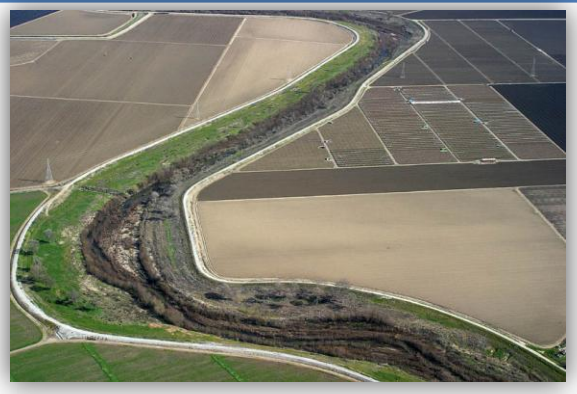
County of Santa Cruz

California Environmental Quality Act (CEQA) Initial Study/Mitigated Negative Declaration




Pajaro River Bench Excavation Project

Prepared by:
County of Santa Cruz, Planning Department
701 Ocean Street, 4th Floor
Santa Cruz, CA 95060
www.sccoplanning.com

February 27, 2012

Pajaro River Bench Excavation Project

Prepared for:

Santa Cruz County Flood Control and
Water Conservation District – Zone 7
701 Ocean Street, Room 410
Santa Cruz, CA 95060
www.dpw.co.santa-cruz.ca.us

Monterey County
Water Resources Agency
893 Blanco Circle
Salinas, CA 93901
http://www.mcwra.co.monterey.ca.us

Prepared by:

County of Santa Cruz
Planning Department
701 Ocean Street, 4th Floor
Santa Cruz, CA 95060
www.sccoplanning.com

February 27, 2012

County of Santa Cruz

PLANNING DEPARTMENT
701 OCEAN STREET, 4TH FLOOR, SANTA CRUZ, CA 95060
(831) 454-2580 FAX: (831) 454-2131 TDD: (831) 454-2123
KATHLEEN MOLLOY PREVISICH, PLANNING DIRECTOR

NOTICE OF INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION

NOTICE IS HEREBY GIVEN that the County of Santa Cruz is proposing to adopt a Mitigated Negative Declaration in accordance with Section 15072 of the California Environmental Quality Act for the following project. The proposed Mitigated Negative Declaration can be reviewed on the Internet at http://www.sccoplanning.com, and at the County of Santa Cruz Planning Department Records Room, 701 Ocean Street, 4th Floor, Santa Cruz, California 95060 during normal business hours. Comments on the proposed Mitigated Negative Declaration must be sent to Todd Sexauer at the address listed above, and should reference "Pajaro River Bench Excavation Project."

Owner/Applicant: County of Santa Cruz Flood Control District (Zone 7)
Application No.: 06-0133
Staff Planner: Todd Sexauer; (831) 454-3511

Zone Districts: Commercial Agriculture and Environmental Management Open Space

Project Location: The proposed Project is located in Santa Cruz and Monterey counties. The project area consists of the lower 7.5 miles of the Pajaro River mainstem beginning immediately west of Murphy Road Crossing and ending immediately east of the State Route 1 Bridge. The project location includes portions of the incorporated City of Watsonville and the unincorporated Town of Pajaro, and adjacent agricultural lands within the counties of Santa Cruz and Monterey. The project area is defined to include the physical footprint of the benches from the toe of the levees down to the two-year water surface elevation of the Pajaro River.

Project Description: The project proposes to excavate excess sediment from select locations along the upper terrace benches inside the Pajaro River levees in order to improve the flood carrying capacity of the levee system. The proposed project would create a two-year floodplain to re-establish flow levels at bankfull capacity. The proposed bench excavation project is also specifically designed to relieve the magnitude and severity of potential flooding caused by failure of the Pajaro River levees. Modeling results have determined that a volume up to 336,000 cubic yards could be excavated from eleven locations along 7.5 miles of the levee benches between Highway 1 and Murphy Road Crossing. The excavation sites span 39.1 acres and include nine excavation sites within Santa Cruz County, and two sites within Monterey County.

The proposed project would improve channel form and function by enhancing the potential for increased sinuosity within the newly created floodplain area. The increased meander lengths for the stream lessen the stream gradient and also are expected to reduce flow velocities. This project further benefits fish and wildlife by creating overbank resting areas and still water areas in the widened floodplain. Steelhead trout use this section of the River's mainstem as a migration corridor to access tributaries such as Corralitos and Salsipuedes Creeks that are used for spawning.

Public Review Period and Comment: Written comments on the proposed Mitigated Negative Declaration must be received no later than April 6, 2012 at 5:00 p.m. (a 30-day public review period beginning on March 8, 2012). For additional information, please contact Matt Johnston, Environmental Coordinator at (831) 454-3201 or by e-mail at pln458@co-santa-cruz.ca.us. The County of Santa Cruz does not discriminate on the basis of disability, and no person shall, by reason of a disability, be denied the benefits of its services, programs or activities. If you require special assistance in order to review this information, please contact Bernice Romero at (831) 454-3137 (TDD number (831) 454-2123 or (831) 763-8123 to make arrangements.

Public Hearing: The project will be considered at a public hearing by the County of Santa Cruz Flood Control District (Zone 7) Board. The time, date and location have not been set. When scheduling does occur, these items will be included in all public hearing notices for the project.

COUNTY OF SANTA CRUZ

PLANNING DEPARTMENT
701 OCEAN STREET, 4TH FLOOR, SANTA CRUZ, CA 95060
(831) 454-2580 FAX: (831) 454-2131 TDD: (831) 454-2123
KATHLEEN MOLLOY PREVISICH, PLANNING DIRECTOR
http://www.sccoplanning.com/

MITIGATED NEGATIVE DECLARATION

Project: Pajaro River Bench Excavation Project **APN(S): Multiple**

Project Description: The project proposes to excavate excess sediment from select locations along the upper terrace benches inside the Pajaro River levees in order to improve the flood carrying capacity of the levee system. The proposed project would create a two-year floodplain to re-establish flow levels at bankfull capacity. The proposed bench excavation project is also specifically designed to relieve the magnitude and severity of potential flooding caused by failure of the Pajaro River levees. Modeling results have determined that a volume up to 336,000 cubic yards could be excavated from eleven locations along 7.5 miles of the levee benches between Highway 1 and Murphy Road Crossing. The excavation sites span 39.1 acres and include nine excavation sites within Santa Cruz County, and two sites within Monterey County.

Project Location: The proposed Project is located in Santa Cruz and Monterey counties. The project area consists of the lower 7.5 miles of the Pajaro River mainstem beginning immediately west of Murphy Road Crossing and ending immediately east of the State Route 1 Bridge. The project location includes portions of the incorporated City of Watsonville and the unincorporated Town of Pajaro, and adjacent agricultural lands within the counties of Santa Cruz and Monterey. The project area is defined to include the physical footprint of the benches from the toe of the levees down to the two-year water surface elevation of the Pajaro River.

Applicant: County of Santa Cruz Flood Control District (Zone 7) Board

Staff Planner: Todd Sexauer; email: pln459@co.santa-cruz.ca.us

This project will be considered at a public hearing by the Board of Supervisors. The time, date and location have not been set. When scheduling does occur, these items will be included in all public hearing notices for the project.

California Environmental Quality Act Mitigated Negative Declaration Findings:

Find, that this Mitigated Negative Declaration reflects the decision-making body's independent judgment and analysis, and; that the decision-making body has reviewed and considered the information contained in this Mitigated Negative Declaration and the comments received during the public review period; and that revisions in the project plans or proposals made by or agreed to by the project applicant would avoid the effects or mitigate the effects to a point where clearly no significant effects would occur; and, on the basis of the whole record before the decision-making body (including this Mitigated Negative Declaration) that there is no substantial evidence that the project as revised will have a significant effect on the environment. The expected environmental impacts of the project are documented in the attached Initial Study on file with the County of Santa Cruz Planning Department located at 701 Ocean Street, 4th Floor, Santa Cruz, California.

Required Mitigation Measures or Conditions:

☐ None

☒ Are Attached

Review Period Ends: April 6, 2012

Note: This Document is Considered Draft until it is Adopted by the Appropriate County of Santa Cruz Decision-Making Body

Date: March 6, 2012

Matt Johnston

MATT JOHNSTON, Environmental Coordinator
(831) 454-3201

Table of Contents

List of Figures

List of Tables

County of Santa Cruz

PLANNING DEPARTMENT
701 OCEAN STREET, 4TH FLOOR, SANTA CRUZ, CA 95060
(831) 454-2580 FAX: (831) 454-2131 TDD: (831) 454-2123
KATHLEEN MOLLOY PREVISICH, PLANNING DIRECTOR
www.sccoplanning.com

CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA) ENVIRONMENTAL REVIEW INITIAL STUDY

Date: February 27, 2012 **Application Number:** 06-0133

Staff Planner: Todd Sexauer

I. OVERVIEW AND ENVIRONMENTAL DETERMINATION

APPLICANT: County of Santa Cruz Flood Control & Water Conservation District (Zone 7), and Monterey County Water Resources Agency **APN(s)**: See Table 1

OWNER: Multiple **SUPERVISORAL DISTRICT**: 4

PROJECT LOCATION:

The proposed project location (Figure 1, Regional Location Map) consists of the lower 7.5 miles of the Pajaro River mainstem beginning immediately west of Murphy Road Crossing and ending immediately east of the State Route 1 Bridge. The project location includes portions of the incorporated City of Watsonville and the unincorporated Town of Pajaro, and adjacent agricultural lands within the counties of Santa Cruz and Monterey. The project area is defined to include the physical footprint of the benches from the toe of the levees down to the two-year water surface elevation of the Pajaro River.

Table 1: Assessor Parcel Numbers Occurring within the Project Area by County

	Santa Cruz County			Monterey County	
Assessor Parcel No.	051-231-01 051-231-06 051-231-19 051-231-20 051-231-21 051-231-22 051-241-01 051-241-20 051-241-21 051-241-22 051-241-23 051-241-32	051-241-34 051-241-42 051-241-45 052-243-01 052-243-02 052-243-03 052-243-10 052-243-15 052-243-16 052-243-17 052-243-18 052-243-20	052-243-21 052-581-10 017-231-02 017-241-05 017-591-01 017-651-02 017-302-17 017-273-05 017-281-29 017-283-01 017-283-02	117-221-28 117-341-99 117-361-99 117-381-99 117-401-99 117-411-99	267-011-05 267-011-06 267-011-11 267-011-13 267-021-02 267-021-03 267-021-14

Source: County of Santa Cruz 2011.

SUMMARY PROJECT DESCRIPTION:

The project proposes to excavate excess sediment from select locations along the upper terrace benches inside the Pajaro River levees in order to improve the flood carrying capacity of the levee system. The proposed project would create a two-year floodplain to re-establish flow levels at bankfull capacity. The proposed bench excavation project is also specifically designed to relieve the magnitude and severity of potential flooding caused by failure of the Pajaro River

This page intentionally left blank.

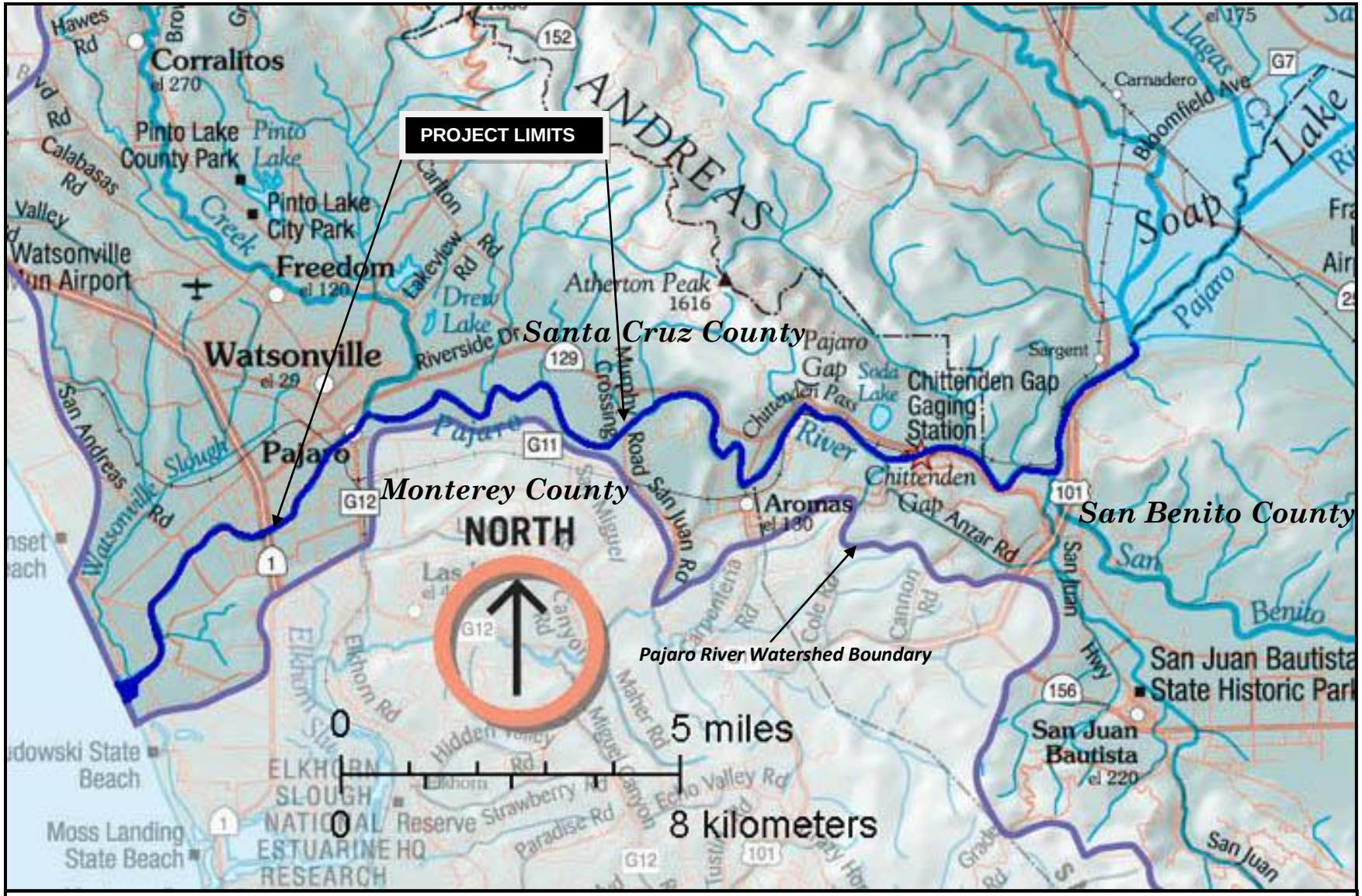


Figure 1 – Regional Location Map

Source: Base Map - Pajaro Watershed Information Center

This page intentionally left blank.

