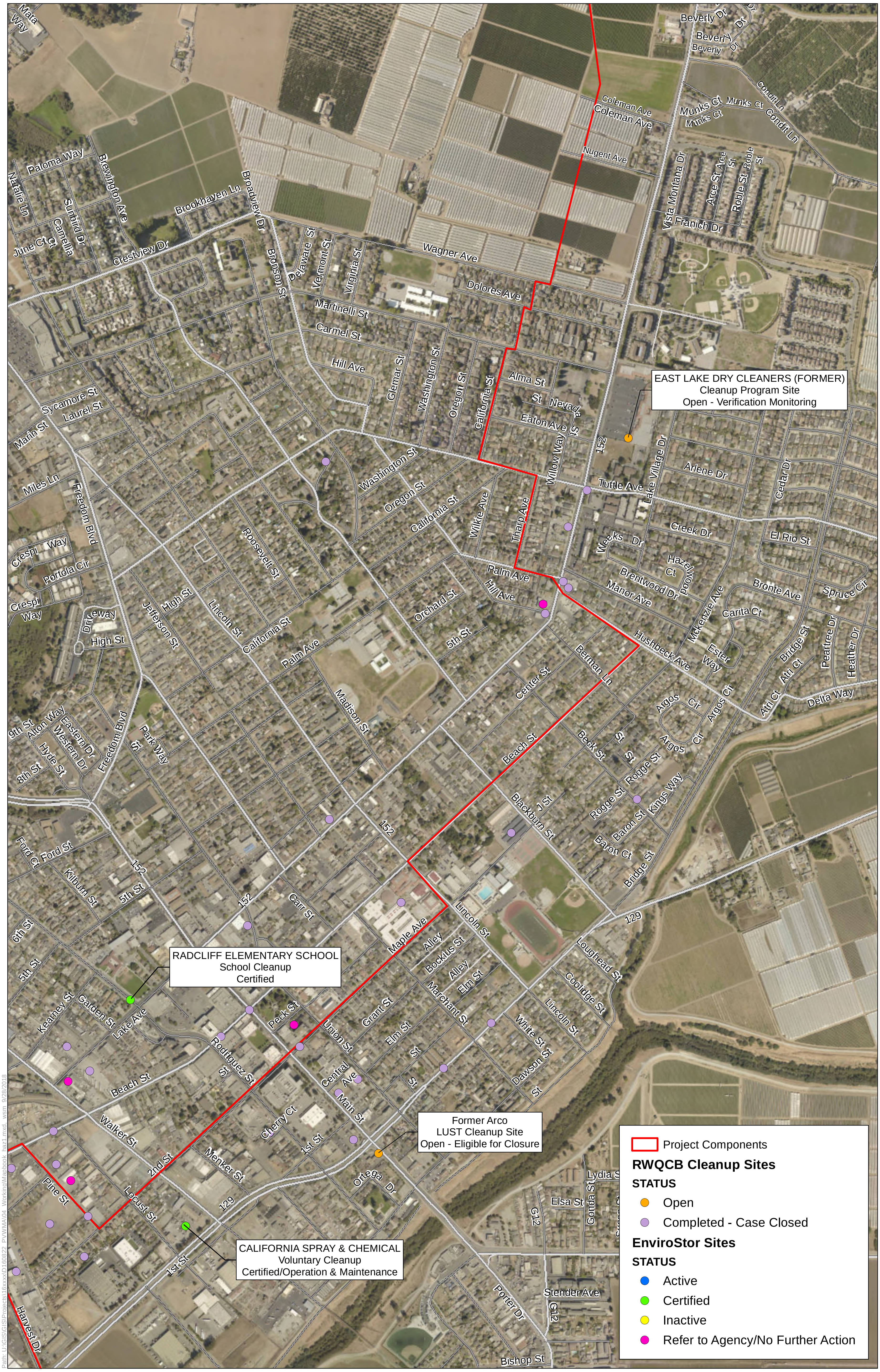
This appendix includes maps of hazardous materials in the Project area. These maps show the results of a Cortese list database search for hazardous materials sites within one quarter-mile of Project components.

SOURCE: State Water Resources Control Board, Geotracker, 2017; Department of Toxic Substances Control, EnviroStor, 2017; California Environmental Protection Agency, Cortese List, CDO and CAO List, 2017.

0 2,000
Feet

ESA

College Lake Integrated Resources Management Project
HAZ-1
Hazardous Materials in the Project Area



SOURCE: State Water Resources Control Board, Geotracker, 2017; Department of Toxic Substances Control, EnviroStor, 2017; California Environmental Protection Agency, Cortese List, CDO and CAO List, 2017.

College Lake Integrated Resources Management Project

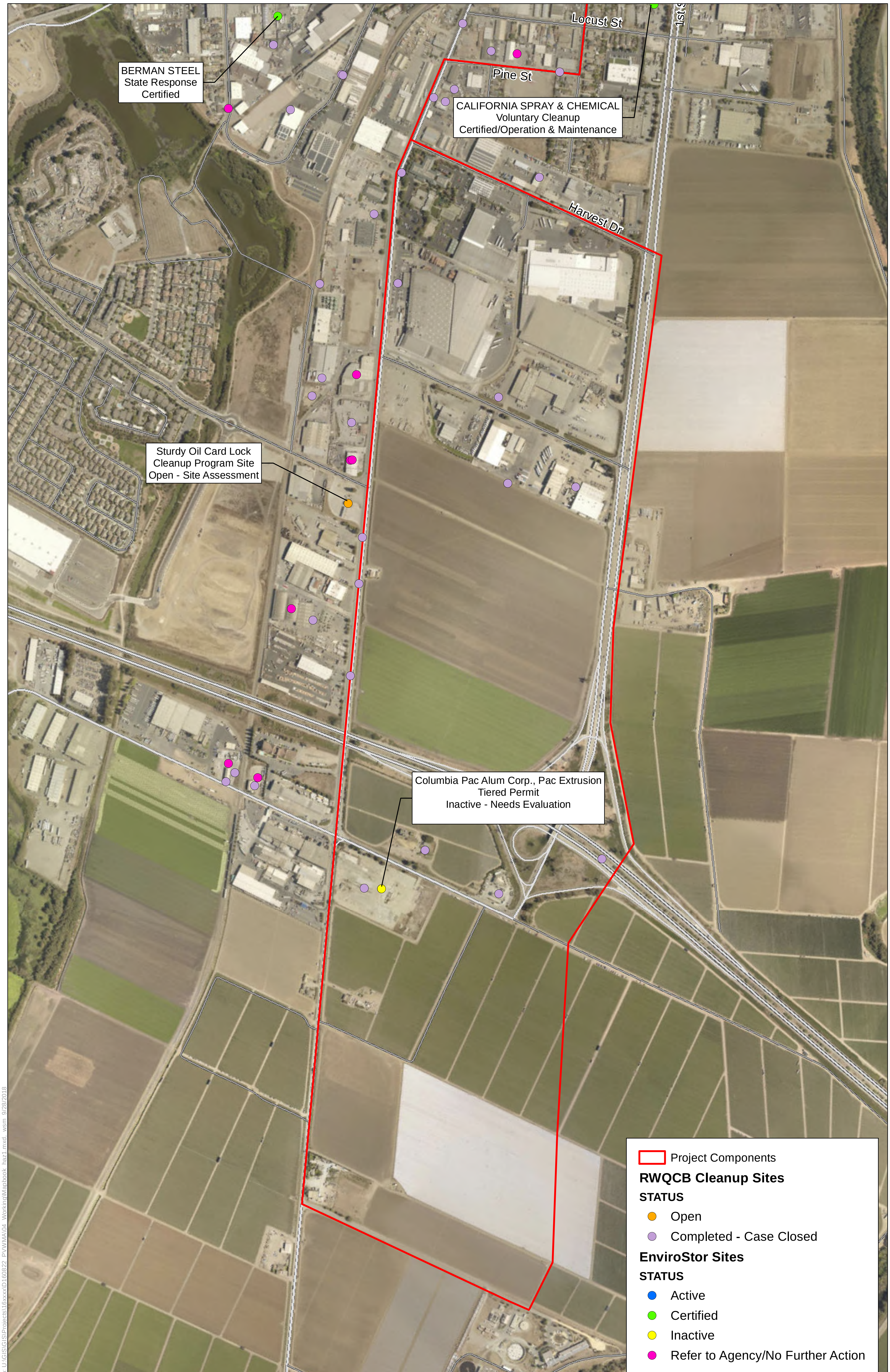
HAZ-2

Hazardous Materials in the Project Area

0 2,000

Feet

ESA



SOURCE: State Water Resources Control Board, Geotracker, 2017; Department of Toxic Substances Control, EnviroStor, 2017; California Environmental Protection Agency, Cortese List, CDO and CAO List, 2017.

College Lake Integrated Resources Management Project

HAZ-3

Hazardous Materials in the Project Area

APPENDIX HYD

Hydrology Supporting Documentation

This appendix contains the following content:

- **Appendix HYD-1:** College Lake Integrated Resources Management Project Hydrologic and Hydraulic Modeling Technical Memorandum

- **Appendix HYD-2:** Lagoon Quantified Conceptual Model Memorandum for Pajaro River Lagoon

- **Appendix HYD-3:** Piezometer Data

HYD-1 College Lake Integrated Resources Management Project Hydrologic and Hydraulic Modeling Technical Memorandum

COLLEGE LAKE INTEGRATED RESOURCES MANAGEMENT PROJECT

HYDROLOGIC AND HYDRAULIC MODELING
TECHNICAL MEMORANDUM

Prepared for
Environmental Science Associates

Prepared by
cbec, inc.

11-8-2018

cbec Project #: 17-1017

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

GLOSSARY OF ACRONYMS AND ABREVIATIONS

Acronym	Meaning
1-D	One-dimensional
2-D	Two-dimensional
AFY	Acre-feet per year (ac-ft/yr)
CDEC	California Data Exchange Center
CIMIS	California Irrigation Management Information System
ET	Evapotranspiration
HEC-RAS	Hydrologic Engineering Center – River Analysis System
HRU	Hydrologic Response Unit
MMD	Mount Madonna
NAVD 88	North American Vertical Datum – 1988
NHC	Northwest Hydraulic Consultants
PRMS	Precipitation Runoff Modeling System
Project	College Lake Integrated Resources Management Project
PV Water	Pajaro Valley Water Management Agency
RD 2049	Reclamation District 2049
USACE	United States Army Corps of Engineers
USGS	United States Geological Survey
WBM	Water Budget Model
WSE	Water Surface Elevation
WWW	Watsonville Water Works
WY	Water year

1 INTRODUCTION

Building on prior College Lake analyses (cbec, 2014), cbec conducted hydrologic and hydraulic modeling to evaluate operations of Pajaro Valley Water Management Agency's (PV Water) proposed College Lake Integrated Resources Management Project (Project), assess potential associated flood effects, and estimate project yield. This technical memorandum addresses model development and subsequent analyses.

1.1 HYDROLOGIC SETTING

College Lake is an ephemeral water body located on Salsipuedes Creek, just upstream from its confluence with Corralitos Creek near the city of Watsonville, California (Figure 1). The lake typically receives inflows from Casserly Creek (which provides flows from the Green Valley Creek, Hughes Creek and Casserly Creek watersheds) and other smaller tributaries, including Fairgrounds and Paulsen Creeks. Due to low channel gradients and the low-lying nature of the lake bottom, it receives reverse flow Pinto Creek at times and from Corralitos Creek during flood events, when the stage in Corralitos Creek and Upper Salsipuedes Creek is greater than that in College Lake and flow is conveyed in the downstream-to-upstream direction along Upper Salsipuedes Creek. Throughout this report, Salsipuedes Creek is discussed as two distinct reaches: Upper Salsipuedes Creek, which extends from College Lake to the Corralitos Creek confluence, and Lower Salsipuedes Creek, which extends from this confluence to the Pajaro River (Figure 1). Pinto Creek refers to the outlet channel of Pinto Lake, which connects to Upper Salsipuedes Creek downstream of College Lake and upstream of the Orchard Park neighborhood.

2 MODEL DEVELOPMENT

Several numerical models were used in combination to simulate College Lake inflows and outflows for the assessment of water management alternatives and to evaluate potential flood effects related to the Project. An existing PRMS hydrologic model developed and calibrated by cbec (cbec, 2014; Markstrom et al., 2015) was updated and recalibrated using recent precipitation data to estimate inflows to College Lake from its tributaries and direct precipitation to the lake basin. A suite of HEC-RAS hydraulic models (HEC, 2018) was used to: calculate flow over the weir, determine fish bypass flow requirements, assess gravity-driven drainage rates for College Lake, generate flood inundation maps and profiles, and inform the calibration and validation of the PRMS hydrologic model. Finally, a custom water budget model was created using Microsoft Excel that relied upon data from the hydrologic and hydraulic models, fish passage flow requirements, water demand, and other parameters to simulate outflow and the water surface elevation in College Lake throughout selected water years of interest.

2.1 HYDROLOGIC MODEL

An existing PRMS rainfall-runoff model (cbec, 2014) was updated and recalibrated for this project. cbec previously developed a model for the contributing watersheds to College Lake and the outlet weir location, and calibrated and validated that version of the PRMS model using College Lake inflow data from water years (WYs) 2012 and 2013. For the current study, that model was modified and recalibrated and revalidated using an expanded dataset covering WYs 2012 – 2017.

2.1.1 Model Updates

Several changes were made to the previous PRMS model. The period of record was extended through September 30, 2017, to allow for the simulation of WYs 2014-2017. This allowed for the simulation of a broad range of hydrologic conditions, given that WY 2014 was a critically dry year for the region, in terms of total rainfall, and WY 2017 was an excessively wet year. Water years 2015 and 2016 were between these extremes, with WY 2015 being characterized as below normal and WY 2016 being characterized as above normal (Figure 2).

The spatial distribution of precipitation in the PRMS model was also changed. Previously, data from two precipitation stations were used: Mount Madonna (MMD) and Watsonville Water Works (WWW[1]). In recent years, the quality of the precipitation data at the MMD station was questionable and considered unreliable. Instead, a synthetic rainfall distribution was specified across the model domain by scaling WWW daily precipitation data using factors derived from 800-meter resolution, gridded, 30-year precipitation normals from the PRISM Climate Group (2017). A total of 12 synthesized precipitation stations (Figure 3) were defined along the transect between, and including, the locations of the WWW and MMD gages. The daily rainfall specified at each of the 12 stations was calculated according to Equation 1:

$$Precip_{StationX} = Precip_{WWW} * \left(\frac{Avg\ 30\ yr\ total_{StationX}}{Avg\ 30\ yr\ total_{WWW}}\right) \qquad (1)$$

where *Precip* is the daily precipitation, *StationX* is any of the 12 station locations in the model, and *Avg 30 yr total* is the 30-year normal annual rainfall amount at a station's location.

2.1.2 Calibration and Validation

To ensure the most accurate model was utilized, the PRMS model was recalibrated using recent hydrologic data following extensive model updates. Reliable gaged inflow records for College Lake were available for WY 2017, but not for the previous water years due to rating curves that were inadequate for estimating high flows in the absence of field observations. However, College Lake stage data were available from a pressure gage located at the pumphouse near the outlet weir. Therefore, the "observed" inflow to College Lake for WYs 2014-2016 was estimated using a HEC-RAS hydraulic model (Section 2.2.2) and a mass balance approach. Hourly inflow to College Lake was computed using Equation 2, before being averaged to produce daily inflow:

$$Inflow = \Delta\, Storage + Outflow \qquad (2)$$

[1] This gage is abbreviated as "WTW" on the California Data Exchange Center's (CDEC) website.

The change in storage was computed by converting the College Lake stage data into storage volumes, via a hypsometric curve (Figure 4), and determining the difference between volumes in the current and previous time steps. The outflow rate was determined using the HEC-RAS model, which computed uncontrolled flow over the College Lake outlet weir into Salsipuedes Creek based on the lake's stage and the flow on Corralitos Creek (USGS gage 11159200) and Pinto Creek. The development of this model is described in Section 2.2.2.

College Lake inflow hydrographs were computed for the period between the initiation of lake filling and the start of pumping, which typically occurs in March or April. Without accurate pumping records, outflow (and by default inflow) could not be reliably calculated after this point. The mass-balance-derived inflow hydrographs were considered to represent the "observed" College Lake inflows for water years 2012-2016, for the purposes of PRMS model calibration and validation. For WY 2017, high-quality Casserly Creek flow data were available, so the flow hydrograph that was developed using a rating curve for this gage was averaged from a 15-minute dataset to daily values and compared to the PRMS-computed flow at the outlet of the Casserly Creek watershed.

The PRMS model was recalibrated with respect to total (mass-balance) College Lake inflow for WYs 2012 and 2013, for which it had previously been calibrated and validated, and Casserly Creek flow for WY 2017. It was then validated against total College Lake inflows for WYs 2014, 2015, and 2016. During the calibration process, a suite of variables controlling soil moisture conditions, the partitioning of runoff into various flow paths, shallow groundwater flow rates, and other processes were manually adjusted over 95 iterations. A custom R (R Core Team, 2016) script was developed to update PRMS input files, run the executable, and extract and plot the results relative to the "observed" data for each iteration. The final values or value ranges for parameters used in the PRMS model calibration are summarized in Table 1.

2.1.2.1 Calibration Results

In general, the PRMS model consistently underpredicted recessional baseflows and tended to overpredict early peaks (Figures 5-7). This created a tendency for the PRMS model to underpredict accumulated inflow volumes, even once the PRMS-computed inflows had been adjusted for use in the Water Budget Model (see Section 2.3.2.1). Namely, the PRMS-computed inflows were increased by 1.5 cfs from April – August and 1.0 cfs in September and October (Table 2). Parameters could not be changed, within their appropriate ranges, to better match the elevated observed baseflow recessions. While the "observed" inflow to College Lake may itself be overestimated in some circumstances, for reasons described in Section 2.2.2, some contribution to groundwater flow that is unrelated to recent precipitation, such as agricultural return flows and spring outflows, was likely unaccounted for in the PRMS model. The seasonal baseflow constants were therefore applied during post-processing of the model results. Note that in Figures 5-7, the adjusted accumulated inflow volume is shown, while the adjusted flow rate is not. This is because the original and adjusted PRMS flow rates are graphically identical at the scale of the plots, due to the small

Table 1. Calibrated PRMS parameters.[2]

PRMS Parameter	Definition[3]	Units	Valid Range	Default	Value(s) Used
carea_max	Maximum possible area contributing to surface runoff expressed as a portion of the HRU area	NA	0.0 – 1.0	0.6	0.1
fastcoef_lin	Linear coefficient in equation to route preferential-flow storage down slope for each HRU	day^{-1}	0.001 – 1.0	0.1	0.1
fastcoef_sq	Non-linear coefficient in equation to route preferential-flow storage down slope for each HRU	NA	0.001 – 1.0	0.8	0.8
gwsink_coef	Linear coefficient in the equation to compute outflow to the groundwater sink for each GWR	day^{-1}	0.0 – 1.0	0	0.01
imperv_stor_max	Maximum impervious area retention storage for each HRU	inch	0.0 – 0.1	0.05	0.01
pref_flow_den	Fraction of the soil zone in which preferential flow occurs for each HRU	NA	0.0 – 1.0	0.0	0.0
sat_threshold	Water holding capacity of the gravity and preferential flow reservoirs	inch	1.0 – 999.0	999.0	999.0
slowcoef_lin	Linear coefficient in equation to route gravity-reservoir storage down slope for each HRU	day^{-1}	0.001 – 0.5	0.015	0.09
slowcoef_sq	Non-linear coefficient in equation to route gravity-reservoir storage down slope for each HRU	NA	0.001 – 1.0	0.1	0.001
smidx_coef	Coefficient in non-linear contributing area algorithm for each HRU	NA	0.001 – 0.06	0.005	0.001
smidx_exp	Exponent in non-linear contributing area algorithm for each HRU	$inch^{-1}$	0.1 – 0.5	0.3	0.5
soil2gw_max	Maximum amount of the capillary reservoir excess that is routed directly to the GWR for each HRU	inch	0.0 – 5.0	0.0	0.0
soil_moist_max	Maximum available water holding capacity of capillary reservoir from land surface to rooting depth of the major vegetation type of each HRU	inch	0.001 – 10.0	2	(variable)[4]
soil_rechr_max	Maximum storage for soil recharge zone	inch	0.001 – 5.0	1.5	(variable)
ssr2gw_rate	Linear coefficient in equation used to route water from the gravity reservoir to the GWR for each HRU	day^{-1}	0.05 – 0.8	0.1	0.05
ssr2gw_exp	Non-linear coefficient in equation used to route water from the gravity reservoirs to the GWR for each HRU	NA	0.0 – 3.0	1.0	3.0

[2] Most calibrated parameters were applied as a constant value to all HRU's, but some were variable among HRU's. Calibration with variable, HRU-dependent parameters involved scaling existing values by factors.
[3] These definitions are drawn directly from the PRMS user manual (Markstrom et al., 2015).
[4] Different values were used for each hydrologic response unit (HRU) in the model. Calibration involved multiplying the original, custom values for each HRU by a factor to preserve relative magnitudes.

additions used for the adjusted flow rates. The differences can be seen clearly, though, in the accumulated inflow volume plots.

Unlike for all other water years, the calibration for WY 2017 was based directly on observed gaged data. The PRMS model matched the peak flows on Casserly Creek well, but underestimated its recession flows, especially late in the rainy season (Figure 7). Overestimation of early peak inflows, followed by underestimation of recession flows, caused the PRMS-simulated inflow volume to be larger than observed inflow volume for the first several months of the simulation before becoming surpassed later in the season (Figure 7).

The PRMS model was previously calibrated using WY 2012 data and validated using WY 2013 data. As such, the calibration for WY 2012 was quite accurate, despite the tendency of the PRMS model to overpredict early peaks by up to three-fold and under-predict recessional baseflows, dramatically at times (Figure 5). Aside from the first rainfall event, the model accurately matched peak inflows to College Lake. With respect to accumulated inflow volume, the non-adjusted PRMS inflow curve underestimated observed inflow by less than six percent (Figure 5). The model was less accurate for WY 2013, having underpredicted the primary flood peaks and the baseflow recession (Figure 6). Prolonged periods of underestimated baseflow following the two early flood events caused the total accumulated inflow volume to be under-predicted (Figure 6).

2.1.2.2 Validation Results

The trends identified from calibration of the PRMS model generally held for the validation years. Water year 2014, however, provided an exception as it was the only year for which the PRMS model overpredicted accumulated College Lake inflow volume (Figure 8). It was a critically dry water year, with a total precipitation of 9.02 inches (Figure 2), rendering it the second driest in the 137-year record at the Watsonville Water Works (WWW) monitoring station. The PRMS model dramatically over-predicted peak inflows and recessional flows, but underpredicted long-term baseflows (Figure 8), indicating that antecedent moisture conditions prior to the flood events likely indicated higher levels of soil saturation than actually occurred. The validation for WYs 2015 and 2016 for College Lake inflow yielded the general trend of early peak overestimation, underestimation of baseflows, and a net underestimation of total inflow volume (Figures 9 and 10).

2.2 HYDRAULIC MODELS

Two sets of hydraulic models were developed for various analyses within this study. An existing 1-dimensional (1-D) HEC-RAS model from cbec's prior work within the College Lake system (cbec, 2014) was adopted and modified for a range of applications. Further, a coupled 1-D/2-dimensional (2-D) HEC-RAS model was subsequently developed based on a recently updated and acquired USACE model of the Pajaro River and College Lake area (USACE, unpublished data), which provided a better characterization of floodplain dynamics and inundation mapping.

2.2.1 Model Precision

Water surface elevation results from the hydraulic models throughout this report are reported to the nearest 0.1 ft, because the quality of available topographic data and the certainty to which Manning's roughness values in spatially heterogeneous reaches that also experience geomorphic changes on short timescales could be resolved render computing water surface elevations to a greater level of precision impractical. Further, flood stages experienced along the modeled creeks, and correspondingly in the overbank areas, are highly dependent upon channel conditions including the degree of sedimentation, debris accumulation, and vegetation/roughness characteristics. Actual flood stages may therefore vary substantially from those reported here, in certain areas for a given event. However, the comparison of events, reported as differences in flood stage between existing, project, and cumulative effects conditions in the following sections, and not the flood stages themselves, form the basis of the analyses.

2.2.2 1-D RAS Model

An existing 1-D HEC-RAS model (referred to as the "1-D Model") was created from several data sources and existing models (cbec, 2014) and was modified as part of the current project for various tasks including: calibration of the PRMS hydrologic model, assessment of fish bypass flow requirements, and generation of inputs to the Water Budget Model. The model includes Corralitos Creek, from just upstream of the Airport Boulevard road bridge to the confluence with Salsipuedes Creek; Salsipuedes Creek, from the College Lake outlet weir to its confluence with the Pajaro River; Pinto Creek, from Grimmer Road to its confluence with Salsipuedes Creek; and College Lake (Figure 11). College Lake was modeled as a 1-D storage area, defined by the stage-volume relationship determined by cbec topographic surveys (Figure 4). The outlet weir was modeled as an inline structure within the 1-D channel, with a variable crest height for different alternative scenarios. Additionally, lateral structures allowed flow to pass between Pinto Creek and Salsipuedes Creek, upstream of their confluence, through a low-lying area as stage within the creeks overtopped the banks. Lateral structures were similarly used to convey flow from the left overbank of Upper Salsipuedes Creek to Lower Salsipuedes Creek, allowing overbank flow to circumnavigate the confluence and flow across College Road, as well as allowing overbank flow from Corralitos and Lower Salsipuedes Creeks to be removed from the model domain to simulate flow onto the floodplains. Bridges and culverts throughout the model domain were included as hydraulic structures. Topographic data for Salsipuedes Creek between the College Lake outlet weir and the Corralitos Creek confluence were based on channel surveys conducted by cbec in 2017.

Variants of the HEC-RAS model were used to estimate parameters for fish passage requirements that were used in the Water Budget Model. Specifically, it was tailored to perform a critical riffle analysis to simulate the minimum depth and flow requirements to support adult and juvenile fish passage in Salsipuedes Creek, downstream of the College Lake outlet weir. The specific requirements are discussed in Section 2.3.2.3.

The HEC-RAS model also aided in the calibration of the PRMS model (Section 2.1.2) by estimating College Lake outflows (and inflows during reverse flow periods on Salsipuedes Creek) over the outlet weir. A stage boundary condition was used for the College Lake storage area, in addition to Corralitos Creek flows at the Freedom, CA USGS gage and a normal depth downstream boundary at the confluence with the Pajaro River. This model was used to solve for the normal and reverse flows over the College Lake outlet weir to construct the mass-balance inflow hydrograph used to calibrate the PRMS model for WYs 2014 – 2016; but it was not used for WY 2017, because reliable gaged College Lake inflow records existed and therefore the mass-balance method was not needed (Section 2.1.2). It is possible that the use of this model to estimate weir flow could over-estimate outflow from College Lake, and hence over-estimate inflow derived from mass-balance. Flood-related debris have been known to accumulate in Salsipuedes Creek downstream of the weir, which can restrict outflow and maintain a higher College Lake stage. The model may therefore over-estimate outflow over the weir as a result of this increase stage, because it assumes that the downstream channel conditions are constant. This factor could explain why the PRMS model appears to under-estimate College Lake inflows following flood events.

2.2.3 2-D RAS Model

For subsequent analyses, including the Flood Effects Analysis (Section 3.1) and the Time to Drain Analysis (Section 3.2), a newer HEC-RAS model was developed from several sources and included 1-D channel reaches and 2-D overbank flow areas (referred to simply as the "2-D Model") to better represent overbank flow than the 1-D Model did. It also allowed for inundation mapping. Variants of this model were used to simulate existing, proposed (Project), and cumulative effects (Project and USACE proposed flood improvements) scenarios.

The existing conditions model was developed by updating the USACE's without-project model (Figure 12), which included the Pajaro River, Upper Salsipuedes Creek, Lower Salsipuedes Creek, Corralitos Creek, College Lake, and adjacent floodplain areas. The USACE model needed to be improved to provide accurate hydraulic information for the areas of interest to the Project. For example, the model was extended upstream of Paulsen Road along Casserly Creek to include 2018 channel topographic survey data (cbec) and overbank flow areas. For College Lake itself, the stage-discharge relationship for the 1-D storage area representing the lake was updated according to cbec data (Figure 4), and the boundary of the storage area was re-delineated. USACE cross section, bridge, and College Lake weir data for Upper Salsipuedes Creek were replaced with geometric data from the 1-D Model, including the 2017 topographic survey (collected by cbec). Likewise, cross section data from Northwest Hydraulic Consultants' 2015 1-D channel capacity model (NHC, 2015) for Corralitos and Lower Salsipuedes Creeks were used in place of USACE topography (Figure 13). The Pajaro River portion of the USACE model was kept intact.

Considerable updates were also made to the 2-D flow areas from the USACE model, which were used to simulate flow within the floodplain areas, including the City of Watsonville (Figure 13). Manning's n values were re-assigned according to Jung et al. (2013), based on land cover classes from the National Land Cover Dataset. Additionally, extensive grid refinement occurred to locally reduce the USACE model's 200-ft grid cells to 50-ft in areas of interest and those with complex hydraulics. All of the lateral structure connections between Corralitos, Upper Salsipuedes, and Lower Salsipuedes Creeks and their floodplains were recreated and were set to use the 2-D equation solving scheme, as opposed to the weir solution, wherever appropriate.

The proposed conditions 2-D Model was then constructed from this existing conditions 2-D Model by incorporating elements of the PV Water Project. These included the proposed weir, channel modifications in the vicinity of the weir, and the presence of the water treatment plant within the floodplain adjacent to the weir structure at Site Option 1 [5].

The cumulative effects 2-D Model was in-turn built from the proposed conditions 2-D model by incorporating the aspects of the proposed USACE flood control project in the region. These updates primarily included higher levees along all model reaches, as well as levee setbacks along portions of the Pajaro River and Lower Salsipuedes Creek.

2.3 WATER BUDGET MODEL

2.3.1 General Workflow

The Water Budget Model was created using Microsoft Excel and relied on inputs from the hydrologic model, USGS gage data, CIMIS data, and HEC-RAS hydraulic model simulations to determine how to allocate water for fish bypass flows and water supply diversions on a daily time step for WYs 2014-2017.

For each alternative, the 1-D HEC-RAS hydraulic model was run for two iterations. For the first iteration (v1), College Lake had three specified lateral inflow hydrographs: PRMS inflow, agricultural returns and spring flow (inflow), and evapotranspiration (ET) from the nearby willow forest (outflow). The second iteration (v2) used these same lateral inflow hydrographs, but also included open water evaporation from College Lake (outflow).

The Water Budget Model was used to estimate willow forest ET and agricultural returns (based on seasonal constants) for RAS model v1. Then, the results of RAS model v1 were relied upon in the Water Budget Model to compute the open water evaporation from College Lake, which was used to run RAS model v2. The results of RAS model v2 were then brought back into the Water Budget Model, where fish bypass flows, water supply extractions, and other flows and metrics were computed.

2.3.2 Water Budget Model Logic

2.3.2.1 Generating Boundary Conditions for the HEC-RAS Models

Prior to the first run of the RAS model (v1), the willow forest ET and agricultural returns needed to be computed. To calculate the estimated willow forest ET, the Water Budget Model extracted the daily reference ET value (inches) from a CIMIS dataset for the Pajaro Station in the Monterey Bay region (CIMIS Station 129). This value was converted to feet, multiplied by a seasonally-varying crop coefficient (K_c) value (Table 2), and multiplied by the area of the willow forest (acres) to determine the daily ET flux in acre-ft.

[5] While two locations are under consideration for the location of the water treatment plant, Site Option 1 was used in the hydraulic analysis as it poses the greatest hydraulic effect, and therefore was considered conservative with respect to assessing flood impacts.

To format the ET flux as a lateral inflow hydrograph in HEC-RAS, it was then converted to cfs and multiplied by negative 1 (to indicate that it was an outflow from the College Lake storage area). The agricultural return and spring flows, on the other hand, were based on seasonal constants that were estimated based upon a comparison between simulated flows from the PRMS model and measured flows observed in Casserly Creek (Table 2).

Table 2. Seasonally-varying crop coefficients and estimated return flows due to springs and agriculture.

Month	Willow Forest ET: K_c	Agricultural Returns + Spring Flows (cfs)
January	0.0	0
February	0.0	0
March	0.0	0
April	0.2	1.5
May	0.3	1.5
June	0.6	1.5
July	0.9	1.5
August	1.1	1.5
September	1.0	1
October	0.65	1
November	0.0	0
December	0.0	0

After running v1 of the HEC-RAS model, the next task for the Water Budget Model was to determine the open water evaporation flux leaving College Lake. The HEC-RAS-modeled College Lake water surface elevation (WSE) was used, in conjunction with the hypsometric curves defined for College Lake (Figure 4), to determine the lake's surface area for a given day. The surface area (acres) was then multiplied by the product of the daily reference ET, converted from inches to feet, and the coefficient for open water (0.6525). The resulting value was then converted from acre-feet to cfs and multiplied by negative 1 for input into the RAS v2 model as a lateral inflow hydrograph to the College Lake storage area.

The results of the HEC-RAS v2 model were used to run the Water Budget Model's primary computations, summarized in the following sections.

2.3.2.2 Water Supply Extractions

The Water Budget Model determined what volumetric rate to divert for water supply extractions based on potential operational criteria. Water supply extractions could not begin until the lake was full (i.e., at the weir elevation), which was determined using a preliminary water balance iteration in which water supply extractions were not accounted for. After this point, the model allocated the specified monthly diversion amounts out of the lake volume, until the lake became empty (determined from the lake level in the previous time step). When this occurred, the model bypassed whatever Net Inflow (Equation 3) was not needed for fish releases. However, during the fish release seasons, if the requested water supply extraction would cause the lake level to drop below a minimum elevation within a given time step, defined in Section 2.3.2.3, the diversion flow was constrained to equal the fraction of the flow that maintained the minimum elevation that was not needed for fish releases.

$$Net\ Inflow = PRMS\ Inflow + (Ag.Returns\ \&\ Spring\ Flow) - Willow\ ET - OW\ Evap - Inf \quad (3)$$

Note that Open Water Evaporation (*OW Evap*) for each daily time step was computed from the final lake level in the previous day. The infiltration rate (*Inf*) to the subsurface from the lake was assumed to be negligible due to the fine-grained (low permeability) deposits present beneath the lake, and the fact that a natural lake persisted at this location prior to the management by RD 2049[6].

2.3.2.3 Fish Bypass Flows

Fish bypass releases from College Lake were used to make three hydraulic regions passable during both the adult passage (12/15 – 3/31) and smolt outmigration (4/1 – 5/31) seasons: 1) Lower Salsipuedes Creek (downstream of the Corralitos Creek confluence), 2) Upper Salsipuedes Creek (between the weir and the Corralitos Creek confluence), and 3) the proposed weir itself. Lower Salsipuedes Creek was considered passable when the combined flow from Corralitos Creek at Freedom, CA and College Lake outflow was 21 cfs for adult fish and 8 cfs for smolts (Podlech, 2018). Flows required to make Upper Salsipuedes Creek passable must produce a depth of 0.6 feet at the reach's critical riffle for adults and 0.4 feet for smolts, which corresponded to flows leaving College Lake of 1.8 cfs and 1.0 cfs, respectively. The weir passage flow rate will be refined during the design phase of the College Lake weir and fish passage structure, but the current modeling effort assumed that the weir passage flow requirements are the same as those for Upper Salsipuedes Creek.

Fish bypass releases only began once the WSE in College Lake had surpassed the level at which passable conditions for fish would have occurred without the RD 2049 weir in place and flows only being regulated by existing channel topography on Upper Salsipuedes Creek. This corresponded to the College Lake WSE that yielded a depth of 0.6 feet at the critical riffle (59.5 ft, NAVD 88) for the adult season, and 0.4 feet of depth (59.3 ft, NAVD 88) for the smolt season. After the lake level had reached this minimum level for the adult season, the Water Budget Model computed fish bypass releases by determining which hydraulic regions could be made passable using the decision tree logic in Figure 14. The model was not allowed to draw upon storage in College Lake to release more than the Net Inflow in a given time step for fish bypass flows, and the lake was required to remain at or above the minimum WSE level for natural fish passage throughout the adult passage and smolt outmigration seasons.

2.3.2.4 Uncontrolled Weir Flow

The Water Budget Model used the standard weir equation (Equation 4), with some specific assumptions, to determine the uncontrolled flow rate over the weir in each time step based on the headwater (College

[6] Infiltration rates were evaluated in the 2014 cbec effort, where they were ultimately assumed to be negligible in comparison to the magnitude of the open water evaporation and willow forest ET fluxes. If larger infiltration rates were applied to the WBM, larger agricultural returns/spring flow estimates would need to be applied.

Lake) and tailwater (Salsipuedes Creek downstream of the weir) elevations. The weir flow computed by version 2 of the 1-D HEC-RAS model could not be used in calculations, because the headwater and tailwater conditions varied substantially from the HEC-RAS model as diversions for water supply and fish flows were accounted for in the Water Budget Model. The uncontrolled weir flow therefore needed to be computed explicitly:

$$q = CLH^{\frac{3}{2}} \tag{4}$$

where q is the discharge over the weir (cfs), C is the weir coefficient, L is the length of the weir spillway crest (ft), and H is the height of the headwater elevation above the broad-crested weir elevation (ft).

The headwater elevation for a given time step was equal to the water budget-computed College Lake water surface elevation from the previous time step. The tailwater elevation was defined in different ways throughout the simulation. Before the lake was full (i.e., at the elevation of the weir), the tailwater elevation was drawn directly from the HEC-RAS (version 2) output data. This allowed for reverse flows (from Corralitos Creek and/or Pinto Creek) into College Lake to be computed prior to lake filling. After the lake became full, the tailwater elevation was calculated as a fraction (0.999999) of the headwater elevation. The assumption was that the water surface elevation in Salsipuedes Creek downstream of the weir would equilibrate rapidly with the level in College Lake[7], such that for a daily time step, it could be assumed that weir flow was occurring in the positive flow direction (out of College Lake) with a high degree of submergence. This occurred because of the limited conveyance capacity of Upper Salsipuedes Creek during floods.

The Water Budget Model used a decision tree (Figure 14) to determine which values to use for parameters in the weir equation, and to what extent flows were reduced due to weir submergence (Table 3). For a given time step, if both the headwater and tailwater elevations were below the weir crest elevation, then there was no weir flow. If either the headwater or tailwater elevations were above the weir crest elevation while the other water surface elevation was below the weir crest elevation, then free weir flow occurred, and the direction of the flow was based on the relative headwater and tailwater elevations. If both the headwater and tailwater elevations were above the weir crest elevation, then submerged flow occurred and the discharge computed by the weir equation was reduced by a function of the submergence ratio (*SR*) (Equation 5) (Figure 15) until the submergence ratio was greater than 95 percent, the default value used in HEC-RAS weir flow computations:

$$SR = \frac{H_2}{H_1} \tag{5}$$

where H_1 is the greater and H_2 the lesser of the heights of the headwater and tailwater elevations.

[7] This assumption is validated by direct observation of existing conditions under the existing weir as well as when sandbags are added to the crest of the existing weir, temporarily raising its crest to ~62.5 ft.

In the HEC-RAS model, when the submergence ratio was greater than 95 percent, the program no longer used weir calculations and instead used the standard energy method typical of 1-D cross section solvers. Not having the ability to perform these iterative calculations in a spreadsheet model, when the submergence ratio was greater than 95 percent in the Water Budget Model, the flow was computed as free weir flow with a revised weir length and a reduced weir coefficient, which was calibrated from the 1-D/2-D HEC-RAS model results for the months of December 2016 and January 2017 (Figure 16). The weir lengths and reduced weir coefficients were specified in the Water Budget Model as a lookup table based upon College Lake stage (Table 4).

Table 3. Uncontrolled weir flow computation logic.

Stage >= Weir Crest?		Headwater (<>=) Tailwater	Flow Direction[8]	SR >= 0.95?	Modeled Flow Type	Weir Coefficient	Weir Length	Potentially reduced discharge?[9]
Headwater	**Tailwater**							
False	False				No flow			
True	False		Normal		Free	2.6	40 ft	
False	True		Reverse		Free	2.6	40 ft	
True	True	>	Normal	True	Free	*Table 4*		False
				False	Submerged	2.6	40 ft	True
		<	Reverse	True	Free	*Table 4*		False
				False	Submerged	2.6	40 ft	True
		=			No flow			

Table 4. Custom weir lengths and coefficients when the submergence ratio was greater than 95%.

College Lake Stage (ft, NAVD 88)[10]	Weir Length (ft)[11]	Applied Weir Coefficient[12]
60.1	40	0.480
64.0	96	0.200
65.0	105	0.195
66.0	111	0.185
66.5	226	0.085

[8] The "normal" flow direction is defined as flow leaving College Lake over the weir.
[9] Discharge reductions only apply for submerged weir flow if the submergence ratio is between 0.76 and 0.95 (See Figure 15).
[10] The model does not interpolate values between rows based on stage; a new stage value and associated weir length and weir coefficient parameters are selected only after the specified College Lake stage is surpassed.
[11] Calculated from wetted, effective flow width of cross section at location of weir.
[12] These coefficients are lower than typical weir coefficients, because the model is using a calibrated weir flow calculation in a setting that is not characterized by true weir flow.

2.3.2.5 Mass Balance Calculations

The final section of the Water Budget Model contained the mass balance calculations that were used to determine the resulting water surface elevation in College Lake after each time step. These were based on the conservation of mass principle (Equation 6, a variant of Equation 2):

$$\Delta\, Storage = Inflow - Outflow \tag{6}$$

The starting lake level for each time step was first converted to a surface area, by using the College Lake hypsometric curve (Figure 4). Then, open water evaporation was computed using this surface area. Infiltration was also based on the surface area of the lake, but the infiltration rate was assumed to be negligible. The change in storage was then computed from inflows and outflows in the previous time step according to Equation 7:

$$\Delta\, Storage_n = Net\ Inflow_{n-1} - (UWF + Fish\ Bypass + \ Demand)_{n-1} \tag{7}$$

where *UWF* was the uncontrolled weir flow and *Demand* was the diversion flow for water supply. The inflows and outflows from the previous time step were needed to avoid circular references in Excel, given that fluxes were dependent upon either the stage or surface area of College Lake within a given time step.

The change in storage was then added to the previous time step's storage to determine the resulting volume for each time step. This volume was then converted to a water surface elevation using the hypsometric curve (Figure 4), which in turn became the starting water surface elevation for the subsequent time step.

3 ANALYSES

Having developed the suite of hydrologic, hydraulic, and water budget models, various operational and logistical questions about the Project were analyzed. The hydraulic models were used to determine the potential for flood effects associated with water treatment plant locations, weir operations, and cumulative effects of the PV Water project and the USACE proposed flood control project. They were also used to determine the time required to drawdown College Lake in anticipation of a flood event. The Water Budget Model, which incorporated hydraulic and hydrologic model outputs, was used to assess Project yield for an array of potential management alternatives.

3.1 FLOOD EFFECTS ASSESSMENT

The 2-D Model was used to understand flood dynamics associated with the 10-year and 100-year runoff events, as well as to determine the lake level to which College Lake must be drawn down to in order to not have flood effects under proposed conditions compared to existing conditions.

3.1.1 Characterization of 10-Year and 100-Year Events

To understand the comparative potential flood effects of the Project, with and without the proposed USACE project in place, the 2-D model was used to simulate existing, proposed, and cumulative effects conditions for the 10-year and 100-year flood events. Preliminary modeling for this project indicated that the initial College Lake WSE was highly influential on the severity of flooding experienced, as higher initial stages resulted in lower remaining storage capacities for the lake to store incoming flood events. Therefore, the first step for developing these simulations was to determine the typical minimum level of College Lake during the wet season with the existing weir crest at its current elevation of approximately 60.1 ft (NAVD 88). An exceedance probability analysis of observed stage data for WYs 2012-2017 (Figure 17) was conducted, in which the distribution was calculated from a subset of the data that corresponded to periods when the lake was above the weir crest elevation and pumping to drain the lake, was not occurring (Figure 18). The 80 percent exceedance probability lake level was chosen, corresponding to a College Lake stage of approximately 61.0 ft (NAVD 88) (Figure 18), as this elevation reflects the lowest typical elevation of College Lake during the wet season. WSEs lower that this elevation are not typical.

Having determined the initial lake stage, each simulation was run with a starting College Lake stage of 61.0 ft. For existing conditions, the Reclamation District 2049 (RD 2049) weir geometry was used, while for proposed and cumulative effects conditions, the proposed PV Water weir was positioned in the low position with a crest elevation of 60.1 ft (NAVD 88), roughly matching the crest elevation of the existing weir. USACE unsteady hydrographs (USACE, unpublished data) were used for the 10-year and 100-year events (Figure 19) for boundary conditions at Corralitos Creek, the Pajaro River, and as inflow to College Lake. While the USACE model applied the College Lake inflow directly to the 1-D storage area representing the lake, the 2-D model applied the inflow to the short reach of Casserly Creek that was added as one of the model updates. In reality, other tributaries to College Lake provide some of this inflow, but Casserly Creek comprises the majority of inflows. Flood profiles from each scenario for both events were generated along Casserly Creek, Upper Salsipuedes, Lower Salsipuedes Creek, and Corralitos Creek by rounding simulated water surface elevations to the nearest 0.1 ft to determine flood effects. Profile plots were then generated for each reach (Figures 20 – 23), with the exception of Casserly Creek, which was relatively short and visually uninformative for comparisons. Additionally, inundation maps were prepared (Figures 24 – 27) using a threshold depth of 0.049 ft, such that depths that would round to 0.0 ft were not displayed.

The Project had no effects to the flood profiles on Corralitos, Lower Salsipuedes, or Casserly Creeks (Figures 20 – 23). In other words, no cross sections within these reaches experienced a water surface elevation increase of 0.1 ft or more, between the existing and proposed conditions scenarios. Noticeable differences occurred between the cumulative effects scenario, however, which includes both the proposed PV Water Project conditions and the proposed USACE project, and the existing and proposed scenarios for Corralitos and Lower Salsipuedes Creeks. For the 100-year event, the cumulative effects scenario shows elevated water surface elevations in Corralitos Creek upstream of the Salsipuedes Creek confluence and in Lower Salsipuedes Creek upstream of the Pajaro River (Figure 22). This is because, under existing and proposed conditions, significant out-of-bank flow occurs as these creeks overtop surrounding levees and spill onto the floodplain, including into the City of Watsonville. However, with the USACE project in place, these levees are raised in key areas to prevent overtopping, so the water surface elevation within the channel is higher as the flow is contained. A similar trend exists for the 10-year event on Corralitos Creek, but for Lower Salsipuedes Creek, the cumulative effects scenario displays a lower flood profile in the downstream reaches compared to the existing and proposed scenarios (Figure 20). This is due to levee setbacks along Lower Salsipuedes Creek, which effectively increase the channel capacity. Unlike with the 100-year event, the levees in this region for the 10-year event were not overtopped under existing and proposed conditions, so the increase in channel capacity for the cumulative effects scenario causes a noticeable decrease in water surface elevation, whereas this effect was overwhelmed in the 100-year event by comparing profiles with out-of-bank flow (existing and proposed) against in-channel flow (cumulative effects).

Upper Salsipuedes Creek experienced Project-related flood effects for the 100-year event, but not for the 10-year event. For the 100-year event, these differences between existing and proposed conditions were on the order of 0.1 ft and occurred just upstream of the proposed weir structure and the Site Option 1 WTP (Figure 23). In other words, the effects were restricted to the floodplain downstream of the College Lake basin and did not extend upstream to Casserly Creek or downstream within Upper Salsipuedes Creek. Even within College Lake itself, no flood effects were observed due to either the 10-year or 100-year events (Table 5). The cumulative effects model, having Project elements incorporated, mirrored this trend within the floodplain downstream of College Lake for the 100-year event, but experienced lower water surface elevations than existing and proposed conditions for both the 100-year and 10-year events in the vicinity of Orchard Park due to upgraded bridge crossings for California State Route 152 and College-Holohan Road (Figures 21 and 23). The cumulative effects scenario also showed slightly elevated water surface elevations for both events compared to the existing and proposed conditions at the downstream end of Upper Salsipuedes Creek, near the Corralitos-Lower Salsipuedes Creek confluence, which is due to the previously mentioned constraining of flow to these channels as a result of the USACE project (Figures 21 and 23).

The stage difference between cumulative effects and existing conditions scenarios within College Lake and in the areas immediately downstream of it were 0.1 ft and 0.2 ft for the 10-year and 100-year events, respectively (Table 5). At first, this observation seems counter-intuitive, given that the increased capacity of the California State Route 152 and College-Holohan Road bridges in the USACE project allow for lower water surface elevations in much of Upper Salsipuedes Creek under the cumulative effects scenario. However, detailed investigation of particle tracking animations and 1-D/2-D lateral structure connection outputs elucidated the mechanism behind this observation. Under USACE project conditions, the Orchard Park area becomes inundated from the northern side, along Pinto Creek, which can occur either due to reverse flows from Corralitos Creek or due to College Lake flooding. Unlike under existing and proposed conditions, where flood waters do not enter Orchard Park from the river-left bank of Corralitos Creek, upstream of the Salsipuedes Creek confluence, because the USACE project includes levee improvements along Corralitos Creek as well as along the lower portion of Upper Salsipuedes Creek. The flood waters that enter Orchard Park from the north become trapped by the improved levees as the water flows south toward Corralitos Creek and must ultimately flow back north to escape into Upper Salsipuedes Creek via Pinto Creek. This accumulation of water within Orchard Park, as a result of the improved levees, creates a backwater effect into College Lake that persists despite improved channel capacity in Upper Salsipuedes Creek.

Table 5. College Lake maximum stages and stage differences compared to existing conditions.[13]

Event	Existing	Proposed		Cumulative Effects	
	Max Stage	Max Stage	Stage Diff.	Max Stage	Stage Diff.
10-yr	70.6	70.6	0.0	70.7	0.1
100-yr	73.4	73.4	0.0	73.6	0.2

As shown in the inundation maps generated for the existing versus proposed scenarios for both flood events (Figures 24 and 25),[14] flood effects were only apparent in the vicinity of the proposed weir structure for the 100-year event (Figure 25). Very small increases in flood extent, on the order of less than 5 ft of lateral expansion of the wetted front, are apparent along the southwest corner of College Lake for proposed Project conditions when compared to existing, though the difference is almost imperceptible from visual inspection of the map beyond scales of 1:4,000[15] (Figure 25, region rendered in black). Similarly, slight increases are observed in the overbank areas of Casserly Creek, upstream of Paulsen Road, though the differences in flood stage within the channel between existing and proposed were trivial and did not constitute a flood effect. For the 10-year event, slight increases in the extent of the wetted front by 0-2 ft were also shown in these two locations but were difficult to detect from visual inspection at most scales (Figure 24). The cumulative effects water surface extents showed much more dramatic deviations from the existing conditions than the proposed conditions did for both flood events (Figures 26 and 27). Inundation is more extensive within the Corralitos Creek channel, and the effect of levee setbacks along Lower Salsipuedes Creek is apparent in the water surface extents. Additionally, the overbank flooding into the city of Watsonville that was prevalent under both existing and proposed conditions was not observed under the cumulative effects scenario, due to increased channel capacities and upgraded levees, but the USACE project increased flood extents in many other areas where additional protection was not provided, as a result of loss of floodplain conveyance elsewhere in the system. Notably, these areas include College Lake, Casserly Creek, much of the river-left overbank of Lower Salsipuedes Creek, and agricultural land near the confluence of Lower Salsipuedes Creek and the Pajaro River, especially during the 100-year flood (Figure 27).

The potential location of the water treatment plant at Site Option 1 is one of two proposals under consideration for the Project. This configuration was selected for the hydraulic modeling because, being located adjacent to the Upper Salsipuedes Creek channel, this water treatment plant would remove

[13] Stage values are reported in units of ft (NAVD 88). Based on initial lake level of 61.0 ft.

[14] For the inundation figures, existing conditions water extents were overlain on those for proposed conditions (Figures 24 and 25) as well as for cumulative effects conditions (Figures 26 and 27). The existing conditions extents were rendered with slight transparency, so areas that are shown by dark blue indicate overlapping coverage of existing and proposed/cumulative effects extents, while areas that are lighter blue indicate areas where only the existing conditions extent was observed, and black areas indicate proposed/cumulative effects extents that were not coincident with existing conditions water surface extents.

[15] The inundation maps were produced with a scale of roughly 1:26,000. For the inset windows, scales of approximately 1:12,000 and 1:14,000 were used for the Casserly Creek and College Lake areas, respectively.

floodplain conveyance capacity, whereas the Site Option 2 is not within the 100-year floodplain. Preliminary modeling for this project comparing the siting of these treatment plants indicated that including the plant at Site Option 1 did not alter flood effects compared to locating the plant outside of the floodplain for the 10-year and 50-year events. However, for the 100-year event, locating the water treatment plant at Site Option 1 caused an increase of roughly 0.2 ft within College Lake and along Upper Salsipuedes Creek compared with Site Option 2. Neither of these conditions were compared to existing conditions as part of that modeling effort. The results indicate, however, that the water treatment plant at Site Option 1 is a primary driver for the Project-related flood effects observed in the 100-year event. If the treatment plant were to be located at Site Option 2 instead, College Lake would not need to be drawn down as low (i.e., lower than 61.0 ft at the beginning of a flood) to avoid having flood effects compared with existing conditions.

3.1.2 Threshold Lake Level Analysis

Having identified the range of flood effects associated with an initial College Lake stage of 61.0 ft, an analysis was conducted to determine the lake level to which College Lake must be drawn down, in anticipation of a flood event, in order to not have flood effects anywhere along Corralitos, Upper Salsipuedes, Lower Salsipuedes, or Casserly Creeks. This involved iteratively varying the initial stage in College Lake in increments of 0.1 ft to determine the level at which no water surface elevation increases of 0.1 ft or more were observed between existing and proposed conditions. Again, the proposed weir was kept in the low position of 60.1 ft. As previously described, no flood effects existed for the 10-year event when initialized with a 61.0 ft College Lake stage. However, increasing the initial stage to 61.1 ft resulted in a flood effect at the location of the weir, so it was determined that for a 10-year event, College Lake must be drawn down to 61.0 ft for the proposed conditions to not have a flood effect compared to existing. The 100-year event, on the other hand, did experience a flood effect due to the Project (primarily due to the water treatment plant in the floodway) when the lake was initialized at 61.0 ft. This analysis determined that the lake would need to be drawn down to 60.1 ft, or the lowest elevation of the weir crest itself, to not have a flood effect of 0.1 ft or more.

However, drawing down the lake level to below the low weir crest elevation is hydraulically infeasible, given that, without additional pumping and relying on gravity drainage over the weir alone, the water surface elevation in College Lake will never reach 60.1 ft during the wet season if there is any inflow to the lake from either the upstream or downstream directions. The analysis was then modified slightly to allow for WSE increases of up to 0.1 ft upstream of the proposed weir structure and within College Lake, while still not allowing for any effects on Casserly, Corralitos, or Lower Salsipuedes Creeks, as well as downstream of proposed weir structure on Upper Salsipuedes Creek. Under these assumptions, the allowable operating College Lake starting elevations changed to 61.2 and 61.3 ft for the 10-year and 100-year events, respectively. The greater increase in initial stage allowance for the 100-year event compared to the 10-year event is because the cross-sectional flow area for the 100-year event is much greater than for the 10-year as would be expected, so changes in initial College Lake stage have a decreased effect on water surface elevations within downstream cross sections.

3.2 COLLEGE LAKE DRAINAGE RATE ANALYSIS

An analysis was conducted to understand the rate at which College Lake would drain over the proposed weir, in order to meet pre-event drawdown criteria. The 2-D Model was used to simulate wet-season average flows of 16.4 cfs on Corralitos Creek and 14.7 cfs into College Lake (as determined by gage data and hydrologic model results, respectively), with varying starting College Lake water surface elevations of 63.0, 64.0, and 65.0 ft, which represent a typical range of College Lake wet-season stages based on observed stage data (Figure 28). The proposed weir structure was modeled using a breach scenario, in which the weir crest was lowered from an elevation of 62.5 ft to 60.1 ft over a period of 3 hours. In reality, this reduction would occur on the order of 10 minutes, but ultimately the time that it takes to lower the weir is not important in these scenarios because channel conditions in Upper Salsipuedes Creek and at the confluence with Corralitos and Lower Salsipuedes Creeks control the rate of flow over the weir through backwater effects. To assess the extent of hydraulic control exerted by these channel conditions, a duplicate suite of runs was conducted in which the proposed conditions 2-D Model was modified to include greater capacity within Upper Salsipuedes Creek and in which the depositional feature (i.e., sand and gravel bar) that typically forms at the confluence was removed. One potential maintained condition was simulated with Increases in channel capacity were achieved by cutting 20-ft wide rectangular channels within each cross section to a depth matching the invert elevations of the existing culverts for the California State Route 152 and College-Holohan Road bridge crossings (Figure 29). These channel improvements were also extended through the first riffle on Lower Salsipuedes Creek.

Ultimately, simulated results indicate that if the channel capacities for Upper Salsipuedes Creek and the confluence are not actively maintained during the wet season, it could take up to 11 days to lower College Lake from an initial stage of 65 ft down to 61 ft, assuming average inflow conditions persist during that time[16]. If the lake started at 63 ft, it would take over 8 days (Table 6, Figures 30 – 32). Alternatively, under maintained channel conditions, these time differences would range from roughly 3 days to 2 days, respectively (Table 6, Figures 33 – 35).

The maintained channel conditions used in this analysis were not based upon any proposed management activities, rather they were used to illustrate an aggressive channel maintenance management scenario[17] to simulate the effect of downstream hydraulic controls on the drawdown time of College Lake.

3.3 WATER BUDGET ALTERNATIVES

The Water Budget Model (Section 2.3) was used to determine the probable water supply yield from College Lake across a range of hydrologic conditions and weir operations. As discussed in Section 2.2.1, WYs 2014 – 2017 provided an excellent range of hydrologic variability with which to assess demand

---

[16] PV Water can control the rate of flow over the proposed, variable weir crest when the lake is between 60.1 ft and 62.5 ft. When the stage is above 62.5 ft and the weir is at 60.1 ft, PV Water has no control over the rate.

[17] Maintaining the capacity of the confluence and Upper Salsipuedes Creek to this degree may be infeasible and would require additional investigation in the future.

Table 6. Time (in days) for College Lake to be drawn down to selected elevations from various starting lake levels.[18]

Final Elevation (ft, NAVD 88))	Days to Drawdown with Existing Channel Conditions			Days to Drawdown with Maintained Channel Conditions		
	63 ft	64 ft	65 ft	63 ft	64 ft	65 ft
65.0			0.0			0.0
64.0		0.0	1.0		0.0	0.5
63.0	0.0	1.5	2.5	0.0	0.6	1.0
62.0	2.5	3.9	5.0	0.8	1.3	1.8
61.5	4.5	6.0	7.0	1.2	1.7	2.2
61.0	8.3	9.8	10.8	1.8	2.3	2.8

scenarios (Figure 2). Monthly estimates of potential demand values for these four water years were provided by Carollo Engineers and were based on observed deliveries, which were then limited to reflect the proposed water treatment plant processing capacity (Table 7). At a proposed production rate of 6,000 gallons per minute, operating 16 hours per day for 6 days per week, the water treatment plant would process about 106 acre-ft of water per week, or roughly 470 acre-feet for a 31-day month. The demand values assume that 400 acre-ft per year will be provided by separate water supply projects which would draw from Harkins and Watsonville Sloughs.

Table 7. Monthly demand values (in acre-ft) for each water year, accounting for the proposed treatment plant production rate.

WY	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
2014	154	54	32	303	34	56	395	470	455	470	470	455	3,348
2015	171	56	34	260	25	45	282	470	455	470	470	455	3,193
2016	86	45	25	226	19	36	191	470	455	470	470	455	2,948
2017	70	36	19	201	14	29	124	470	455	470	470	437	2,795

Three sets of scenarios were run in the Water Budget Model for each water year. The first set involved keeping the proposed PV Water weir in the 60.1-ft position for the entire year. The second set had the weir crest set to the 62.5 ft position for the entire year. Finally, the third set, which unlike the first two consisted of multiple runs for each water year, investigated operating a variable weir crest elevation. Specifically, the third, variable operation set was to determine the potential effect to Project yield associated with maintaining the weir in the 60.1 ft position throughout the wet season and raising it to 62.5 ft following the last major precipitation event. As a starting point for these runs, the earliest date was identified for each water year for which the weir could be raised to 62.5 ft following the last major precipitation event such that the College Lake stage would not exceed 62.5 ft and spill over the elevated weir crest, which was maintained at 62.5 ft for the remainder of the season. Then, the remaining scenarios involved raising the weir, again for the remainder of the season, on the day after this last major

[18] The stage values in the left column correspond to the final lake elevation, while those across the top indicate the starting lake level. The values within the table correspond to the number of days to drain the lake from the starting lake level to the final lake level.

precipitation event, as well as after each of the following events. This approach was meant to provide insight for how the lake may be operated in the future to account for forecasted precipitation, and what the potential risks may be for relying on late-season inflows to capture inflow that was bypassed during the wet season while the weir was low at 60.1 ft in order to minimize possible flood effects.

Ultimately, maintaining the weir in the high position of 62.5 ft for the entire year allows for the greatest Project yield, while keeping the weir low at 60.1 ft causes dramatic reductions of 500 – 600 acre feet per year, on average (Table 8). This is expected, given that the difference in storage volume of College Lake between 60.1 ft and 62.5 ft is roughly 600 acre-ft (Figure 4). However, maintaining a higher lake level during the wet season by holding the weir in the high position could result in flood effects, where College Lake would be at a higher stage under proposed (Project) conditions than it would have been under existing conditions leading into a flood event. If the weir is kept low for the wet season, and raised in anticipation of the passing of the final precipitation event, this additional flood risk could potentially be avoided, and the cost to Project yield compared to leaving the weir high would be around 100 acre-ft on average (Table 8).

Table 8. Project yield for 60.1 ft, 62.5 ft, and variable weir configurations.

Water Year	Requested Diversion[19] (ac-ft)	Weir Configuration						Difference (Compared to 60.1 ft weir)	
		60.1 ft weir		62.5 ft weir		Variable weir[20]			
		Met	% Met	Met	% Met	Met	% Met	62.5 ft weir	Variable weir
2014	3348	1741.5	52.0	2196.6	65.6	2183.6	65.2	455.1	442.1
2015	3193	1838.0	57.6	2440.5	76.4	2284.6	71.6	602.5	446.7
2016	2948	1818.0	61.7	2409.4	81.7	2306.1	78.2	591.4	488.1
2017	2795	1938.7	69.4	2502.0	89.5	2404.9	86.0	563.3	466.2
Average	3071	1834.0	60.2	2387.1	78.3	2294.8	75.3	553.1	460.8

Graphical depictions of potential College Lake operations are shown in Figures 36 – 58. For each water year, plots were generated for the 60.1 ft weir, 62.5 ft weir, and all variable weir scenarios. Due to the volume of graphics associated with this analysis, not all of the plots are discussed in detail here. Instead, a description of plots for WY 2016 is provided, and similar visual inspections can be made for all water years. Maintaining the weir at 60.1 ft for water year 2016 resulted in 61.7% of the requested demand being met (Figure 49). Note that diversions may not begin until the lake level (dark blue, dashed line) has reached the weir elevation (grey, dotted line), and that fish bypass flows (solid green line) can similarly not begin until the lake reaches the minimum level for fish passage (light purple line). Also note that water supply diversions can only occur after fish bypass flows have been met, and that the lake must remain above the minimum level for fish passage for the duration of the adult and smolt seasons (12/15-3/31 and 4/1-5/31, respectively), represented by vertical dashed-dotted black lines. Raising the weir to 62.5 ft for

[19] As limited by the water treatment plant capacity.
[20] These values were drawn from the first iteration of the variable weir set for each water year, in which the weir is raised as early as possible following the last major flood event while not being allowed to overtop the 62.5 ft weir.

water year 2016 resulted in over 81% of the requested diversion being met (Figure 50), as well as higher lake levels. If instead the weir is kept low throughout the flood season and raised after the last major flood event such that the 62.5 ft weir would not be overtopped, over 78% of the demand could still be met (Figure 51). Alternatively, if the weir were simply raised the day after that same flood event, without allowing for additional time to prevent overtopping, the Project would meet over 81% of demand but would create a flood effect by inundating overbank areas around College Lake and upstream of Paulsen Road with backwater from College Lake (Figure 52). Waiting until later in the season to raise the weir in anticipation of forecasted precipitation events could cause dramatic reductions in yield (see yield summaries in the top left corner of the figures) if the events are smaller than predicted (Figures 53 and 54).

4 REFERENCES

cbec, inc. (2014). College Lake Multi-Objective Management Project Final Report. Prepared for Resource Conservation District of Santa Cruz County, with assistance from Mike Podlech and Gary Kittleson.

Hydrologic Engineering Center (HEC). 2018. HEC-RAS River Analysis System, version 5.0.5. U.S. Army Corps of Engineers.

Jung, Younghun, Venkatesh Merwade, Kyudong Yeo, Yongchul Shin, Seung Oh Lee. 2013. "An Approach Using a 1D Hydraulic Model, Landsat Imaging and Generalized Likelihood Uncertainty Estimation for an Approximation of Flood Discharge." Water: 5, 1598-1621.

Markstrom, S.L., Regan, R.S., Hay, L.E., Viger, R.J., Webb, R.M.T., Payn, R.A., and LaFontaine, J.H. (2015). PRMS-IV, the precipitation-runoff modeling system, version 4: U.S. Geological Survey Techniques and Methods, book 6, chap. B7, 158 p., https://dx.doi.org/10.3133/tm6B7.

Northwest Hydraulic Consultants (NHC). 2015. Salsipuedes Creek Capacity Analysis Report – Draft Report. Prepared for Santa Cruz County - Department of Public Works: Flood Control Engineering.

Podlech, M. 2018. Fish Passage Assessment for the College Lake Integrated Resource Management Project. Prepared for ESA, Oakland, CA.

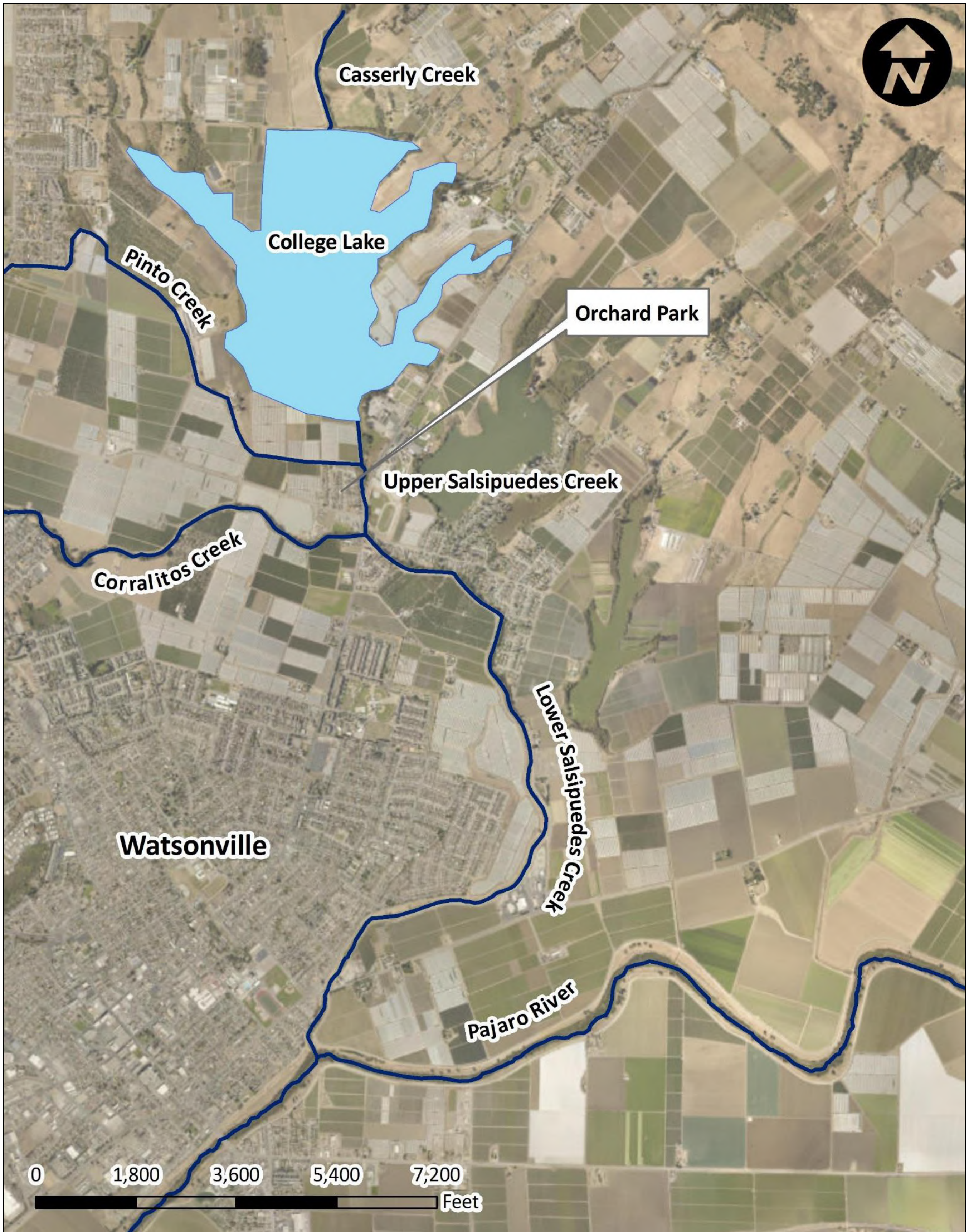
PRISM Climate Group (2017). PRISM Gridded Climate Data. Oregon State University. http://prism.oregonstate.edu.

R Core Team (2016). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria.

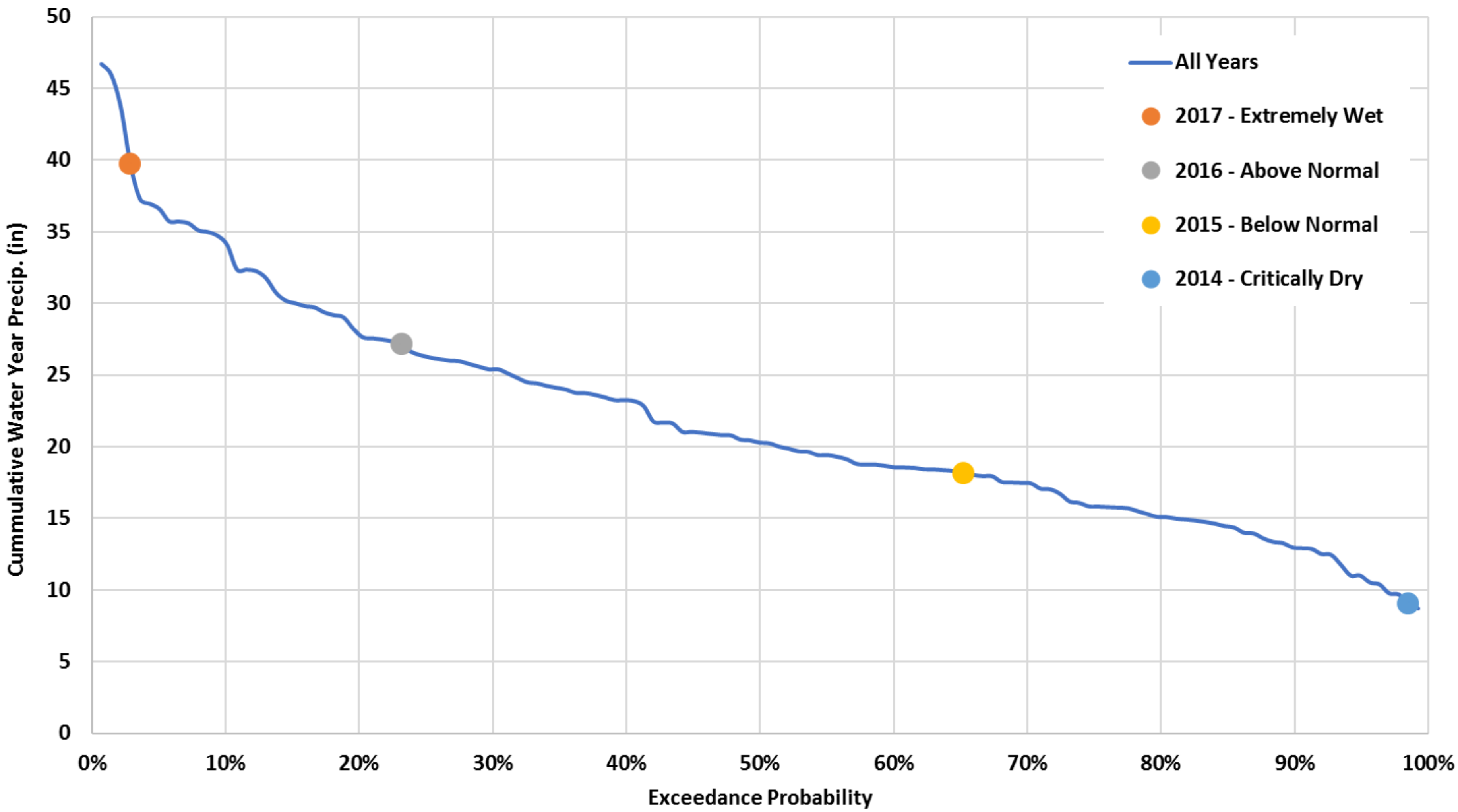
San Francisco District – US Army Corps of Engineers (1997). Pajaro River Basin, Santa Cruz County, California. Hydrologic engineering report. US Department of Defense.

5 LIST OF PREPARERS

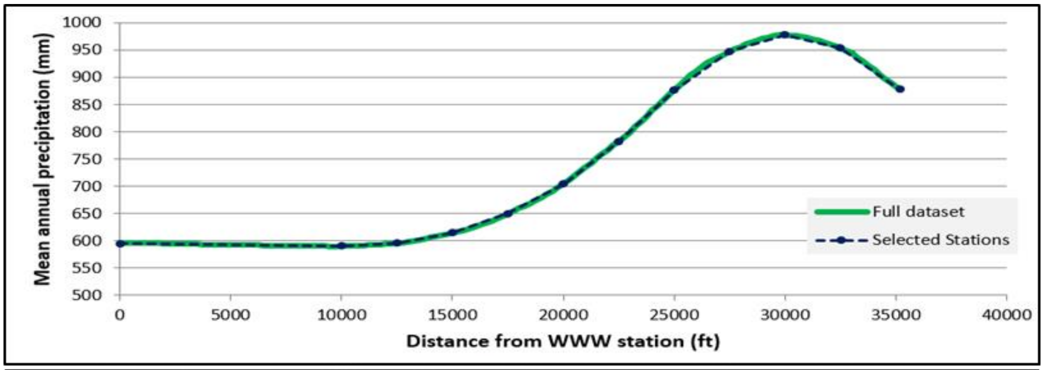
Luke Tillmann, M.S., Project Engineer, cbec, inc.
Chris Hammersmark, Ph.D., P.E., Project Director and Project Manager, cbec, inc.