levees. Modeling results have determined that a volume up to 336,043 cubic yards could be excavated from eleven locations along 7.5 miles of the levee benches between Highway 1 and Murphy Road Crossing. The excavation sites span 39.1 acres and include nine excavation sites within Santa Cruz County, and two sites within Monterey County.

The proposed project would improve channel form and function by enhancing the potential for increased sinuosity within the newly created floodplain area. The increased meander lengths for the stream lessen the stream gradient and also are expected to reduce flow velocities. This project further benefits fish and wildlife by creating overbank resting areas and still water areas in the widened floodplain. Steelhead trout use this section of the River's mainstem as a migration corridor to access tributaries such as Corralitos and Salsipuedes Creeks that are used for spawning.

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED: All of the following potential environmental impacts are evaluated in this Initial Study. Categories that are marked have been analyzed in greater detail based on project specific information.

- ☒ Geology/Soils
- ☒ Hydrology/Water Supply/Water Quality
- ☒ Biological Resources
- ☒ Agriculture and Forestry Resources
- ☐ Mineral Resources
- ☒ Visual Resources & Aesthetics
- ☒ Cultural Resources
- ☒ Hazards & Hazardous Materials
- ☒ Transportation/Traffic
- ☒ Noise
- ☒ Air Quality
- ☒ Greenhouse Gas Emissions
- ☐ Public Services
- ☐ Recreation
- ☐ Utilities & Service Systems
- ☐ Land Use and Planning
- ☐ Population and Housing
- ☒ Mandatory Findings of Significance

DISCRETIONARY APPROVAL(S) BEING CONSIDERED:

- ☐ General Plan Amendment
- ☐ Land Division
- ☐ Rezoning
- ☐ Development Permit
- ☒ Encroachment Permit (City of Watsonville)
- ☐ Coastal Development Permit
- ☒ Grading Permit (County of Monterey Only)
- ☐ Riparian Exception
- ☒ Land Clearing Permit (County of Santa Cruz Only)
- ☒ Biotic Approval Section 16.32.060 (County of Santa Cruz)

NON-LOCAL APPROVALS

Other agencies that must issue permits or authorizations:

- California Department of Fish and Game: 1602 Streambed Alteration Agreement
- California Regional Water Quality Control Board: Water Quality Certification
- California Department of Transportation: Encroachment Permit

- U.S. Army Corps of Engineers: Section 404 Nationwide 27 and 33 Permits
- U.S. Fish and Wildlife Service Section 7 Consultation under the Endangered Species Act
- National Oceanic and Atmospheric Administration Fisheries Service Section 7 Consultation under the Endangered Species Act

DETERMINATION: (To be completed by the lead agency)
On the basis of this initial evaluation:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☒ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Matt Johnston
Environmental Coordinator

2/27/12
Date

II. BACKGROUND INFORMATION

EXISTING SITE CONDITIONS

Parcel Size: Numerous. The project crosses some 48 parcels (see Table 1)
Existing Land Use: Primarily open space surrounded by agricultural uses.
Vegetation: Dominated by non-native ruderal vegetation on the benches
Slope in area affected by project: ☒ 0 – 30% ☐ 31 – 100%
Nearby Watercourse: Pajaro River and Salsipuedes Creek
Distance To: Adjacent to the main channel of the Pajaro River

ENVIRONMENTAL RESOURCES AND CONSTRAINTS*

Water Supply Watershed: Not Mapped	Fault Zone: Mapped
Groundwater Recharge: Mapped	Scenic Corridor: Mapped
Timber or Mineral: Not Mapped	Historic: Not Mapped
Agricultural Resource: Mapped	Archaeology: Not Mapped
Biologically Sensitive Habitat: Mapped	Noise Constraint: Yes
Fire Hazard: Not Mapped	Electric Power Lines: Yes
Floodplain: Mapped	Solar Access: N/A
Erosion: Yes	Solar Orientation: N/A
Landslide: Not Mapped	Hazardous Materials: Mapped
Liquefaction: Mapped	Other:

Note: *Environmental resources and constraints shown are mapped only for sites within the jurisdiction of the County of Santa Cruz. Comparable GIS data are not available for sites located within the jurisdiction of the City of Watsonville or the County of Monterey.

SERVICES

Fire Protection: Pajaro Valley Fire Protection District, City of Watsonville, and North County Fire Protection District	Drainage District: County of Santa Cruz Flood Control & Water Conservation District, Zone 7 and Monterey County Water Resources Agency
School District: N/A	project Access: Via SR 129 and Main Street/Porter Drive
Sewage Disposal: N/A	Water Supply: N/A

PLANNING POLICIES

Zone District: Commercial Agriculture and Resource Conservation
Special Designation: None
General Plan: Agriculture and Resource Conservation
Urban (Reserve*) Services Line: ☒ Inside ☒ Outside
Coastal Zone: ☐ Inside ☒ Outside
*Urban Reserve is applicable only to the County of Monterey.

ENVIRONMENTAL SETTING AND SURROUNDING LAND USES:

The project area is located along the Pajaro River bounded on the north by Santa Cruz County and on the south by Monterey County. Land uses on the Santa Cruz side are characterized by

agriculture, with urban residential and some park areas in the City of Watsonville. Urban development centered in the City of Watsonville includes the major thoroughfares of routes of Highway 1, Highway 129, West Beach Road, and Carlton Road. The Monterey County side of the river corridor is characterized mainly by agricultural uses, with some urban use in the unincorporated Town of Pajaro.

Within the project area, the Pajaro River generally forms the boundary between Santa Cruz and Monterey counties and is adjacent to the City of Watsonville. However, several areas of the river within the project alignment no longer follow the boundary between the counties due to past meandering. The City has jurisdiction over and responsibility for the development of areas adjacent to the Pajaro River within its urban service area. The project is thus subject to the County of Santa Cruz General Plan (Santa Cruz County 1994) and County Code (Santa Cruz County Code Title 13), the Monterey County General Plan (Monterey County 2010) and County Code (Monterey County Code Title 21), and to the City of Watsonville General Plan (City of Watsonville 1994) and Municipal Code (City of Watsonville Municipal Code Title 14).

PROJECT BACKGROUND:

The U.S. Army Corps of Engineers (USACE) initiated a flood control study for the Pajaro River in 1936. However, it was not until 1949 that the current earthen levee system was constructed along the lower 12.5-mile segment of the river from the Murphy Road Crossing to the river mouth and the first 4.5 miles of Salsipuedes Creek. The flood conveyance design capacity of the 1949 levee system was intended to be a 2 percent annual exceedance event (50-year flood). A 1998 study (USACE 1998) for the original levee system calculated design flow capacities for the Pajaro River upstream of the Salsipuedes Creek confluence to be 19,000 cubic feet per second (cfs) and downstream of the Salsipuedes Creek confluence to be (22,000 [cfs]), which are far less than a 50-year flood event.

Need for project – Floods within the Lower Pajaro Levee System

Major flood damage resulted when the levee exceeded its carrying capacity in both 1955, and 1995. In 2004, a State of California appellate court decision, the Arreola case, held that the counties of Santa Cruz and Monterey, together with Caltrans, are liable for flood damages to residential, agricultural and commercial land owners for property destruction resulting from the 1995 flood. Caltrans was held liable for $11 million dollars, and the two counties were held liable for over $40 million dollars in damages to the local litigants. This caused the two counties to research the possibility of formally relinquishing the levee maintenance duties to California Department of Water Resources. Relinquishment efforts have since been terminated and the counties struggle to maintain an aged levee with a limited budget.

The problem of inadequate flood conveyance capacity within the Pajaro River levee system is documented in the USACE, San Francisco District report: Pajaro River at Watsonville, California; Preconstruction, Engineering, and Design Phase General Reevaluation Report Pre-Conference Materials for F3 Milestone Feasibility Scoping Meeting; November 2000. This report identifies the problem as follows: “The threat of significant flooding is the primary problem that has been identified in the study area. The City of Watsonville, the unincorporated Town of Pajaro, and surrounding agricultural areas in Monterey and Santa Cruz counties are subject to flooding from the Pajaro River (mainstem).

Flood History

The Pajaro River and its tributaries have a long history of flooding since the 1949 construction of the legacy levees. Documented flooding in the City of Watsonville area has been limited to overflow from Corralitos Creek, which has occurred in 1955, 1982 and 1986. However, the

Town of Pajaro was subject to flooding due to breaching and/or overtopping of the Pajaro river levees intensively in 1995.

The worst flooding to occur in the City of Watsonville was in 1955, when 29 city blocks were flooded to a maximum depth of 2 feet due to floodwaters escaping over the south bank of Corralitos Creek between Green Valley Road and Highway 152. No lives were lost in the storm; however, 972 people were evacuated and $1,120,000 in damages was incurred, which included the cost of levee repairs.

On January 4, 1982, some flooding occurred along the southeastern perimeter of Watsonville. The flooding resulted from the overflow of Corralitos Creek and produced shallow flooding in a 200 to 1,000 foot wide strip along Bridge Street and Riverside Drive. Several homes were damaged as a result of this overflow. According to stream gauge records for Corralitos Creek at Freedom, the January 1982 event is the major flood of record.

Flooding was reported to have occurred in February 1986 along Corralitos Creek between the community of Freedom and Highway 152, as well as further upstream along Eureka Canyon Road. Estimated flood damages for the two areas amounted to $2,900,000. It was reported that overtopping of the levees occurred along Salsipuedes Creek between Highway 152 and the Pajaro River during the same storm. While no documented flood damages were found regarding from flooding of Salsipuedes Creek during the 1986 storm, the levees along the creek had to be repaired at three locations due to overtopping or channel bank erosion.

In March 1995, floodwaters inundated the entire Town of Pajaro as well as several hundred acres of prime agricultural land, causing an estimated $90 million dollars in flood damages. While the town of Watsonville was threatened, it only sustained minor flood damages. Flood waters ponded behind the right (south) bank levee at the State Highway 1 Bridge, requiring it to be breached in order to drain the large amount of accumulated water. Ponding also occurred at the confluence of Salsipuedes Creek and the Pajaro River (northeast corner).

Floodwaters from the February 1998 storm, which is now the flood of record, caused a major levee breach along the north bank of the Pajaro River, approximately 1,500 feet downstream of Highway 1. Flooding was mainly limited to agricultural type land. While flood damages were relatively minor (less than $2 million), considering the magnitude of the event, scour and erosion damage was extensive. Costs for emergency repair work along the levy system totaled nearly $9 million.

Santa Cruz County Flood Control and Water Conservation District Zone 7

In October 1991, the Santa Cruz County Flood Control and Water Conservation District Zone 7 was established, which is proposed to encompass the Pajaro River Valley Drainage Basin. Both the County of Santa Cruz and the City of Watsonville participate in Zone 7. Monterey County flood protection is directed by the Monterey County Water Resources Agency and does not participate in Zone 7.

Since the formation of Zone 7, assistance from the USACE has been requested to prepare a study to determine improvements that could be made throughout the Pajaro Valley Drainage Basin to improve flood capacity. The County has also worked with the California Department of Fish and Game (CDFG) to allow selective clearing of vegetation in the channel. The Pajaro River and Salsipuedes and Corralitos Creeks Management and Restoration Plan was adopted in 2002 by the Zone 7 Board of Directors. The primary objective of the project is to implement a management program along the Pajaro River and Salsipuedes and Corralitos Creeks that: (1) maintains the flood carrying capacity of the system, (2) installs and maintains bank erosion measures as necessary, and (3) enhances and preserves habitat values. A secondary

objective for the County is to implement the project within the annual funding available for flood control maintenance along the river system. The project included the following: (1) ongoing resurfacing and maintenance of the Santa Cruz County levees along the Pajaro River and Salsipuedes Creek as needed to maintain the current levee geometry and elevation; (2) monitoring and installation of necessary bank protection measures to correct erosion problems along the Pajaro River; (3) establishing and managing vegetation along the Pajaro River, Salsipuedes and Corralitos Creeks in a manner that balances habitat values with maximizing the flood carrying capacity of the river system; and (4) limited periodic sediment (sand bar) removal from the channel bottom of Salsipuedes Creek and the Pajaro River in the Salsipuedes Creek confluence zone.

Current Maintenance and On-going Grading of the Pajaro River Levee Channel

The counties of Monterey and Santa Cruz are responsible for the maintenance of the levee system under an agreement with the USACE. The counties of Monterey and Santa Cruz perform on-going maintenance that includes annual vegetation thinning and sediment removal on an as-needed basis. Annual vegetation thinning includes mowing the upper terrace benches and thinning willow growth on the streambank and the channel bottom outside of a riparian buffer zone that exists on either side of the low-flow channel.

Historically, sediment removal was comprised of excavation of sandbars from the channel bottom. This occurred on an as-needed basis from year to year, varying on need and availability of permits. More recently, the counties have considered a departure from sediment removal work in the channel bottom after being advised by both permitting agencies and hydraulic consultants to move sediment removal operations to the benches. Sediment removal on the benches does much more to improve flood conveyance capacity and floodplain function, and to preserve biological habitat in the channel bottom.

The County's on-going method of channel maintenance is based on adaptive management. The plan is based on performing annual surveys of the channel cross section and comparing changes to historical cross sections. This is done in order to determine the extent to which vegetation and sediment removal are necessary from year to year. In this way, the Counties present an actual need for thinning and/or sediment removal on a year-to-year basis. Determination of the need to work in the channel is based on surveys and modeling work that demonstrates how much maintenance work is necessary each year.

DETAILED PROJECT DESCRIPTION:

The project proposes to excavate excess sediment from select locations along the upper terrace benches inside the Pajaro River levees in order to improve the flood carrying capacity of the levee system. The proposed project would create a two-year floodplain to re-establish flow levels at bankfull capacity. This is expected to be a more self-maintaining scenario for the River, returning to the river its natural ability to move sediment more effectively out of the river channel system by natural geomorphic processes. The project also creates more lateral room for the river to meander over a wider floodplain area within the levee channel. This would be a departure from historical operations that had potential to cause greater environmental impacts by removing sediment from the channel bottom. By creating a two-year floodplain in the bench area, the proposed project would enhance the environmental characteristics of the stream and restores the channelized stream to a more naturally functioning ecosystem while providing immediate improvement to flood conveyance capacity.

The proposed bench excavation project is also specifically designed to relieve the magnitude and severity of potential flooding caused by failure of the Pajaro River levees. Modeling results have determined that a volume up to 336,043 cubic yards can be excavated from select

locations along 7.5 miles of the levee benches between Highway 1 and Murphy Road Crossing. An additional 33 acres of bench area and levee slope may be disturbed to facilitate construction access. The excavation area spans 39.1 acres and includes three excavation sites located entirely within Santa Cruz County (2R, 3R, and 4R), and five sites located entirely within Monterey County (2L, 4L, 5R, 5.5R, and 7R). The three remaining sites (1R, 6R, and 8R) are located in both Santa Cruz and Monterey counties. As a result, the 336,043 cubic yards of excavated material is evenly distributed between Santa Cruz (169,414 cubic yards) and Monterey (166,628 cubic yards) counties. Figure 2 shows the bench excavation by jurisdiction. Table 2 provides the estimated length, area, depth, and volume of each of the proposed excavation sites. Figures 3 and 4 show typical "before" and "after" cross sections of the Pajaro levee system.

The proposed project would improve channel form and function by enhancing the potential for increased sinuosity within the newly created floodplain area. The increased meander lengths for the stream lessen the stream gradient and also are expected to reduce flow velocities. This project further benefits fish and wildlife by creating overbank resting areas and still-water areas in the widened floodplain. Steelhead trout use this section of the River's mainstem as a migration corridor to access tributaries such as Corralitos and Salsipuedes Creeks that are used for spawning.

Table 2: Excavation Proposed by Site

Site	Length (feet)	Area (acres)	Average Excavation Depth (feet)	Excavated Volume (cubic yards)	Off Haul Volume (cubic yards)*
Right Bank					
1R	1,496	2.58	7.0	20,093	22,102
2R	2,424	4.42	7.5	36,090	39,699
3R	1,147	2.06	6.6	14,505	15,956
4R	2,221	6.24	7.8	52,432	57,675
5R	2,831	4.84	7.0	35,769	39,346
5.5R	605	0.88	6.5	6,285	6,914
6R	4,502	9.46	6.3	84,833	93,316
7R	699	1.09	4.0	5,588	6,147
8R	2,706	4.29	4.1	25,324	27,856
Subtotal	***18,631***	***35.85***	**--**	***280,919***	***309,011***
Left Bank					
2L	965	1.43	3.3	7,992	8,791
4L	951	1.82	5.8	16,583	18,241
Subtotal	***1,916***	***3.25***	**--**	***24,575***	***27,032***
Total	**20,547**	**39.11**	**--**	**305,494**	**336,043**

Note: *Off haul volume assumes 10% swelling of excavated material.
Source: NHC 2011.

Hydraulic Modeling

The technical analysis for this bench excavation project is presented in a letter report by Northwest Hydraulic Consultants Inc. (NHC): File #50275; RE: Pajaro River Bench Excavation Analysis; October 20, 2004. A Pajaro River Bench Excavation 65 Percent Design Basis Memorandum was also completed on June 30, 2011. This study analyzed sediment excavation as follows: "As requested, NHC Inc. has evaluated the sensitivity of Pajaro River water surface profiles between Highway 1 and Murphy's Crossing to channel vegetation conditions and partial excavation of benches located between the channel and levees."… "The concept evaluated involves the excavation of benches on both sides of the river to create a new bench elevation no lower than the water surface profile of the two-year flood. The entire width of bench would not be excavated. Only bench areas extending beyond a minimum buffer width, measured from the existing levee toe, would be excavated. The purpose of the buffer is to reduce the potential of bank erosion undermining the levee toe." The report continues with a determination that over

This page intentionally left blank.

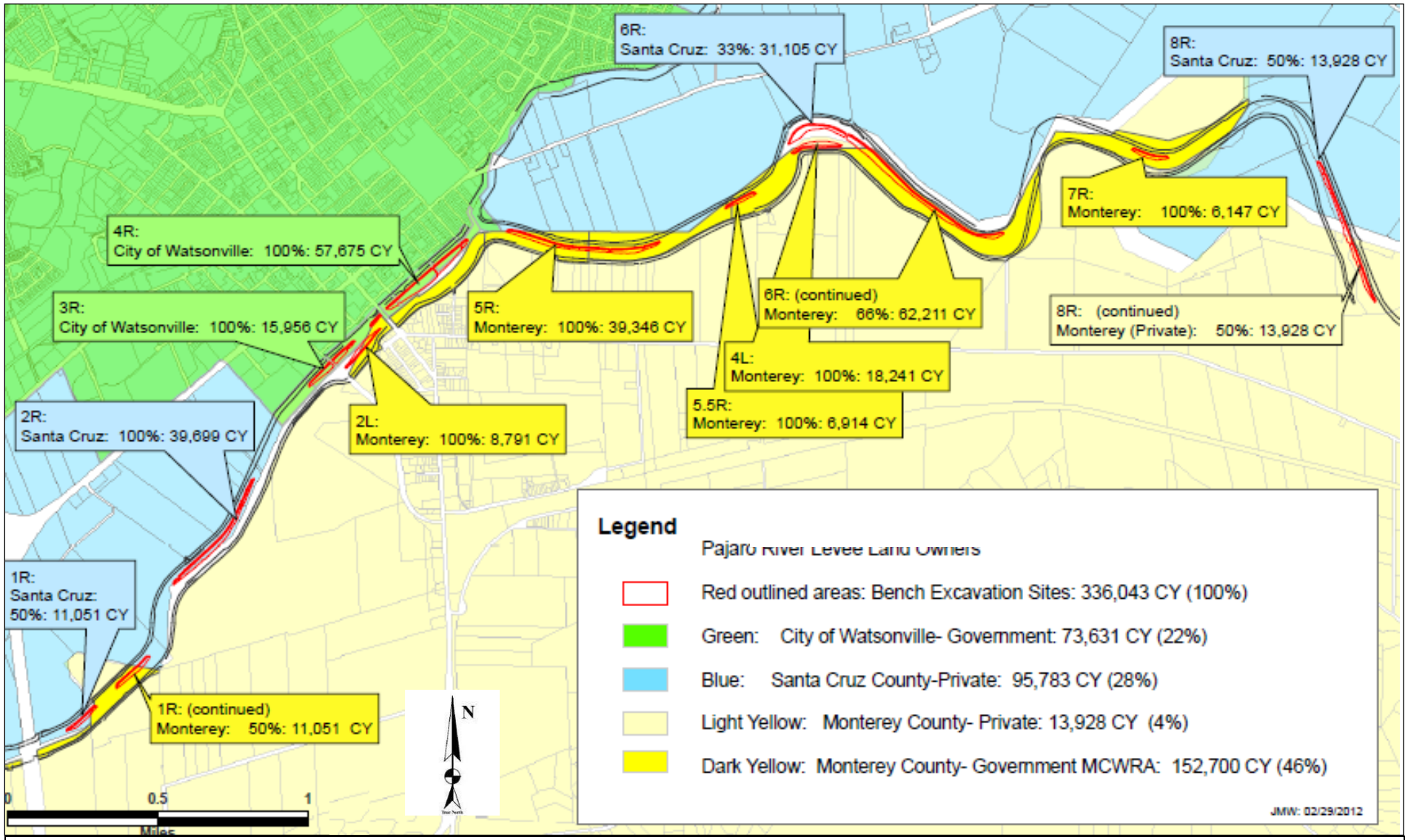


Figure 2: Pajaro River Bench Excavation by Jurisdiction

Source: County of Santa Cruz, 2012.

This page intentionally left blank.

Pajaro River Levee System - Bench Excavation Project - Typical Cross Section - **(Existing) BEFORE**

Excavate the Inner Channel Bench by a depth of 2 to 8 ft. (average depth = 5 feet);
and a width of 50 to 250 ft.
Leave a buffer area untouched against the levee that is 50 feet wide in straight reaches
and inside bends and 100 feet on outside bends.

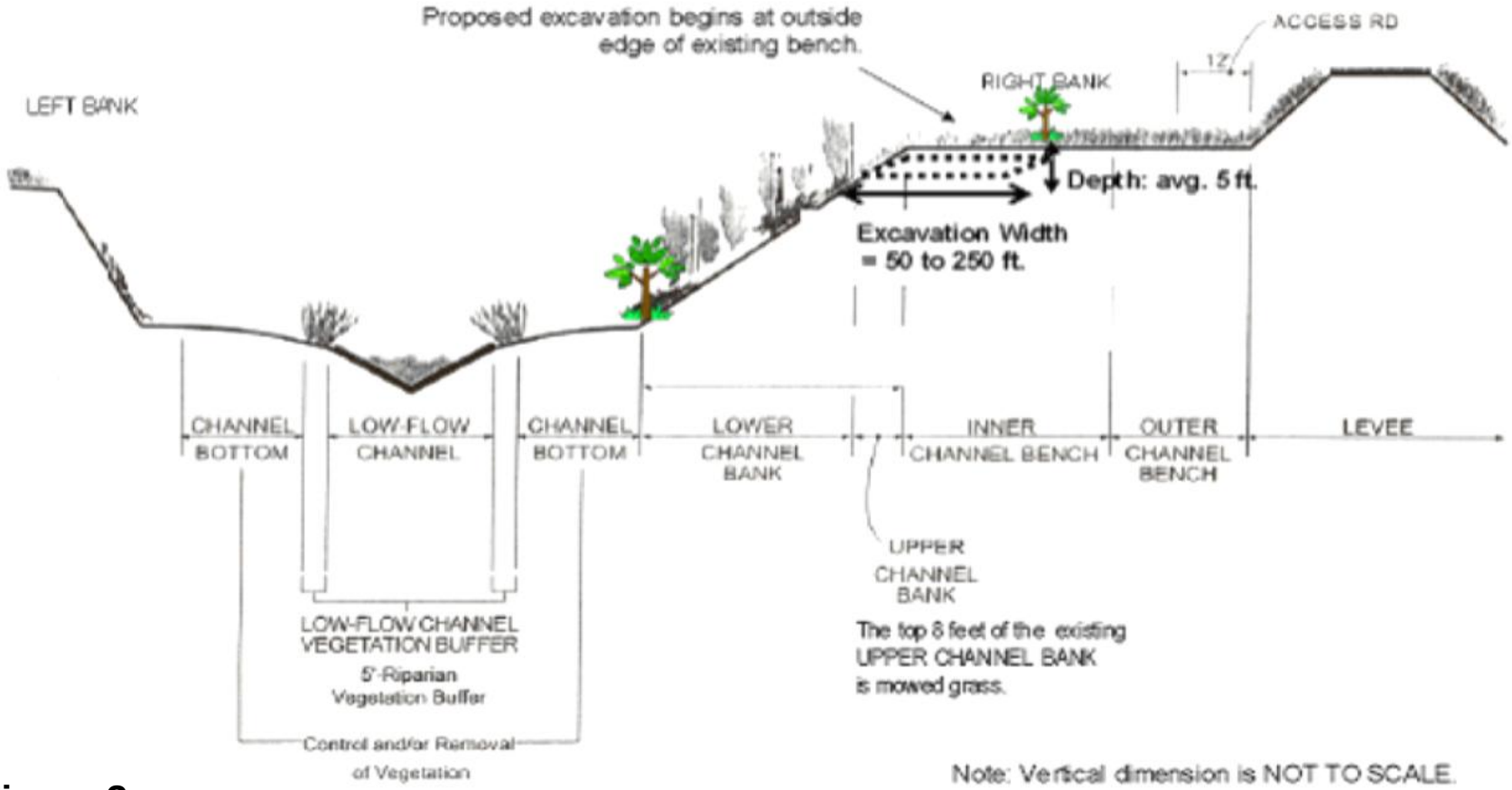


Figure 3

This page intentionally left blank.