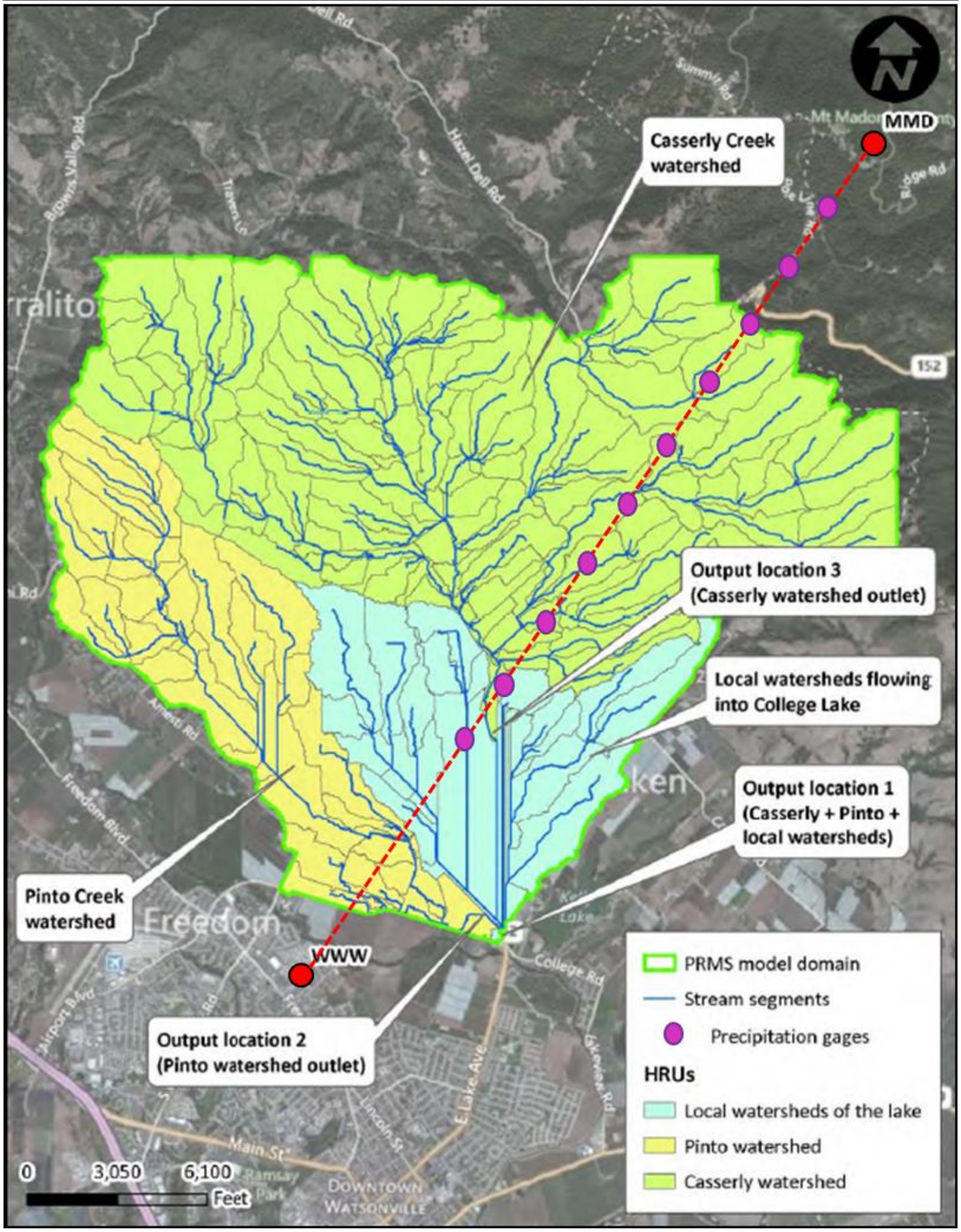


Notes: The delineation for College Lake is for illustrative purposes and does not reflect any legal boundaries.	cbec eco engineering	*PV Water BMP Program Services - College Lake Project* **Location map**
		Project No. 17-1017 | Created By: LST | **Figure 1**

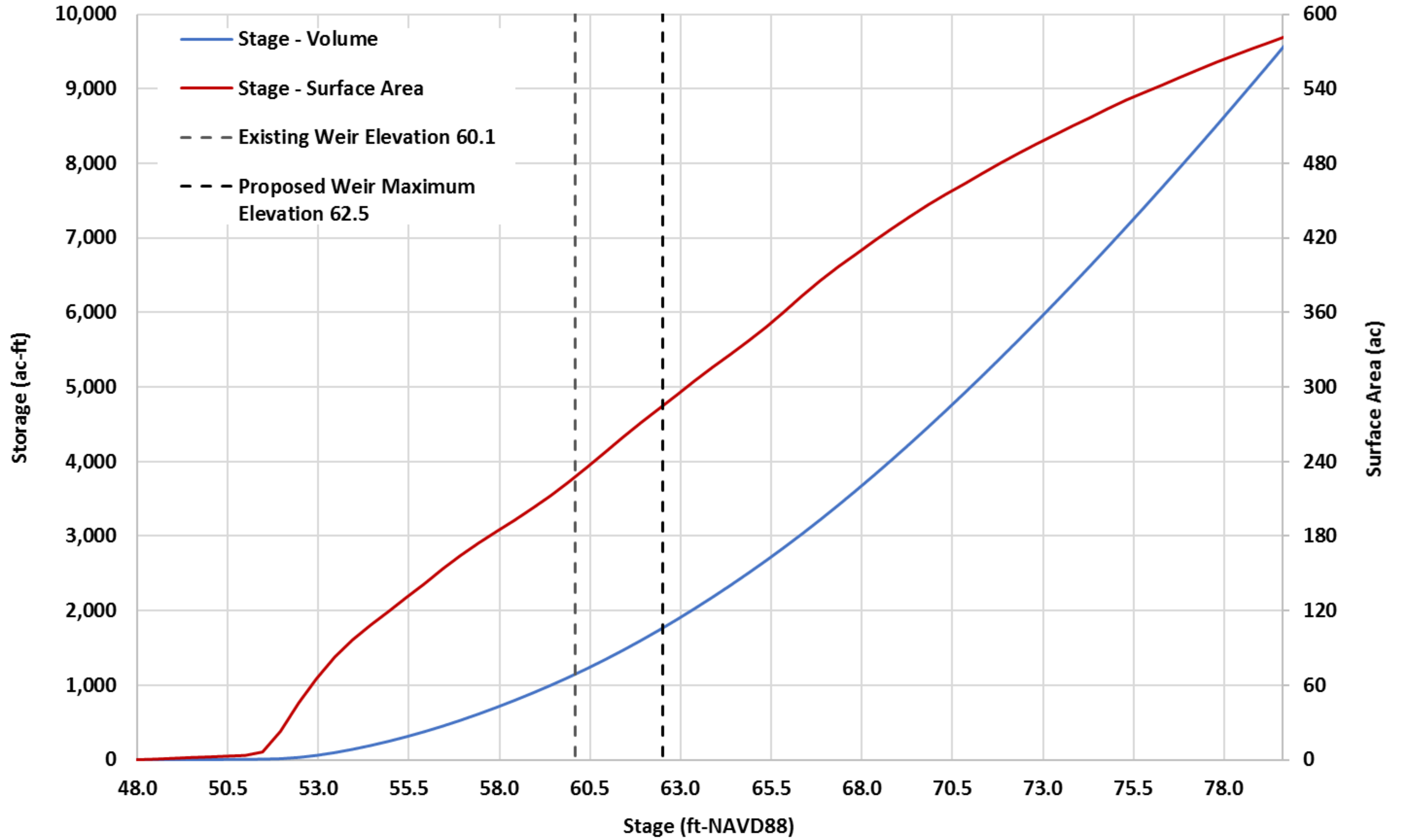


Notes: Based on 137 years of data from the Watsonville Water Works (WWW) station from 1880-2017.	cbec eco engineering	*PV Water BMP Program Services - College Lake Project* **Water years 2014-2017: rainfall characterization**	
		Project No. 17-1017	Created By: CTH	**Figure 2**





Notes: A total of 12 stations were scaled from WWW data.	cbec eco engineering	*PV Water BMP Program Services - College Lake Project* **PRMS model: synthetic precipitation stations**		
		Project No. 17-1017	Created By: LST, SP	**Figure 3**



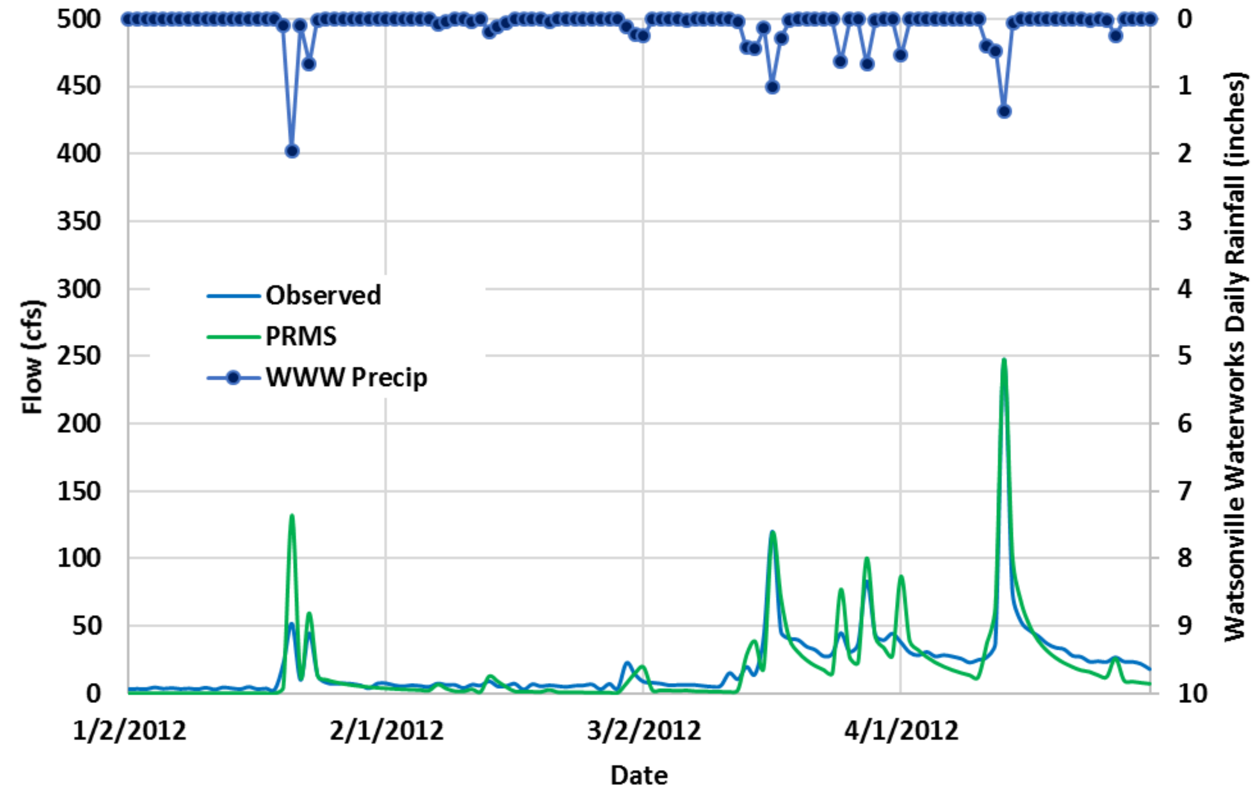
Notes:

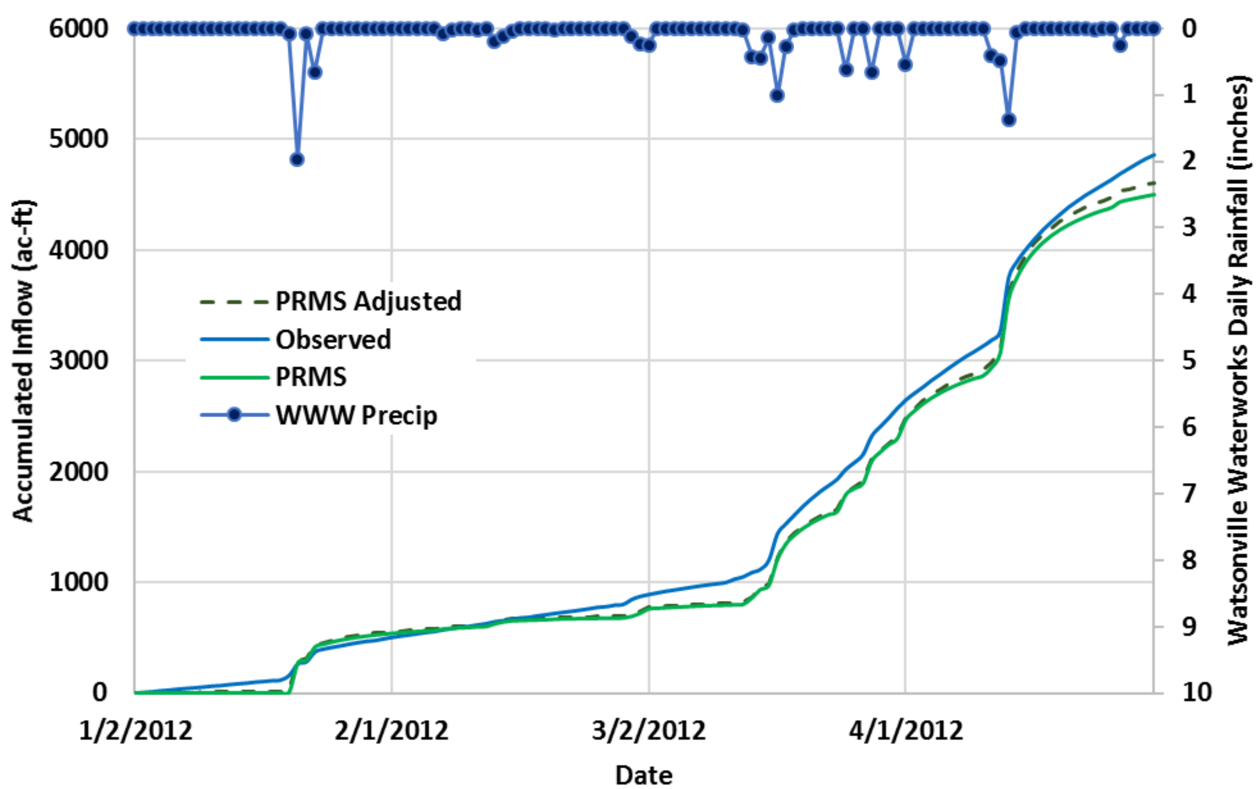
cbec eco engineering

PV Water BMP Program Services - College Lake Project

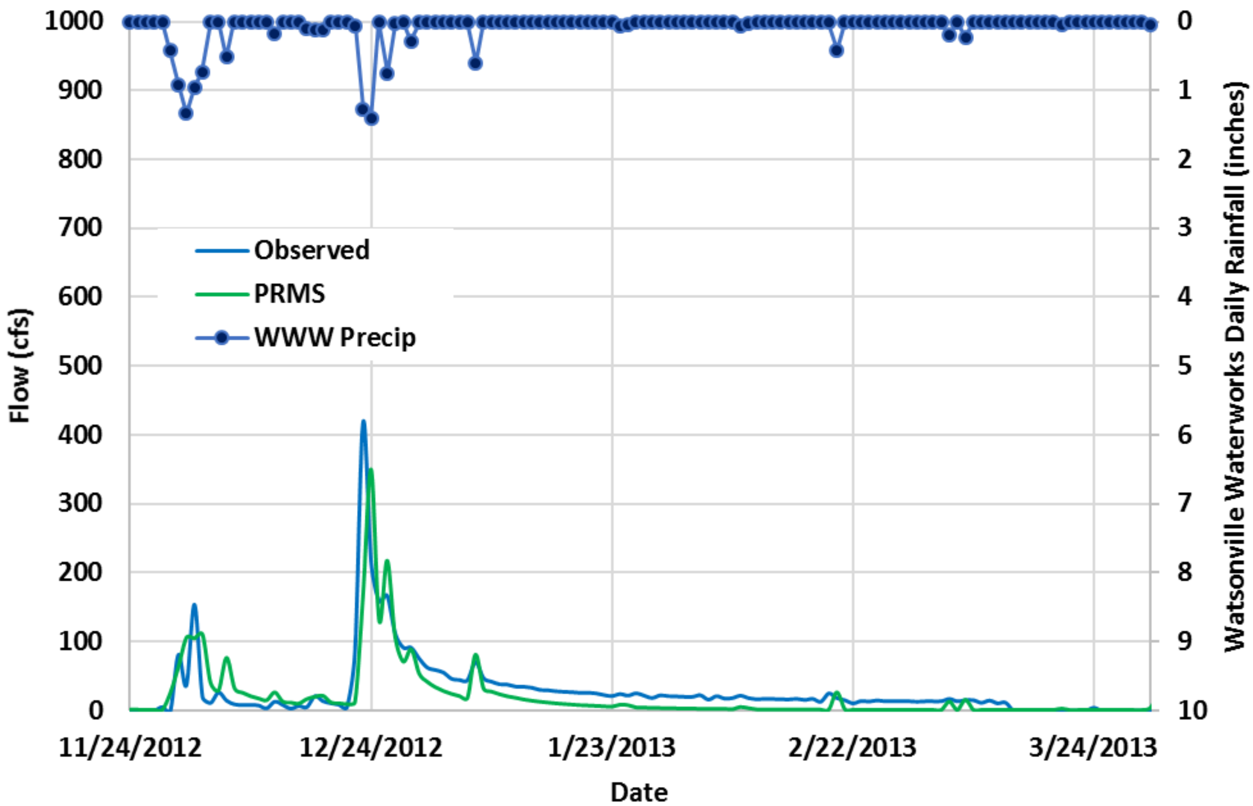
Stage-storage and stage-surface area curves

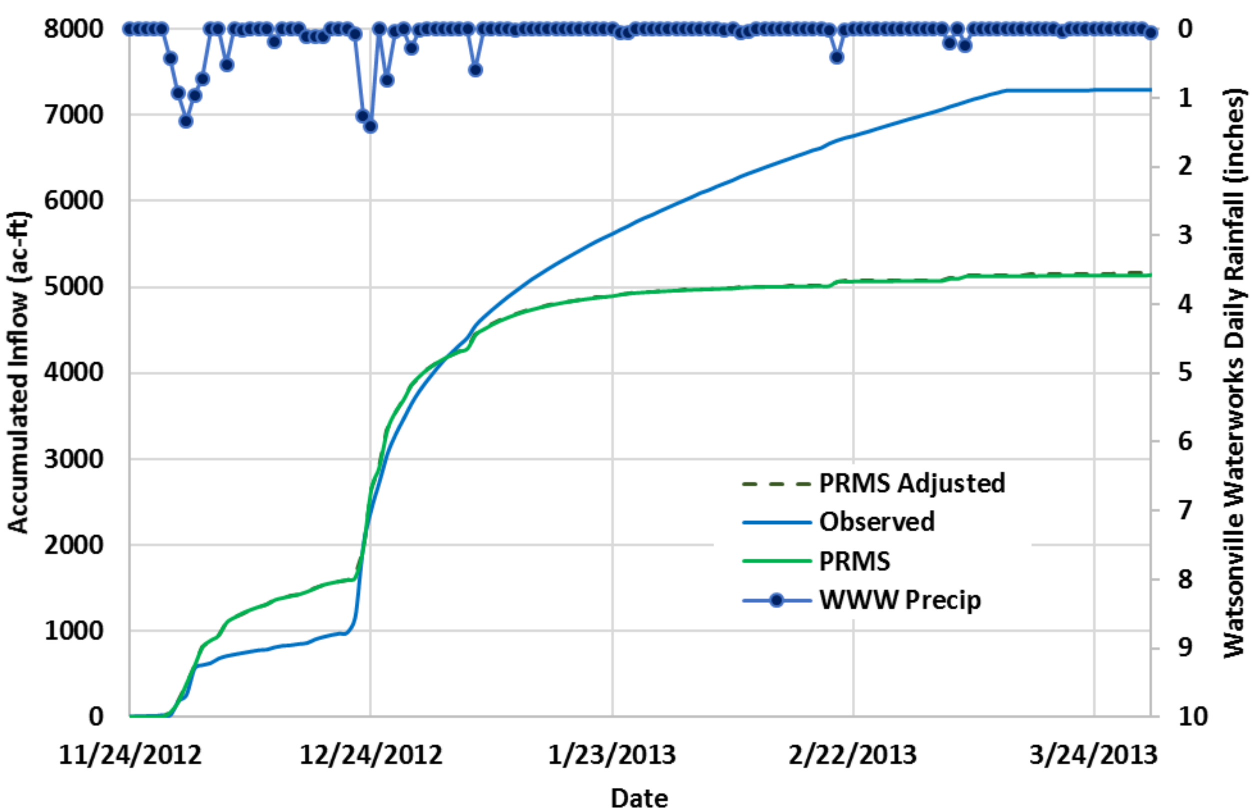
Project No. 17-1017 | Created By: LST | **Figure 4**





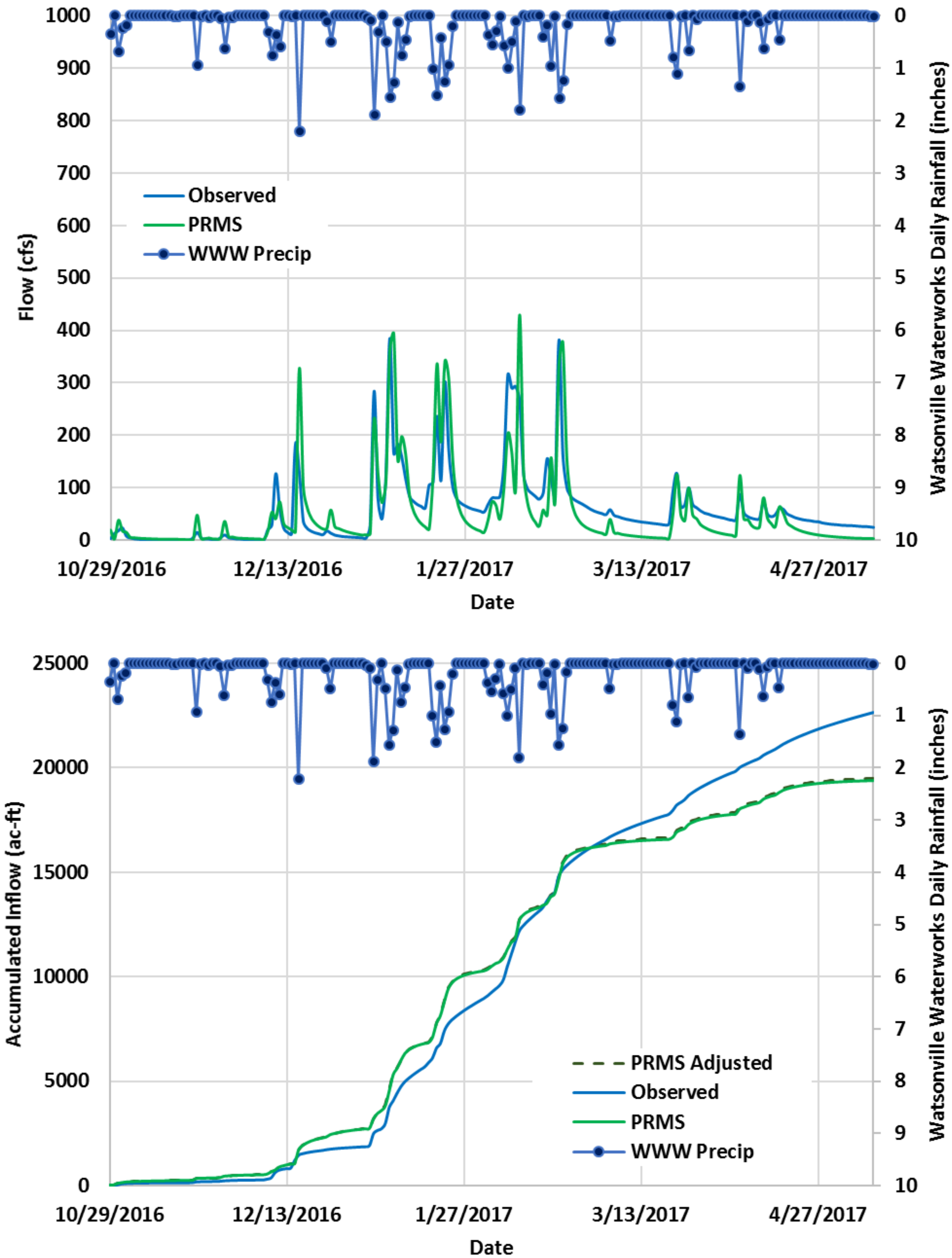
Notes: Adjusted PRMS inflows are only indicated on the accumulated inflow plot.	cbec eco engineering	*PV Water BMP Program Services - College Lake Project* **PRMS calibration: WY 2012 (College Lake inflow)**		
		Project No. 17-1017	Created By: LST	**Figure 5**



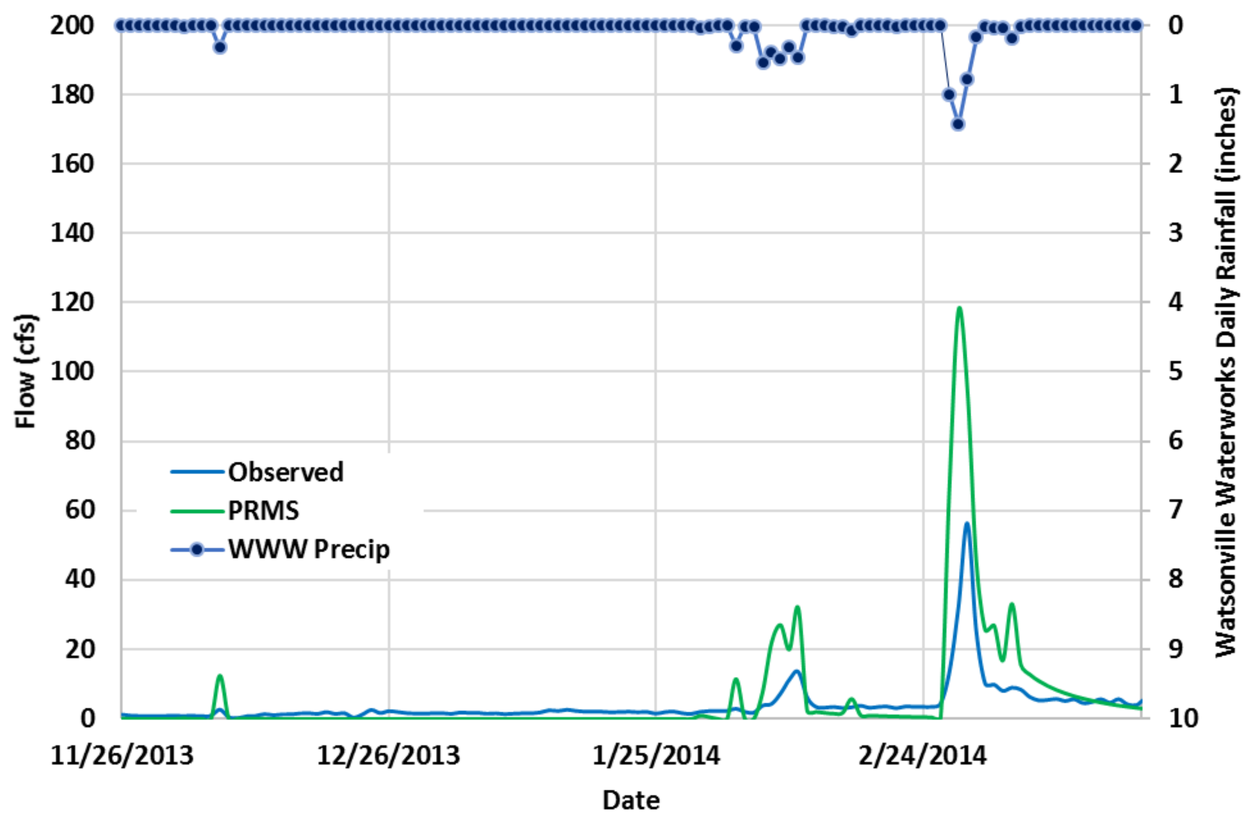


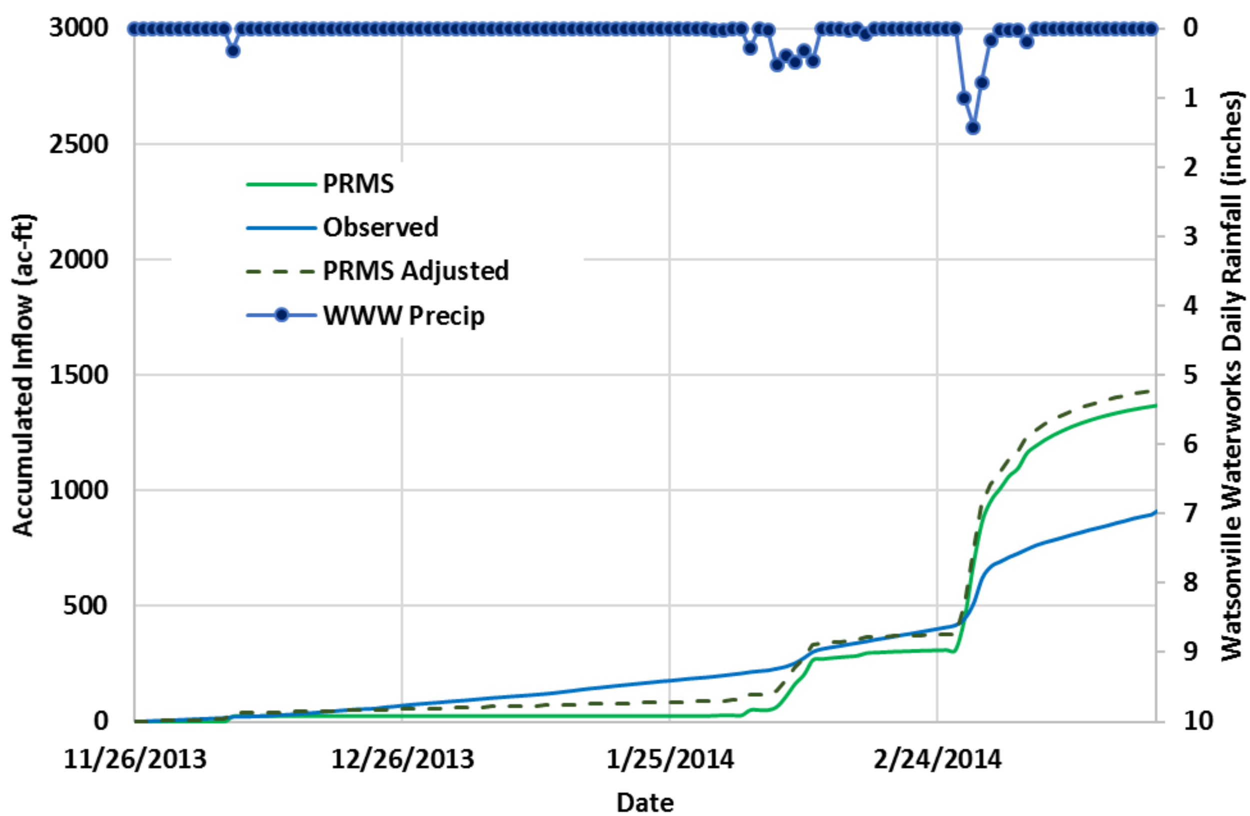
Notes: Adjusted PRMS inflows are only indicated on the accumulated inflow plot.	cbec eco engineering	*PV Water BMP Program Services - College Lake Project* **PRMS calibration: WY 2013 (College Lake inflow)**
		Project No. 17-1017 | Created By: LST | **Figure 6**

11/8/2018

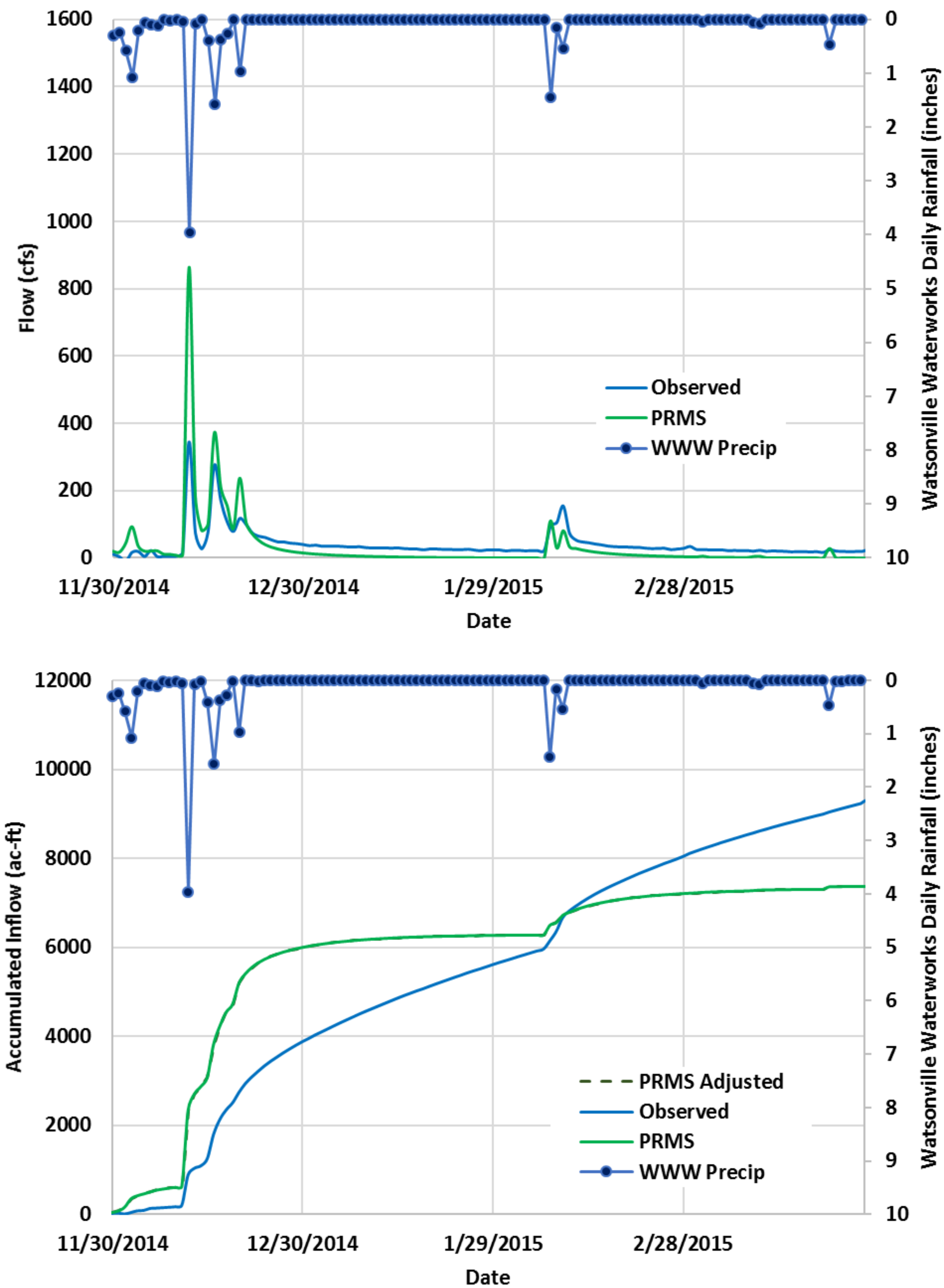


Notes: Adjusted PRMS inflows are only indicated on the accumulated inflow plot.	cbec eco engineering	*PV Water BMP Program Services - College Lake Project* **PRMS calibration: WY 2017 (Casserly Creek flow)** Project No. 17-1017 / Created By: LST / **Figure 7**

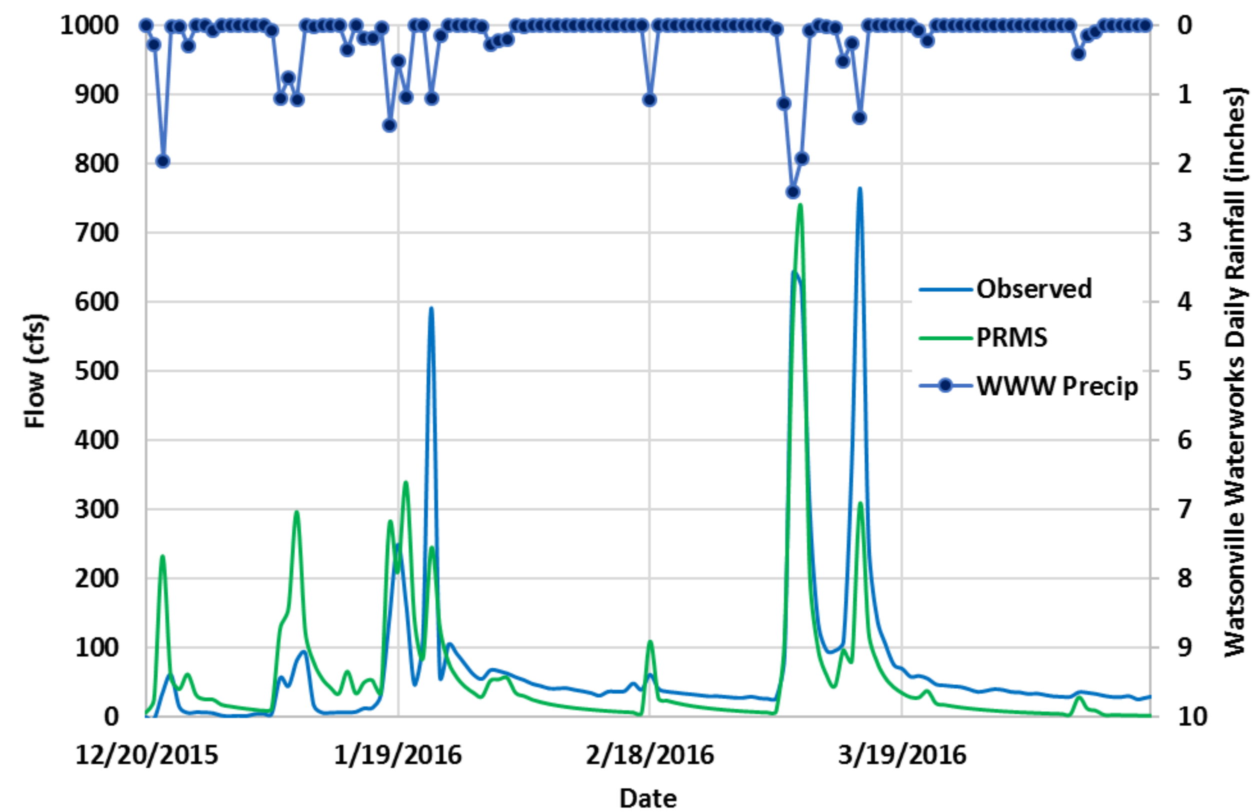


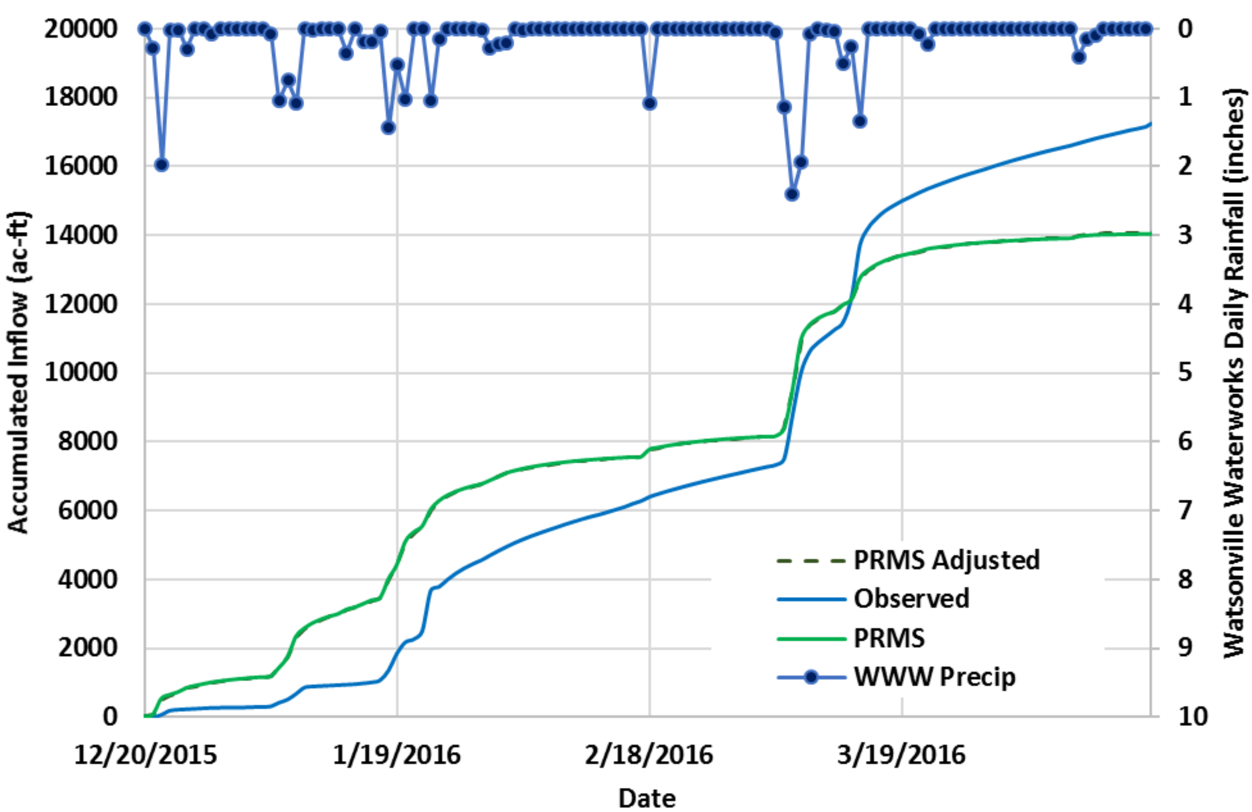


Notes: Adjusted PRMS inflows are only indicated on the accumulated inflow plot.	cbec eco engineering	*PV Water BMP Program Services - College Lake Project* **PRMS validation: WY 2014 (College Lake inflow)**
		Project No. 17-1017 | Created By: LST | **Figure 8**



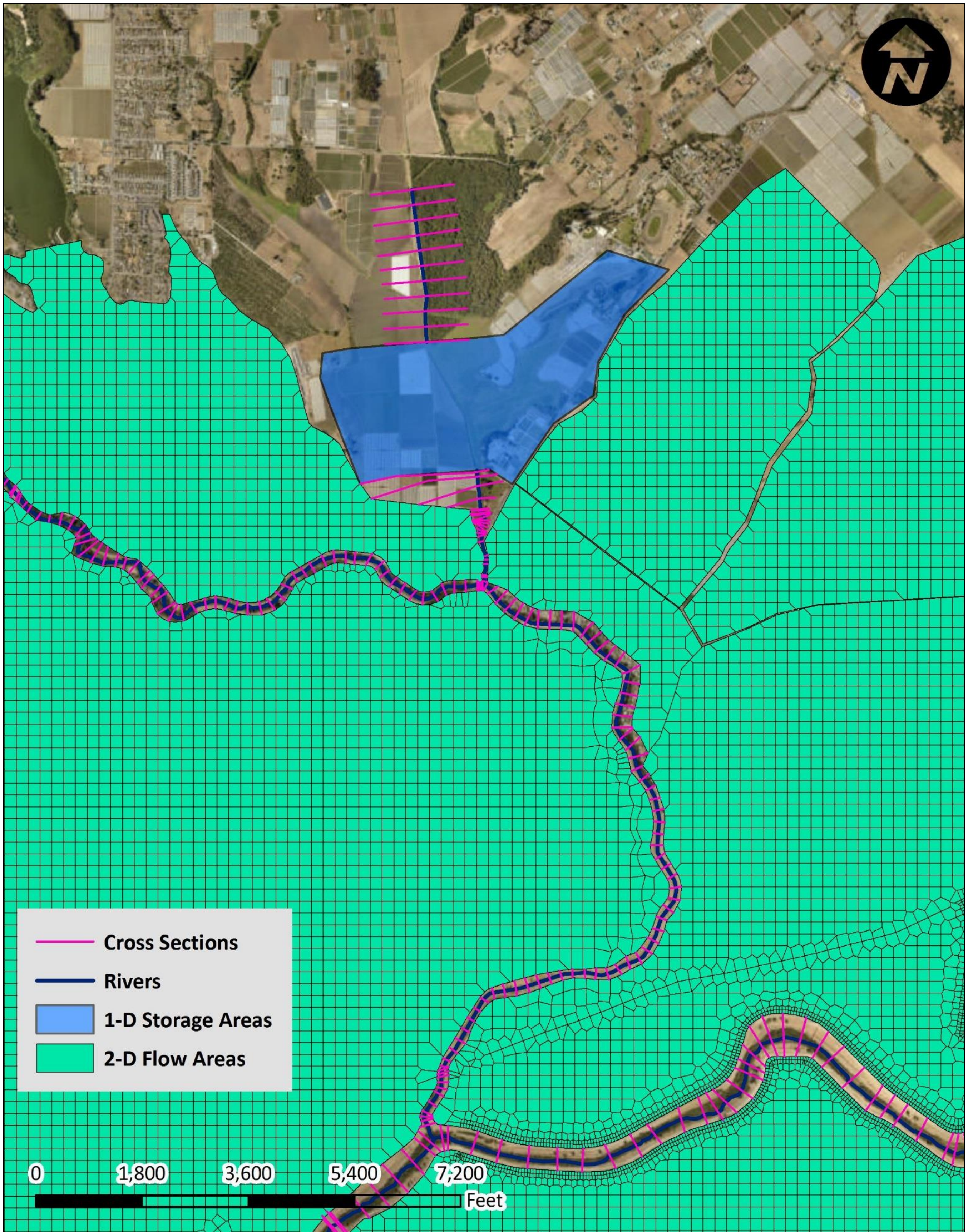
Notes: Adjusted PRMS inflows are only indicated on the accumulated inflow plot.	cbec eco engineering	*PV Water BMP Program Services - College Lake Project* **PRMS validation: WY 2015 (College Lake inflow)**		
		Project No. 17-1017	Created By: LST	**Figure 9**



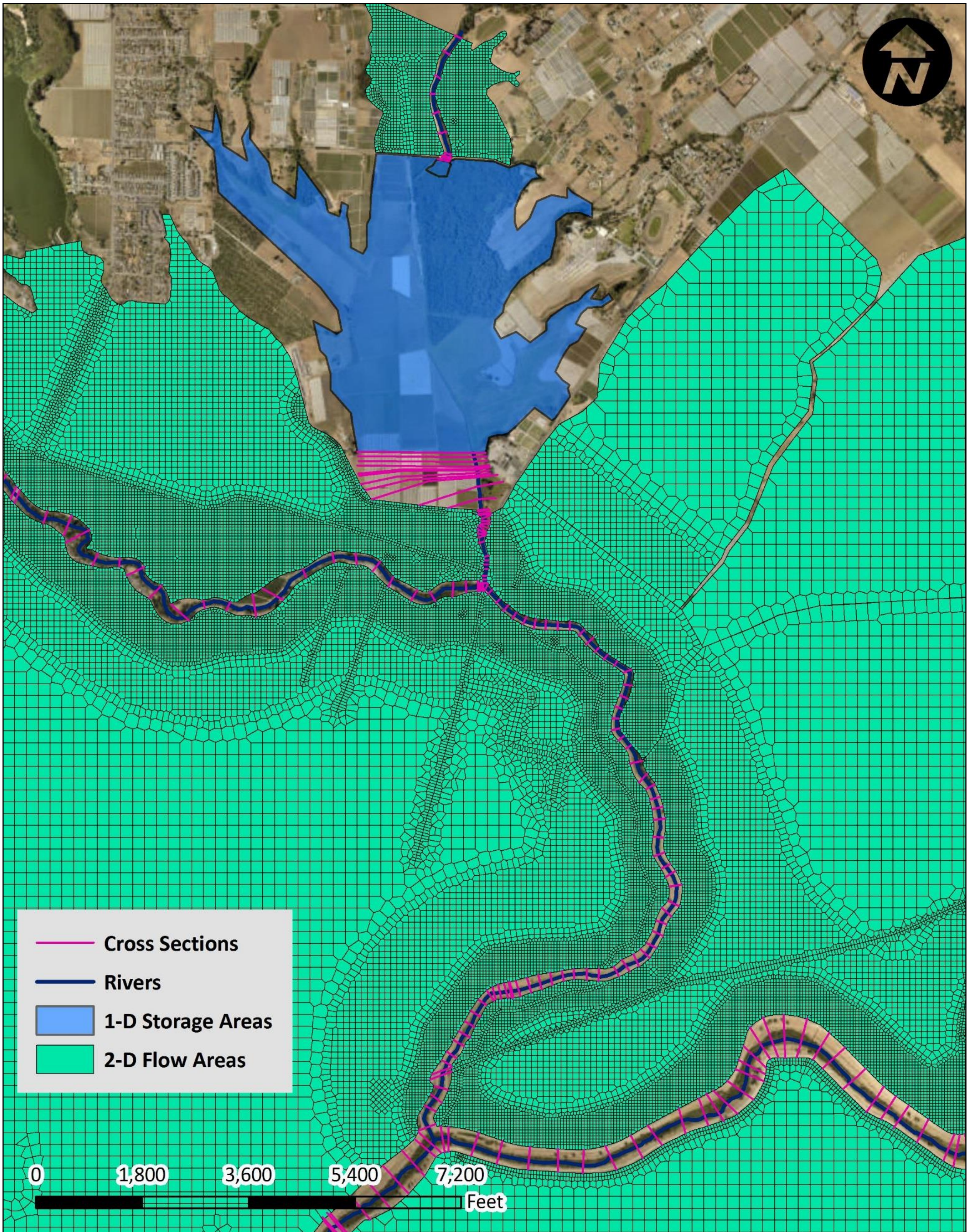


Notes: Adjusted PRMS inflows are only indicated on the accumulated inflow plot.	cbec eco engineering	*PV Water BMP Program Services - College Lake Project* **PRMS validation: WY 2016 (College Lake inflow)** Project No. 17-1017 | Created By: LST | **Figure 10**

Notes:	cbec eco engineering	*PV Water BMP Program Services - College Lake Project* **1-D Hydraulic model (HEC-RAS)**		
		Project No. 17-1017	Created By: SP	**Figure 11**



Notes: This model was developed by the USACE and does not include any updates by cbec.	cbec eco engineering	*PV Water BMP Program Services - College Lake Project* **2-D USACE model**		
		Project No. 17-1017	Created By: LST	**Figure 12**



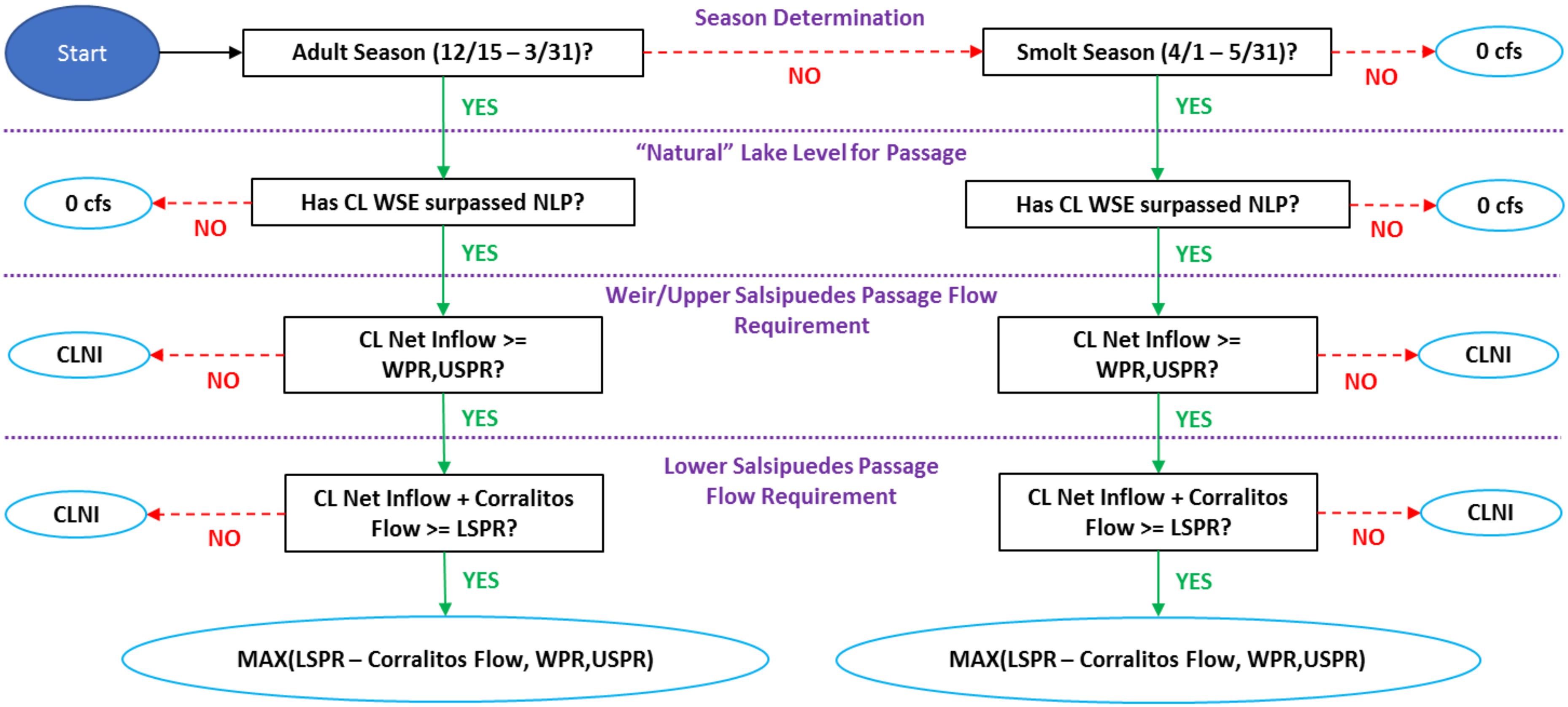
Notes: This is the updated (existing conditions) 2-D Model, including cbec edits to the USACE model.

cbec eco engineering

PV Water BMP Program Services - College Lake Project

2-D Model (Existing conditions)

Project No. 17-1017	Created By: LST	**Figure 13**



Abbreviations			
CL WSE	College Lake – Water Surface Elevation	**USPR**	Upper Salsipuedes (Fish) Passage (Flow) Requirement
NLP	Natural (Lake) Level for (Fish) Passage	**LSPR**	Lower Salsipuedes (Fish) Passage (Flow) Requirement
WPR	Weir Passage (Flow) Requirement	**CLNI**	College Lake Net Inflow

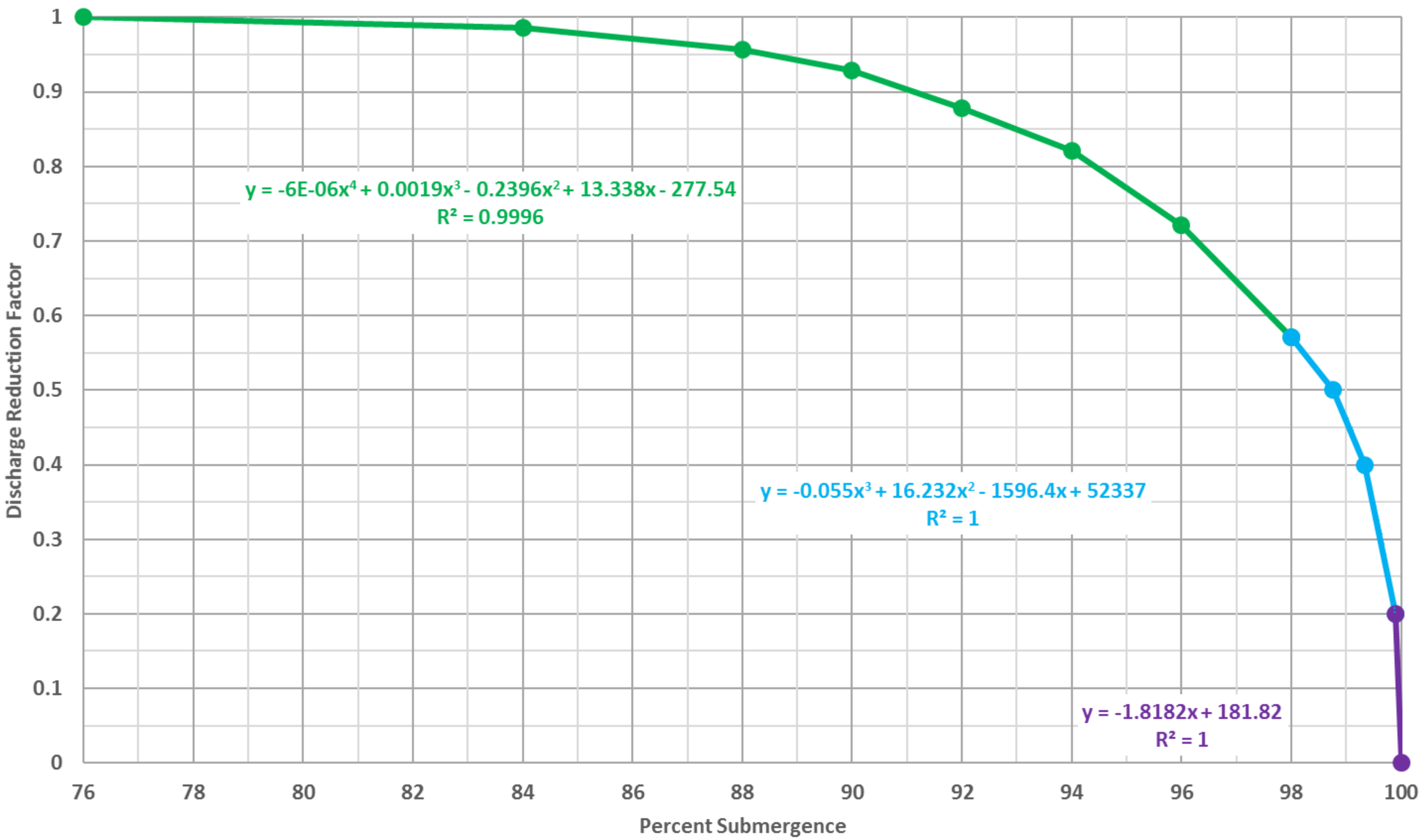
Notes: WBM = Water Budget Model.

cbec eco engineering

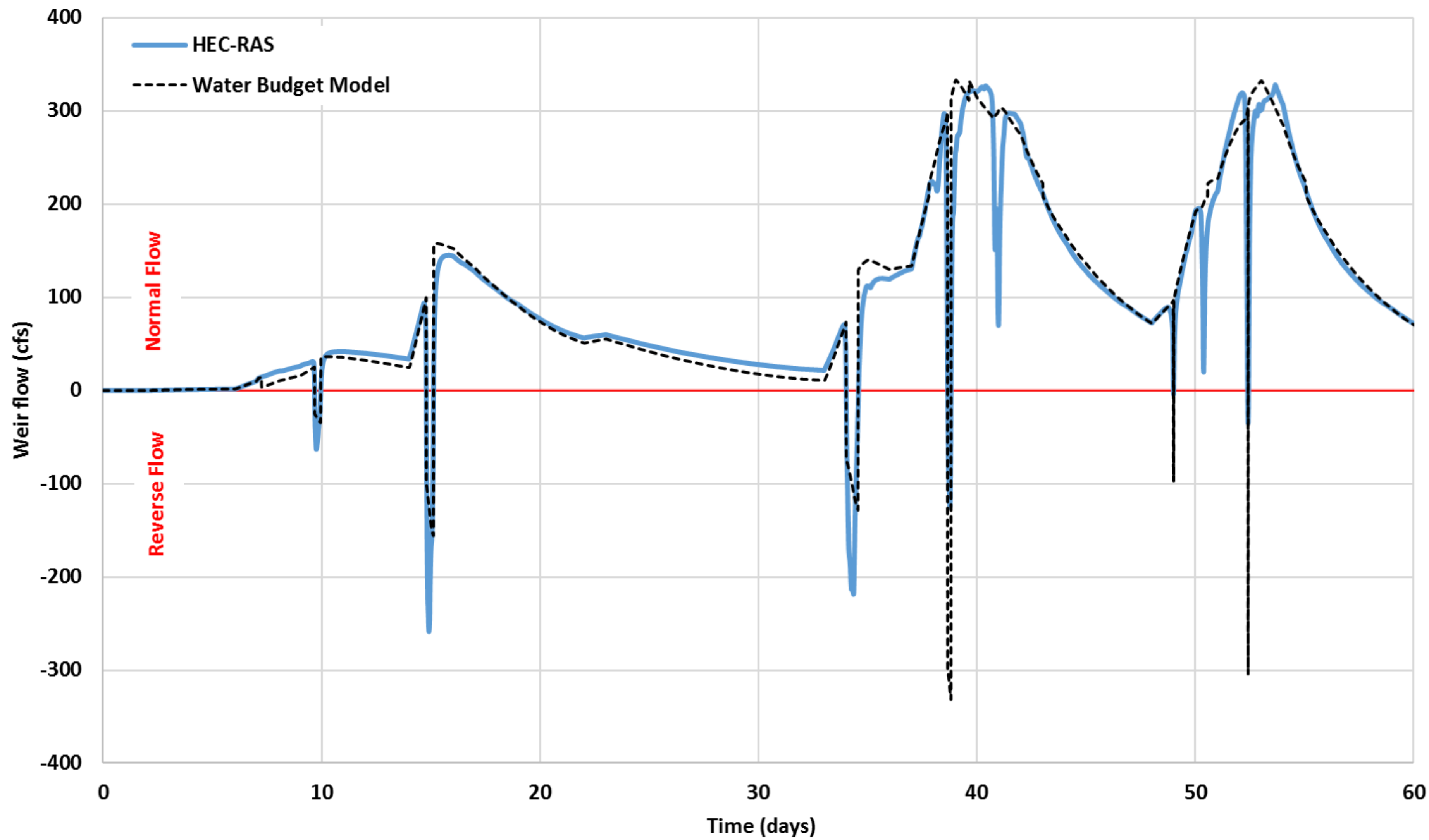
PV Water BMP Program Services - College Lake Project

WBM: Fish bypass flow determination

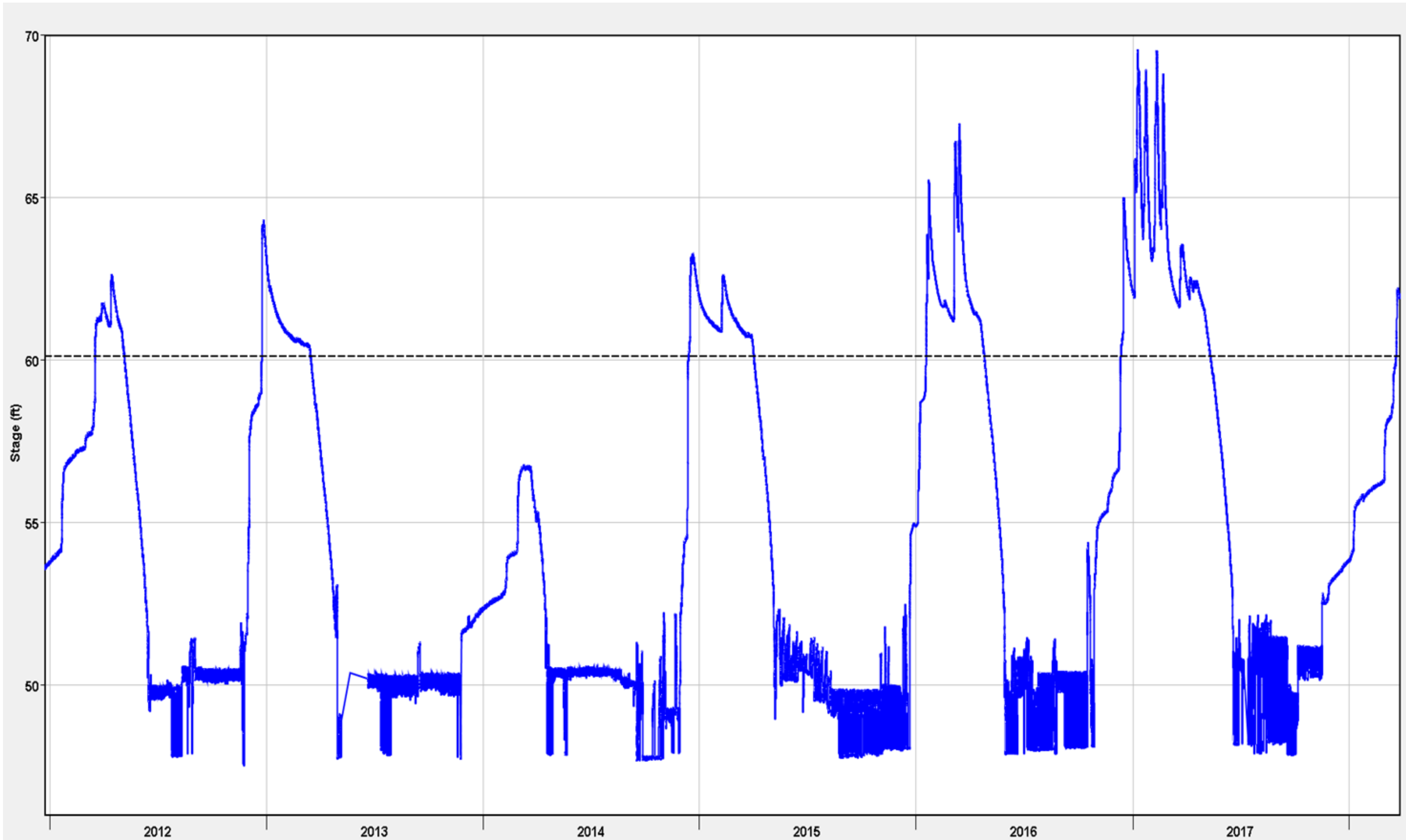
Project No. 17-1017 | Created By: LST | **Figure 14**



Notes: This curve was adopted from the HEC-RAS Hydraulic Reference Manual, and fit piecewise using three equations.	cbec eco engineering	*PV Water BMP Program Services - College Lake Project* **WBM: Submerged weir flow reduction curve**		
		Project No. 17-1017	Created By: LST	**Figure 15**



Notes: 'Normal flow' indicates flow out of College Lake into Upper Salsipuedes Creek.	cbec eco engineering	*PV Water BMP Program Services - College Lake Project* **WBM: Weir flow calibration (Dec 2016 - Jan 2017)**
		Project No. 17-1017 | Created By: LST | **Figure 16**



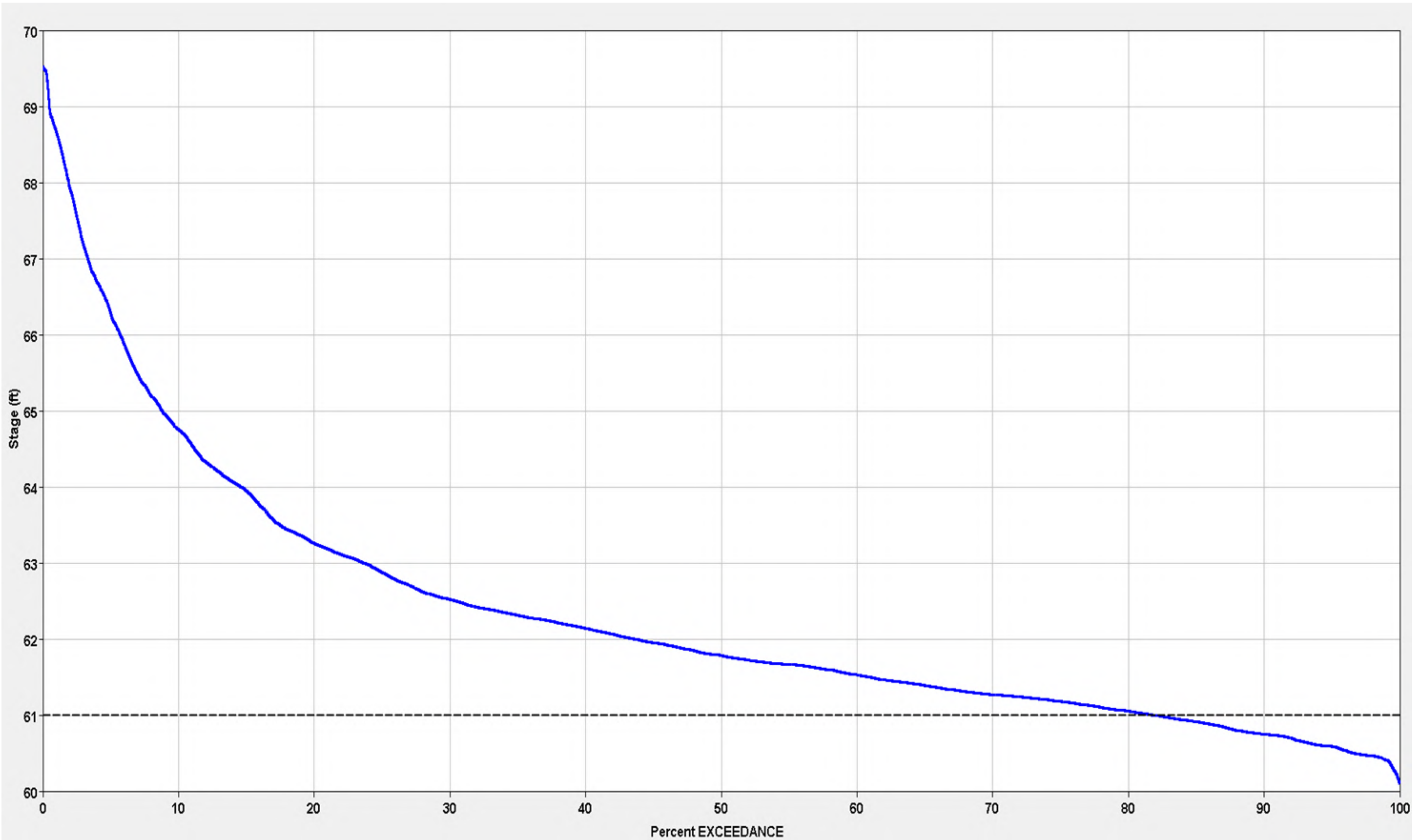
Notes: The elevation of the existing CLRD weir crest (60.1 ft) is indicated.

cbec eco engineering

PV Water BMP Program Services - College Lake Project

College Lake observed stage

Project No. 17-1017	Created By: LST	**Figure 17**



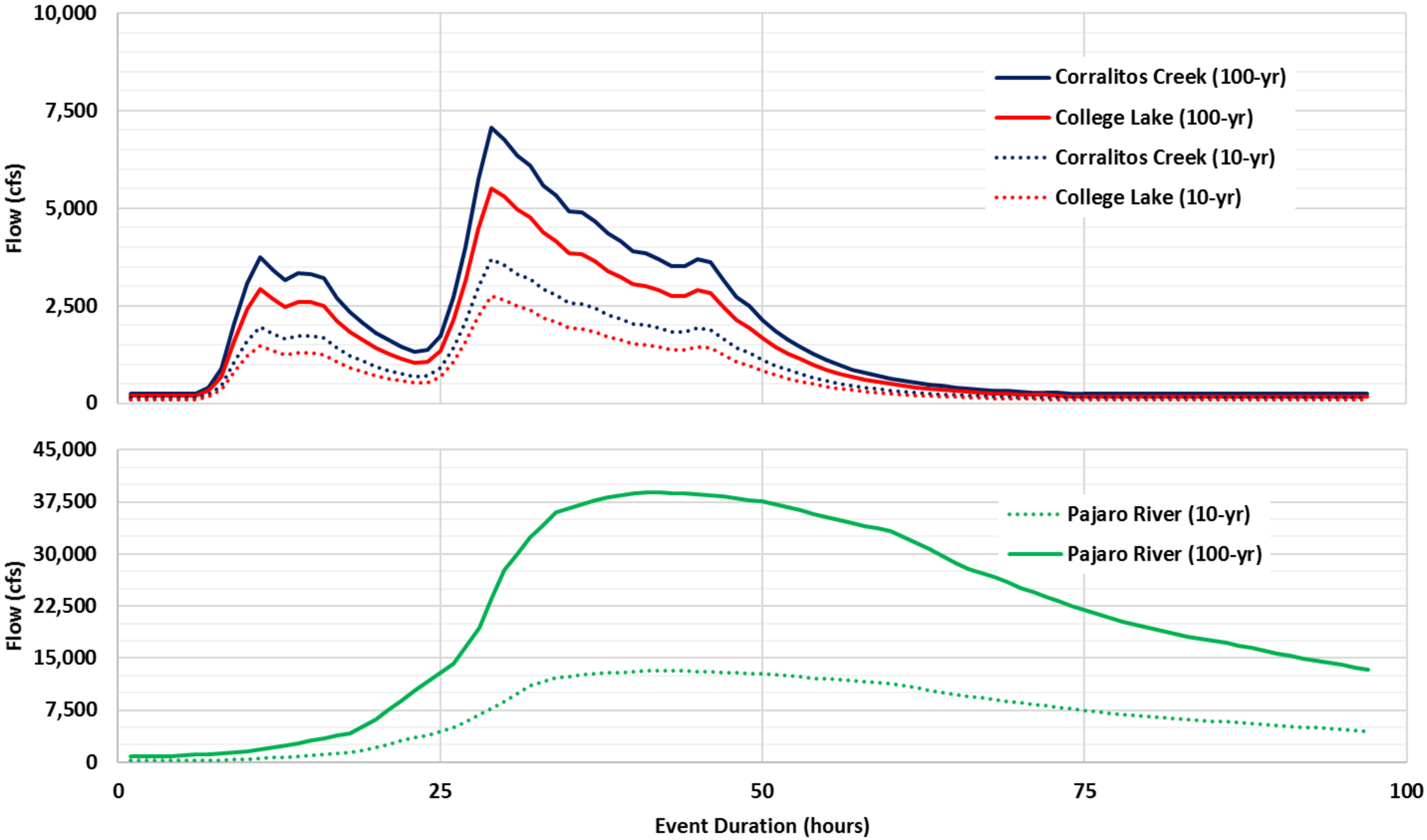
Notes: This curve was calculated from all data from WY's 2012-2017 that was above the 60.1 ft weir crest that did not coincide with pumping.

cbec eco engineering

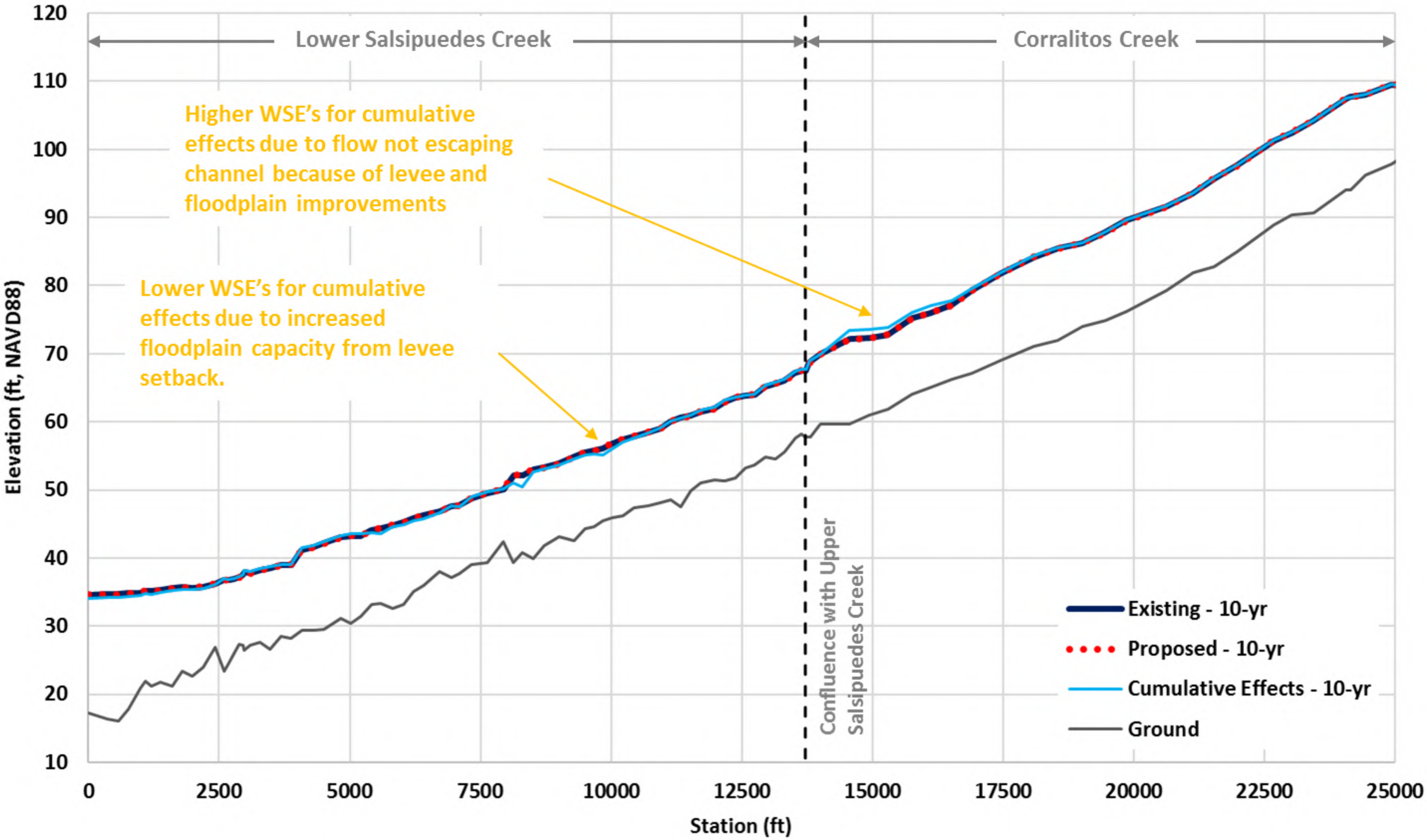
PV Water BMP Program Services - College Lake Project

College Lake stage exceedance curve

Project No. 17-1017 | Created By: LST | **Figure 18**



Notes:	cbec eco engineering	*PV Water BMP Program Services - College Lake Project* **USACE inflow hydrographs**		
		Project No. 17-1017	Created By: LST	**Figure 19**



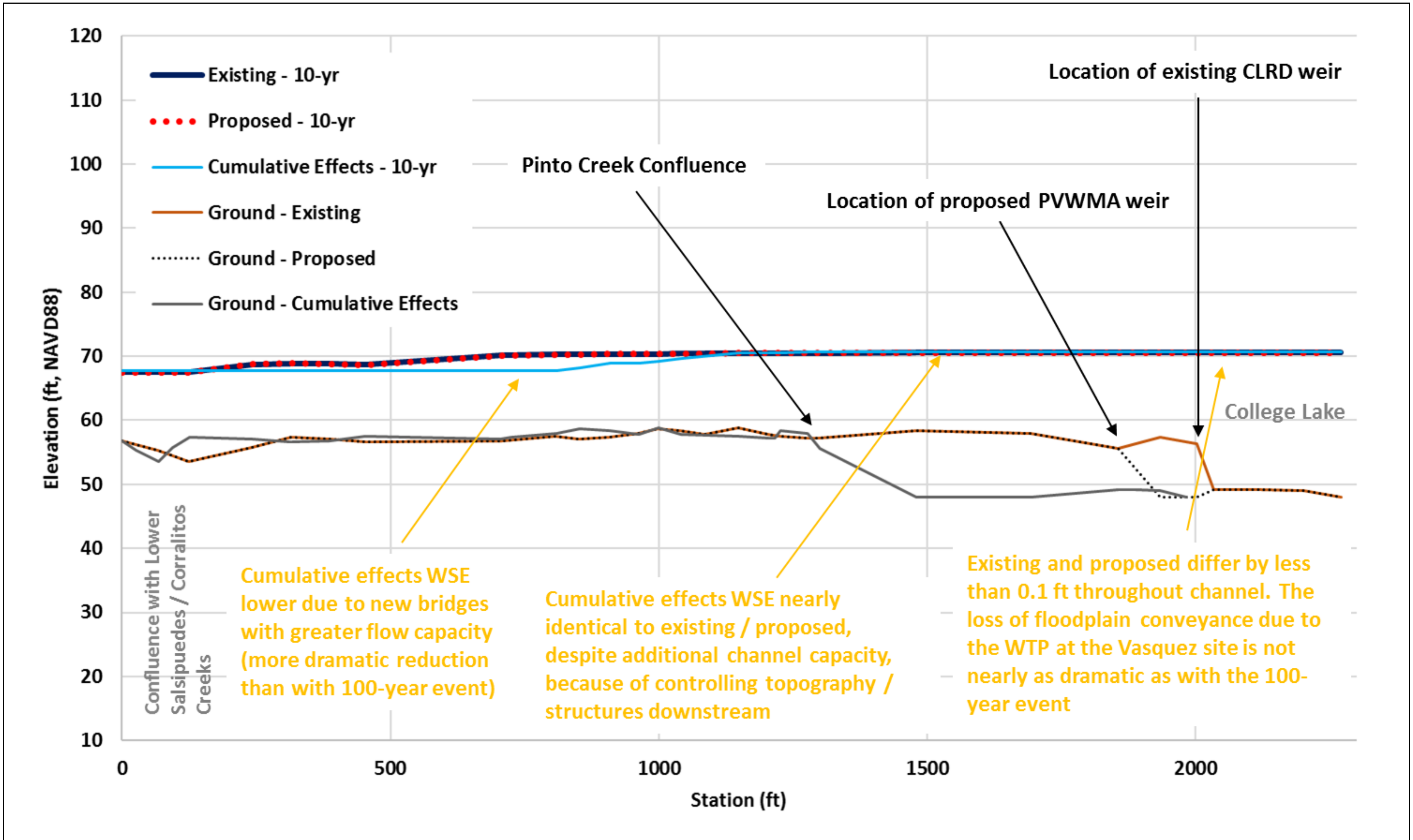
Notes:

cbec eco engineering

PV Water BMP Program Services - College Lake Project

Profile: Corralitos-Lower Salsipuedes (10-yr)

Project No. 17-1017	Created By: LST	**Figure 20**



Notes:

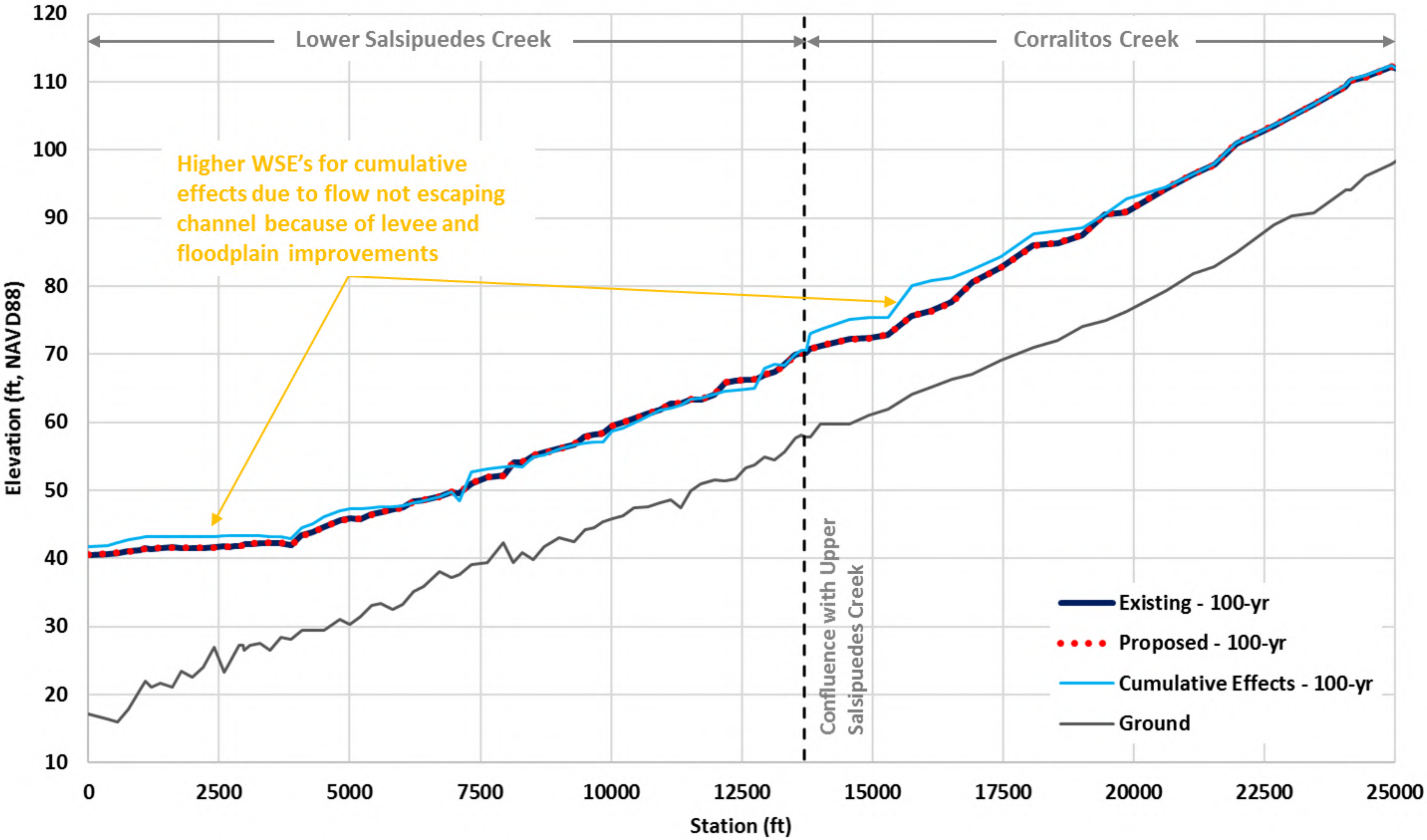
cbec eco engineering

PV Water BMP Program Services - College Lake Project

Profile: Upper Salsipuedes (10-yr)

Project No. 17-1017	Created By: LST	**Figure 21**

11/8/2018



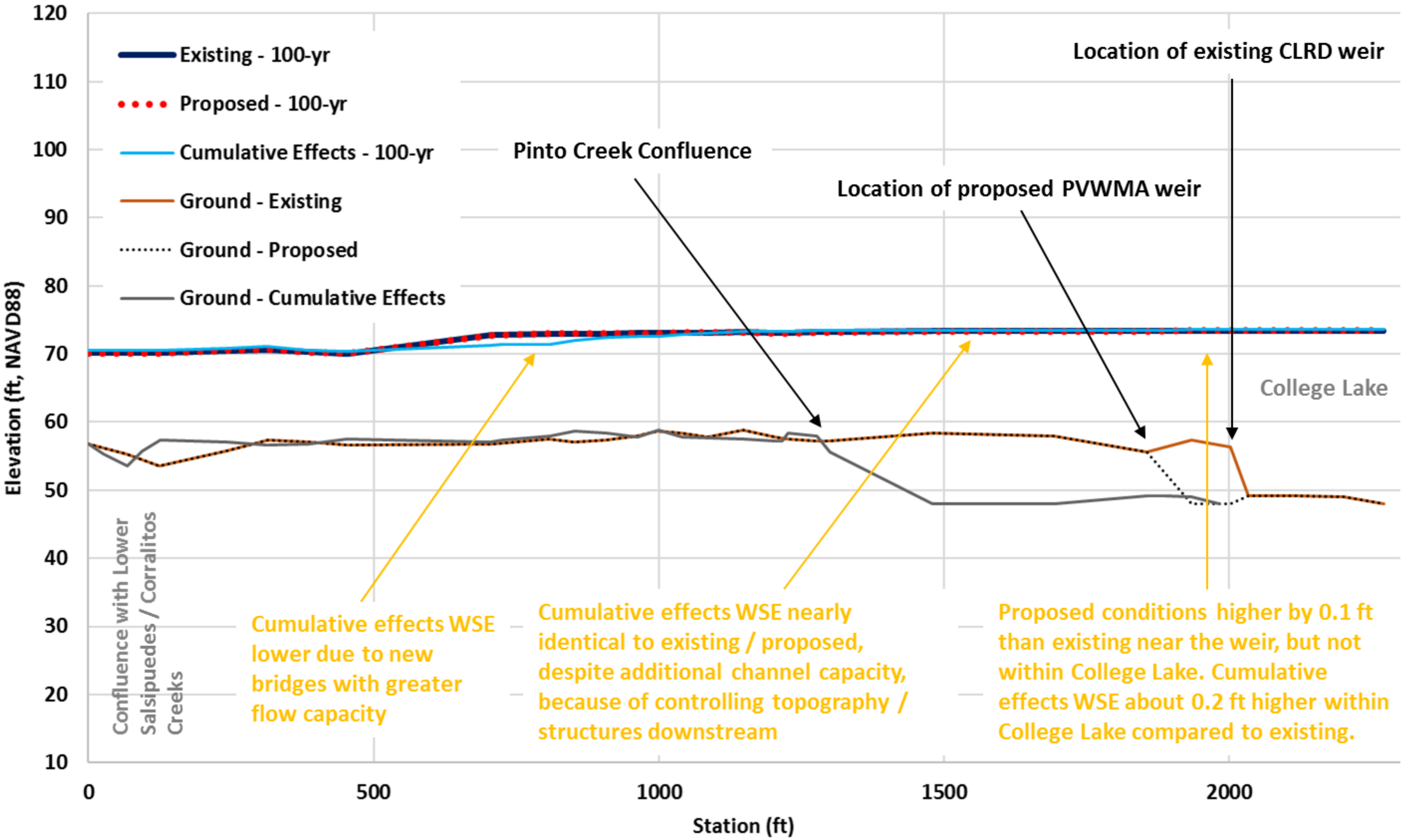
Notes:

PV Water BMP Program Services - College Lake Project

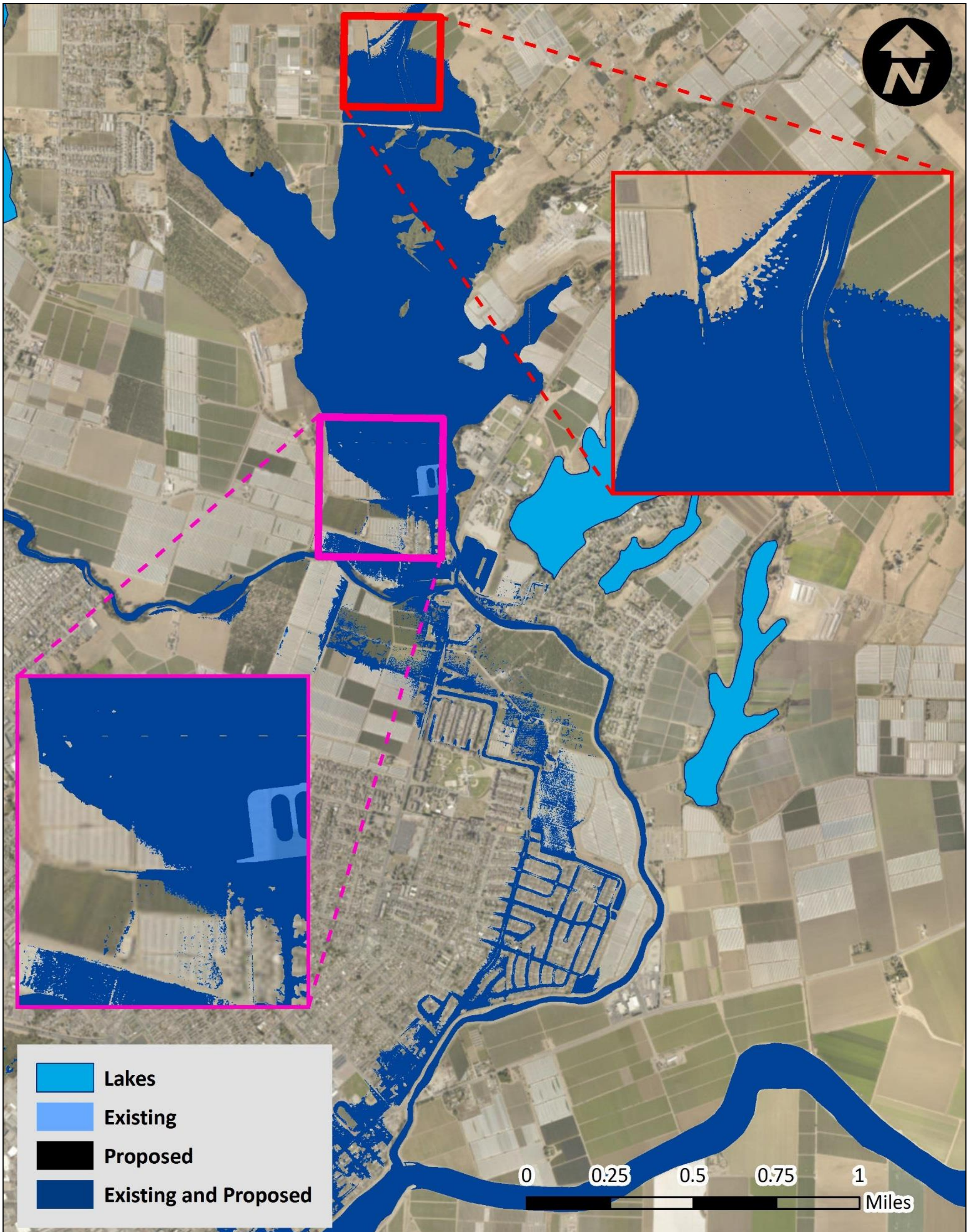
Profile: Corralitos-Lower Salsipuedes (100-yr)