Pajaro River Levee System - Bench Excavation Project - Typical Cross Section **- AFTER**

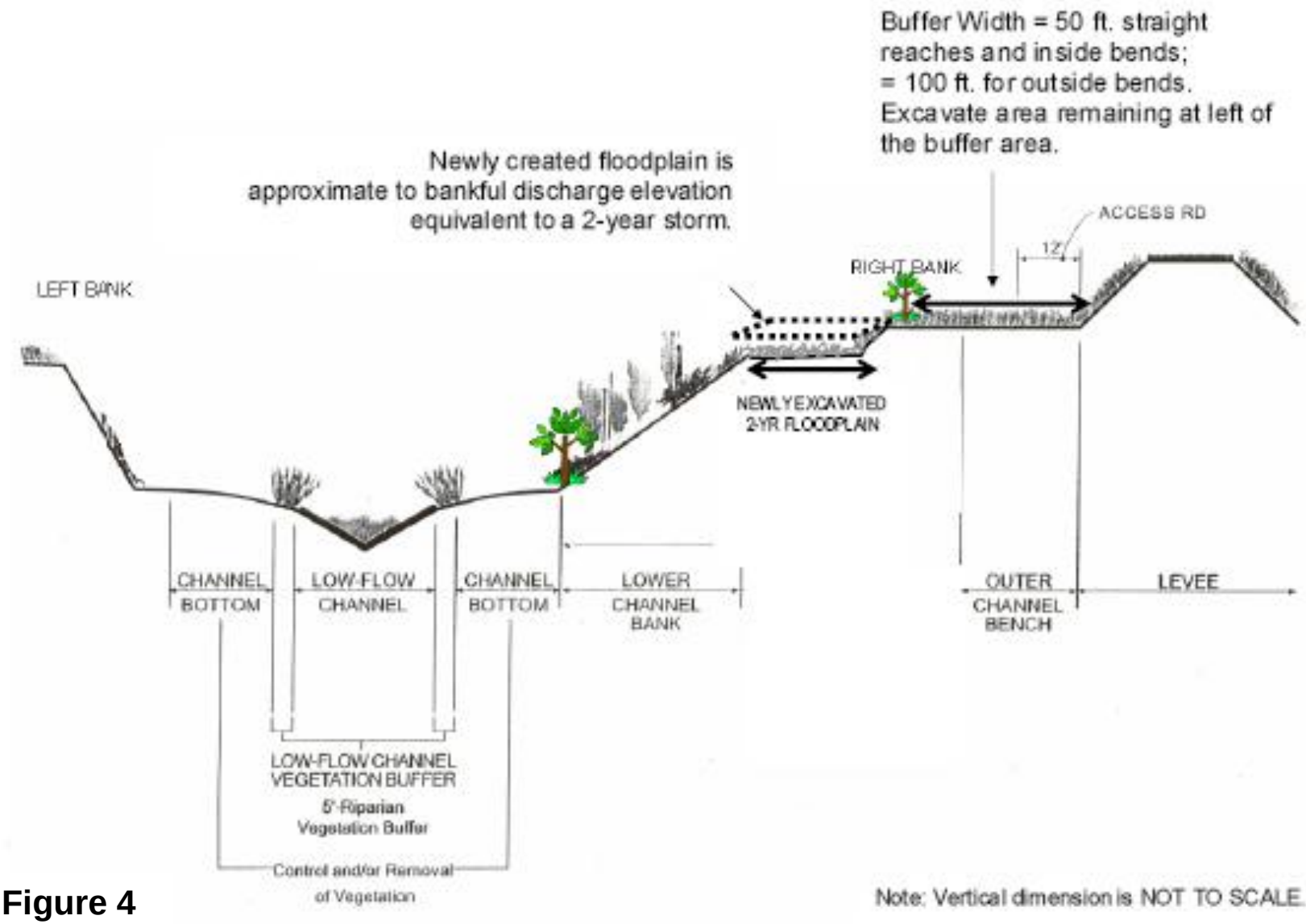


Figure 4

This page intentionally left blank.

322,000 cubic yards of bench sediment can be removed from the system. This would result in an increase in conveyance capacity for the five model reaches.

Regulatory Permitting

Waters of the U.S. and Wetlands (Section 404 of the CWA)

Under Section 404 of the Clean Water Act (CWA), the USACE is responsible for regulating the discharge of fill materials into waters of the United States, including wetlands. Wetlands are defined as, "those areas that are inundated or saturated by surface or ground water 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. Wetlands generally include; swamps, marshes, bogs, and similar areas" (EPA, 40 CFR 230.3, and CE 33 CFR 328.3). The three criteria used to delineate wetlands are the presence of: (1) hydrophytic vegetation, (2) wetland hydrology, and (3) hydric soils. According to the 1987 USACE Manual, evidence of at least one positive wetland indicator from each parameter must be found in order to make a positive determination. Areas that are inundated for sufficient duration and depth to exclude growth of hydrophytic vegetation, such as lakes and ponds, or convey water, such as streams, are also subject to Section 404 jurisdiction. Along the Central California coast, these "other waters" can include intermittent and ephemeral streams, as well as lakes, and rivers. "Other waters' are identified by the presence of an ordinary high water (OHW) mark, a defined river or stream bed, a bank, or by the absence of emergent vegetation in ponds or lakes. An OHW mark is defined as the natural line on the shore established by fluctuations of water.

Water Quality Certification (Section 401 of the CWA)

Under Section 401 of the CWA, the State Water Resources Control Board (SWRCB) and Regional Water Quality Control Board (RWQCB) must certify that the activities permitted by the USACE under Section 404 of the CWA will not violate water quality standards individually or cumulatively over the term of the issued permit (the term is typically five years). Water quality certification must be consistent with the requirements of the federal CWA, the California Environmental Quality Act (CEQA), the California Endangered Species Act, and the SWRCB's mandate to protect beneficial uses of waters of the State known as the California Porter-Cologne Water Quality Control Act. The RWQCB establishes beneficial uses of surface and groundwater resources, as contained in its Water Quality Control Basin Plan for the Central Coast (Central Coast RWQCB 1995).

Endangered Species Act

The federal Endangered Species Act (ESA) of 1973 (16 USC 1536) as amended in 1988, establishes a national program for the conservation of threatened and endangered species of fish, wildlife and plants, and the preservation of the habitat critical to the survival of listed species. The ESA's purpose is to conserve the ecosystems upon which endangered and threatened species depend and to recover listed species. Under the law, species may be listed as either "endangered" or "threatened." "Endangered" is defined as a species in danger of extinction throughout all or a significant portion of its range. "Threatened" is defined as a species likely to become endangered within the foreseeable future. All species of plants and animals, except pest insects, are eligible for listing.

The ESA defines procedures for listing species, designating critical habitat for listed species, and preparing recovery plans. It also specifies prohibited actions and exceptions. The U.S. Fish and Wildlife Service (USFWS) has primary responsibility for enforcing ESA with respect to

terrestrial and freshwater organisms, while National Marine Fisheries Service (NMFS) NMFS is responsible for enforcing ESA when marine species, including anadromous fish, are concerned.

ESA Section 7(a) requires federal agencies to ensure that the actions they authorize, fund, and carry out do not jeopardize species listed as threatened or endangered or their critical habitats. Under Section 7, a project applicant may request consultation between a federal permitting agency and the USFWS or NMFS (collectively, the "Services") if the applicant has reason to believe that a listed species is likely to be affected by a proposed project. The federal agency prepares a Biological Assessment (BA), which is reviewed by the Services. The responsible Service issues a Biological Opinion (BO) regarding how the proposed action will affect listed species or critical habitat. If the Service determines that a proposed action will jeopardize the continued existence of a listed species, the Service must issue a BO offering "reasonable and prudent alternatives" on how the proposed action could be modified to avoid jeopardy.

California Endangered Species Act

The California Endangered Species Act (CESA) (Code Section 2050-2098, 1984) includes provisions for the protection and management of species listed as endangered or threatened, or designated as candidates for such listing. The act requires consultation with the California Department of Fish and Game (CDFG) "to ensure that any action authorized by a state lead agency is not likely to jeopardize the continued existence of any endangered or threatened species or results in the destruction or adverse modification of habitat essential to the continued existence of the species" (Section 2090). Plants of California declared to be endangered, threatened, or rare are listed in 14 California Code of Regulations (CCR) Section 670.2. Animals of California declared to be endangered, threatened, or rare are listed in 14 CCR Section 670.5.

California Fully Protected Species

As stated in Section 3511(a)(1) of the California Fish and Game Code, "Except as provided in Section 2081.7, fully protected birds or parts thereof may not be taken or possessed at any time. No provision of this code or any other law shall be construed to authorize the issuance of permits or licenses to take any fully protected bird, and no permits or licenses heretofore issued shall have any force or effect for that purpose. However, the department may authorize the taking of those species for necessary scientific research, including efforts to recover fully protected, threatened, or endangered species, and may authorize the live capture and relocation of those species pursuant to a permit for the protection of livestock." The white-tailed kite, known to occupy the project site, is listed as a Fully Protected species.

Streambed Alteration Agreement (Section 1600-1616 of the California Fish and Game Code)

California Fish and Game Code Sections 1600-1616 require project proponents to submit to the CDFG a Notification of Lake or Streambed Alteration for any project that may "substantially divert or obstruct the natural flow of, or substantially change or use any material from the 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." Upon approval CDFG will issue a Streambed Alteration Agreement (SAA). As a state agency, CDFG requires that a CEQA document be completed prior to issuing an SAA. This IS/MND provides the required CEQA compliance for this project. In addition to completing the Notification of Lake or Streambed Alteration and verification of complete CEQA documentation, project applicants must submit a fee to CDFG to receive the SAA.

Tributary Creek Analyses

As part of this project, it was necessary to analyze sediment excavation from the benches of the tributary that is Salsipuedes Creek. The County of Santa Cruz commissioned from NHC Inc.

hydraulic analysis of the creek. That February 2005 report determined that no excavation on the Creek was justifiable because of inadequate channel capacity upstream of the project reach. This determination was made by performing a new cross sectional survey of the creek channel and a comparing those cross sections to historical cross sectional data. In this way, patterns of aggradation and scour were analyzed with the conclusion that sediment excavation on the creek was not necessary at this time.

The proposed excavation area spans 35.85 acres on the Santa Cruz County (right bank) side of the Pajaro River, and 3.25 acres on the Monterey side (left bank). The proposed bench excavation project would potentially require the removal of approximately 22 trees on the right bank and 13 trees on the left bank.

Sediment Disposal Sites

The proposed project would generate approximately 336,043 cubic yards of sediment that would be deposited at the following sites. Table 3 outlines the cut volume, off haul site and distance.

Table 3 – Excavation Sites Cut Volume, Off-haul Site and Distance

Excavation Site	Receiving Site	Material Volume, CY	Off Haul Volume[1], CY	Transport Method	Off Haul Distance in Miles
1R	Buena Vista Landfill	20,093	22,102	Truck	6
2R	City of Watsonville Landfill	36,090	39,699	Truck	6.7
3R	Buena Vista Landfill	14,505	15,956	Rail	5.8
4R	Manabe-Ow Business Park	52,432	57,675	Rail	1.6
5R	Elkhorn Slough[2]	35,769	39,346	Truck	4.7
5.5R	Elkhorn Slough[2]	6,285	6,914	Truck	5.2
6R	Elkhorn Slough[2]	84,833	93,316	Truck	6.0
7R	Elkhorn Slough[2]	5,588	6,147	Truck	7.4
8R	Elkhorn Slough[2]	25,324	27,856	Truck	9.5
2L	Manabe-Ow Business Park	7,992	8,791	Rail	1.6
4L	Elkhorn Slough[2]	16,583	18,241	Truck	12.0
Total		**305,494**	**336,043**		

Note: 1 – Off haul volume assumes 10% swelling of excavated material.
2 – For planning purposes, as much as 25% may be deposited at A.R. Wilson Quarry if it is determined to be commercially marketable sand. A combined total (5R, 5.5R, 6R, 7R, 8R, & 4L) of up to 48,000 cubic yards could be sent to A.R. Wilson Quarry.
Source: County of Santa Cruz, 2011.