Project No. 17-1017	Created By: LST	**Figure 22**

11/8/2018



Notes:	cbec eco engineering	*PV Water BMP Program Services - College Lake Project* **Profile: Upper Salsipuedes (100-yr)**		
		Project No. 17-1017	Created By: LST	**Figure 23**

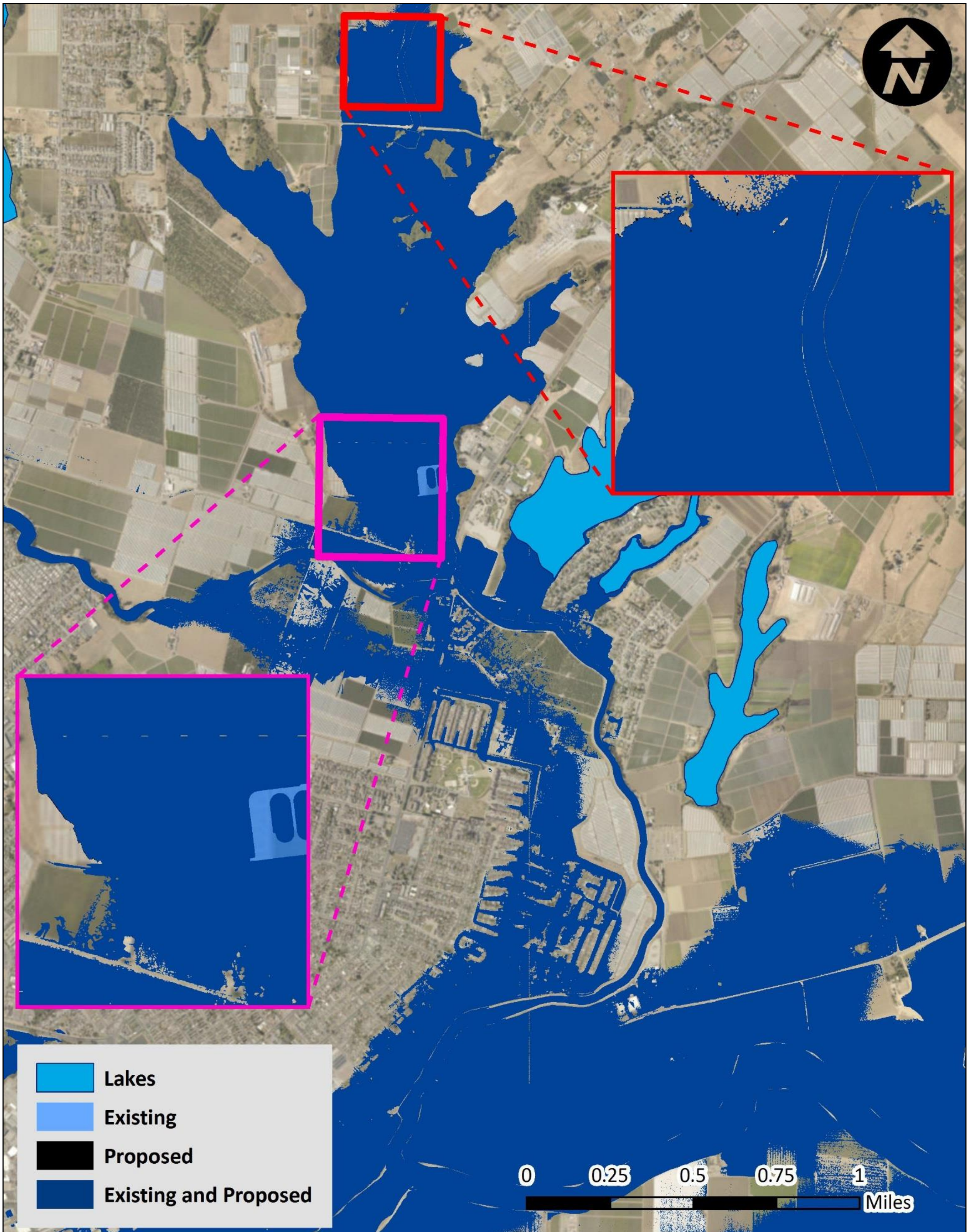


Notes:

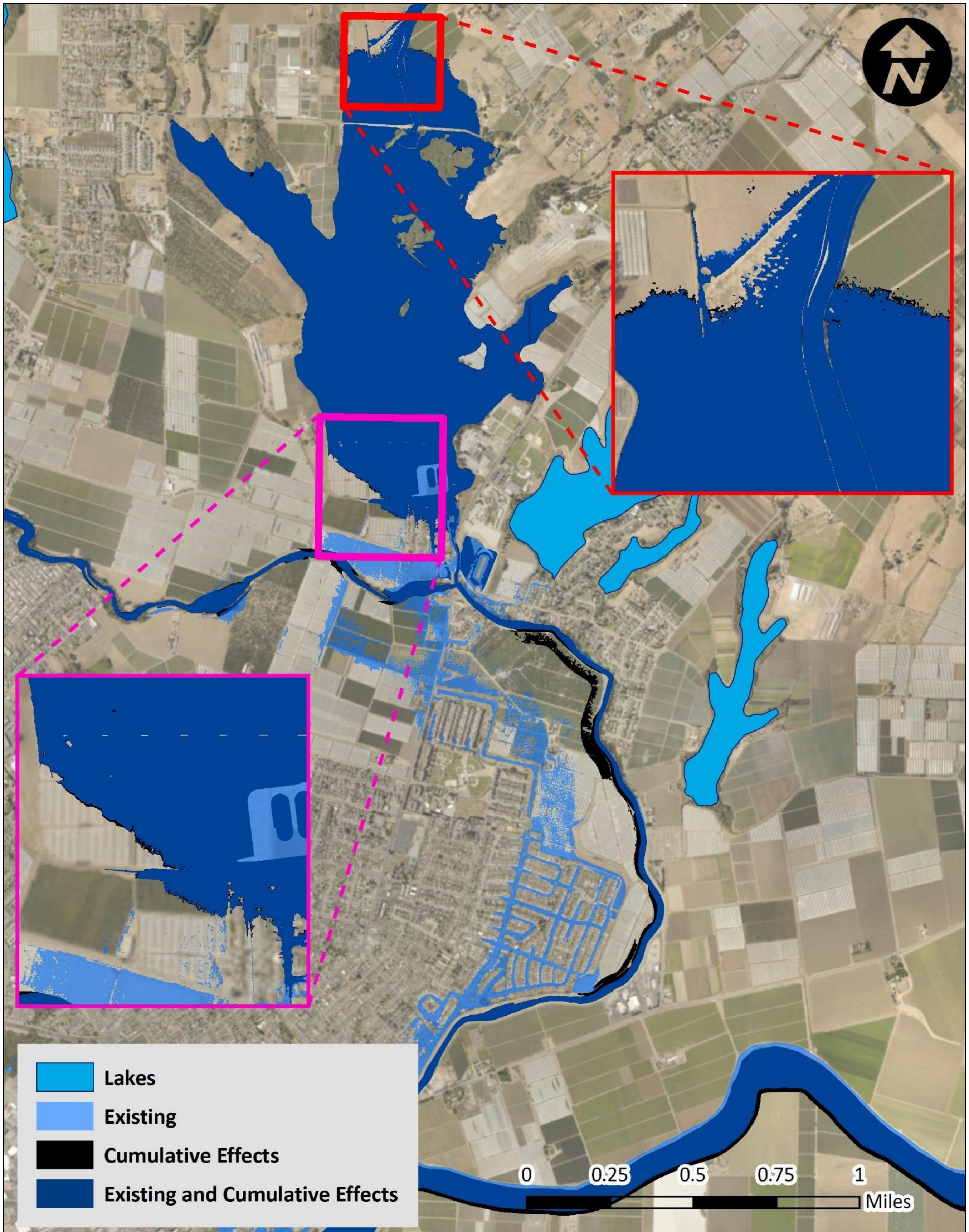
PV Water BMP Program Services - College Lake Project

Inundation: Proposed vs Existing (10-yr)

Project No. 17-1017	Created By: LST	**Figure 24**



Notes:	cbec eco engineering	*PV Water BMP Program Services - College Lake Project* **Inundation: Proposed vs Existing (100-yr)**		
		Project No. 17-1017	Created By: LST	**Figure 25**



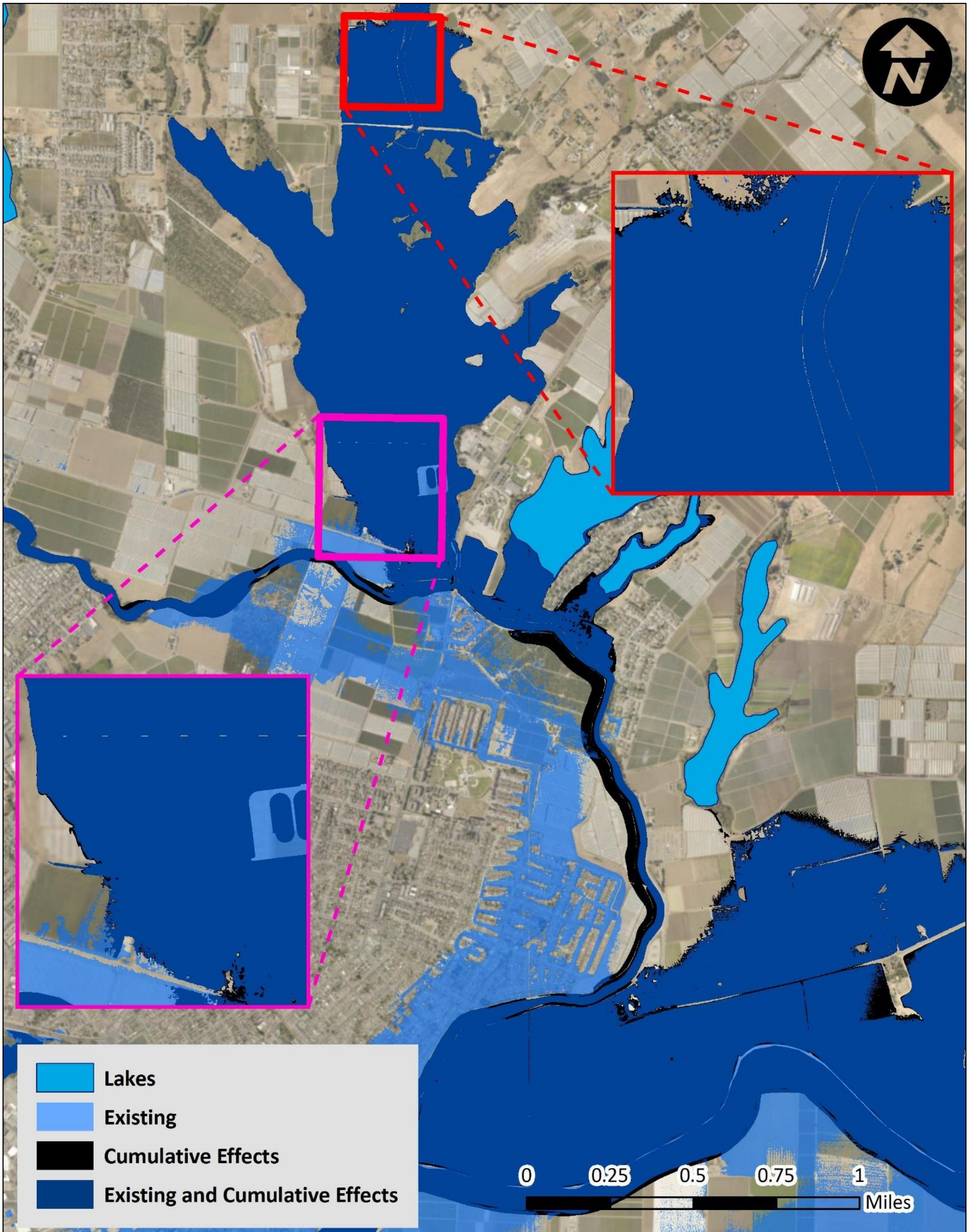
Notes:

cbec eco engineering

PV Water BMP Program Services - College Lake Project

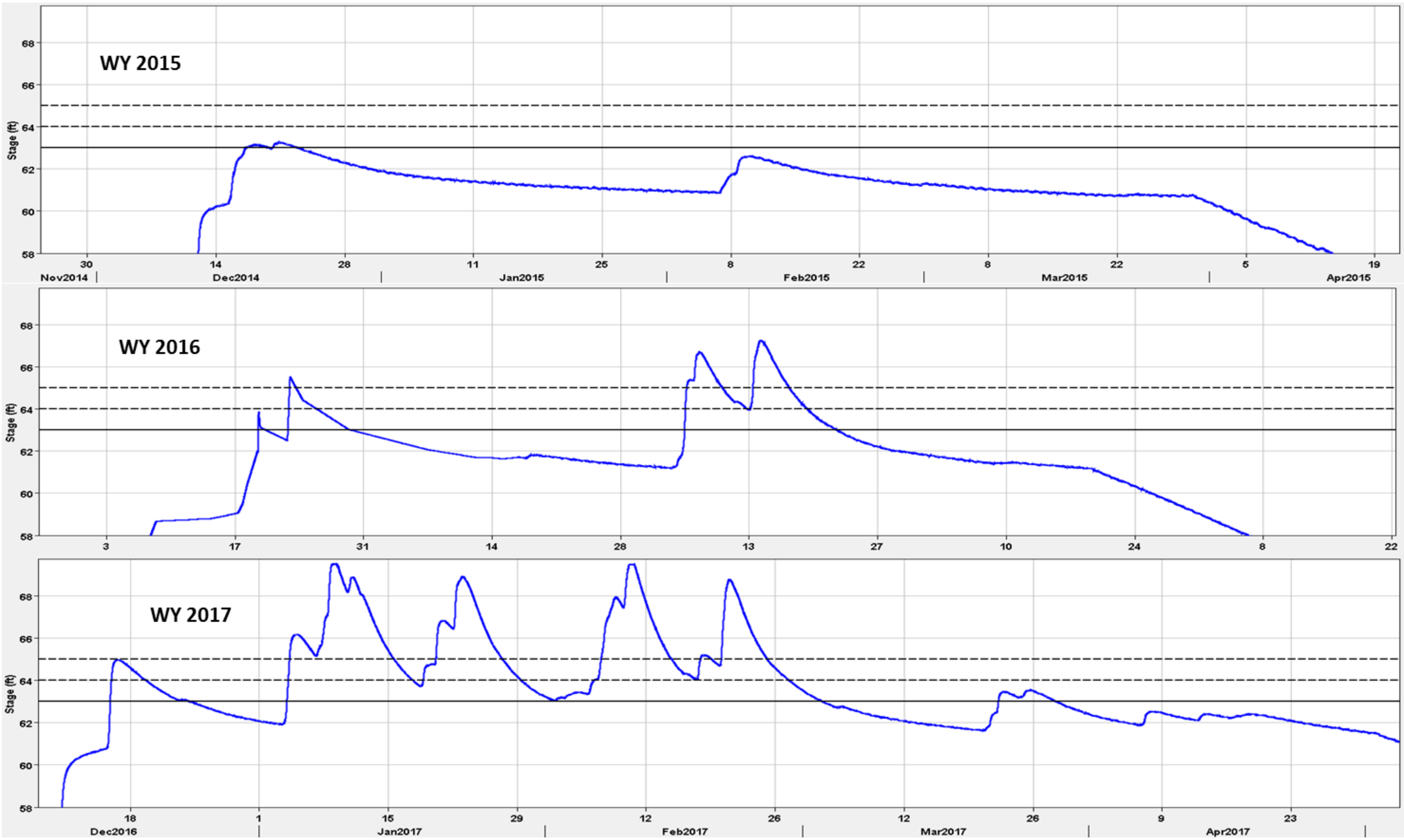
Inundation: Cumulative vs Existing (10-yr)

Project No. 17-1017	Created By: LST	**Figure 26**



Notes:	cbec eco engineering	*PV Water BMP Program Services - College Lake Project*		
		Inundation: Cumulative vs Existing (100-yr)		
		Project No. 17-1017	Created By: LST	**Figure 27**

11/8/2018

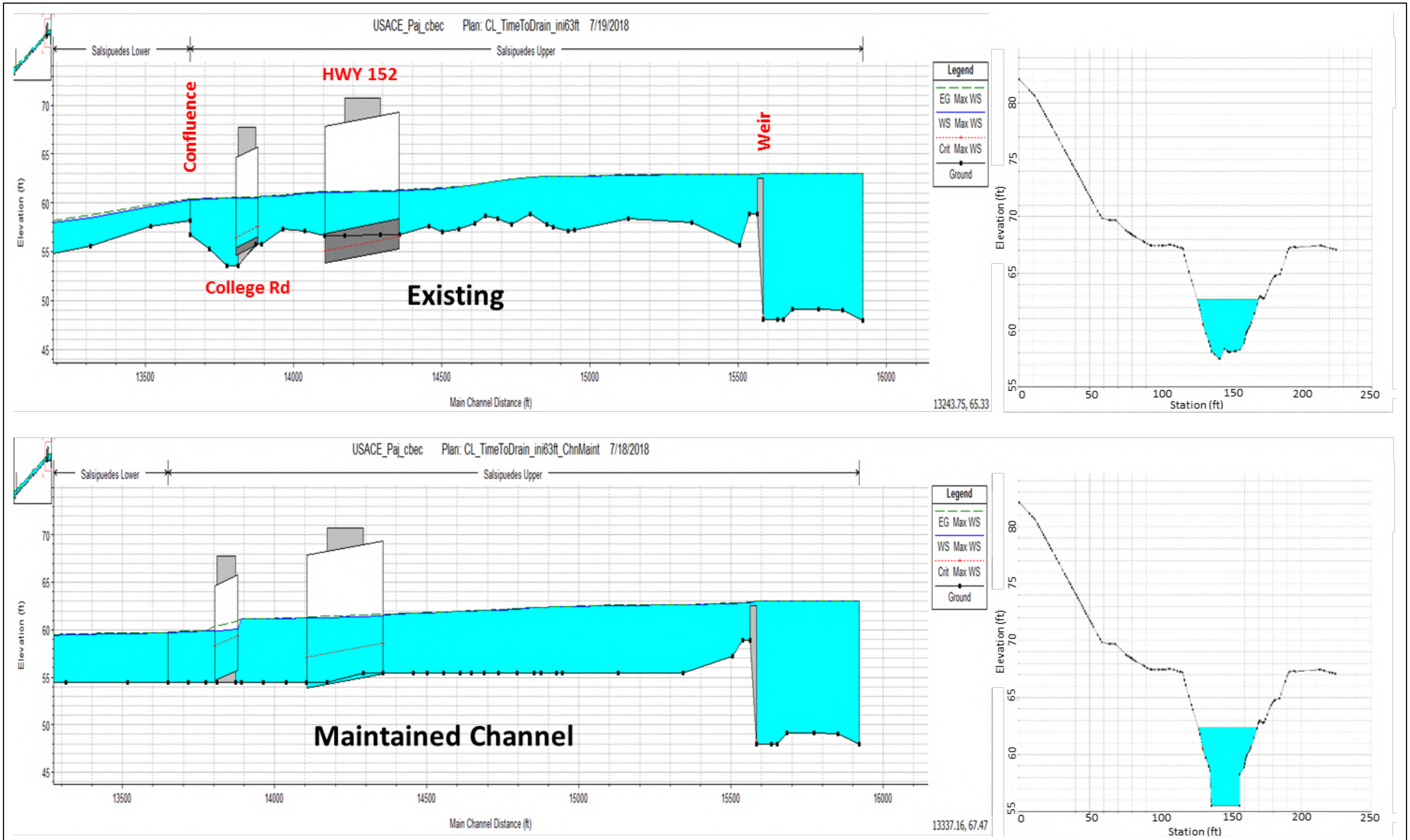


Notes: College Lake stages of 63, 64, and 65 ft are indicated on the plots.

PV Water BMP Program Services - College Lake Project

Drainage Rate: Initial College Lake stages

Project No. 17-1017	Created By: LST	**Figure 28**



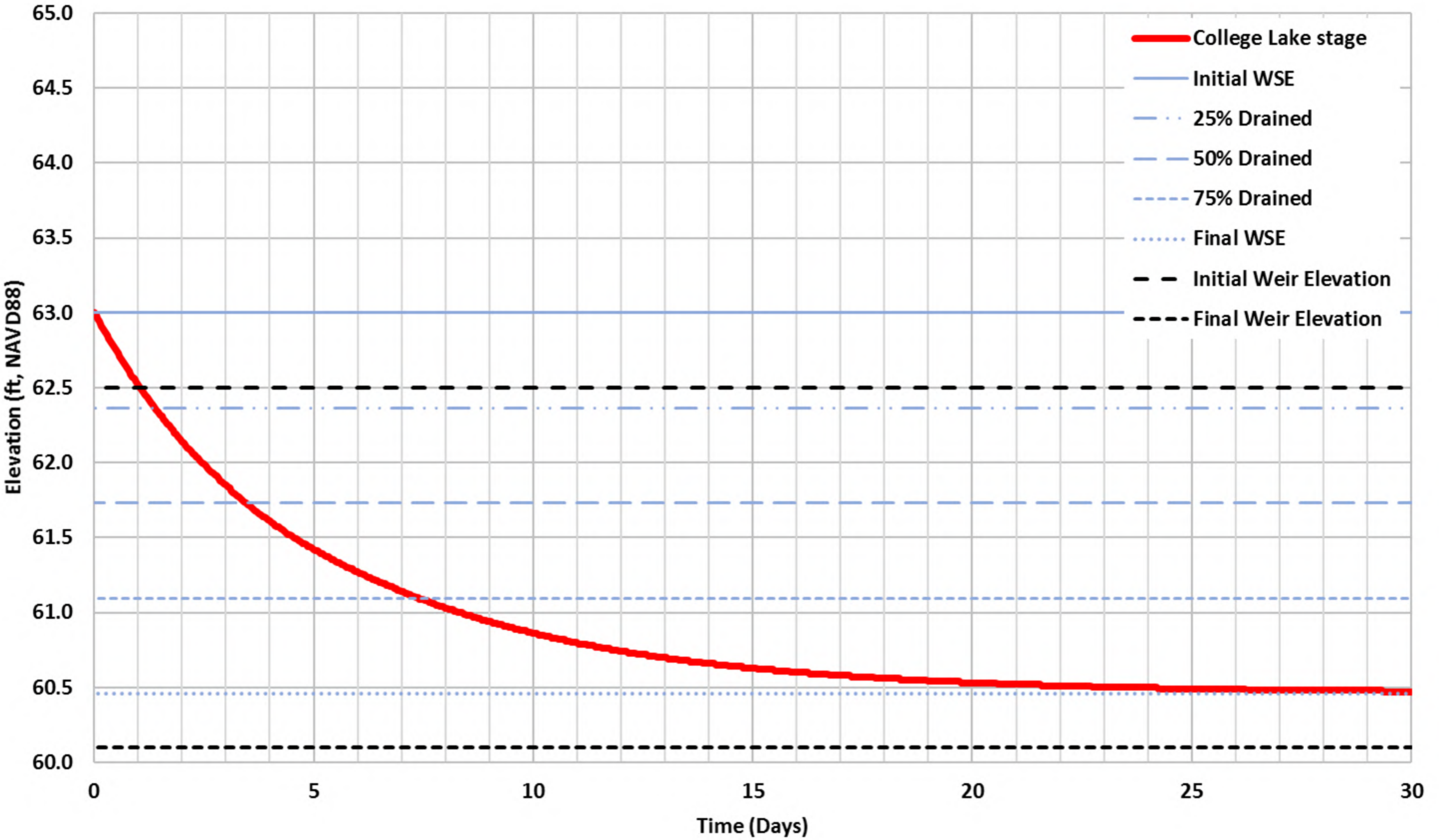
Notes: For the maintained channel, a 20-ft wide rectangular cut was made, down to the invert elevations of the culverts.

cbec eco engineering

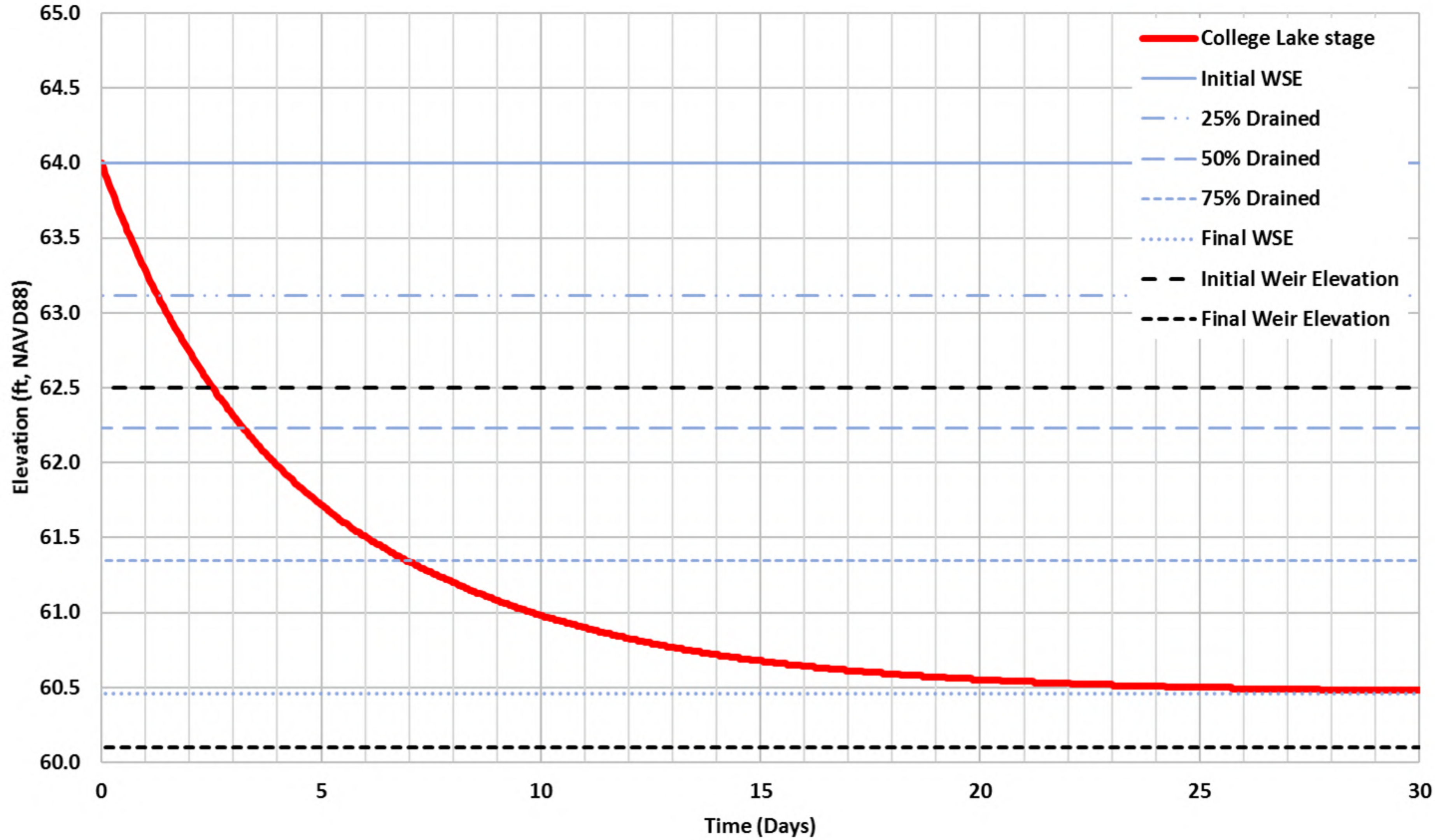
PV Water BMP Program Services - College Lake Project

Drainage Rate: Channel conditions

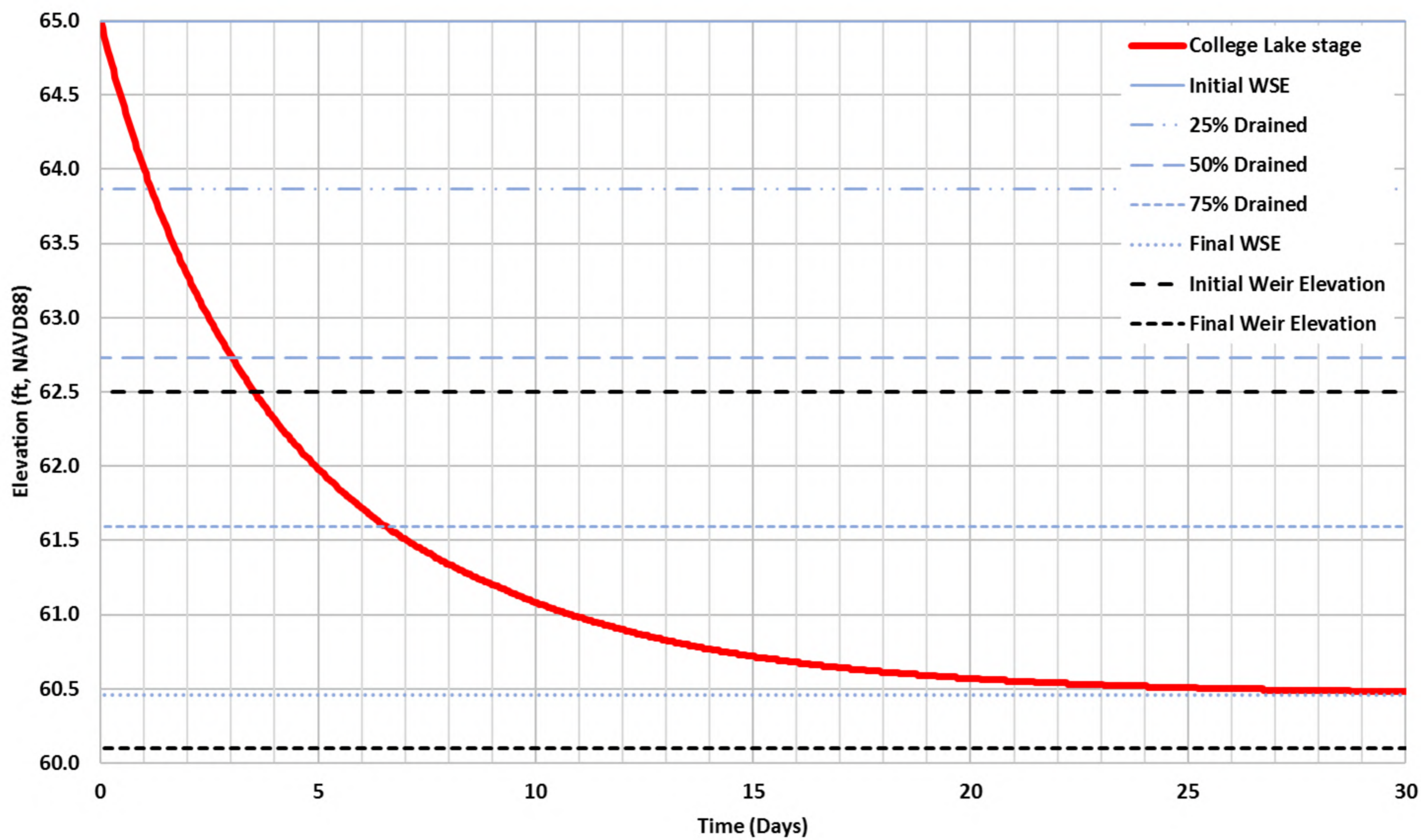
Project No. 17-1017	Created By: LST	**Figure 29**



Notes:	cbec eco engineering	*PV Water BMP Program Services - College Lake Project*		
		Drainage Rate: Existing channel, 63 ft initial WSE		
		Project No. 17-1017	Created By: LST	**Figure 30**



Notes:		*PV Water BMP Program Services - College Lake Project* **Drainage Rate: Existing channel, 64 ft initial WSE**		
	cbec eco engineering	Project No. 17-1017	Created By: LST	**Figure 31**

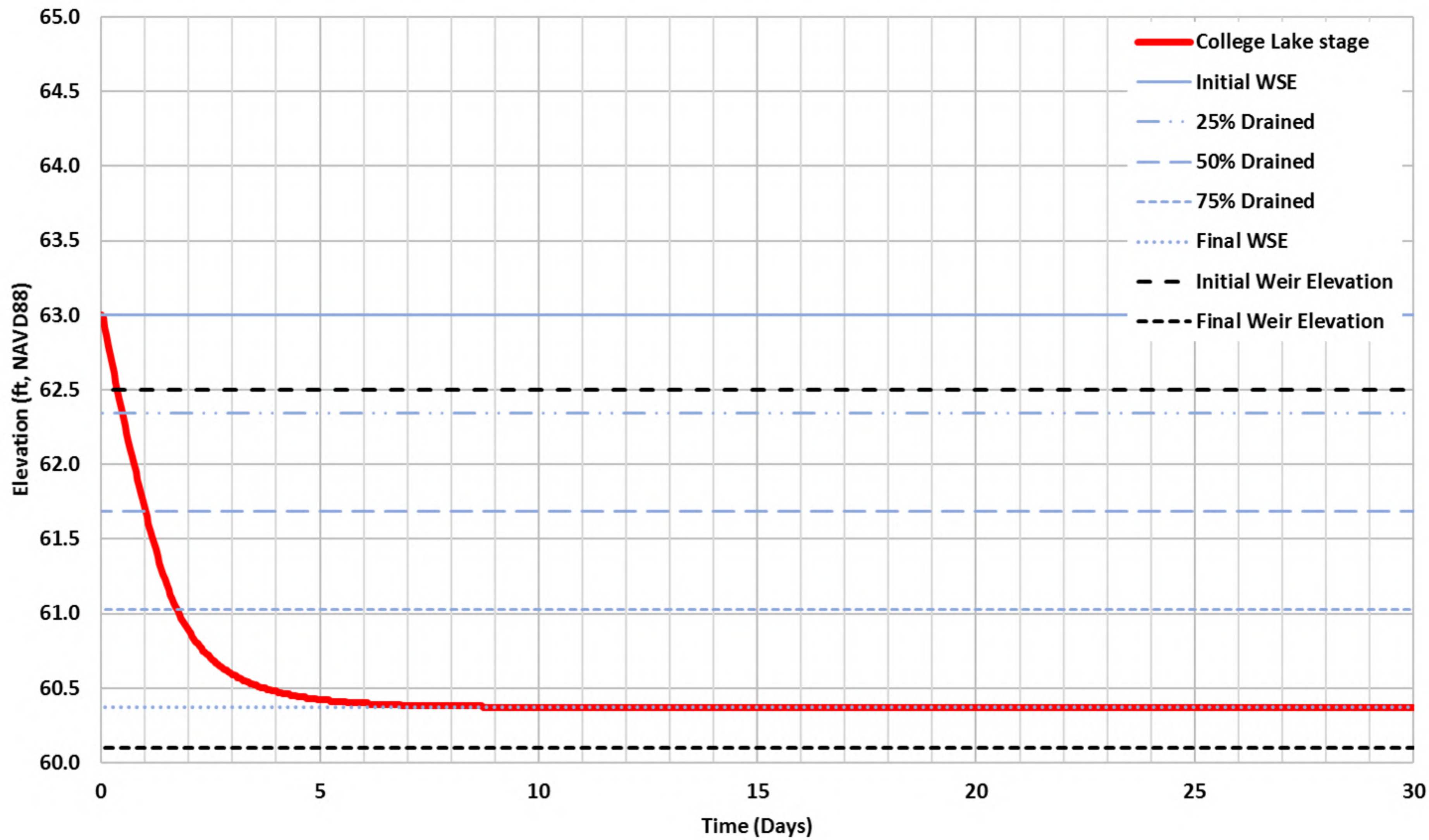


Notes:

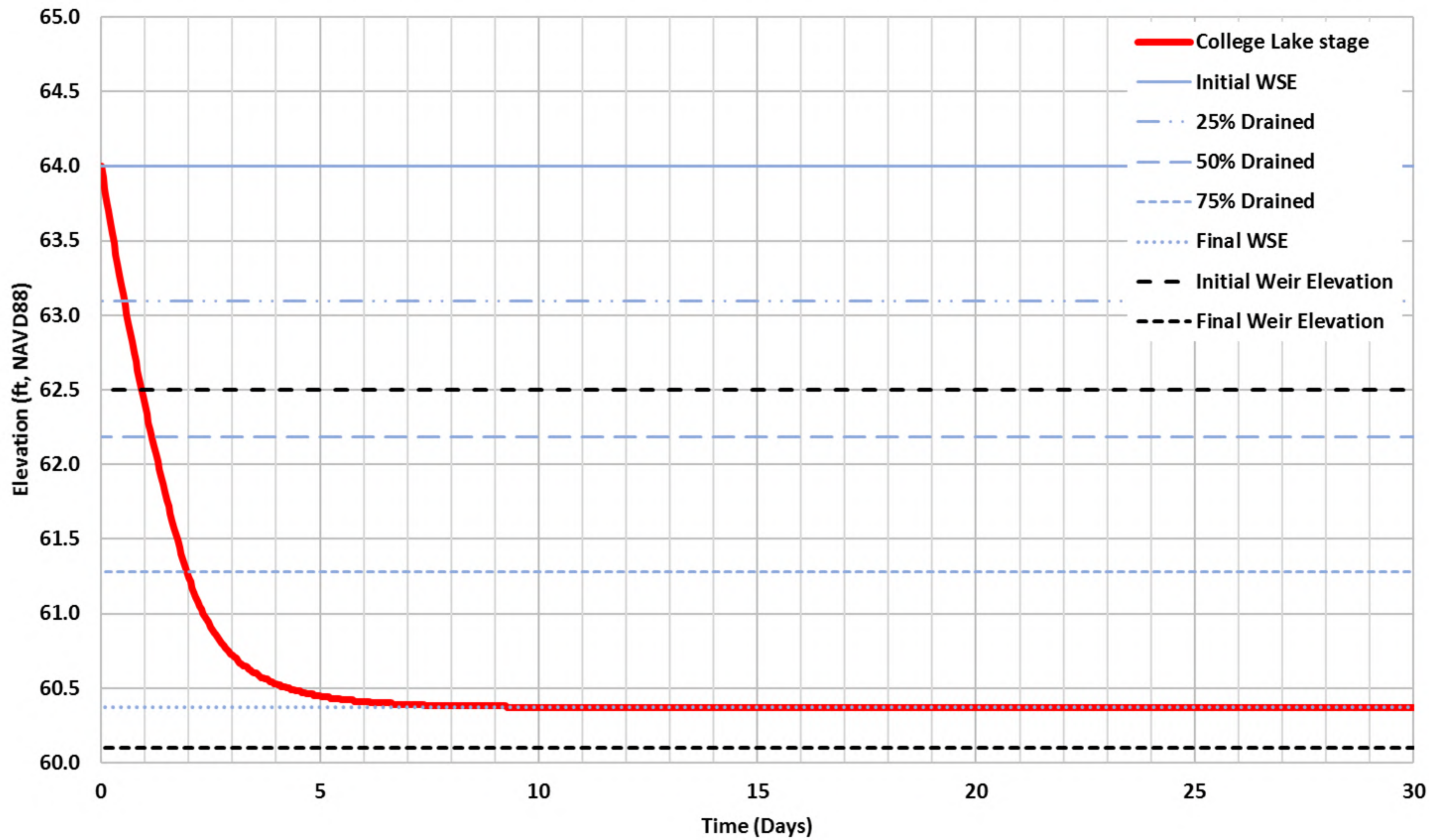
PV Water BMP Program Services - College Lake Project

Drainage Rate: Existing channel, 65 ft initial WSE

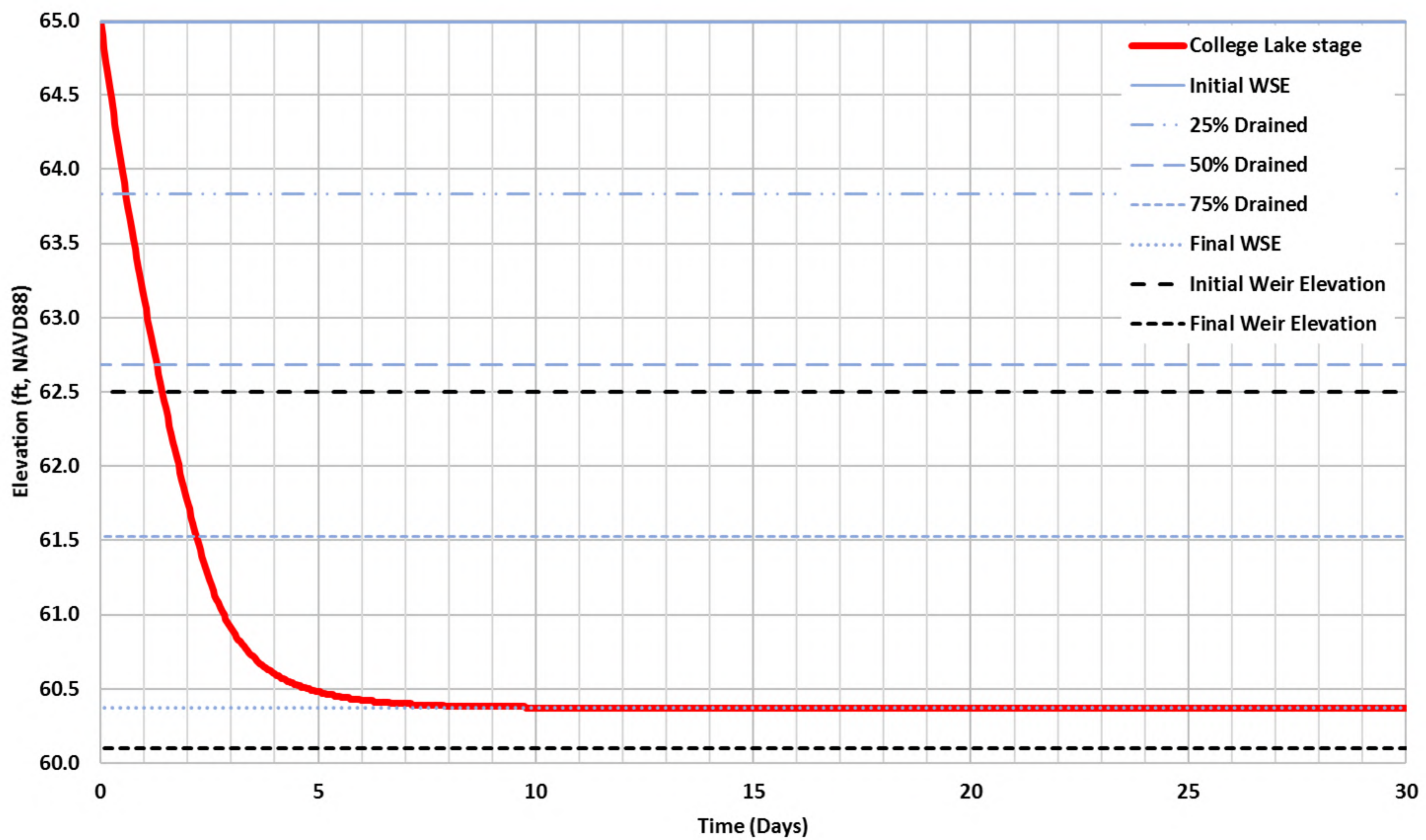
Project No. 17-1017	Created By: LST	**Figure 32**



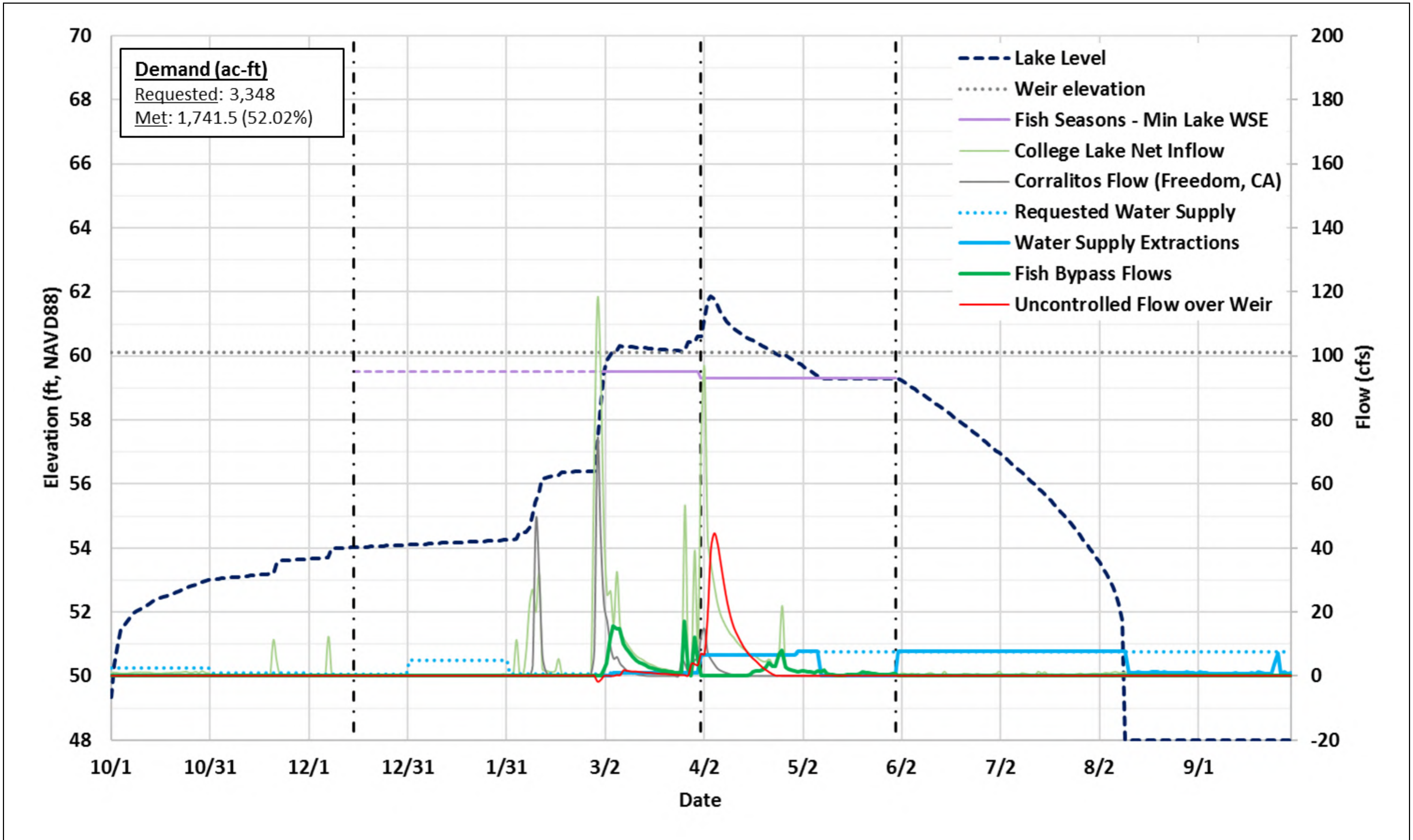
Notes:	cbec eco engineering	*PV Water BMP Program Services - College Lake Project*		
		Drainage Rate: Maintained channel, 63 ft initial WSE		
		Project No. 17-1017	Created By: LST	**Figure 33**



Notes:	cbec eco engineering	*PV Water BMP Program Services - College Lake Project*		
		Drainage Rate: Maintained channel, 64 ft initial WSE		
		Project No. 17-1017	Created By: LST	**Figure 34**



Notes:		*PV Water BMP Program Services - College Lake Project*		
	cbec eco engineering	**Drainage Rate: Maintained channel, 65 ft initial WSE**		
		Project No. 17-1017	Created By: LST	**Figure 35**

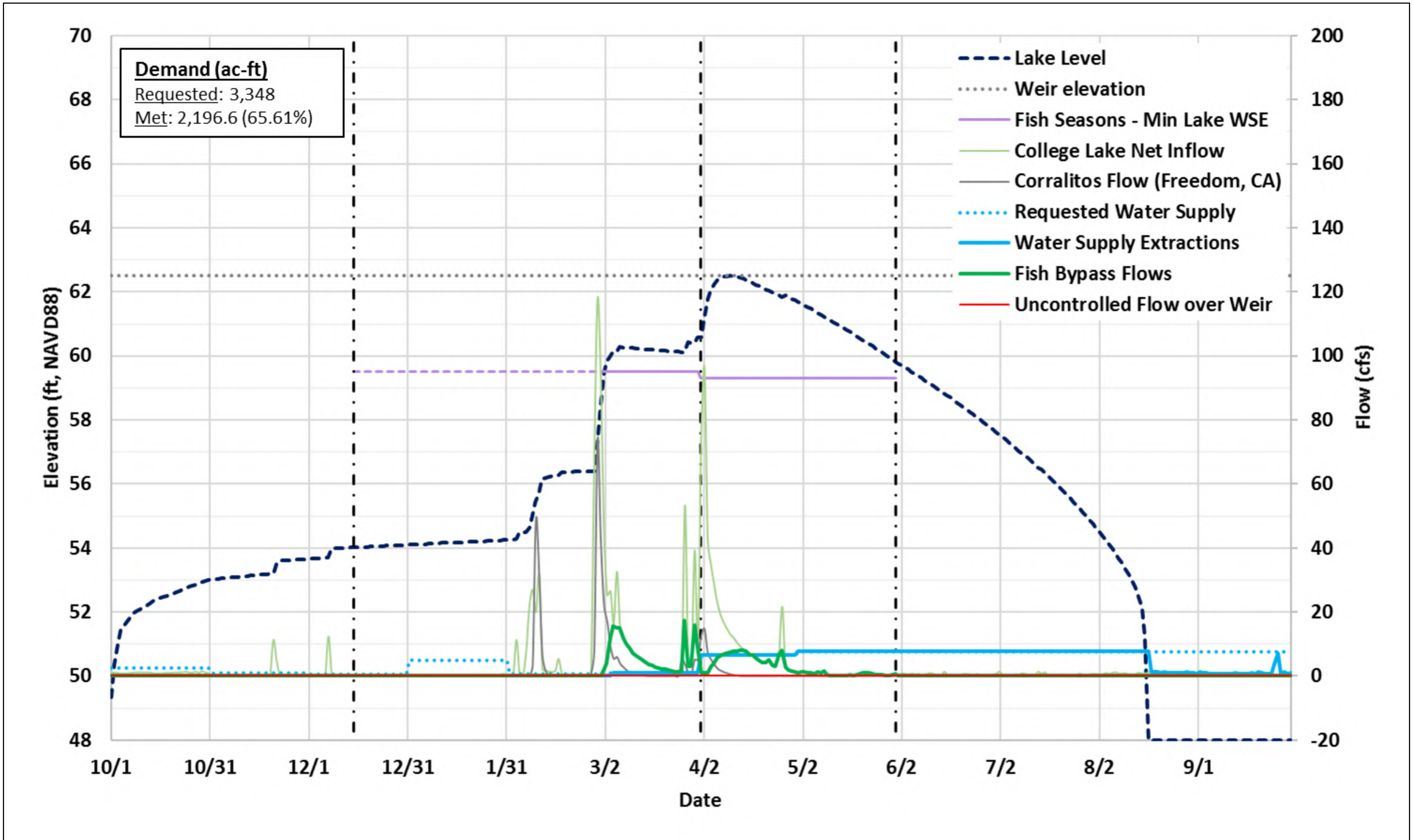


Notes: Water year 2014 was critically dry in terms of total annual precipitation.
Vertical dashed-dotted black lines indicate fish bypass season dates.

PV Water BMP Program Services - College Lake Project

WBM: WY 2014 - 60.1 ft weir

Project No. 17-1017	Created By: LST	**Figure 36**

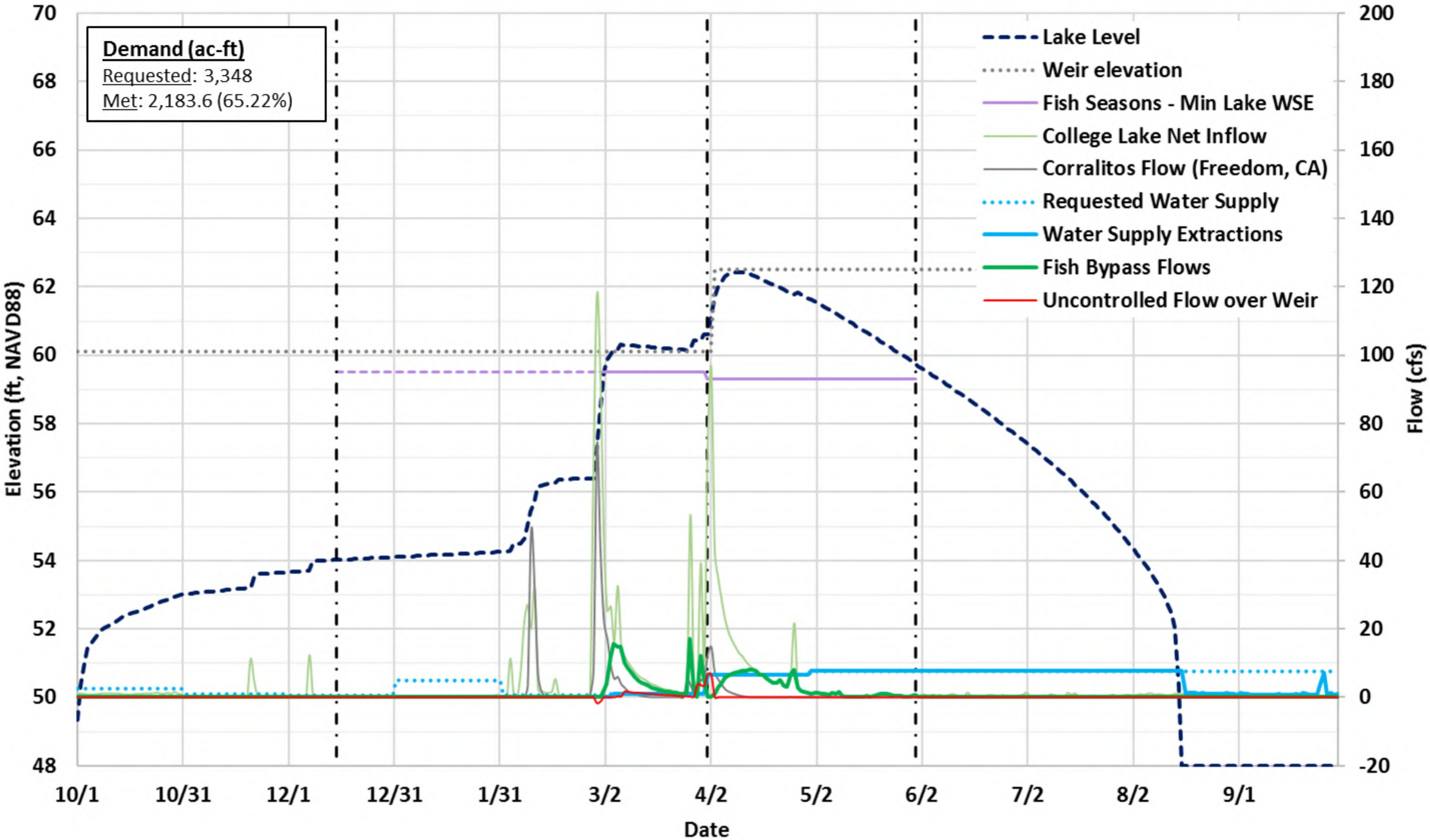


Notes: Vertical dashed-dotted black lines indicate fish bypass season dates.

PV Water BMP Program Services - College Lake Project

WBM: WY 2014 - 62.5 ft weir

Project No. 17-1017	Created By: LST	Figure 37



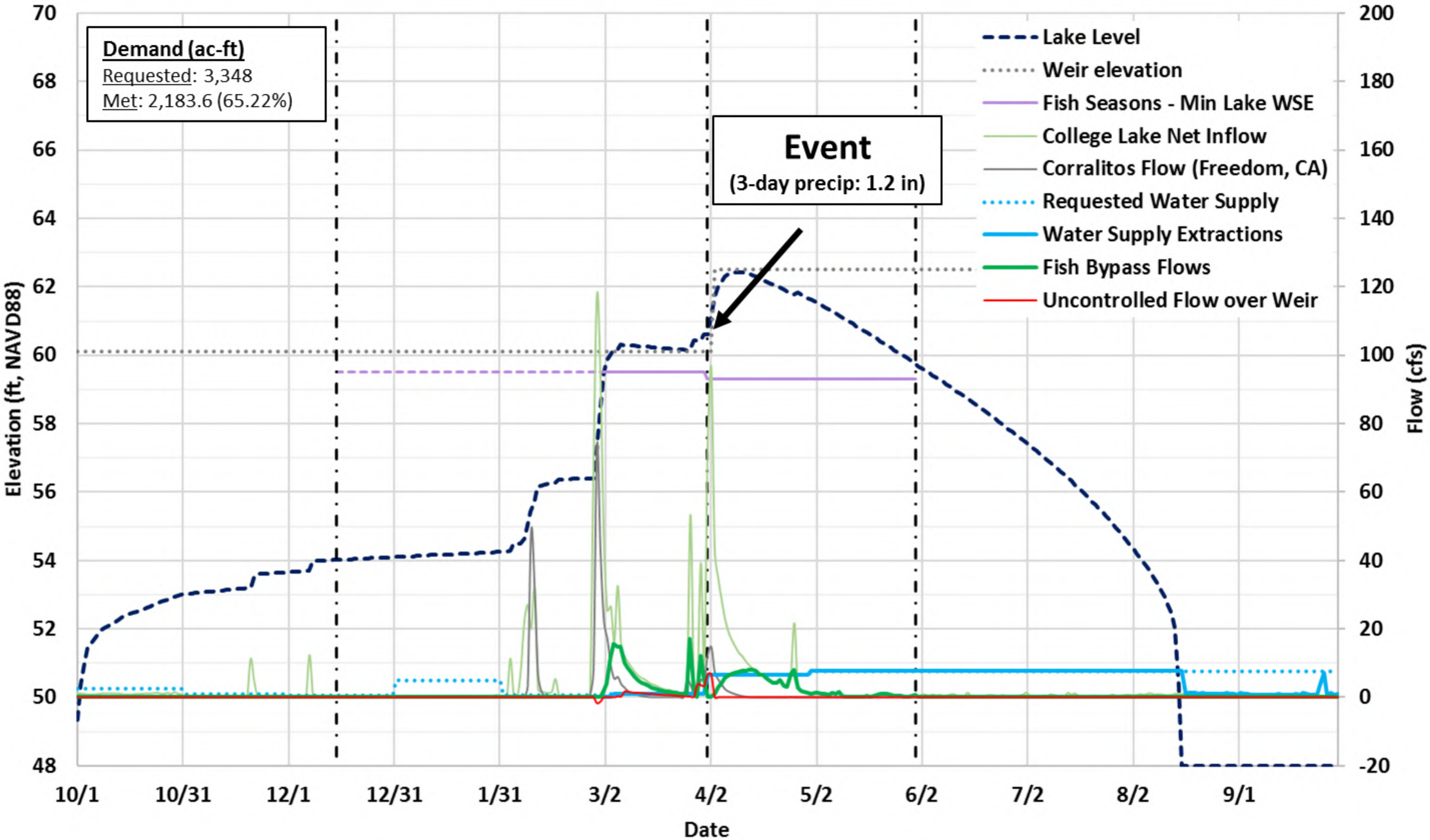
Notes: Weir raised as early as possible after last major storm event to ensure that lake did not surpass 62.5 ft. Vertical dashed-dotted black lines indicate fish bypass season dates.

cbec eco engineering

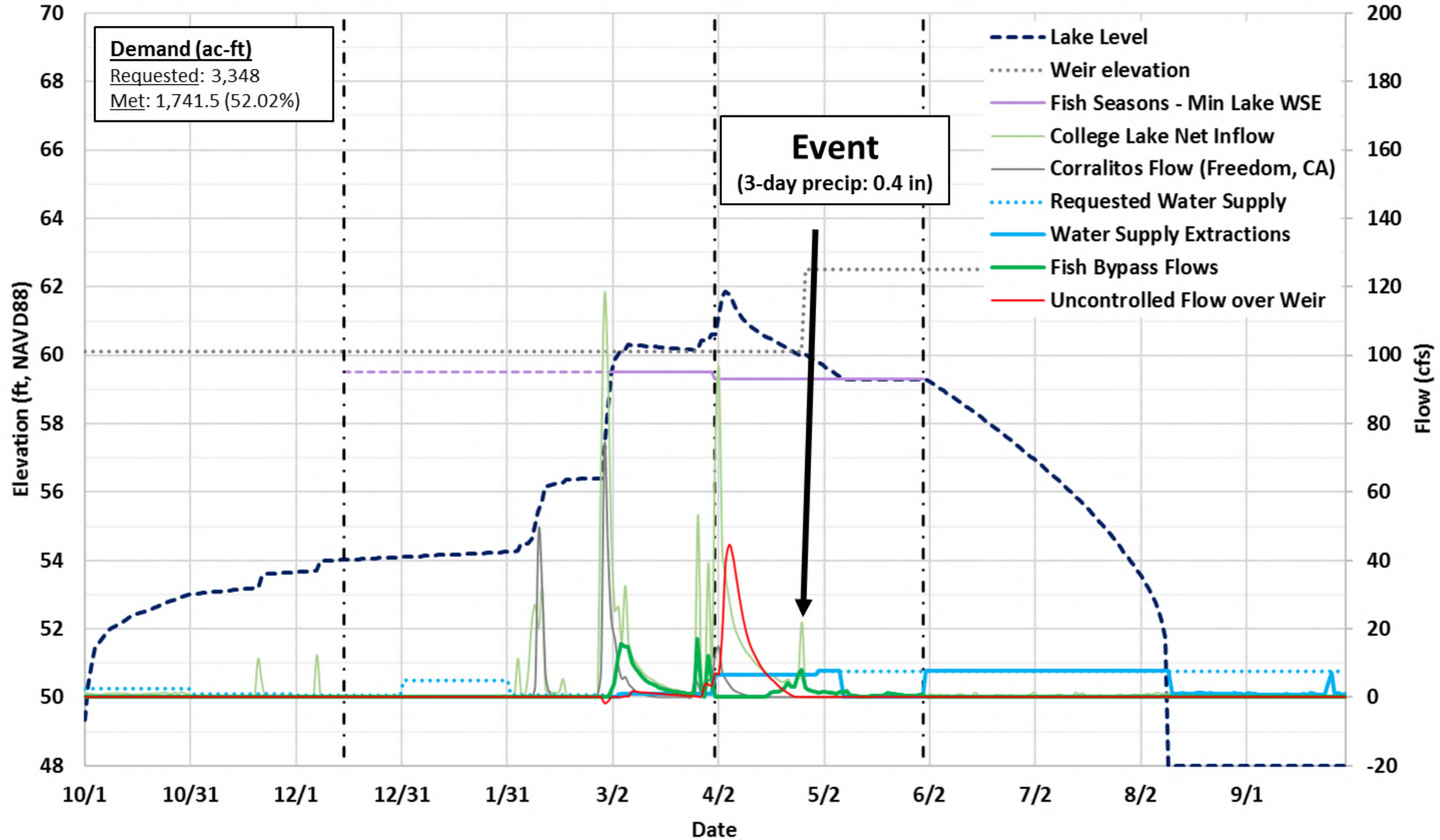
PV Water BMP Program Services - College Lake Project

WBM: WY 2014 - Variable weir (1)

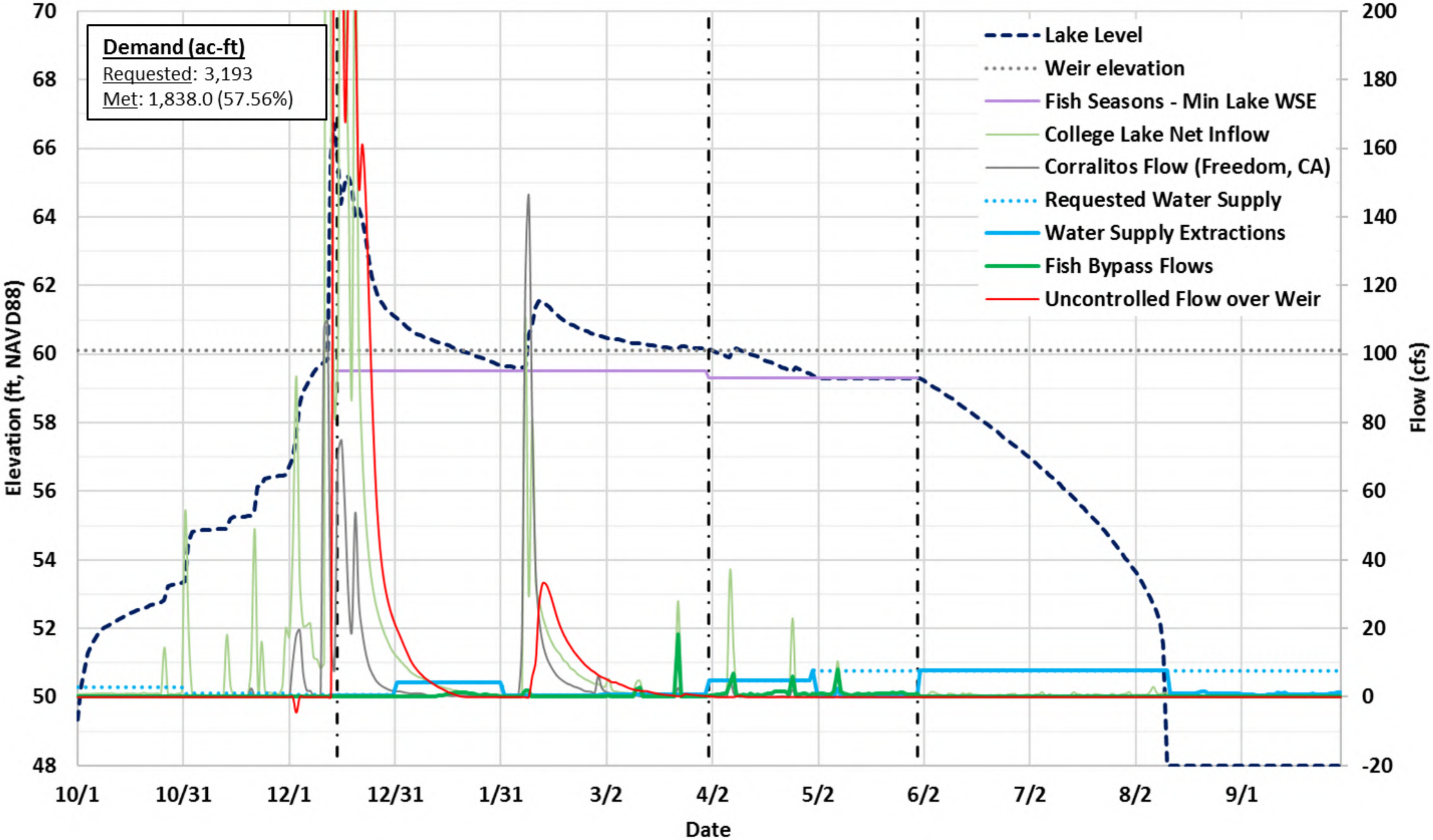
Project No. 17-1017	Created By: LST	**Figure 38**



Notes: Weir raised immediately after indicated storm event. Identical to previous plot, because weir could be raised immediately after storm event and still avoid overtopping the high weir. Vertical dashed-dotted black lines indicate fish bypass season dates.	cbec eco engineering	*PV Water BMP Program Services - College Lake Project* **WBM: WY 2014 - Variable weir (2)**
		Project No. 17-1017 | Created By: LST | **Figure 39**



Notes: Weir raised immediately after indicated storm event. Vertical dashed-dotted black lines indicate fish bypass season dates.	cbec eco engineering	*PV Water BMP Program Services - College Lake Project* **WBM: WY 2014 - Variable weir (3)**
		Project No. 17-1017 / Created By: LST / **Figure 40**



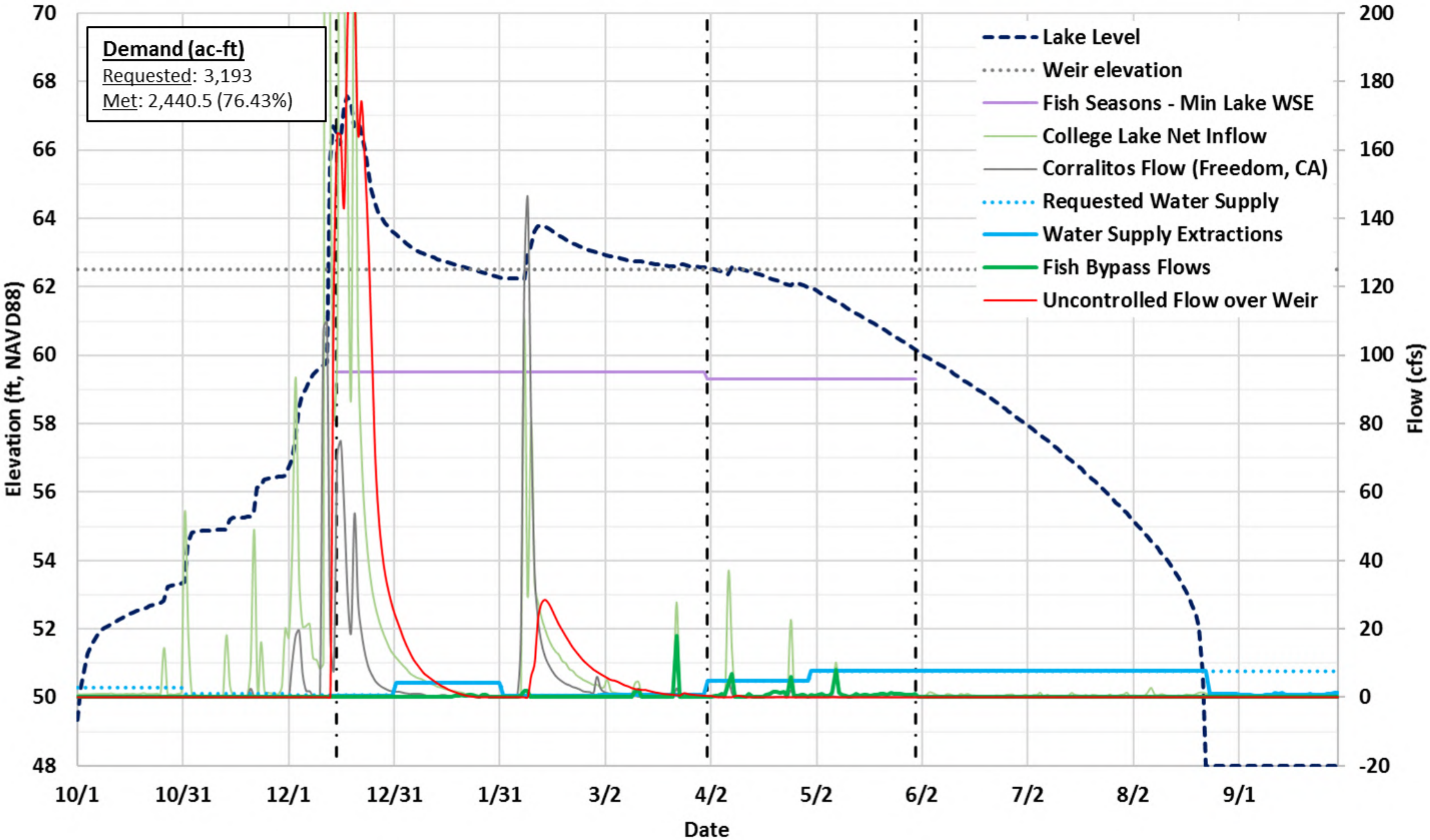
Notes: Water year 2015 was below normal in terms of total annual precipitation.
Vertical dashed-dotted black lines indicate fish bypass season dates.

cbec eco engineering

PV Water BMP Program Services - College Lake Project

WBM: WY 2015 - 60.1 ft weir

Project No. 17-1017	Created By: LST	**Figure 41**

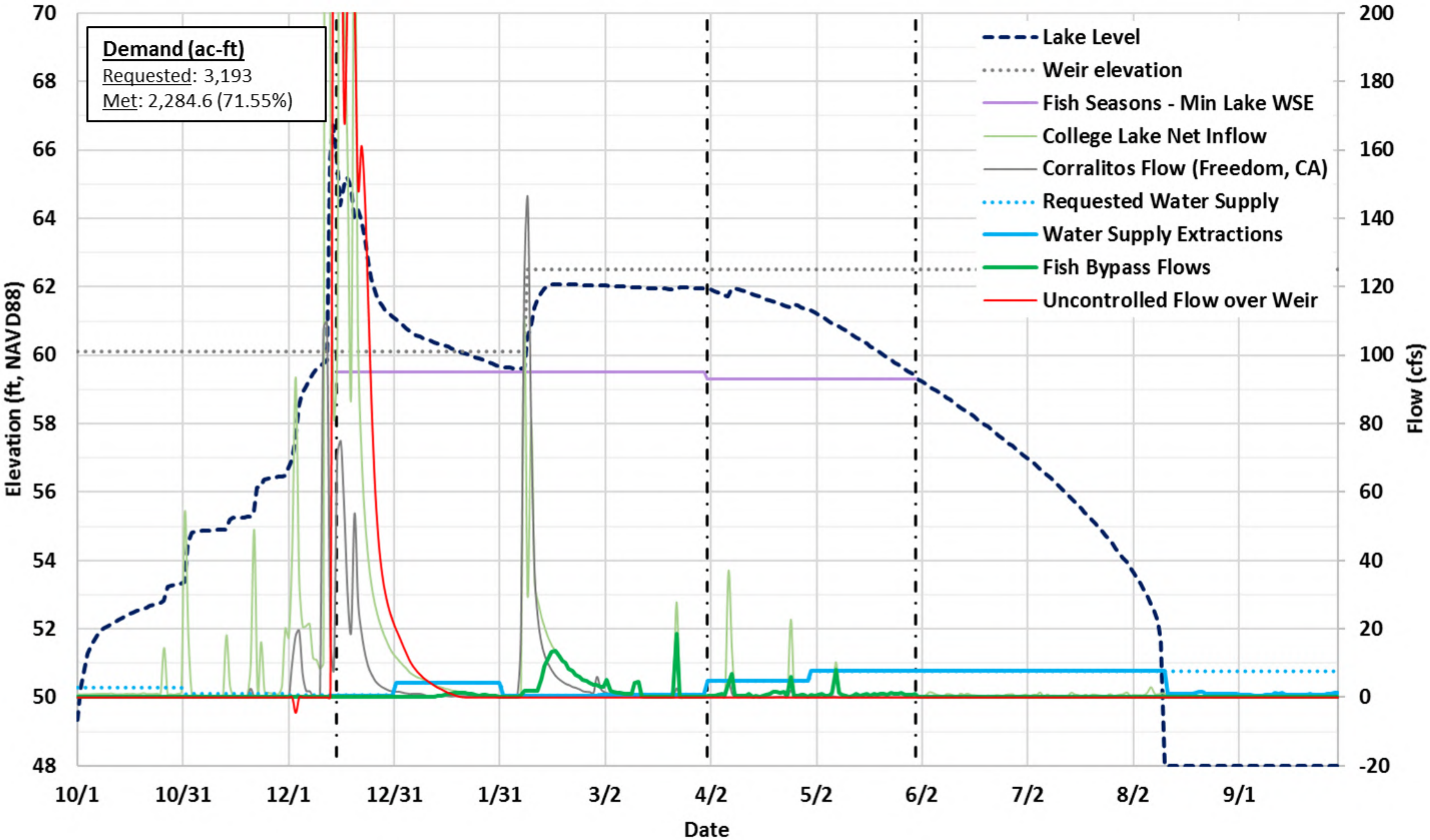


Notes: Vertical dashed-dotted black lines indicate fish bypass season dates.

PV Water BMP Program Services - College Lake Project

WBM: WY 2015 - 62.5 ft weir

Project No. 17-1017	Created By: LST	**Figure 42**



Notes: Weir raised as early as possible after last major storm event to ensure that lake did not surpass 62.5 ft. Vertical dashed-dotted black lines indicate fish bypass season dates.