Manabe-Ow Business Park

The Manabe-Ow project area consists of nine parcels (Assessor's Parcel Numbers: 018-711-02, 018-711-03, 018-711-04, 018-711-05, 018-711-12, 018-711-13, 018-711-14, 018-711-15, and 018-711-16), which total 95.4 acres (see Figure 5). The site is located east of and adjacent to

Highway 1 and roughly one-half mile northwest of West Riverside Drive (State Route 129). Ohlone Parkway is a major north-south arterial extending through and providing access to the southern portion of the planning area. Ohlone Parkway terminates at West Beach Street south of the planning area. Loma Vista Drive provides access at the north edge of the planning area and Santa Victoria Avenue provides access to the residential portion of the planning area east of Ohlone Parkway.

On October 26, 2010, the Watsonville City Council certified the Final Environmental Impact Report and adopted the Specific Plan that will guide development of the business park. This Initial Study will rely on the previously certified EIR for impacts associated with the placement of sediment within the Manabe-Ow site according to §15063(b)(1)(C) of the CEQA Guidelines.

This page intentionally left blank.

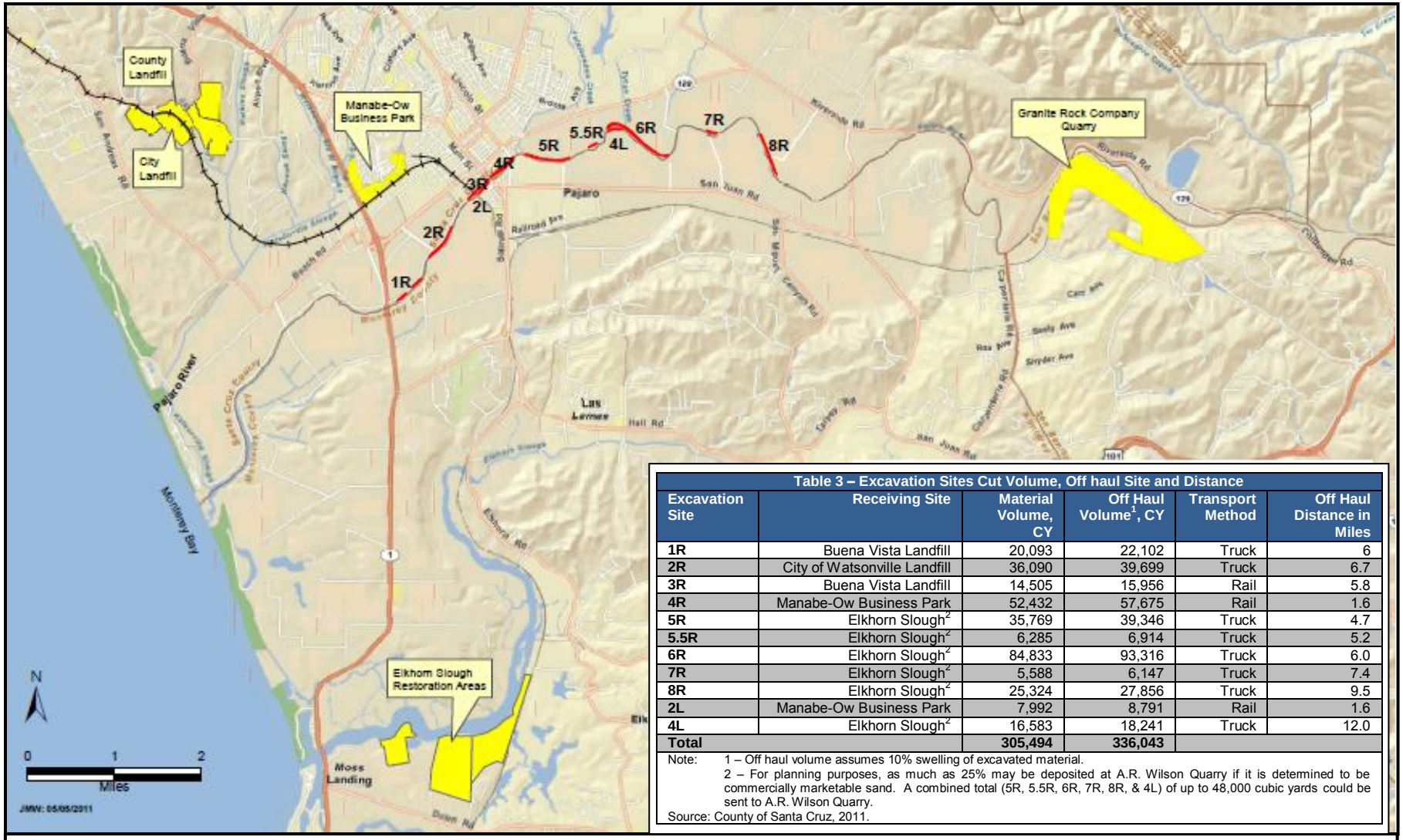


Table 3 – Excavation Sites Cut Volume, Off haul Site and Distance

Excavation Site	Receiving Site	Material Volume, CY	Off Haul Volume[1], CY	Transport Method	Off Haul Distance in Miles
1R	Buena Vista Landfill	20,093	22,102	Truck	6
2R	City of Watsonville Landfill	36,090	39,699	Truck	6.7
3R	Buena Vista Landfill	14,505	15,956	Rail	5.8
4R	Manabe-Ow Business Park	52,432	57,675	Rail	1.6
5R	Elkhorn Slough[2]	35,769	39,346	Truck	4.7
5.5R	Elkhorn Slough[2]	6,285	6,914	Truck	5.2
6R	Elkhorn Slough[2]	84,833	93,316	Truck	6.0
7R	Elkhorn Slough[2]	5,588	6,147	Truck	7.4
8R	Elkhorn Slough[2]	25,324	27,856	Truck	9.5
2L	Manabe-Ow Business Park	7,992	8,791	Rail	1.6
4L	Elkhorn Slough[2]	16,583	18,241	Truck	12.0
Total		**305,494**	**336,043**		

Note: 1 – Off haul volume assumes 10% swelling of excavated material.
2 – For planning purposes, as much as 25% may be deposited at A.R. Wilson Quarry if it is determined to be commercially marketable sand. A combined total (5R, 5.5R, 6R, 7R, 8R, & 4L) of up to 48,000 cubic yards could be sent to A.R. Wilson Quarry.
Source: County of Santa Cruz, 2011.

Figure 5 – Fill Material Receiving Site Locations

Sources: Northwest Hydraulic Consultants and the County of Santa Cruz, 2011.

This page intentionally left blank.

The Manabe-Ow Specific Plan requires a combination of fill and building flood proofing. Flood proofing would include raising building pad elevations with imported fill to a minimum of within three feet of the base flood elevation (BFE). Within the West Business Park Planning area, building pads would be filled to an elevation of approximately 17 to 18 feet. Within the East Business Park Planning Area where the flood zone is higher, building pads would need to be set at 19 to 20 feet in elevation. Based on current topographic conditions, this would require approximately 225,000 cubic yards of fill for the entire project. The Pajaro Bench Excavation project proposes to provide the Manabe-Ow site with approximately 66,000 cubic yards of fill material during Phase 1 of the proposed project. Approximately 66,000 cubic yards of sediment would be placed at the site in an effort to elevate the planned building pads.

Buena Vista Landfill

The Buena Vista Landfill is located at 1231 Buena Vista Drive near Watsonville, approximately one mile south of Highway 1 (see Figure 5). The Buena Vista Landfill is a Class III landfill operating under a State of California Solid Waste Facilities Permit from the CIWMB (California Integrated Waste Management Board), now CalRecycle (44-AA-0004). In addition, the County of Santa Cruz has issued a Development Permit (83-1503-DP) for the landfill. The Buena Vista Landfill is a recipient of the Solid Waste Association of 1997 Silver Award for Landfill Excellence. Materials accepted at the Buena Vista Landfill are Class III non-hazardous residential, commercial and industrial waste, dewatered sewage sludge and low-level petroleum contaminated soils. The existing permit from the CIWMB/CalRecycle currently allows the placement of the proposed sediment. Approximately 35,000 cubic yards of sediment would be deposited at the landfill for use as cover or during reclamation following closure.

City of Watsonville Landfill

The City of Watsonville Landfill is located at 730 San Andreas Road in Watsonville approximately 1 mile south of Highway 1 (see Figure 5). The City of Watsonville Landfill is a Class III landfill operating under State of California Solid Waste Facilities Permit from the CIWMB, now CalRecycle (44-AA-0002). The existing permit from the CIWMB/CalRecycle currently allows the placement of the proposed sediment. Approximately 36,000 cubic yards of sediment would be deposited at the landfill for use as cover.

Elkhorn Slough Sites

The proposed stockpile site for the planned salt marsh restoration is located within the Elkhorn Slough National Estuarine Research Reserve (ESNERR) in Monterey County. As a partner to the ESNERR, the Elkhorn Slough Foundation supports outreach, education and research. However, their role as a land trust is their main focus. The Foundation manages nearly 4,000 acres in the Elkhorn watershed and has been directly involved in the restoration of key habitats including tidal wetlands, coastal prairie, oak woodlands, freshwater ponds, riparian corridors and maritime chaparral.

The Tidal Wetland project (TWP), an initiative of the ESNERR began in 2004. TWP is a collaborative effort to develop and implement strategies to conserve and restore estuarine habitats in the Elkhorn Slough watershed.

The Elkhorn Slough Tidal Wetland Strategic Plan (2007) published the following findings of this planning process: (1) Over the past 150 years, human actions have resulted in substantial tidal marsh loss, subtidal habitat erosion, increased levels of pollution and increased numbers of invasive species; (2) Approximately 50 percent, or 1,000 acres, of the tidal marsh in Elkhorn Slough has been lost since 1870 due to human activities; (3) Bank erosion rates along the main channel of Elkhorn Slough range from 1 to 2 feet per year; (4) These rapid changes affect the

estuary's animals and plants, threaten the biodiversity of the estuary and impact neighboring private lands, public access sites, and other infrastructure; and (5) Marsh loss and habitat erosion will likely continue at high rates if no action is taken.

The Tidal Wetland project's overarching goals for the Elkhorn Slough Estuary strive to: (1) Conserve the highest quality estuarine habitats and native biodiversity; (2) Restore and enhance estuarine habitats with special emphasis on those with the highest loss rates; and (3) Restore and enhance natural processes to sustain a more stable and resilient estuarine system.

Both the ESNERR Seal Bend (APN 133-181-002) and Minhoto Hester's (APN 133-181-004) stockpile areas are located off of Dolan Road, in Moss Landing (see Figure 5). The Seal Bend stockpile area is approximately 12.7 acres in size and has been used to house livestock. The Minhoto Hester's stockpile area is approximately 35 acres in size and is currently planted in annual barley, recently developed as a vegetated buffer between the adjacent tidal wetlands and agriculture. Up to 192,000 cubic yards of sediment would be deposited at these sites in preparation for use by the Elkhorn Slough Foundation for tidal marsh restoration project.

A.R. Wilson Quarry

A small portion of the 192,000 cubic yards of sediment planned to be placed at Elkhorn Slough may be sent to A.R. Wilson Quarry if it is determined to be commercially marketable material. A.R. Wilson Quarry is located at 1900 Quarry Road, End of Quarry Road, in Aromas, California in San Benito County. Sediment sampling of the material is proposed to be conducted by Graniterock prior to project approval to determine the presence and location of commercially marketable sand. If it is determined that no marketable sand exists in the sediment deposits to be excavated, all of the 192,000 cubic yards of sediment would be sent to Elkhorn Slough. For planning purposes, it is being assumed that as much as 25 percent (48,000 cubic yards) of the material would go to A.R. Wilson Quarry.

Project Staging Areas

Staging Area – City of Watsonville

A vacant City of Watsonville parcel (017-302-24) located adjacent to the levee immediately downstream of the Riverside Park on East Front Street would be used as a staging area during the excavation of sites 3R and 4R. The use of the site has been coordinated with the City. The staging area would be used for storage of construction equipment and supplies during excavation activities.

Staging Area – Outside of Urban Area

All staging of equipment for the remaining excavation sites (1R, 2R, 5R, 5.5R, 6R, 7R, 8R, 2L, and 4L) within both Santa Cruz and Monterey counties would occur within the right-of-way located immediately outside of the levees (i.e., adjacent to the toe of slope).

Transportation of Sediment to Receiver Sites

Excavated bench material would potentially be transported to five receiver sites as discussed above. Transportation of excavated material from the eleven benches located adjacent to the main channel of the Pajaro River would generate up to an estimated 260 vehicle trips per day during the dry season (up to an average of 32 hourly trips). In annual terms, the proposed project would generate up to an estimated 27,900 annual maintenance vehicle trips in Year 1 and 37,000 vehicle trips in Year 2, or up to an estimated 64,800 annual vehicle trips if the work were to be completed in one year (see Table 4).