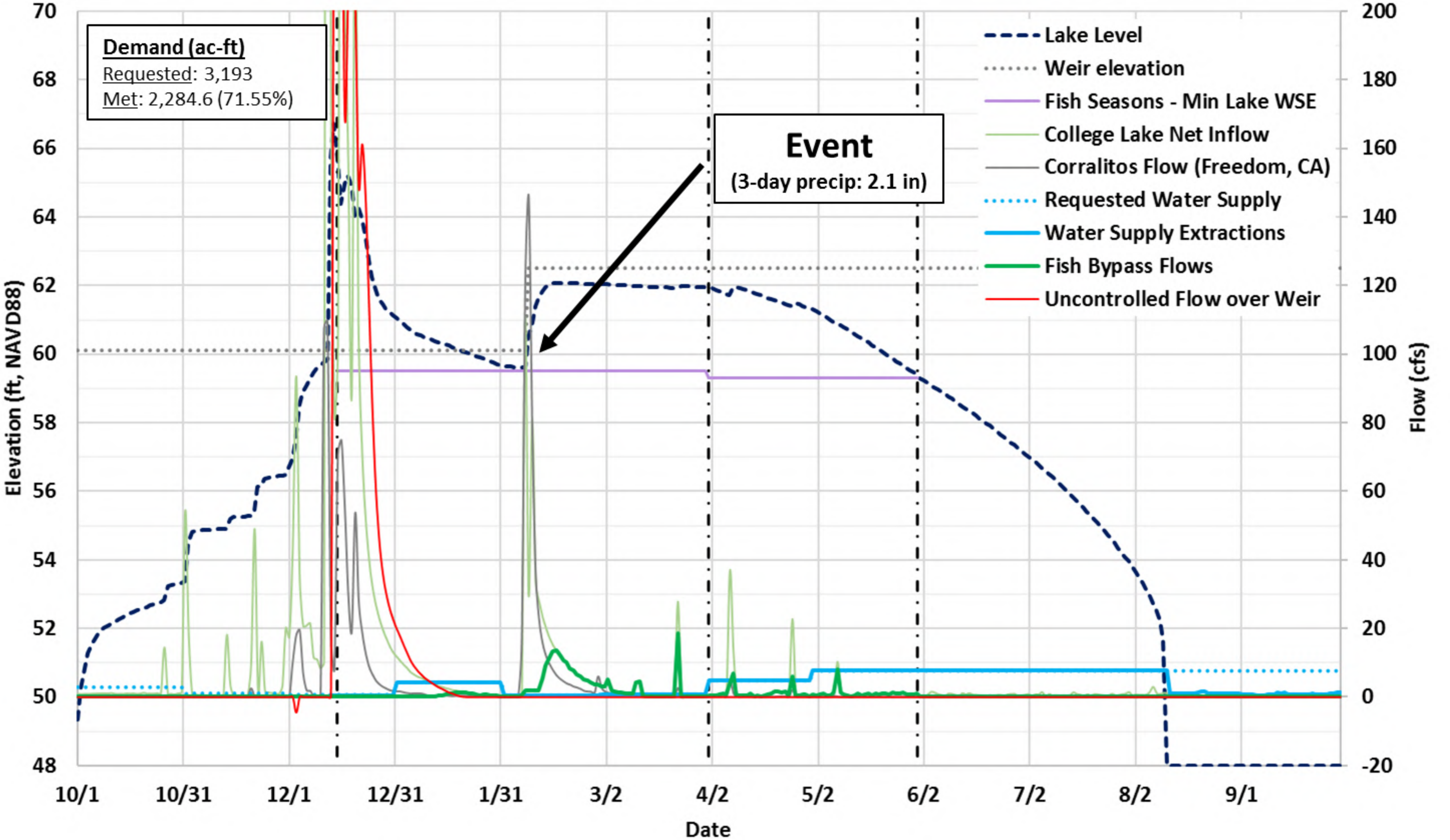
cbec eco engineering

PV Water BMP Program Services - College Lake Project

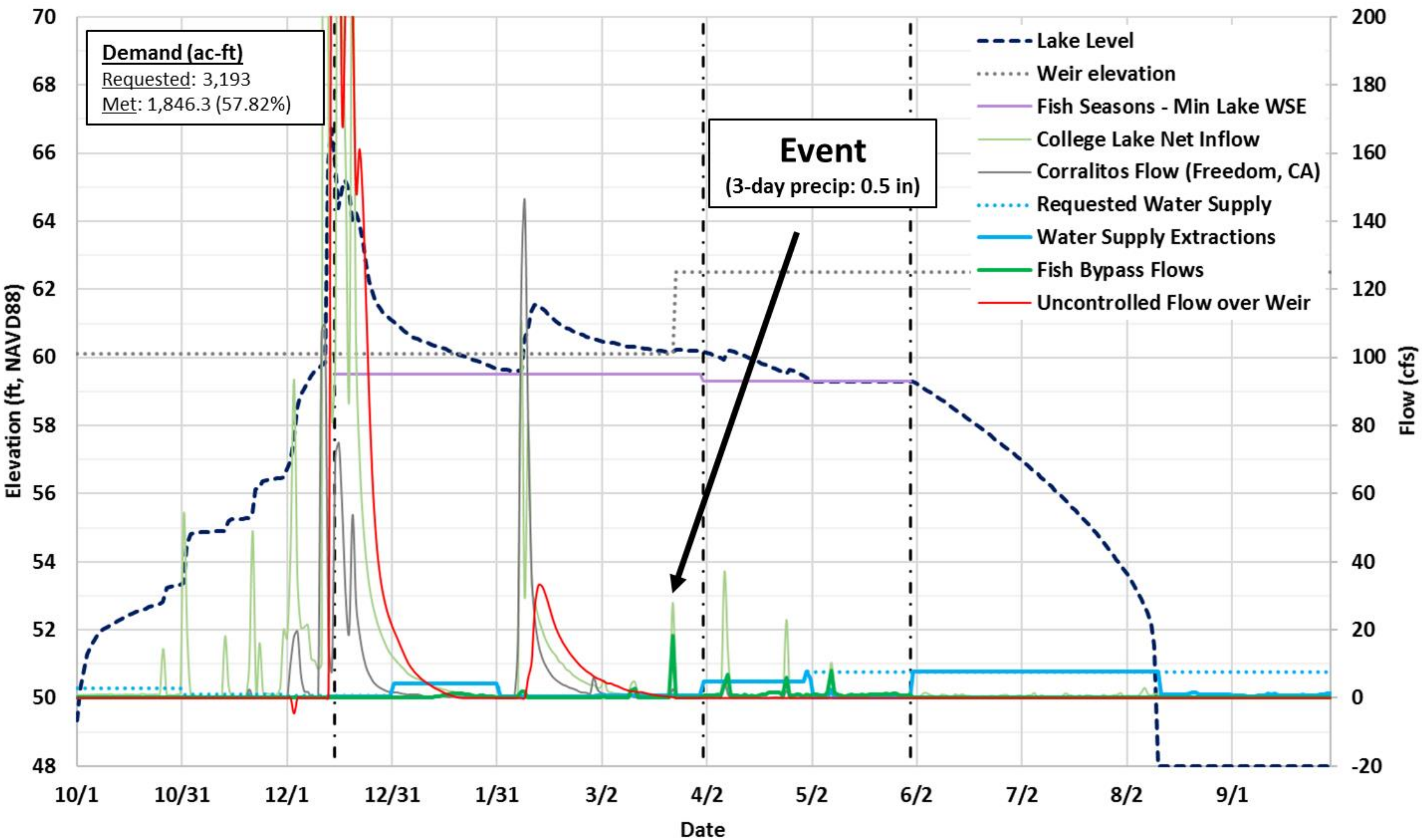
WBM: WY 2015 - Variable weir (1)

Project No. 17-1017	Created By: LST	**Figure 43**

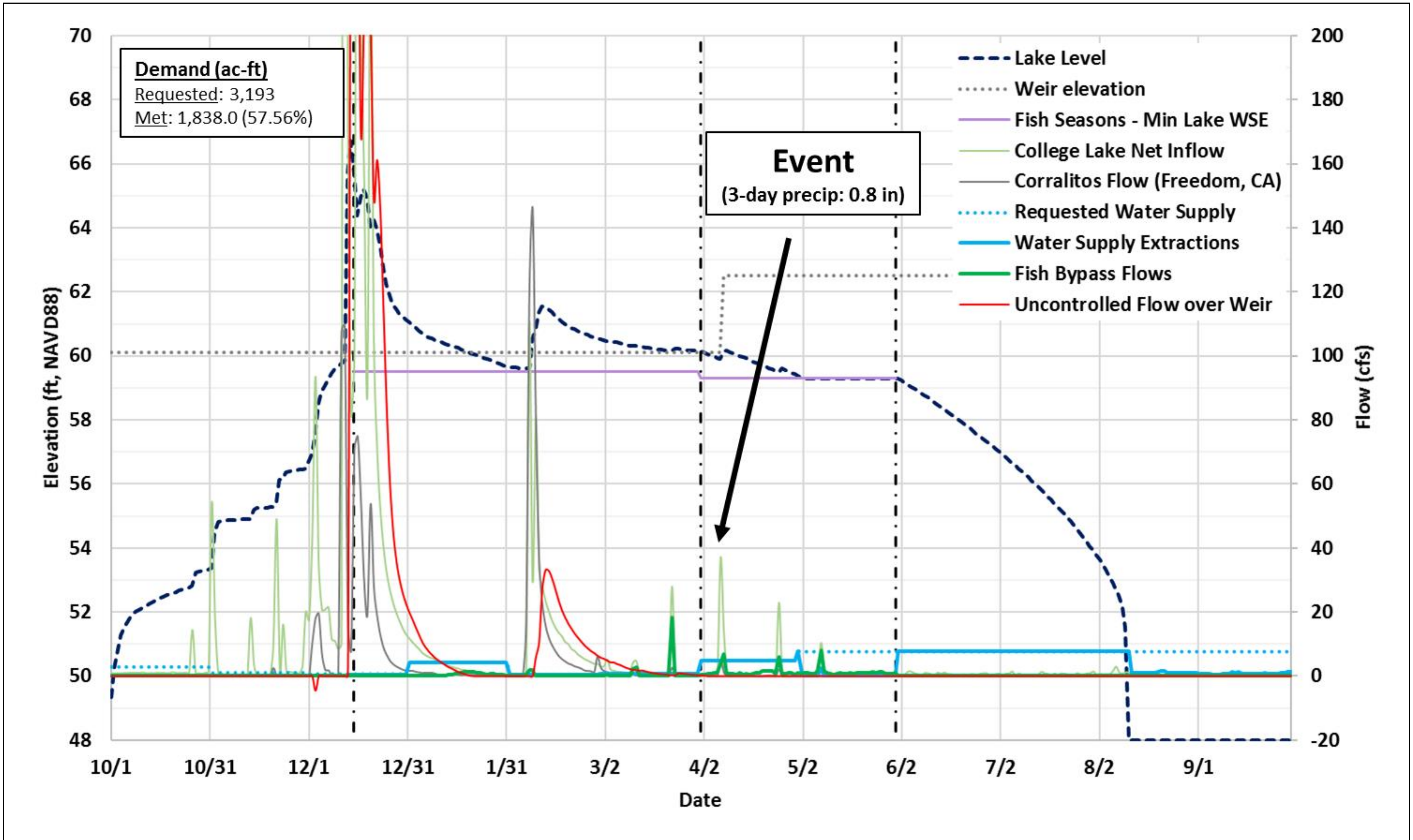
11/8/2018



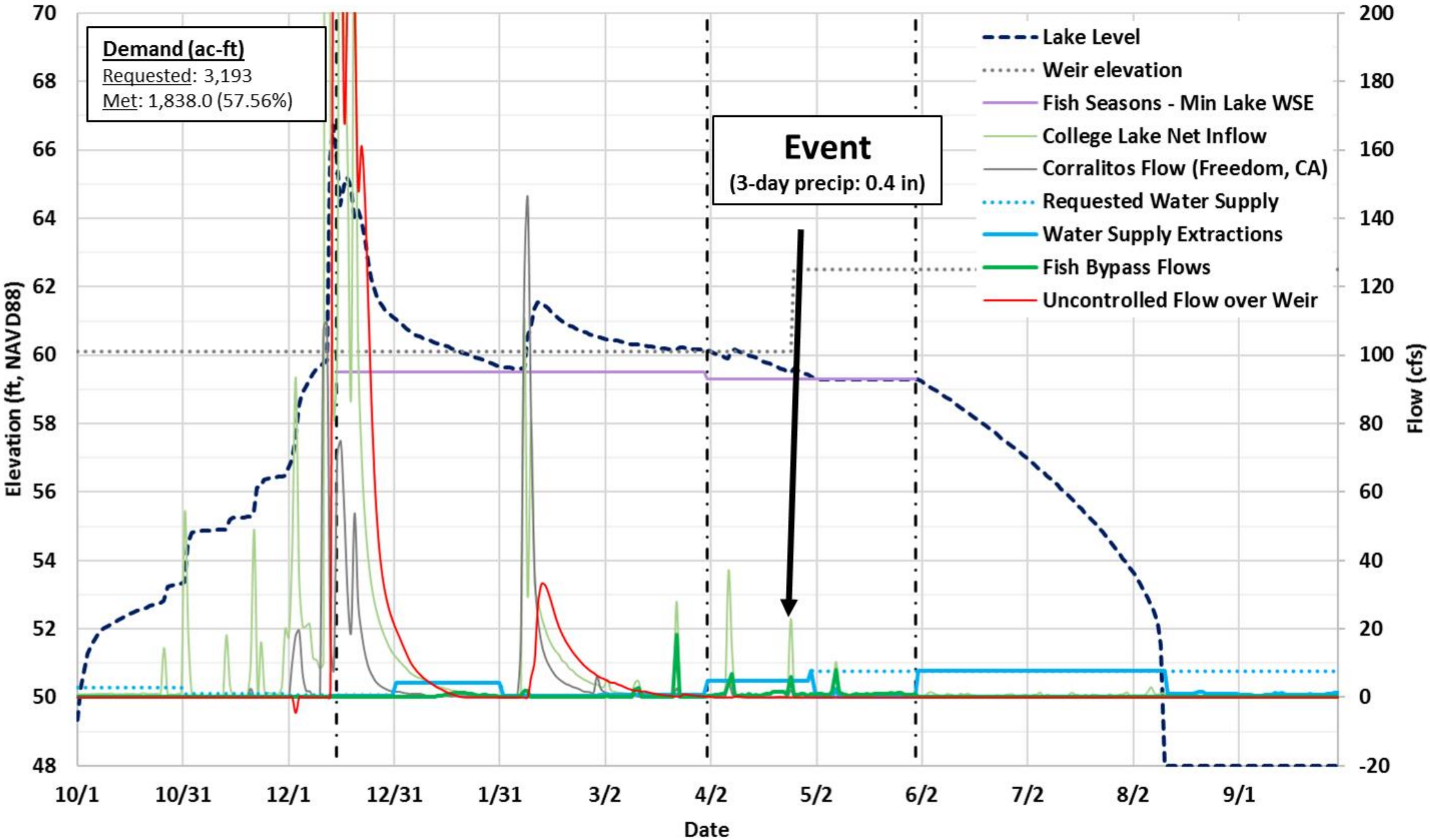
Notes: Weir raised immediately after indicated storm event. Identical to previous plot, because weir could be raised immediately after storm event and still avoid overtopping the high weir. Vertical dashed-dotted black lines indicate fish bypass season dates.	cbec eco engineering	*PV Water BMP Program Services - College Lake Project* **WBM: WY 2015 - Variable weir (2)** Project No. 17-1017	Created By: LST	**Figure 44**



Notes: Weir raised immediately after indicated storm event. Vertical dashed-dotted black lines indicate fish bypass season dates.	cbec eco engineering	*PV Water BMP Program Services - College Lake Project* **WBM: WY 2015 - Variable weir (3)**
		Project No. 17-1017 · Created By: LST · **Figure 45**



Notes: Weir raised immediately after indicated storm event. Vertical dashed-dotted black lines indicate fish bypass season dates.	cbec eco engineering	*PV Water BMP Program Services - College Lake Project* **WBM: WY 2015 - Variable weir (4)**
		Project No. 17-1017 / Created By: LST / **Figure 46**



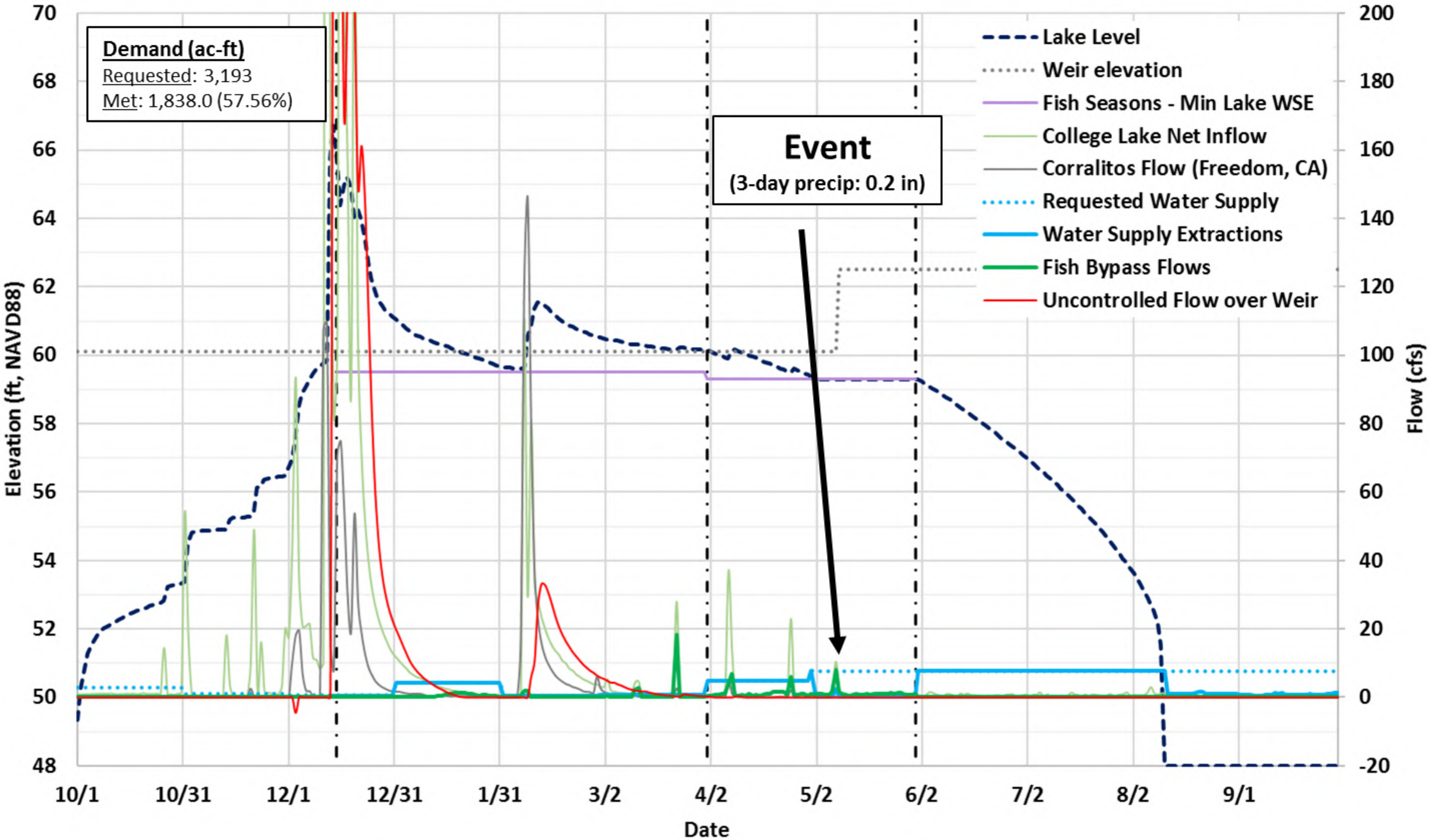
Notes: Weir raised immediately after indicated storm event. Vertical dashed-dotted black lines indicate fish bypass season dates.

cbec eco engineering

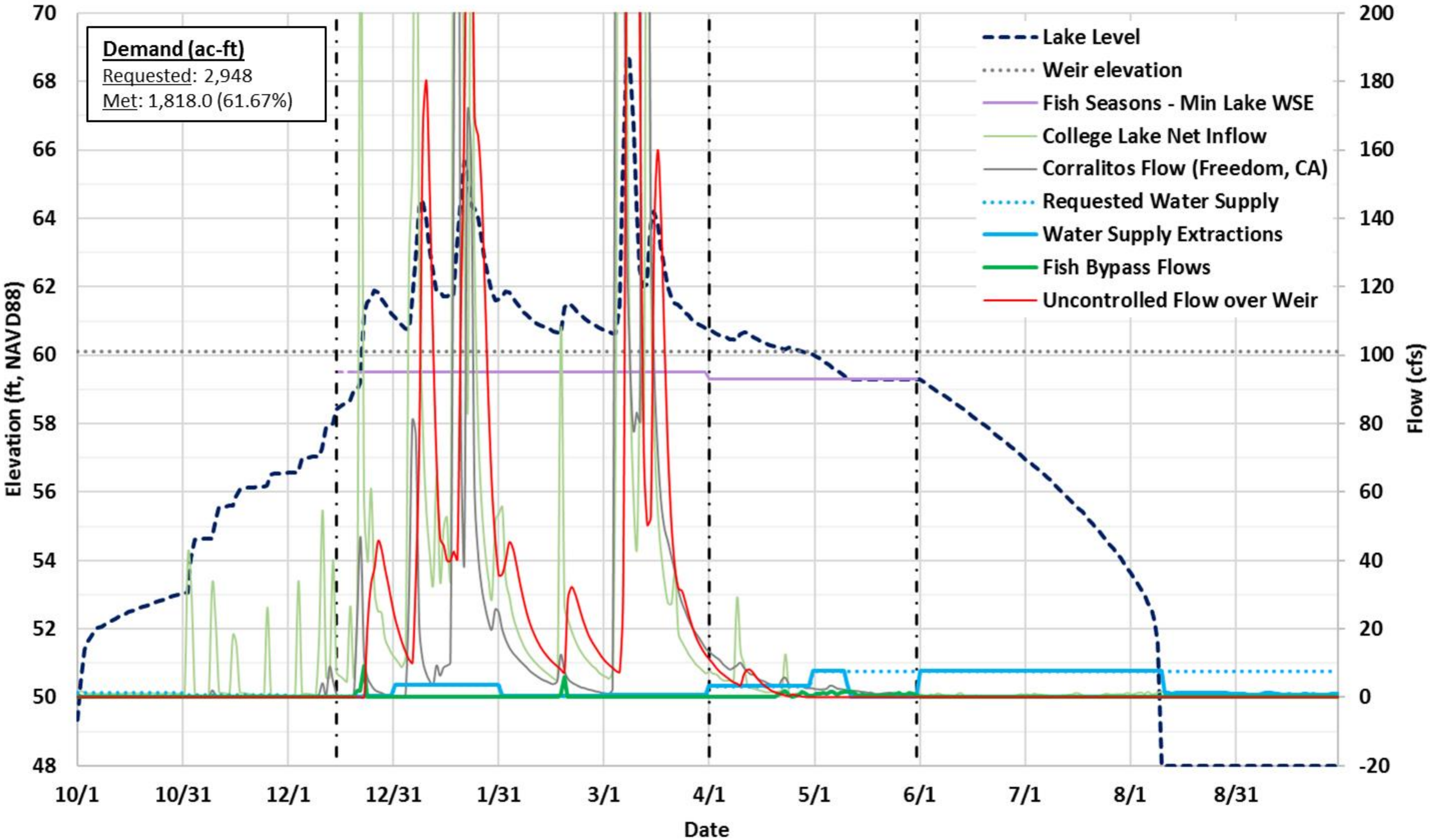
PV Water BMP Program Services - College Lake Project

WBM: WY 2015 - Variable weir (5)

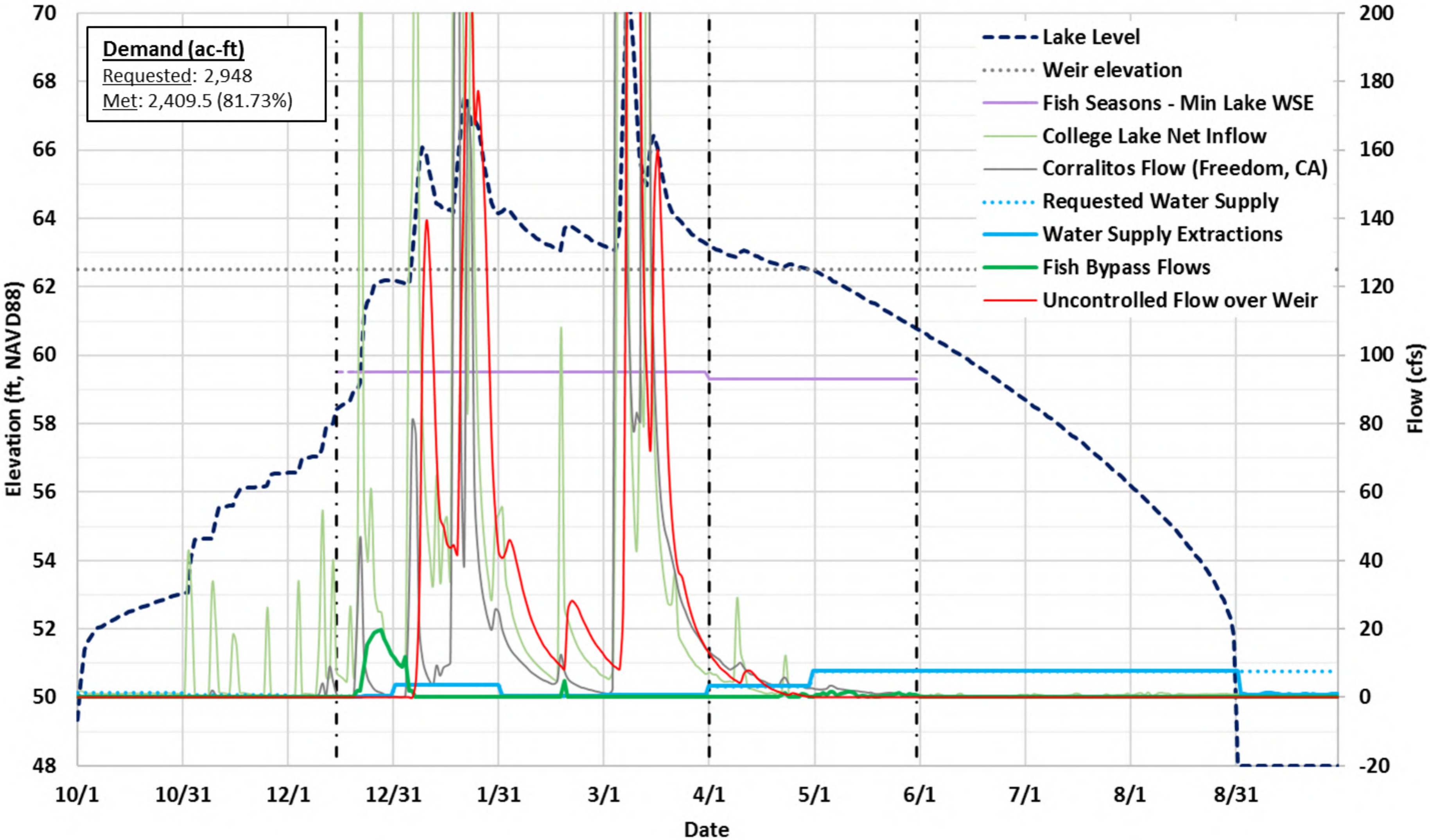
Project No. 17-1017	Created By: LST	**Figure 47**



Notes: Weir raised immediately after indicated storm event. Vertical dashed-dotted black lines indicate fish bypass season dates.	cbec eco engineering	*PV Water BMP Program Services - College Lake Project* **WBM: WY 2015 - Variable weir (6)**		
		Project No. 17-1017	Created By: LST	**Figure 48**



Notes: Water year 2016 was above normal in terms of total annual precipitation. Vertical dashed-dotted black lines indicate fish bypass season dates.	cbec eco engineering	*PV Water BMP Program Services - College Lake Project* **WBM: WY 2016 - 60.1 ft weir**		
		Project No. 17-1017	Created By: LST	**Figure 49**

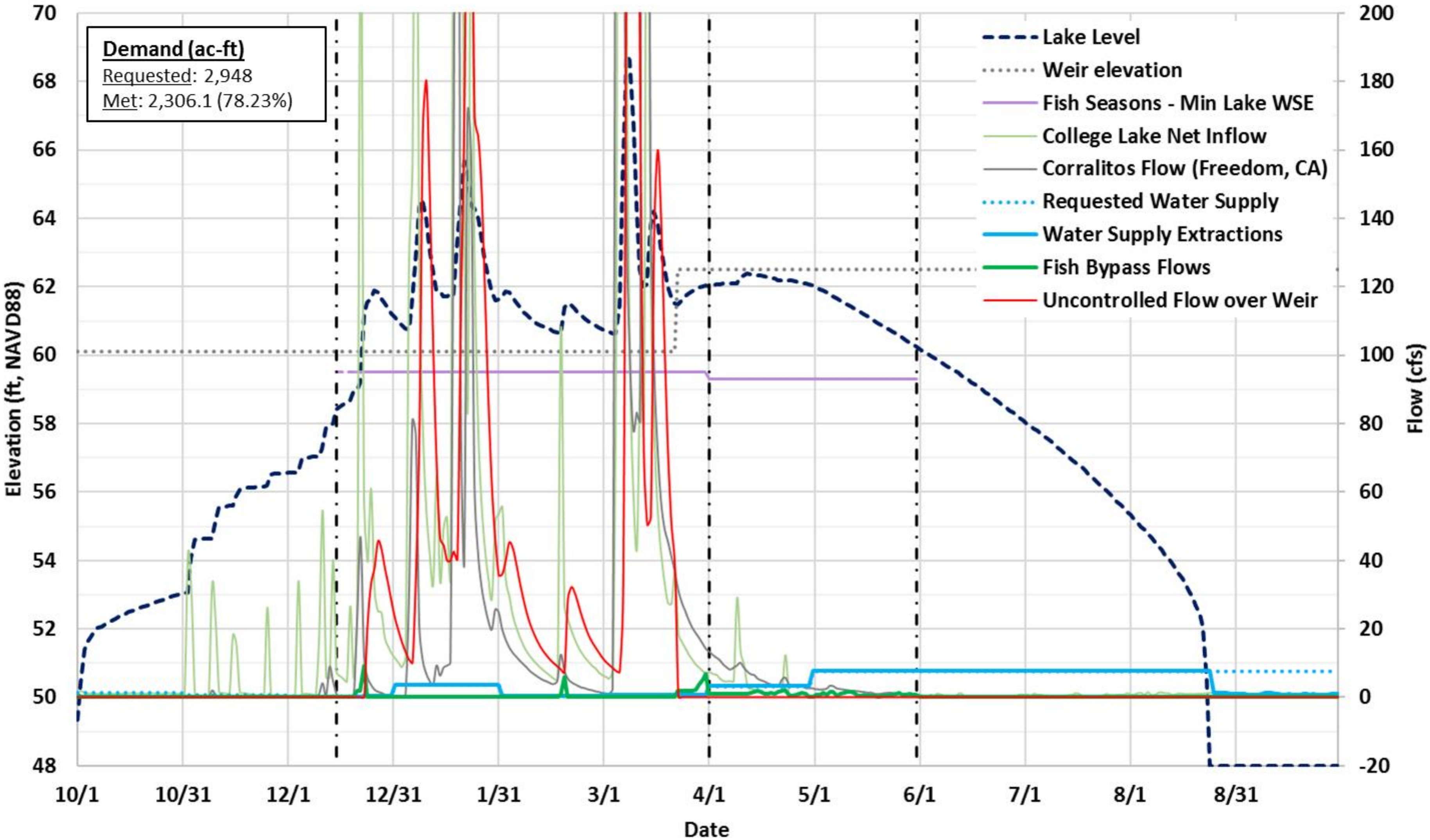


Notes: Vertical dashed-dotted black lines indicate fish bypass season dates.

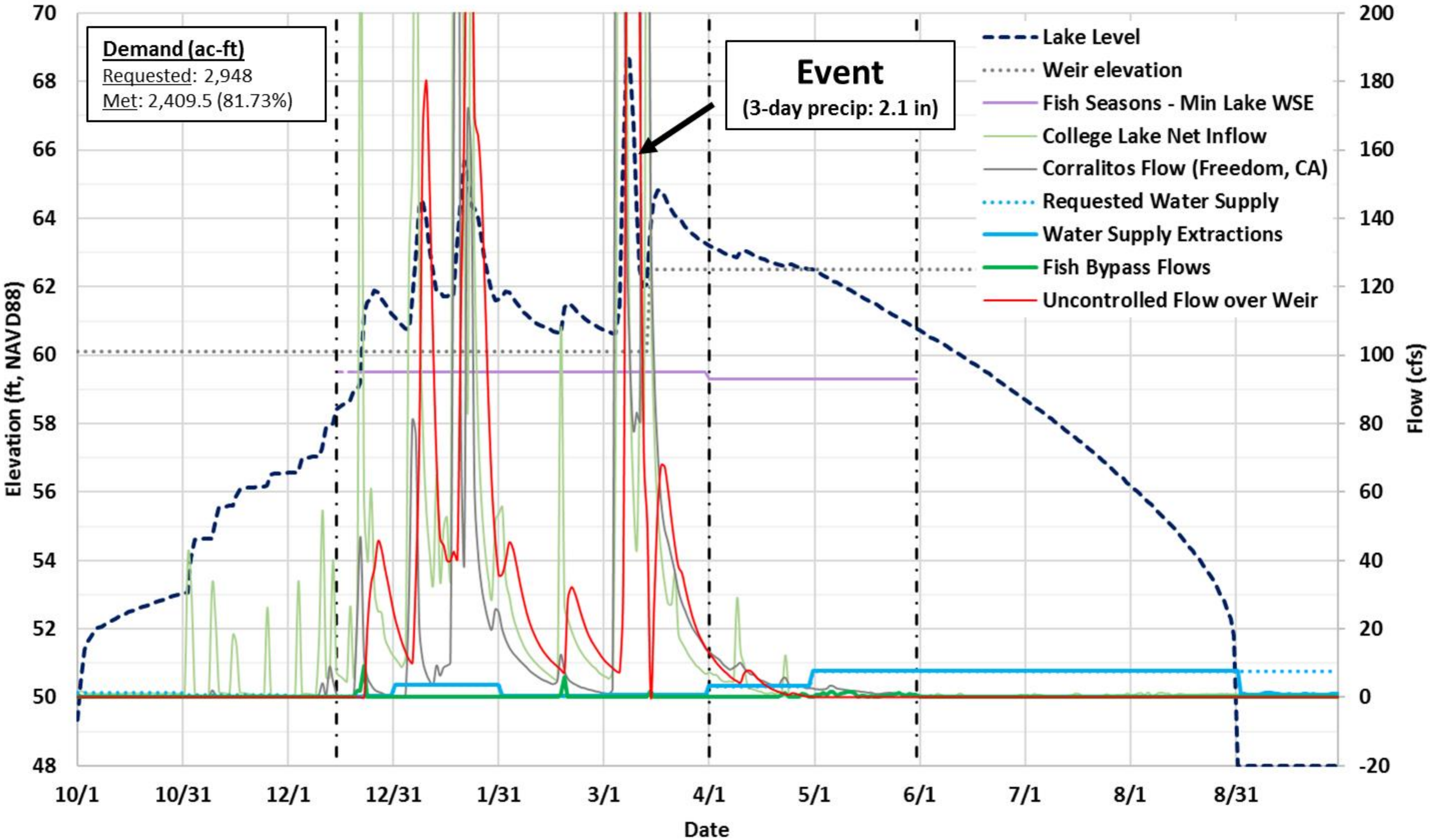
PV Water BMP Program Services - College Lake Project

WBM: WY 2016 - 62.5 ft weir

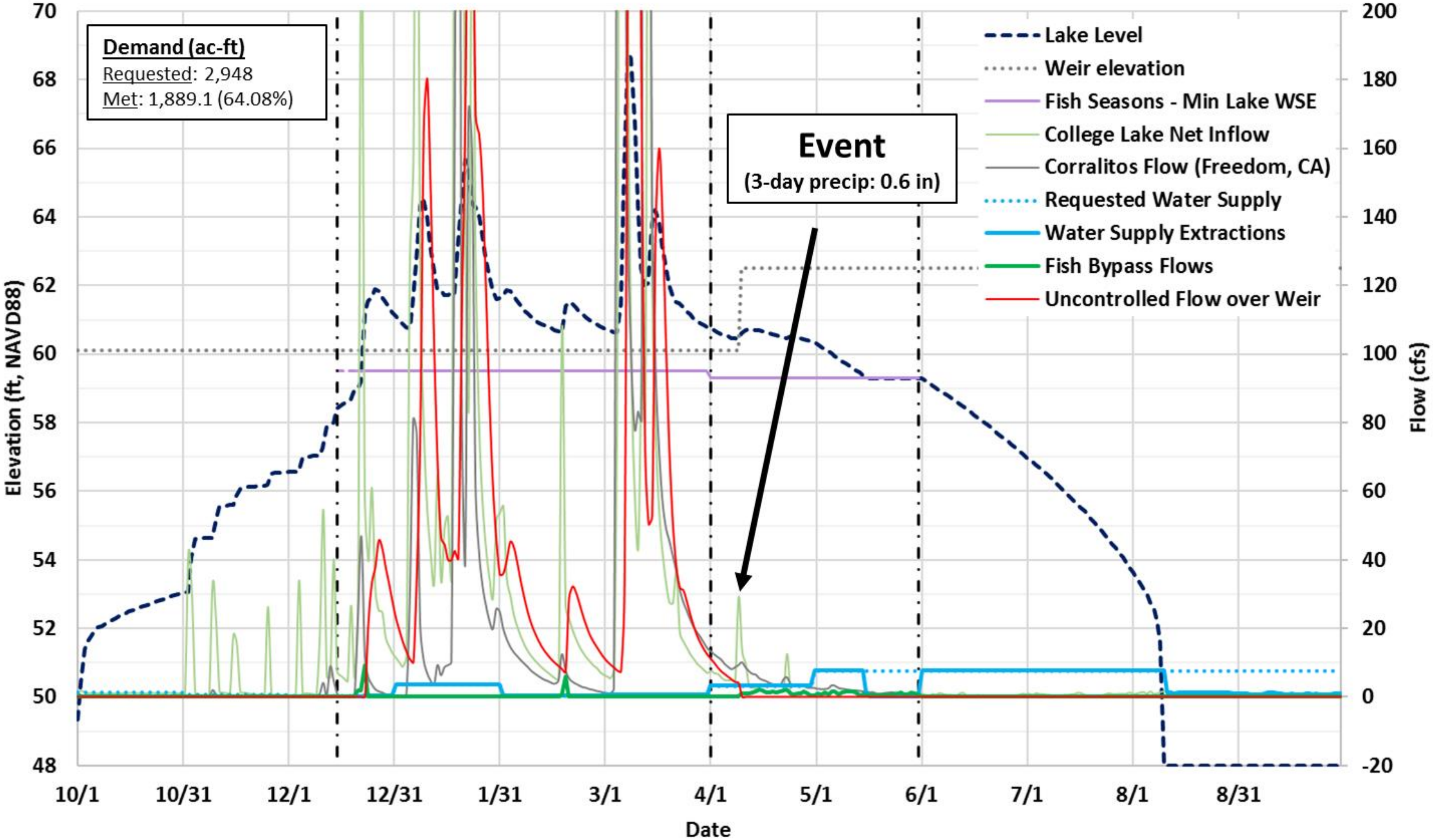
Project No. 17-1017	Created By: LST	**Figure 50**



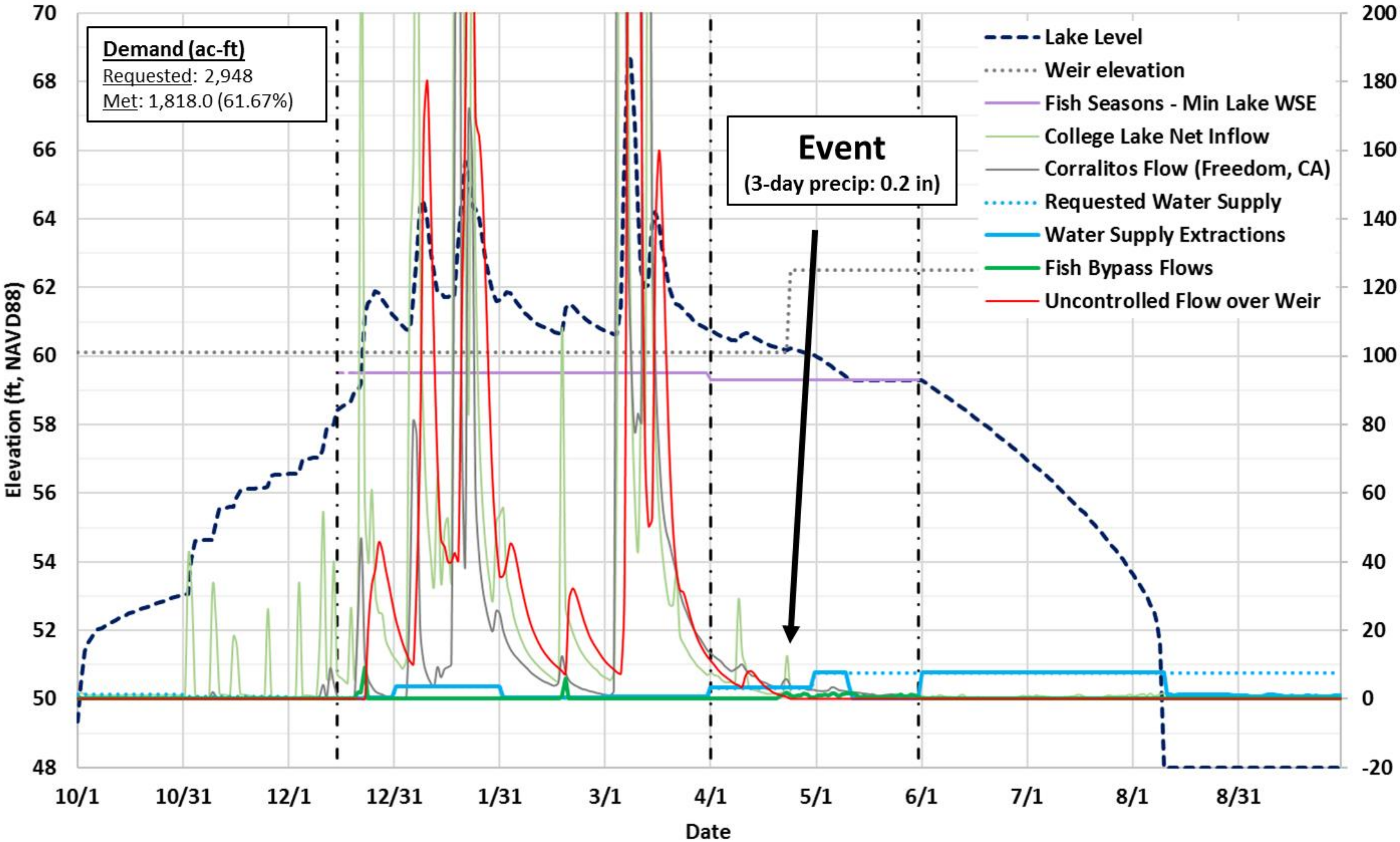
Notes: Weir raised as early as possible after last major storm event to ensure that lake did not surpass 62.5 ft. Vertical dashed-dotted black lines indicate fish bypass season dates.	cbec eco engineering	*PV Water BMP Program Services - College Lake Project* **WBM: WY 2016 - Variable weir (1)**
		Project No. 17-1017 / Created By: LST / **Figure 51**



Notes: Weir raised immediately after indicated storm event. The lake reaches a stage of nearly 65 ft, which would cause inundation upstream of Paulsen Road. Vertical dashed-dotted black lines indicate fish bypass season dates.	cbec eco engineering	*PV Water BMP Program Services - College Lake Project* **WBM: WY 2016 - Variable weir (2)**	
		Project No. 17-1017	Created By: LST	**Figure 52**



Notes: Weir raised immediately after indicated storm event. Vertical dashed-dotted black lines indicate fish bypass season dates.	cbec eco engineering	*PV Water BMP Program Services - College Lake Project* **WBM: WY 2016 - Variable weir (3)**		
		Project No. 17-1017	Created By: LST	**Figure 53**



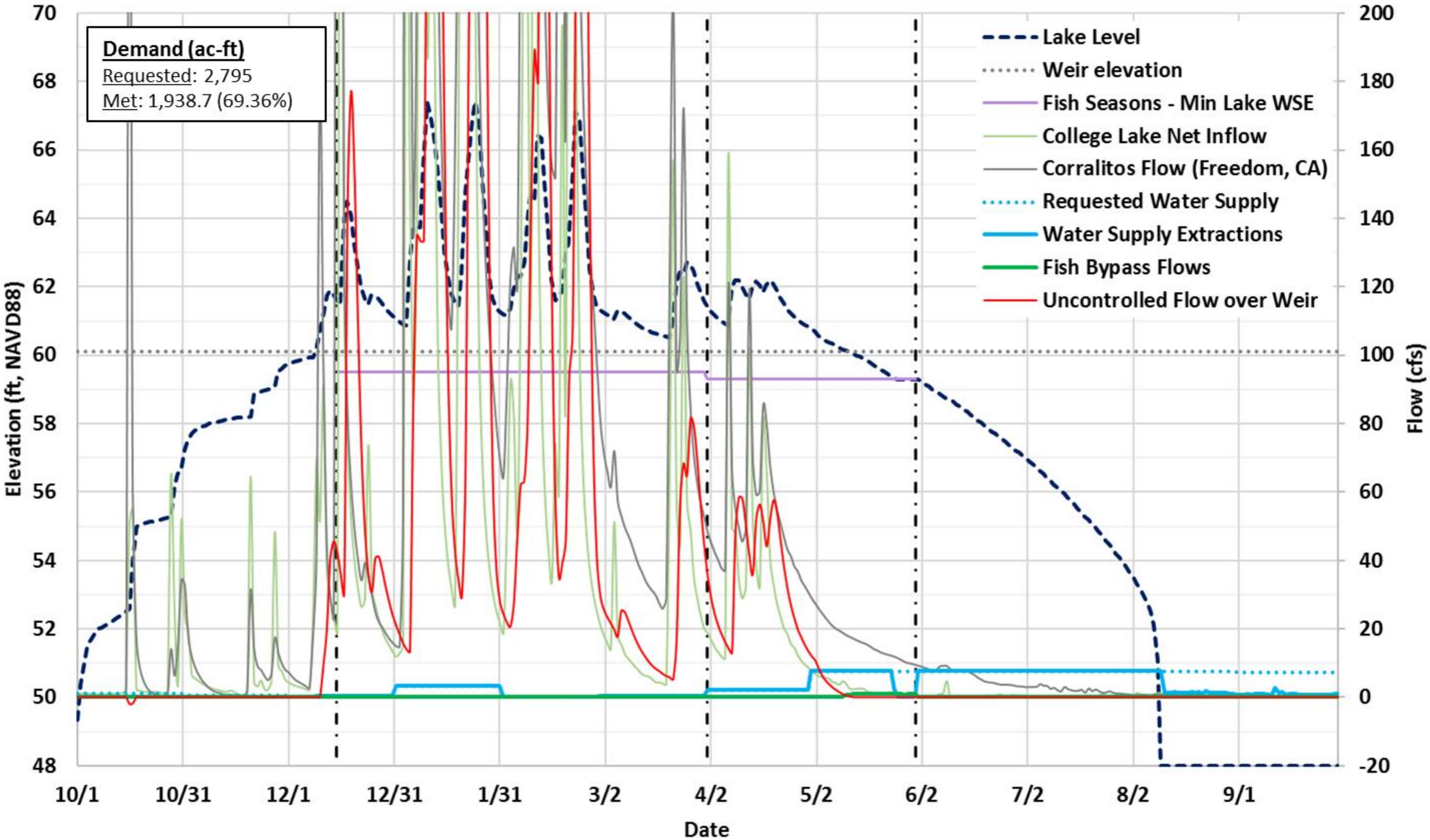
Notes: Weir raised immediately after indicated storm event. Vertical dashed-dotted black lines indicate fish bypass season dates.

cbec eco engineering

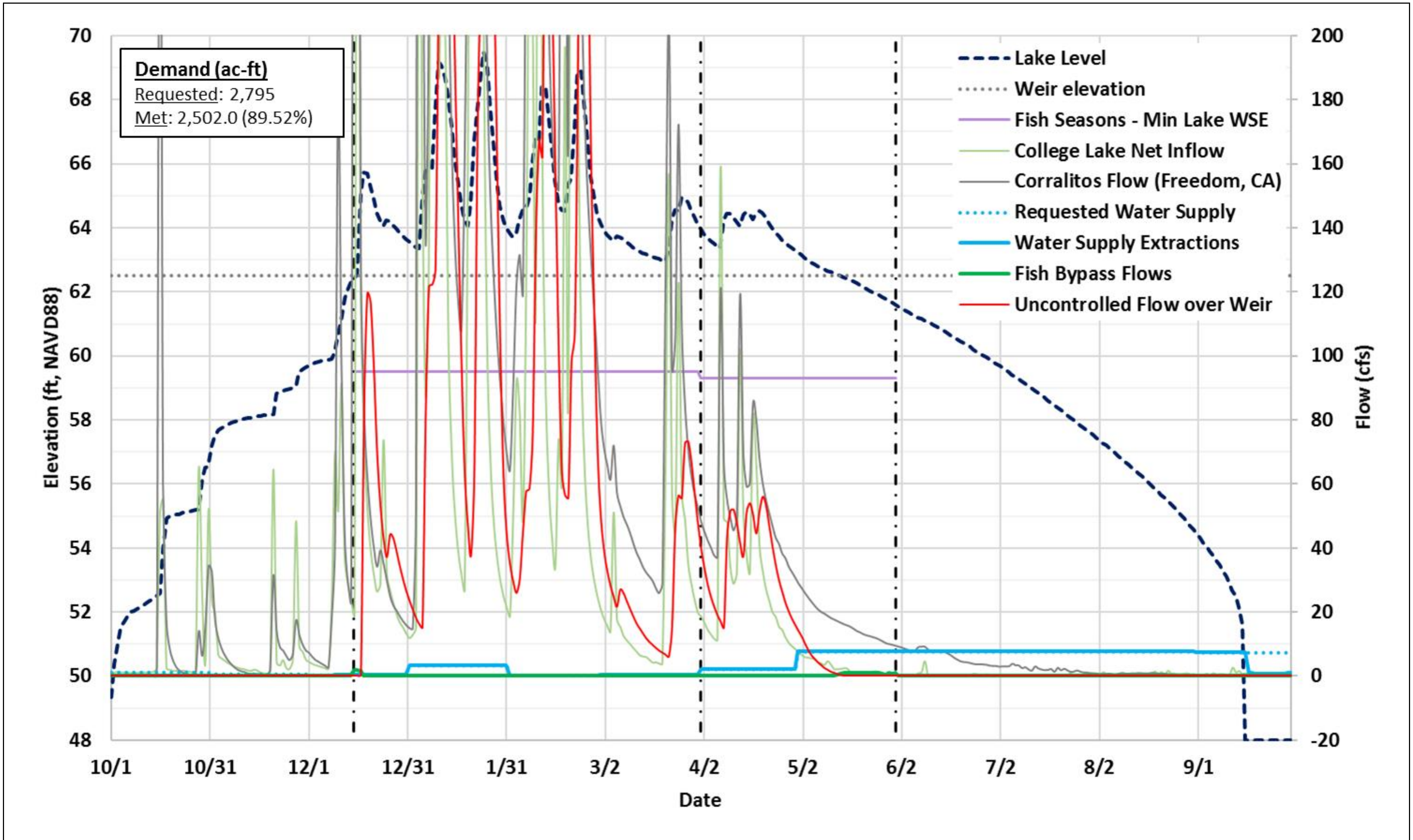
PV Water BMP Program Services - College Lake Project

WBM: WY 2016 - Variable weir (4)

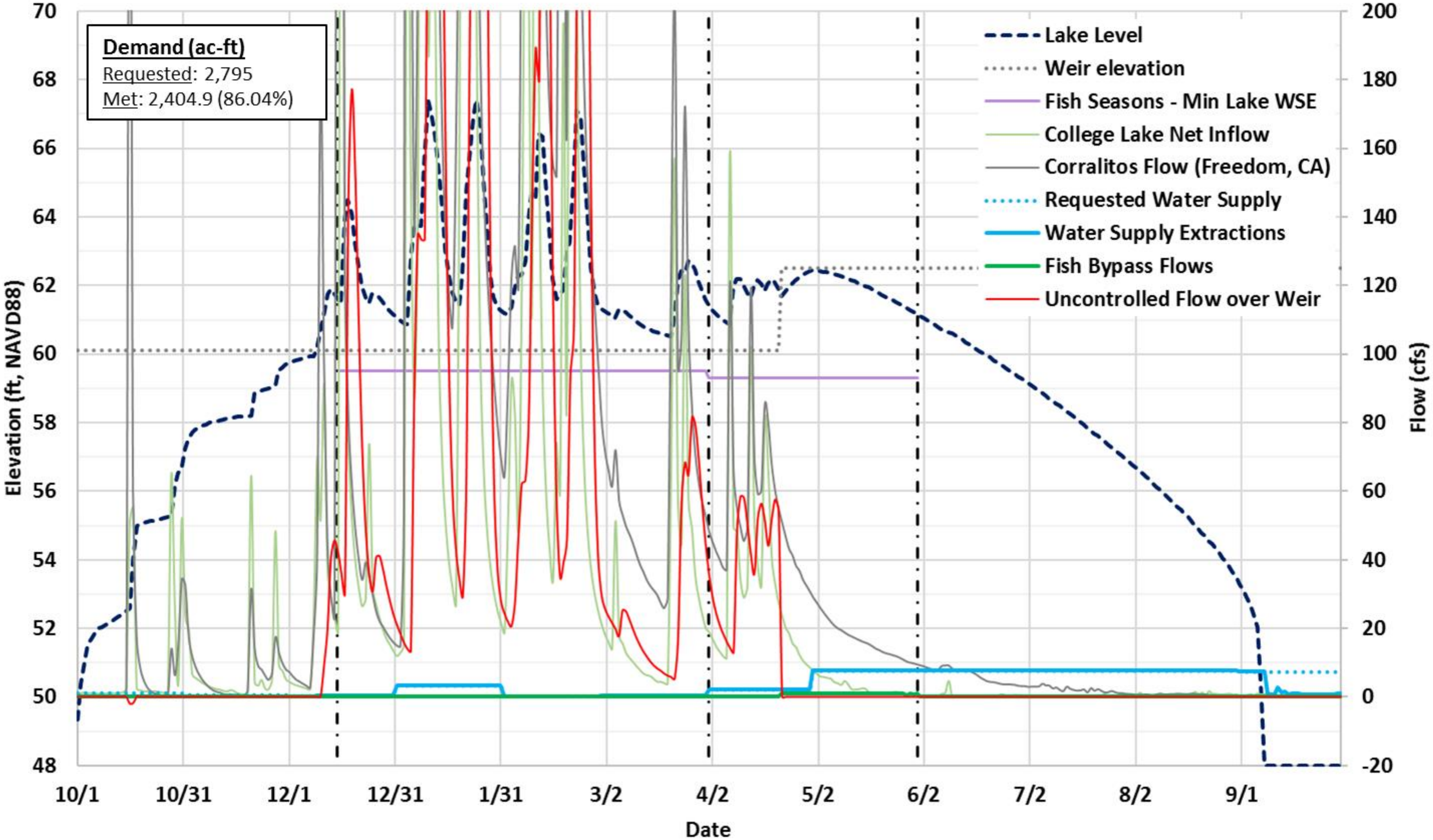
Project No. 17-1017	Created By: LST	**Figure 54**



Notes: Water year 2017 was extremely wet in terms of total annual precipitation. Vertical dashed-dotted black lines indicate fish bypass season dates.	cbec eco engineering	*PV Water BMP Program Services - College Lake Project* **WBM: WY 2017 - 60.1 ft weir**	
		Project No. 17-1017	Created By: LST	**Figure 55**



Notes: Vertical dashed-dotted black lines indicate fish bypass season dates.	cbec eco engineering	*PV Water BMP Program Services - College Lake Project* **WBM: WY 2017 - 62.5 ft weir**		
		Project No. 17-1017	Created By: LST	**Figure 56**



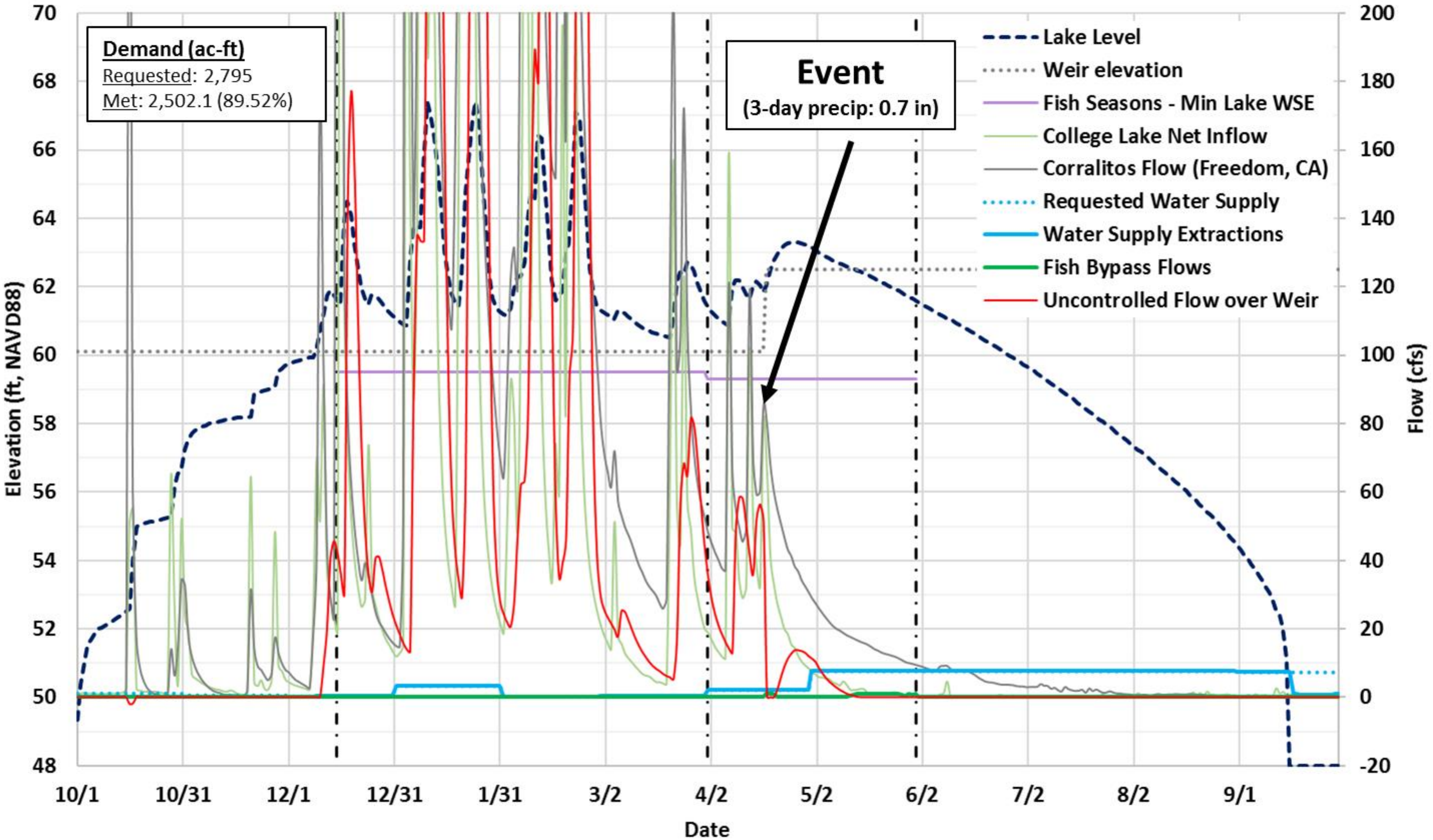
Notes: Weir raised as early as possible after last major storm event to ensure that lake did not surpass 62.5 ft. Vertical dashed-dotted black lines indicate fish bypass season dates.

cbec eco engineering

PV Water BMP Program Services - College Lake Project

WBM: WY 2017 - Variable weir (1)

Project No. 17-1017	Created By: LST	**Figure 57**



Notes: Weir raised immediately after indicated storm event. Vertical dashed-dotted black lines indicate fish bypass season dates.

PV Water BMP Program Services - College Lake Project

WBM: WY 2017 - Variable weir (2)

Project No. 17-1017	Created By: LST	**Figure 58**

HYD-2 Lagoon Quantified Conceptual Model Memorandum for Pajaro River Lagoon

memorandum

date April 12, 2019

to Brian Lockwood, General Manager, Pajaro Valley Water Management Agency

cc Jill Hamilton

from Dane Behrens, PhD, PE, Environmental Science Associates

subject Lagoon Quantified Conceptual Model Memorandum for Pajaro River Lagoon

1. Introduction

ESA has developed a hydrologic/geomorphic model of the Pajaro River Lagoon and its barrier beach to assess the potential effects of upstream water management projects on lagoon hydrologic conditions. This model was developed to support the broader CEQA assessment that is being conducted by ESA for the Pajaro Valley Water Management Agency (PV Water), as it develops projects to optimize groundwater management within the basin.

This document discusses the development and initial application of the ESA's lagoon quantified conceptual model (QCM) for the Pajaro River Lagoon. The QCM has been developed incrementally for several years (see Battalio et al. 2006; Rich and Keller, 2013, Behrens et al. 2015), and has been applied to support restoration activities in a number of coastal lagoons throughout the state of California. The model applies an interconnected water balance for the lagoon and sediment balance of the beach and lagoon mouth, which together allow users to understand how changes to hydrology, management choices, and climate change can influence lagoon conditions.

1.1 Project Descriptions

Four proposed projects that address local water supply and the overall groundwater balance within the basin are currently being considered. The intent of the model described in this memorandum is to act as a decision support tool to understand how each of the projects could influence conditions in the lagoon. The projects currently being considered are outlined below.

College Lake Integrated Resources Management Project

The proposed College Lake Integrated Resources Management Project (Project) is one of the three priority supplemental water supply projects outlined in the Pajaro Valley Water Management Agency's (PV Water) Basin Management Plan Update (BMP Update, adopted in 2014). The primary purposes of the Project are to help balance the groundwater basin and prevent further seawater intrusion through meeting water supply needs in PV Water's service area by developing College Lake as a water storage and supply source. College Lake is located in unincorporated Santa Cruz County approximately one-mile northeast of the Watsonville city limits and is north of Holohan Road and west of Highway 152.

The proposed components to be constructed and operated as part of the Project include the weir structure and intake pump station, water treatment plant (WTP), and the College Lake pipeline. The weir structure is being designed to accommodate fish passage and bypass flows. The adjustable weir would be capable of raising the College Lake water level by up to 2.4 feet to a water surface elevation (WSE) of 62.5 feet. This would increase the total storage capacity at 62.5 feet WSE to approximately 1,764 acre feet (AF). A screened intake would be constructed within the weir structure to divert water to the intake pump station. The screen is intended to comply with National Oceanic and Atmospheric Administration National Marine Fisheries Service and California Department of Fish and Wildlife screening criteria for anadromous salmonids. The intake pump station would deliver raw (untreated) water impounded behind the weir to the proposed WTP. The WTP would remove sediment, filter and disinfect the diverted surface water. Treated water would be pumped into the proposed 5.5-mile long College Lake pipeline, which would deliver irrigation water to local agricultural users via PV Water's Coastal Distribution System (CDS) located west of Highway 1.

Harkins Slough Recharge Facilities Upgrade

The existing facility diverts water from Harkins Slough to a filter plant and recharge basin for storage in a surficial groundwater aquifer, and subsequent recovery for agricultural irrigation use in the CDS. The upgrade includes installing new recovery wells at the existing recharge basin, upgrading the existing pump station and filter plant, and constructing new recharge basins. Annual average diversions are projected to be 1,470 AF and would occur November 1 to May 31.[1] Proposed improvements would be constructed in 2020 through 2023.

Watsonville Slough with Recharge Basins

This component of the BMP Update would divert water from the Watsonville Slough system from November 1 to May 31. The water would be stored in a surficial groundwater aquifer via infiltration through a recharge basin(s). The project includes a new diversion point in the slough system. A pump station at the diversion point would divert the water to a filtration facility via a pipeline. Recovery wells constructed around the proposed recharge basin(s) would extract water during the irrigation season. As planned, this project would require construction of a diversion structure, inlet pump station, intake pipeline, expansion of the existing filtration facility, booster pump station, recharge basin(s), and recovery wells. Annual average diversions are projected to be 1,690 AF and would

1 Carollo Engineers, *Pajaro Valley Water Management Agency BMP Program Management Services Harkins and Watsonville Slough Intakes and Diversion Structures Conceptual Design*, Draft, June 2017.

occur November 1 to May 31.[2] This project would be constructed in 2023 and 2024 with the last recharge basin constructed in 2026.

Murphy Crossing with Recharge Basins

This component of the BMP Update would divert water from the Pajaro River between November 1st and May 31st, when the Pajaro River water quality is within an acceptable range and stream flows are above the required minimum necessary to maintain steelhead habitat. Based on prior guidance provided by Prof. Jerry Smith in 1997, the Murphy Crossing project is expected to only operate when sufficient bypass flows are available in the Pajaro River for steelhead (minimum of 45 cfs from November 1st through March 31st, and 20 cfs from April 1st through May 31st). The project includes the construction of an infiltration gallery, pump station, monitoring wells, recharge basins, and a connector pipeline from pump station to recharge basins. An infiltration gallery located upstream of the Murphy Crossing bridge would capture water and transport it to four recharge basins. The recharge basins would be located just north of the intersection of State Route 129 and Murphy Road. Annual average diversions are projected to be 500 AF and would occur November 1 to May 31.[3] This project requires further design development, interagency agreements, acquisition of water rights, and resource agency permits and would not be constructed until 2025-2035.

1.2 Goals of this Document

The goals of this memorandum are to:

(1) Develop an initial inventory of data relevant for lagoon function, including nearshore coastal processes, freshwater inflows, lagoon sonde data, and beach/lagoon topography

(2) Develop and document a QCM of mouth morphology/lagoon hydrology for Pajaro River Lagoon (including both the Pajaro River and Watsonville Slough segments)

(3) Assess potential impacts of the proposed supplemental supply projects on mouth closure seasonality and water column conditions in the lagoon.

In addition to mouth closure, changes to lagoon water levels are also discussed, as they relate to the potential freshwater habitat available in the lagoon. Other aspects, such as water column salinity and temperature, are not discussed at this phase, although these can be assessed in the future as data are provided for model verification.

Section 2 discusses the model approach and aspects of the development. Section 3 outlines the data sources. Sections 4 and 5 provide preliminary results from the model hindcast of 2011-2017 and model simulations for project conditions for the water years of 2014 through 2017. These draft results can be refined further as more data become available and/or as the definition of projects within the watershed evolve.

---

2 Carollo Engineers, *Pajaro Valley Water Management Agency BMP Program Management Services Harkins and Watsonville Slough Intakes and Diversion Structures Conceptual Design*, Draft, June 2017.

3 Detailed hydraulic modeling has not been conducted for the Murphy Crossing project. For purposes of analysis, it is assumed that the volume of water diverted would be equal to the yield estimated for the project in the Basin Management Plan.

2. Lagoon Modeling Approach

2.1. Model Development

To provide an understanding of how the Pajaro River Lagoon would respond to future changes, ESA developed a quantified conceptual model (QCM) for the site, which predicts lagoon mouth morphology and the resulting water levels of the lagoon. A QCM is a simplified time-series model which implements a lagoon water balance alongside parametric model of the lagoon mouth and beach.

The current QCM approach is an adapted and refined version of earlier approaches for tidal conditions from Crissy Field Lagoon (Battalio et al. 2006) and for fluvial conditions for the Carmel River (Rich and Keller 2013), and builds on lessons learned from both approaches. In recent years, ESA has further developed the QCM as a more complete tool to assess systems with both tidal and fluvial characteristics (Behrens et al. 2015). It is typically used as a decision support tool to better understand impacts of lagoon management and climate change, and has been applied at a number of sites throughout California since 2012. It is currently being utilized as a decision support tool by the San Mateo County Resource Conservation District to test restoration approaches in Pescadero Lagoon (ESA 2017) and as a climate change planning tool by the Carmel Area Wastewater District in the Carmel River Lagoon. It has been used in a similar capacity at Los Peñasquitos Lagoon (ESA 2016) and Devereux Slough (ESA 2015), in southern California, and at a number of other sites in central and southern California.

The QCM approach is centered on a water budget for the lagoon, which is coupled with a sediment budget for the lagoon mouth. The model is based on two core concepts:

- All water flows entering and leaving the lagoon should balance.
- The net erosion/sedimentation of the inlet channel results from a balance of erosive (fluvial and tidal) and constructive/deconstructive coastal (wave) processes.

The model uses time series of nearshore waves and tides, watershed runoff, and evapotranspiration data as boundary conditions. Using these as forcing conditions with information about a lagoon's topography, the model dynamically simulates time series of lagoon water levels, along with inlet, beach, and lagoon state. With each time step, the net inflows or outflows to the system are estimated, along with the net sedimentation or erosion in the mouth. The flow terms vary depending on whether the mouth of the lagoon is open or closed. During closed conditions, inflows include watershed runoff and wave overwash into the lagoon, while outflows include beach berm seepage and evapotranspiration. These processes are represented in Figure 1. For more information on how the model resolves different processes, refer to Behrens et al. (2015).

During open-mouth conditions, flows between the lagoon and ocean are resolved differently depending on the ocean water level and inlet thalweg (low points in a channel). When the thalweg is deep enough that ocean and lagoon water levels can communicate directly, a solution to a simplified one-dimensional momentum equation is applied to resolve velocities (see Behrens et al. 2015). When ocean levels drop below the thalweg elevation (i.e. causing one-way drainage outflow from the lagoon to the ocean), outflows are resolved using the approach of Williams and Stacey (2016). Seepage flows through the beach are characterized using a Darcian approach (Rich and Keller 2013). Wave overwash is estimated by calculating wave runup on the beach face, and pairing this with the predicted beach crest height to get an overtopping rate based on the methodology of Laudier et al. (2011).

The model is trained by adjusting empirical coefficients that control the amount of sediment trapped in the mouth, beach berm growth, and frictional losses in the channel during outflow. Flow terms such as wave overwash and berm seepage are also adjusted to allow variations in lagoon water levels to match observations.

As the model steps forward in time, it continuously transitions the mouth through tidal, perched, and closed conditions. When deposition in the inlet bed exceeds erosion, the bed rises vertically, eventually perching above most tidal elevations and closing. Mouth closure occurs in the model when sediment fills the bed higher than lagoon water levels. Breaching occurs in the model when the lagoon fills from accumulation of either watershed runoff or wave overwash, and water levels overtop the beach berm crest, eroding a new lagoon mouth.

Model accuracy is tested by comparing modeled lagoon water level time series against observed water levels, and by comparing the timing and length of predicted inlet closure events to those of historical records. Closure time series and lagoon water level time series usually provide a good indication of which processes are dominating the system at a given time, such as runoff during floods, or powerful waves prior to closure. Thus, reproducing these time series is taken to mean that the dominant processes are meaningfully represented. As discussed below, the model also incorporates records of manual breaching of the lagoon mouth, to account for the effect of these events on lagoon water levels and closure seasonality. Model accuracy is discussed in Section 4.2.

2.2. Treatment of Mouth Breach Events

The Pajaro River Lagoon experiences seasonal mouth closure events in most years, beginning near the end of the wet season, when wave-driven sedimentation in the lagoon mouth overpowers the erosive capacity of tidal and fluvial currents. Based on data compiled by Balance Hydrologics (Balance), the dry season typically ends between April and June (See Table 4-1 in Balance (2014)). These events can last from several days to several months, and end with a ‘breach’ event when a new mouth erodes in the beach. Both natural and artificial breach events happen in the lagoon. Natural breaches occur when ponded water in the lagoon rises to the elevation of the lowest point in the beach crest, causing spilling to the ocean and erosion of a new mouth. As with other lagoons in California, artificial breaching at the Pajaro River Lagoon is achieved by digging a trench in the beach with heavy equipment, artificially creating a low point in the beach for flows to begin spilling over.

Normally, the Santa Cruz County Department of Public Works breaches the mouth with heavy equipment when the mouth has been closed for an extended period of time and runoff is anticipated to fill the lagoon to levels that would create a public safety risk, and potentially flood adjacent farmland and the Pajaro Dunes community. Under conditions with expected runoff, the mouth is thought to be more likely to remain open after the breach, and conditions in the lagoon are thought to be less likely to become saline (pers. comm. G.Kittleson). Breaching tends to occur during or immediately prior to the first major rainfall event after the dry season, which often occurs between December and February. In most cases, breaching takes place at elevations of 8 to 9 feet NAVD88. To account for manual breaching in the model, we applied a list of recent breach events compiled by cbec inc, eco engineers (cbec). On the date of a known artificial breach, we manually lowered the elevation of the beach, to simulate the digging of a trench with heavy equipment, and allowed the model to erode the new lagoon mouth dynamically based on the hydraulic conditions that result from the newly connected lagoon (high water elevation) and ocean (lower water elevation).

2.3. Boundary Conditions

Boundary conditions used in the model are illustrated in Figure 2, and include:

- Combined fluvial inflows from the Pajaro River (below the confluence with Salsipuedes Creek) and Watsonville Slough
- Ocean tides
- Nearshore wave conditions, and
- Evapotranspiration

The Pajaro River and Watsonville Slough are treated as separate basins (i.e. interconnected water balances). For the purposes of this study, the 'lagoon' is assumed to include both water bodies, since both experience tides during open-mouth lagoon conditions and water levels inundate both areas when the beach blocks the mouth.

2.4. Key Assumptions and Considerations

For this assessment, the main assumptions and considerations include the following:

- For simplicity when comparing existing and project conditions, we assume that breaching occurs whenever water levels in the lagoon reach 8 feet NAVD88. We assume this is more appropriate than assuming that recorded artificial breach events would have happened on the same dates for both existing and project conditions. This is because breach timing is highly dependent on anticipated flood levels, which could change slightly if inflows to the lagoon are altered.
- Surveys used to generate the hypsometric curve are assumed to be generally representative of 2011-2017 conditions, although sedimentation, flushing during floods, and migration of the lagoon mouth will cause change in the lagoon hypsometry that are not reflected here.
- The slope of the water surface in the lagoon is assumed to be small under most flow conditions (i.e. that the surface can be assumed flat for the purpose of volume calculations). This assumption is not valid during high fluvial flows, and modeled water levels are expected to be representative of the gauge locations (i.e. not farther upstream).
- Vertical gains and losses from interaction between surface flows and the local aquifer are assumed to be small below San Andreas Road on Watsonville Slough and below the confluence with Salsipuedes Creek on the Pajaro River (pers. comm. W. Henson, USGS).
- Additional surface flow inputs include tide drain flows from farms adjacent to the lagoon, and from semi-routed surface water runoff (Hanson et al. 2014). Using the Pajaro Valley Hydrologic Model (PVHM), the USGS estimate tile drain flows to amount to 4,906 Acre-feet per year, and semi-routed surface water runoff at 3,329 acre-feet per year. Based on the seasonality of these terms provided by USGS (pers. comm. W. Henson), these combined returns would amount to about 1-4 cu. ft. per second (cfs), depending on the wetness of the year. Since model results are not available after 2010, we have applied a representative value of 2 cfs here, for simplicity.

- The water volume upstream of the Shell Road hydraulic control structure on Watsonville Slough was included in the hypsometric relationship for the lagoon. This straight segment of the slough above Shell Road receives freshwater runoff estimated by Balance (2014) at San Andreas Road.

- Since water levels were only collected on Watsonville Slough, they are presumed to be representative of lagoon conditions only during mid- to high-tides in the lagoon and during typical closed-lagoon conditions (when water ponds behind the beach and inundates both the slough and river). However, these data do not show low water levels that may occur in the lagoon at low tide. This is because the bed of Watsonville Slough is higher than the bed of the Pajaro River, and thus the gauges located in the slough show a truncated version of low tides during open-mouth lagoon conditions.

3. Data Sources

Data sources for the model are outlined in Table 1, and illustrated in Figure 2. Some aspects of the data collection and inventory are described below.

Table 1. Data availability for Pajaro River Lagoon

Parameter	Source/Location	Availability
Coastal Influences		
Offshore Waves	• NDBC Monterey Buoy (#46042)	Directional:1987- present Full spectral:1996- present
Nearshore Wave Estimates	• CDIP • ESA PWA (2014)	2000-present
Ocean Tide Stage	• NOAA Monterey Gauge (#9413450)	1986-present
Beach and Lagoon Mouth		
Inlet Condition (Open/Closed)	• Record of breach events compiled by cbec • Mouth closure periods also inferred from 2012-2017 from lagoon water level time series	1988-present
Beach/Lagoon topography	• Coastal LiDAR from NOAA and USGS: (2010, 2016) • ESA (2018): topographic survey cross sections of Watsonville Slough • Schaaf & Wheeler (2001): Pajaro River thalweg profile	2001, 2010, 2016, 2018
Lagoon Hydrology		
Runoff	• USGS Pajaro R Gauge at Chittenden (#11159000) • Hanson et al. (2014): estimates of agricultural return flows • Balance Hydrologics: Watsonville Slough flows (2003-2012) • cbec (2018): existing and project inflows at confluence of Salsipuedes Creek and Pajaro River (2014-2017 WYs)	1951-present
Evapotranspiration	• CIMIS #209 (Watsonville West II)	2007-present
Lagoon Water Level	• Moss Landing Marine Labs: (2011-2012) • Balance Hydrologics: (2011-2013) • PV Water (2018): 2012-2016 • Balance Hydrologics: 2016-2017	2011-2017
Water Quality		
Conductivity	• Balance Hydrologics (2014)	2011-present

3.1. Lagoon Hydrology

Resolving each of the surface water inflows into the lagoon required applying assumptions based on the data collection and reporting by PV Water, the USGS, Balance Hydrologics, and cbec. To resolve surface flows on Watsonville Slough, the annual outflow at the San Andreas Road crossing measured by Balance (2014) was compared against annual flows measured at the USGS Chittenden Gauge on the Pajaro River. For the years 2003-2012, this suggests that Watsonville Slough flows are on the order of 3-4 percent of Pajaro Flows at Chittenden, although the ratio varied from year to year. This amount is greater than would be estimated from a basin size comparison alone between the two locations. Given the complex hydrogeology and surface and groundwater management practices in each basin, it is expected that this estimation has a high uncertainty. However, since inflows to the lagoon are dominated by the Pajaro River, the effect of the uncertainty in Watsonville Slough flows on the overall uncertainty in the water balance is assumed small.

Inflows for existing and project conditions on the Pajaro River were made available by cbec (2018) for the water years 2014 through 2017. Inflows during prior years were estimated by scaling flows from the USGS Chittenden gauge based on the added watershed area of Salsipuedes Creek. Since these estimates for prior years do not account for management of College Lake, it is assumed that their accuracy is lower, and they are included here to allow qualitative comparison of lagoon conditions during those years.

3.2. Beach and Lagoon Topography

Hypsometric (i.e. relating water surface elevation to stored water volume) curves for Watsonville Slough and the Pajaro River were developed using a combination of coastal LiDAR, a 2018 ESA survey of Watsonville Slough, and a Pajaro River thalweg profile available from Schaaf and Wheeler (2001). Recent bathymetric information for Pajaro River was not available, and the hypsometry of this segment of the model could be improved in the future if a new survey is conducted. The extent of the Pajaro River included in the hypsometric curve was chosen based on the extent upstream that the thalweg surpasses 10 feet NAVD, which is near the City of Watsonville.

Beach conditions (width, length, beach face slope) were characterized using coastal LiDAR collected in 2010 (NOAA 2012), and 2016 (USGS 2016).

4. Hindcast of 2011 to 2017 Conditions

4.1. Observed Lagoon Conditions

The QCM was used to hindcast conditions from January, 2011 to December, 2017. Since estimated inflows to the lagoon for water years 2012 and 2013 were not provided by cbec, modeled lagoon conditions are included for those years only for qualitative comparison. The main purpose of the hindcast is to hone the model for water years 2014-2017 and understand the level of uncertainty in model predictions during those years.

As discussed by cbec (2018) and others, water years 2014-2017 include a wide range of inflow conditions, spanning a critically dry year (2014) and excessively wet year (2017). As shown in Figure 3, this led to markedly different conditions in the lagoon mouth condition and water levels.

In the relatively dry water years of 2014 and 2015, the mouth was primarily closed, and inflows ponded behind the closed beach. During the few winter storm events, the mouth remained open for several months, before closing due to wave action in early spring. In both years, low base flows were eventually overmatched by beach seepage and evaporative losses in the model, visible as seasonal low points in water levels in early fall. In the wetter water years of 2016 and 2017, higher winter flows scoured a deeper mouth, allowing the lagoon to remain open to tides for substantially longer periods of time. Powerful waves during the El Niño winter of 2015-2016 partially blocked outflows from the lagoon, leading to high water levels in the open lagoon. Although waves in the fall of 2016 were powerful enough to close the mouth, high base flows at the time caused the lagoon to fill rapidly and breach (erode a new mouth after overtopping the beach).

The results suggest that without artificial breaching, lagoon water levels could be higher during seasonal mouth-closure events that those that have been observed recently. After mouth closure, waves continue to cause the beach to grow through the dry season. The available coastal LiDAR suggests that areas of the beach that are distant from the location of the mouth can grow to 10-14 feet NAVD88. Recurrent breaching of the mouth creates an artificial low point in the beach that is slowly rebuilt every year, but this area does not grow to the height of northern portions of the beach that are less frequently disturbed. Because of this, the mouth is sometimes able to breach naturally at low elevations (less than 8 feet NAVD88), whereas under natural conditions the elevation threshold for natural breaching might be much higher.

4.2. Model Comparison

Overall, the model compares well against the available data (Figure 4), although further refinement is expected as more data are collected. During relatively wet conditions, the model reproduces the observed deep scouring of the mouth and periods of strong tidal communication between the lagoon and the ocean. The model also approximates the progressive shallowing of the mouth (cutting off low tides in the lagoon) prior to seasonal closure events, capturing the transitional weeks of muted tides that lead up to closure events in most years.

Overall, the timing of closure events were typically approximated to within about 1 week of the observed dates. While artificial mouth breaching events were incorporated in the model, a number of natural breach events were also correctly predicted, when water levels in the lagoon filled to the level of the beach before waves could build it to typical elevations associated with flooding. Short-lived (less than one week duration) closure events that occurred in winter or spring prior to final seasonal closure were sometimes not captured by the model, or were predicted in error, which is expected given the simplicity of the model and complexity of lagoon mouth morphology on the open coast.

Water levels in the lagoon during mouth closure events were typically captured to within one foot of observations. However, since many mouth-breach events tended to occur during coincident high-runoff and high-wave conditions, the complex hydraulics sometimes led to higher errors. These events happened during the first major rainfall-runoff event of the year, typically in the months of January-February, when wave conditions are also seasonally powerful. The interaction between powerful waves and high runoff in the mouth lead to complex hydraulics that are difficult to predict with a simple approach.

The left panel of Figure 5 compares the modeled number of days of mouth closure for water years 2014-2017 against observations. Monthly predictions over this period were generally close, although the model under-predicted the number of closure days in April and May. During the four-year modeling timespan, the mouth was observed closed for about 7 days on average in April and about 14 days on average in May, compared with model predictions of 4 and 9 days, respectively. For all other months, predictions were within 1-2 days of the observations.

The right panel of Figure 5 compares the observed and modeled water level exceedance in Watsonville Slough for water years 2014-2017. Water levels in the slough and in the Pajaro River tend to be much higher than the exceedance curve for ocean tides as a result of mouth closure and ponding behind the closed beach. Overall, the model and observed exceedance curves tended to be within 0.1-0.2 feet of each other for most elevations, although errors were slightly higher (~ 0.5 feet) for lagoon stages of about 7 feet NAVD.

We expect that the model could be refined further in the future if needed, as more data are collected. Given the complexity of coastal lagoon hydrology, the model is intended to provide a meaningful statistical representation of seasonal water levels and closure conditions, while exact daily or hourly conditions are much harder to capture.

5. Results for Project Conditions

5.1. College Lake Project

As discussed by cbec (2018), the College Lake Project would result in a change in management of flows entering and leaving College Lake as the result of constructing an adjustable weir at its outlet point. This would in turn affect inflows to the Pajaro River near the upstream extent of its lagoon.

Inflow time series for existing and project conditions were provided to ESA on October 31st, 2018. After the QCM was refined and used to hindcast conditions for the water years 2014 through 2017 (see Section 4 above), we applied the model over the same time period with the altered inflows to the lagoon. Figure 6 illustrates the predicted water levels in the lagoon for both conditions.

Predicted changes to lagoon conditions varied from year to year. The following list details some of the major observations:

- The effects of the project depend heavily on the relative annual wetness of conditions. Differences in closure timing and water levels were negligible in the 2016 and 2017 water years (wet years). Differences were noticeable in both conditions in the 2014 and 2015 water years (dry years).

- Seasonal water levels in the lagoon tended to be lower with the project during seasonal closure events in the 2014 and 2015 water years (dry years), but were nearly identical during closure events in 2016 and 2017 (wet years).

- In the spring of 2015, reduced flows to the lagoon during the last rainstorm of the year (impounded behind the College Lake weir) allowed waves to close the lagoon earlier by about 5-6 weeks.

- In 2014, seasonal closure occurred at roughly the same time for existing and project conditions, which is likely due to the fact that wave conditions were conducive to mouth closure at that time, regardless of inflows.

- Water level predictions are sensitive to the assumed amount of agricultural return flows entering the lagoon (based on Hanson et al. 2014), which prevented inflows to the lagoon from dropping to zero in summer.

- The project did not result in delays in the seasonal breach events, since inflows during the first major rainfall event of each year was sufficient to fill and breach the lagoon regardless of prior College Lake releases.

Figure 7 (left panel) provides a summary of monthly closure conditions for the modeling period. The increase in expected closure days in April and May is a result of the earlier closure in the spring of 2015. Given the small sample size, it is unclear how relevant this result is. While the predicted change is within the expected uncertainty of model predictions for number of closure days per month, it may be possible that during especially dry years, lower inflows could allow waves to close the mouth sooner in the year. With a greater range of years, the threshold for dryness that would influence this shift would become more clear. It is possible that most years would not experience this shift.

Figure 7 (right panel) compares the water level exceedance for the 2014-2017 water years with and without the project. Lower water levels are a result of reducing inflows to the lagoon in spring, which made it easier for seepage through the berm and evapotranspiration to remove water from the lagoon. These results also have an expected degree of uncertainty given the small sample size of years, and the assumption that groundwater contributions to surface flows are small. It is possible that a reduction in surface water levels would increase groundwater flows to the lagoon (due to a higher head gradient between the local groundwater table and surface water in the lagoon at the channel edges).

The results suggest that the timing of breach events would not have been impacted significantly within the modeling time period. Although some of the late dry-season flow releases that occurred under existing conditions in 2014 and 2015 raised water levels in the lagoon, full breaching of the lagoon mouth did not occur until later, when the first major rainfall event of each of those years occurred. Although the project scenario left lower water levels in the lagoon at the time that these storms arrived, the ensuing runoff was more than sufficient to raise water levels to the height of the beach (and thus induce breaching).

5.2. Cumulative Effects from Additional Projects

Figures 8 and 9 show the results of the four cumulative projects on Pajaro River Lagoon water levels and mouth closure frequency. Given the flow bypass requirements of the Murphy Crossing project, and the low amount of flow arriving to the Pajaro River Lagoon from Watsonville and Harkins Sloughs, the cumulative projects are expected to have a relatively minor impact on lagoon conditions. Figure 8 indicates that water levels were almost identical to the College Lake Project conditions. Figure 9 indicates a minor increase in the amount of time that the lagoon was predicted to experience mouth closure.

6. List of Preparers

Dane Behrens, PhD, P.E.
Bob Battalio, P.E.
James Jackson, P.E.
Karen Lancelle

References

Balance Hydrologics, 2014. Watsonville Sloughs Hydrology Study. Prepared for RCD Santa Cruz County. February 14, 2014.

Battalio, R.T., D. Danmeier, and P. Williams, 2006. Predicting closure and breaching frequencies of small tidal inlets –a quantified conceptual model, Proc. 30th Int. Conf. Coastal Eng., ASCE 2007, 4, 3937-3949.

Behrens, D., M. Brennan, and R. Battalio, 2015. A quantified conceptual model of inlet morphology and associated lagoon hydrology, Shore & Beach 83, 3, 33-42.

ESA, 2015. North Campus Open Space, Devereux Slough: Lagoon QCM Technical Appendix. Prepared for U.C. Santa Barbara

ESA, 2016. Task Order No. 35 – Los Peñasquitos Lagoon Restoration Strategy, Task 3.1 – Lagoon Inlet Dynamic Modeling and Assessment of Inlet Maintenance. Prepared for the City of San Diego. June 20, 2016.

ESA, 2017. Draft Lagoon Quantified Conceptual Model Memorandum for Pescadero Creek Lagoon. Prepared for San Mateo County Resource Conservation District. Apr 10, 2017.

Hanson, R.T., Schmid, W., Faunt, C.C., Lear, J., and B. Lockwood. 2014. Integrated hydrologic model of Pajaro Valley, Santa Cruz and Monterey Counties, California: U.S. Geological Survey Scientific Investigations Report 2014-5111, 166 p. http://dx.doi.org/10.3133/sir20145111.

Laudier, N., E.B. Thornton, and J. MacMahan, 2011. Measured and modeled wave overtopping on a natural beach. *Coastal Engineering*, 58(9), 815-825.

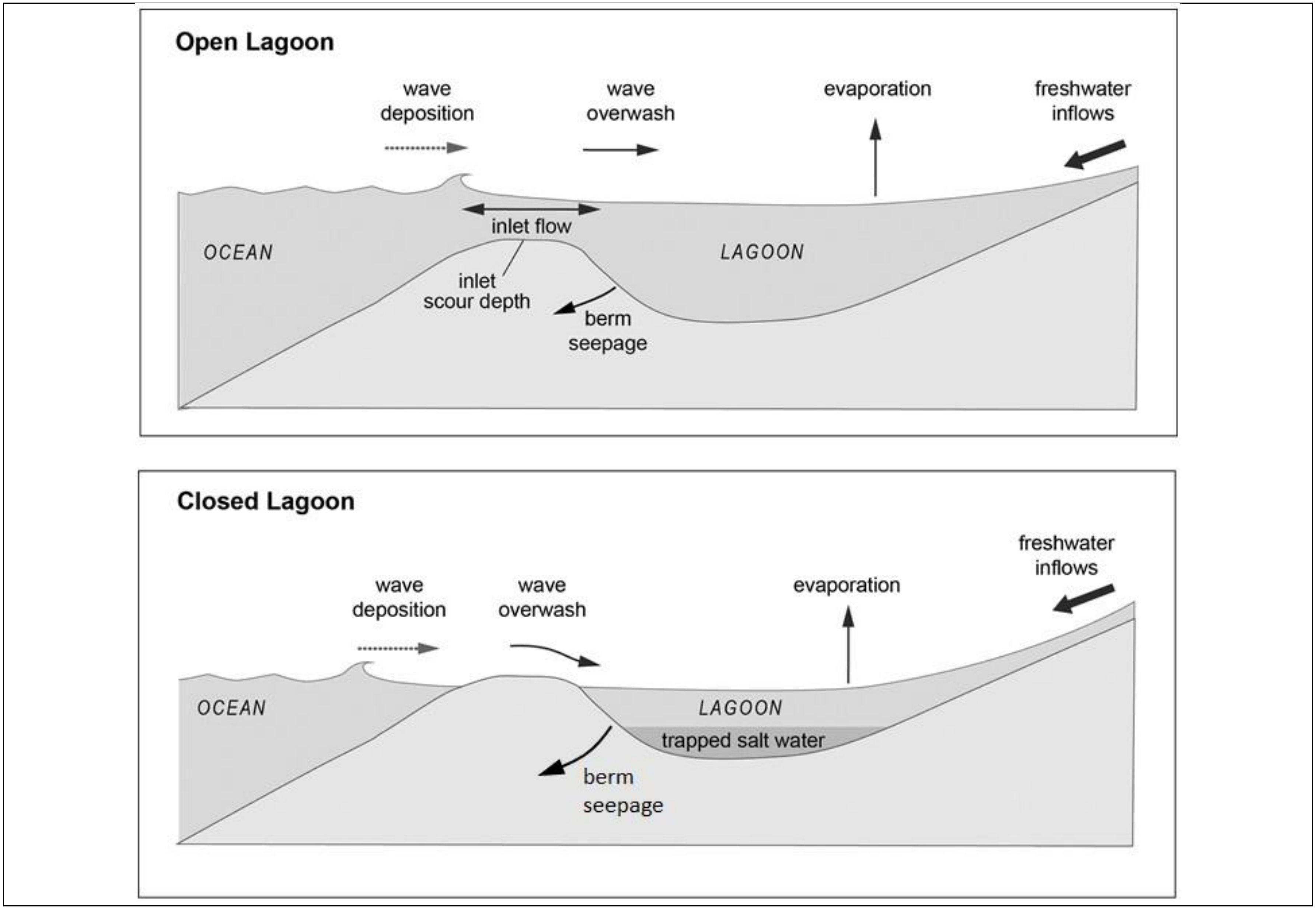
National Oceanic and Atmospheric Administration (0). 2012. 2009-2011 CA Coastal Conservancy Coastal LiDAR Project: Hydro-flattened bare earth DEM. NOAA Coastal Services Center. Charleston, South Carolina. Available online: http://www.csc.noaa.gov/dataviewer/#

Rich, A., and E.A. Keller, 2013. A hydrologic and geomorphic model of estuary breaching and closure. Geomorphology 19: 64-74.

Schaaf and Wheeler, 2001. Pajaro River Watershed Study: Technical Memorandum No. 1.2.5 – River Geometry. Prepared for PRWFPA Staff Working Group. November 13, 2001.

Williams, M. E., and M. T. Stacey. 2016. Tidally discontinuous ocean forcing in bar-built estuaries: The interaction of tides, infragravity motions, and frictional control. Journal of Geophysical Research: Oceans 121 (1): 571-585. 10.1002/2015JC011166

U.S. Geological Survey (USGS). 2016. USGS West Coast El Nino Lidar (WA, OR, CA). https://coast.noaa.gov/htdata/lidar2_z/geoid12b/data/6259/west_coast2016_usgs_el_nino_m6259_metadata.html



SOURCE: Behrens et al. (2015)

Figure 1
Schematic of coastal lagoon hydrology during open- and closed-mouth conditions.

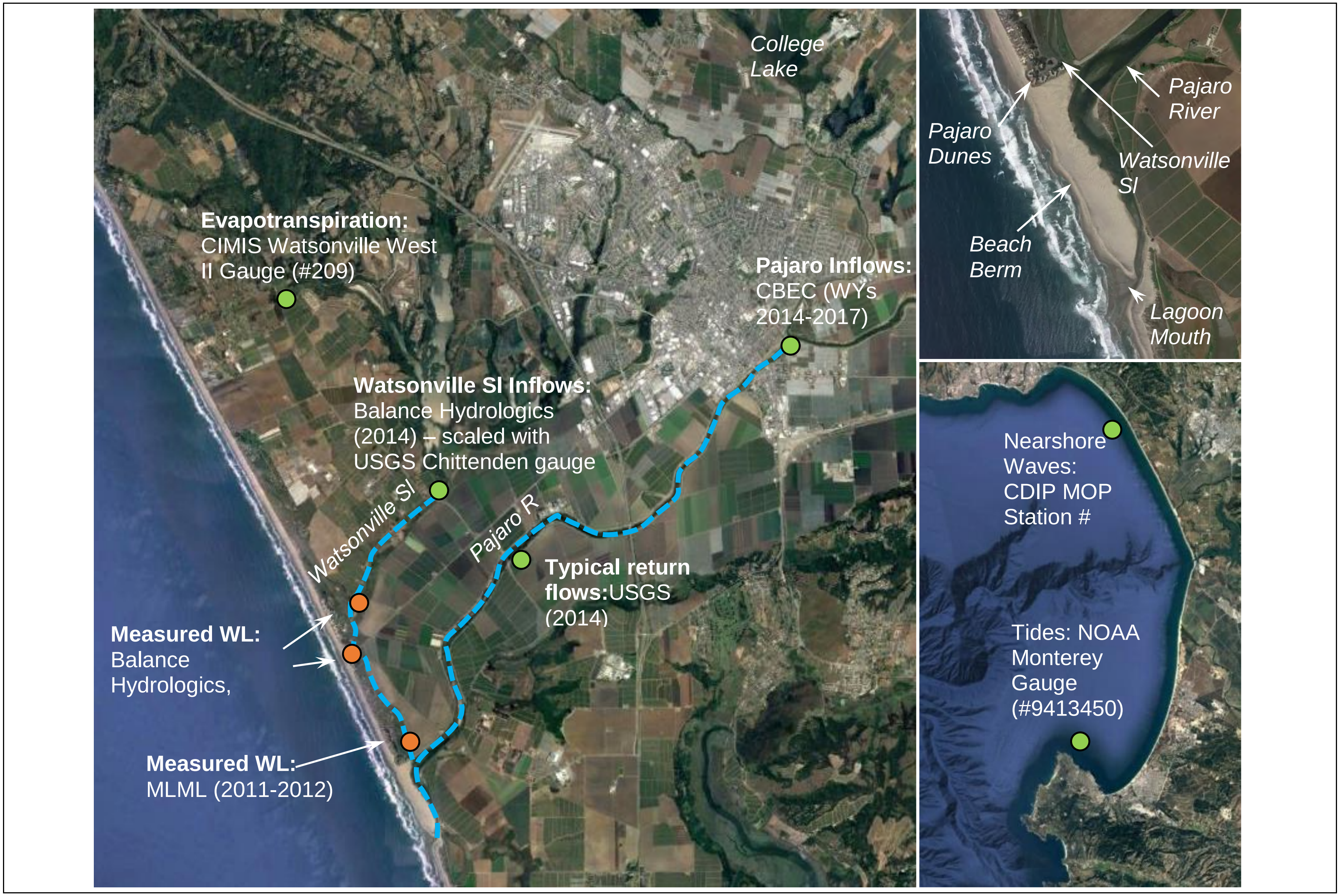
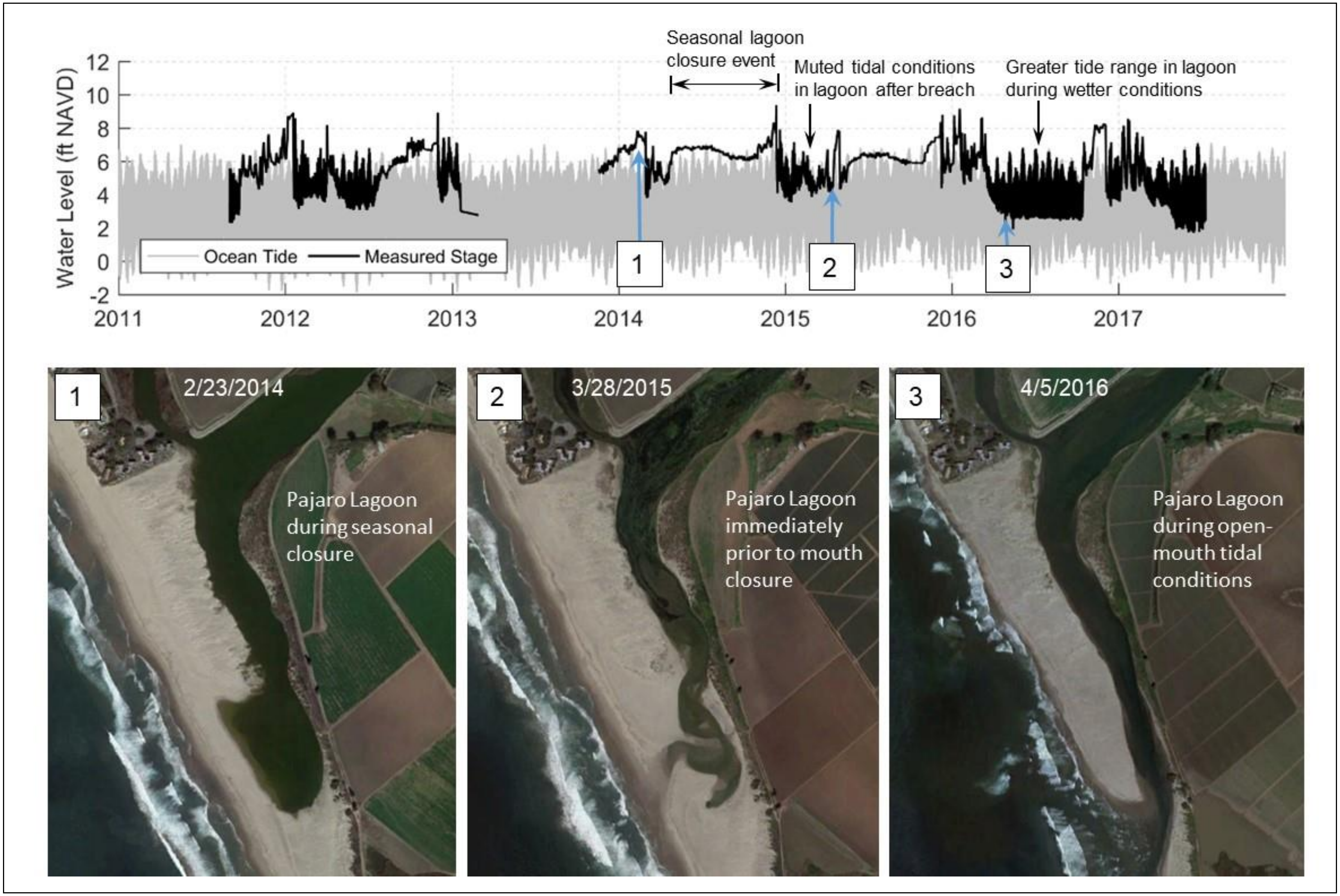


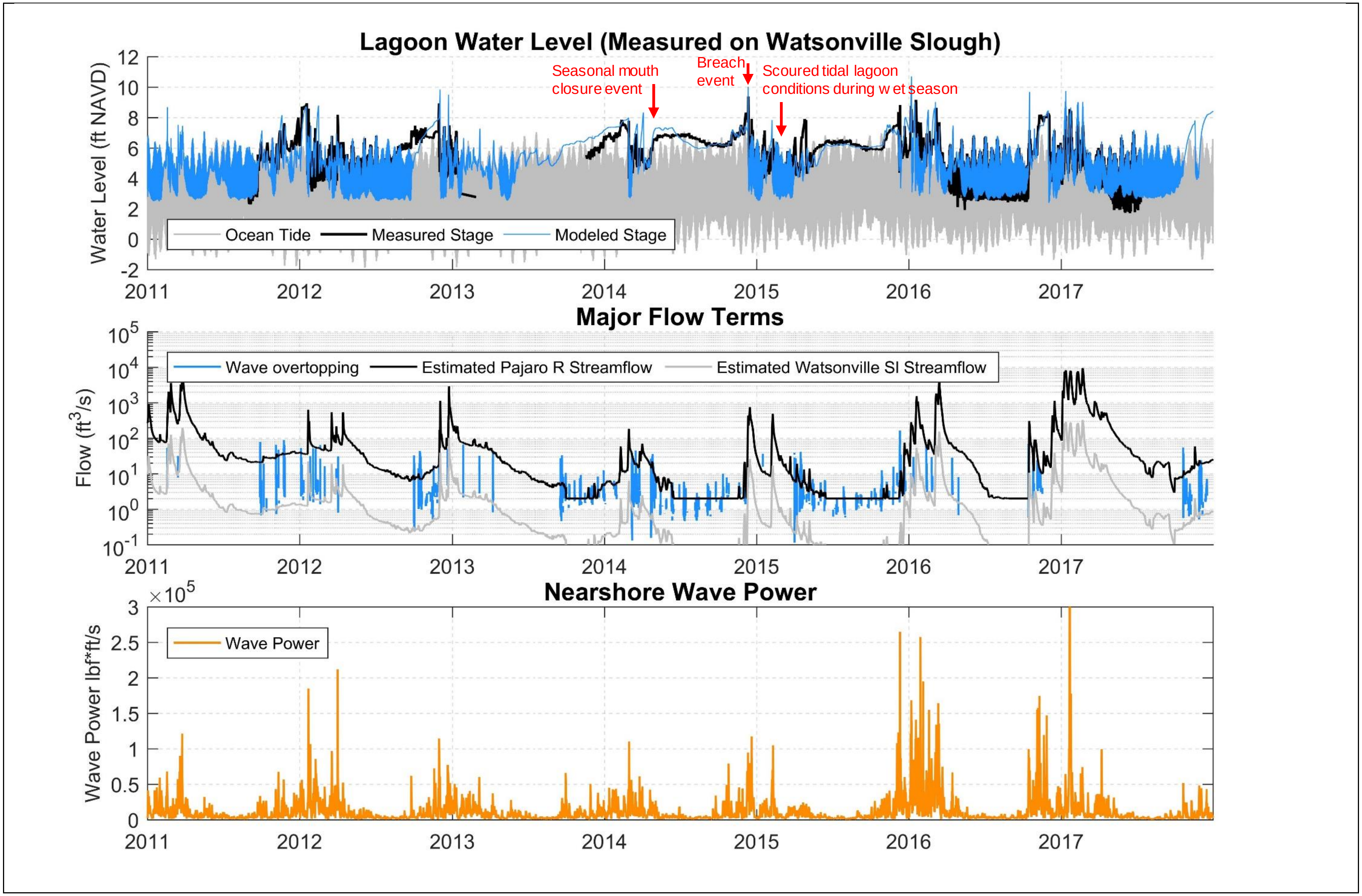
Figure 2

Sources of data used for the Pajaro lagoon model.



SOURCE: Water levels provided by Moss Landing Marine Labs, Balance Hydrologics, and PVWMA

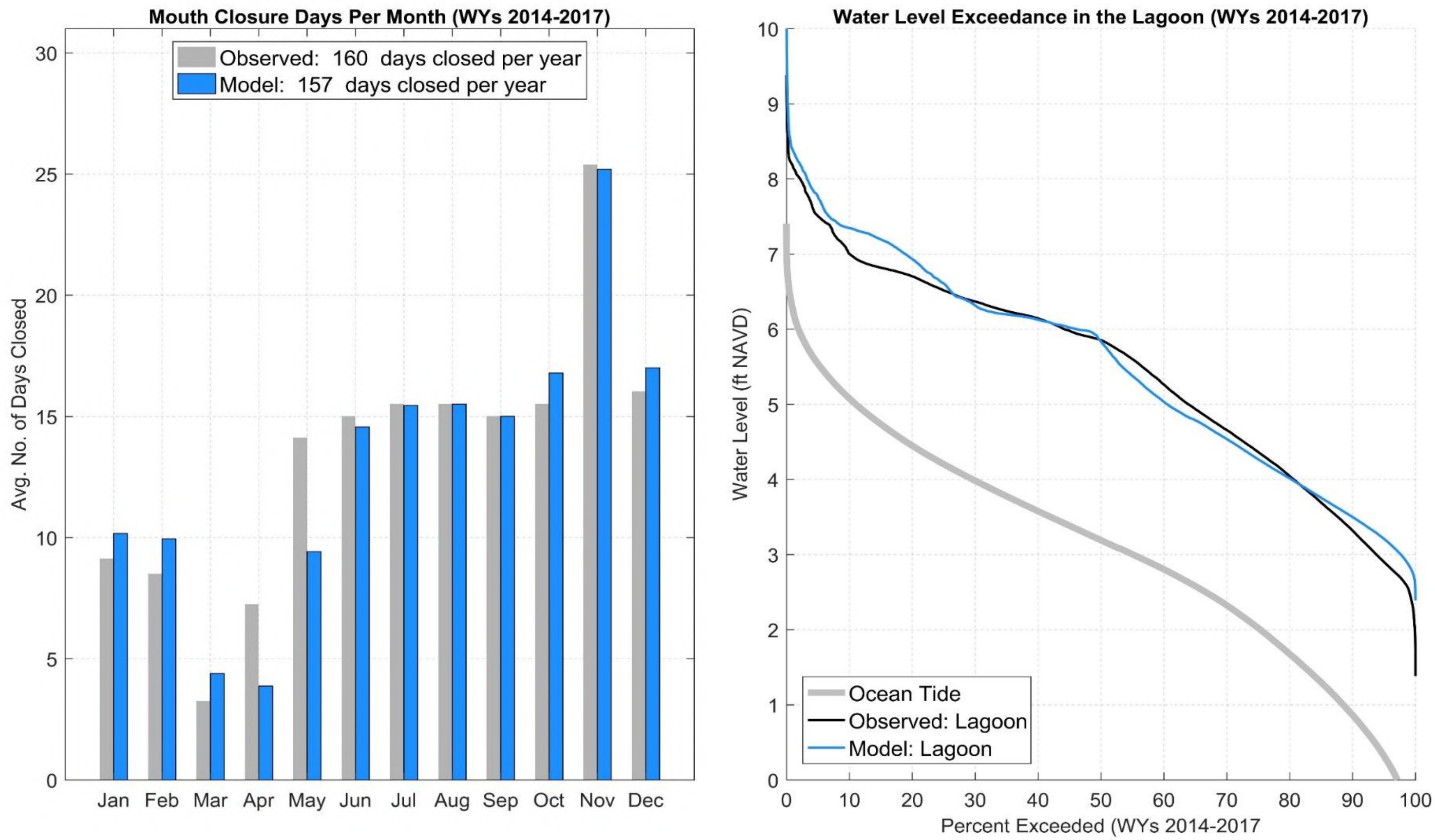
Figure 3
Lagoon conditions observed from 2011 to 2017.



SOURCE: See Table 1 for sources

PVWMA BMP Program Management. D160822.00

Figure 4
Model hindcast of 2011-2017 lagoon water levels (top), compared against dominant flow terms (mid) and nearshore wave power (bottom).

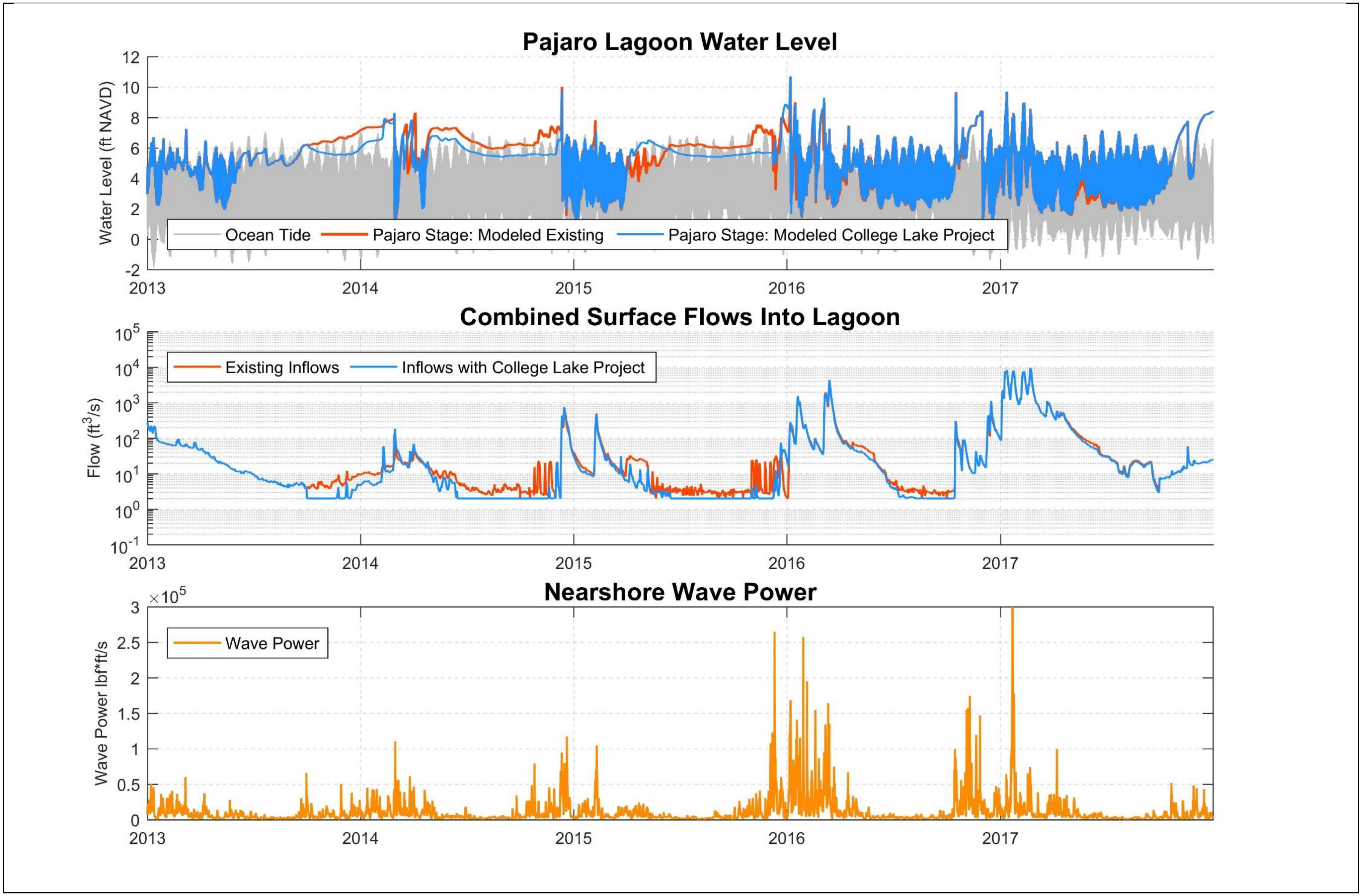


SOURCE: Water level and mouth closure sources listed in Table 1

NOTE: lagoon water levels are based on measurements in Watsonville Slough, and are not representative of low tide levels that may occur in the Pajaro River.

Figure 5

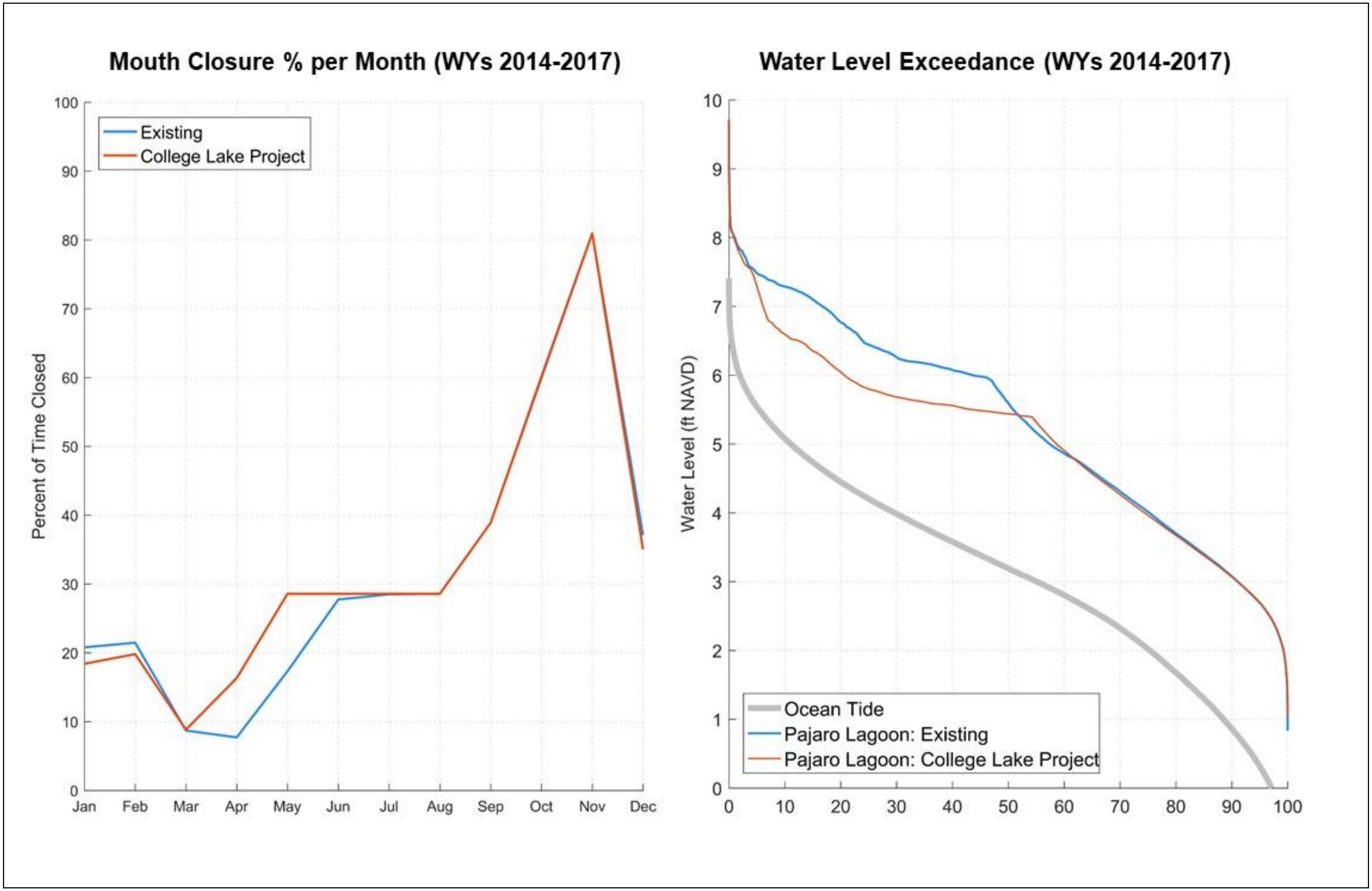
Comparison of modeled and predicted mouth closure days per month (left panel) and water level exceedance (right panel) for water years 2014-2017.



SOURCE: surface flows at Pajaro and Salsipuedes confluence provided by CBEC (2018) and supplemented with estimates of Watsonville Slough flows based on Balance (2014) and ag return flows based on Hanson et al. (2014). Wave conditions obtained from CDIP (see Table 1)

Figure 6

Comparison of modeled water levels in the lagoon for existing and College Lake Project conditions (top), compared against inflows (mid), and nearshore wave power (bottom).

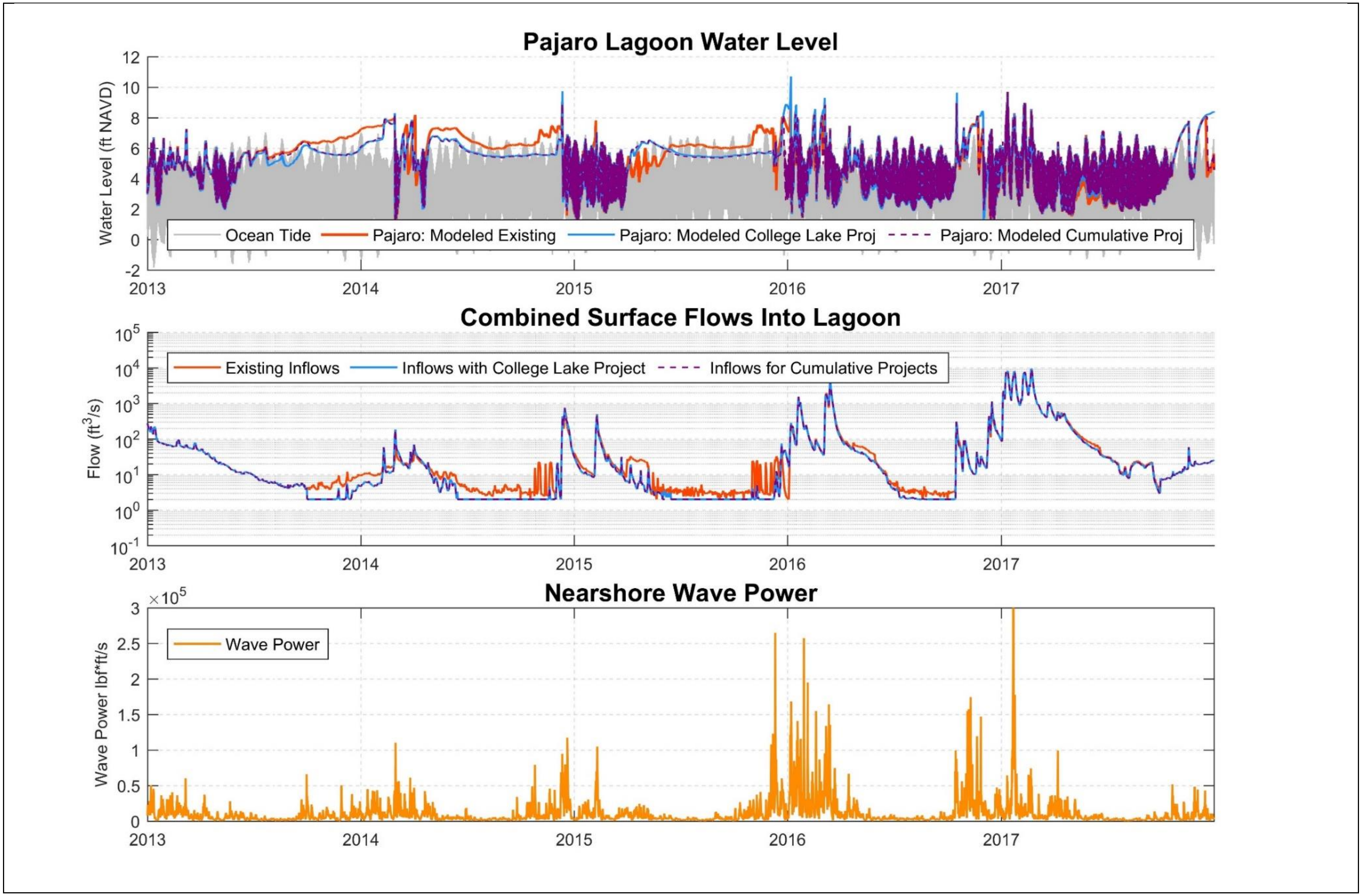


SOURCE: flows provided by CBEC (2018).

NOTE: Artificial breaching was assumed whenever lagoon water levels reached 8 feet NAVD88.

Figure 7

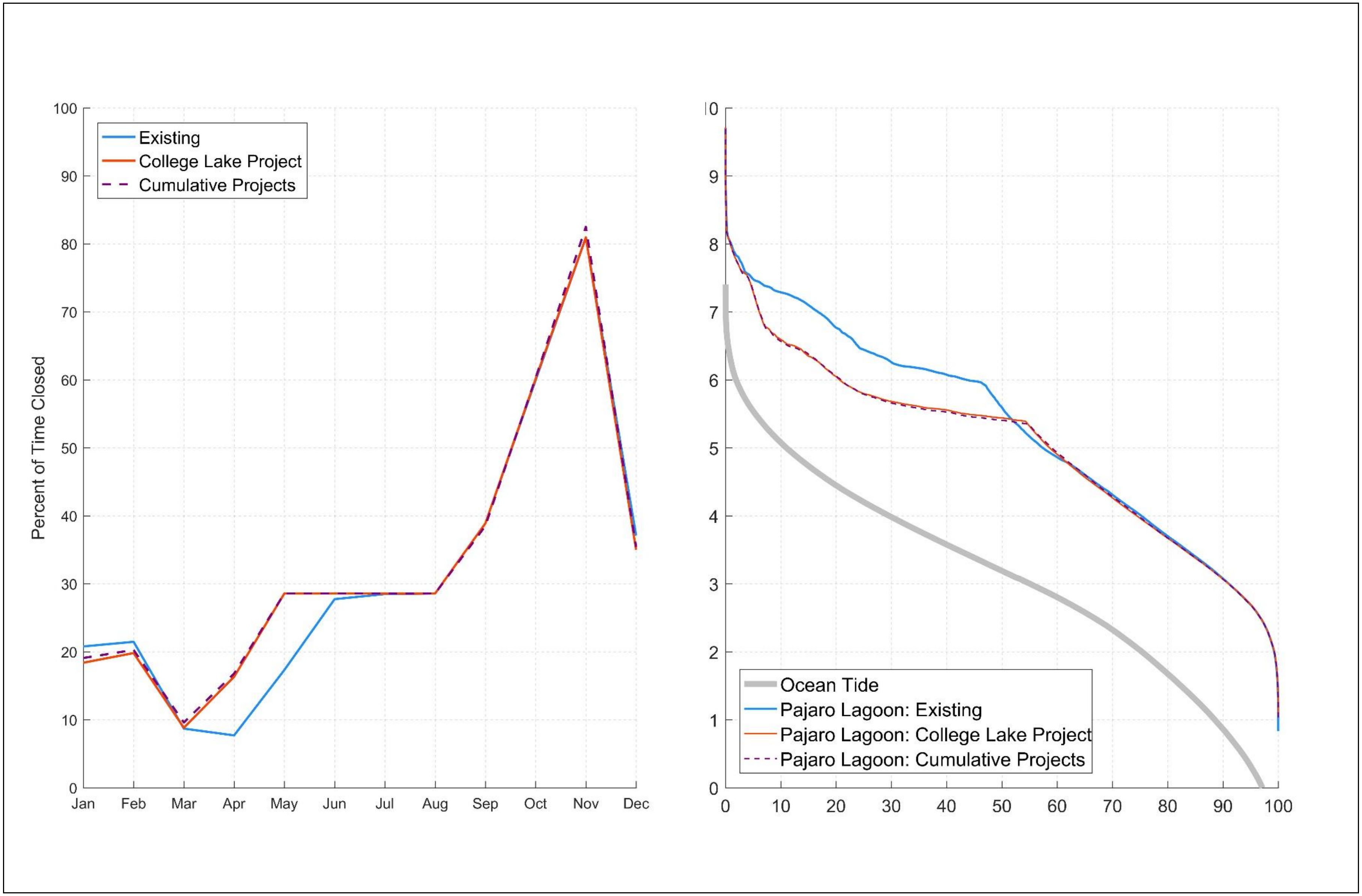
Comparison of predicted closure days per month (left panel) and water level exceedance (right panel) with and without the College Lake Project for water years 2014-2017.



SOURCE: surface flows at Pajaro and Salsipuedes confluence provided by CBEC (2018) and supplemented with estimates of Watsonville Slough flows based on Balance (2014) and ag return flows based on Hanson et al. (2014). Wave conditions obtained from CDIP (see Table 1)

Figure 8

Comparison of modeled water levels in the lagoon for existing, College Lake, and cumulative project conditions (top), compared against inflows (mid), and nearshore wave power (bottom).



SOURCE: flows provided by CBEC (2018).

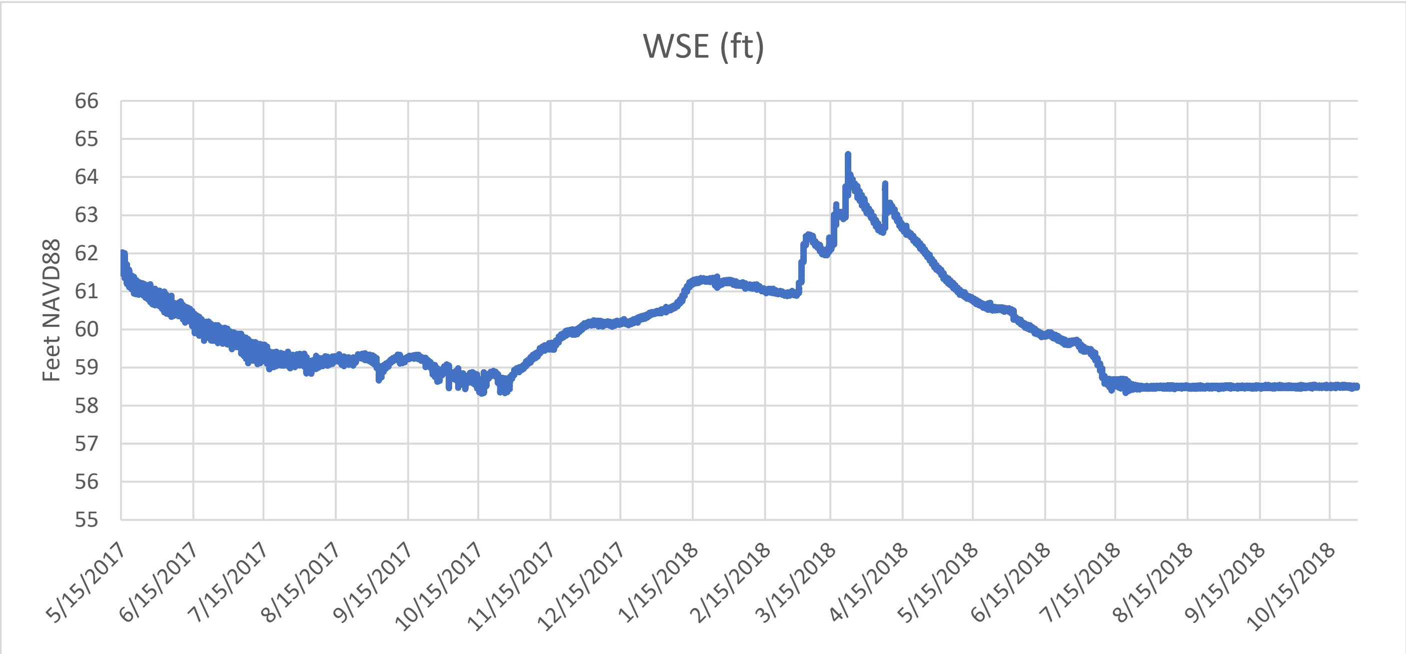
NOTE: Artificial breaching was assumed whenever lagoon water levels reached 8 feet NAVD88.

Figure 9
Comparison of predicted closure days per month (left panel) and water level exceedance (right panel) with and without the College Lake Project and the 4 cumulative projects for water years 2014-2017.

HYD-3 Piezometer Data

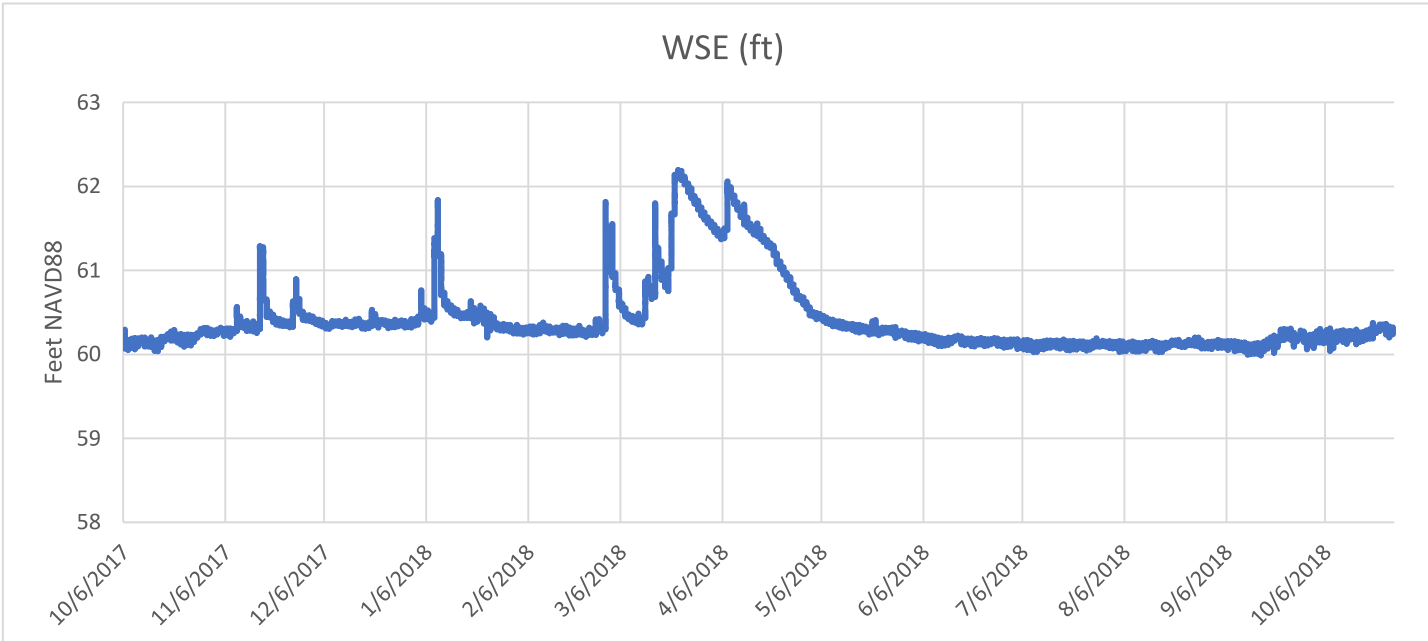
PIEZOMETER 1

Location (CA State Plane Zone III NAD_1983; Northing, Easting)	1808066.41, 6197160.71
Start Date	5/15/2017 14:30
End Date	10/26/2018 12:15
Instrument Elevation (ft NAVD 88)	58.445



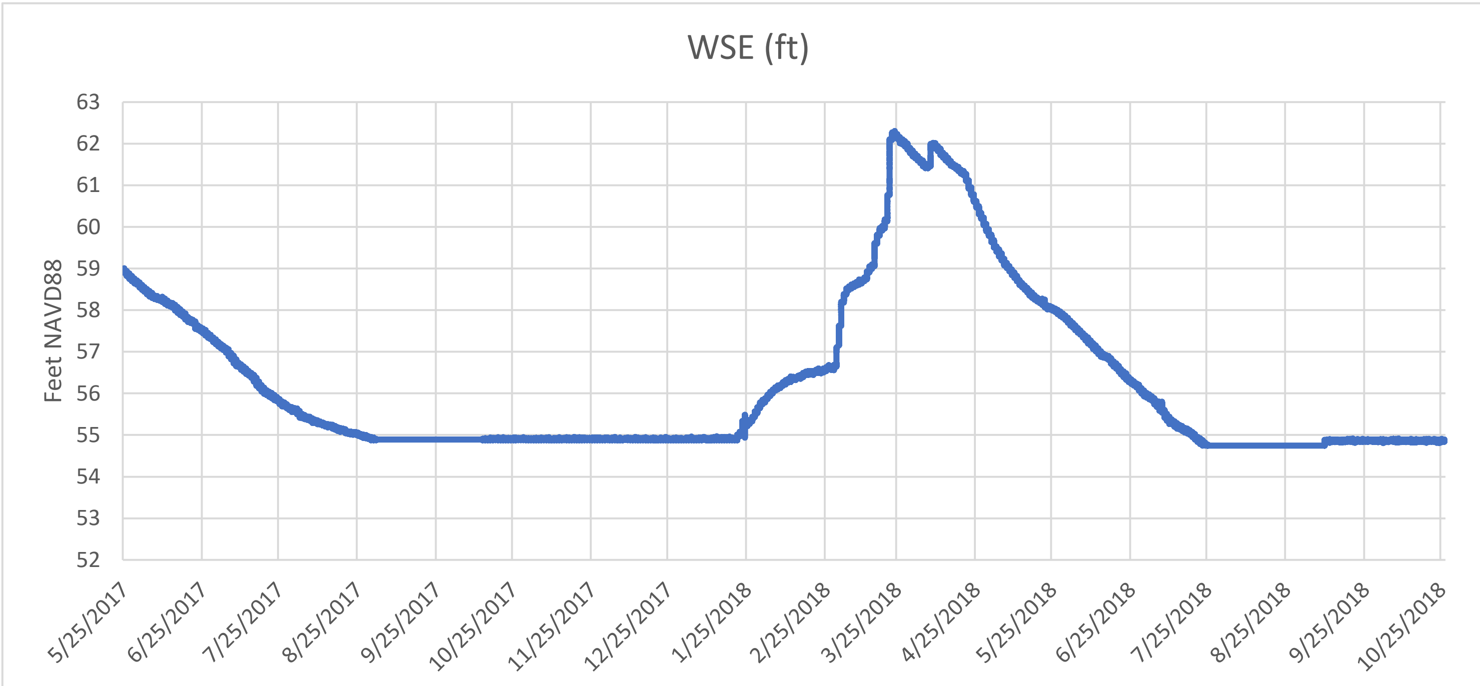
PIEZOMETER 2

Location (CA State Plane Zone III NAD_1983; Northing, Easting)	1808266.591, 6198456.12
Start Date	10/6/2017 11:30
End Date	10/26/2018 12:15
Instrument Elevation (ft NAVD 88)	58.778



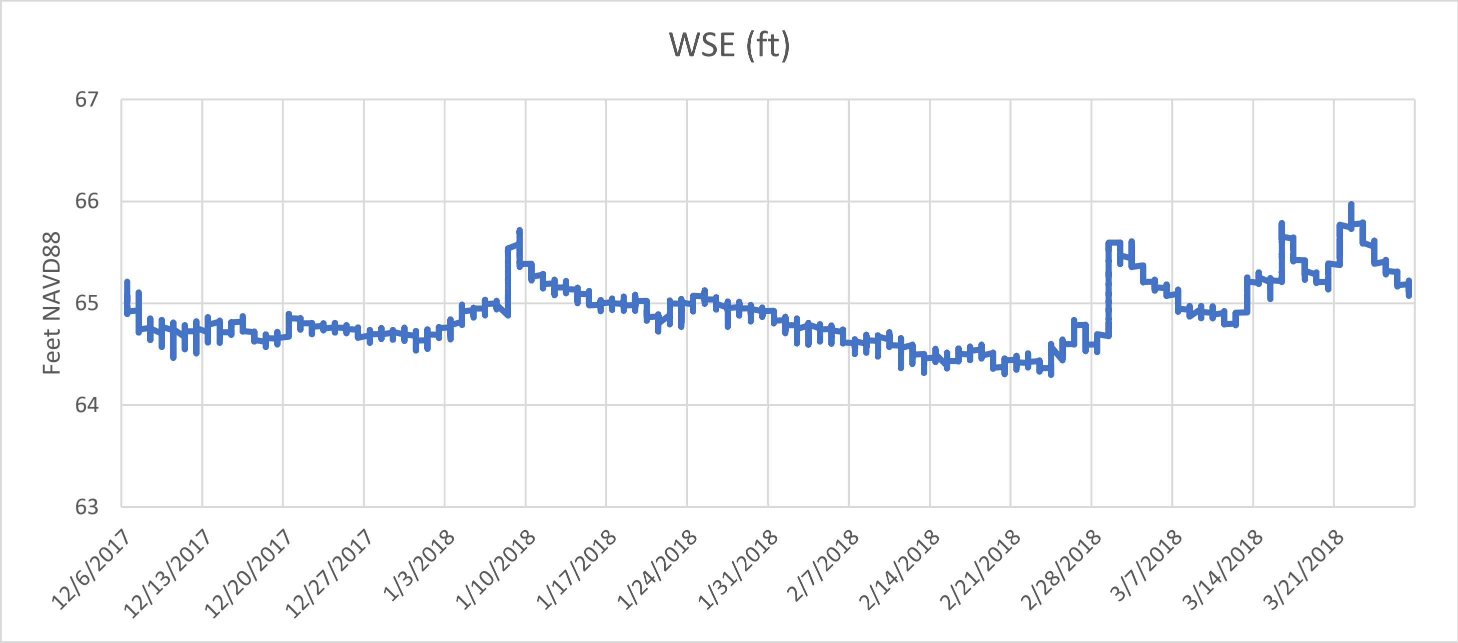
PIEZOMETER 3

Location (CA State Plane Zone III NAD_1983; Northing, Easting)	1806707.261, 6198443.817
Start Date	5/25/2017 15:45
End Date	10/26/2018 12:15
Instrument Elevation (ft NAVD 88)	54.884



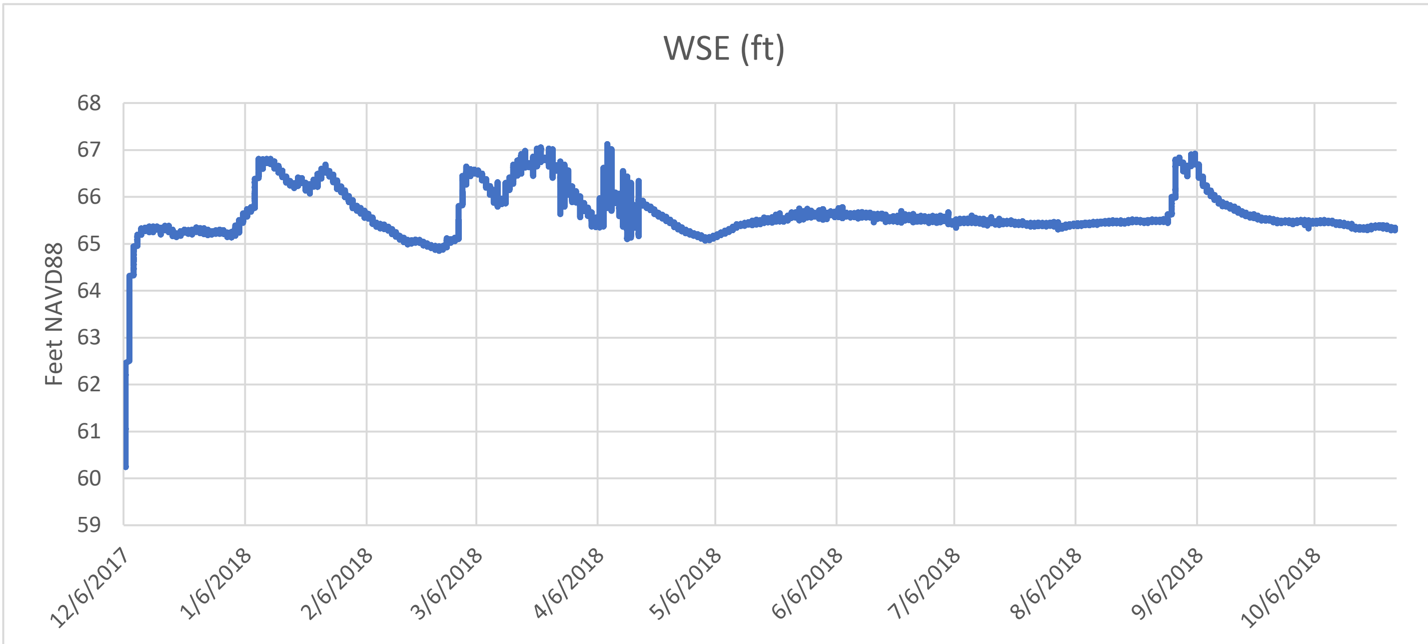
PIEZOMETER 4

Location (CA State Plane Zone III NAD_1983; Northing, Easting)	1808980.109, 6197289.368
Start Date	12/6/2017 12:45
End Date	3/27/2018 9:30
Instrument Elevation (ft NAVD 88)	58.624



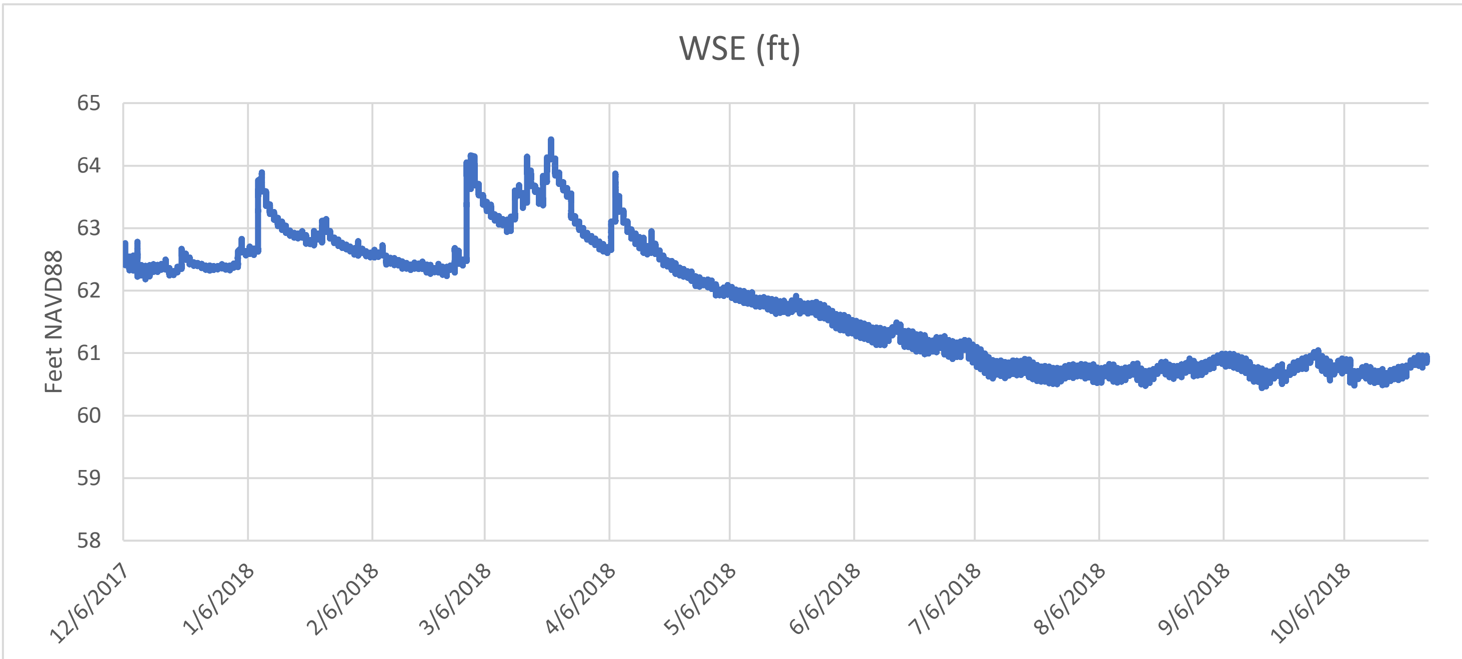
PIEZOMETER 5

Location (CA State Plane Zone III NAD_1983; Northing, Easting)	1809373.354, 6197212.715
Start Date	12/6/2017 11:00
End Date	10/26/2018 12:15
Instrument Elevation (ft NAVD 88)	60.218



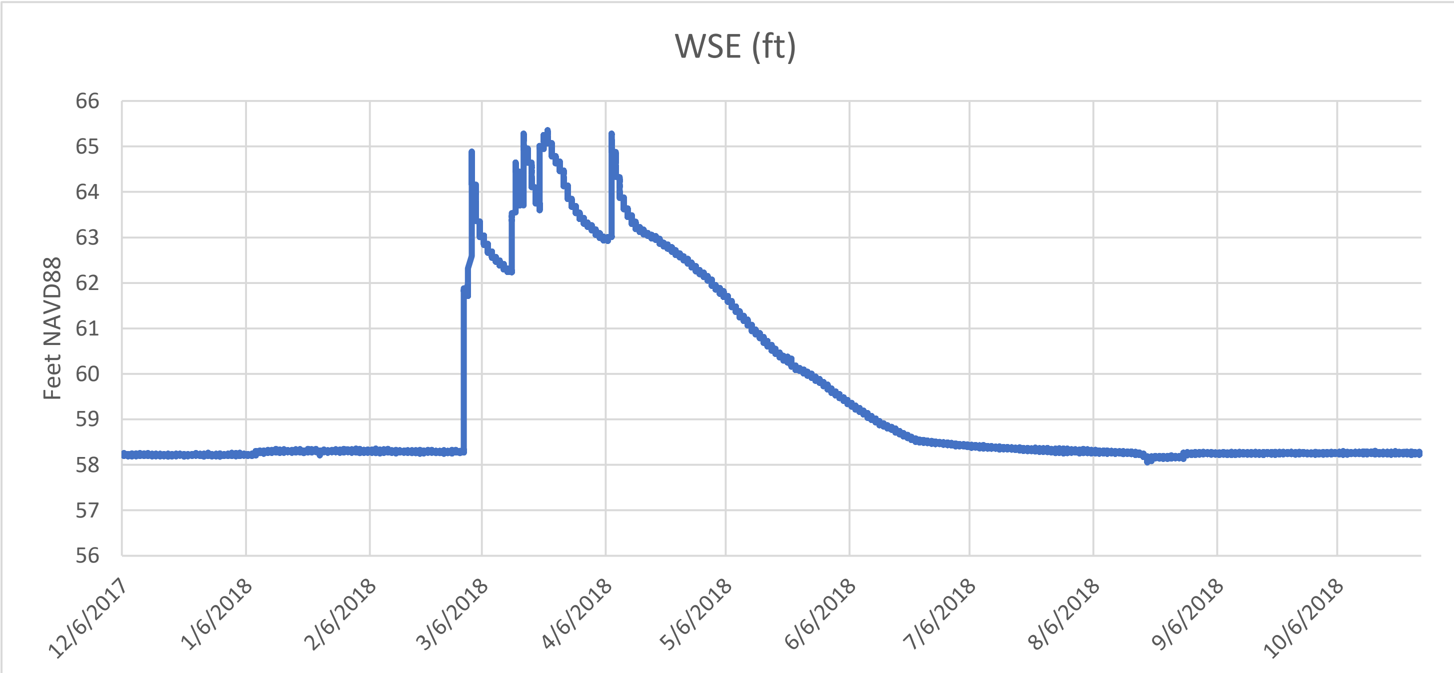
PIEZOMETER 6

Location (CA State Plane Zone III NAD_1983; Northing, Easting)	1808488.215, 6197243.089
Start Date	12/6/2017 13:30
End Date	10/26/2018 12:15
Instrument Elevation (ft NAVD 88)	57.512



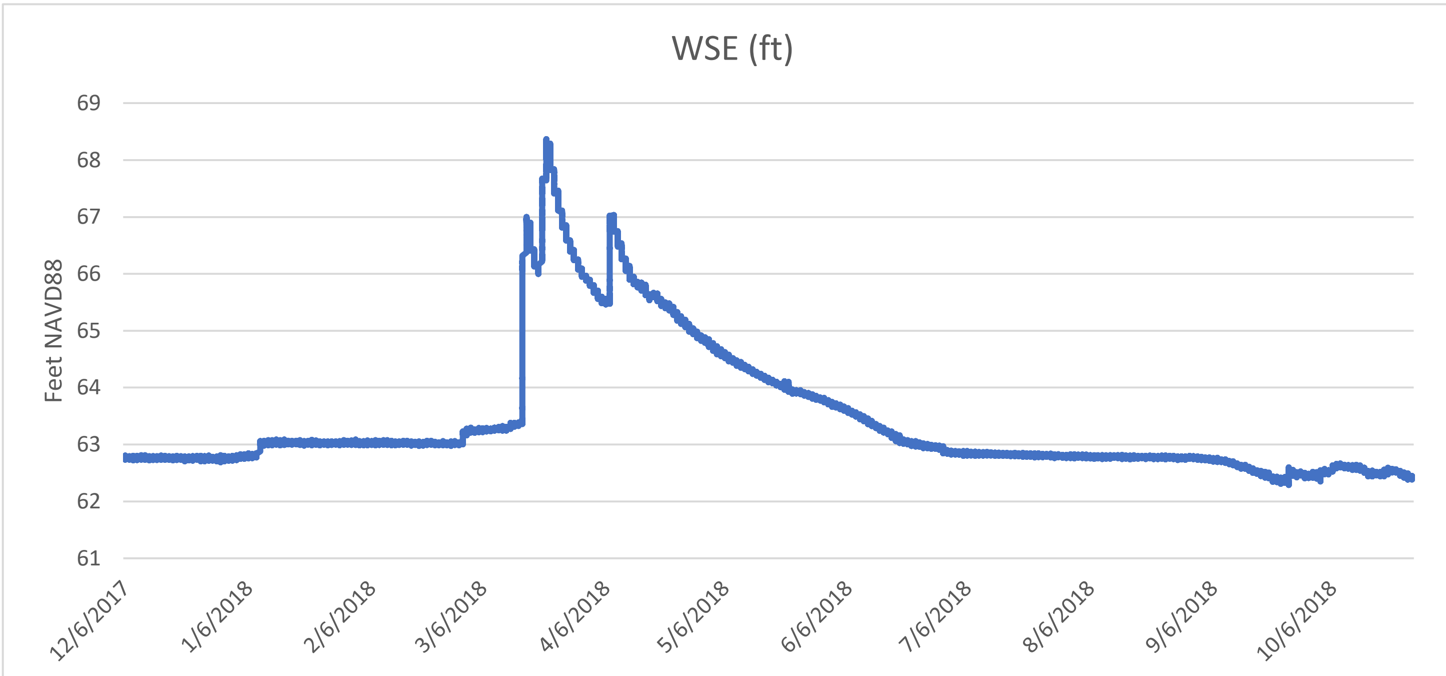
PIEZOMETER 7

Location (CA State Plane Zone III NAD_1983; Northing, Easting)	1806861.498, 6198524.561
Start Date	12/6/2017 15:00
End Date	10/26/2018 12:15
Instrument Elevation (ft NAVD 88)	58.223



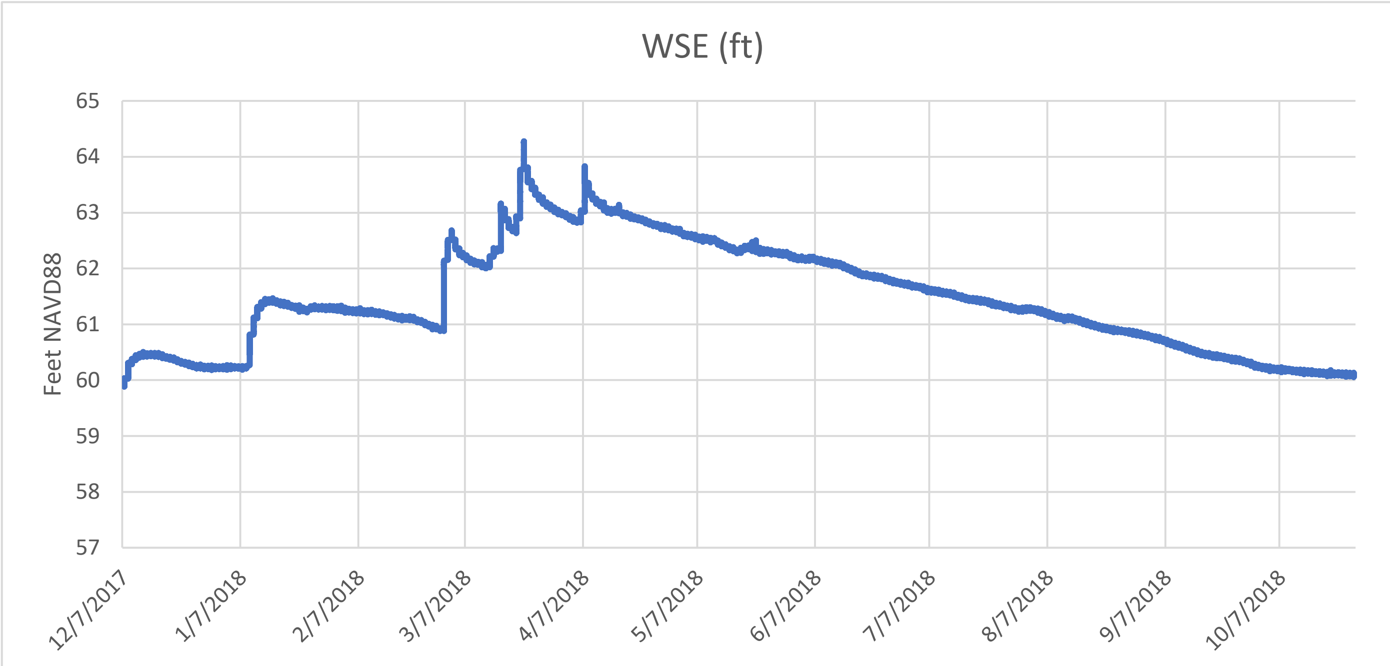
PIEZOMETER 8

Location (CA State Plane Zone III NAD_1983; Northing, Easting)	1807115.983, 6198712.023
Start Date	12/6/2017 16:00
End Date	10/26/2018 12:15
Instrument Elevation (ft NAVD 88)	62.779



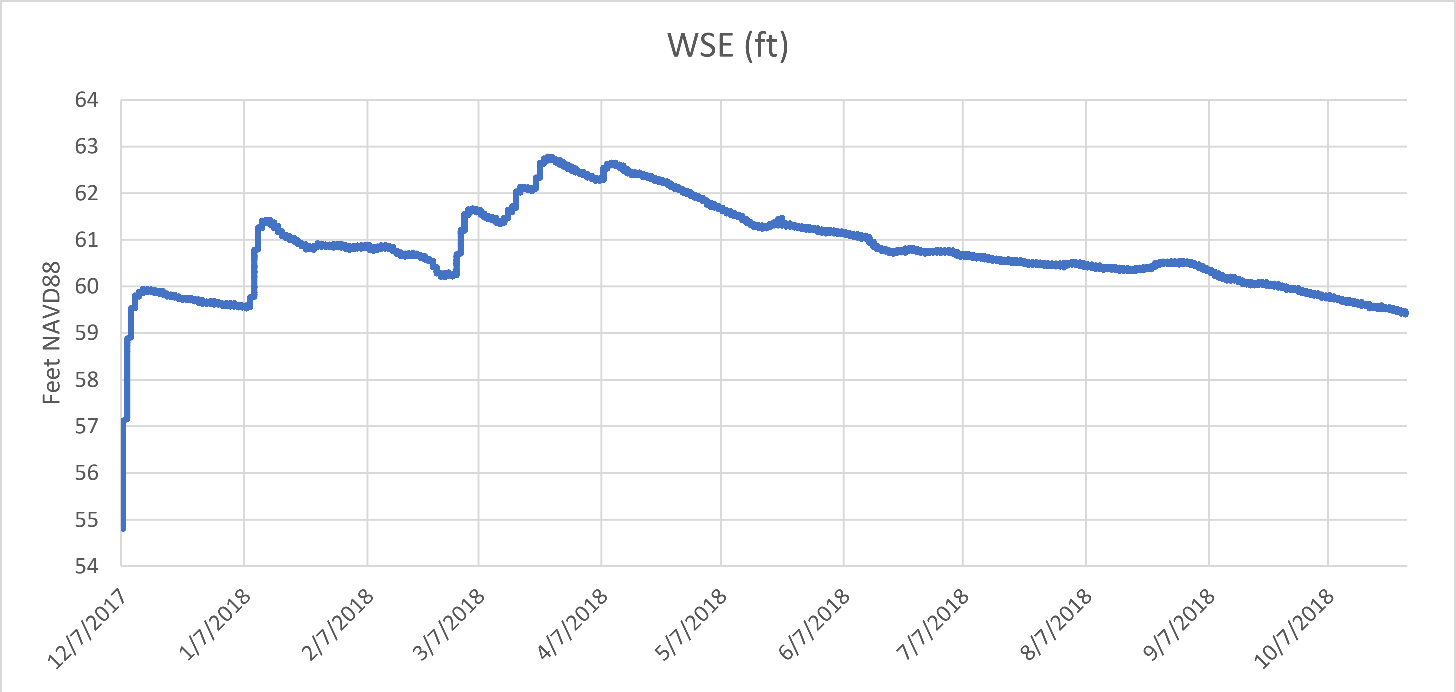
PIEZOMETER 9

Location (CA State Plane Zone III NAD_1983; Northing, Easting)	1803568.76, 6196929.51
Start Date	12/7/2017 9:00
End Date	10/26/2018 12:00
Instrument Elevation (ft NAVD 88)	59.921



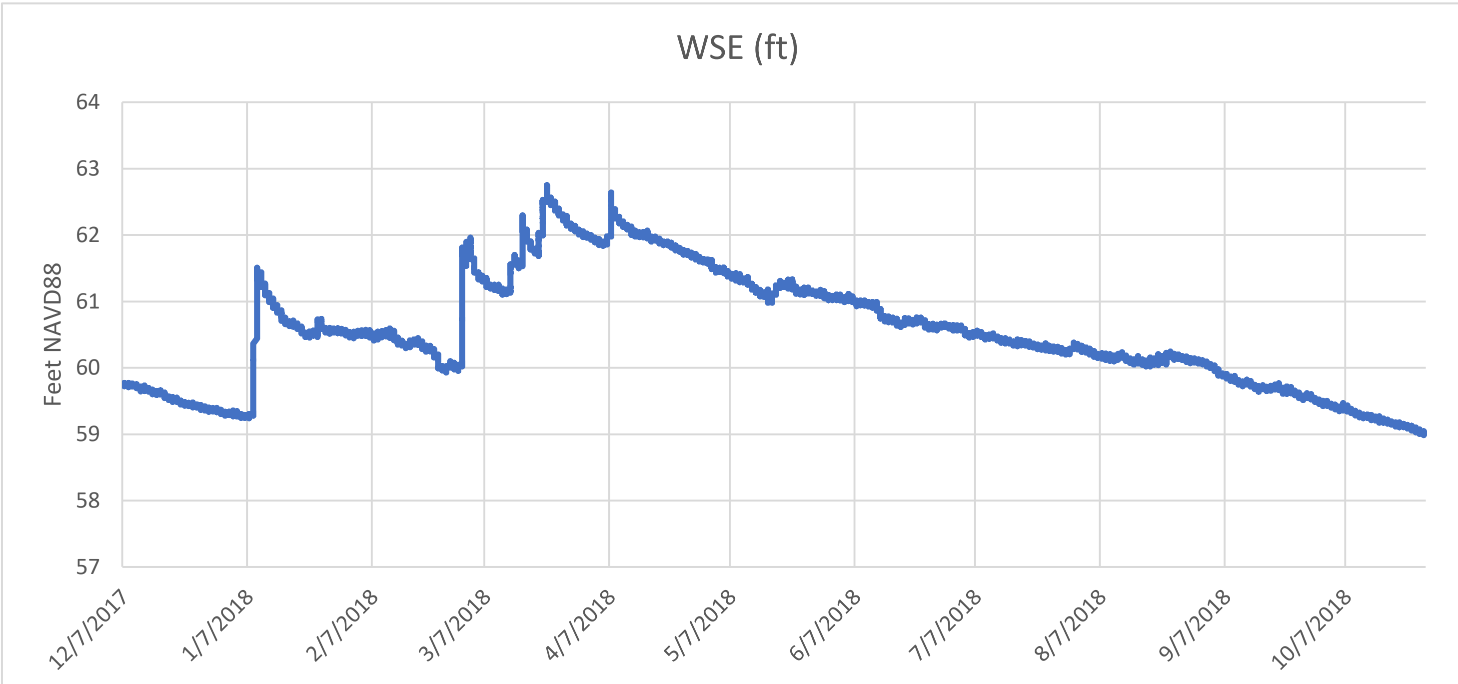
PIEZOMETER 10

Location (CA State Plane Zone III NAD_1983; Northing, Easting)	1803892.97, 6196900.184
Start Date	12/7/2017 9:00
End Date	10/26/2018 12:15
Instrument Elevation (ft NAVD 88)	54.811



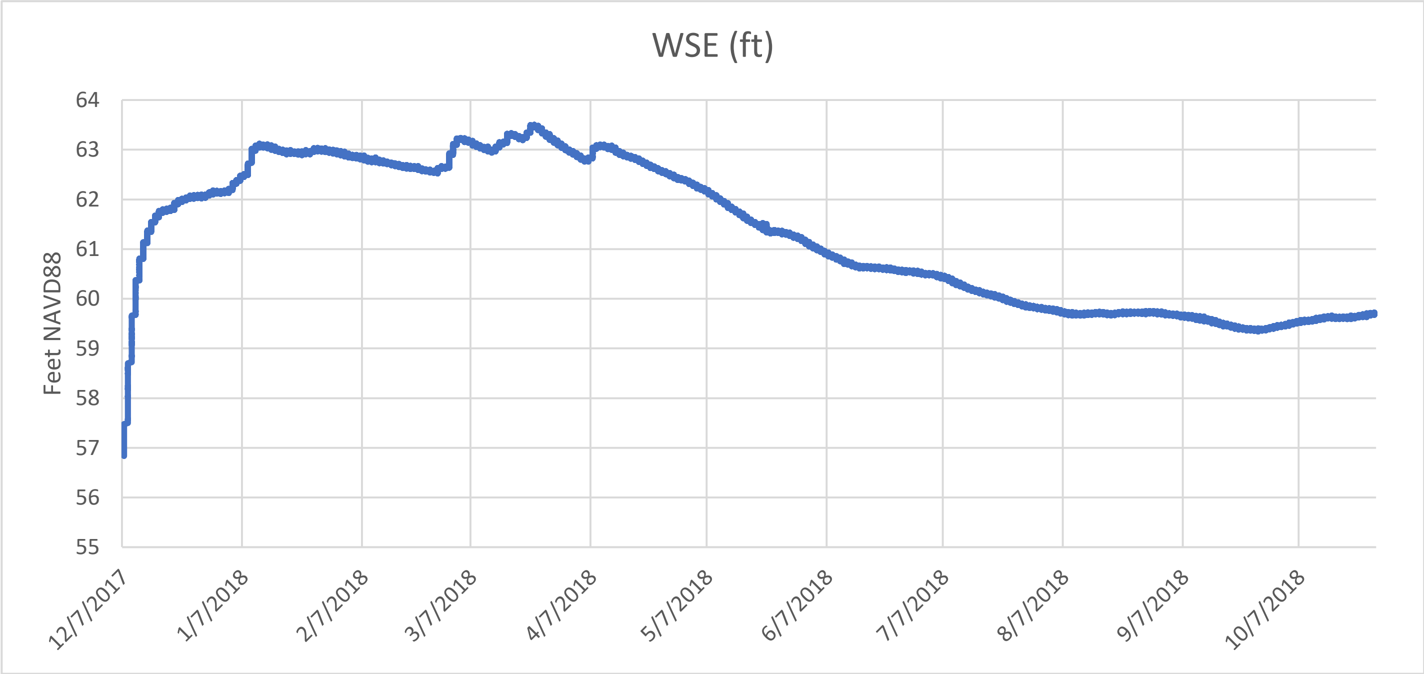
PIEZOMETER 11

Location (CA State Plane Zone III NAD_1983; Northing, Easting)	1804085.499, 6196892.665
Start Date	12/7/2017 9:45
End Date	10/26/2018 12:00
Instrument Elevation (ft NAVD 88)	55.442



PIEZOMETER 12

Location (CA State Plane Zone III NAD_1983; Northing, Easting)	1808947.041, 6198521.386
Start Date	12/7/2017 15:00
End Date	10/26/2018 12:15
Instrument Elevation (ft NAVD 88)	56.635



APPENDIX NOP

Notice of Preparation and Comments on the Notice of Preparation

This appendix contains a copy of the Notice of Preparation (NOP) for the College Lake Integrated Resources Management Project, as well as comments received in response to the NOP.

COLLEGE LAKE INTEGRATED RESOURCES MANAGEMENT PROJECT

Notice of Preparation

Prepared for
Pajaro Valley Water Management Agency

November 2017

COLLEGE LAKE INTEGRATED RESOURCES MANAGEMENT PROJECT

Notice of Preparation

Prepared for
Pajaro Valley Water Management Agency

November 2017

180 Grand Avenue
Suite 1050
Oakland, CA 94612
510.839.5066
www.esassoc.com

ESA

Bend	Oakland	San Francisco
Camarillo	Orlando	Santa Monica
Delray Beach	Pasadena	Sarasota
Destin	Petaluma	Seattle
Irvine	Portland	Sunrise
Los Angeles	Sacramento	Tampa
Miami	San Diego	

160822

OUR COMMITMENT TO SUSTAINABILITY | ESA helps a variety of public and private sector clients plan and prepare for climate change and emerging regulations that limit GHG emissions. ESA is a registered assessor with the California Climate Action Registry, a Climate Leader, and founding reporter for the Climate Registry. ESA is also a corporate member of the U.S. Green Building Council and the Business Council on Climate Change (BC3). Internally, ESA has adopted a Sustainability Vision and Policy Statement and a plan to reduce waste and energy within our operations. This document was produced using recycled paper.

PUBLIC NOTICE

Availability of Notice of Preparation of Environmental Impact Report and Notice of Public Scoping Meetings

Date: November 28, 2017

Project Title: College Lake Integrated Resources Management Project

Location: City of Watsonville and Unincorporated Santa Cruz County

APN: Potential water treatment plant and weir structure sites in Santa Cruz County: 051-441-24, 051-101-47, and 051-441-28. College Lake is located in Santa Cruz County on multiple properties with numerous Assessor Parcel Numbers (APNs), identified in the Notice of Preparation (NOP). Pipelines and appurtenant facilities would be located in the City of Watsonville and Santa Cruz County on multiple properties with numerous APNs, identified in the NOP.

Project Sponsor: Pajaro Valley Water Management Agency
36 Brennan Street
Watsonville, CA 95076

Lead Agency: Same as Project Sponsor

Staff Contact: Brian Lockwood, General Manager
Pajaro Valley Water Management Agency
Fax: (831) 722-3139
Email: eir@pvwater.org

The Pajaro Valley Water Management Agency (PV Water) has prepared a Notice of Preparation (NOP) of an Environmental Impact Report (EIR) in connection with the College Lake Integrated Resources Management Project (proposed Project) to inform the public, responsible and trustee agencies, and interested parties about the Project and the intent to prepare an EIR. The purpose of an NOP is to provide sufficient information describing the project and the potential environmental effects to enable responsible and trustee agencies to make a meaningful response related to the scope and content of the EIR (CEQA Guidelines Section 15082). The NOP is available for public review and comment online at:

http://pvwater.org/about-pvwma/bmp-update.php

Paper copies are also available at PV Water’s offices, 36 Brennan Street, Watsonville, CA 95076; Watsonville Public Library, 275 Main Street, Suite 100, Watsonville, CA 95076; Watsonville Public Library, Freedom Branch, 2021 Freedom Boulevard, Freedom, CA 95077, and Monterey County Library, Pajaro Branch, 29 Bishop Street, Pajaro, CA 95076.

Project Summary

The proposed Project is one of the three priority supplemental water supply projects outlined in PV Water's Basin Management Plan Update (adopted in 2014). The primary purpose of the proposed Project is to help balance the Pajaro Valley Groundwater Basin, prevent further seawater intrusion, and meet the water supply needs in PV Water's service area by developing College Lake as a water storage and supply source. The Project components would consist of a new weir structure and intake pump station at the south side of College Lake, a water treatment plant and pipeline to convey the stored water from College Lake to the water treatment plant, and a 5.5-mile pipeline to convey treated water to agricultural uses in the Pajaro Valley (refer to the NOP for locations that would receive water).

Public Scoping Process

To ensure that the public and regulatory agencies have an opportunity to ask questions and submit comments as to the scope and content of the EIR, two scoping meetings will be held during the NOP review period, both occurring on **Tuesday, December 12, 2017**, in the **Community Room at the City of Watsonville Civic Plaza (275 Main Street, Fourth Floor, Watsonville, CA 95076)**. Meetings will be held from **3:00 to 4:30 PM** and from **7:00 to 8:30 PM**. Both scoping meetings will start with a brief presentation providing an overview of the proposed Project. Following the presentation, interested parties will be provided an opportunity to ask questions and provide comments. Participants are encouraged to submit written comments; comment forms will be supplied at the scoping meetings. Written comments may also be submitted anytime during the NOP scoping period to the mailing address, fax number, or email address listed below.

Due to the time limits mandated by State law, your response must be sent at the earliest possible date, but not later than **5:00 PM** on **January 5, 2018.** Please include a name, address, email address, and telephone number of a contact person in your agency (if applicable) for all future correspondence on this subject. Please send your comments to:

Pajaro Valley Water Management Agency
ATTN: Brian Lockwood, General Manager
36 Brennan Street
Watsonville, CA 95076

Fax: (831) 722-3139
E-mail: eir@pvwater.org

NOTICE OF PREPARATION

College Lake Integrated Resources Management Project Environmental Impact Report

Introduction

In accordance with the provisions of the California Environmental Quality Act (CEQA) and the CEQA Guidelines, the Pajaro Valley Water Management Agency (PV Water), as CEQA Lead Agency, is preparing a project level Environmental Impact Report (EIR) for the College Lake Integrated Resources Management Project (proposed Project), formerly referred to as the College Lake with Inland Pipeline to Coastal Distribution System.

PV Water has prepared this Notice of Preparation (NOP) of an EIR in connection with the proposed Project to inform the public, responsible and trustee agencies, and interested parties about the proposed Project and the intent to prepare an EIR. The purpose of an NOP is to provide sufficient information describing the project and the potential environmental effects to enable the responsible agencies to make a meaningful response related to the scope and content of the EIR (CEQA Guidelines Section 15082). The purpose of the EIR is to provide information about potential significant physical environmental effects of the proposed Project, to identify possible ways to minimize the significant effects, and to describe and analyze possible alternatives to the Project. PV Water is seeking your views regarding the scope and content of the environmental document in connection with the proposed Project. Written comments will be accepted until **5:00 PM on January 5, 2018**. The public comment period was extended by PV Water from the required 30 calendar days to 38 calendar days to account for holidays. PV Water will also hold two scoping meetings, occurring on **Tuesday, December 12, 2017**, in the **Community Room at the City of Watsonville Civic Plaza (275 Main Street, Fourth Floor, Watsonville, CA 95076)**. The meetings will be held from **3:00 to 4:30 PM** and from **7:00 to 8:30 PM**.

Project Background

Pajaro Valley Water Management Agency

PV Water is a state-chartered water management district, formed in 1984 to manage groundwater resources and supplemental water supplies in its service area. In 2015, PV Water filed a notice of election to become the Groundwater Sustainability Agency within its service area under the Sustainable Groundwater Management Act (SGMA). The service area encompasses approximately 70,000 acres in the Pajaro Valley, located in southern Santa Cruz County, northern Monterey County, and a small portion of San Benito County. Seawater intrusion in the Pajaro Valley Groundwater Basin was first documented in 1953 and has continued to become more severe. In the coastal areas and throughout much of the Pajaro Valley groundwater basin, overdraft conditions have caused groundwater levels to drop below sea level seasonally, creating a landward pressure gradient that causes seawater to move inland. Seawater intrusion has elevated the chloride concentration in groundwater up to two and a half miles inland from the coast, in some areas contaminating the groundwater to the point that it is unsuitable for agricultural irrigation.

PV Water was created to manage existing and supplemental water supplies for its service area. Its intent is to manage local groundwater resources in a manner to halt, and eventually reduce, long-term overdraft of the groundwater basin while ensuring sufficient water supplies for present and anticipated needs. To achieve this objective, PV Water has prepared and periodically updates a basin-wide groundwater management plan, the Basin Management Plan (BMP), to serve as the guiding document for its major projects and programs. The BMP preparation process includes review of the existing groundwater basin conditions, evaluation of the results of implemented projects to reduce overdraft and seawater intrusion, as well as the identification of additional projects and management strategies to achieve its stated goals.

Previous Basin Management Planning Efforts

PV Water prepared its first BMP in the 1990s. The “1993 BMP” identified a preferred alternative that called for importing surface water supply to the region via the federal Central Valley Project through an import pipeline to substantially augment the use of local surface water supplies. A Program Environmental Impact Report (1993 BMP PEIR) was prepared for the 1993 BMP to analyze, at a program-level, these concepts.

A redraft of the BMP was prepared in 2000 but its completion was delayed to allow additional analyses of local water supply options, which were then incorporated into the 2002 Revised BMP. The 2002 Revised BMP EIR provided a program-level analysis of the environmental impacts of two alternatives, and a project-level analysis of local projects. The final strategy of the 2002 Revised BMP adopted by the PV Water Board of Directors (the Board) was called the Modified BMP 2000 Alternative and included the following six major projects and programs: Harkins Slough Recharge Project, Coastal Distribution System (CDS) Project, Import Pipeline, Recycled Water, supplemental wells, and conservation. Subsequently, PV Water constructed the Harkins Slough Recharge Facilities, a significant portion of the CDS, supplemental wells, and, in cooperation with the City of Watsonville, the Recycled Water Facility (RWF).