Table 4: Sediment Transport Scenarios						
Scenario	**Total Trips**			**Total Vehicle Miles Travelled**		
	Year 1	Year 2	Total	Year 1	Year 2	Total
1. Sediment transported by heavy-duty trucks under a two-year work window to all disposal sites.	27,808	36,970	64,778	141,350	471,455	612,805
2. Sediment transported by heavy-duty trucks under a one-year work window to all disposal sites.	64,778			612,805		
3. Sediment transported by rail and heavy-duty trucks under a two-year work window. The excavated material at sites 3R, 4R, and 2L would be transported by rail to the disposal sites rather than by heavy-duty trucks.	15,124	36,970	52,094	98,757	471,455	570,212
4. Sediment transported by rail and heavy-duty trucks under a one-year work window. The excavated material at sites 3R, 4R, and 2L would be transported by rail to the disposal sites rather than by heavy-duty trucks.	52,094			570,212		
Source: Fehr & Peers, August 2011.						

Tree Removal and Fish Habitat Enhancement

A total of 35 mature riparian trees would be removed during vegetation clearing prior to bench excavation activities (see Table 5). Of these trees, 29 cottonwoods, five willows, and one box elder would be removed. The project would construct steelhead habitat enhancement features along the banks of the Pajaro River using salvaged wood from mature native trees removed during vegetation clearing. Habitat features composed of salvaged wood would be placed slightly above the summer water level. Fish habitat enhancement features would be placed at 19 locations within the project area. Single, double and triple root wads and logs would be anchored into the banks of the river at eight excavation sites and cabled down to boulders. Figure 6 provides typical details of a fish habitat enhancement area.

Revegetation and Erosion Control

The proposed riparian revegetation efforts would be phased. Erosion control and hydroseeding would be completed no later than October 15 immediately following earth moving activities. The majority of proposed willow (*Salix* spp.) and black cottonwood (*Populus trichocarpa*) short cuttings would be planted the first winter after construction (Year 1). Whereas, the proposed container stock and live transplants or divisions would be planted the second fall and winter after construction is complete (Year 2). The revegetation plan is contained in its entirety as Attachment 6.

Cuttings would include black cottonwood, red willow (*Salix laevigata*), Arroyo willow (*S. lasiolepis*), and sandbar willow (*S. exigua*). Cuttings would be collected from the Pajaro River or nearby Watsonville slough outside of the nesting season (see Table 6).

As part of soil erosion control, the total square footage of each excavation site would be hydroseeded by October 15 the first fall after construction (Year 1). Two mixes would be applied using the 2-step process, Mix A and Mix B (see Table 7). Mix A would be composed of sterile wheat (*Elymus x Triticum*), meadow barley (*Hordeum brachyantherum*), California brome (*Bromus carinatus*), white yarrow (*Achillea millefolium*) and Hookers primrose (*Oenothera elata* ssp. *hookeri*). Sterile wheat and the components listed below would be provided by a professional hydroseeder for both Mix A and Mix B; whereas, the County or its agents would provide the seed of the native species for Mix A. Mix B is 100% sterile wheat.

Mix A would be applied to the newly constructed 3:1 riverbanks (11.4 acres), and Mix B would be applied to the excavated benches (27.7 acres). Sterile wheat is intended to cover well the first year, allowing the site seed bank to respond in subsequent years.

This page intentionally left blank.

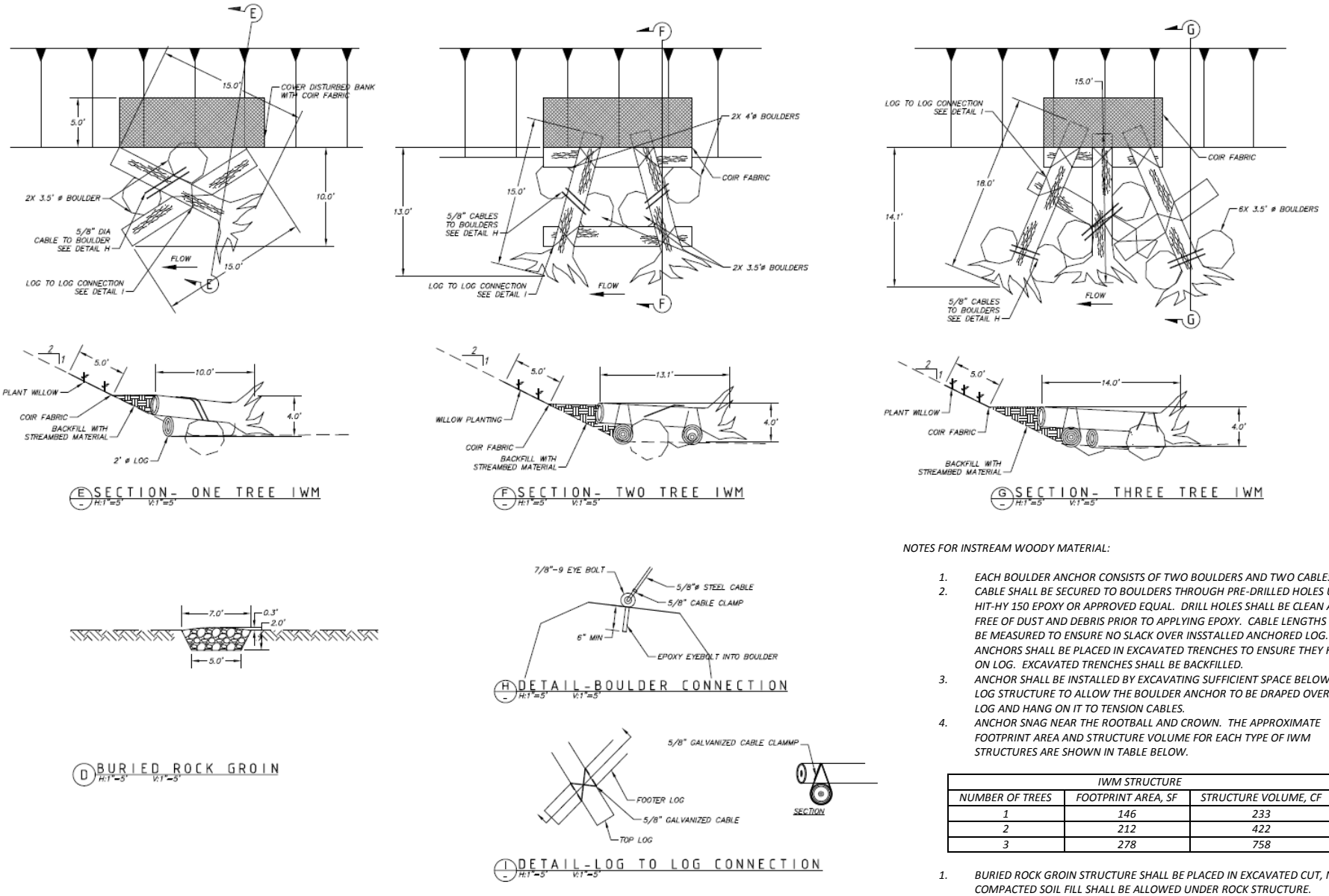


Figure 6 – Typical Details of a Fish Habitat Enhancement Area

NOTES FOR INSTREAM WOODY MATERIAL:

1. *EACH BOULDER ANCHOR CONSISTS OF TWO BOULDERS AND TWO CABLES.*
2. *CABLE SHALL BE SECURED TO BOULDERS THROUGH PRE-DRILLED HOLES USING HIT-HY 150 EPOXY OR APPROVED EQUAL. DRILL HOLES SHALL BE CLEAN AND FREE OF DUST AND DEBRIS PRIOR TO APPLYING EPOXY. CABLE LENGTHS MUST BE MEASURED TO ENSURE NO SLACK OVER INSSTALLED ANCHORED LOG. ANCHORS SHALL BE PLACED IN EXCAVATED TRENCHES TO ENSURE THEY HAN ON LOG. EXCAVATED TRENCHES SHALL BE BACKFILLED.*
3. *ANCHOR SHALL BE INSTALLED BY EXCAVATING SUFFICIENT SPACE BELOW THE LOG STRUCTURE TO ALLOW THE BOULDER ANCHOR TO BE DRAPED OVER THE LOG AND HANG ON IT TO TENSION CABLES.*
4. *ANCHOR SNAG NEAR THE ROOTBALL AND CROWN. THE APPROXIMATE FOOTPRINT AREA AND STRUCTURE VOLUME FOR EACH TYPE OF IWM STRUCTURES ARE SHOWN IN TABLE BELOW.*

IWM STRUCTURE		
NUMBER OF TREES	*FOOTPRINT AREA, SF*	*STRUCTURE VOLUME, CF*
1	*146*	*233*
2	*212*	*422*
3	*278*	*758*

1. *BURIED ROCK GROIN STRUCTURE SHALL BE PLACED IN EXCAVATED CUT, NO COMPACTED SOIL FILL SHALL BE ALLOWED UNDER ROCK STRUCTURE.*
2. *THE OBJECTIVE OF ROCK PLACEMETN IS TO CREATE AN INTERLOCKING MATRIX WITH EACH ROCK SUPORTED AT MINIMUM OF THREE POINTS OF CONTACT. NO MOVEMENT SHALL BE DETECTED WHEN WALKED ON BY FIELD ENGINEER.*
3. *ROCK SIZE GRADATION SHALL BE AS SHOWN IN TABLE BELOW*

BURIED ROCK GROIN GRADATION	
PERCENT FINER	*PARTICLE DIAMETER, IN*
30%	*7*
50%	*8*
100%	*17*

This page intentionally left blank.

Adaptive Management Plan for Vegetation Maintenance

Following a five year plant establishment period for the excavated benches, the following vegetation maintenance would continue as outlined in the CDFG 1602 Streambed Alteration Agreement (Notification Number 1600-2004-0371-3), dated August 4, 2004, and from Table 3.4-1 of the Final EIR for the Pajaro River and Salsipuedes and Corralitos Creeks Management and Restoration Plan, Santa Cruz County, California (Harding ESE. 2002).

Table 5:
Trees to be Removed at Excavation Sites

Tree No.	Species	Tree DBH (Inches)	Site Location
Santa Cruz County			
None	--	--	1R (Portion)
2	Cottonwood	17.5	2R
3	Cottonwood	27.5	
4	Cottonwood	20.5	
5	Cottonwood	33.5	
6	Cottonwood	33	
11	Cottonwood	24	3R
None	--	--	4R
15	Cottonwood	17.5	5R
16	Willow	16 & 18	
17	Cottonwood	28	
18	Willow	21	
19	Cottonwood	23	
20	Cottonwood	23	
21	Cottonwood	24	
22	Willow	28	
25	Cottonwood	25.5	
27	Cottonwood	23	
29	Cottonwood	24	
31	Cottonwood	23	5.5R
40	Box Elder	14	6R
41	Cottonwood	12	
42	Cottonwood	23	
55	Cottonwood	35.5	8R (Portion)
Monterey County			
None	--	--	1R (Portion)
214	Cottonwood	25	2L
217	Cottonwood	22.5	
218	Cottonwood	27	
219	Cottonwood	20.5	
220	Cottonwood	21	
264	Willow	22	4L
265	Cottonwood	21.5	
268	Cottonwood	22.5	
269	Cottonwood	19	
None	--	--	7R
62	Willow	28	8R (Portion)
63	Cottonwood	28.5	
65	Cottonwood	26	
66	Cottonwood	19 & 22	

Source: NHC, 2011.

- Prior to mowing of the benches, a qualified biologist would inspect the areas to be mowed and sprayed where the benches are greater than 32 feet wide. In these areas, sprouts of native sycamore, cottonwood and box elder would be flagged for retention so that an eventual spread of trees every 40 feet would be established. The numbers, survival and approximate locations of the sprouts would be recorded and reported to CDFG, after the second spraying in June.
- A maximum average of 60 shoots per 0.1 mile would be removed along the lower channel bank of the Pajaro River for all work. Therefore a total maximum of 4,500 shoots (7.5 miles time 60 shoots per 0.1 miles = 4,500 shoots) would be removed annually along the lower channel bank.
- On the toe of the lower channel bank of the Pajaro River, one willow clump would be flagged, marked, and retained on average of at least one clump every 40 feet (approximately 1,000 trees total over the 7.5 mile reach) and allowed to grow to maturity. Following bench excavation, the County would provide to CDFG a map showing the location of all such retained tree clumps and a written description of how the trees were marked and what measures would be implemented to ensure these trees are retained.
- A riparian buffer zone, five feet in width, would be established on each side of the low flow channel. In this buffer, only vegetation that is greater than three inches in diameter would be removed.
- Channel benches and upper channel bank (top eight feet); both banks. Mowing twice annually, in March and June, followed by an herbicide application.
- Lower channel bank (between lower limit of the upper eight feet and the toe of slope), both banks. Vegetation over three inches in diameter would be manually cut, mowed and/or knocked down with mechanical equipment. Removal would average 20-40 sprouts and shoots every 0.1 mile. At least 10 feet of vegetation would be left on the lower channel bank.

Table 6: Master Planting List for the Pajaro River (all excavation sites combined)[1]					
Scientific Names	**Common Names**	**Container Type or Cuttings[2]**	**Estimated Quantities**	**Approximate On-Center Spacing[3] (feet)**	**Planting Location**
Trees					
Acer negundo	Box Elder	treepot	456	12.0 – 15.0	Mid Bank
Alnus rubra or *rhombifolia*	Red or White Alder	treepot	51	12.0 – 15.0	Bench Lower Bank
Platanus racemosa	California Sycamore	treepot	42	12.0 – 15.0	Lower Bank
Populus trichocarpa	Black Cottonwood	Short cuttings	643	10.0 – 12.0	Bench Lower Bank
Quercus agrifolia	Coast Live Oak	treepot, acorns	24	12.0 – 15.0	Upper Bank
Salix spp. (i.e. S. lasiolepis, S. laevigata and lasiandra)	Arroyo, Red, and Yellow Willow	short cuttings	2155	8.0 – 10.0	Bench Channel Edge
Sambucus nigra	Blue Elderberry	treepot	90	12.0 – 15.0	Upper Bank
Shrubs					
Artemisia californica	California Sage	1-gallon	528	8.0	Upper Bank
Artemisia douglasiana	Mugwort	1-gallon	909	8.0	Mid Bank
Baccharis pilularis	Coyote Brush	treepot	420	12.0	Mid Bank Upper Bank
Baccharis salicifolia	Mule Fat	treepot	84	10.0	Bench
Cornus sericea	Creek Dogwood	treepot	48	10.0 – 12.0	Lower Bank
Frangula californica	Coffeeberry	treepot	198	10.0 – 12.0	Mid Bank Upper Bank
Rosa californica	Wild Rose	1-gallon	474	8.0	Mid Bank
Rubus ursinus	California Blackberry	32ed32n	1827	5.0	Lower Bank
Salix exigua	Sandbar Willow	short cutting	130	4.0- 5.0	Bench Channel
Perennial Herbs & Grasses					
Baccharis douglasii	Marsh Baccharis	1-gallon	264	5.0	Lower Bank
Cyperus eragrostis	Tall Cyperus	divisions	40	8.0	Bench Channel Edge
Juncus effusus ssp. *pacificus*	Bog Rush	divisions	230	6.0	Channel Edge
Leymus triticoides	Creeping Wild Rye Grass	1-gallon	489	5.0	Mid Bank
Oenothera elata ssp. *hookeri*	Hooker's Primrose	1-gallon	160	4.0	Mid Bank
Bolboschoenus fluviatilis	River Tule	divisions	136	8.0	Bench
Schoenoplectus robustus	Prairie Bulrush	divisions	181	8.0	Bench
Schoenoplectus californicus	California Tule	divisions	435	8.0	Bench Channel Edge
Sparganium eurycarpum	Broad-fruited Burreed	divisions	94	8.0	Bench Channel Edge

Notes:
1. Total Area Bench 27.73 acres; Total Area Bank 11.37 acres
2. Container sizes: treepots @ 4" by 4" by 14" deep; depots @ 2.5" by 2.5" by 10 " deep.
3. Exact spacing and quantities will need to be field fit for each revegetation area, depending on existing vegetation and rate of natural recruitment. Distances are approximate guidelines.
   California blackberry will be planted 3 per larger planting basin (3 ft. by 6ft.). Same applies to creeping wild rye grass, and mugwort.

Source: Native Vegetation Network, 2011.

- Channel bottom, entire reach. Removal of an average of 100-200 sprouts every 0.1 mile of channel. Removal of vegetation greater than three inches in diameter in the riparian buffer zone along the low flow channel. Woody vegetation would be manually cut, mowed and/or knocked down with mechanical equipment.

Table 7: Hydroseed Mixes for Pajaro River Excavation Sites		
Common name	**Scientific Name**	**Application Rate**
Hydroseed Mix A (3:1 Banks, Total Acreage, 11.4 acres)		
White Yarrow	*Achillea millefolium*	1 lb. per acre
California Brome	*Bromus carinatus*	10 lbs. per acre
Meadow Barley	*Hordeum brachyantherum*	10 lbs. per acre
Sterile Wheat	*Elymus X Triticum*	30 lbs. per acre
Hooker's Primrose	*Oenothera elata* ssp. *hookeri*	1 lb. per acre
Total		52 lbs. per acre
Hydroseed Mix B (Level Benches, Total Acres, 27.7 acres)		
Sterile Wheat	*Elymus X Triticum*	50 lbs. per acre
Source: Native Vegetation Network, 2011.		

This page intentionally left blank.

III. ENVIRONMENTAL REVIEW CHECKLIST

A. GEOLOGY AND SOILS

Would the project:

		Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
1.	Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
	A. 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? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☒	☐
	B. Strong seismic ground shaking?	☐	☐	☒	☐
	C. Seismic-related ground failure, including liquefaction?	☐	☐	☒	☐
	D. Landslides?	☐	☐	☒	☐

***Discussion (A through D)*:**

Environmental Setting

Regional Geology and Tectonics

The regional geologic setting of the proposed project is primarily controlled by conditions typical of the Coast Ranges Geomorphic Province of California. The physiography of the province is characterized by northwest-southeast trending ranges of hills or low mountains and intervening valleys. This trend in the regional topography is imposed on the landscape as a consequence of the structural geology and tectonics at the boundary of the North American and Pacific lithospheric plates. Under the current sense of plate motion, the Pacific plate is moving northward relative to the North American Plate, creating a “transform” boundary. The motion of right-lateral movement of the plates within the San Francisco Bay Region is distributed across several sub-parallel regional fault zones that comprise the San Andreas Fault System. These fault zones are seismically active and capable of generating large earthquakes (earthquake magnitudes greater than 6.5).

The Coast Ranges are predominantly underlain by bedrock of Mesozoic Franciscan Assemblage, a complex suite of primarily marine sedimentary and volcanic rocks that have undergone low-grade metamorphism. These rock formations were folded and faulted during

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

tectonic subduction of an oceanic plate with the North American Plate during the period from about 140 to 28 million years ago (Harden 2001). The Coast Ranges also include folded and faulted younger sedimentary and volcanic rocks. Younger Quaternary sediments have been deposited with stream valleys (including the Pajaro River) and at the margin of Monterey Bay.

The study area is more specifically located in the lower portion of the watershed of the Pajaro River. The watershed can be generally split into three topographic environments: 1) the lower watershed west of the San Andreas Fault; 2) the middle watershed within the southern Santa Cruz Mountains and the San Andreas Fault Zone; and 3) the upper watershed within and surrounding the southern Santa Clara Valley. The upper watershed drains the hills on the western margin of the Santa Clara Valley (and eastern flank of the Santa Cruz Mountains) that are underlain by sedimentary and volcanic rocks of the Franciscan Complex and younger Tertiary sedimentary rocks. The eastern margin of the valley is predominantly underlain by sedimentary rocks of the Great Valley Sequence. The broad valley of the upper watershed is underlain by alluvial and lake deposits of Pleistocene Lake San Benito (Jenkins 1973).

West of Pajaro Gap, the river emerges from the Santa Cruz Mountains and flows into the broad alluvial valley of the lower watershed. The valley is underlain by a thick sequence of Quaternary and Holocene alluvium. The recent geologic history of the lower watershed is relatively complex and reflects stream response to active tectonism. Prior to its present course, the lower Pajaro River apparently flowed through the valley formed along Elkhorn Slough. Right-lateral movement of the San Andreas Fault (and possibly landsliding) fault appears to have dammed the Pajaro River forming Pleistocene Lakes San Benito and San Juan east of the fault. Progressive movement on the fault displaced the Pajaro Gap northwestward to its present position. At some point in the recent geologic past, flow in the Pajaro River was shifted and discharged into the ancestoral course of Corralitos Creek or its tributaries. Evidence of lake deposits and shorelines in the lower Pajaro Valley suggests that a lake formed east of the Zayante Fault which trends northwest-southeast through the central portion of the lower watershed (Jenkins 1973).

Project Area Geology and Geomorphology

The lower Pajaro River flows through a wide, nearly flat, east-west trending valley between the western flank of the Santa Cruz Mountains and Monterey Bay. The overall topography of the valley is nearly flat and generally slopes westward (i.e., in the downstream direction). The stream banks are moderately steep. Levees, constructed for flood control, are located along much of the course of the river and form artificial slopes. The valley is filled with a thick sequence of relatively recent alluvial deposits.

Geologic mapping indicates that the majority of the project area is underlain by two Holocene alluvial deposits identified as Quaternary Younger flood-plain deposits (Qyf) and Quaternary Older flood-plain deposits (Qof) (Brabb 1986). These sediments were transported and deposited by the Pajaro River and its tributaries. The Qyf unit generally consists of heterogeneous deposits of sand and silt, commonly containing relatively thin discontinuous layers of clay. Thickness of the younger alluvium is generally less than 20 feet. The Qof unit consists of unconsolidated, moderately to poorly sorted sand, silt, and gravel, with layers of silty clay. The relatively fine-grained texture of the alluvial deposits may reflect deposition of lake sediment from Pleistocene Lakes San Benito and San Juan carried by the Pajaro River. These deposits also suggest the presence of former lakes on the modern valley floor. Significant sand and gravel deposits in the lower portions of the valley fill serve as a major groundwater aquifer beneath the Pajaro Valley. The Qof unit thickness has been measured on the order of 200 feet beneath parts of the valley.

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

The Qyf and Qof fluvial sediments were generally deposited along the present course of the Pajaro River. The river valley incised into older Quaternary deposits referred to as the Aromas Sand (Qa) and marine terrace deposits (Qt). These units are exposed on the eastern, and southern and northern margins of the lower Pajaro valley and found buried beneath the Qf and Qof deposits in the central portion of the valley. The Aromas Sand is comprised of deeper fluvial deposits overlain by eolian (wind transported) deposits. The unit can be up to 800 feet thick in the western portion of the study area and overlie the Purisima Formation (Tp), a Miocene to Pliocene) sedimentary rock (Johnson et al. 1988).

Faults and Seismic Hazards

The State of California considers a fault segment historically active if it has generated earthquakes accompanied by surface rupture during historic time (i.e., approximately the last 200 years). A fault that shows evidence of movement within Holocene time (approximately the last 11,000 years) is defined as active. A fault segment is considered potentially active if there is evidence of displacement during Quaternary time (approximately the last 2 million years) (Hart and Bryant 1997).

Faults within the project vicinity are shown on Figure 7. Although it is not located immediately within an active fault zone as defined by the Alquist-Priolo Fault Zoning Act (APFZA), the area has the potential to experience moderate ground shaking during earthquakes generated on regional active faults. The following discussion summarizes the characteristics of regional active faults that are expected to generate earthquakes that may cause significant seismic shaking within the project area.

San Andreas Fault

The San Andreas Fault Zone (about 1.2 miles east of the eastern margin of the project area) is the most well-defined and most intensely studied fault within the region. The fault extends over 800 miles from the Salton Sea northwestward to Cape Mendocino. In northern California, the San Andreas Fault Zone is divided into four discrete segments: North Coast – North (NCN), North Coast – South (NCS), Peninsula (PIN), and Santa Cruz Mountain (SCM) segments. This portion of the fault zone extends from San Juan Bautista in the south to Punta Gorda and all segments ruptured during the 1906 (M7.7 to M8.3) San Francisco earthquake (USGS 2008). The U.S. Geological Survey (USGS) estimates the probability of an M6.7 or greater earthquake on the North Coast segment of the San Andreas Fault Zone to be about 21 percent in the period 2007 to 2036. A rupture of all of the segments would result in a M7.9 earthquake, similar to the 1906 event.

In 1989, the M6.9 Loma Prieta earthquake occurred in the Santa Cruz Mountains. The epicenter was south of the mapped trace of the SCM segment of the San Andreas Fault and may have occurred on a subparallel trace of the fault. This earthquake caused extensive damage within the study area, including in downtown Santa Cruz and Watsonville. The earthquake generated a peak ground acceleration of 0.36g at Watsonville and MMI VIII ("severe") shaking. During the quake, the Pacific Plate (west of the fault) was displaced along the fault approximately 6.2 feet horizontally and 4.3 feet vertically (upward) relative to the North American Plate. The southern part of the San Andreas Fault Zone has a 59 percent probability of generating an M6.7 or greater earthquake in that time period (USGS 2008).

Zayante-Vergales Fault Zone

The Zayante and Vergeles faults are subparallel and about 5 miles west of the San Andreas Fault Zone. The northern portion of the Zayante-Vergales Fault Zone is identified as the

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

This page intentionally left blank.