While the implementation of the Harkins Slough Recharge Facilities, the RWF, supplemental wells, and the CDS have helped to reduce the magnitude of the groundwater overdraft and resulting seawater intrusion problems, these problems still persist. In 2005, PV Water contracted with the United States Geological Survey to cooperatively develop a robust, regional hydrologic model to simulate the use and movement of water within the groundwater basin. Based on the hydrologic modeling results, PV Water established a target of reducing groundwater pumping in the Pajaro Valley groundwater basin by 12,100 acre-feet per year (AFY).[1]

[1] One acre-foot equals about 326,000 gallons, or enough water to cover an acre of land one foot deep.

Basin Management Plan Update

In 2010, PV Water formed the Ad Hoc BMP Committee as a means for the Pajaro Valley community to help guide the Board in the development of an updated BMP (BMP Update) focused on implementing locally controlled solutions (e.g., additional surface water supplies and/or reductions in groundwater pumping).[2] The BMP Update planning process began with the development of a comprehensive list of supplemental water supply projects, including some identified in previous BMPs, that could help meet the goals of stopping seawater intrusion and basin overdraft. Potential projects (44 in total) were identified, screened, ranked, and prioritized for feasibility, cost, and other factors. Based on this analysis, seven projects were recommended by the BMP Committee, and ultimately selected by the Board for inclusion in the BMP Update portfolio. These projects include:

- Conservation
- Increased Recycled Water Storage at the RWF
- Increased Recycled Water Deliveries
- Harkins Slough Recharge Facilities Upgrades
- Watsonville Slough with Recharge Basin
- College Lake with Inland Pipeline to Coastal Distribution System
- Murphy Crossing with Recharge Basins

2014 Program Environmental Impact Report

To address the potential environmental impacts of the BMP Update components, PV Water prepared the draft and final *Program Environmental Impact Report for the Pajaro Valley Water Management Agency Basin Management Plan Update* (State Clearinghouse #2000062030, referred to herein as 2014 BMP Update PEIR), which evaluated the environmental impacts of the seven components at a program level of detail. A program EIR is prepared for a series of actions that can be characterized as one large project, such as the BMP Update (CEQA Guidelines Section 15168). A program EIR is a first-tier environmental document that assesses and documents the broad environmental impacts of a program with the understanding that a more detailed site-specific review may be required to assess future projects implemented under the program. The 2014 BMP Update PEIR evaluated the BMP Update components based on conceptual information available at that time, and established a framework for "tiered" or project-level environmental documents that would be prepared in accordance with the overall program.

The Board certified the 2014 BMP Update PEIR on April 16, 2014 (Resolution 2014-04). The Board approved the BMP Update and made findings pursuant to CEQA, including a statement of overriding considerations, and adopted a mitigation monitoring and reporting program for the BMP Update (Resolution 2014-05).

[2] In early 2010, the Board removed the Import Pipeline Project from further consideration for a variety of reasons, including the desire to implement locally controlled projects, feasibility and cost.

College Lake Integrated Resources Management Project EIR

Since completing the 2014 BMP Update PEIR, PV Water has developed the College Lake Integrated Resources Management Project[3] in greater detail through planning and conceptual design studies. The College Lake Integrated Resources Management Project EIR will describe and evaluate the proposed design, construction and operation of the proposed Project, tiering from the 2014 BMP Update PEIR as appropriate and incorporating parts of the PEIR by reference. The 2014 BMP Update PEIR is available for review at the PV Water offices (36 Brennan Street, Watsonville, CA 95076) and on PV Water's website at http://pvwater.org/about-pvwma/bmp-update.php.

Current College Lake Operations

College Lake is a seasonal lake that receives water inflows from the Green Valley, Casserly, and Hughes Creek subwatersheds. These streams drain approximately 11,000 acres of range, rural residential, and crop lands. Casserly Creek and two of its tributaries, Banks Creek and Gaffey Creek, are known to support the state and federally listed south-central California coast steelhead (*Oncorhynchus mykiss*). College Lake may also provide winter and spring rearing habitat for juvenile steelhead. Outflows from the lake naturally flow downstream to Salsipuedes Creek (mixing with overflow from Pinto Lake) in the winter.

The lake level is managed with an existing weir (crest elevation of 60.1 feet) and pump station, operated by Reclamation District 2049 (RD 2049) on the south side of the lake. The weir causes inundation of approximately 228 acres of the lake basin and helps prevent water from flowing upstream through Salsipuedes Creek into the lakebed during times of high flows and when RD 2049 is pumping water from the lake, as described below. At the existing weir headgate level elevation, storage capacity of this basin is about 1,150 AF[4]. To accommodate summer farming, the lake basin is pumped dry in the spring, usually beginning in mid-March, depending on the amount of spring rains. The pumped water flows into Salsipuedes Creek and then through the lower Pajaro River to Monterey Bay. Pumping of water from the basin generally continues intermittently throughout the summer until mid-October or November, depending on the amounts and timing of early rains and when crops need to be harvested. Pumping water over the weir allows the lakebed to be drained earlier than would occur naturally, to allow for farming within the lakebed during the summer.

[3] The College Lake with Inland Pipeline to Coastal Distribution System component identified in the BMP Update has been renamed to the College Lake Integrated Resources Management Project to reflect the multiple beneficial uses of the project.

[4] cbec, inc. eco engineering, College Lake Stage-Volume and Stage-Area Curves, November 10, 2017.

Project Description

Project Purpose and Objectives

The proposed Project is one of the three priority supplemental water supply projects outlined in the BMP Update. The primary purpose of the proposed Project is to help balance the groundwater basin, prevent further seawater intrusion, and meet the water supply needs in PV Water's service area, by developing College Lake as a water storage and supply source. The following objectives were included in the BMP Update PEIR:

- Prevent seawater intrusion, long-term groundwater overdraft, land subsidence, and water quality degradation;
- Manage existing and supplemental water supplies to control overdraft and provide for present and future water needs;
- Create a reliable, long-term water supply, which has been identified as an important cornerstone of the long-term economic vitality of the Pajaro Valley;
- Develop water conservation programs; and
- To recommend a program that is cost effective and environmentally sound.

PV Water anticipates that the proposed College Lake Project would advance all of these objectives, with the exception of water conservation.[5]

Project Location

The proposed Project includes components that would be located in portions of the City of Watsonville and unincorporated Santa Cruz County (see **Figure 1**, presented at the end of the NOP).

- **College Lake Water Storage Area.** College Lake is located in unincorporated Santa Cruz County approximately one-mile northeast of the Watsonville city limits and is north of Holohan Road and west of Highway 152. **Appendix NOP-1** includes a list of properties by Assessor Parcel Number (APN) located within the College Lake water storage area. (With respect to potential adverse effects on agricultural land associated with development and operation of College Lake, refer to the discussion under Land Use and Agricultural Resources in this NOP.)

- **Weir Structure and Intake Pump Station.** The proposed weir and diversion and intake pump station facility would be located in Salsipuedes Creek at the south end of College Lake, near the location of the existing weir (**Figure 2**, presented at the end of the NOP). The proposed site for the weir and diversion and intake pump station and associated pipeline is within portions of the following properties: APNs 051-441-24, 051-441-28, 051-441-01, and 051-101-47.

5 Information on PV Water's water conservation programs is available at http://www.pvwma.dst.ca.us/.

- **Water Treatment Plant.** The proposed water treatment plant would be located at one of two possible locations (see Figure 2). The preferred water treatment plant location is west of the proposed weir structure (within APN 051-441-24). The other candidate site is north of Holohan Road between Laken Drive and Grimmer Road, southwest of College Lake (within APN 051-101-47).

- **College Lake Pipeline.** The proposed College Lake pipeline would extend from the proposed College Lake water treatment plant to the CDS and the RWF. The proposed alignment traverses portions of unincorporated Santa Cruz County and the City of Watsonville (see **Figures 3a through 3e**, presented at the end of the NOP). The pipeline alignment would follow either disturbed or existing developed road right-of-way, or traverse agricultural fields.

- **Point of Diversion and Place of Use.** As part of the proposed Project, PV Water has filed a petition for partial assignment of water-right Application 18334, new water right Application A032881, and a request for release from priority under Water Code Section 10504 with the State Water Resources Control Board. These requests are for a permit to appropriate up to 3,000 AFY of water in College Lake. The proposed point of diversion would be located near the existing weir. **Appendix NOP-2** presents the proposed place of use, which would be the service areas where the appropriated water would be used.

Project Components

The components proposed to be constructed and operated as part of the proposed Project include the weir structure and intake pump station, water treatment plant, and the College Lake pipeline, each of which is described below.

Weir Structure and Intake Pump Station

The proposed Project would include a weir structure with an adjustable weir, and a diversion and intake pump station facility occupying approximately 1-acre, to divert surface water from College Lake. The adjustable weir structure would be constructed near the existing weir which would be demolished. The new adjustable weir would raise the dry-weather season College Lake water level by up to 2.4 feet to an elevation of 62.5 feet. This would increase the total storage capacity of the lake from approximately 1,150 AF to approximately 1,764 AF, and would also increase the total dry-weather season inundated lakebed area from approximately 228 acres to 285 acres (Figure 2).[6] The weir structure would consist of a reinforced concrete spillway with mechanically adjustable weir, abutment retaining walls on either side of the structure, and reinforced concrete aprons upstream and downstream of the weir. The weir structure would also be designed to accommodate fish bypass flows and fish passage.

A screened intake would be constructed within the weir structure to divert water to the intake pump station. The intake pump station would deliver raw (untreated) water from College Lake to the proposed water treatment plant. The diversion and intake facility would include a fish screen, intake pipeline, and intake pump station. The screen would be located at the intake pipeline and would comply with National Oceanic and Atmospheric Administration (NOAA) National Marine

[6] cbec, inc. eco engineering, College Lake Stage-Volume and Stage-Area Curves, November 10, 2017.

Fisheries Service (NMFS) and California Department of Fish and Wildlife (CDFW) screening criteria for anadromous salmonids.

The proposed Project would also require installation of an approximately 2,400-foot pipeline to convey the diverted surface water from the intake pump station to the proposed water treatment plant. The pipeline would be constructed generally to follow existing agricultural field roadways (see Figure 3a).

Water Treatment Plant

The proposed Project would include a water treatment plant approximately four acres in size to treat and disinfect the diverted surface water. As shown on Figures 2 and 3a, PV Water has identified two potential locations for the water treatment plant. Regardless of which of the two locations is ultimately selected, the configuration of the water treatment plant would be similar.

The proposed water treatment plant would contain concrete-lined sedimentation basins, intermediate ozonation,[7] a sand filtration system consisting of filters installed on a concrete pad or in concrete basins, a sodium hypochlorite disinfection system, and a booster pump station. The filtered and disinfected water would flow to the booster pump station that would provide the additional pressure needed to pump the water though the proposed College Lake pipeline.

College Lake Pipeline

The proposed Project would include an approximately 5.5-mile-long, 18- to 24-inch-diameter pipeline from the new treatment plant to the CDS and the RWF. (Refer to Appendix NOP-2 for a map depicting areas that could receive treated water from College Lake.) As shown on Figures 3a through 3e, the pipeline routes under consideration generally follow either disturbed or existing developed road right-of-way, or traverse agricultural fields. Due to potential constraints on West Beach Street, PV Water is considering a different alignment for the segment between the intersection of West Beach Street and Harvest Drive and the Watsonville Wastewater Treatment Plant (Figures 3d and 3e).

Construction

Construction is expected to begin in 2023 and to be completed by 2025, with an overall construction period of approximately 30 months. Construction activities would include staging/laydown, site clearing, earth work, pile driving, structural placement and backfilling, concrete and paving work, dewatering, excavation, and trenching in the proposed Project area. Highway 1 and Highway 152 would be the primary construction access routes to the Project areas.

[7] Ozonation is a disinfection process that uses ozone gas (O3) to inactivate or destroy pathogenic organisms. Ozonation systems generate ozone from a feed gas (air or liquid oxygen) and feed the ozone into a contact chamber. In the chamber, ozone and its decomposition products oxidize/destroy the cellular material of pathogenic organisms. The off-gases from the contact chamber are treated to destroy residual ozone before release into the atmosphere.

Site Clearing and Preparation

Construction workers would clear and prepare the construction work areas in stages as construction progresses. Before construction were to start, the contractor would clear and grade portions of the Project area, removing vegetation and debris, as necessary, to provide a level surface for equipment access, materials staging, and construction activities.

Staging and Laydown Areas

Construction equipment and materials would be stored within the construction work areas to the extent feasible, though additional offsite laydown areas may be required. If required, the additional laydown area(s) would be located near the proposed Project sites. Construction staging and laydown for the proposed weir structure and water treatment plant would consist of approximately one acre and be located within the four-acre area designated for the water treatment plant site. Staging and laydown for pipeline construction would occur primarily within the width of the construction corridor and along the proposed pipeline route.

Weir Structure and Water Treatment Plant

In general, construction of the proposed weir and water treatment plant facilities would involve excavation; erecting concrete structures; and installing piping, pumps, electrical and other equipment; testing and commissioning facilities; and finish work such as erecting enclosures, painting, flooring, doors, windows, paving, landscaping, and fencing. Equipment required for construction of these project components would generally include dozers and rollers for site grading, excavators, back hoes, pile drivers, dump trucks, fork lifts, and cranes for hoisting of construction material and setting of large permanent equipment such as pumps, and pavers.

Pipeline Installation

The construction method for installation of the proposed pipelines would depend on their locations. Conventional cut and cover construction techniques would be used for installing pipelines that would be installed in existing roadways or agricultural fields. Creeks, drainages, railroads, and highway crossings may require trenchless construction techniques (see Figures 3a through 3e). Typical construction equipment for pipeline installation would include pavement saws, flatbed trucks, backhoes, excavators, pipe cutting and welding equipment, haul trucks for soils transport and materials delivery, compaction equipment, pickup trucks, generators, air compressors, cranes, drill rigs, skip loaders and pavers.

Proposed Operations and Maintenance

Operation and maintenance of the proposed Project would include:

- Operation of the water treatment plant and weir structure;
- Monitoring of the treatment processes, conveyance, and weir facilities; and,
- Inspecting and maintaining the project components.

PV Water plans to design the College Lake components to operate automatically such that they would generally be unmanned. One or two existing full time staff members would operate and maintain the facilities as needed.

The proposed weir structure would be adjustable and would be raised and lowered seasonally as needed for water storage and fish passage. When water is available and needed to meet irrigation demand, PV Water would pump water from College Lake through the intake to the new water treatment plant. The filtered and disinfected water would flow though the proposed College Lake pipeline, serving agricultural uses along the route, and connecting to the CDS and recycled water facilities within the Watsonville Wastewater Treatment Plant. Current estimates indicate that the proposed Project would provide up to 3,000 AFY of water.

Environmental Commitments Proposed as Part of the Project

Appendix NOP-3 identifies mitigation measures that apply to the proposed Project and were adopted by the PV Water Board of Directors on April 16, 2014 as part of the mitigation monitoring and reporting program for the BMP Update.

Permits and Approvals

The proposed Project may require permits and other approvals from the following agencies:

Federal

- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife Service
- National Marine Fisheries Service

State

- California Office of Historic Preservation
- California Division of Safety of Dams
- State Water Resources Control Board
- Central Coast Regional Water Quality Control Board
- California Department of Fish and Wildlife
- California Department of Transportation

Local

- Monterey Bay Air Resources District
- PV Water
- Santa Cruz County
- Santa Cruz County Regional Transportation Commission
- City of Watsonville

Environmental Effects to be Analyzed

The EIR will analyze at a project level of detail the environmental effects of constructing, operating, and maintaining the proposed Project. As indicated above, the proposed Project includes mitigation measures adopted by the Board to reduce the severity and magnitude of environmental effects (presented in Appendix NOP-3). Analyses conducted as part of the College Lake Integrated Resources Management Project EIR may identify the need for additional mitigation, which could take the form of (1) modifications to update the mitigation measures presented in Appendix NOP-3 to reflect current conditions and site-specific impacts; or (2) new mitigation measures to replace or augment an adopted mitigation measure. Topics to be addressed in the EIR include, but are not limited to, the following:

Land Use and Agricultural Resources

Existing land uses at and in the vicinity of proposed Project components include agricultural, residential, commercial, public and other uses. Construction and operation of the proposed Project components could temporarily or permanently affect land uses in the Project area. The EIR will evaluate the potential for implementation of the proposed Project to physically divide existing land uses or conflict with applicable local, regional, and state land use plans and policies.

Farming occurs within parts of, and in the area surrounding, College Lake and the two optional water treatment plant sites proposed, and along portions of the two optional pipeline alignments proposed. The proposed Project may affect land that is designated prime, unique, or farmland of statewide or local importance.[8] PV Water is proposing to construct, operate and maintain new facilities within and near agricultural lands, which could result in the temporary or permanent removal of agricultural soils from production. In addition, the increased area of inundation at College Lake and changes in the length of time of inundation might reduce the agricultural productivity of the land. On the basis of proposed design and operating characteristics and modeling, the EIR will evaluate the effects of the proposed Project on agricultural resources.

Surface Water Hydrology and Water Quality

Project construction and operation could affect surface water hydrology and water quality as follows. Ground disturbances during construction could discharge sediment and other pollutants to stormwater. The proposed Project would result in new impervious surfaces at the water treatment plant and weir structure which would result in an increase in surface runoff and decrease in groundwater infiltration. The proposed Project could also alter drainage and flow patterns through the installation and operation of a new weir structure in Salsipuedes Creek, potentially resulting in erosion, deposition, flooding and/or changes in creek flows. As part of the CEQA process, the potential impacts related to flood hazards will be evaluated. Mitigation Measures HWQ-1 (apply for and implement requirements of National Pollutant Discharge

[8] California Department of Conservation. Farmland Mapping and Monitoring Program, Division of Land Resource Protection, California Important Farmland Finder. Accessed on September 29, 2017. Available online at https://maps.conservation.ca.gov/DLRP/CIFF/.

Elimination System permits), HWQ-2 (avoid rapid, imposed water level fluctuations), and HWQ-4 (facilities shall not exacerbate flood hazards on other properties) described in Appendix NOP-3 would be implemented as part of the proposed Project. The analysis to be presented in the EIR will include hydrologic and hydraulic modeling conducted for the proposed Project, as well as information regarding local hydrology and water quality collected by PV Water and the Central Coast Regional Water Quality Control Board. The EIR will describe the effects of the proposed Project on water quality and surface water hydrology during Project construction and operations.

Groundwater Resources

By diverting water that would otherwise flow through Salsipuedes Creek, the proposed Project could reduce the amount of water available to recharge groundwater downstream of the proposed weir. This same diverted water would be treated and distributed through the College Lake pipeline and delivered to water users. The proposed Project would decrease the amount of water these users pump from the groundwater basin, helping to reduce existing groundwater overdraft conditions. Construction activities could also temporarily affect unconfined groundwater during excavation. Mitigation Measure HWQ-3 (mitigate the loss of pumping in existing wells) described in Appendix NOP-3 would be implemented as part of the proposed Project. The EIR will describe the effects of the proposed Project on groundwater resources during Project construction and operations.

Terrestrial Biological Resources

Construction of the proposed Project could result in the temporary and/or permanent loss of habitat at proposed Project sites as well as cause construction disturbance to terrestrial habitats and wildlife as a result of short-term effects such noise, vibration, dust, and erosion. Mitigation Measures BIO-1a through 1e (avoid and protect wetlands and riparian areas), BIO-2a through BIO-2i (best management practices, special-status species protection measures, and adaptive habitat management), and BIO-3a and BIO-3b (rare plant surveys and revegetation) described in Appendix NOP-3 would be implemented as part of the proposed Project and would help protect terrestrial biological resources. The EIR will evaluate the proposed Project’s potential construction and operational impacts on terrestrial special-status plant and wildlife species, sensitive habitats including jurisdictional wetlands, protected trees, and migratory birds that have potential to occur in the Project area.

Fisheries / Aquatic Wildlife

Fisheries and aquatic wildlife could be affected by construction and operation of the proposed Project. Mitigation Measures 2l FISH-1 through FISH-6 (worker training, biological monitoring, and water quality best management practices), BIO-2m (water diversion timing), BIO-2n (seasonal construction work windows), BIO-2o (protection of steelhead migratory habitat), and BIO-2p (streamflow monitoring) described in Appendix NOP-3 would be implemented as part of the proposed Project. The EIR will evaluate potential impacts of the proposed Project on regulated fisheries resources, fish passage, and fisheries habitat resulting from Project implementation. Impacts to fisheries during construction and operation will be considered, with a focused assessment of water diversion operations, including bypass volumes, rates, and timing from College Lake as they relate to fisheries resources. Particular attention will be given to fish passage and rearing requirements to be identified during coordination with the National Marine Fisheries Service and the California Department of Fish and Wildlife.

Air Quality and Greenhouse Gas Emissions

Emissions of criteria pollutants and criteria pollutant precursors would be generated during construction of the proposed Project components. Such emissions could contribute to an exceedance of an ambient air quality standard and/or cause potential human health risks at nearby sensitive receptor locations. Mitigation Measure AQ-1 (dust control program) described in Appendix NOP-3 would be implemented as part of the proposed Project. Direct and indirect emissions of greenhouse gases (GHG) would also be generated during construction and operations of the proposed Project. For the EIR, the analysis will use construction equipment inventory and other information associated with the proposed Project as inputs to estimate air pollutant and GHG emissions using the CalEEMod emissions model. For significance conclusions, estimated emissions will be compared to Monterey Bay Air Resources District significance criteria as identified in its *Guidelines for Implementing CEQA*, revised February 2016. The EIR will also describe any potential conflict the proposed Project may have with an applicable plan, policy, or regulation adopted for the purpose of reducing criteria pollutant emissions and/or emissions of GHGs.

Geology and Soils

Proposed Project activities would occur in a seismically-active region, and in areas with potentially unstable soils. In addition, ground disturbance during construction activities would expose soil to erosion. Mitigation Measures GS-1 (implement geotechnical report recommendations related to seismic hazards), GS-2 (erosion control plans), and GS-3 (implement geotechnical report recommendations related to soil constraints) described in Appendix NOP-3 are being, and would continue to be, implemented. For the EIR, the analysis will use information about the geology and soils in the Project vicinity as well as available geotechnical reports developed for the proposed Project to evaluate Project impacts (see **Figure 4** for a topographic map of College Lake). The EIR will describe the effects of the proposed Project on seismic hazards, soil erosion, and unstable or corrosive soils during Project construction and operations.

Hazards and Hazardous Materials

The use of construction equipment and excavation for proposed Project components could result in accidental release of hazardous materials into the environment during construction, either from construction vehicles and equipment (e.g., fuels, lubricants) or from contaminated soil or groundwater disturbed during grading. Mitigation Measures HM-1 (soil testing of agricultural sites) and HM-2 (Phase 1 Environmental Site Assessment for pipelines) described in Appendix NOP-3 would be implemented as part of the proposed Project. Using information collected from regulatory agency databases as well as from previous environmental reviews, the EIR will evaluate the potential for contamination to occur in the vicinity of proposed Project component locations as well as the potential exposure of people and the environment to hazardous materials. The EIR will also evaluate the potential for adverse effects associated with the transport, use, and storage of hazardous materials such as water treatment chemicals to occur during proposed Project operations.

Noise

The EIR will evaluate construction- and operation-related noise increases and associated effects of the proposed Project on ambient noise levels, relative to applicable noise standards, and will address the potential for indirect impacts to nearby land uses. The EIR will include an analysis of noise compatibility standards for residential, commercial, institutional, and recreational uses, and will discuss the potential long-term impacts of noise and groundborne vibration that could result from the proposed Project. Potential short-term, construction-related noise impacts also will be described, and the analysis will evaluate the potential for Project-generated noise to affect nearby sensitive land uses in the vicinity of the proposed Project.

Transportation and Traffic

Traffic disruption along major roadways and access roads could occur during construction of the proposed Project components. The installation of pipelines within or adjacent to road rights-of-way could result in temporary street closures, lane closures and traffic delays. Mitigation Measure TR-1 (preconstruction survey of road conditions on key access routes) described in Appendix NOP-3 would be implemented as part of the proposed Project. The EIR will describe the types of construction activities for the proposed Project that would generate temporary increases in traffic volumes along local and regional roadways. The analysis will include information about construction activities (e.g., duration of activities, the numbers of trucks and workers) and will describe the types of traffic control plan measures that would be necessary for reducing effects on vehicular circulation, public transportation, and other alternative means of transportation. The EIR will also address the potential for Project construction to create traffic safety hazards or impede access for emergency vehicles. Lastly, the EIR will describe the potential for the proposed Project to affect transportation and circulation during operation and maintenance activities.

Cultural Resources

Ground disturbance activities associated with construction of the proposed Project components could adversely affect cultural resources in the area. Cultural resources studies are in progress and will include archival research, geoarchaeological review, and surveys. The EIR will evaluate potential impacts on historical, archaeological, and paleontological resources, and human remains in the area of potential effect (i.e., potential Project component sites and surrounding areas). Multiple known cultural resource sites are recorded in the proposed Project area. Mitigation Measures CR-1a (siting facilities to avoid cultural resources), CR-1b (marking of exclusion zones and resource boundaries), and CR-1c (Accidental Discovery of Archeological Resources) described in Appendix NOP-3 would be implemented as part of the proposed Project. The EIR will characterize the archaeological sensitivity of proposed Project component locations and revise or identify new appropriate mitigation measures, if necessary, based on the identification of known resources and the likelihood of encountering archaeological resources during earth-disturbing construction activities that may occur during Project implementation.

Tribal Cultural Resources

Since completion of the BMP Update PEIR there have been changes in state law due to the passage of Assembly Bill 52 (AB 52). AB 52 established a new category of resources related to Native Americans that require consideration under CEQA, known as tribal cultural resources, which are defined as "sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American Tribe" that are either included or determined to be eligible for inclusion in the California Register or included in a local register of historical resources, or a resource that is determined to be a tribal cultural resource by a lead agency, in its discretion and supported by substantial evidence.[9] On July 30, 2016, the California Natural Resources Agency adopted the final text for tribal cultural resources update to Appendix G of the CEQA Guidelines, which was approved by the Office of Administrative Law on September 27, 2016. The EIR will evaluate potential impacts to tribal cultural resources and identify appropriate mitigation measures, as warranted.

Utilities and Service Systems

The EIR will describe potential conflicts with existing utility lines that could occur during construction of the proposed Project, and describe potential impacts related to landfill capacity associated with the disposal of spoils and debris generated during construction of project components. Consistency with federal, state, and local waste diversion goals will also be evaluated.

Aesthetic Resources

The proposed Project would site new facilities aboveground in the College Lake area which could adversely affect aesthetic resources. Mitigation Measures AE-1a, AE-1b, and AE-1c (design elements to enhance visual integration) described in Appendix NOP-3 would be implemented as part of the proposed Project. The EIR will evaluate construction- and operations-phase impacts to aesthetic resources related to the proposed components.

Energy

Water conveyance is a large source of energy consumption in California. The proposed Project components would result in new energy uses associated with water treatment, pumping, and conveyance facilities, and potential decreases in individual energy uses from expected changes in groundwater pumping. The EIR will quantify and disclose the various types and amounts of energy that would be consumed during short-term construction and long-term operation, including volumes of gasoline and diesel fuel, and kilowatt hours of electricity. The proposed Project will be evaluated relative to its potential to result in substantially inefficient or wasteful consumption of energy, and its potential to result in substantial transportation energy use requirements.

---

9 Public Resources Code Section 21074(a)(1) and (2).

Forestry and Mineral Resources

The proposed College Lake pipeline (proposed and optional alignment segments) would be installed generally in existing roadways or agricultural fields. The water treatment plant and weir structure would be located in parcels zoned for agriculture. The entire Project area is mapped by the California Geological Survey as MRZ-1 (no significant mineral deposits are present).[10] Therefore, no impact to mineral resources is expected and the EIR will not address this topic.

The proposed Project area contains no timber harvesting activities or land specifically designated as forest land or timberland. No impact to forestry resources would occur and the EIR will not address this topic.

Population and Housing

Project facilities would not displace substantial numbers of people or existing housing given the location of proposed facilities and existing land uses on affected parcels (refer to Figures 3a through 3e). The proposed Project would not increase available water supplies for domestic or municipal purposes (instead, surface water supplies would be substituted for groundwater supplies currently used for irrigation) and, consequently, the proposed Project would not induce any substantial population growth. The new water supply developed under the proposed Project would replace use of groundwater in an effort to stop overdraft and seawater intrusion in the groundwater basin. For these reasons, impacts to population and housing would be less than significant and the EIR will not address these topics.

Public Services

The proposed Project involves a public service (the provision of non-potable supplemental water supplies to replace groundwater pumping); however, the Project would not increase the overall available water supply nor result in construction of uses (e.g., residential, commercial) that would generate increased demand of public services (e.g., fire or police protection). Although implementation of the proposed Project is not expected to result in the need for new or physically altered governmental facilities for fire protection, police protection, schools, parks or other public facilities, the EIR will review the potential effects of the proposed Project on these public services resulting from both construction and operation of Project components.

Alternatives

The EIR will identify and evaluate alternatives capable of feasibly meeting most of the basic objectives of the proposed Project while reducing significant environmental effects, in addition to discussing a “No Action” alternative.

[10] California Geological Survey, 1987. *Mineral Land Classification: Aggregate Materials in the San Francisco – Monterey Bay Area.* DMG Special Report 146 Part IV.

Growth Inducement

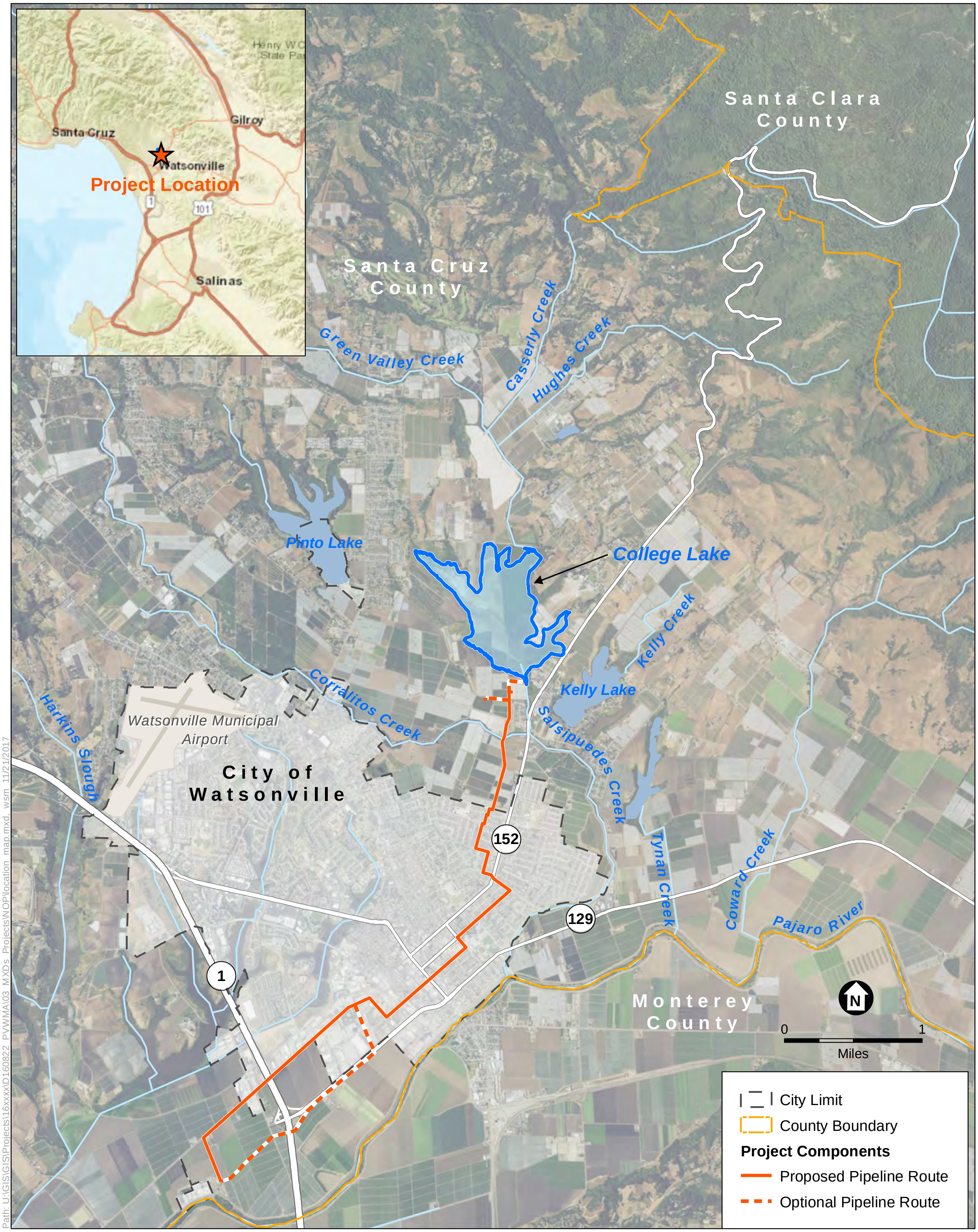
CEQA requires a discussion of a project's potential to remove an obstacle to growth (e.g., a major public service expansion) or result in increases in population, and an evaluation of the potential indirect environmental impacts, or secondary effects, of that growth (CEQA Guidelines section 15126.2(d)). The 2014 BMP Update PEIR concluded that "implementation of the BMP Update's components would not result in construction of residential, commercial, or industrial structures, and thus would not directly foster population or economic growth."[11] The purpose of the BMP Update components, of which the proposed Project is a part, is to help balance the groundwater basin, prevent further seawater intrusion, and meet the water supply needs in the service area. The BMP Update components do not provide water supply for municipal or industrial uses that would support growth of residential, commercial, or industrial uses. The water supply from College Lake under the proposed Project would not be a new potable water supply source but would be used to offset existing groundwater pumping for agricultural use. PV Water's enabling act also includes provisions indicating that no water shall be imported for purposes other than agricultural use. The proposed Project would not expand PV Water's service area, or increase water supply to meet planned growth within the service area. Given that the proposed Project is consistent with the 2014 BMP Update PEIR conclusions, the EIR will not address growth inducement.

Cumulative Impacts

The EIR will assess the environmental effects of the proposed Project, in combination with the effects of past, present, and future foreseeable cumulative projects in the vicinity, which together could result in significant cumulative impacts. The EIR will include a list of projects with the potential to contribute to cumulative effects, including (for example) the U.S. Army Corps of Engineer's Pajaro River Flood Risk Management Study[12] as well as other projects being implemented under PV Water's BMP Update.

[11] Pajaro Valley Water Management Agency, 2014. *Final Environmental Impact Report for the Basin Management Plan Update*, February 2014.

[12] U.S. Army Corps of Engineers, San Francisco District. 2017. Pajaro River Flood Risk Management General Reevaluation Report & Integrated Environmental Assessment, Updated Draft FONSI and Executive Summary to the Draft General Reevaluation Report and Integrated EA. November 2017.

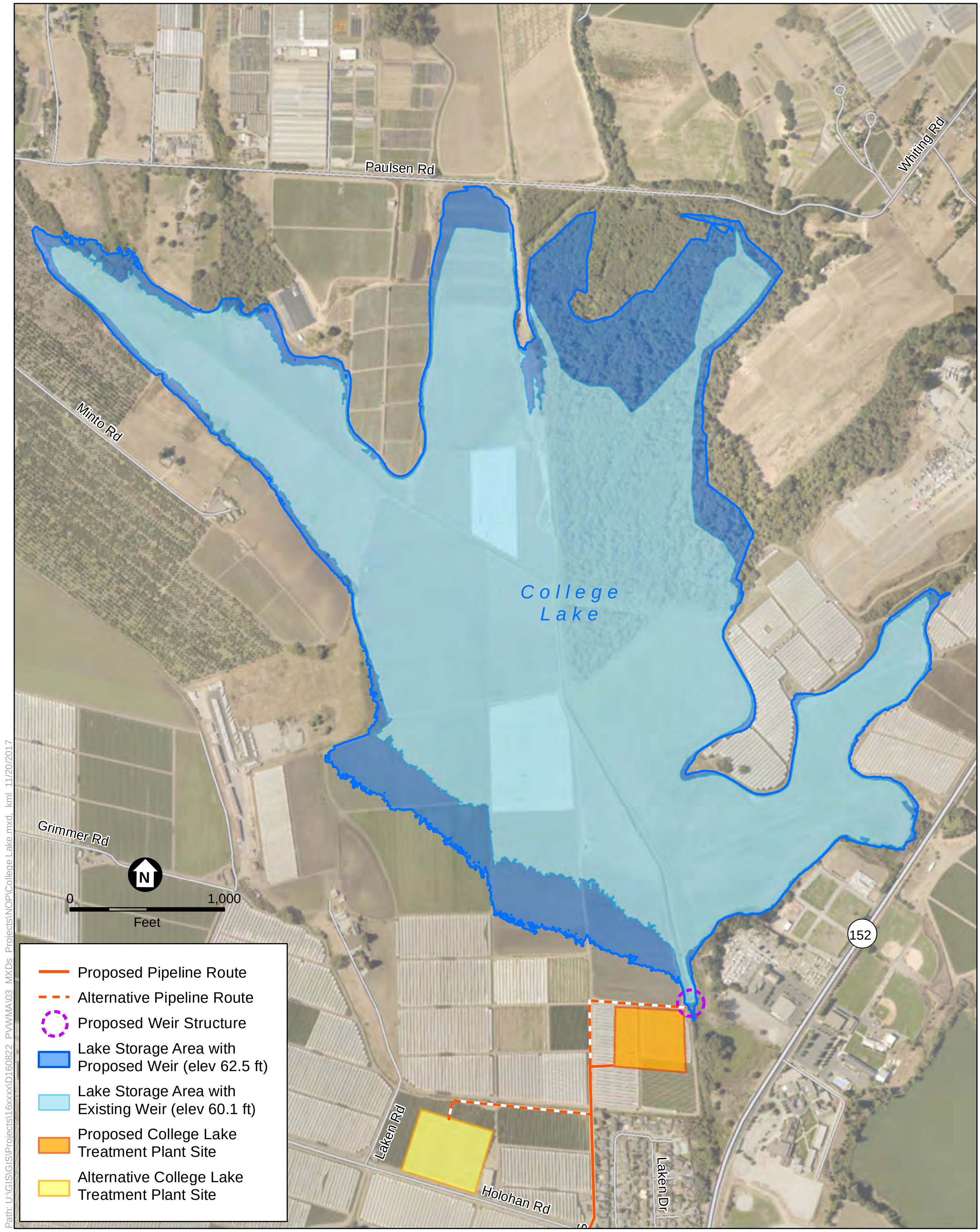


SOURCE: Carollo Engineers, 2017; ESRI World Imagery, 7/23/2016; ESA

College Lake Integrated Resources Management Project

Figure 1
Project Location Map

ESA

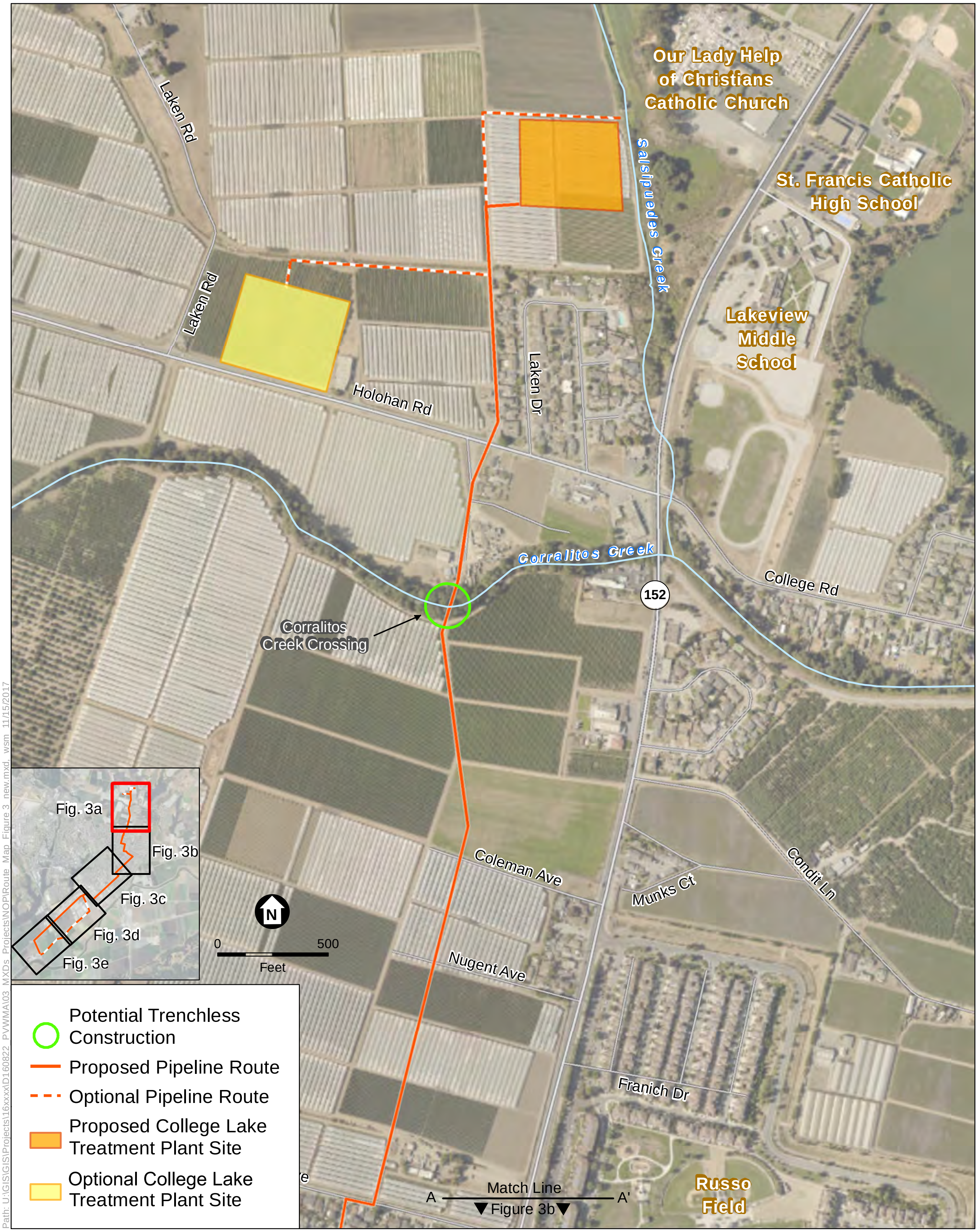


SOURCE: Carollo Engineers, 2017; ESRI World Imagery, 7/23/2016; ESA

College Lake Integrated Resources Management Project

Figure 2
College Lake

ESA



SOURCE: Carollo Engineers, 2017; ESRI World Imagery, 7/23/2016; ESA

College Lake Integrated Resources Management Project

Figure 3a
Pipeline Alignment

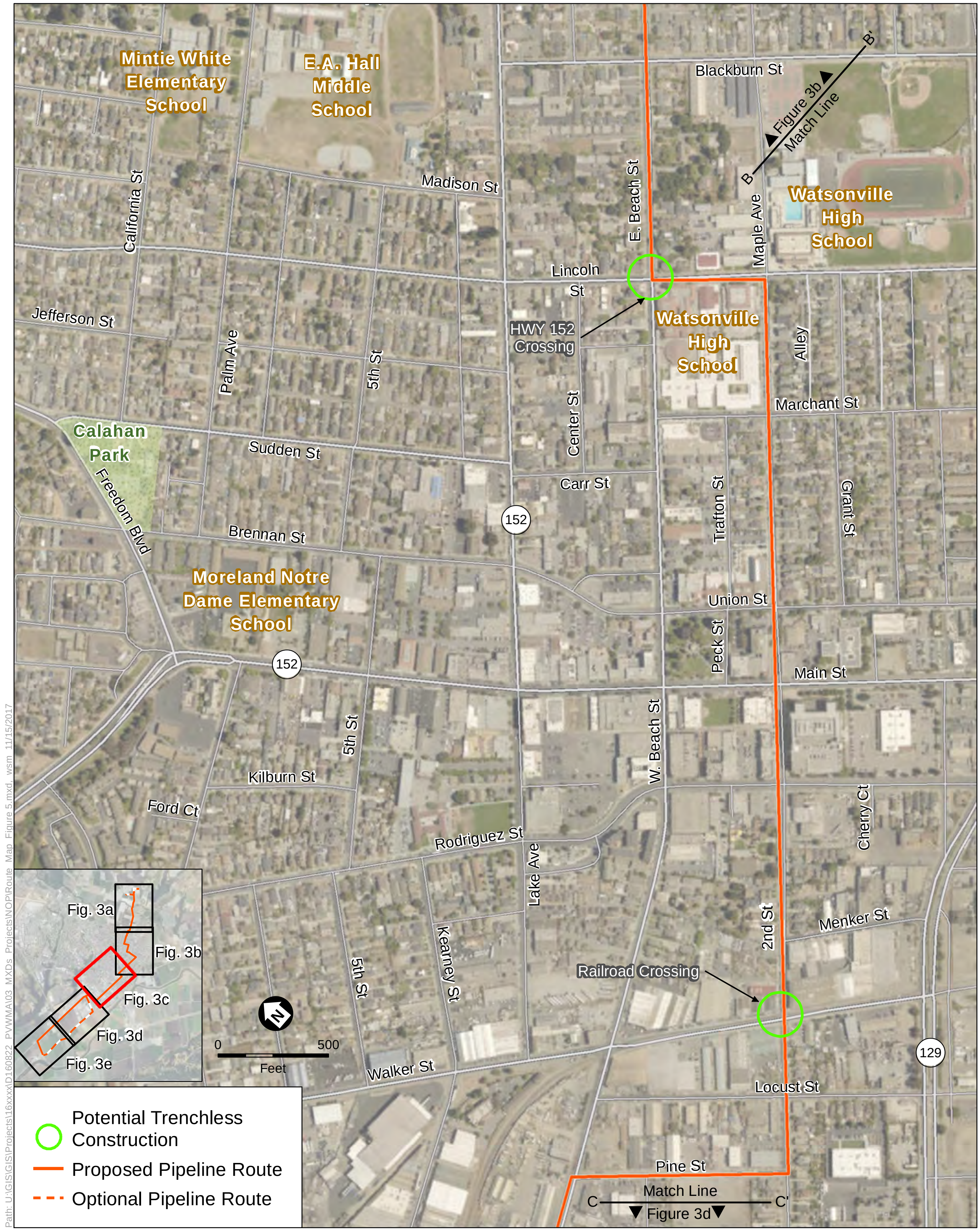
ESA

SOURCE: Carollo Engineers, 2017; ESRI World Imagery, 7/23/2016; ESA

College Lake Integrated Resources Management Project

Figure 3b
Pipeline Alignment

ESA

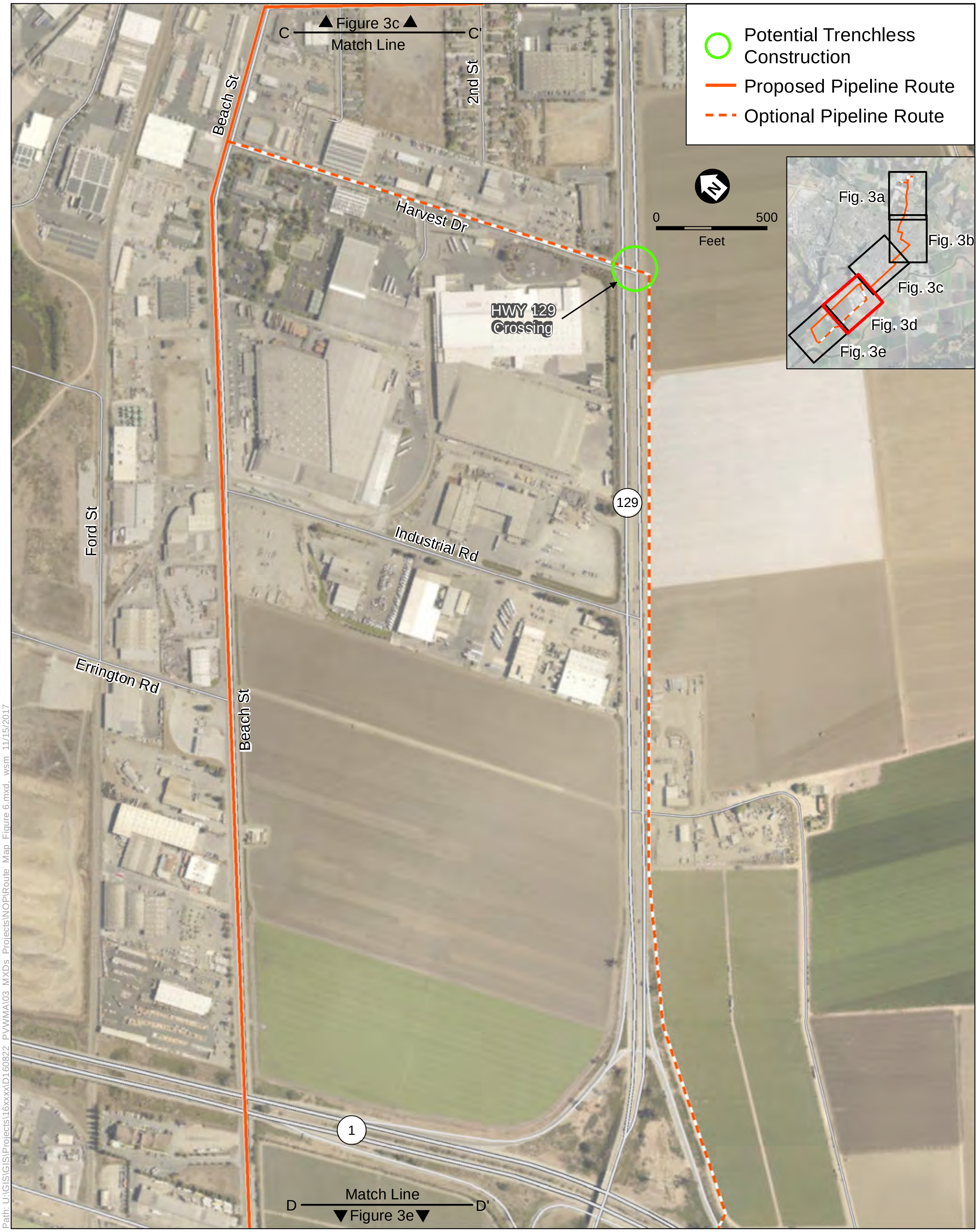


SOURCE: Carollo Engineers, 2017; ESRI World Imagery, 7/23/2016; ESA

College Lake Integrated Resources Management Project

Figure 3c
Pipeline Alignment

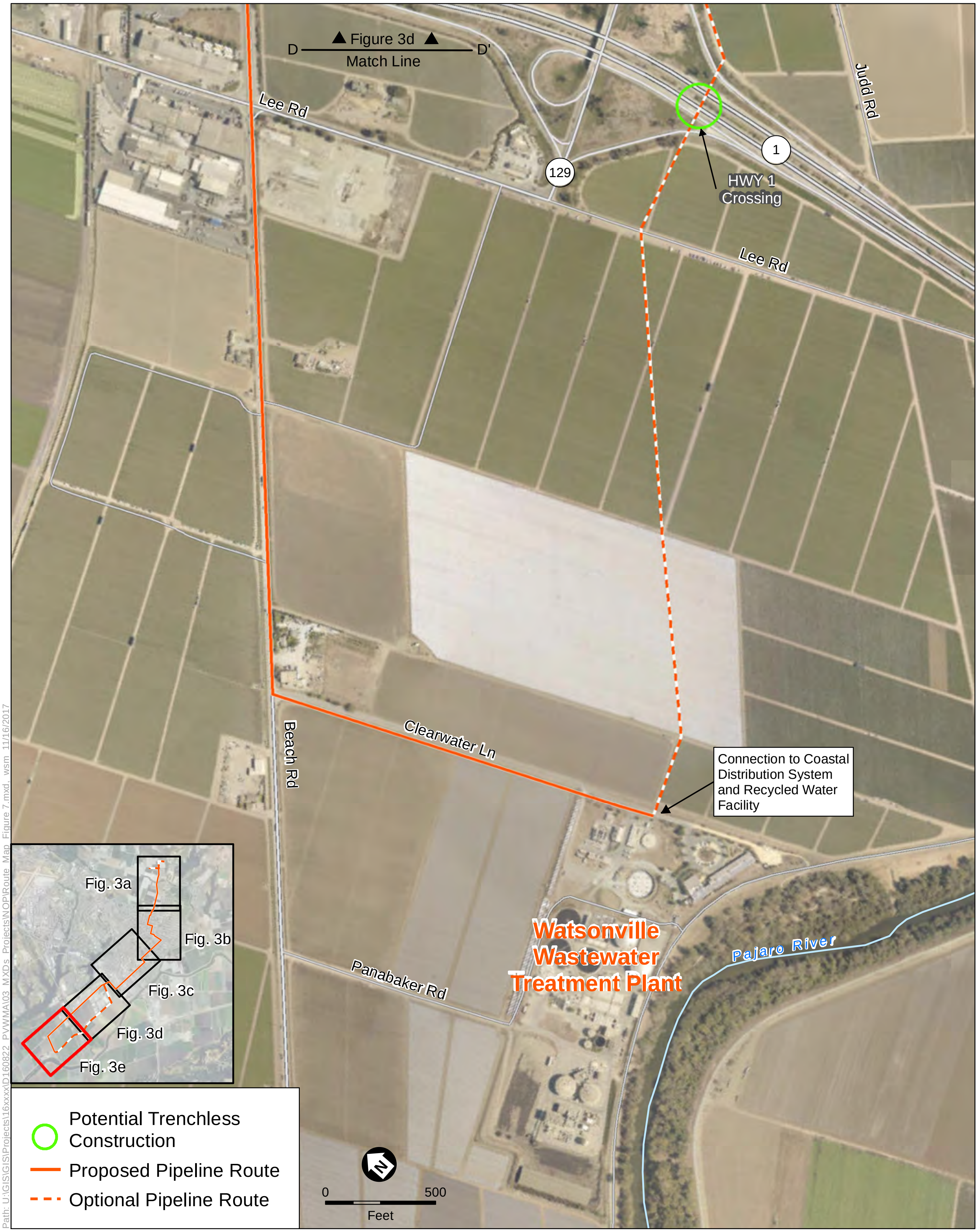
ESA



SOURCE: Carollo Engineers, 2017; ESRI World Imagery, 7/23/2016; ESA

College Lake Integrated Resources Management Project

Figure 3d
Pipeline Alignment

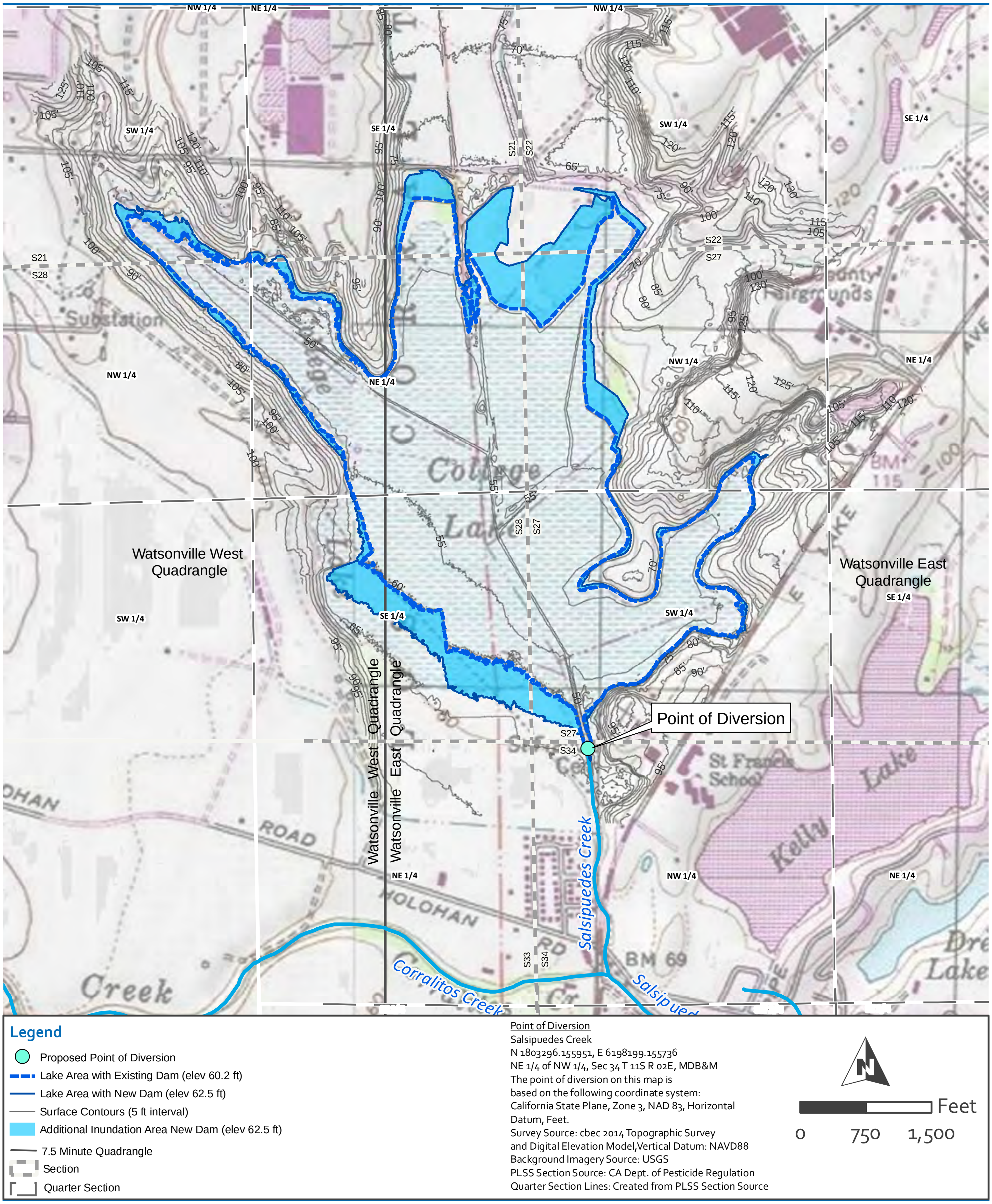


SOURCE: Carollo Engineers, 2017; ESRI World Imagery, 7/23/2016; ESA

College Lake Integrated Resources Management Project

Figure 3e
Pipeline Alignment

ESA



SOURCE: Carollo Engineers, August 14, 2017

College Lake Integrated Resources Management Project

Figure 4

College Lake Topography

ESA

APPENDIX NOP-1

Assessor Parcel Numbers Associated with the College Lake Integrated Resources Management Project

This Appendix lists the Assessor Parcel Numbers of privately owned properties that are wholly or partially within the footprint of the proposed water storage area for College Lake or other proposed facilities (e.g., weir structure, College Lake pipeline, water treatment plant).

PARCELS POTENTIALLY AFFECTED BY THE COLLEGE LAKE INTEGRATED RESOURCES MANAGEMENT PROJECT

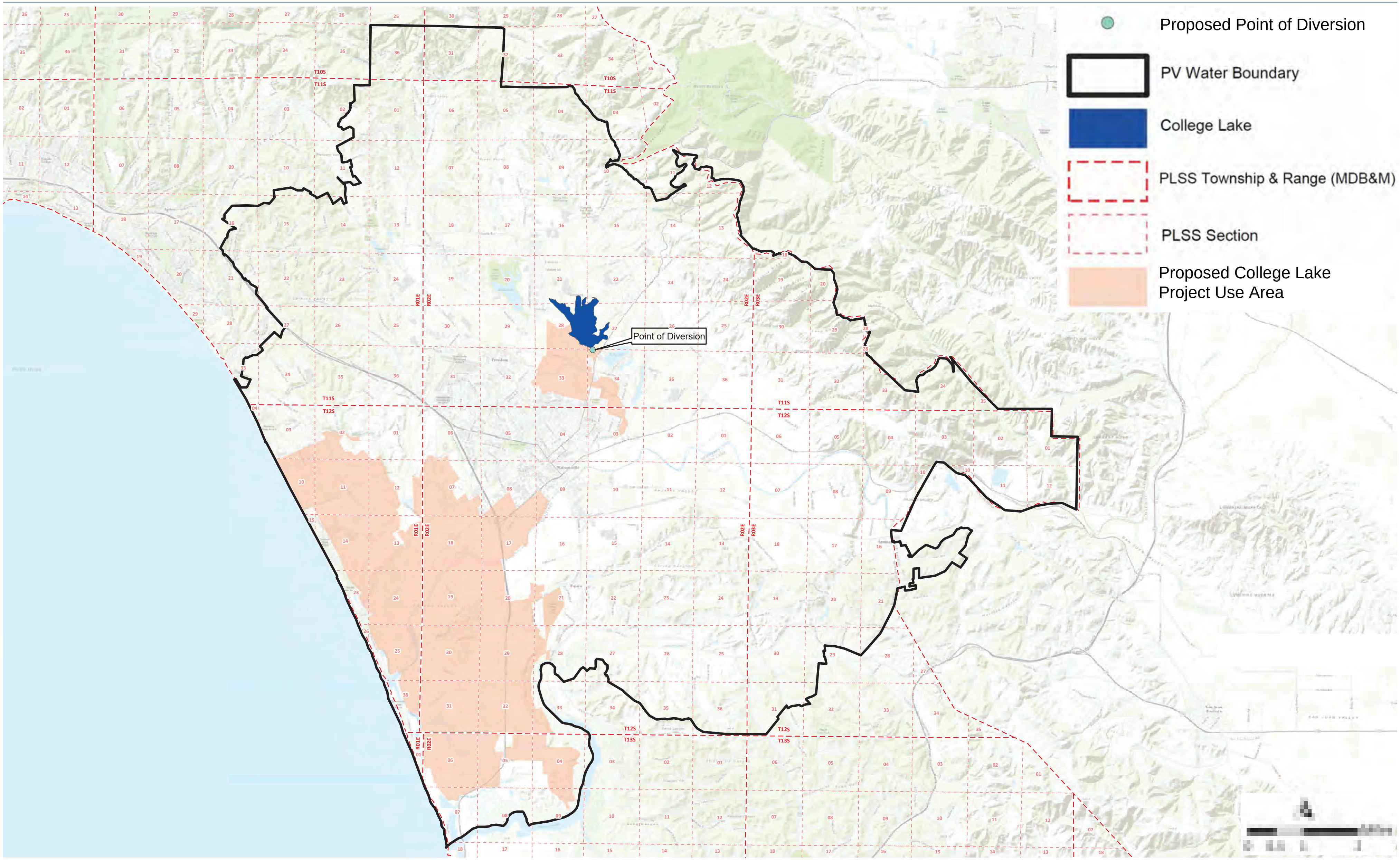
COLLEGE LAKE STORAGE AREA[1]			
051-101-07	051-101-18	051-441-02	051-441-27
051-101-09	051-101-19	051-441-04	051-441-28
051-101-10	051-101-20	051-441-11	051-651-01
051-101-11	051-101-22	051-441-12	051-651-04
051-101-12	051-101-24	051-441-20	051-651-05
051-101-13	051-101-50	051-441-22	
051-101-15	051-101-78	051-441-24	
WEIR STRUCTURE			
051-441-24	051-441-28		
WATER TREATMENT PLANT			
051-101-47	051-441-24		
COLLEGE LAKE PIPELINE[2]			
019-131-04	051-441-01	052-243-21	052-581-04
048-231-09	051-441-24	052-272-01	052-581-06
048-231-16	052-243-11	052-272-02	052-581-09
048-241-01	052-243-12	052-371-06	052-581-13
048-242-01	052-243-15	052-371-07	052-581-14
051-101-47	052-243-16	052-371-09	
051-243-18	052-243-17	052-371-10	
051-271-01	052-243-20	052-371-11	

NOTES:
[1] These are parcels that are wholly or partially within the proposed water storage area.
[2] With the exception of the following parcels, the proposed alignment for the College Lake pipeline is within the public right of way in unincorporated Santa Cruz County and the City of Watsonville.

APPENDIX NOP-2

College Lake Proposed Place of Use

This Appendix shows the proposed place of use for the College Lake Integrated Resources Management Project. The proposed place of use includes parcels served by the existing coastal distribution system (CDS), parcels that may be served by an expanded CDS, and parcels near the College Lake Pipeline.



SOURCE: California State Plane, Zone 3, NAD 83, Horizontal Datum, Feet; CA Department of Pesticide Regulation; Carollo Engineers, 2017.

Notes:

1. The Point of Diversion is in Salsipuedes Creek.
2. The proposed place of use includes parcels served by the existing coastal distribution system (CDS), parcels that may be served by an expanded CDS, and parcels near the College Lake Pipeline.
3. PLSS - Public Land Survey System; MDB&M - Mount Diablo Baseline and Meridian

College Lake Integrated Resources Management Project

Project Use Area Map

APPENDIX NOP-3

2014 BMP Update PEIR Impacts, Mitigation Measures, and Applicability to the Proposed Project

The College Lake Integrated Resources Management Project (proposed Project) was analyzed under its former name—the College Lake with Inland Pipeline to Coastal Distribution System — at a program-level in the 2014 Basin Management Plan Update Program Environmental Impact Report (2014 BMP Update PEIR) as one of seven components under the BMP. The 2014 BMP Update PEIR identified programmatic mitigation measures. Under Resolution No. 2014-05, the PV Water Board of Directors adopted the BMP Update Mitigation Monitoring and Reporting Program that identifies programmatic mitigation measures applicable to the BMP Update components, including the proposed Project. The EIR for the proposed Project will provide a detailed, project-level analysis of the proposed Project based on site-specific and up-to-date information developed subsequent to the preparation of the 2014 BMP Update PEIR.

TABLE NOP 3-1
IMPACTS AND MITIGATION MEASURES ADOPTED FOR THE BMP UPDATE

Impact	Mitigation Measure
AESTHETICS	
Impact AE-1*:* Implementation of the BMP Update and future construction of identified BMP components would not generally alter the visual character of the sites or surrounding area, although some of the structural development may be visible. This represents a potentially significant impact that will be reduced to a less-than-significant level with the incorporation of mitigation measures listed below.	***AE-1a*****:** PVWMA shall use design elements to enhance visual integration of the proposed above-ground facilities with their surroundings. Proposed structures shall be painted low-glare earth-tone colors that blend with the surrounding terrain, unless colors otherwise specified by regulatory agencies, such as purple facilities for recycled water systems.
See Impact AE-1.	***AE-1b*****:** PVWMA shall use design elements and landscaping to enhance visual integration of the College Lake pumping and filtration facilities with their surroundings. Proposed facilities shall be painted low-glare earth-tone colors that blend closely with the surrounding terrain. Vegetation shall be planted at proposed facilities to provide screening from views of the facilities from Highway 152.
See Impact AE-1.	***AE-1c:*** PVWMA shall shield the weir with vegetation to minimize textural contrasts with the surrounding vegetation using grasses, shrubs and trees typical of the immediately surrounding area.
AGRICULTURE AND LAND USE	
Impact AG-1: Implementation of BMP Update components would result in the permanent conversion of agricultural lands. This represents a significant and unavoidable impact.	No feasible mitigation is available; this impact is significant and unavoidable.
AIR QUALITY AND GREENHOUSE GASES	
Impact AQ-1: Implementation of the BMP Update components would temporarily generate criteria air pollutants, particularly PM10, and may expose sensitive receptors to substantial pollutant emissions during construction. This is a potentially significant impact. With mitigation measures identified in this EIR, the impact would be reduced to a less-than-significant level.	***AQ-1:*** The construction contractor shall implement a dust program that includes the following elements: • Water all active construction sites at least twice daily • Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard • Pave, apply water three times daily, or apply (non- toxic) soil stabilizers on all unpaved access roads, parking areas and staging areas at construction sites • Sweep daily (with water sweepers) all paved access roads, paved parking areas and paved staging areas at construction sites • Sweep streets daily (with water sweepers) if visible soil material is carried onto adjacent public streets. • Hydroseed or apply (non-toxic) soil binders to inactive construction areas. However, do not apply these measures in operating agricultural fields under cultivation unless requested by the grower • Enclose, cover, water twice daily or apply (non- toxic) soil binders to exposed stockpiles (dirt, sand, etc.). • Limit traffic on unpaved roads to 15 mph • Install sandbags or other erosion control measures to prevent silt runoff to public roadways • Replant vegetation in disturbed areas as quickly as possible The contractor or builder shall designate a person or persons to monitor the fugitive dust emissions and enhance the implementation of the measures as necessary to minimize dust complaints. The name and telephone number of such persons shall be provided to the APCD Compliance Division prior to the start of any grading, earthwork or demolition.

TABLE NOP 3-1 (Continued)
IMPACTS AND MITIGATION MEASURES ADOPTED FOR THE BMP UPDATE

Impact	Mitigation Measure
BIOLOGICAL RESOURCES	
Impact BIO-1: Construction of BMP Update components could result in impacts to potentially jurisdictional wetlands/waters of the U.S. and streambeds and banks under the jurisdiction of the U.S. Army Corps of Engineers, Department of Fish and Wildlife, Regional Water Quality Control Board, and/or California Coastal Commission. Potential direct impacts could occur from the loss of riparian or wetland vegetation and/or fill of wetlands or waters. Indirect impacts could occur due to sedimentation of rivers, creeks, or channels during or following construction activities, and impacts to and their function as wildlife and fishery habitat. This represents a potential significant impact which can be reduced to a less-than-significant level with the following mitigation measures. No operational impacts to wetlands or riparian vegetation are anticipated due to the BMP Update.	***BIO-1a*:** Wetlands and riparian habitat will be avoided by project construction activities. All facilities and construction activities will be maintained outside the jurisdictional area defined by riparian or emergent wetland vegetation and applicable setbacks and buffers where feasible. Within the Coastal Zone, project improvements will be located 100 feet from coastal review wetlands. Within the City of Watsonville, development will be located 100 feet from riparian areas. Within the unincorporated areas of the County, yet outside the Coastal Zone, a setback of 30 feet and 50 feet will be established adjacent to intermittent and perennial streams, respectively. If complete avoidance of wetlands and riparian areas is infeasible and/or development occurs within a regulated buffer/setback area, impacts would be minimized through implementation of Mitigation Measures BIO-1b, BIO- 1c BIO-1d, and BIO-1e.
See Impact BIO-1.	***BIO-1b****:* Standard measures to maintain water quality and to control erosion and sedimentation will be implemented. These measures include: • Restrict trenching across all waterways to low-flow periods. • Exclude water from around the section of trench that is within the actively flowing channels. This will further reduce the potential for sediment or other pollutants to enter the waterways and impact downstream resources. The diversion will consist of water pillows, rock, sandbags, or other structural methods deemed most effective by the project engineer. • Place sediment curtains downstream of the construction zone to prevent sediment disturbed during trenching activities from being transportedand deposited outside of the construction zone. • Locate spoil sites so they do not drain directly into the waterways. If a spoil site drains into a channel, catch basins will be constructed to intercept sediment before it reaches the channels. Spoil sites will be graded to reduce the potential for erosion. • Prepare and implement a spill prevention plan for potentially hazardous materials. The plan will include the proper handling and storage of all potentially hazardous materials, as well as the proper procedures for cleaning up and reporting of any spills. If necessary, containment berms will be constructed to prevent spilled materials from reaching the creek channels. • Store equipment and materials away from the waterways, outside existing levees or at least 50 feet from waterways, but within the pipeline right-of-way. No equipment or materials will be deposited within 100 feet of wetlands. • Provide proper and timely maintenance for vehicles and equipment used during construction to reduce the potential for mechanical breakdowns leading to a spill of materials into or around the creeks. Maintenance and fueling will be conducted in an area that meets the criteria set forth in the spill prevention plan (i.e., away from the creeks). • Prior to construction, install temporary construction fencing at the perimeter of the construction zone to prevent inadvertent equipment access or construction staging within adjacent riparian forest and/or coastal marsh habitats. This fencing will be signed in the field as "SENSITIVE HABITAT AREA — NO CONSTRUCTION ACCESS". Monitor construction activities to verify compliance with the perimeter fencing and limits of construction access and staging and implement remedial action if non-compliance is noted. • Restrict limbing of riparian forest trees; if trees are limbed for construction access, document the impact and provide compensation as per Mitigation Measure BIO-1c.

TABLE NOP 3-1 (Continued)
IMPACTS AND MITIGATION MEASURES ADOPTED FOR THE BMP UPDATE

Impact	Mitigation Measure
BIOLOGICAL RESOURCES (cont.)	
See Impact BIO-1.	**BIO-1c**: Where impacts to mixed riparian or willow riparian forest occurs, revegetation measures will be developed as part of a revegetation plan approved by CDFW, RWQCB, and if applicable, USACE and/or California Coastal Commission, pursuant to regulatory agency permitting. The revegetation plan will include specific plans for the revegetation of impacted riparian forest, and for restoration of nearby creek riparian habitat, as appropriate. Upon approval by Santa Cruz County and other applicable agencies, the PVWMA may choose to coordinate with the Natural Resources Conservation Service (NRCS) and the Santa Cruz County Resource Conservation District (RCD) to develop and implement the required riparian revegetation, including providing funds to the RCD for their implementation of the revegetation. Revegetation measures will include the use of locally obtained plant materials, detailed descriptions of installation methods, after-installation care, weed control measures, success criteria, and corrective measures if the success criteria are not met. Revegetation will include a 3:1 replacement ratio the acreage of riparian habitat lost and for all trees lost as result of the project to account for the reduced habitat values of smaller trees compared with mature vegetation. Success criteria for replanting will be less than 20 percent mortality of individual species yearly for 5 years. Replanting will be conducted each year that plantings exceed 20% mortality, such that 80% plant survival is maintained each year of the 5-year monitoring period. Cover provided by invasive, non-native plant species shall not exceed 5% during each year of the 5-year monitoring period.
See Impact BIO-1.	**BIO-1d**: Where impacts to coastal freshwater marsh occurs, revegetation measures will be developed as part of a revegetation plan approved by CDFW, RWQCB, USACE, and/or California Coastal Commission, pursuant to regulatory agency permitting. Upon approval by Santa Cruz County and other applicable agencies, the PVWMA may choose to coordinate with the Natural Resources Conservation Service (NRCS) and the Santa Cruz County Resource Conservation District (RCD) to develop and implement the required wetland revegetation, including providing funds to the RCD for their implementation of the revegetation. The revegetation plan will include specific plans for the revegetation of impacted coastal marsh, and for restoration of nearby wetland habitat, as appropriate. Revegetation measures will include the use of locally obtained plant materials, detailed descriptions of installation methods, after-installation care, weed control measures, success criteria, and corrective measures if the success criteria are not met. Revegetation will include a 3:1 replacement ratio (or an equivalent habitat replacement strategy as agreed upon by PVWMA and regulatory agencies) for impacted wetlands. If natural recovery is a viable strategy, then a wetland plant cover exceeding 50% should be attained after two growing seasons. Mitigation may occur via restoration, creation, or preservation of wetlands. Mitigation will occur at a site acceptable to permitting agencies and pursuant to Project permit requirements. If the compensatory mitigation includes restoration, enhancement, or creation of wetlands, a qualified biologist will monitor the designated wetland mitigation area for a minimum of five years to ascertain if the wetland mitigation is successful. Annual reports will be submitted to permitting agencies by December 31 of each monitoring year, describing the results of the monitoring and any remedial actions needed to achieve a minimum 3:1 habitat replacement ratio or equivalent for permanent impacts to wetlands and other waters.
See Impact BIO-1.	**BIO-1e**: Where construction and/or facilities are placed within a riparian or wetland development setback area, indirect impacts to adjacent riparian and wetland vegetation will be minimized. Where feasible, buffer plantings of native trees and shrubs will be installed between the facility and the adjacent wetland or riparian resource to provide a vegetated buffer. A buffer planting plan will be prepared as part of a revegetation plan approved by CDFW, RWQCB, USACE, and/or California Coastal Commission, pursuant to regulatory agency permitting. The buffer planting plan will include specific revegetation measures, including the use of locally obtained plant materials, detailed descriptions of installation methods, after-installation care, weed control measures, success criteria, and corrective measures if the success criteria are not met.

TABLE NOP 3-1 (Continued)
IMPACTS AND MITIGATION MEASURES ADOPTED FOR THE BMP UPDATE

Impact	Mitigation Measure
BIOLOGICAL RESOURCES (cont.)	
Impact BIO-2: Construction and operation of BMP Update components could result in a substantial adverse effect, either directly or through habitat modifications on; or substantially reduce the number or restrict the range of any wildlife species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service. Impacts could occur due to increased sedimentation in streams, dewatering of pools, reducing the wetted extent (including exposing CRF egg masses to desiccation or predation), habitat loss through vegetation removal, destruction of nests and burrows, and other construction disturbance. This represents a potentially significant impact; however, the impact would be reduced to a less-than-significant level with incorporation of the following mitigation measures.	**BIO-2a**: During project activities, all trash that may attract predators will be properly contained, removed from the work site, and disposed of regularly. Following construction, all trash and construction debris will be removed from work areas.
See Impact BIO-2.	**BIO-2b**: All refueling, maintenance, and staging of equipment and vehicles will occur at least 65 feet from any riparian habitat or water body. The Agency will ensure contamination of habitat does not occur during such operations. Prior to the onset of work, the Agency will ensure that the contractor has prepared a plan to allow a prompt and effective response to any accidental spills. All workers will be informed of the importance of preventing spills and of the appropriate measures to take should a spill occur.
See Impact BIO-2.	**BIO-2c**: The spread or introduction of invasive exotic plant species will be avoided to the extent practicable. When practicable, invasive exotic plants in the project areas will be removed.
See Impact BIO-2.	**BIO-2d**: Prior to any on-site work in areas where special-status species may occur, a qualified biologist will conduct a tailgate training session in which all construction personnel will receive training regarding measures (below) that are to be implemented to avoid environmental impacts. This training will include a presentation of the potential for sensitive species to occur at the site and measures to protect habitat including aquatic habitat and avoid impacts to the species. All personnel working on the site will receive this training, and will sign a sign-in sheet showing they received the training.
See Impact BIO-2.	**BIO-2e**: Prior to the commencement of work, the limits of the work area (including haul routes, access ramps, storage areas and material stockpiles) will be clearly marked with orange construction fencing to prevent workers from impacting habitat outside the work area. No work will occur outside the designated marked work areas.
See Impact BIO-2.	**BIO-2f**: Each morning before work begins on any components in or within 100 feet of a suitable habitat area (defined as: riparian habitat, USACE jurisdictional wetlands or "other waters" of the U.S., or sensitive habitats identified in subsequent USFWS Biological Opinions and CDFW 1600 Lake and Streambed Alteration Agreements), a qualified monitor will survey the work site and habitat immediately surrounding the active work site for conditions that could impact special-status species, and will remain on-site whenever work is occurring that may adversely impact special-status species and their habitats. No work will be allowed to begin each morning until the monitor has inspected the work site.

TABLE NOP 3-1 (Continued)
IMPACTS AND MITIGATION MEASURES ADOPTED FOR THE BMP UPDATE

<table>
<tr><th>Impact</th><th>Mitigation Measure</th></tr>
<tr><td colspan="2">BIOLOGICAL RESOURCES (cont.)</td></tr>
<tr><td>See Impact BIO-2.</td><td>BIO-2g: A USFWS-approved biologist or biological monitor will permanently remove from within the project area(s), any individuals of exotic species, such as bullfrogs, crayfish, and centrarchid fishes to the extent practicable.</td></tr>
<tr><td>See Impact BIO-2.</td><td>BIO-2h: Upon locating individuals of special-status species that are dead or injured as a direct result of activities conducted by PVWMA, initial notification will be made to the USFWS’s Division of Law Enforcement at (916) 978-4861 (Sacramento) within three working days of its finding. The USFWS Field Office within whose area of responsibility the specimen is recovered will also be notified. Written notification will be made within five calendar days and include the date, time, and location of the carcass, a photograph, cause of death, if known, and any other pertinent information.</td></tr>
<tr><td>See Impact BIO-2.</td><td>BIO-2i: Nesting Bird Surveys. Prior to any project construction activities, the project proponent will take the following steps to avoid direct losses of nests, eggs, and nestlings and indirect impacts to avian breeding success:
• If construction activities occur only during the non- breeding season, between August 31 and February 1, no surveys will be required.
• During the breeding bird season (February 1 through August 31), a qualified biologist will survey construction areas in the vicinity of the project site for nesting raptors and passerine birds not more than 14 days prior to any ground-disturbing activity or vegetation removal. Surveys will include all potential habitats within 500 feet (for raptors) of activities and all on-site vegetation including bare ground within 250 feet of activities (for all other species). If results are positive for nesting birds, avoidance procedures will be adopted, if necessary, on a case-by-case basis. These may include implementation of buffer areas (minimum 50-foot buffer for passerines and 250-foot minimum buffer for raptors) or seasonal avoidance.</td></tr>
<tr><td>See Impact BIO-2.</td><td>BIO-2i.1: Develop Adaptive Management Plan for College Lake Waterfowl Management and Multi- Species Mitigation. To mitigate impacts to existing waterfowl or waterfowl habitat at College Lake, an Adaptive Management Plan for waterfowl management and multi-species mitigation will be developed with the consultation of the state and federal resource agencies and College Lake stakeholders. The Adaptive Management Plan for waterfowl management and multi-species mitigation at College Lake will develop multi-year baseline waterfowl population and habitat use data for future project design, environmental permitting and CEQA impact analysis of project-level alternatives. To the extent practical, it will integrate the results of ongoing College Lake hydrology and hydraulic analyses, as well as future consultations with state and federal agencies on fish flows and fish bypass criteria.

The Management Plan will be specific to the level of impact and mitigations under site-specific and project implementation conditions. However, the following standards will apply as defined during project-level design, regulatory review and CEQA analysis: The Management Plan should include terms and conditions from applicable permits and agreements as appropriate and define provisions for monitoring assignments, scheduling, and responsibility. The Management Plan should also include habitat replacement and revegetation, protection during ground-disturbing activities, performance standards, maintenance criteria, and monitoring requirements for temporary and permanent impacts consistent with mitigation in this EIR and regulatory requirements during project- specific review. The Management Plan will be in conformance with the biology mitigation measures from this EIR, and will also include terms and conditions consistent regulatory requirements as applicable from the USFWS, USACE, SWRCB, and CDFW permits during project design and permitting as applicable. The Management Plan will be prepared for project level project implementation as determined needed through future CEQA review and consultation with agencies as required under CESA and ESA.</td></tr>
</table>

TABLE NOP 3-1 (Continued)
IMPACTS AND MITIGATION MEASURES ADOPTED FOR THE BMP UPDATE

Impact	Mitigation Measure
BIOLOGICAL RESOURCES (cont.)	
See Impact BIO-2.	**BIO-2j (CRT)**: The following measures for avoidance and minimization of adverse impacts to California Red- Legged Frog (Rana draytonii) (CRF) during construction of the BMP Update components are those typically employed for construction activities that may result in short-term impacts to individuals and their habitat. The focus of these measures is on scheduling activities at certain times of year, keeping the disturbance footprint to a minimum, and monitoring. Consultation with the USFWS will be conducted and a Biological Opinion developed for each BMP Update component that requires a USACE Section 404 Wetland Permit. Ongoing and future CRF studies in the project area may result in site-specific conditions that would be integrated into the future project-level BMP Update component designs, permitting and operations. **CRF-1.** The Agency will annually submit the name(s) and credentials of biologists who would conduct activities specified in the following measures. No project activities will begin until the Agency receives approval from the Service that the biologist(s) is qualified to conduct the work. **CRF-2.** A USFWS-approved biologist will survey the work site 48 hours prior to the onset of activities. If CRF, tadpoles, or eggs are found, the approved biologist will determine the closest appropriate relocation site. The approved biologist will be allowed sufficient time to move them from the work site before work activities begin. Only USFWS-approved biologists will participate in activities associated with the capture, handling, and moving of CRF. **CRF-3.** Before any activities begin on a project, a USFWS-approved biologist will conduct a training session for all construction personnel. At a minimum, the training will include a description of the CRF and its habitat, the importance of the CRF and its habitat, general measures that are being implemented to conserve the CRF as they relate to the project, and the boundaries within which the project may be accomplished. Brochures, books and briefings may be used in the training session, provided that a qualified person is on hand to answer any questions. **CRF-4.** A USFWS-approved biologist will be present at the work site until such time as all removal of CRF, instruction of workers, and disturbance of habitat have been completed. After this time, the biologist will designate a person to monitor on-site compliance with all minimization measures and any future staff training. The USFWS-approved biologist will ensure that this individual receives training outlined in measure WPT-2 and in the identification of CRF. The monitor and the USFWS-approved biologist will have the authority to stop work if CRF are in harm's way. **CRF-5.** The number of access routes, number and size of staging areas, and the total area of the activity will be limited to the minimum necessary to achieve the project goal. Routes and boundaries will be clearly demarcated, and these areas will be outside of riparian and wetland areas to the extent practicable. **CRF-6.** Work activities will be completed between April 1 and November 1 to the extent practicable. Should the Agency demonstrate a need to conduct activities outside this period, the Agency may conduct such activities after obtaining the Service's approval. **CRF-7.** If a work site is to be temporarily dewatered by pumping, intakes will be completely screened with wire mesh not larger than five millimeters (mm) to prevent CRF from entering the pump system. Water will be released or pumped downstream at an appropriate rate to maintain downstream flows during construction. Upon completion of construction activities, any barriers to flow will be removed in a manner that would allow flow to resume with the least disturbance to the substrate. **CRF-8.** The Declining Amphibian Populations Task Force's Fieldwork Code of Practice will be followed to minimize the possible spread of chytrid fungus or other amphibian pathogens and parasites. **CRF-9:** Implement Mitigation Measure 3.10-1 through 3.10-4 in Section 3.10, Hydrology and Water Quality: Surface Water Systems.

TABLE NOP 3-1 (Continued)
IMPACTS AND MITIGATION MEASURES ADOPTED FOR THE BMP UPDATE

Impact	Mitigation Measure
BIOLOGICAL RESOURCES (cont.)	
See Impact BIO-2.	**BIO-2k (WPT):** The following measures for avoidance and minimization of adverse impacts to western pond turtle (*Actinemys marmorata*) (WPT) during construction of the BMP Update project elements are those typically employed for construction activities that may result in short-term impacts to individuals and their habitat. The focus of these measures is on keeping the disturbance footprint to a minimum and aggressive monitoring of WPTs before vegetation removal and during the construction and revegetation phase. **WPT-1.** The Agency will annually submit the name(s) and credentials of biologists who would conduct activities specified in the following measures. No project activities will begin until proponents have received approval from CDFW that the biologist(s) is qualified to conduct the work. **WPT-2.** A CDFW-approved biologist will survey the work site 48 hours prior to the onset of activities. If WPT adults, juveniles or eggs are found, the approved biologist will determine the closest appropriate relocation site. The approved biologist will be allowed sufficient time to move them from the work site before work activities begin. Only CDFW-approved biologists will participate in activities associated with the capture, handling, and moving of WPT. **WPT-3.** Before any activities begin on a project, a CDFW-approved biologist will conduct a training session for all construction personnel. At a minimum, the training will include a description of the WPT and its habitat, the importance of the WPT and its habitat, general measures that are being implemented to conserve the WPT as they relate to the project, and the boundaries within which the project may be accomplished. Brochures, books and briefings may be used in the training session, provided that a qualified person is on hand to answer any questions. **WPT-4.** A CDFW-approved biologist will be present at the work site until such time as all removal of WPT, instruction of workers, and disturbance of habitat have been completed. **WPT-5.** The number of access routes, number and size of staging areas, and the total area of the activity will be limited to the project plans. Routes and boundaries will be clearly demarcated. Where impacts occur in these staging areas and access routes, restoration will occur as identified in the general BMP Update components above.
See Impact BIO-2.	**BIO-2l (FISH)**: The following measures are required to reduce impacts to special status fisheries, including steelhead and resident rainbow trout, to a less-than- significant level: **FISH-1.** A NOAA Fisheries-approved, qualified fisheries biologist would be onsite to provide preconstruction training on steelhead life-history to construction crews and to provide daily monitoring during construction activities. **FISH-2.** If the preliminary construction concept proposes the use of temporary coffer dams for isolating the work areas at the upstream and downstream extent of the project, installation and removal of the temporary coffer dams would be monitored by the qualified fisheries biologist. **FISH-3.** Following initial construction of the coffer dam bypass system, isolated standing water would be pumped from the work area to adjacent vegetated terraces, settling tanks or back into the river, if turbidity is not elevated more than 10% of background turbidity levels. **FISH-4.** If a work site is to be temporarily de-watered by pumping, intakes will be completely screened with wire mesh not larger than 0.2 inch to prevent steelhead or other native fish from entering the pump system. Water will be released or pumped downstream at an appropriate rate to maintain downstream flows during construction. Upon completion of construction activities, any barriers to flow will be removed in a manner that would allow flow to resume with the least disturbance to the substrate.

TABLE NOP 3-1 (Continued)
IMPACTS AND MITIGATION MEASURES ADOPTED FOR THE BMP UPDATE

Impact	Mitigation Measure
BIOLOGICAL RESOURCES (cont.)	
See Impact BIO-2 (cont.)	**FISH-5.** The installation and removal of the coffer dam structures would be controlled to minimize turbidity in the water. **FISH-6.** The use of best management practices would be implemented to reduce the probability of sediment and/or contaminated material from entering the creek.
See Impact BIO-2. ***Impact BIO-4:*** Construction and operation of BMP Update components may interfere substantially with the movement of native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery site. Specifically, the College Lake with Inland Pipeline to Coastal Distribution System and the Murphy Crossing with Recharge Basin components may reduce streamflows for steelhead passage, particularly for down-migrating smolts in spring months. This is a significant impact that can be reduced to a less than significant level with implementation of the following mitigation.	**BIO-2m**: No water shall be diverted from College Lake from the time the lake begins filling in late fall/early winter through the end of the smolt outmigration period (approximately May 31 or June 15) unless sufficient bypass flows are provided at the dam for unimpeded adult upstream migration through March 31, and sufficient bypass flows are provided at the dam for unimpeded smolt outmigration through May 31. The precise bypass flow levels required to achieve unimpeded migrations are not known at this time. After May 31 or June 15, the entire storage of College Lake could potentially be diverted. College Lake would likely be too warm to allow summer rearing by steelhead, especially in the presence of warm water predatory fishes.
See Impact BIO-2. **See Impact BIO-4.**	**BIO-2n**: Protection of Steelhead Migratory Habitat - Impacts to steelhead migration passage shall be minimized by carrying out construction in College Lake/Casserly Creek/Salsipuedes Creek after June 1 and prior to November 1, during which time adults and smolts do not migrate through the area.
See Impact BIO-2.See Impact BIO-4.	**BIO-2o**: *Protection* of Steelhead Migratory Habitat - The proposed College Lake with Inland Pipeline to Coastal Distribution System component shall be operated such that it complies with all minimum required bypass flow requirements during the steelhead migration period, including those developed through a new bypass flow study to be conducted by a qualified fisheries biologist in consultation with the relevant regulatory agencies.
See Impact BIO-2. **See Impact BIO-4.**	**BIO-2p**: The PVWMA shall install and operate surface-water streamflow gaging stations on Casserly Creek upstream and on Salsipuedes Creek downstream of the proposed College Lake diversion structure to monitor available diversion inflows and to provide and document future Biological Opinion-required fish bypass flows.
Impact BIO-3: Construction of BMP Update component facilities could adversely affect special status plant species, either directly or through habitat modifications on; or substantially reduce the number or restrict the range of any plant species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service, if species are found to be present within the component-specific construction areas. This represents a potential significant impact that can be reduced to a less-than-significant level	**BIO-3a**: Occurrences of special status plant species shall be avoided by project construction activities to the extent feasible. All facilities and construction activities will be maintained outside habitats supporting special status plant species where feasible. Prior to construction, a qualified biologist will conduct a survey of the project area to ascertain the presence or absence of special status plant species. If no species are encountered, no mitigation is required. If a special status species is found within a BMP Update component project area, a setback of 50 feet will be established between the occurrence and the BMP Update construction activities. Prior to construction, PVWMA will install temporary construction fencing at the 50-foot setback line to prevent inadvertent equipment access or construction staging within the special status plant habitat. This fencing will be signed in the field as “SENSITIVE HABITAT AREA - NO CONSTRUCTION ACCESS”. A qualified biologist will inspect the temporary construction barrier fence and monitor the contractor’s compliance with this avoidance measure. If complete avoidance of special status plant species is infeasible, impacts would be minimized through implementation of Mitigation Measure BIO-3b.

TABLE NOP 3-1 (Continued)
IMPACTS AND MITIGATION MEASURES ADOPTED FOR THE BMP UPDATE

Impact	Mitigation Measure
BIOLOGICAL RESOURCES (cont.)	
with mitigation identified in this EIR. No operational impacts to special status plant species are anticipated from the project.	
See Impact BIO-3.	**BIO-3b**: Prior to clearing and grubbing in areas where impacts to special status plant species cannot be avoided, PVWMA will consult with applicable resource agencies (i.e., CDFW and/or USFWS) prior to implementing salvage and revegetation actions. A qualified biologist will collect any available above- ground seed pods/seed heads for their use in future revegetation efforts. During construction, the upper 6 inches of topsoil from areas supporting the plant species will be stripped from the construction area and stored for later use. The topsoil will be used in future revegetation efforts which may be on-site (if feasible) or at an off-site location approved by permitting agencies (i.e., USFWS, CDFW). At the designated revegetation area, all stockpiled topsoil will be placed on site and finish graded to blend with surrounding topography. Under direction of a qualified biologist, the areas will be revegetated with locally native herbaceous plant species compatible with natural regeneration of the special status plant species. The qualified biologist will hand broadcast any seeds collected from the special status plant species into the appropriate habitat areas. The revegetation will achieve a minimum of 2:1 plant replacement (i.e., re- establish two plants for every plant impacted). The qualified biologist will monitor the revegetation areas for two years after construction to ascertain if the special status plant species re-established within the revegetation area. Annual reports will be submitted to permitting agencies by December 31 of each monitoring year, describing the results of the revegetation measures, for a period of 5 years.
CULTURAL RESOURCES	
Impact CR-1: Construction activities associated with implementation of BMP Update components may result in the alteration or destruction of recorded archaeological sites or encounter unknown, buried resources during ground disturbing activities, which is a potentially significant impact. With mitigation identified in this EIR, the impacts would be reduced to less-than-significant levels.	**CR-1a**: Final pipeline and facility plans shall locate facilities and pipeline alignments away from identified and recorded archaeological sites in each component area based on a site reconnaissance and archaeological investigation conducted by a qualified archaeologist at the time site-specific construction plans are developed. The archaeologist shall identify the areal extent of potential recorded sites, assess potential significance to identified resources, recommend adjustment to siting of improvements, facilities and/or pipeline alignments, if necessary, and provide other recommendations to avoid impacts to identified significant resources. If a significant or potentially significant archaeological or historic resource is identified pursuant to the definitions in the State CEQA Guidelines as identified above, the consulting archaeologist shall develop an appropriate mitigation plan for the cultural resource. Possible mitigation measures for important cultural resources may include monitoring by a qualified archaeologist during construction at identified sensitive sites, documentation and recordation of the resource, recovery and relocation, or stabilization of the resource.
See Impact CR-1.	**CR-1b**: The cultural resource boundaries of potentially significant sites shall be marked as exclusion zones both on ground and on construction maps prior to the commencement of construction activities on component sites. Construction supervisory personnel shall be notified of the existence of cultural resources in each component area and will be required to keep personnel and equipment away from these cultural resources sites. During construction and operational phases, personnel and equipment will be restricted to each surveyed corridor for each component.
See Impact CR-1.	**CR-1c**: Should any as yet undiscovered cultural resources be uncovered at any component site, such as structural features, or unusual amounts of bone or shell, artifacts, human remains, or architectural remains be encountered during any development activities, work will be suspended and PVWMA staff will be contacted. A qualified professional archaeologist shall be retained and will perform any necessary investigations to determine the significance of the find. PVWMA will then implement any mitigation deemed necessary for the recordation and/or protection of the cultural resources. In addition, pursuant to Sections 5097.97 and 5097.98 of the State Public Resources Code and Section 7050.5 of the State Health and Safety Code, in the event of the discovery of human remains, all work must be halted and the County Coroner shall be immediately notified. If the remains are determined to be Native American, guidelines of the Native American Heritage Commission shall be adhered to in the treatment and disposition of the remains.

TABLE NOP 3-1 (Continued)
IMPACTS AND MITIGATION MEASURES ADOPTED FOR THE BMP UPDATE

Impact	Mitigation Measure
ENERGY, UTILITIES, AND SERVICES	
Impact ES-1: Construction of the BMP Update components could result in temporary, planned or accidental disruption to utility services provided by underground lines. This potentially significant impact can be reduced to a less than- significant level with the incorporation of mitigation measures identified in this EIR.	**ES-1**: A study to identify utilities along proposed alignments will be conducted by PVWMA during pre- design states of projects. The following mitigation measures are required for segments identified in final design as having potential conflicts with significant utilities: a. Utility excavation and encroachment permits would be required from the appropriate agencies, including the Public Works Departments of Santa Cruz County, City of Watsonville, Caltrans, and Union Pacific Railroad. These permits include measures to minimize utility disruption. PVWMA and its contractors shall comply with permit conditions. Permit requirements shall be included in construction contract specifications. b. Utility locations would be verified through field survey (potholing) and use of an underground locating service. c. A detailed engineering and construction plan shall be prepared as part of the design plans and specifications. This plan shall include procedures for the excavation, support, and fill of areas around utility cables and pipes. All affected utility services would be notified of PVWMA's construction plans and schedule. Arrangements would be made with these entities regarding protection, relocation, or temporary disconnection of services. d. In areas where the pipeline would parallel wastewater mains, engineering and construction plans shall include trench wall support measures to guard against trench wall failure, and possible resulting loss of structural support for the wastewater main. Residents and businesses in the project area shall be notified in writing by the contractor of planned utility service disruption two to four days in advance, in conformance with state and County standards.
ENERGY, UTILITIES, AND SERVICES (cont.)	
Impact ES-2: Construction of the BMP Update components could potentially impact solid waste landfill capacity, since the County's Buena Vista Landfill is approaching capacity. Although the BMP Update improvements are expected to generate a relatively small amount of construction waste to be disposed of at the landfill, this is considered a significant impact due to limited landfill capacity. Mitigation is identified below to reduce the impact to a less-than-significant level.	**ES-2**: PVWMA shall include in its construction specifications a requirement for the contractor to provide plans for recovering, reusing, and recycling construction, demolition, and excavation wastes and providing for composting of plant material, where feasible.
GEOLOGY AND SOILS	
Impact GS-1: Seismic groundshaking and its secondary effects, including localized liquefaction and related ground failure from a major earthquake in Santa Cruz County or Monterey Bay region could cause structural damage to associated facilities of each of the BMP Update components. With mitigation identified in this EIR, the impacts would be limited to less-than-significant levels.	**GS-1**: Future construction of proposed BMP Update facilities shall be designed in accordance with design recommendations of geotechnical reports and in compliance with applicable policies and appropriate engineering investigation practices necessary to reduce the potential detrimental effects of groundshaking and liquefaction. Construction shall be in accordance with applicable City and County ordinances and policies regarding mitigation of seismic and geologic hazards, and appropriate geotechnical studies shall be conducted.

TABLE NOP 3-1 (Continued)
IMPACTS AND MITIGATION MEASURES ADOPTED FOR THE BMP UPDATE

Impact	Mitigation Measure
GEOLOGY AND SOILS (cont.)	
Impact GS-2: Construction of BMP Update components would result in erosion and discharge of sediment in water bodies. With mitigation identified in this EIR, the impact would be reduced to a less-than-significant level	**GS-2**: Construction of future BMP Update facilities shall include preparation and implementation of erosion control plans to minimize erosion and inadvertent transport of sediments into water bodies during installation of facilities. Measures shall include, but not be limited to: limiting the area of ground disturbance and vegetation removal at any one time during construction; conducting work prior to the rainy season if possible and protecting disturbed areas during the rainy season; installing bales or other appropriate barriers adjacent to water bodies to prevent transport of sediments into sloughs and water courses; immediately revegetating disturbed areas; and other Best Management Practices during construction to protect water quality. All grading and construction shall conform to requirements of the Santa Cruz County Grading Ordinance. To the extent possible, grading activities in non-cropped areas shall be limited to the period between April 15 and October 31.
Impact GS-3: Proposed pipeline, diversion facilities and water filtration systems associated with BMP Update components could incur damage as a result of underlying soils properties (subsidence, high shrink-swell potential, and corrosivity). With mitigation identified in this EIR, the impacts would be limited to less-than-significant levels.	**GS-3**: All diversion and pipeline facilities shall be designed and engineered in accordance with recommendations of a geotechnical report and appropriate engineering designs to reduce the potential detrimental effects of expansive soils, corrosivity, and/or other identified soils constraints. A licensed geotechnical engineer shall prepare recommendations applicable to foundation design, earthwork, and site preparation prior to or during the project design phase. Recommendations will address mitigation of site- specific, adverse soil and bedrock conditions that could hinder development. Project engineers shall implement the recommendations. Geotechnical design and design criteria will comply with applicable codes and requirements of the California Building Code with California additions (CCR Title 24), applicable City and County construction and grading ordinances.
HAZARDS AND HAZARDOUS MATERIALS	
Impact HM-1: Construction of the BMP Update components could potentially release hazardous materials from the disturbance/removal of soils used for agricultural purposes that may contain pesticide residuals. In addition, Construction of the BMP Update components (i.e., excavation for pipelines) could potentially release hazardous materials in areas of potential soil contamination such as those identified by DTSC. This is a potentially significant impact that would be reduced to a less-than-significant level with mitigation identified below.	**HM-1**: Prior to initiation of earthwork activities, PVWMA shall perform soil testing on agricultural sites proposed for development and analytically test for pesticide residuals and pesticide-related metals arsenic, lead, and mercury. If contamination is identified in the soil samples above applicable levels, PVWMA shall prepare a Site Management Plan (SMP) to establish protocols/guidelines for the contractor including: identification of appropriate health and safety measures while working in contaminated areas; soil reuse; handling, and disposal of any contaminated soils; and agency notification requirements. The SMP shall be subject to the review and approval of the appropriate regulatory agency.
See Impact HM-1.	**HM-2**: During the design phase of the proposed pipeline alignment from College Lake to Coastal Distribution System (CDS), PVWMA shall perform a Phase I Environmental Site Assessment for the alignment to determine the potential for encountering hazardous materials contamination in soils to be excavated and identify appropriate recommendations. Appropriate health and safety measures shall be identified as needed for worker safety, soil handling, and disposal of contaminated soils.

TABLE NOP 3-1 (Continued)
IMPACTS AND MITIGATION MEASURES ADOPTED FOR THE BMP UPDATE

Impact	Mitigation Measure
SURFACE WATER, GROUNDWATER, AND WATER QUALITY	
Impact HWQ-1: Construction of proposed BMP Update components could result in increased erosion and sedimentation with adverse impacts to water quality. Temporary dewatering of shallow groundwater during construction could also result in increased erosion and sedimentation with adverse impacts to water quality. Additionally, accidental release of fuels or other hazardous materials associated with construction activities could degrade water quality. This potentially significant impact can be reduced to a less-than-significant level with mitigation measures identified in this EIR.	**HWQ-1**: PVWMA shall require contractors to apply for all applicable NPDES permits, including dewatering permits, develop a SWPPP for construction of proposed facilities, and comply with conditions of the permit(s), as required by the CCRWQCB. The objectives of the SWPPP are to identify pollutant sources that may affect the quality of stormwater discharge and to implement BMPs to reduce pollutants in stormwater discharges. The SWPPP for this proposed action would include the implementation, at a minimum, of the following elements: • Source identification • Preparation of a site map • Description of construction materials, practices, and equipment storage and maintenance • List of pollutants likely to contact stormwater • Estimate of the construction site area and percent impervious area • Erosion and sedimentation control practices, including soils stabilization, revegetation, and runoff control to limit increases in sediment in stormwater runoff, such as detention basins, straw bales, silt fences, check dams, geofabrics, drainage swales, and sandbag dikes • Proposed construction dewatering plans • Provisions to eliminate or reduce discharge of materials to stormwater • Description of waste management practices • Maintenance and training practices
Impact HWQ-2: Operation of proposed BMP Update components could result in increased erosion and subsequent sedimentation, with adverse impacts to surface water quality. Diversions from Watsonville and Harkins Sloughs resulting in chronic imposed water-level fluctuations may result in increased erosion and sedimentation, including potential bank collapse. College Lake and Murphy Crossing diversions may result in erosion and downstream sedimentation depending upon operations and pump design. This potentially significant impact can be reduced to a less-than-significant level with the following mitigation measure.	**HWQ-2**: Rapid, imposed water-level fluctuations shall be avoided within the sloughs, Salsipuedes Creek, and the Pajaro River to minimize erosion and failure of exposed (or unvegetated), susceptible banks. This can be accomplished by operating the pumps at an appropriate flow rate, in conjunction with commencing operation of the pumps only when suitable water levels or flow rates are measured in the water body. Criteria for minimizing fluctuations and/or protecting banks from related erosion will need to be developed, as some banks presently are stable and others are not. Control is important, as the mobilized sediment also impairs in-slough habitat values, and potentially exacerbates bacterial levels in the slough system. It may be that water-level fluctuations may be controlled as well to minimize other impacts, such as desiccation of amphibian eggs or waterlogging of agricultural soils adjacent to the sloughs.
Impact HWQ-3: Overall, the BMP Update will raise groundwater levels locally in the project areas; however, basin-wide groundwater elevation will not increase. Higher groundwater levels will result in reduced pumping costs and marginally greater pumping rates from existing pumps in wells. Therefore, the BMP Update has a beneficial impact from reduced pumping costs and marginally greater pumping rates from existing pumps in wells, and a beneficial impact by raising groundwater levels in localized	**HWQ-3.** If pumping rates in existing wells fall below levels that can support existing or planned land uses, and the reduction in pumping can be attributed to one or many of the project components, then one of several measures may be undertaken to mitigate the loss of pumping. These mitigation measures may include: 1. Improving irrigation efficiency 2. Modifying irrigation and agricultural operations 3. Lowering the pump in the irrigation well 4. Lowering and changing the pump in the irrigation well

TABLE NOP 3-1 (Continued)
IMPACTS AND MITIGATION MEASURES ADOPTED FOR THE BMP UPDATE

Impact	Mitigation Measure
SURFACE WATER, GROUNDWATER, AND WATER QUALITY (cont.)	
project areas but not basin wide. The College Lake component of the BMP Update, however, may seasonally reduce groundwater levels from their baseline elevations at localized areas downstream of the lake. In these areas, project operation could decrease the annual production rate of existing nearby irrigation wells due to localized drawdown. Under extreme conditions, existing or planned land use(s) may not be fully supported. If pumping rates are reduced to the extent that land uses cannot be fully supported, this would represent a potentially significant impact that can be reduced to a less-than-significant level with mitigation. This impact, however, is unlikely; and would only occur locally only in some years and seasons.	5. Adding storage capacity for irrigation supply 6. Replacing the irrigation well 7. Replacing the irrigation water source to determine if well production loss can be attributed to one of the project components, the PVWMA will allow well owners to enroll in a monitoring and mitigation program (MMP). PVMWA will collect baseline data necessary for establishing significant impacts only from wells that are enrolled in the MMP. If a well is not enrolled in the MMP, to claim a significant impact the well owner will need to provide adequate and reliable baseline data. To claim a significant impact for each well enrolled in the MMP, PVWMA will first establish baseline irrigation well extraction rates, drawdowns, and water quality near planned components. Pumping rate reductions and changes in water quality from these baseline values will be analyzed to assess whether or not they are caused by the project. A pumping rate reduction or adverse change in water quality is assumed to be caused by the Project if: 1) it occurs at the same time as the onset of operations of BMP Update component(s); 2) it occurs in an area reasonably predicted to be affected by the BMP Update component(s); 3) static groundwater levels have dropped; 4) pumping groundwater levels have not dropped more than static groundwater levels; and 5) no other obvious reason exists for the drop in production capacity. For PVWMA or others to identify another reason for loss of production it must be based on the written professional opinion of a qualified hydrogeologist that will be submitted to the PVWMA staff or their designee, for review and concurrence.
Impact HWQ-4: Development of BMP Update components may expose people and structures to flood hazards or impede or redirect flood flows because many of the BMP Update facilities are located within the FEMA 100-year flood hazard zones. This potentially significant impact can be reduced to a less-than-significant level with mitigation measures identified in this EIR. In addition, these impacts may be exacerbated by climate change in the cumulative.	**HWQ-4**: Facilities shall be designated to comply with FEMA and County of Santa Cruz requirements to floodproof the facilities and shall not exacerbate upstream or downstream flood hazards on other properties. The FEMA process will require identification of the FEMA floodway zone and may require no increase water elevations for a one percent chance annual flood. The FEMA process will require identification of the FEMA zone type and may require no increase water elevations for a one percent chance annual flood. To meet the specific FEMA requirements for the component, substantial modifications to the facility design and additional mitigation may be required.
TRANSPORTATION AND TRAFFIC	
Impact TR-1: Construction of BMP Update components would increase wear and tear on area roadways used by construction vehicles. With mitigation identified in this EIR, the impact would be reduced to a less-than-significant level.	**TR-1**: Conduct a preconstruction survey of road conditions on key access routes to the project sites (e.g., San Andreas Road). The pavement conditions of local streets judged to be in good condition for use by heavy truck traffic shall be monitored. Roads damaged by construction shall be repaired to a structural condition equal to, or better than, that which existed prior to construction activity.

The table below contains a list of parties who commented on the Notice of Preparation for the College Lake Integrated Resources Management Project.

	Commenter	Affiliation	Date Submitted	Type
Federal	Morrison, Amanda	National Marine Fisheries Services	1/5/2018	Letter
State	Bjornstad, Christopher A.	California Department of Transportation	12/22/2017	Letter
	Mangeny, Andrew J.	Department of Water Resources - Division of Safety of Dams	12/28/2017	Letter
	Herrig, Justine	State Water Resources Control Board	1/4/2018	Letter
Local	Lopez, Valentine	Amah Mutsan Tribal Band	12/12/2017	Email
	Muegge, Hanna	Monterey Bay Air Resources District	1/3/2018	Letter
	Kirkish, Natalie (General Counsel, Reclamation District 2049)	Reclamation District 2049	1/5/2018	Letter
	Diffenbaugh, John	Reclamation District 2049 (Secretary), Diffenbaugh Family Farms LLC	1/4/2018	Letter
	Diffenbaugh, John	Reclamation District 2049 (Secretary), Diffenbaugh Family Farms LLC	12/12/2018	Oral comments
	Binding, Pail	Santa Cruz County Mosquito and Vector Control	1/4/2018	Comment Card
Individual	Banovac, Charles	CLRD president	12/12/2018	Oral comments
	Braycovich Banovac, Janet		1/5/2018	Letter
	Busch, Jerry			Letter
	Busch, Jerry		12/12/2018	Oral comments
	Greatorex, Jeanne		12/13/2017	Email
	Johnston, Mike		12/12/2018	Oral comments
	Kett, Brandon	Interlaken Lands, LLC	12/26/2017	Letter
	Lukrich, John		12/12/2018	Oral comments
	Maragoni, Jessie		1/2/2018	Comment Card
	Marzolf, Myron		1/3/2018	Comment Card
	Peixoto, Dick		12/12/2018	Oral comments
	Rambo, James and Melinda		12/26/2017	Letter
	Rambo, Melinda		12/12/2018	Oral comments
	Remde, Frank "Ted"		1/4/2017	Comment Card
	Remde, Frank "Ted"		12/12/2018	Oral comments
	Turley, Carol	Pajaro Dunes	12/12/2018	Oral comments

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
777 Sonoma Avenue, Room 325
Santa Rosa, California 95404-4731

JAN 0 5 2018

Brian Lockwood
General Manager
Pajaro Valley Water Management Agency
36 Brennan Street
Watsonville, California 95076

Re: Comments on the Notice of Preparation of a project level Environmental Impact Report for the College Lake Integrated Resources Management Project, Watsonville, California

Dear Mr. Lockwood:

The National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS) is writing to comment on the Notice of Preparation (NOP) of a project level Environmental Impact Report (EIR) for the College Lake Integrated Resources Management Project (proposed project). The primary goals of the proposed project are to help balance water resources in the Pajaro Valley Groundwater Basin, prevent further seawater intrusion, and meet the water supply needs in the Pajaro Valley Water Management Agency's (PV Water) service area by developing College Lake as a water storage and supply source. The components of the proposed project would consist of a new weir and intake pump station at the south side of College Lake, a water treatment plant and pipeline to convey the stored water from College Lake to the water treatment plant, and a 5.5-mile pipeline to convey treated water to agricultural uses in the Pajaro Valley. PV Water is the California Environmental Quality Act Lead Agency for the proposed project.

We are concerned the proposed project may affect federally threatened South-Central California Coast Distinct Population Segment steelhead (*Oncorhynchus mykiss*) and their designated critical habitat in various ways. Please find our detailed comments on these concerns below:

Fish passage. According to the NOP, the weir will be designed to accommodate fish bypass flows and fish passage; particular attention will be given to fish passage and rearing requirements which will be identified through coordination with NMFS and the California Department of Fish and Wildlife. We suggest the EIR preparers incorporate the criteria and guidance contained in NMFS' *Anadromous Salmonid Passage Facility Design* (NMFS 2011) and *Fish Screening Criteria for Anadromous Salmonids* (NMFS 1997) into the weir designs.

Bypass flows. According to the NOP, the precise bypass flows required to achieve unimpeded migration at the weir are unknown at this time. In addition to identifying appropriate bypass flows at the weir, the EIR should evaluate how water storage may impair migration flows downstream of the College Lake outlet. For instance, notwithstanding ongoing impacts, under existing conditions, pumping from the lake augments stream flow in Salsipudes Creek and in some years this may improve smolt migration conditions for fish moving downstream from the

Corralitos Creek watershed (Smith 2010). To better understand the optimum bypass flows for steelhead, the EIR should evaluate stream flow through and downstream of College Lake as if the weir was not in place.

Interim pump and weir operations. According to the NOP, construction of the proposed project is expected to begin in 2023 and to be completed by 2025. PV Water will need to acquire private property within College Lake for the proposed project. We assume private property acquisition will occur well in advance of construction. The EIR should describe how PV Water will or will not operate the pumps and weir in the time period between private property acquisition and the completion of construction activities. The EIR should also discuss appropriate avoidance and minimizations measures for this interim period.

Non-native fish species. College Lake supports non-native and warm water fishes (Podlech 2011, Smith 2010). The EIR should discuss how PV Water will address the control of non-native fish species.

Monitoring. In our April 3, 2013, comment letter to PV Water on the NOP of a Subsequent Program EIR for PV Water's 2012 Basin Management Plan Update (NMFS 2013), we recommended PV Water begin implementing an adequate monitoring plan that identifies ongoing, current impacts to steelhead and inform project-level analysis and permitting. To our knowledge, a monitoring plan has not been implemented, yet the need is still present. Therefore, we reiterate that *this* EIR include an appropriate steelhead monitoring plan for the proposed project.

Thank you for the opportunity to comment on the NOP. We look forward to providing PV Water technical assistance during the development of the EIR. Please direct questions regarding this letter to William Stevens of the NMFS North-Central Coast Office in Santa Rosa at (707) 575-6066, or William.Stevens@noaa.gov.

Sincerely,

A. Moran

for Alecia Van Atta
Assistant Regional Administrator
California Coastal Office

cc: Jon Jankovitz, California Department of Fish and Wildlife
Copy to File ARN 151416WCR2017SR00096
Copy to Chron File

Literature Cited

NMFS (National Marine Fisheries Service). 2013. Letter from Dick Butler to Mary Bannister re: Notice of Preparation of a Subsequent Program Environmental Impact Report for the

Pajaro Valley Water Management Agency's 2012 Basin Management Plan Update. National Marine Fisheries Service, Santa Rosa, California. April 3, 2013. 4 pages.

NMFS (National Marine Fisheries Service). 2011. Anadromous Salmonid Passage Facility Design. National Marine Fisheries Service, Northwest Region, Portland, Oregon. July 2011. 138 pages.

NMFS (National Marine Fisheries Service). 1997. Fish Screening Criteria for Anadromous Salmonids. National Marine Fisheries Service, Southwest Region. January 1997. 10 pages.

Podlech, M. 2011. College Lake Smolt Outmigrant Study, Spring 2011. *Prepared for*: Resource Conservation District of Santa Cruz County, Capitola, Californa. *Prepared by*: Mike Podlech, Aquatic Ecologist, Santa Cruz, California. 11 pages.

Smith, J. 2010. Fisheries Issues Associated with the Present and Potential Future Operation of the College Lake Complex (Pajaro River Watershed) - Draft. Department of Biological Sciences, San Jose State Unversity, San Jose, California. 5 pages.

DEPARTMENT OF TRANSPORTATION
50 HIGUERA STREET
SAN LUIS OBISPO, CA 93401-5415
PHONE (805) 549-3101
FAX (805) 549-3329
TTY 711
http://www.dot.ca.gov/dist05/

Serious drought
Help save water!

December 22, 2017

SCr-152-3.1
SCH#2017112063

Mr. Brian Lockwood
Pajaro Valley Water Management Agency
36 Brennan Street
Watsonville, CA 95076

Dear Mr. Lockwood:

COMMENTS FOR THE NOTICE OF PREPARATION (NOP) – COLLEGE LAKE INTEGRATED RESOURCES MANAGEMENT PROJECT, WATSONVILLE, CA

The California Department of Transportation (Caltrans), District 5, Development Review, has reviewed the College Lake Integrated Resources Project which plans to develop College Lake as a water storage and supply source. Caltrans offers the following comments in response to the NOP:

1. Caltrans requests the opportunity to review final designs for the drainage systems; a profile plan will need to be provided that shows where proposed pipes will be in relation to existing facilities. In particular, we are concerned about existing drainage systems as well as any utilities that may be present in the State right of way on SR 1, SR 152, and SR 129.

2. Please be aware that if any work is completed in the State's right-of-way it will require an encroachment permit from Caltrans, and must be done to our engineering and environmental standards, and at no cost to the State. The conditions of approval and the requirements for the encroachment permit are issued at the sole discretion of the Permits Office, and nothing in this letter shall be implied as limiting those future conditioned and requirements. For more information regarding the encroachment permit process, please visit our Encroachment Permit Website at: http://www.dot.ca.gov/trafficops/ep/index.html.

3. At any time during the environmental review and approval process, Caltrans retains the statutory right to request a formal scoping meeting to resolve any issues of concern. Such formal scoping meeting requests are allowed per the provisions of the California Public Resources Code Section 21083.9 [a] [1].

4. Caltrans supports local development that is consistent with State planning priorities intended to promote equity, strengthen the economy, protect the environment, and promote public health and safety. We accomplish this by working with local jurisdictions to achieve a shared vision of

how the transportation system should and can accommodate interregional and local travel and development. Projects that support smart growth principles which include improvements to pedestrian, bicycle, and transit infrastructure (or other key Transportation Demand Strategies) are supported by Caltrans and are consistent with our mission, vision, and goals.

Thank you for the opportunity to review and comment on the proposed project. If you have any questions, or need further clarification on items discussed above, please contact me at (805) 549-3157 or email christopher.bjornstad@dot.ca.gov.

Sincerely,

Chris Bjornstad

Christopher A. Bjornstad
Transportation Planner
District 5 Development Review

DEPARTMENT OF WATER RESOURCES
1416 NINTH STREET, P.O. BOX 942836
SACRAMENTO, CA 94236-0001
(916) 653-5791

DEC 28 2017

RECEIVED
JAN 04 2018
PVWMA

Mr. Brian Lockwood
Pajaro Valley Water Management Agency
36 Brennan Street
Watsonville, California 95076

SCH #2017112063: Notice of Preparation – College Lake Integrated Resources Management Project
Santa Cruz County

We have reviewed the Notice of Preparation for the above referenced project, which describes the proposed construction of a new weir structure at College Lake near the town of Watsonville in Santa Cruz County. The proposed reservoir capacity will be 1,764 acre-feet, but the embankment height was not found in the Notice of Preparation. Therefore, additional information is required for us to make a determination as to the jurisdictional status of the dam.

As defined in Sections 6002 and 6003, Division 3, of the California Water Code, dams 25 feet or higher with a storage capacity of more than 15 acre-feet, and dams higher than 6 feet with a storage capacity of 50 acre-feet or more are subject to State jurisdiction. Dam height is defined as the vertical distance measured from the maximum possible water storage elevation to the downstream toe of the barrier.

If the proposed dam will be subject to State jurisdiction, a construction application, together with plans, specifications, and the appropriate filing fee must be filed with this Division. All dam safety related issues must be resolved prior to approval of the application. Additionally, all work must be performed under the direction of a Civil Engineer registered in California. Erik Malvick, our Acting Design Engineering Branch Chief, is responsible for the application process and can be reached at (916) 227-6742.

If you have any questions or need additional information, you may contact Area Engineer Austin Roundtree at (916) 227-4625 or me at (916) 227-4631.

Sincerely,

Andrew J. Mangney

Andrew J. Mangney, Regional Engineer
Central Region
Field Engineering Branch
Division of Safety of Dams

cc: (See attached list.)

State Water Resources Control Board

JAN 04 2017

Pajaro Valley Water Management Agency
c/o Brian Lockwood, General Manager
eir@pvwater.org

In Reply Refer to:
JH: A032881

Dear Mr. Lockwood:

DIVERSION OF WATER RELATED TO NOTICE OF PREPARATION FOR THE COLLEGE LAKE INTEGRATED RESOURCES MANAGEMENT PROJECT (SCH #2017112063) IN THE PAJARO RIVER WATERSHED IN SANTA CRUZ COUNTY

Staff from the State Water Resources Control Board, Division of Water Rights (Division) has received a copy of the Notice of Preparation (NOP) for the above mentioned project (Project). Division staff have reviewed the NOP and provide the following comments:

1. Please provide a description of the current operations of College Lake and the changes proposed by the Project, including when water is likely to spill over the weir uncontrolled and when water is pumped over the weir and the estimated quantities.

2. Please provide discussion of any non-native species, such as bullfrogs, that could proliferate as a result of Project operations and any special-status species, such as the California red-legged frog, that may be affected by increased non-native populations.

3. Please provide discussion on whether or not the Project would create permanent wetland or fringe habitat at College Lake that may attract special-status species such as San Francisco garter snake.

4. Please provide discussion of fish species within Salsipuedes Creek and the Pajaro River watershed that could be affected by the Project, as well as the potential effects of the project on fish habitat characteristics, including but not limited to wood and gravel recruitment, availability of food, water temperature, and barriers to migration.

5. Please provide discussion on the current water quality conditions of Salsipuedes Creek and the Pajaro River watershed and how the Project could affect those conditions.

6. Provide discussion on the existing riparian habitat from the proposed point of diversion downstream to the Pacific Ocean and how the Project could affect the existing riparian habitat.

7. Please note that for projects which are seeking a water right permit, evaluation and analysis of temporary construction impacts along with potential long-term impacts from the operation of the Project are necessary. Please include discussion of potential long-term effects to migratory fish, aquatic/semi-aquatic special-status species, proliferation of non-native species, downstream riparian habitat, water quality, wetlands, tidal lands, and wood and gravel recruitment from the diversion and use of the water.

Water Quality Certification

Any applicant seeking a water right permit where the proposed activity may result in a discharge to surface water is required to obtain a State Water Quality Certification (certification). (Cal. Code Regs., tit. 23, § 3855.) The purpose of the certification program is to protect the waters of the United States in California by upholding Section 401 of the Clean Water Act and thereby ensuring that waste discharged to these waters from a proposed activity meets water quality standards and other appropriate requirements. State certification conditions become mandatory conditions of any water right permit for the project. Certification is required for a water diversion project where water is appropriated or is put to beneficial use, and which requires a permit issued by the U.S. Army Corps of Engineers. For more information regarding State certification, please contact the program manager for the Water Quality Certification Program, Ann Marie Ore at 916-319-9387 or at annmarie.ore@waterboards.ca.gov.

Please contact me at (916) 323-5176 or justine.herrig@waterboards.ca.gov if you have any questions or require additional information. Written correspondence or inquiries should be addressed as follows: State Water Resources Control Board, Division of Water Rights, Attn: Justine Herrig, PO Box 2000, Sacramento, CA, 95812-2000.

Sincerely,

ORIGINAL SIGNED BY:

Justine Herrig, Senior
Permitting Section
Division of Water Rights

ec: Brian Lockwood
lockwood@pvwater.org

Alan Lilly
abl@bkslawfirm.com

David Hines
david.hines@wildlife.ca.gov

William Stevens
william.stevens@noaa.gov

ec's continued next page:

Matt McCarthy
matthew.mccarthy@waterboards.ca.gov

Nicole Kuenzi
nicole.kuenzi@waterboards.ca.gov

Ann Marie Ore
annmarie.ore@waterboards.ca.gov

Harvey Packard
harvey.packard@waterboards.ca.gov

cc: Ms. Nadell Gayou, Engineer
Department of Water Resources
Division of Environmental Services
901 P Street, 2nd Floor
Sacramento, California 95814

Governor's Office of Planning and Research
State Clearinghouse
Post Office Box 3044
Sacramento, California 95812-3044

Alena Maudru

From: vjltestingcenter@aol.com
Sent: Tuesday, December 12, 2017 6:53 AM
To: EIR
Subject: Consultation w/ Tribe

Dear Mr. Lockwood,

Our Tribe request formal consultation regarding the College Lake Integrated Resources Management Project as it is within our traditional tribal territory. Our Tribe further request that a Native American Monitor be used for any ground disturbance within 400 feet of a known archaeological site. Please contact me by phone so we can discuss.

Thank you,

Valentin Lopez, Chairman
Amah Mutsun Tribal Band
(916) 743-5833
www.amahmutsun.org

Monterey Bay Air
Resources District
Serving Monterey, San Benito, and Santa Cruz Counties

24580 Silver Cloud Court
Monterey, CA 93940
PHONE: (831) 647-9411 • FAX: (831) 647-8501

January 3, 2018

Pajaro Valley Water Management Agency
ATTN: Brian Lockwood, General Manager
36 Brennan Street
Watsonville, CA 95076

Email: eir@pvwater.org

Re: Comments on College Lake Integrated Resources Management Project

Dear Mr. Lockwood:

Thank you for providing the Monterey Bay Air Resources District (Air District) with the opportunity to comment on the above-referenced document. The Air District suggests that PV Water consider the following when writing the Draft EIR:

- Construction Dust– Fugitive dust from construction activities can be significant if not mitigated. Please include the standard mitigation measures found in the Air District's 2008 CEQA Guidelines (Chapter 8).

- Permits Required – Please note that Air District Permits to operate may be required for engine generator sets and boilers. Air District permits or registration with the California Air Resources Board may also be required for portable construction equipment. Please contact the Air District's Engineering Division at (831) 647-9411 if you have questions about permitting.

- Construction Equipment - The Air District suggests that when possible cleaner construction equipment be used for the project. This includes equipment that conforms to ARB's Tier 3 or Tier 4 emission standards. We further recommend that, whenever feasible, construction equipment use alternative fuels such as compressed natural gas, propane, electricity or biodiesel.

- Building Demolition/Renovation and Trenching Activities - If any buildings are renovated or demolished as part of this project, Air District rules may apply. These include Rule 424, National Emissions Standards for Hazardous Air Pollutants and Rule 439, Building Removals. Rule 424 contains the investigation and reporting requirements for asbestos which includes surveys and advanced notification on structures being renovated or demolished. Notification to the Air District is required at least ten days prior to renovation or demolition activities. If old underground piping or other asbestos containing construction materials are encountered during trenching activities, Rule 424 could also apply. District Rule 439 prohibits the release of any visible emissions from building removals. Rules 424 and 439 can be found online at https://www.arb.ca.gov/drdb/mbu/cur.htm. Please contact Mike Sheehan, Compliance Program Coordinator, at (831) 718-8036 for more information regarding these rules.

- Transportation - Given the growing use of electric vehicles, please consider making EV charging stations available at the proposed College Lake Treatment Plant Site.

Best Regards,

Hanna Muegge

Hanna Muegge
Air Quality Planner

wittwer / parkin

JONATHAN WITTWER
WILLIAM P. PARKIN
RYAN D. MORONEY
NICOLE G. DI CAMILLO

January 5, 2018

VIA EMAIL

Brian Lockwood, General Manager
Pajaro Valley Water Management Agency
36 Brennan St.
Watsonville, CA 95076
EIR@pvwater.org

Re: College Lake Reclamation District No. 2049 Comments on PVWMA College Lake Integrated Resources Management Project Notice of Preparation of an Environmental Impact Report

Dear Mr. Lockwood:

This office serves as General Counsel for College Lake Reclamation District No. 2049 ("CLRD") and submits these comments on the Pajaro Valley Water Management Agency's ("PVWMA") above referenced Notice of Preparation ("NOP") on its behalf. CLRD is a duly organized reclamation district, which was formed in 1920 and which continues to operate to this date as a State Agency under Water Code § 50000 *et. seq. See Kirk v. Flournoy* (1974) 36 Cal. App. 3d 553, 557 (a district created by state law is an agency of the state)*; see also Rodeo Sanitary Dist. v. Board of Supervisors* (1999) 71 Cal. App. 4th 1443, 1449-1450 (county's attempt to use general police power to overrule a state "created and authorized" district's "traditional legal authority" void as in conflict with state law). The District's purpose is for reclamation of 320 acres of prime agricultural resource land at College Lake north of Watsonville. The purpose of the annual drainage of College Lake is to enable agricultural use of these lands, which comprise some of the finest farmland in the world. CLRD has been the only agency continually engaged in these operations at College Lake for the past 98 years.

A. Background on CLRD's Legal Authority over College Lake

CLRD was formed in 1920 and has been the only party managing College Lake since that time. CLRD has the express legal authority under State law to pump the water out of College Lake to reclaim the land for agricultural production. This unique legal authority makes it advantageous for PVWMA to partner with CLRD to obtain the lawfully pumped water that would benefit the aquifer – and hence the entire community. As an "ongoing project" predating the California Environmental Quality Act (Public Resources Code § 21000 *et seq.* "CEQA"), CLRD's ongoing improvements and operations are exempt from CEQA review under CEQA

Guideline § 15261. *See Nacimiento Regional Water Management Advisory Committee v. Monterey County Water Resources Agency* (1993) 15 Cal. App. 4th 200.

CLRD can report that its 98 years of management has resulted a win-win-win situation at College Lake:

1. We have a win for agriculture because CLRD reclaims a sizeable amount of prime farmland and raises 2 or 3 crops each growing season.
2. We have a win for the fish because there is now a thriving steelhead population using College Lake, its canals and the surrounding waterways (not known to be the case in 1920).
3. We have a win for the waterfowl because College Lake is one of the most heavily used prime waterfowl habitats in the State.

The good news is that we can add one more win to this list – a win for the PVWMA and the aquifer and community it serves. CLRD regularly pumps enough water out of College Lake to provide the amount of water the project seeks to pipe down to the Coastal Distribution System.

Under State Reclamation District Law (Water Code Section 50000, *et seq.*), "reclamation works" are defined by Water Code § 50013 as:

> "such public works and equipment as are necessary for the ***unwatering***, watering, or irrigation of district lands and other district operations." (emphasis added)

The general powers of a reclamation district under Water Code § 50900 include "do[ing] all things necessary or convenient for accomplishing the purposes for which it was formed." Specifically, under Water Code § 50932, a reclamation district is empowered to:

> "construct, maintain and operate such drains, ***canals***, sluices, bulkheads, water gates, levees, embankments, pumping plants, ***dams***, diversion works, or irrigation works, and all things reasonably necessary or convenient for accomplishing the purposes of the district."

It is the position of CLRD that the operation and maintenance of its reclamation works (the very purpose of its existence) is a prevailing public interest because *inter alia*: (1) it is a long vested right; (2) it is a competing and prevailing governmental purpose when it is unwatering land for agricultural purposes[1] - particularly where, as here, CLRD has operated and maintained its Reclamation works in a manner which has resulted in a thriving steelhead population; and (3) CLRD's maintenance and operation of its reclamation works does not substantially divert or

---

[1] *See, e.g., Community Services District in Getz v. Pebble Beach Community Services District* (1990) 219 Cal.App.3d 229 and *Building Industry Association v. Marin Municipal Water District* (1991) 235 Cal.App.3d 1641)

---

obstruct the natural flow of, or substantially change or use any material from the bed, channel, or bank of, any stream or lake.

B. CLRD's Status as a Responsible and Trustee Agency

The DEIR fails to properly designate CLRD as a Responsible or Trustee Agency. Likewise, PVWMA has not treated CLRD as such in regards to consultation and other requirements under CEQA. Thus, as a preliminary matter, CLRD formally reiterates its objections raised to PVWMA failing to accord CLRD its legal status as a Responsible Agency and/or a Trustee Agency under CEQA.

There is no requirement that CLRD have permit authority over the Project as a whole to qualify as a Responsible Agency. *See Save Our Carmel River v. Monterey Peninsula Water Management Dist.* (2006) 141 Cal. App. 4th 677, 701 (emphasis added):

> The responsible agency typically has permitting authority or discretionary approval power over *some aspect of the project* for which a lead agency is primarily responsible. [CITATIONS]. And the "*responsible agency may refuse to approve a project* in order to avoid direct or indirect environmental effects *of that part of the project which the responsible agency would be called on to carry out* or approve." (Guidelines, § 15042.)

PVWMA would need CLRD's prior approval to legally use or interfere with CLRD's improvements or operations (including any unwatering for agriculture – Water Code §§ 50013, 50932). Without CLRD's approval, PVWMA would have to condemn all improvements and rights of CLRD. Under these circumstances, CLRD clearly qualifies as a responsible agency.

CLRD is likewise a "Trustee Agency," which is defined as "a state agency having jurisdiction by law over natural resources affected by a project which are held in trust for the people of the State of California." CEQA Guideline § 15386. CLRD is a State Agency under Water Code § 50000 *et seq.*, whose jurisdiction includes but is not limited to, agricultural and biological resources at College Lake.

Thus, in order to comply with CEQA and to enable CLRD to address the issues relevant to its jurisdiction (which include but are not limited to agricultural and biological resources), PVWMA should address the significant issues raised, project alternatives identified, and mitigation measures proposed by CLRD in this comment letter and thereafter proceed as required by law.

The Settlement Agreement between CLRD and PVWMA entered into on March 23, 2014 reserved CLRD's rights to challenge this NOP. It states that it:

> "shall in no way prejudice RD 2049's ability to challenge the College Lake Component Project-level EIR and its project-level approval and, in such challenge, to raise any of the

below listed grounds, any issues related thereto, and in addition any other mitigation measures, alternatives, other grounds, or other issues related which RD 2049 concludes are raised, or should be identified and analyzed, by the Project-level EIR. In such a challenge, PVWMA shall not assert as a defense or otherwise argue or contend that RD 2049 waived the right to such challenge on such grounds, nor shall RD 2049 be disadvantaged in any way by virtue of such certification (e.g., as to standard of review, court deference to Program Level EIR determinations, or otherwise):

a. Significance Criteria. the legality and/or adequacy of the significance criteria established in the FEIR for impacts to agricultural resources at College Lake.
b. Weir Height and Location. impacts to agricultural resources resulting from the height and/or location of the proposed adjustable weir at College Lake, described more specifically on Page 2·20 of the BMP Update Draft EIR; and/or
c. Pumping. impacts to agricultural resources resulting from a change in pumping schedule or other action resulting in the lakebed not being available annually for agricultural operations to the same degree and condition it is currently at College Lake.

PVWMA and RD 2049 agree that, as between PVWMA and RD 2049, each will be in the same legal position at the Project-level EIR stage as if there had been 'in effect no determination' in the Program EIR as to the above three potential grounds for challenge."

Thus, CLRD request that PVWMA consider its comments on these issues.

CLRD participated extensively in the Program EIR process and requests that each and every document it submitted to PVWMA in that regard be considred as part of the Project EIR which is the subject of this letter and included in the record.

C. Questions Regarding PVWMA's NOP

CLRD submits the following questions, comments and proposed alternatives and mitigation measures on the DEIR:

1. Will the project description require that the Project utilize CLRD's public reclamation improvements and ongoing operations for the College Lake Component? If not, will the resulting conflict with CLRD's reclamation of agricultural resources, property rights and those of the agricultural land owners within CLRD's jurisdiction be identified in the NOP as a significant environmental impact and analyzed as such? If not, why not?
2. If the conflict described in item #1 above remains, and is not reduced to a "less-than-significant" environmental impact, will the DEIR provide such information to the public? If not, why not?

3. The NOP identifies permanent conversion of agricultural land to non-agricultural land as a significant and unavoidable impact. (NOP 3-2). Why is nothing less than permanent conversion of agricultural land considered a significant impact? Why aren't impacts such

as reduced number or crop cycles or an increased period or area of inundation of College Lake even discussed in the NOP, not to mention considered a significant impact? How can this significance criteria or the failure to address such other potential impacts on agricultural resources or production be consistent with PVWMA's own enabling act in which the California Legislature established that "[a]gricultural uses shall have priority over other uses under this act within the constraints of state law." (Pajaro Valley Water Management Agency Act of 1984 § 102(d))?

4. Why are the agricultural resources impacts (those which are identified as "significant" and those not discussed at all) stated to be "***unavoidable***" when there is the project alternative and/or mitigation measure of continued reclamation and use of agricultural resources utilizing CLRD's ongoing improvements and operations for the College Lake Component?

5. Why is it stated that there is no feasible mitigation for loss of agricultural land when some mitigation could be achieved by PVWMA acquiring off-site agricultural and placing it in an agricultural conservation easement in perpetuity?

6. Why are biological habitat resource impacts related to steelhead migration and waterfowl habitat not analyzed in terms of a project alternative and/or mitigation measure of acquiring water from the continued reclamation and use of agricultural resources utilizing CLRD's ongoing improvements and operations for the College Lake Component? For instance:

    a. As to steelhead, the BMP Update states that "Casserly Creek and two of its tributaries, Banks Creek and Gaffney Creek, are known to support the state and federally listed south-central California coast steelhead (*Onchorhynchus mykiss*). .... A steelhead smolt outmigration study was conducted in the spring of 2011 at the outlet of College Lake (Podlech 2011). While the data for this study were not conclusive, due to the small sample size of collected fish, scale analysis of smolts demonstrated that these fish were rearing in the lake and exhibited substantial recent growth rates. ***Therefore, College Lake appears to function as a productive rearing habitat for juvenile steelhead*** prior to their outmigration to the ocean ***and needs to be managed as such***. Also, as a downstream refuge from high winter flows in the small upper watershed creeks, College Lake contributes to an increase in juvenile winter survival and may aid in overall salmonid population stability and persistence."

    BMP Update at 58-60 (emphasis added).

Please note that the foregoing major beneficial support of steelhead habitat is the result of the 98 year management of College Lake by CLRD. The same is true of the beneficial impacts described in the NOP as follows:
"Hughes Creek subwatersheds. These streams drain approximately 11,000 acres of range, rural residential, and crop lands. Casserly Creek and two of its tributaries, Banks Creek and Gaffey Creek, are known to support the state and federally listed south-central California coast steelhead (*Oncorhynchus mykiss*). College Lake may also provide winter and spring rearing habitat for juvenile steelhead."

b. As to waterfowl, the NOP acknowledges the significance of the habitat College Lake provides for waterfowl:

"The lake, when filled with rainfall runoff in winter and during the spring drainage period, supports a significant variety of waterbirds, such as ducks, herons, gulls and terns. The lake is especially noted for waterfowl abundance and diversity during the winter and migrant shorebirds during spring drawdown. Based on available, cumulative data, 213 bird species have been documented in the College Lake area (Ebird, 2013)."

DEIR at 3.4-53

Again, please note that the foregoing major beneficial support of waterfowl habitat is the result of the 98 year management of College Lake by CLRD. Nonetheless, the NOP fails to address that the Project would negatively impact this habitat. The impacts to waterfowl are analogous to those of agriculture: if the lake remains flooded too long to allow production of waterfowl food, or too deep to allow adequate access, it could substantially impact waterfowl use and benefits from the system. Nutrients and food sources are very important to waterfowl for the expenditures of migration, nesting and brood rearing. Because the lake is so significant to waterfowl overall, this represents a potentially significant impact. The DEIR currently fails to provide any alternatives or mitigation for such potentially significant impacts. However, the alternative project proposed by CLRD, as described below, will address these concerns.

D. CLRD's Proposed Project Alternatives and/or Mitigation Measures

CLRD requests that the EIR include a project alternative and/or mitigation measures as follows. The essence of CLRD's request is that PVWMA implement the College Lake Integrated Resources and Management Project to stop seawater intrusion and basin overdraft by acquiring water from the continued reclamation and use of agricultural resources utilizing CLRD's ongoing improvements and operations. For the reasons set forth above and other reasons and evidence which CLRD can provide if necessary, this approach is environmentally superior.

1. The DEIR Project Description and /or Mitigation Measures Related to Agricultural Resources should be revised as follows:

   The current NOP provides for no mitigation measures for agricultural resources even though the impact to agricultural resources is described as significant and unavoidable.[2] However, the project description could be revised pursuant to an MOU with CLRD so that the objectives of the College Lake Component can be adequately satisfied without significantly altering CLRD's current improvements and operations.

   Furthermore, if PVWMA plans to take over CLRD's current improvements and operations, there would be no increased area of inundation at College Lake (previously estimated at 38 acres) and no reduction in the annual number of crop cycles. Therefore, there would be no reduction in agricultural productivity due to implementation of the Project utilizing current CLRD improvements and operations.

   The foregoing Project Description and/or proposed mitigation measure is required to comply with one of the objectives of the PVWMA established by the State Legislature that "[a]gricultural uses shall have priority over other uses under this act within the constraints of state law." Pajaro Valley Water Management Agency Act of 1984 § 102(d). Will CLRD's proposed revised Project Description and/or mitigation measure be implemented, and if not, why not? Further, if not implemented, will the DEIR be revised to inform the public of the reasons (if any) for designing the Project in a manner which fails to prioritize use of the prime agricultural resources at College Lake?

   Even if the alternative of partnering with CLRD is not selected, PVWMA could provide for some mitigation of the loss of agricultural land by acquiring off-site agricultural land and preserving that land for agriculturtal land in perpetuity under an agricultural conservation easement or some other legal instrument.

---

[2] As a general comment, the impacts to agricultural resources are not well described and heretofore have been largely ignored. This precludes informed decision making and public review and fails to satisfy the fundamental requirement that an EIR "demonstrate to an apprehensive citizenry that the agency has, in fact, analyzed and considered the ecological implications of its action…[t]he EIR process protects not only the environment but also ***informed self-government***." *Laurel Heights Improvement Assn. v. Regents of University of California* (1988) 47 Cal.3d 376, 392; *see also* CEQA Guidelines § 15003.

2. The Project Description and/or Mitigation Measures Related to Biological Resources should be revised as follows.

   If the Project Description is revised so that PVWMA acquires the water it seeks through the utilization (under contact with CLRD) of CLRD's current improvements and operations, adverse environmental impacts to biological resources such as steelhead and waterfowl will be substantially reduced or eliminated. The DEIR Mitigation Measures Related to Biological Resources can then be revised as to Impacts BIO-2m, 2n, and 2o to read as set forth below. One prime basis for these revisions is that the Project Description for College Lake Component would no longer include construction of a new adjustable weir downstream of the existing low dam which new outlet weir would raise the College Lake outlet elevation by 2.3 feet to 62.5 feet. Instead, this College Lake Component would be implemented by contracting with CLRD to continue to operate its reclamation works, including the "low dam" (as it has for over 98 years) in a manner which has resulted in a thriving habitat for steelhead and waterfowl as well. The Mitigation Measures below describe the long-time operation of the CLRD reclamation works, concurrently enabling provision of 2400 AFY or more to PVWMA in a typical rainfall year.

   The mitigation measures for biological resources should therefore read: PVWMA shall contract with CLRD to assure that the CLRD takes all necessary actions to assure that neither the operation, nor the maintenance, of the CLRD Reclamation works shall cause the water level of the canal between the pump plant/station and College Lake to fall to a depth of less than eight inches or a width of less than three (3) feet, unless there was inadequate generation of water into the watershed to maintain such standards. PVWMA recognizes that the CLRD is not obligated to maintain flows above what would occur naturally and CLRD commits to continue its past stewardship efforts (screening, buffering etc.) which have resulted in a healthy steelhead population in College Lake and associated canals as found in a report by an Aquatic Ecologist dated October 2011 prepared for the Resource Conservation District of Santa Cruz County.

   Furthermore, PVWMA's contract with the College Lake Reclamation District shall assure that CLRD: (1) performs its maintenance only between August 15th and November 14th (not to exceed a total of fourteen days per year) and (2) performs repair work on the District's Reclamation works between June 15th and November 14th in any year, but may perform emergency repair of CLRD's Reclamation works at any time of year. Anytime equipment must be placed in a CLRD canal, CLRD shall install coffer dams to protect fish in the area.

   PVWMA's contract with CLRD shall require that CLRD determine the date of commencement and rate of pumping and draining of College Lake in the manner it has done for the past 98 years so as to continue to provide habitat for steelhead in a manner which has not adversely affected summer rearing habitat (as found by the Resource

Conservation District of Santa Cruz County in a report by its Aquatic Ecologist of October 2011). Unimpeded bypass of the weir for flows shall be provided for adult upstream migration from November 15th through the following March 31st each year and for smolt outmigration from November 15th through the following May 1st of each year whenever the District determines that it is consistent with the District's purposes, but in no event through less than March 31st. This requirement for "unimpeded bypass" does not obligate the CLRD to assure actual flows if there was inadequate generation of water into the watershed.

The Mitigation Measure for BIO 2p will be revised by replacing the words "Salsipuedes Creek" with "the canal" because the area downstream of the existing CLRD "low dam" is not Salsipuedes Creek, but rather a man-made canal.

E. Reclamation District Assets

The NOP states that PVWMA "is proposing to construct, operate and maintain new facilities within and near agricultural lands." In addition, PVWMA has expressed its interest in acquiring the land within the CLRD. The EIR should evaluate the impacts of the removal and replacement of the current CLRD facilities. Furthermore, the CLRD facilities are owned as assets by the District. The CLRD requests an evaluation of how PVWMA will handle the CLRD's assets.

Thank you for the opportunity to provide comments on this Project.

Sincerely,
WITTWER PARKIN, LLP
General Counsel
College Lake Reclamation District

Natalie Kirkish by JW

Natalie Kirkish

cc: Brian Lockwood, GM of PVWMA (via email)
PVWMA Board of Directors (via email)
Tony Condotti, General Counsel of PVWMA (via email)
CLRD Board of Directors (via email)

To: Pajaro Valley Water Management Agency (PVWMA)
Re: Comments on the College Lake Integrated Resources Management Project
From: John Diffenbaugh representing Diffenbaugh Family Farms LLC owner Paulsen Lake Ranch in the College Lake Basin; Secretary, Reclamation District 2049
Date: January 4, 2018

These responses to the PVWMA NOP are intended to ensure that the EIR on the Basin Management Plan address the key issues involved in a successful project.

1. Impacts on farm land:

- The previous BMP study established that over 100 acres of current commercially farmed good, seasonal agricultural land will be taken out of production by use of the College Lake Basin as a water-storage and distribution area.
- In addition, it should be researched and projected as to how many additional acres of land will be made unproductive for commercial farming by holding water in the basin and by raising the weir two feet.
- It should be anticipated that lands on the upstream side of Paulsen/Whiting Roads will be also impacted. This is known because of the impact of the flood of 2017 on these lands.
- Paulsen Road will have to be raised so as to avoid flooding of this thoroughfare. This will in turn impact the adjacent properties and farm acreage.
- As more farms and acreage will be taken out of production, these owners should be compensated.

2. Stream beds and water channels: The lack of clear channels for Casserly Creek and smaller stream waters to pass through the Lake Basin needs to be addressed.

- The level of the Casserly Creek stream bed is now above the level of some of the surrounding agricultural fields. Water is seeping under the levees and flooding the fields. This refers to the waters flowing from the Casserly Road area i.e. mainly waters of Gaffey Creek and Green Valley Creek.
- After water passes under the Paulsen/Whiting Roads Bridge it flows into the lands of the PVWMA, which have been allowed to become overgrown. This is an example of lack of or poor land management. There is no clear channel through this area. Either a channel should be cleared or a new channel should be dug out around this area so that water and fish can move through the Lake Basin when water levels are low.
- The outflow channel from the weir to Corralitos Creek on the outflow side of the lake is also clogged and silted in to the extent that water levels are higher. This will lead to the flooding of the Orchard Park. Therefore, this outflow channel needs to be cleared.

3. Lake Basin Management:

- The current infrastructure of the Reclamation District 2049, which was developed and maintained over a 100-year period, will be needed during the development phase of the PVWMA project. The PVWMA should be prepared to compensate the Reclamation District for their expense and ownership of the pumps, weir, canals and other developed infrastructures.
- The Lake basin should be divided into management areas along the natural topography such that when water levels are low the different areas can be managed with different goals i.e. survival of fish, wildlife habitat, and water storage. Dividing the drainage areas with small

berms and canals would allow for draining or even flooding the areas separately. These berms may be lower than the high-water level, becoming submerged when the Lake is full. Pumps can be strategically placed to move water between areas.
- The surface area of the Lake should be reduced to a minimum area each year by draining the basin so that a large area of stagnant water with floating vegetation does not develop. Some means of mechanical removal of floating vegetation should be investigated and acquired so that the water quality in the Lake remains good. As much as possible, the Lake should be drained every year as a management practice.

4. Wildlife habitat and recreational use management: These are compatible with water storage.
    - Wildlife habitat should be enhanced. The surrounding landowners have worked over much time to create bird and fish habitats and want to see their efforts continued and supported.
    - The landowners in the area are not open to public access on their private property. Access for the public could be provided from the County Fair Grounds. Motorized recreational vehicles such as motor boats and jet-skis should not be allowed on the Lake. Canoes, kayaks and rowboats may be allowed as a compatible recreational use.
    - The rights and interests of the landowners around the Lake should be respected such that the PVWMA water storage/distribution project may enjoy the cooperation of the surrounding landowner community.
5. Compensation of landowners in the Lake Basin/Project area:
    - PVMMA, RC 2049 and Landowners all recognize that the highest use of the Lake is for water storage. Water is the most valuable commodity on earth and in our Pajaro Valley. It must be recognized that the landowners are not only giving up their use of the land for their livelihood of farming, but they are also subordinating their water rights to the PVWMA project.
    - Landowners should be compensated for the value of this highest use of their land.
    - Landowners should be given the option of selling an easement, at a fair rate of an annual fee, to the PVWMA to allow PVWMA to inundate their lands with water. The annual fee should be no less than 3-4% of the land's value for water storage purposes.
    - Landowners continuing to own land adjacent to the PVWMA water project should be able to retain riparian water rights for these lands.
    - In the case of any land sale to PVWMA, the laws of eminent domain should be applied to give landowners three years' time to find suitable replacement properties, if desired.
    - Negotiations with landowners should be conducted in the spirit of compromise and cooperation toward the mutual goal of supporting agriculture in the Pajaro Valley and stopping salt water intrusion into our aquifers.

Sincerely,

John Diffenbaugh
Diffenbaugh Family Farms LLC, Paulsen Lake Ranch
Secretary, Reclamation District 2049

Environmental Impact Report for Proposed College Lake Integrated Resources Management Project - Scoping

PV Water

Comments must be submitted in writing and received by **January 5, 2018** to be considered in the Draft EIR. Comments may be submitted in writing at the public meetings on December 12, via email to **eir@pvwater.org** or by U.S. Postal Service to the address below (this form can be folded as shown on reverse and mailed without an envelope; standard postage [$0.49] required).

MY COMMENT IS ABOUT (please mark an "X" next to all that apply):

RECEIVED
JAN 04 2018
PVWMA

[ ] Project Description
[ ] CEQA Process
[ ] Aesthetics
[ ] Air Quality & Greenhouse Gas Emissions
[X] Biological Resources
[ ] Geology & Soils
[ ] Hazards & Hazardous Materials
[X] Hydrology & Water Quality
[ ] Land Use & Agricultural Resources
[ ] Noise
[X] Public Services
[ ] Transportation/Traffic
[ ] Recreation
[ ] Utilities, Energy, & Service Systems
[X] Other: Public Health Pest Hazards

The Santa Cruz County Mosquito Abatement/Vector Control division of the County Agricultural Commissioner provides public health vector control services to reduce the risk of mosquitoes and mosquito-borne diseases. The College Lake area has a long history of seasonal floodwater mosquito production. With the proposed Project, surface waters will be impounded for longer periods of time. The resultant vegetation growth combined with shallow water and poor circulation could ~~be~~ result in improved habitat for summer Culex mosquitoes and increase the risk of mosquito-borne diseases and biting nuisance to the surrounding community.

Project planners should be aware that the public health impacts of mosquitoes pose a serious public health risk and environmental impact and should work collaboratively with our agency to ensure that the EIR provides mitigation measures that include vegetation maintenance, ensures access for mosquito management equipment, provides consideration for biological and chemical mosquito control agents and water level control contingencies for mosquito-borne disease emergencies.

Please Print (use additional sheets if necessary)

NAME: Paul Binding
ORGANIZATION (if applicable): Santa Cruz County Mosquito and Vector Control CSA 53
ADDRESS: 640 Capitola Road, Santa Cruz, CA 95062 (temporary location: 870 17th Ave, S.C. 95062)
EMAIL: AGC020@agdept.com
PHONE: 831-454-2590

Do you wish to withhold your name and contact information from public review or from disclosure under the Freedom of Information Act? [X] No [ ] Yes

Please submit this form at the scoping meetings or email to **eir@pvwater.org** or mail before **January 5, 2018** to:

Pajaro Valley Water Management Agency
ATTN: Brian Lockwood, General Manager
36 Brennan Street, Watsonville, CA 95076

For more information visit pvwater.org

--Fold Here--

--Fold Here--

Place
stamp
here

Pajaro Valley Water Management Agency
ATTN: Brian Lockwood, General Manager
36 Brennan Street
Watsonville, CA 95076

PV Water Environmental Impact Report for Proposed College Lake Integrated Resources Management Project - Scoping

Comments must be submitted in writing and received by **January 5, 2018** to be considered in the Draft EIR. Comments may be submitted in writing at the public meetings on December 12, via email to **eir@pvwater.org** or by U.S. Postal Service to the address below (this form can be folded as shown on reverse and mailed without an envelope; standard postage [$0.49] required).

RECEIVED
JAN 05 2018
PVWMA

MY COMMENT IS ABOUT (please mark an "X" next to all that apply):

[X] Project Description
[ ] CEQA Process
[X] Aesthetics
[X] Air Quality & Greenhouse Gas Emissions
[ ] Biological Resources
[ ] Geology & Soils
[ ] Hazards & Hazardous Materials
[X] Hydrology & Water Quality
[X] Land Use & Agricultural Resources
[X] Noise
[ ] Public Services
[X] Transportation/Traffic
[X] Recreation
[X] Utilities, Energy, & Service Systems
[ ] Other: ______________

Please see two pages attached.

Please Print (use additional sheets if necessary)

NAME: JANET BRAYCOVICH BANOVAC
ORGANIZATION (if applicable): JANET BRAYCOVICH BANOVAC SEPARATE PROPERTY TRUST
ADDRESS: PO BOX 75 WATSONVILLE, CA 95077
EMAIL: jbanovac@aol.com
PHONE: 650-465-1989 831-728-8055

Do you wish to withhold your name and contact information from public review or from disclosure under the Freedom of Information Act? [ ] No [X] Yes

Janet Braycovich Banovac 1/5/18

Please submit this form at the scoping meetings or email to **eir@pvwater.org** or mail before **January 5, 2018** to:

Pajaro Valley Water Management Agency
ATTN: Brian Lockwood, General Manager
36 Brennan Street, Watsonville, CA 95076

For more information visit pvwater.org

January 5, 2018

To PV Water Agency:

The Braycovich Ranch has been in my family for 3 generations. It has a lot of meaning to me and my family. My parents worked very hard and I grew up here. It is NOT meant to be broken up for any reason. We understand your project and how it serves the community. To make this work smoothly I want to lease the property to PV Water rather than sell it. There are a lot of complications to selling as I have ajoining land, I live on the ranch, and other things both known and unknown at this time. I will outline some of my concerns/items that need to be addressed. There will be most likely many other things that come up as time passes - I am in hopes that raising the weir is planned correctly and does not do unknown damage at this time. There are other lands around the lake that are not in the Reclamation District that will be affected (damaged) by this project, mostly due to raising the weir.

-I do not want any paths around the edge of my property. It interferes with farming.

-No accesss from either of my roads as it interferes with farming.

- No recreation on my land as it would interfere with farming.

-My road in back of my house cannot be damaged as it is the road to the back of my ranch which is farmed. I need that access and it cannot be flooded. If it is flooded, it will cause a lot of damage to my farming business.

-We are worried about worse flooding. You may want to hold water in heavy rain years, once it builds up, it cannot empty fast enough through a 9 or 12 inch pipe.

-Worry about silt and algae buildup in the lake. Your plan is not to pump out completely until October or so. It must be managed in such a way that it does not have the pollution of Pinto Lake.

-Pest Control: Since water will be in the lake the majority of the year, I am concerned about mosquitos and other insects that bite. I am allergic to certain bites. It will be mandatory to have a plan in place to control pests. Remember, people will be living around the lake.

-My property should be disked at least once per year. We don't want swamp conditions.

-Are you going to buy or lease after the specific EIR is approved? We hear different messages

Janet Braycovich Banovac
1-5-18

regarding this.

-Pump Facility that you are planning on building. How tall? We are concerned about noise. Any plans to make sure noise levels are low? Why do you have a facility site by the weir and an alternative as well? We would prefer to have the facility built by the weir.

- I am very concerned about raising the weir to the height you have indicated. The flooding could be disasterous on high rain years or a 100 year flood. The flood of 1955 was unbelievable. The water literally came up at least halfway up my hill. Now with the weir higher, all Holohan Road, Orchard Park and the town of Watsonville could be flooded. You better recheck your idea of a 12 inch pipe. We do not feel that is sufficient to hold the water. If or when you have a plan in place, we would like to hear about it.

-Earthquake fault lines go through the lake. That needs to be studied. Just because of inactivity for a long time doesn't mean that it can't change. Mother nature is unpredicitable as we all know.

-Also, we have a drainage problem along Holohan Rd. that floods at my corner mailbox (118 Holohan Rd.). My tenants, John E. Eiskamp and Dick Peixoto, maintain 3 pumps that ineffienctly pump through a 12 inch pipe uphill to Pinto Creek. We ask that you help permanently solve this drainage water problem. Your help would make it easier to provide a reasonble solution for my adjacent lake property. This would also help the flooded Lipanovich house on the adjacent property at 116 Holohan Rd.

Another scenario I'd like you to look at -- My land is on a gradual slope that comprises a portion of the western edge of the lake Eleven and a half acres are in the CLRD designated area and thirteen and a half acres are outside CLRD but directly affected. Because of the slight slope, I would prefer that you move dirt towards my contingent property, that will be high enough so that it can be farmed. Perhaps 5 to 10 acres can be saved for farming. My soil is the best in all of the lake. One would need to study the effects of seepage from the inundated lake.

Regards,

Janet Braycovich Banovac 1/5/18

Janet Braycovich Banovac

Braycovich Ranch

Comments on the Notice of Preparation for College Lake Integrated Resources Management Project Environmental Impact Report

Submitted by Jerry Busch

Thank you for the opportunity to comment on the proposed project and Environmental Impact Report.

College Lake is actually a depressional wetland, inundated seasonally from December through May, with a water regime that is mostly human controlled. The area of emergent marshland ranges from about 50 acres to 100 acres from year to year, changing with fluctuations in the cultivated area. Cumulatively, the emergent marsh has extended to about 125 acres over the past 4 years. The area of riparian woodland is an additional 90 acres, so the total wetland area in the depression is currently greater than 200 acres. Further contraction of farmed area would likely increase the wetland area.

The wetlands of College Lake are one of the most important wintering areas for waterfowl on the Western seaboard, based on high count data recorded on ebird, an online bird count listing site operated by Cornell University and the National Audubon Society. College Lake is number one or two in dabbling duck density per acre, based on recorded high counts, among large wetlands on the Coast of the United States between Canada and Mexico. The EIR should disclose the Statewide, Regional and Area significance of the resource to waterfowl.

PVWMA Board of Directors has taken action to insure the College Lake wetland wildlife populations are not damaged by the proposed water supply project. First, in 2014, the agency adopted the Final Environmental Impact Report for the Basin Management Plan Update. That document found that the irrigation impoundment could have a substantial adverse affect on wildlife habitat or sensitive species, but that mitigation measures, including the required development of a long term Adaptive Management Plan for College Lake, would reduce these to less-than-significant. The FEIR requires the Adaptive Management Plan to address “site-specific and project implementation conditions,” and to establish “multi-year baseline waterfowl population and habitat use data” to address potential ongoing impacts.

The Basin Management Plan Update, draft and final EIRs adopted by the PVWMA and supported by the Ad Hoc BMP Committee, and the cbec study produced by the RCD with help from a stakeholder committee, all considered a yield of 2,100-2,400 AFY. The cbec study indicated that wet season water supply extractions could add to the total diversion volumes. The cbec study also indicated that wet season extractions could be used to make up for lost yield caused by drawing the lake down earlier in the summer. In November, the agency made a decision to apply for water rights for 3,000 AFY. The PVWMA Board in the EIR should consider an alternative to that decision, which would be to stick to the original intent of the program EIR and supporting documents and *use wet season yields to facilitate mitigation of reservoir impacts*.

The change to a 3,000 foot yield goal represents a 25% increase over the program EIR and raises questions about the validity of tiering off of that document. More importantly, the cbec model showed that this yield could result in the inundation of low-lying wetland areas into October. This inundation pattern would not only wipe out vegetation at lower elevations, it could also fail in some years to meet the objective of a complete annual drawdown, required to protect steelhead by controlling predatory fish. The EIR needs to fully describe the hydrologic assumptions that are behind the proposed yield and present wet year and dry year scenarios, as well as scenarios based on early rains and late rains.

On November 20, 2017, the PVWMA Board considered project specific objectives for the proposed College Lake Project to be included in the EIR, including this policy: "Optimize the beneficial use of locally controlled surface water to offset groundwater pumping in a manner consistent with habitat preservation and enhancement." This language, as subsequently revised, would establish a clear goal for the activities of the agency and the community.

PVWMA baseline studies are crucial to future adaptive management efforts, as they establish the yardstick against which future management of the wetlands is measured and adjusted. Key parameters include bird numbers and distribution, distribution and occurrence frequency of plant species, the height and species composition of dominant vegetation, and the distribution of waterfowl food plants. The scope of the EIR should include evaluation and improvement of these mandatory baseline studies, including improved randomization of the plant transects and application of statistical techniques to obtain levels of significance. It is essential that agency pursue these studies without any gaps in data collection.

Baseline studies should also include monitoring sedimentation rates in the lakebed and a series of annual California Rapid Assessment Method for Wetlands (CRAM) evaluations. Consider enlisting the volunteer organizations such as the Coastal Watershed Council to characterize macro invertebrates and other biotic factors.

Where the program FEIR mandates Adaptive Management, the project EIR must provide detailed evaluation of required AMP elements. At minimum, the project EIR should establish the required minimum contents and overall methodology of the AMP. The EIR should establish goals and performance standards to address specific project impacts. The EIR mitigation plan should also require that the AMP be adequately funded and that it be implemented concurrently with project implementation until the goals and standards are met. The EIR should include a policy that optimization of water yields includes consideration of project impacts on wildlife.

AMP implementation based on accurate and significant monitoring data, clear goals and standards, and carefully implemented management measures, is a way to insure that environmental impacts of the proposed project do not exceed thresholds of significance. Conversely, an AMP based on incomplete or inadequate data, or on weak performance standards, would not provide a realistic basis for a finding of less-than-significant impacts.

A no-net-loss requirement for wetland acreage should be implemented. Because virtually all of the basin will have reverted to jurisdictional wetlands by the onset of operations and agriculture discontinued in the inundation area, intermittent (past) agricultural activities should not figure in wetland delineation or reduce estimates of wetland acreage.

Thresholds of significance and operational performance standards such as the following could be considered for the inclusion in the EIR, AMP and mitigation and monitoring program:

Threshold of Significance	Performance Standard	Mitigation Measures
1. Loss of wetlands	No net loss of wetland area. Consider conversion from palustrine to lacustrine habitat to be a loss of wetland area.	Minimize wetland loss by managing the timing and extent of Spring drawdowns. Ramp up extractions gradually, monitoring impacts. Purchase and enhance new wetland areas. Consider re-contouring to shorten inundation period in selected locations.
2. 25% decline in waterfowl populations	Maintain waterfowl populations at least 75% of average	Enhancement measures such as adjusting drawdown date, planting, re-grading, buffer enhancement, food plant production.
3. 25% decline in waterfowl food plant s	Maintain food plant occurrence at least 75% of average	Enhancement measures such as adjusting drawdown date, planting, re-grading, disking.
4. 25% general decline in hydrophytic, palustrine vegetation	Maintain wetland plant occurrence at least 75% of average	Enhancement measures such as adjusting drawdown date, planting, re-grading, discourage invasive species such as *P. aquatica, Xanthium strumarium* (cocklebur), and, as appropriate, *Melilotus alba.* Control willow expansion into marshland.
5. 25% decline in raptor populations	Maintain raptor populations above 75% of average	Enhancement measures such as buffer enhancement, expansion of upland habitat, adjusting drawdown date, planting, re-grading, buffer enhancement, waterfowl production.
6. 25% decline in mammalian populations	Maintain habitat for deer, rabbits, rodents and squirrels.	Buffer enhancement; wildlife corridors identification and maintenance, wetland conservation, planting and restoration of food plants.
7. 25% decrease in wildlife diversity	CRAM assessment. Maintain wildlife diversity above 75%	Implement Adaptive Management Plan, buffer enhancement, wetland protection. Seek to improve all CRAM components.
8. Decline in a possible breeding population of Bryant's savannah sparrow	Confirm and maintain self-sustaining population of Bryant's savannah sparrow	Maintain appropriate habitat – grassland / wet meadow / wetland.
9. 50% increase in sedimentation rate at College Lake	Maintain sedimentation at less than 50% increase	Monitor sedimentation rates. Install sediment basins and wetland habitats to control sediment flow. Watershed management.
10. Sedimentation in Corralitos Creek	Maintain creek beds below weir elevation. Maintain ditch and culverts below weir.	Active ditch and creek maintenance; watershed management.
11. Reduction or degradation of buffer habitat.	Acquisition in fee or of leases or easements to protect and restore buffer habitat; secondary site for treatment plant.	Removal of invasive vegetation such as *Arundo donax* from PVWMA properties; debris removal; vegetation management; nest boxes.

DISCUSSION OF IMPACTS

Highly selected waterfowl food plants, including swamp timothy, smartweed, Japanese millet and fat hen, are currently found in more than 50% of the College marsh samples. These species are encouraged by the May-June drawdown date and by periodic disking.

Currently, the most productive marsh areas are between 50 and 53 feet in elevation above sea level, comprising about 75 acres. If these elevations are not drawn down until late September or October, waterfowl food plants will be eliminated in these areas. Possibly *all* plants. Elimination of a plant community, particularly one supporting an associated group of waterfowl, raptors and passerines, requires a mandatory finding of significance and implementation of adequate mitigation measures. This potential wetland impact needs to be specifically evaluated by the EIR in detail, incorporating the results of vegetation studies up to the date of EIR publication.

Another concern is that a September drawdown will foster a noxious species so high in tannic acid that it literally repels waterfowl and other wildlife, a plant commonly known as pink lady's thumb, *Persicaria amphibia. Persicaria amphibia* is highly adapted to aquatic environments: a perennial that spreads from tillers, floats, grows in disturbed habitats and dredge spoils, is both a colonizing and climax species and tolerates a wide range of drawdown dates and inundation periods. It occurs at every elevation in College Lake. The Lapis Lane branch of the College Lake was fallowed this year after cultivation last year; by October 14, *Persicaria amphibia* was found in about 40% of point samples. This plant has taken over large areas of Watsonville Slough, Freedom Lake and is concentrated in parts of College Lake at both the 53' elevation and 63' elevation. It would be highly deleterious if it became dominate at College Lake. This potentially significant habitat conversion impact should be evaluated by the EIR. The plant's occurrence in dredge spoils has negative implications for mitigations involving recontouring. Topographic mitigation measures should be tested on small scale before implementation (AMP).

The Adaptive Management strategy that makes the most sense, particularly in the presence of *Persicaria amphibia*, along with other semi-undesirable species such as *Melilotis alba* and cocklebur, is to build water yields *gradually over time*, measuring vegetation response and implementing management measures to maintain diversity. Abrupt pursuit of maximal yields could allow *P. amphibia* to quickly establish throughout the lake bottom, where removal would be harder than prevention, would cost more, represent a more substantial impact and possibly require water yield adjustments anyway.

The AMP/MMP should also include monitoring and early-intervention control of the pioneer incursions of such virulently invasive species as Canada thistle (*Cirsium arvense*) and Cape ivy (*Delairea odorata)*, already recorded within and adjacent to College Lake.

The mature areas of the riparian forest include a diverse layer of tall vegetation including sand bar willow, box elder, cottonwood, dogwood and other trees. Beneath these and the willows is a rich understory of plants, including the beautiful *Bidens frondosa,* a locally rare species known from only one previous County record; also wild orchids, sedges and rushes, and fat hen. The EIR should evaluate impacts on riparian vegetation by providing known plant tolerances for inundation and siltation.

The termination of agricultural activities could allow willows to expand across the lakebed, which would represent a conversion from palustrine wetland to riparian wetland. This prospect should be considered and addressed in the MMP and AMP.

Another important plant is *Melilotus alba,* or sweet white clover, a tall wetland affiliate. If increased in area, the clover can overwhelm plants used by waterfowl; yet if eliminated, it would hurt deer populations.

The loss of waterfowl food plants would impede the pre-breeding nutritive buildup that is documented to be important to waterfowl productivity. We know that waterfowl are affected by loss of food plants because we have monitored fields before and after such plants are replaced by crops. This change causes a visible, marked decline in waterfowl usage, particularly when crop residues are ploughed under after harvesting.

Seed-producing plants also encourage sparrows. More than 10 species of sparrows regularly occur at College Lake, drawn to many of the same seed bearing plants as the ducks and geese. The wetlands and buffer habitats in summer support a breeding population of savannah sparrow that is probably the Bryant's race (*Passerculus sandwichensis alaudinus*), which is currently BSSC-listed. This breeding population may not survive project implementation. The EIR should disclose whether this population is the Bryant's race, confirm breeding, and determine what the impact on this population would be. The population is near or at the current southern limit of the species' range, which means that it is particularly sensitive. Extirpation of the colony would represent a contraction or degradation of the species' range.

Declines in populations of waterfowl, shorebirds, sparrows and finches could potentially affect use of the wetland by avian predators such as golden eagles, which are regular visitors in both winter and summer, peregrine falcons (aka "duck hawks"), and numerous other raptors and owls, along with loggerhead shrikes. The loss of waterfowl food plants causes a cascade of impacts, including rendering important components of the avian predator community non-self sustaining. Similarly, the prolonged inundation could eliminate bush rabbits and jackrabbits, and reduce vole and mice populations, along with the bobcats, foxes and coyotes, hawks and eagles that depend on this prey-base. Existing invertebrates such as the Western pygmy blue could be extirpated. This ecosystem collapse or degradation is a potentially significant impact.

The mudflats currently used by migratory shorebirds could be underwater during both the spring migration and the return south in August; mitigation for this could require management of buffer habitat, water levels and possibly the weir itself. This is a potentially significant impact.

Implementation of an AMP, with proper management and enhancement of upper marsh elevations, could enhance marsh plant diversity, and macro invertebrates, and help to mitigate impacts to waterfowl and waterfowl food plants.

It should be within the scope of the EIR to evaluate other regulatory policies affecting wetland protection, such as the State's "no net loss" policies, CEQA's inclusion of locally-listed wildlife among protected species (see Santa Cruz County General Plan / LCP and County Code), the State Water Resources Control Board watershed-based protections against fill and dredge spoils, and federal protections against wetland contamination including sedimentation. Last winter's storms discharged tons of sediment from unprotected soils in the watershed that accumulated in the lakebed. The increased residency and settling of suspended sediments in the water column caused by the project needs to be evaluated by the EIR for possible avoidance or mitigation as a potential Clean Water Act Violation. Increased sedimentation caused by the water project is pollution under the CWA, and should be considered fill and subject to SWRCB regulation. The AMP needs to include monitoring of sediment deposition as part of its baseline data and impact evaluation. Does sedimentation have the potential to reduce yields over time and shorten the overall project life? Mitigation could include working with the Resource Conservation District and the County of Santa Cruz to develop and implement a long-term Watershed Management Plan for the lake watershed, and active measures in the primary watershed. Acquisition of habitat north of Paulsen Road could allow establishment of wetlands that would filter contaminants, provide habitat mitigation, extend project life and reduce culvert and ditch maintenance costs and impacts.

A concern is that sedimentation deposition (bed aggradation) in Corralitos and Salsipuedes creeks will elevate the bed grade to near or above that of the modified weir, so that the weir would have to be further elevated in order to provide fish flows. This would, in turn, postpone College Lake drawdown dates unless additional water was released or used. Aggradation in Corralitos Creek will cause sediment to further impact the ditches and culverts between the weir and the confluence, requiring regular maintenance. These potential factors should be evaluated, and mitigation should be an element of the MMP and AMP.

Upland buffer habitat is one of the factors of wetland quality included in the California Rapid Assessment Method for Wetlands, or CRAM, which should be included in the assessment of baseline conditions. CRAM is recommended by the State Resources Agency as a means of assessing the health of wetlands before and after project implementation. Expansion of the extent, depth and quality of buffer habitat is a means of improving wetland quality to partly mitigate damage caused by water project management. Many wetland species range the uplands in winter and bottomlands in the dry season; waterfowl use the uplands in spring. Additionally, evaluate the baseline composition of aquatic invertebrates, an important waterfowl food, for comparison with future composition.

The existing upland habitats, though valuable, are impacted by agriculture and development and still have room for restoration and expansion. The EIR should evaluate upland habitat easements, purchases and voluntary cooperation by landowners to expand lake buffer areas and expansion of wetland area. Upland habitat acquisition would have the added benefit of incurring more access and educational opportunities. Public involvement, as experience in Watsonville Slough has demonstrated, can reap dividends in habitat restoration, invasive plant control, volunteerism and cultural enrichment. Riparian habitat destruction is an ongoing issue in lands adjacent to the lake. The PVWMA should work with local landowners and public interest groups to protect and restore buffer areas and primary watersheds around the lake.

Location of the proposed treatment plant adjacent to the lake is inconsistent with the objective of improving buffer habitat quality, as human activity and loss of habitat would impact an area around the proposed plant site, and eliminate a significant potential habitat mitigation area. This impact both affects existing wildlife and reduces mitigation potential. Recontouring in lake areas along the southern and southeastern boundaries of the inundation area could be explored to expand waterfowl food plant habitat; this could be a viable mitigation measure and should be included for consideration in the AMP and MMP. The alternative treatment plant site adjacent to Holohan Road would avoid buffer impacts.

If the plant is situated in the wetland buffer area, additional areas of buffer habitat should be acquired or leased and restored in the area of the plant along the southern side of the wetland, to provide compensatory mitigation. Since the lake will be a public resource and recreation destination, visual and noise impacts of the plant location within the buffer area should be evaluated. The visual impacts of placing a treatment plant, road and parking area in the primary buffer area of the lake, within the primary viewshed of all the access points upstream, is a potentially significant visual and water-quality impact.

Buffer enhancement could also include cooperative programs with the County of Santa Cruz to improve management of public lands adjacent to the lake, addressing invasive Harding grass and ox tongue and encouraging grassland species more beneficial to wildlife. The County effort could also include termination of dumping activities in the primary watershed and remediation of fill areas. Waterfowl use these areas for nesting; raptors use these areas for foraging, including foraging during breeding periods. The areas include potential habitat for ground nesting raptors such as Northern harrier and short-eared owl.

Cooperative management with local citizen groups can be a viable long-term mitigation measure and should be considered for incorporation into the AMP. Non-government institutions have played a significant role in habitat maintenance and enhancement in numerous other parts of the County, including Watsonville Slough and Elkhorn Slough. Outreach efforts by the PVWMA could continue to include this element. Citizen assistance can be particularly effective, for example, in debris clean-ups, which are needed for PVWMA parcels as well as private properties around the lake.

In the long-term, the College Lake wetlands and pond areas will become a multi-use public resource. The decision to implement an acquisition and water management program in the lake would be the first public decision establishing this multi-use resource, so the impact analysis should include consideration of the potential impact and benefits. A Multi-Use Management Plan should be mandated, adopted and implemented by the PVWMA, addressing access, recreation and education as well as extraction, and including involvement and long-term integration of stakeholder organizations.

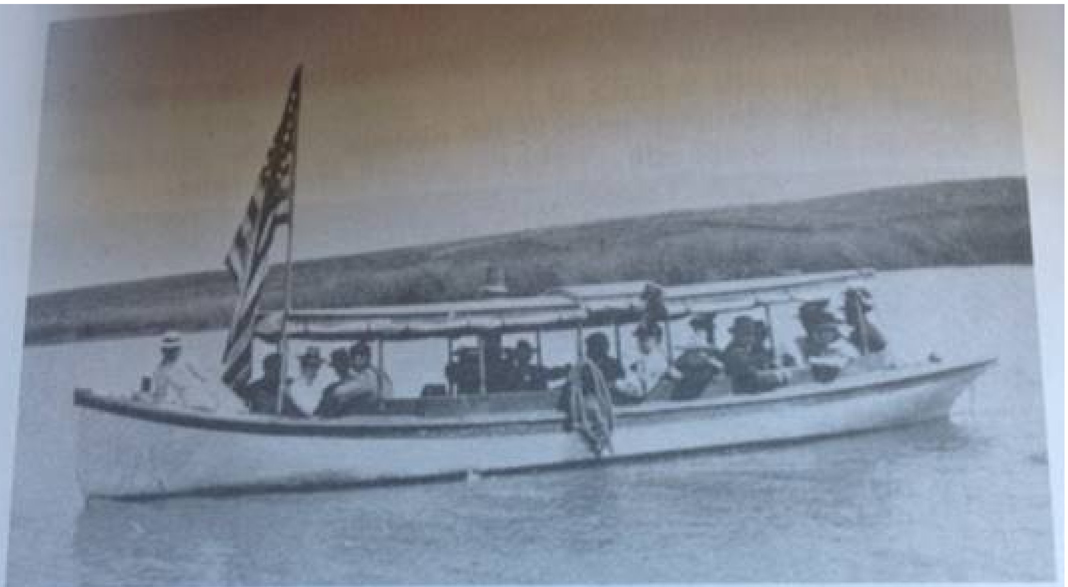
It may be possible to integrate the proposed water project with the levy system proposed for flood control. If a Corps of Engineers levy is proposed near Orchard Park, perhaps the height of the weir and the elevation of Paulson Road could be raised, allowing expansion of the wetland north of Paulsen Road, and more storage and yield from the water project in winter, in turn enabling earlier drawdowns in summer.

ALTERNATIVES

Alternatives to this project were described by the Amended Basin Plan, but could be implemented in conjunction with the proposed College Lake project to reduce its impacts. Conjunctive management, such as additional groundwater recharge basins using treated water from the College Lake project, Murphy Crossing with recharge, and other projects described in the Amended Basin Plan could potentially replace enough yield from the College Lake project to allow environmentally appropriate drawdown scenarios. The EIR needs to provide a detailed analysis of these alternatives as potential mitigation for the proposed project and a means of reducing wetland loss.

From: Jeanne Greatorex [mailto:venajean@gmail.com]
Sent: Wednesday, December 13, 2017 12:22 PM
To: EIR <EIR@PVWater.org>
Subject: COLLEGE LAKE INTEGRATED RESOURCES MANAGEMENT PROJECT

I first need to acknowledge my position on the College Lake project. If it was up to me the lake would be returned to a natural lake. It was not a seasonal lake until the pumping started.



"H. C. Peckham has received his launch and it has been launched off the Petersen point, on the College lake and he is now ready to carry passengers around the lake at the rate of 25 cents a head. All persons buying tickets before June 1st will be entitled to a free ride." The Pajaronian, *May 23, 1895.*

That being said I realize there are other interests and issues involved.

It goes without saying that farming is a crucial part of this project as Watsonville = agriculture. However, the other interests are equally as important.

I see that the integrated resources report has included information about the wetlands and the flora and fauna that live at the lake. The Watsonville Wetlands which include the surrounding lakes are a treasure and vital resource to millions of birds both migratory and year-round (and also the fish populations). Therefore some portion of College Lake must be maintained as a lake with water year-round.

I realize there will never be boating on the lake again, but I do feel that the general public deserve some access to the lake. I would like the report to include a wooden walkway similar to what was built at Pinto Lake that would give access to a portion of the year-round lake such that the birds and wildlife could be observed.

Two unrelated comments:

1. I would like to see the farming around College Lake be organic.

2. Why doesn't the pipeline to the treatment plant follow Salsipuedes Creek and Pajaro River?

Thank you for taking the time to review my thoughts.

- *Jeanne Greatorex, 9 Foothill Drive, Watsonville, CA*

Pajaro Valley WMA
36 Brennan Street
Watsonville, CA 95076

RECEIVED
JAN 04 2018
PVWMA

Dec. 26, 2017

RE: College Lake project

Dear PVWMA,

I attended your December 12th scoping meeting in Watsonville that reviewed the proposed plans to develop College Lake into a water storage and supply source. I was notified by you that my farm property is located near one of the pipeline alignments. I own two parcels: 052-273-01 and 02, located at 1401 West Beach Street, just outside of the Watsonville city limits.

I totally support the College Lake project, and being a farmland owner of 22 acres that is adjacent to the proposed pipeline, I'd like to know how I can have my property connected to this pipeline with a turn out that will supply water to my farmland.

I have attached a copy of the accessors map of my parcels and a copy of a recent well test of the only well on my property which is located just east of hwy 1. The well report was done on 6/29/17 and as you can see, the standing water level is at 23 feet, and the pumping level drops to 46 feet, which I fear is below sea level. This report was after a very wet winter, and I know the water levels were much lower during the 2014 drought.

For these reasons, I would like the agency to contact me to discuss the possibility of connecting to the new pipeline that will be installed right next to our land.

Thank you. Sincerely,

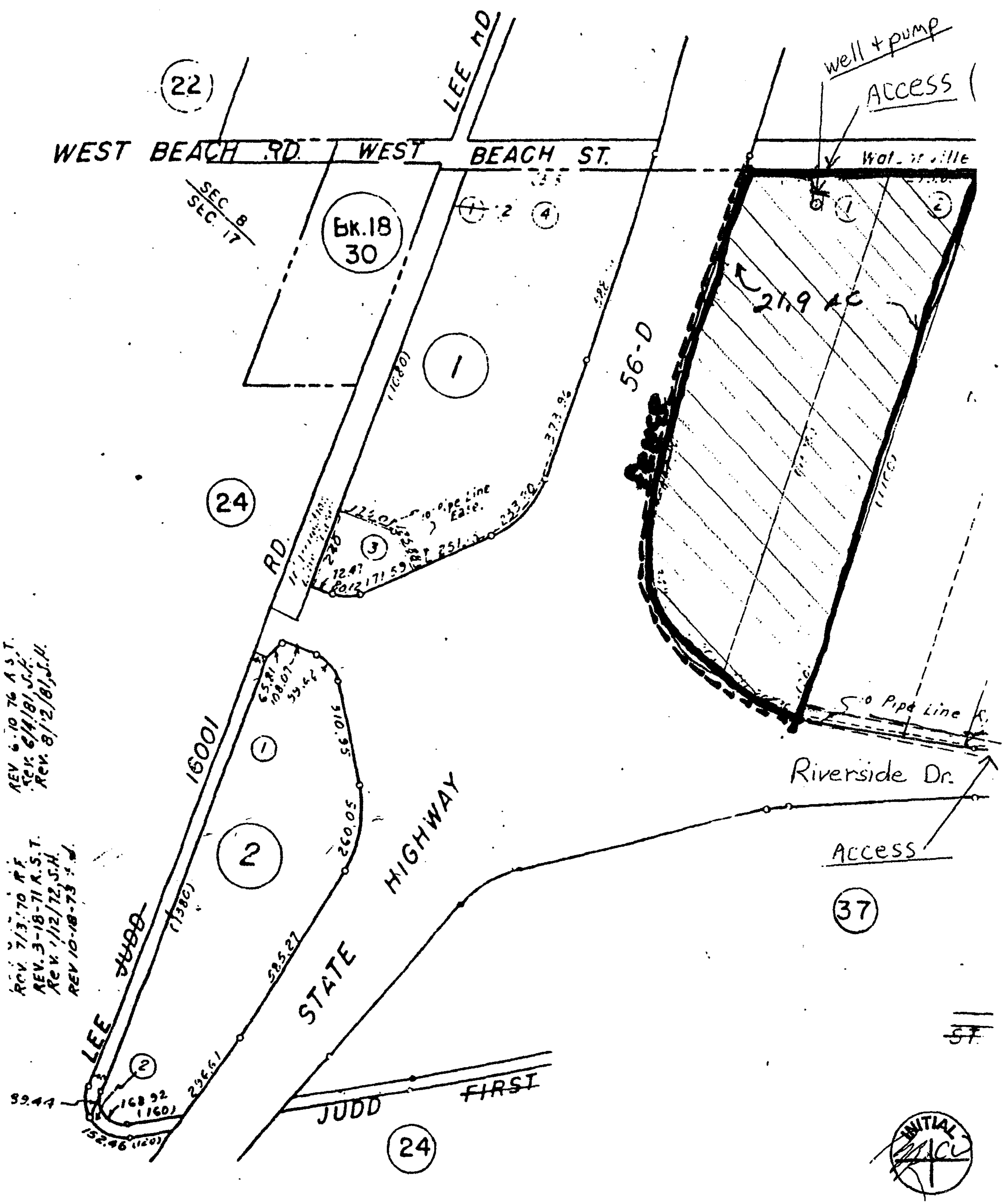
BKett

Brandon Kett 818-2139
Interlaken Lands, LLC
77 Aspen Way, Suite 202
Watsonville, CA 95076

TAX PURPOSES ONLY

POR. RANCHO E
SECS. 8 & 17, T. 12 S., R.

EXHIBIT "A"



Craig Evans Pump Testing Services
(831) 915-0167
Pump Test Report

v.6.0 9/2014

Customer and Facility Data

Pump/Location:	Kett Well/West Beach Road	**HP:** 25	**Utility:** PG&E
GPS Coord.:	**Long** -121.7756 **Lat** 36.89891	**Pump Make:**	Fairbanks-Morse
Motor Make:	U.S. **Type** Well	**Meter Number:**	1004485755
Customer Addr:	AISOP ROY PUMP COMPANY & DRILLING CO IN 1508 ABBOTT STREET SALINAS, CA 93901	**Serial Number:**	NONE
		Voltage: 460	**Amps:** 32
Contact:	Mike Fowler	**Our Test #:**	
Phone: (831) 424-3946	**Fax:**	**Cell:** (831) 901-8209	

Test Results

Test Date: 6/29/2017 **Tester:** Craig Evans

250' deep well (Peixoto said)

Run Number ('E' = used for cost anal):	E-1
1. Pumping Water Level (ft):	46
2. Standing Water Level (ft):	23
3. Draw Down (ft):	23
4. Recovered Water Level (ft):	23
5. Discharge Pressure at Gauge (psi):	37
6. Total Lift (ft):	134
7. Flow Velocity (ft/sec):	2.1
8. Measured Flow Rate (gpm):	**390**
9. Customer Flow Rate (gpm):	415
10. Specific Capacity (gpm/ft draw):	16.8
11. Acre Feet per 24 Hr:	1.7
Million Gallons per 24 Hr:	0.562
12. Cubic Feet per Second (cfs):	0.9
13. Horsepower Input to Motor:	22
14. Percent of Rated Motor Load (%):	73
15. Kilowatt Input to Motor:	17
16. Kilowatt Hours per acre-foot:	230
17. Cost to Pump an acre-foot:	$62.04
18. Energy Cost ($/hour)	$4.45
19. Base Cost per Kwh:	$0.270
20. Nameplate rpm:	1,775
21. rpm at Gearhead:	0
22. Overall Pumping Efficiency (%):	**60**

If a Flow Velocity (line 7) is less than 1 ft/second, the accuracy of the test is suspect.

Note any major difference between the "Measured" flow rate and the "Customer's" (lines 8,9).

Remarks

All results are based on conditions during the time of the test. If these conditions vary from the normal operation of your pump, the results shown may not describe the pump's normal performance.

Overall efficiency of this plant is considered to be good assuming this run represents plant's normal operating condition.

Oil on the surface of the water in the well may have affected the accuracy of the water level measurements.

This pump had a propeller type flow meter.

Well Only Pump Test.

The overall pump efficiency is underestimated because computations do not include the pressure loss in the column, screen, foo

Estimated savings of 13 kWh/AF and $0.26 annual energy costs from a retrofit

Current OPE of 60% and estimated potential OPE of 65%

PV Water

Environmental Impact Report for Proposed College Lake Integrated Resources Management Project - Scoping

Comments must be submitted in writing and received by **January 5, 2018** to be considered in the Draft EIR. Comments may be submitted in writing at the public meetings on December 12, via email to **eir@pvwater.org** or by U.S. Postal Service to the address below (this form can be folded as shown on reverse and mailed without an envelope; standard postage [$0.49] required).

MY COMMENT IS ABOUT (please mark an "X" next to all that apply):

[ ] Project Description
[ ] CEQA Process
[ ] Aesthetics
[ ] Air Quality & Greenhouse Gas Emissions
[ ] Biological Resources
[ ] Geology & Soils
[ ] Hazards & Hazardous Materials
[ ] Hydrology & Water Quality
[X] Land Use & Agricultural Resources
[ ] Noise
[ ] Public Services
[ ] Transportation/Traffic
[ ] Recreation
[ ] Utilities, Energy, & Service Systems
[ ] Other: ______

- Consider removing silt from College Lake to lower it and therefore hold more water without raising the level of water in the lake.
- Raising the water level in the Lake for extended periods of time adversely affects adjoining farm land, reducing land area and increasing lateral seepage.
- How will adversely affected landowners be compensated for acreage rendered no longer farmable? Purchase, lease or credit landowners?
- Do adjoining ~~[illegible]~~ landowners have Riparian rights to the water in the Lake

Please Print (use additional sheets if necessary)

NAME: Jessie Maragoni
ORGANIZATION (if applicable): —
ADDRESS: 4358 S. Del Rey Ave Del Rey, CA 93616
EMAIL: njmaragoni@sbcglobal.net
PHONE: 661-706-6172

Do you wish to withhold your name and contact information from public review or from disclosure under the Freedom of Information Act? [ ] No [X] Yes

Please submit this form at the scoping meetings or email to **eir@pvwater.org** or mail before **January 5, 2018** to:

Pajaro Valley Water Management Agency
ATTN: Brian Lockwood, General Manager
36 Brennan Street, Watsonville, CA 95076

For more information visit pvwater.org

PV Water — Environmental Impact Report for Proposed College Lake Integrated Resources Management Project - Scoping

Comments must be submitted in writing and received by **January 5, 2018** to be considered in the Draft EIR. Comments may be submitted in writing at the public meetings on December 12, via email to **eir@pvwater.org** or by U.S. Postal Service to the address below (this form can be folded as shown on reverse and mailed without an envelope; standard postage [$0.49] required).

RECEIVED
JAN 08 2018
PVWMA

MY COMMENT IS ABOUT (please mark an "X" next to all that apply):

[ ] Project Description
[ ] CEQA Process
[ ] Aesthetics
[ ] Air Quality & Greenhouse Gas Emissions
[X] Biological Resources
[X] Geology & Soils
[X] Hazards & Hazardous Materials
[X] Hydrology & Water Quality
[ ] Land Use & Agricultural Resources
[ ] Noise
[ ] Public Services
[X] Transportation/Traffic
[X] Recreation
[ ] Utilities, Energy, & Service Systems
[ ] Other: ______________

1) PAULSEN ROAD: RAISING the LAKE WATER ELEVATION BY 2+ FEET WILL FLOOD the ROAD.

2) WATER QUALITY: IN 2016 the WATER EXCESS FROM PINTO LAKE (HEAVY RAIN) FLOWED OVER GREEN VALLEY ROAD AND INTO COLLEGE LAKE. The POLLUTED PINTO LAKE WATER WILL CONTAMINATE the COLLEGE LAKE WATER

3) MOSQUITOS - MAY INCREASE?

4) FISHING - BOATING: ARE these POSSIBLE?

5) FISH - CAN STEELHEAD TROUT/SALMON BE RESTORED?

6) FLOODING OF HOMES AT HOLOHAN ST. & Highway 152?

7) GEOLOGY - FAULT LINE THRU PINTO-COLLEGE-DREW LAKES. CAN THESE 3 LAKES BE MADE INTO ONE LAKE?

Please Print (use additional sheets if necessary)

NAME: MYRON MARZOLF

ORGANIZATION (if applicable): ______________

ADDRESS: 107 ONYX DRIVE, WATSONVILLE

EMAIL: MCMARZOLF@SBCGLOBAL.NET

PHONE: ______________

Do you wish to withhold your name and contact information from public review or from disclosure under the Freedom of Information Act? [ ] No [X] Yes

Please submit this form at the scoping meetings or email to **eir@pvwater.org** or mail before **January 5, 2018** to:

Pajaro Valley Water Management Agency
ATTN: Brian Lockwood, General Manager
36 Brennan Street, Watsonville, CA 95076

For more information visit pvwater.org

--Fold Here--

--Fold Here--

SAN JOSE CA 950

29 DEC 2017 PM 2 L

USA FOREVER

Lori Marzolf
107 Onyx Dr
Watsonville, CA 95076

Pajaro Valley Water Management Agency
ATTN: Brian Lockwood, General Manager
36 Brennan Street
Watsonville, CA 95076

95076-430336

December 26, 2017

Pajaro Valley Water Management Agency
Attn: Brian Lockwood, General Manager
36 Brennan Street, Watsonville, CA 95076

Thank you for giving us an opportunity to respond to the information presented to us regarding the proposed College Lake Integrated Resources Management Project. The items we would like to see addressed in the Draft EIR are: CEQA Process, Land Use, Noise, Traffic, Impact on Wildlife.

Comments Regarding Proposed Water Treatment Plant Site

Our home borders the College Lake farmland and wetland area. We see the wildlife population on a daily basis and realize this area as one of the last pristine refuge sites in the Watsonville area. We know you want the water from the lake to fuel the deficit from the coastal farm areas but it must be done with as little disturbance to the area as possible. Water is not the only valuable resource here. We feel to build a water treatment plant at the College Lake Proposed Site would jeopardize the wildlife population on a permanent basis because of ongoing operations and maintenance due to noise and human presence. The Alternate Site on Holohan is much more suited to a plant, creating easy access to the treatment plant and allowing College Lake to return to a more natural state after pipeline construction, avoiding continuous human traffic and ongoing noise.

Residents of Orchard Park have long been denied adequate flood protection and are concerned that the construction and use of College Lake as a water storage facility may increase the chances of flooding. We are asking for mitigation such as a berm or and the use of pumping during times of flooding of College Lake (see attached photos). Flooding of the treatment plant is another reason to use the alternate site, and the possibility of liquification of the area during a seismic event is another. We are also concerned about noise from pumping or plant operation during sleeping times. We feel the Alternate Site would be best for our community. Some of our noise concerns are listed below. If the Alternate Site is used the impact of construction would be greatly mitigated. We expect that all our concerns would be addressed in the Draft EIR and CEQA laws upheld.

Health and Safety Considerations Common to All Systems

The following types of operational noise are associated with treatment facilities, pump stations and the above-ground facilities at portals:

- Noise from the operation of mechanical equipment, including pumps, blowers, fans, centrifuges, and cogeneration engine or turbine generators
- Noise from standby electrical generation equipment (e.g., backup generators for treatment facilities or pump stations during a power outage)
- Noise from electrical power substations
- Noise from water flowing over weirs
- Noise from routine operation and maintenance activities. These planned activities would typically occur for a short time (weeks) and during normal working hours
- Noise from emergency operation, maintenance, and repair activities. These are unanticipated conditions that may require nighttime work, and could pose significant noise impacts

Noise and Vibration Affected Environment

1. Include sound level output of equipment used during operation in addition to sound levels anticipated during construction.
2. List equipment that would result in vibration during plant operation. Discuss vibration levels associated with the equipment and potential engineered mitigation for the potentially damaging vibrations.
3. Develop a Noise Control Plan. Include predicted noise sources and attenuation measures in detail.
4. Provide a quantitative evaluation of expected frequency and duration of vibration impacts from all high-inertia rotating equipment.
5. Provide a quantitative evaluation of mitigation measures of all construction noise impacts. Commit to specific hours and days that such impacts may be experienced.

6. Discuss what mitigation measures would be used to prevent unacceptable increases over existing sound levels.
7. Provide additional noise monitoring stations and data at the northern and western sides of the Route 9 site, closer to residential receptors.

Vibration Impacts Common to All Systems

Vibration can occur from the operation of mechanical equipment at treatment facilities and conveyance pump stations (Unocal Conveyance Alternative only). Based on the U.S. Department of Transportation (1998), a vibration velocity of 0.004 in/sec RMS (applicable to a Category 2 land use in Table 10-3), was chosen as the maximum acceptable vibration level applicable to residential receivers adjacent to treatment plant site. Large (150 horsepower and larger) pumps, blowers, centrifuges, fans, and engine generators will be designed with the necessary vibration isolation and damping foundations to reduce transmission of force to the supporting structures to levels below the threshold of human perception at the nearest residences where people normally sleep.

Noise Impacts Common to All Systems

Noise generated by construction equipment would be experienced by nearby receptors while treatment, conveyance, and outfall facilities are being built. The EIR should show unmitigated maximum noise levels from commonly used construction equipment. Examples below are some but not all that may be used.

Expected Construction Equipment and Maximum Noise Levels

Type of Equipment

Crawler tractor / dozer

Front end loader

Hydraulic backhoe excavator

Grader Mobile crane

Pile driver (impact)

Pile driver (sonic or vibratory)

Portable air compressor

Trucks

Engine Size (Horsepower)

Range of Maximum Sound Level at 50 feet (dBA)

Rating or Capacity

101 to 250 hp

251 to 700 hp

2-1/4 to 5 cu yd

6 to 15 cu yd

1-1/2 to 3 cu yd

3-1/4 to 7 cu yd

9 to 16 ft blade

11 to 75 ton at 10 ft boom

400 to 2000 cfm at 100 psi

100 to 400 hp

Noise Mitigation Common to All Systems Construction Mitigation

Mitigation measures to reduce noise impacts, in addition to applicable local regulations, have been identified for implementation at the treatment plant sites if necessary to maintain noise levels within permissible limits. The following measures would be implemented at either treatment plant site:

- Vibratory or sonic pile driving will be implemented where feasible, as determined by soil conditions, to reduce noise impacts from impact pile driving.
- All construction equipment would be required to be equipped with well- maintained mufflers and other sound control devices comparable to or better than those originally supplied by the manufacturer.
- Noisy portable equipment, such as generators or compressors, would be located as far away from sensitive receptors as practical and muffled.
- Equipment would not be allowed to idle for long periods; equipment not being used would be shut off.
- Construction haul routes would be designated to minimize impacts on sensitive receptors.
- Specific noise level limits would be specified in construction contract documents for certain construction equipment, such as internal combustion engine-powered generators, compressors, excavators, loaders, and graders. Noise levels would be monitored during construction.
- Any construction activities required outside of exempt daytime hours would be conducted only under a variance. Applicable noise source land uses are industrial for the Route 9 site and commercial for the Unocal site.
- Damping material would be used on material haul truck beds.

  Additional measures would be implemented to mitigate impacts to residential properties and public use areas near portal operations. These measures include establishing a 24- hour hotline for the public to express complaints about noise impacts and sending flyers to the community well in advance of construction to inform them about the project. Construction site noise barriers and building treatments to improve highly impacted buildings’ noise reduction capability could also be implemented as needed. In extreme cases, residents could be temporarily relocated if unmitigatable conditions persist.

Operation Mitigation

For mitigation of the conveyance system pump stations, all equipment would be housed in buildings and in sound-proof buildings. Ventilation air intakes and exhausts of equipment rooms would be placed in a direction facing away from residences and sensitive receivers whenever possible. Noise-reduction-rated acoustic louvers and duct silencers would be selected to reduce transmission of indoor noise to the outdoors.

Conveyance system noise sources, such as engines, fans, and blowers, would be designed with noise reductions to limit noise impacts. Also, pumps, blowers, centrifuges, fans, and engine generators would be designed with the necessary vibration isolation and damping foundations to reduce transmission of force to the supporting structures to levels below the threshold of human perception at the nearest residences. Pump station ventilation systems design would include attenuation of fan noise and pump and motor noise to meet the specified noise level limits.

Vibration Mitigation Common to All Systems Construction Mitigation

Vibratory or sonic-type pile driving is the only practical mitigation available for pile driving and could reduce transmitted vibration to at least half of the levels resulting from impact pile driving (USDOT, 1998). Other construction activities with vibration impacts, such as excavation and truck movement, would have lower impacts than pile driving and can only be partially mitigated by limiting the time of day of occurrences and the proximity to sensitive structures on residential land uses.

Operation Mitigation

Because long-term vibration impacts from operation of conveyance facilities are expected to be negligible, mitigation would be needed only for operating pump stations and facilities. The design measures listed above for operation noise mitigation would also mitigate for potential operational vibration impacts for night-time use.

We look forward to a plan that has an ecological long-range approach to the environment as well as a source of water to a desperate special interest group.

Thank you again,
James and Melinda Rambo
64 Laken Drive
Watsonville, CA 95076
831-722-3720

PV Water

Environmental Impact Report for Proposed College Lake Integrated Resources Management Project - Scoping

Comments must be submitted in writing and received by **January 5, 2018** to be considered in the Draft EIR. Comments may be submitted in writing at the public meetings on December 12, via email to **eir@pvwater.org** or by U.S. Postal Service to the address below (this form can be folded as shown on reverse and mailed without an envelope; standard postage [$0.49] required).

RECEIVED
JAN 04 2018
PVWMA

MY COMMENT IS ABOUT (please mark an "X" next to all that apply):

[ ] Project Description
[ ] CEQA Process
[ ] Aesthetics
[ ] Air Quality & Greenhouse Gas Emissions
[ ] Biological Resources
[ ] Geology & Soils
[ ] Hazards & Hazardous Materials
[ ] Hydrology & Water Quality
[ ] Land Use & Agricultural Resources
[ ] Noise
[ ] Public Services
[ ] Transportation/Traffic
[ ] Recreation
[ ] Utilities, Energy, & Service Systems
[X] Other: ______________

SEE "PROPOSED SOLUTIONS FOR FORESEEN PROBLEMS" ATTACHED

Please Print (use additional sheets if necessary)

NAME: FRANK "TED" REHDE
ORGANIZATION (if applicable): ______________
ADDRESS: 69 CUTTER DRIVE, WATSONVILLE, CA 95076
EMAIL: VERANDA VINE YARD 1 @ AOL.COM.
PHONE: 831-724-4078

Do you wish to withhold your name and contact information from public review or from disclosure under the Freedom of Information Act? [X] No [ ] Yes

Please submit this form at the scoping meetings or email to **eir@pvwater.org** or mail before **January 5, 2018** to:

Pajaro Valley Water Management Agency
ATTN: Brian Lockwood, General Manager
36 Brennan Street, Watsonville, CA 95076

For more information visit pvwater.org

Proposed Solutions for Foreseen Problems with College Lake Project:

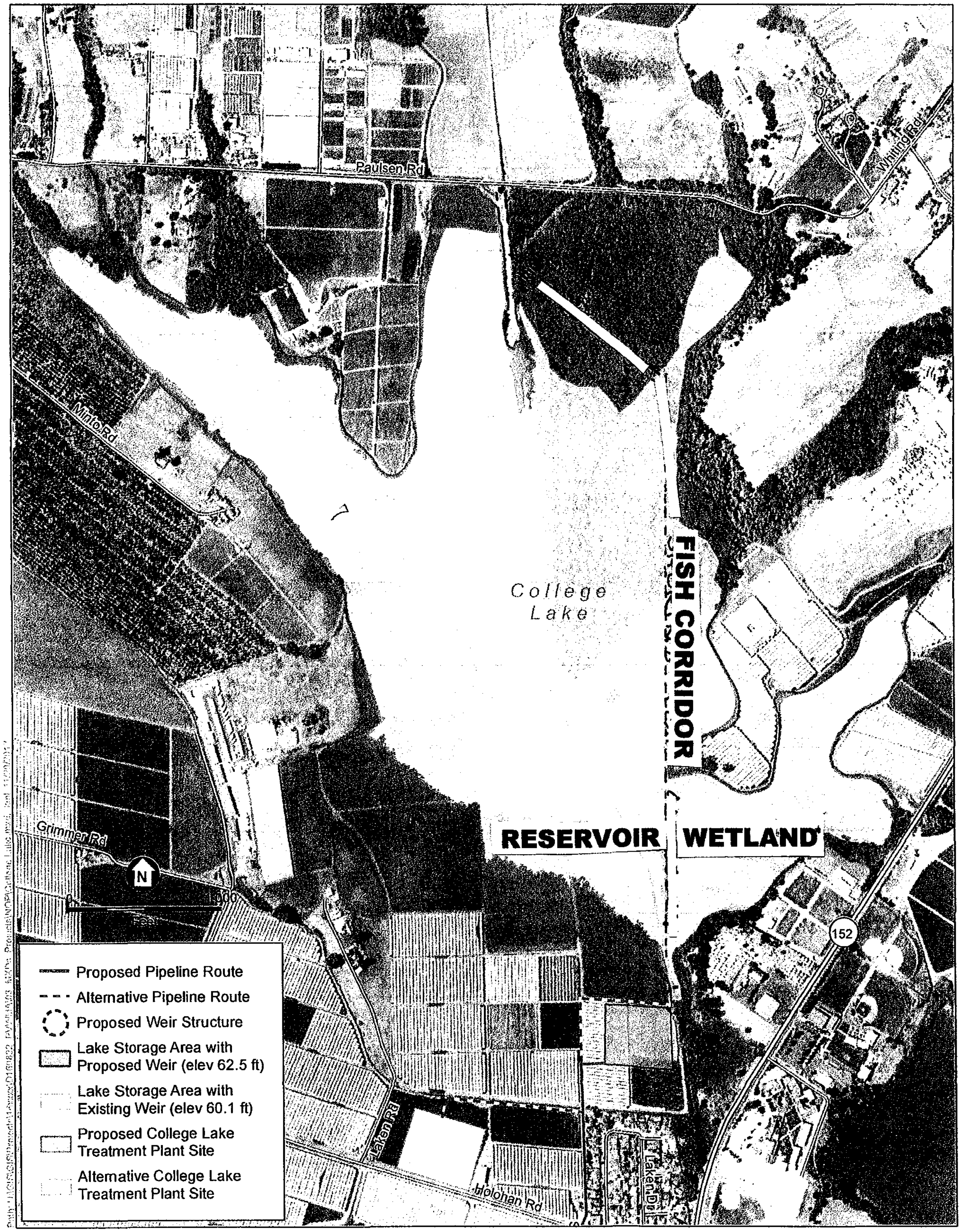
Fish Migration: To provide an unencumbered fish migratory corridor through the Lake, it might be feasible to install a low-cost, straight-line, separation shoring- barrier close to the meandering east shoreline from the upper to lower end. Thereby establishing a wetland side and a reservoir side of a "Divided Lake" . This concept is illustrated on the accompanying page (Figure 2 Notice of Preparation). This idea was submitted for an earlier study by PVWMA .

Siltation : Siltation of the lakebed is a recurring natural phenomenon and silt removal will be required to maintain optimum reservoir capacity and utility of the Lake. Paulsen Road at the northern end of the Lake would seem to provide the easiest access to accomplish this objective . A "Sedimentation Basin" adjacent to Paulsen Road could facilitate the process.

Water Extraction: As an alternative to the system noted in the "Notice of Preparation" , consideration might be given to surface extraction of the piped water rather than extraction from below the surface. Surface extraction has the benefit of drawing silt-free water , possibly using gravity flow, and also mitigate any fish issues.

Treatment Plant Alternative: It is understood that the Lake water cannot be transported until it is treated. Rather than build a Treatment Plant as proposed on 4 acres of land adjoining the Lake , it may be feasible and more practical to treat the water in a floating treatment apparatus on the Lake.

Supplemental Rail Tank Car Water Storage on the Rail Line adjacent to the Beach Road Treatment Plant: In the event of the need for emergency supplemental water storage, consideration could be given to using rail tank cars which are idled do to low oil demand. It may be possible to decontaminate them for the purpose of water storage. The average tank car reportedly holds about 30,000 gallons.



SOURCE: Carollo Engineers, 2017; ESRI World Imagery, 7/23/2016; ESA

College Lake Integrated Resources Management Project

Figure 2
College Lake

ESA

APPENDIX PD-1

Assessor Parcel Numbers Associated with the College Lake Integrated Resources Management Project

This appendix lists the Assessor Parcel Numbers of privately owned properties that are wholly or partially within the footprint of the proposed water storage area for College Lake or other proposed facilities (e.g., weir structure, College Lake pipeline, water treatment plant).

Parcels Potentially Affected By The College Lake Integrated Resources Management Project

COLLEGE LAKE STORAGE AREA[a]			
051-012-25	051-101-13	051-101-54	051-441-24
051-031-28	051-101-15	051-101-59	051-441-27
051-041-45	051-101-03	051-101-78	051-441-28
051-042-01	051-101-18	051-441-02	051-651-01
051-101-07	051-101-19	051-441-04	051-651-04
051-101-09	051-101-20	051-441-11	051-651-05
051-101-10	051-101-22	051-441-12	
051-101-11	051-101-24	051-441-20	
051-101-12	051-101-50	051-441-22	
WEIR STRUCTURE			
051-441-24	051-441-28		
WATER TREATMENT PLANT			
051-101-47	051-101-48	051-101-49	051-441-24
COLLEGE LAKE PIPELINE[b]			
019-131-04	051-441-24	052-243-20	052-371-10
048-231-09	052-243-10	052-243-21	052-371-11
048-231-16	052-243-11	052-272-01	052-571-13
048-241-01	052-243-12	052-272-02	052-581-04
048-242-01	052-243-15	052-371-02	052-581-06
051-101-47	052-243-16	052-371-06	052-581-07
051-271-01	052-243-17	052-371-07	052-581-09
051-441-01	052-243-18	052-371-09	052-581-14

NOTES:
[a] These are parcels that are wholly or partially within the proposed water storage area.
[b] With the exception of the listed parcels, the proposed alignment for the College Lake pipeline is within the public right of way in unincorporated Santa Cruz County and the City of Watsonville.

APPENDIX PD-2

2014 BMP Update PEIR Mitigation Measures

The proposed College Lake Integrated Resources Management Project (Project) was analyzed under its former name – the College Lake with Inland Pipeline to Coastal Distribution System – at a program level of detail in the *Final Environmental Impact Report for the Basin Management Plan Update* (2014 BMP Update PEIR) as one of seven components under the BMP. The 2014 BMP Update PEIR identified programmatic mitigation measures. Under Resolution No. 2014-05, the PV Water Board of Directors adopted the BMP Update Mitigation Monitoring and Reporting Program (MMRP) that identifies mitigation measures applicable to the BMP Update components, including the Project. Table PD 2-1 presents adopted mitigation measures that apply to the Project. Refer to Chapter 3, *Environmental Setting, Impacts, and Mitigation Measures*, of this EIR for proposed revisions to some of these mitigation measures.

TABLE PD 2-1
MITIGATION MEASURES ADOPTED FOR THE 2014 BMP UPDATE PEIR

Mitigation Measure
AESTHETICS
AE-1a: PVWMA shall use design elements to enhance visual integration of the proposed above-ground facilities with their surroundings. Proposed structures shall be painted low-glare earth-tone colors that blend with the surrounding terrain, unless colors otherwise specified by regulatory agencies, such as purple facilities for recycled water systems.
AE-1b: PVWMA shall use design elements and landscaping to enhance visual integration of the College Lake pumping and filtration facilities with their surroundings. Proposed facilities shall be painted low-glare earth-tone colors that blend closely with the surrounding terrain. Vegetation shall be planted at proposed facilities to provide screening from views of the facilities from Highway 152.
AE-1c: PVWMA shall shield the weir with vegetation to minimize textural contrasts with the surrounding vegetation using grasses, shrubs and trees typical of the immediately surrounding area.
AIR QUALITY AND GREENHOUSE GASES
AQ-1: The construction contractor shall implement a dust program that includes the following elements: • Water all active construction sites at least twice daily • Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard • Pave, apply water three times daily, or apply (non- toxic) soil stabilizers on all unpaved access roads, parking areas and staging areas at construction sites • Sweep daily (with water sweepers) all paved access roads, paved parking areas and paved staging areas at construction sites • Sweep streets daily (with water sweepers) if visible soil material is carried onto adjacent public streets. • Hydroseed or apply (non-toxic) soil binders to inactive construction areas. However, do not apply these measures in operating agricultural fields under cultivation unless requested by the grower • Enclose, cover, water twice daily or apply (non- toxic) soil binders to exposed stockpiles (dirt, sand, etc.). • Limit traffic on unpaved roads to 15 mph • Install sandbags or other erosion control measures to prevent silt runoff to public roadways • Replant vegetation in disturbed areas as quickly as possible The contractor or builder shall designate a person or persons to monitor the fugitive dust emissions and enhance the implementation of the measures as necessary to minimize dust complaints. The name and telephone number of such persons shall be provided to the APCD Compliance Division prior to the start of any grading, earthwork or demolition.
BIOLOGICAL RESOURCES
BIO-1a: Wetlands and riparian habitat will be avoided by project construction activities. All facilities and construction activities will be maintained outside the jurisdictional area defined by riparian or emergent wetland vegetation and applicable setbacks and buffers where feasible. Within the Coastal Zone, project improvements will be located 100 feet from coastal review wetlands. Within the City of Watsonville, development will be located 100 feet from riparian areas. Within the unincorporated areas of the County, yet outside the Coastal Zone, a setback of 30 feet and 50 feet will be established adjacent to intermittent and perennial streams, respectively. If complete avoidance of wetlands and riparian areas is infeasible and/or development occurs within a regulated buffer/setback area, impacts would be minimized through implementation of Mitigation Measures BIO-1b, BIO- 1c BIO-1d, and BIO-1e.
BIO-1b: Standard measures to maintain water quality and to control erosion and sedimentation will be implemented. These measures include: • Restrict trenching across all waterways to low-flow periods. • Exclude water from around the section of trench that is within the actively flowing channels. This will further reduce the potential for sediment or other pollutants to enter the waterways and impact downstream resources. The diversion will consist of water pillows, rock, sandbags, or other structural methods deemed most effective by the project engineer. • Place sediment curtains downstream of the construction zone to prevent sediment disturbed during trenching activities from being transportedand deposited outside of the construction zone. • Locate spoil sites so they do not drain directly into the waterways. If a spoil site drains into a channel, catch basins will be constructed to intercept sediment before it reaches the channels. Spoil sites will be graded to reduce the potential for erosion. • Prepare and implement a spill prevention plan for potentially hazardous materials. The plan will include the proper handling and storage of all potentially hazardous materials, as well as the proper procedures for cleaning up and reporting of any spills. If necessary, containment berms will be constructed to prevent spilled materials from reaching the creek channels. • Store equipment and materials away from the waterways, outside existing levees or at least 50 feet from waterways, but within the pipeline right-of-way. No equipment or materials will be deposited within 100 feet of wetlands. • Provide proper and timely maintenance for vehicles and equipment used during construction to reduce the potential for mechanical breakdowns leading to a spill of materials into or around the creeks. Maintenance and fueling will be conducted in an area that meets the criteria set forth in the spill prevention plan (i.e., away from the creeks).

TABLE PD 2-1 (CONTINUED)
MITIGATION MEASURES ADOPTED FOR THE 2014 BMP UPDATE PEIR

Mitigation Measure
BIOLOGICAL RESOURCES (cont.)
• Prior to construction, install temporary construction fencing at the perimeter of the construction zone to prevent inadvertent equipment access or construction staging within adjacent riparian forest and/or coastal marsh habitats. This fencing will be signed in the field as "SENSITIVE HABITAT AREA — NO CONSTRUCTION ACCESS". Monitor construction activities to verify compliance with the perimeter fencing and limits of construction access and staging and implement remedial action if non-compliance is noted. Restrict limbing of riparian forest trees; if trees are limbed for construction access, document the impact and provide compensation as per Mitigation Measure BIO-1c.
BIO-1c: Where impacts to mixed riparian or willow riparian forest occurs, revegetation measures will be developed as part of a revegetation plan approved by CDFW, RWQCB, and if applicable, USACE and/or California Coastal Commission, pursuant to regulatory agency permitting. The revegetation plan will include specific plans for the revegetation of impacted riparian forest, and for restoration of nearby creek riparian habitat, as appropriate. Upon approval by Santa Cruz County and other applicable agencies, the PVWMA may choose to coordinate with the Natural Resources Conservation Service (NRCS) and the Santa Cruz County Resource Conservation District (RCD) to develop and implement the required riparian revegetation, including providing funds to the RCD for their implementation of the revegetation. Revegetation measures will include the use of locally obtained plant materials, detailed descriptions of installation methods, after-installation care, weed control measures, success criteria, and corrective measures if the success criteria are not met. Revegetation will include a 3:1 replacement ratio the acreage of riparian habitat lost and for all trees lost as result of the project to account for the reduced habitat values of smaller trees compared with mature vegetation. Success criteria for replanting will be less than 20 percent mortality of individual species yearly for 5 years. Replanting will be conducted each year that plantings exceed 20% mortality, such that 80% plant survival is maintained each year of the 5-year monitoring period. Cover provided by invasive, non-native plant species shall not exceed 5% during each year of the 5-year monitoring period.
BIO-1d: Where impacts to coastal freshwater marsh occurs, revegetation measures will be developed as part of a revegetation plan approved by CDFW, RWQCB, USACE, and/or California Coastal Commission, pursuant to regulatory agency permitting. Upon approval by Santa Cruz County and other applicable agencies, the PVWMA may choose to coordinate with the Natural Resources Conservation Service (NRCS) and the Santa Cruz County Resource Conservation District (RCD) to develop and implement the required wetland revegetation, including providing funds to the RCD for their implementation of the revegetation. The revegetation plan will include specific plans for the revegetation of impacted coastal marsh, and for restoration of nearby wetland habitat, as appropriate. Revegetation measures will include the use of locally obtained plant materials, detailed descriptions of installation methods, after-installation care, weed control measures, success criteria, and corrective measures if the success criteria are not met. Revegetation will include a 3:1 replacement ratio (or an equivalent habitat replacement strategy as agreed upon by PVWMA and regulatory agencies) for impacted wetlands. If natural recovery is a viable strategy, then a wetland plant cover exceeding 50% should be attained after two growing seasons. Mitigation may occur via restoration, creation, or preservation of wetlands. Mitigation will occur at a site acceptable to permitting agencies and pursuant to Project permit requirements. If the compensatory mitigation includes restoration, enhancement, or creation of wetlands, a qualified biologist will monitor the designated wetland mitigation area for a minimum of five years to ascertain if the wetland mitigation is successful. Annual reports will be submitted to permitting agencies by December 31 of each monitoring year, describing the results of the monitoring and any remedial actions needed to achieve a minimum 3:1 habitat replacement ratio or equivalent for permanent impacts to wetlands and other waters.
BIO-1e: Where construction and/or facilities are placed within a riparian or wetland development setback area, indirect impacts to adjacent riparian and wetland vegetation will be minimized. Where feasible, buffer plantings of native trees and shrubs will be installed between the facility and the adjacent wetland or riparian resource to provide a vegetated buffer. A buffer planting plan will be prepared as part of a revegetation plan approved by CDFW, RWQCB, USACE, and/or California Coastal Commission, pursuant to regulatory agency permitting. The buffer planting plan will include specific revegetation measures, including the use of locally obtained plant materials, detailed descriptions of installation methods, after-installation care, weed control measures, success criteria, and corrective measures if the success criteria are not met.
BIO-2: During the development of BMP Update components, PVWMA will implement conservation measures during construction activities to avoid and minimize incidental take and significant impacts on individuals, populations, or habitat of special-status wildlife species to the maximum extent practicable. The following general measures will be incorporated into the planning and construction of BMP Update components, as appropriate, to ensure that the effects of the BMP Update are avoided, minimized, and mitigated. Suggested species-specific measures for CA red-legged frog, WPT, and steelhead are included, as well, although BMP Update components that proposed to divert surface waters beyond existing entitlements would require future additional project-level CEQA analyses of specific diversion and operation plans to support water rights application and environmental permits. It is assumed that project-level biological studies and analysis for these BMP Update components will be required to support those future permits and biological opinions.
BIO-2a: During project activities, all trash that may attract predators will be properly contained, removed from the work site, and disposed of regularly. Following construction, all trash and construction debris will be removed from work areas.
BIO-2b: All refueling, maintenance, and staging of equipment and vehicles will occur at least 65 feet from any riparian habitat or water body. The Agency will ensure contamination of habitat does not occur during such operations. Prior to the onset of work, the Agency will ensure that the contractor has prepared a plan to allow a prompt and effective response to any accidental spills. All workers will be informed of the importance of preventing spills and of the appropriate measures to take should a spill occur.
BIO-2c: The spread or introduction of invasive exotic plant species will be avoided to the extent practicable. When practicable, invasive exotic plants in the project areas will be removed.

TABLE PD 2-1 (CONTINUED)
MITIGATION MEASURES ADOPTED FOR THE 2014 BMP UPDATE PEIR

Mitigation Measure
BIOLOGICAL RESOURCES (cont.)
BIO-2d: Prior to any on-site work in areas where special-status species may occur, a qualified biologist will conduct a tailgate training session in which all construction personnel will receive training regarding measures (below) that are to be implemented to avoid environmental impacts. This training will include a presentation of the potential for sensitive species to occur at the site and measures to protect habitat including aquatic habitat and avoid impacts to the species. All personnel working on the site will receive this training, and will sign a sign-in sheet showing they received the training.
BIO-2e: Prior to the commencement of work, the limits of the work area (including haul routes, access ramps, storage areas and material stockpiles) will be clearly marked with orange construction fencing to prevent workers from impacting habitat outside the work area. No work will occur outside the designated marked work areas.
BIO-2f: Each morning before work begins on any components in or within 100 feet of a suitable habitat area (defined as: riparian habitat, USACE jurisdictional wetlands or "other waters" of the U.S., or sensitive habitats identified in subsequent USFWS Biological Opinions and CDFW 1600 Lake and Streambed Alteration Agreements), a qualified monitor will survey the work site and habitat immediately surrounding the active work site for conditions that could impact special-status species, and will remain on-site whenever work is occurring that may adversely impact special-status species and their habitats. No work will be allowed to begin each morning until the monitor has inspected the work site.
BIO-2g: A USFWS-approved biologist or biological monitor will permanently remove from within the project area(s), any individuals of exotic species, such as bullfrogs, crayfish, and centrarchid fishes to the extent practicable.
BIO-2h: Upon locating individuals of special-status species that are dead or injured as a direct result of activities conducted by PVWMA, initial notification will be made to the USFWS's Division of Law Enforcement at (916) 978-4861 (Sacramento) within three working days of its finding. The USFWS Field Office within whose area of responsibility the specimen is recovered will also be notified. Written notification will be made within five calendar days and include the date, time, and location of the carcass, a photograph, cause of death, if known, and any other pertinent information.
BIO-2i: Nesting Bird Surveys. Prior to any project construction activities, the project proponent will take the following steps to avoid direct losses of nests, eggs, and nestlings and indirect impacts to avian breeding success: • If construction activities occur only during the non- breeding season, between August 31 and February 1, no surveys will be required. During the breeding bird season (February 1 through August 31), a qualified biologist will survey construction areas in the vicinity of the project site for nesting raptors and passerine birds not more than 14 days prior to any ground-disturbing activity or vegetation removal. Surveys will include all potential habitats within 500 feet (for raptors) of activities and all on-site vegetation including bare ground within 250 feet of activities (for all other species). If results are positive for nesting birds, avoidance procedures will be adopted, if necessary, on a case-by-case basis. These may include implementation of buffer areas (minimum 50-foot buffer for passerines and 250-foot minimum buffer for raptors) or seasonal avoidance.
BIO-2i.1: Develop Adaptive Management Plan for College Lake Waterfowl Management and Multi- Species Mitigation. To mitigate impacts to existing waterfowl or waterfowl habitat at College Lake, an Adaptive Management Plan for waterfowl management and multi-species mitigation will be developed with the consultation of the state and federal resource agencies and College Lake stakeholders. The Adaptive Management Plan for waterfowl management and multi-species mitigation at College Lake will develop multi-year baseline waterfowl population and habitat use data for future project design, environmental permitting and CEQA impact analysis of project-level alternatives. To the extent practical, it will integrate the results of ongoing College Lake hydrology and hydraulic analyses, as well as future consultations with state and federal agencies on fish flows and fish bypass criteria. The Management Plan will be specific to the level of impact and mitigations under site-specific and project implementation conditions. However, the following standards will apply as defined during project-level design, regulatory review and CEQA analysis: The Management Plan should include terms and conditions from applicable permits and agreements as appropriate and define provisions for monitoring assignments, scheduling, and responsibility. The Management Plan should also include habitat replacement and revegetation, protection during ground-disturbing activities, performance standards, maintenance criteria, and monitoring requirements for temporary and permanent impacts consistent with mitigation in this EIR and regulatory requirements during project- specific review. The Management Plan will be in conformance with the biology mitigation measures from this EIR, and will also include terms and conditions consistent regulatory requirements as applicable from the USFWS, USACE, SWRCB, and CDFW permits during project design and permitting as applicable. The Management Plan will be prepared for project level project implementation as determined needed through future CEQA review and consultation with agencies as required under CESA and ESA.
BIO-2j (CRT): The following measures for avoidance and minimization of adverse impacts to California Red- Legged Frog (Rana draytonii) (CRF) during construction of the BMP Update components are those typically employed for construction activities that may result in short-term impacts to individuals and their habitat. The focus of these measures is on scheduling activities at certain times of year, keeping the disturbance footprint to a minimum, and monitoring. Consultation with the USFWS will be conducted and a Biological Opinion developed for each BMP Update component that requires a USACE Section 404 Wetland Permit. Ongoing and future CRF studies in the project area may result in site-specific conditions that would be integrated into the future project-level BMP Update component designs, permitting and operations. **CRF-1.** The Agency will annually submit the name(s) and credentials of biologists who would conduct activities specified in the following measures. No project activities will begin until the Agency receives approval from the Service that the biologist(s) is qualified to conduct the work.

TABLE PD 2-1 (CONTINUED)
MITIGATION MEASURES ADOPTED FOR THE 2014 BMP UPDATE PEIR

Mitigation Measure
BIOLOGICAL RESOURCES (cont.)
CRF-2. A USFWS-approved biologist will survey the work site 48 hours prior to the onset of activities. If CRF, tadpoles, or eggs are found, the approved biologist will determine the closest appropriate relocation site. The approved biologist will be allowed sufficient time to move them from the work site before work activities begin. Only USFWS-approved biologists will participate in activities associated with the capture, handling, and moving of CRF. **CRF-3.** Before any activities begin on a project, a USFWS-approved biologist will conduct a training session for all construction personnel. At a minimum, the training will include a description of the CRF and its habitat, the importance of the CRF and its habitat, general measures that are being implemented to conserve the CRF as they relate to the project, and the boundaries within which the project may be accomplished. Brochures, books and briefings may be used in the training session, provided that a qualified person is on hand to answer any questions. **CRF-4.** A USFWS-approved biologist will be present at the work site until such time as all removal of CRF, instruction of workers, and disturbance of habitat have been completed. After this time, the biologist will designate a person to monitor on-site compliance with all minimization measures and any future staff training. The USFWS-approved biologist will ensure that this individual receives training outlined in measure WPT-2 and in the identification of CRF. The monitor and the USFWS-approved biologist will have the authority to stop work if CRF are in harm's way. **CRF-5.** The number of access routes, number and size of staging areas, and the total area of the activity will be limited to the minimum necessary to achieve the project goal. Routes and boundaries will be clearly demarcated, and these areas will be outside of riparian and wetland areas to the extent practicable. **CRF-6.** Work activities will be completed between April 1 and November 1 to the extent practicable. Should the Agency demonstrate a need to conduct activities outside this period, the Agency may conduct such activities after obtaining the Service's approval. **CRF-7.** If a work site is to be temporarily dewatered by pumping, intakes will be completely screened with wire mesh not larger than five millimeters (mm) to prevent CRF from entering the pump system. Water will be released or pumped downstream at an appropriate rate to maintain downstream flows during construction. Upon completion of construction activities, any barriers to flow will be removed in a manner that would allow flow to resume with the least disturbance to the substrate. **CRF-8.** The Declining Amphibian Populations Task Force's Fieldwork Code of Practice will be followed to minimize the possible spread of chytrid fungus or other amphibian pathogens and parasites. **CRF-9:** Implement Mitigation Measure 3.10-1 through 3.10-4 in Section 3.10, Hydrology and Water Quality: Surface Water Systems.
BIO-2k (WPT): The following measures for avoidance and minimization of adverse impacts to western pond turtle (*Actinemys marmorata*) (WPT) during construction of the BMP Update project elements are those typically employed for construction activities that may result in short-term impacts to individuals and their habitat. The focus of these measures is on keeping the disturbance footprint to a minimum and aggressive monitoring of WPTs before vegetation removal and during the construction and revegetation phase. **WPT-1.** The Agency will annually submit the name(s) and credentials of biologists who would conduct activities specified in the following measures. No project activities will begin until proponents have received approval from CDFW that the biologist(s) is qualified to conduct the work. **WPT-2.** A CDFW-approved biologist will survey the work site 48 hours prior to the onset of activities. If WPT adults, juveniles or eggs are found, the approved biologist will determine the closest appropriate relocation site. The approved biologist will be allowed sufficient time to move them from the work site before work activities begin. Only CDFW-approved biologists will participate in activities associated with the capture, handling, and moving of WPT. **WPT-3.** Before any activities begin on a project, a CDFW-approved biologist will conduct a training session for all construction personnel. At a minimum, the training will include a description of the WPT and its habitat, the importance of the WPT and its habitat, general measures that are being implemented to conserve the WPT as they relate to the project, and the boundaries within which the project may be accomplished. Brochures, books and briefings may be used in the training session, provided that a qualified person is on hand to answer any questions. **WPT-4.** A CDFW-approved biologist will be present at the work site until such time as all removal of WPT, instruction of workers, and disturbance of habitat have been completed. **WPT-5.** The number of access routes, number and size of staging areas, and the total area of the activity will be limited to the project plans. Routes and boundaries will be clearly demarcated. Where impacts occur in these staging areas and access routes, restoration will occur as identified in the general BMP Update components above.
BIO-2l (FISH): The following measures are required to reduce impacts to special status fisheries, including steelhead and resident rainbow trout, to a less-than- significant level: **FISH-1.** A NOAA Fisheries-approved, qualified fisheries biologist would be onsite to provide preconstruction training on steelhead life-history to construction crews and to provide daily monitoring during construction activities.

TABLE PD 2-1 (CONTINUED)
MITIGATION MEASURES ADOPTED FOR THE 2014 BMP UPDATE PEIR

Mitigation Measure
BIOLOGICAL RESOURCES (cont.)
FISH-2. If the preliminary construction concept proposes the use of temporary coffer dams for isolating the work areas at the upstream and downstream extent of the project, installation and removal of the temporary coffer dams would be monitored by the qualified fisheries biologist. **FISH-3.** Following initial construction of the coffer dam bypass system, isolated standing water would be pumped from the work area to adjacent vegetated terraces, settling tanks or back into the river, if turbidity is not elevated more than 10% of background turbidity levels. **FISH-4.** If a work site is to be temporarily de-watered by pumping, intakes will be completely screened with wire mesh not larger than 0.2 inch to prevent steelhead or other native fish from entering the pump system. Water will be released or pumped downstream at an appropriate rate to maintain downstream flows during construction. Upon completion of construction activities, any barriers to flow will be removed in a manner that would allow flow to resume with the least disturbance to the substrate. **FISH-5.** The installation and removal of the coffer dam structures would be controlled to minimize turbidity in the water. **FISH-6.** The use of best management practices would be implemented to reduce the probability of sediment and/or contaminated material from entering the creek.
BIO-2m: No water shall be diverted from College Lake from the time the lake begins filling in late fall/early winter through the end of the smolt outmigration period (approximately May 31 or June 15) unless sufficient bypass flows are provided at the dam for unimpeded adult upstream migration through March 31, and sufficient bypass flows are provided at the dam for unimpeded smolt outmigration through May 31. The precise bypass flow levels required to achieve unimpeded migrations are not known at this time. After May 31 or June 15, the entire storage of College Lake could potentially be diverted. College Lake would likely be too warm to allow summer rearing by steelhead, especially in the presence of warm water predatory fishes.
BIO-2n: Protection of Steelhead Migratory Habitat - Impacts to steelhead migration passage shall be minimized by carrying out construction in College Lake/Casserly Creek/Salsipuedes Creek after June 1 and prior to November 1, during which time adults and smolts do not migrate through the area.
BIO-2o: *Protection* of Steelhead Migratory Habitat - The proposed College Lake with Inland Pipeline to Coastal Distribution System component shall be operated such that it complies with all minimum required bypass flow requirements during the steelhead migration period, including those developed through a new bypass flow study to be conducted by a qualified fisheries biologist in consultation with the relevant regulatory agencies.
BIO-2p: The PVWMA shall install and operate surface-water streamflow gaging stations on Casserly Creek upstream and on Salsipuedes Creek downstream of the proposed College Lake diversion structure to monitor available diversion inflows and to provide and document future Biological Opinion-required fish bypass flows.
BIO-3a: Occurrences of special status plant species shall be avoided by project construction activities to the extent feasible. All facilities and construction activities will be maintained outside habitats supporting special status plant species where feasible. Prior to construction, a qualified biologist will conduct a survey of the project area to ascertain the presence or absence of special status plant species. If no species are encountered, no mitigation is required. If a special status species is found within a BMP Update component project area, a setback of 50 feet will be established between the occurrence and the BMP Update construction activities. Prior to construction, PVWMA will install temporary construction fencing at the 50-foot setback line to prevent inadvertent equipment access or construction staging within the special status plant habitat. This fencing will be signed in the field as “SENSITIVE HABITAT AREA - NO CONSTRUCTION ACCESS”. A qualified biologist will inspect the temporary construction barrier fence and monitor the contractor’s compliance with this avoidance measure. If complete avoidance of special status plant species is infeasible, impacts would be minimized through implementation of Mitigation Measure BIO-3b.
BIO-3b: Prior to clearing and grubbing in areas where impacts to special status plant species cannot be avoided, PVWMA will consult with applicable resource agencies (i.e., CDFW and/or USFWS) prior to implementing salvage and revegetation actions. A qualified biologist will collect any available above- ground seed pods/seed heads for their use in future revegetation efforts. During construction, the upper 6 inches of topsoil from areas supporting the plant species will be stripped from the construction area and stored for later use. The topsoil will be used in future revegetation efforts which may be on-site (if feasible) or at an off-site location approved by permitting agencies (i.e., USFWS, CDFW). At the designated revegetation area, all stockpiled topsoil will be placed on site and finish graded to blend with surrounding topography. Under direction of a qualified biologist, the areas will be revegetated with locally native herbaceous plant species compatible with natural regeneration of the special status plant species. The qualified biologist will hand broadcast any seeds collected from the special status plant species into the appropriate habitat areas. The revegetation will achieve a minimum of 2:1 plant replacement (i.e., re- establish two plants for every plant impacted). The qualified biologist will monitor the revegetation areas for two years after construction to ascertain if the special status plant species re-established within the revegetation area. Annual reports will be submitted to permitting agencies by December 31 of each monitoring year, describing the results of the revegetation measures, for a period of 5 years.

TABLE PD 2-1 (CONTINUED)
MITIGATION MEASURES ADOPTED FOR THE 2014 BMP UPDATE PEIR

Mitigation Measure
CULTURAL RESOURCES
CR-1a: Final pipeline and facility plans shall locate facilities and pipeline alignments away from identified and recorded archaeological sites in each component area based on a site reconnaissance and archaeological investigation conducted by a qualified archaeologist at the time site-specific construction plans are developed. The archaeologist shall identify the areal extent of potential recorded sites, assess potential significance to identified resources, recommend adjustment to siting of improvements, facilities and/or pipeline alignments, if necessary, and provide other recommendations to avoid impacts to identified significant resources. If a significant or potentially significant archaeological or historic resource is identified pursuant to the definitions in the State CEQA Guidelines as identified above, the consulting archaeologist shall develop an appropriate mitigation plan for the cultural resource. Possible mitigation measures for important cultural resources may include monitoring by a qualified archaeologist during construction at identified sensitive sites, documentation and recordation of the resource, recovery and relocation, or stabilization of the resource.
CR-1b: The cultural resource boundaries of potentially significant sites shall be marked as exclusion zones both on ground and on construction maps prior to the commencement of construction activities on component sites. Construction supervisory personnel shall be notified of the existence of cultural resources in each component area and will be required to keep personnel and equipment away from these cultural resources sites. During construction and operational phases, personnel and equipment will be restricted to each surveyed corridor for each component.
CR-1c: Should any as yet undiscovered cultural resources be uncovered at any component site, such as structural features, or unusual amounts of bone or shell, artifacts, human remains, or architectural remains be encountered during any development activities, work will be suspended and PVWMA staff will be contacted. A qualified professional archaeologist shall be retained and will perform any necessary investigations to determine the significance of the find. PVWMA will then implement any mitigation deemed necessary for the recordation and/or protection of the cultural resources. In addition, pursuant to Sections 5097.97 and 5097.98 of the State Public Resources Code and Section 7050.5 of the State Health and Safety Code, in the event of the discovery of human remains, all work must be halted and the County Coroner shall be immediately notified. If the remains are determined to be Native American, guidelines of the Native American Heritage Commission shall be adhered to in the treatment and disposition of the remains.
ENERGY, UTILITIES, AND SERVICES
ES-1: A study to identify utilities along proposed alignments will be conducted by PVWMA during pre- design states of projects. The following mitigation measures are required for segments identified in final design as having potential conflicts with significant utilities: a. Utility excavation and encroachment permits would be required from the appropriate agencies, including the Public Works Departments of Santa Cruz County, City of Watsonville, Caltrans, and Union Pacific Railroad. These permits include measures to minimize utility disruption. PVWMA and its contractors shall comply with permit conditions. Permit requirements shall be included in construction contract specifications. b. Utility locations would be verified through field survey (potholing) and use of an underground locating service. c. A detailed engineering and construction plan shall be prepared as part of the design plans and specifications. This plan shall include procedures for the excavation, support, and fill of areas around utility cables and pipes. All affected utility services would be notified of PVWMA's construction plans and schedule. Arrangements would be made with these entities regarding protection, relocation, or temporary disconnection of services. d. In areas where the pipeline would parallel wastewater mains, engineering and construction plans shall include trench wall support measures to guard against trench wall failure, and possible resulting loss of structural support for the wastewater main. Residents and businesses in the project area shall be notified in writing by the contractor of planned utility service disruption two to four days in advance, in conformance with state and County standards.
ES-2: PVWMA shall include in its construction specifications a requirement for the contractor to provide plans for recovering, reusing, and recycling construction, demolition, and excavation wastes and providing for composting of plant material, where feasible.
GEOLOGY AND SOILS
GS-1: Future construction of proposed BMP Update facilities shall be designed in accordance with design recommendations of geotechnical reports and in compliance with applicable policies and appropriate engineering investigation practices necessary to reduce the potential detrimental effects of groundshaking and liquefaction. Construction shall be in accordance with applicable City and County ordinances and policies regarding mitigation of seismic and geologic hazards, and appropriate geotechnical studies shall be conducted.
GS-2: Construction of future BMP Update facilities shall include preparation and implementation of erosion control plans to minimize erosion and inadvertent transport of sediments into water bodies during installation of facilities. Measures shall include, but not be limited to: limiting the area of ground disturbance and vegetation removal at any one time during construction; conducting work prior to the rainy season if possible and protecting disturbed areas during the rainy season; installing bales or other appropriate barriers adjacent to water bodies to prevent transport of sediments into sloughs and water courses; immediately revegetating disturbed areas; and other Best Management Practices during construction to protect water quality. All grading and construction shall conform to requirements of the Santa Cruz County Grading Ordinance. To the extent possible, grading activities in non-cropped areas shall be limited to the period between April 15 and October 31.

TABLE PD 2-1 (CONTINUED)
MITIGATION MEASURES ADOPTED FOR THE 2014 BMP UPDATE PEIR

Mitigation Measure

GEOLOGY AND SOILS (cont.)

GS-3: All diversion and pipeline facilities shall be designed and engineered in accordance with recommendations of a geotechnical report and appropriate engineering designs to reduce the potential detrimental effects of expansive soils, corrosivity, and/or other identified soils constraints. A licensed geotechnical engineer shall prepare recommendations applicable to foundation design, earthwork, and site preparation prior to or during the project design phase. Recommendations will address mitigation of site- specific, adverse soil and bedrock conditions that could hinder development. Project engineers shall implement the recommendations. Geotechnical design and design criteria will comply with applicable codes and requirements of the California Building Code with California additions (CCR Title 24), applicable City and County construction and grading ordinances.

HAZARDS AND HAZARDOUS MATERIALS

HM-1: Prior to initiation of earthwork activities, PVWMA shall perform soil testing on agricultural sites proposed for development and analytically test for pesticide residuals and pesticide-related metals arsenic, lead, and mercury. If contamination is identified in the soil samples above applicable levels, PVWMA shall prepare a Site Management Plan (SMP) to establish protocols/guidelines for the contractor including: identification of appropriate health and safety measures while working in contaminated areas; soil reuse; handling, and disposal of any contaminated soils; and agency notification requirements. The SMP shall be subject to the review and approval of the appropriate regulatory agency.

HM-2: During the design phase of the proposed pipeline alignment from College Lake to Coastal Distribution System (CDS), PVWMA shall perform a Phase I Environmental Site Assessment for the alignment to determine the potential for encountering hazardous materials contamination in soils to be excavated and identify appropriate recommendations. Appropriate health and safety measures shall be identified as needed for worker safety, soil handling, and disposal of contaminated soils.

SURFACE WATER, GROUNDWATER, AND WATER QUALITY

HWQ-1: PVWMA shall require contractors to apply for all applicable NPDES permits, including dewatering permits, develop a SWPPP for construction of proposed facilities, and comply with conditions of the permit(s), as required by the CCRWQCB. The objectives of the SWPPP are to identify pollutant sources that may affect the quality of stormwater discharge and to implement BMPs to reduce pollutants in stormwater discharges. The SWPPP for this proposed action would include the implementation, at a minimum, of the following elements:

- Source identification
- Preparation of a site map
- Description of construction materials, practices, and equipment storage and maintenance
- List of pollutants likely to contact stormwater
- Estimate of the construction site area and percent impervious area
- Erosion and sedimentation control practices, including soils stabilization, revegetation, and runoff control to limit increases in sediment in stormwater runoff, such as detention basins, straw bales, silt fences, check dams, geofabrics, drainage swales, and sandbag dikes
- Proposed construction dewatering plans
- Provisions to eliminate or reduce discharge of materials to stormwater
- Description of waste management practices

Maintenance and training practices

HWQ-2: Rapid, imposed water-level fluctuations shall be avoided within the sloughs, Salsipuedes Creek, and the Pajaro River to minimize erosion and failure of exposed (or unvegetated), susceptible banks. This can be accomplished by operating the pumps at an appropriate flow rate, in conjunction with commencing operation of the pumps only when suitable water levels or flow rates are measured in the water body. Criteria for minimizing fluctuations and/or protecting banks from related erosion will need to be developed, as some banks presently are stable and others are not. Control is important, as the mobilized sediment also impairs in-slough habitat values, and potentially exacerbates bacterial levels in the slough system. It may be that water-level fluctuations may be controlled as well to minimize other impacts, such as desiccation of amphibian eggs or waterlogging of agricultural soils adjacent to the sloughs.

HWQ-3: If pumping rates in existing wells fall below levels that can support existing or planned land uses, and the reduction in pumping can be attributed to one or many of the project components, then one of several measures may be undertaken to mitigate the loss of pumping. These mitigation measures may include:

1. Improving irrigation efficiency
2. Modifying irrigation and agricultural operations
3. Lowering the pump in the irrigation well
4. Lowering and changing the pump in the irrigation well
5. Adding storage capacity for irrigation supply
6. Replacing the irrigation well

TABLE PD 2-1 (CONTINUED)
MITIGATION MEASURES ADOPTED FOR THE 2014 BMP UPDATE PEIR

Mitigation Measure
SURFACE WATER, GROUNDWATER, AND WATER QUALITY (cont.)
7. Replacing the irrigation water source to determine if well production loss can be attributed to one of the project components, the PVWMA will allow well owners to enroll in a monitoring and mitigation program (MMP). PVMWA will collect baseline data necessary for establishing significant impacts only from wells that are enrolled in the MMP. If a well is not enrolled in the MMP, to claim a significant impact the well owner will need to provide adequate and reliable baseline data. To claim a significant impact for each well enrolled in the MMP, PVWMA will first establish baseline irrigation well extraction rates, drawdowns, and water quality near planned components. Pumping rate reductions and changes in water quality from these baseline values will be analyzed to assess whether or not they are caused by the project. A pumping rate reduction or adverse change in water quality is assumed to be caused by the Project if: 1) it occurs at the same time as the onset of operations of BMP Update component(s); 2) it occurs in an area reasonably predicted to be affected by the BMP Update component(s); 3) static groundwater levels have dropped; 4) pumping groundwater levels have not dropped more than static groundwater levels; and 5) no other obvious reason exists for the drop in production capacity. For PVWMA or others to identify another reason for loss of production it must be based on the written professional opinion of a qualified hydrogeologist that will be submitted to the PVWMA staff or their designee, for review and concurrence.
HWQ-4: Facilities shall be designated to comply with FEMA and County of Santa Cruz requirements to floodproof the facilities and shall not exacerbate upstream or downstream flood hazards on other properties. The FEMA process will require identification of the FEMA floodway zone and may require no increase water elevations for a one percent chance annual flood. The FEMA process will require identification of the FEMA zone type and may require no increase water elevations for a one percent chance annual flood. To meet the specific FEMA requirements for the component, substantial modifications to the facility design and additional mitigation may be required.
TRANSPORTATION AND TRAFFIC
TR-1: Conduct a preconstruction survey of road conditions on key access routes to the project sites (e.g., San Andreas Road). The pavement conditions of local streets judged to be in good condition for use by heavy truck traffic shall be monitored. Roads damaged by construction shall be repaired to a structural condition equal to, or better than, that which existed prior to construction activity.

APPENDIX PD-3

Mosquito Abatement

Background Information

California Health and Safety Code, Division 3, Chapter 1 provides Mosquito Abatement and Vector Control districts the power to "conduct effective programs for the surveillance, prevention, abatement, and control of mosquitoes and other vectors" in order to protect public health, safety, and welfare. The Santa Cruz County Mosquito Abatement and Vector Control, County Service Area 53 (MAVC) works with land owners to prevent the spread of mosquito-transmitted diseases through mosquito breeding abatement. Abatement measures commonly include reducing breeding sources and controlling the aquatic stages of larval development to prevent the hatching of adult mosquitos. To accomplish these goals, the Santa Cruz MAVC works with landowners to incorporate the following best management practices into its Integrated Mosquito Management program:

- Public education at schools, community events, and public forums to increase awareness of mosquito breeding conditions
- Biological control by introducing mosquito fish *(Gambusia affinis)*, which is an established but non-native species, into ornamental ponds to consume mosquito larvae
- Breeding source reduction by clearing drainage obstructions and maintaining trails around a potential mosquito breeding source
- Chemical control through aqueous or granular forms of larvicides that interrupt nerve function in mosquito larvae

In Santa Cruz County, there are a dozen mosquito species that can generally be divided into two groups based on where they lay eggs. The floodwater mosquito, Aedes washinoi, lays its eggs on previously submerged vegetation and these eggs remain dormant, sometimes for years, until they are inundated, at which time the larvae hatch. This species is an aggressive daytime biter generally in late winter through spring. Standing water mosquitos, including Culex tarsalis lay egg rafts on still water through summer and fall and are known carriers of diseases such as West Nile virus and encephalitis.[1]

Existing Mosquito Abatement Practices Near College Lake

The College Lake area has a long history of seasonal floodwater mosquito production.[2] The Santa Cruz MAVC already implements mosquito control measures in the creek adjacent to the fairgrounds to limit hatching of floodwater mosquitos and the eastern section of Casserly Creek also has issues with mosquitoes. Access to these locations on foot has been difficult (Steve Driscoll).[3]

---

1 Santa Cruz County Mosquito and Vector Control CSA 53, Best Mosquito Management, 2016. Available online at http://agdept.com/AgriculturalCommissioner/MosquitoAbatementVectorControl.aspx

2 Binding, Paul. Santa Cruz County Mosquito and Vector Control CSA 53. Comments on the Notice of Preparation for Proposed College Lake Integrated Resources Management Project. January 4, 2017.

3 Conversation with Steve Driscoll, Vector Control Specialist, Santa Cruz County Mosquito and Vector Control

Potential Sources of Mosquito Breeding Associated with Project Implementation

The Santa Cruz MAVC provided the following comments on the Project:

> With the proposed Project, surface waters will be impounded for longer periods of time. The resultant vegetation growth combined with shallow water and poor circulation could result in improved habitat for summer *Culex* mosquitoes and increase the risk of mosquito-borne diseases and biting nuisance to the surrounding community. Project planners should be aware that the public health impacts of mosquitoes pose a serious public health risk and environmental impacts and should work collaboratively with our agency to ensure that the EIR provides mitigation measures that include vegetation maintenance, ensures access for mosquito management equipment, provides consideration for biological and chemical mosquito control agents and water level control contingencies for mosquito-borne disease emergencies.

In a follow-up conversation, Santa Cruz MAVC staff also indicated that shallow standing water encourages mosquito (egg laying or larval development) more so than deeper water (2-3 feet deep), and that open basins at the water treatment plant (WTP) could provide opportunities for floodwater and standing water mosquitoes to breed.[4]

Regarding College Lake operations, PV Water will work with the Santa Cruz MAVC to implement appropriate abatement measures. Potential measures are identified below.

Regarding water treatment plant operations, the WTP would include open basins and sludge drying beds (refer to Figures 2-14 through 2-17 in Chapter 2, Project Description). The proposed operations are not expected to create opportunities for water to stagnate. During operations, water would be flowing through the open sedimentation basins and into the water treatment plant continuously. As water in the sedimentation basins is decanted off the top, concentrated sediments form sludge at the bottom, which would be pumped into 0.7 acres of sludge drying beds. As the sludge settles, water is continuously decanted off the top for a period of approximately three months before the sludge is eventually dried. When the irrigation season has ended, the sedimentation basins and sludge drying beds would be completely drained to prevent water from ponding and stagnating.

Potential Measures to Control Mosquito Populations

To reduce standing water adult mosquito populations, PV Water would work with Santa Cruz MAVC to identify and then implement abatement measures. The following are potential measures that could be implemented (Note that these measures are not currently proposed as part of the Project evaluated in the EIR):

- Install a boat ramp or otherwise provide access to improve the ability of Santa Cruz MAVC to conduct abatement services (e.g., larvae inspections and sampling, larvicide application) by boat.

4 Ibid.

- Remove any fencing, standing branches, and rotting vegetation prior to inundation to improve boat access
- Increase the diversity of vegetation in "wetland habitat – wetland conversion" (per Figure 3.5 Land Use Management), as increased species diversity reduces mosquito breeding habitat
- Maintain deep channels (already in PD sediment management plans) to preserve predacious fish during the dry season
- Introduce mosquito fish.

Consistency with Other Regulatory Requirements

As indicated in Table 2-10 in Chapter 2, Project Description, implementation of the Project will require numerous permits and approvals from resource agencies, including approvals to protect special status wildlife species and sensitive habitat. Any mosquito abatement measures to be implemented at College Lake would need to be consistent with such permits and approvals, including Biological Opinions from the U.S. Fish and Wildlife Service and National Marine Fisheries Service.