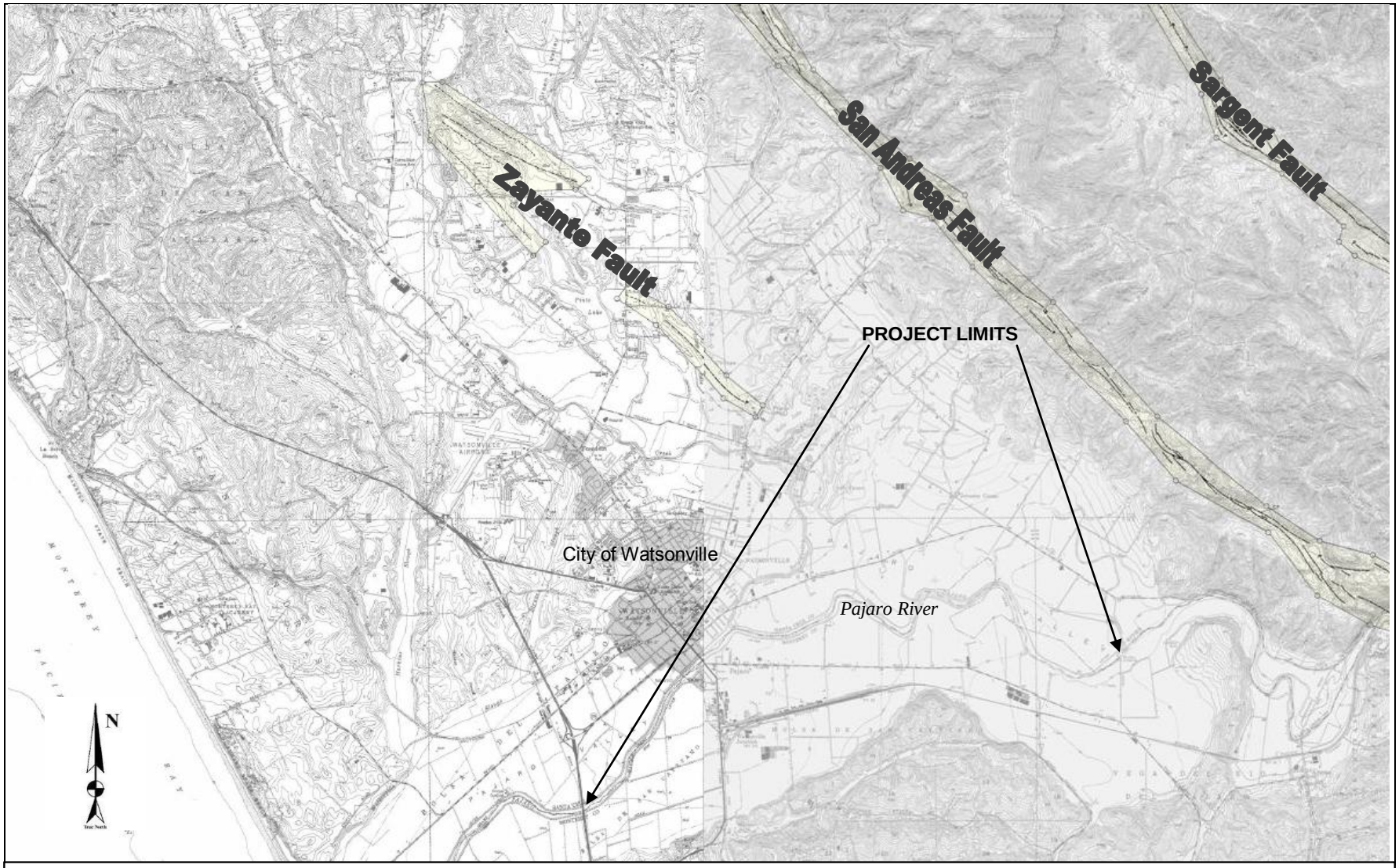


Figure 7 – Fault Lines within the Project Vicinity

Source: http://geohazards.usgs.gov/qfaults/ca/California.php

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

This page intentionally left blank.

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

Zayante Fault, which extends from Watsonville northwestward to near north of Soquel. Within the project area, the Zayante-Vergales Fault Zone is considered to be a potentially active, Quaternary fault (Jennings, 1994; USGS 2010). However, portions of the fault northwest of Watsonville are designated as active on the basis of evidence of Holocene deformation at the surface. The southern portion of the fault zone, the Vergeles Fault, displaces granitic basement rock against Pleistocene-age Aromas Sand, but has not been found to display Holocene movement. Some scientists believe its southern section may be indirectly connected to the San Andreas Fault Zone. The connection between these faults in the subsurface beneath the Pajaro River floodplain is inferred in the absence of specific surface evidence of faulting. The inferred trace of the Zayante-Vergales Fault Zone crosses the Pajaro River near the upstream end of Site 6R.

San Gregorio Fault

The San Gregorio Fault Zone is made up of several shorter faults and extends about 108 miles roughly parallel to the coast of California, from Monterey Bay northward to near Bolinas Lagoon. Except for two small segments that pass through land, the San Gregorio Fault Zone remains offshore from San Francisco to Santa Cruz. The fault zone is generally considered to have a branching connection to the San Andreas Fault Zone, merging near the Golden Gate Bridge. The San Gregorio Fault Zone is likely to accommodate some of the slip rate of the NCN segment of the San Andreas Fault Zone. The San Gregorio Fault Zone is divided into Northern and Southern segments. The southern segment of the fault zone is located about 18 miles west of the western boundary of the project area. The fault zone is capable of producing M7 to M7.5 earthquakes. The San Gregorio continues south through Big Sur and eventually connects with the Hosgri Fault Zone in the south-central portion of the state.

Calaveras Fault Zone

The Calaveras Fault Zone is east of and subparallel to the Hayward North and Hayward South segments of the Hayward-Rodgers Creek Fault Zone. The Calaveras Fault Zone is about 76 miles long and runs from Danville southward to Hollister where the fault merges with the San Andreas Fault. The zone is divided into three distinct segments, the Northern, Central and Southern segments. Evidence of surface rupture (including during an 1861 [M5.8] earthquake) and fault creep characterize activity on the Calaveras North segment. Moderate historic earthquakes and abundant microseismicity characterize the Calaveras Central segment. The Southern segment of the Calaveras Fault Zone is located along the eastern margin of the southern Santa Clara Valley, about 13 miles east of the project site. A maximum M7.2 earthquake is possible if all segments of the fault zone rupture. The overall probability of an earthquake greater than M6.7 in the period 2007 to 2036 on the Calaveras Fault Zone is about 7 percent (USGS 2008).

Sargent Fault

The Sargent Fault branches from the San Andreas Fault and extends for about 34 miles from the Lexington Reservoir in the north to just northwest of Hollister in the south. The fault is located about 3.6 miles east of project area. The Sargent Fault is a steeply dipping fault that displays evidence of strike-slip and reverse senses of displacement is a reverse fault that dips steeply to the west and is seismically active. The fault is one of several reverse faults formed in the compressional environment of a bend in the adjacent San Andreas Fault Zone. The fault is designated as an Alquist-Priolo earthquake fault zone and is considered to be capable of surface rupture and generating a M6.8 earthquake.

The project area could experience significant ground shaking during expected earthquakes on

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

the regional faults discussed above. The California Geological Survey (CGS) and the USGS have evaluated the potential levels of seismic shaking throughout the project area caused by earthquakes on known or suspected seismic sources (i.e., active faults). Maps of the expected maximum level of seismic shaking caused by any of these sources have been developed for the project vicinity (California Geological Survey, 2007). The maps indicate the expected maximum acceleration with a 10 percent probability of occurring in the next 50 years. Acceleration is measured as a fraction of the acceleration due to gravity. The expected maximum acceleration at a particular location is a function of several variables, including distance from the epicenter of a seismic event, the magnitude (i.e., energy release) of the seismic event, and the material properties of the geologic material underlying the particular location.

As described above, more than one seismic source could affect the project site. Additionally, geologic materials along the project alignment are variable and include bedrock and unconsolidated alluvial and basin fill deposits. The anticipated peak ground acceleration forecasted by USGS (2010) in the project area within the next 50 years is between 0.3 and 0.6 g.

Project Area Soils

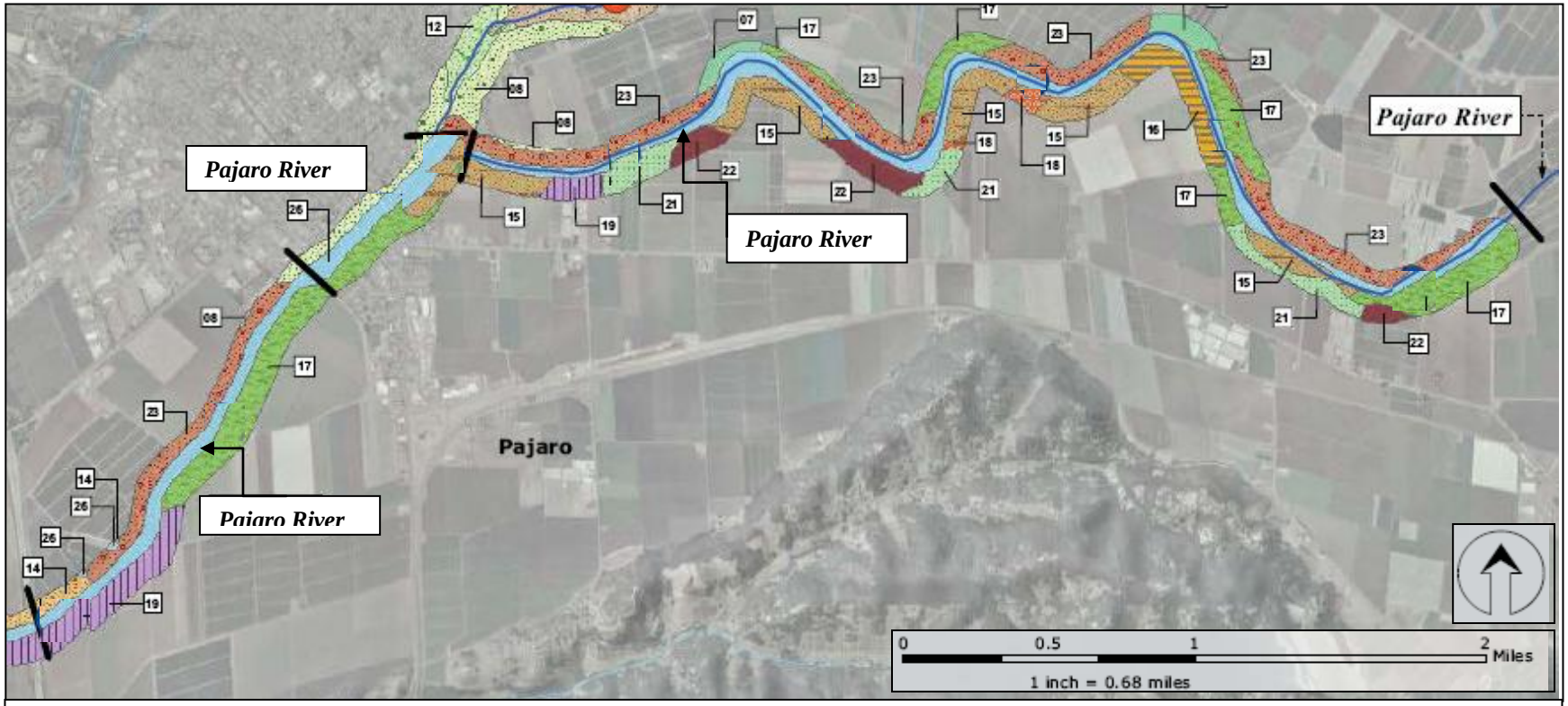
For purposes of this document, the term “soil” refers to the combination of organic and mineral material at the earth’s surface. Soil forms through a complex set of processes that include chemical and physical weathering of bedrock or sediments upon which the soil is developed; accumulation of organic matter through plant, animal, and microbe growth and decay; and accumulation of additional sediment by wind or water. The major influences on soil development are climate, topography, parent material, and time. The Natural Resource Conservation Service (formerly the Soil Conservation Service) has mapped soil types in the project area and vicinity (NRCS 2010).

The soil mapping units south of the Pajaro River were mapped for the Monterey County Soil Survey; north of the river the mapping units were delineated for the Santa Cruz Soil Survey. Due to the difference in the time periods for soil mapping and some changes in soil nomenclature, the mapping units of the two surveys are not consistent; soil mapping unit names and map unit symbols are, in most cases, different. However, as would be expected, the characteristics of the soils are similar for comparable environments. The soil mapping units within and adjacent to the project area are shown on Figure 8; the characteristics of the soils within the project area are summarized in Table 6.

The NRCS categorizes the suitability of the soils of a mapping unit for the growing of field crops, defining “land capability classes”. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive land forming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major soil enhancement techniques. Capability classification is not a substitute for interpretations that show suitability and limitations of groups of soils for rangeland, for woodland, or for engineering purposes. The capability classes range from Class 1 (most suitable soils) to Class 8 (least suitable soils) and are defined in Table 8.

Slope Stability

The downslope movement of earth materials under the force of gravity is generally referred to as “mass wasting.” Slope failure can occur as rapid movement of relatively large, discrete masses of soil and/or bedrock (“landslides”) or slow, continuous movement (“creep”). The



Soil Types

[7] *Conejo Clay Loam*

[8] *Conejo Loam*

[12] *Elder Sandy Loam*

[14] *Fluvaquentic Haploxerolls-aquic Xerofluvents Complex*

[15] *Metz Fine Sandy Loam*

[16] *Metz Loamy Sand*

[17] *Mocho Silt Loam*

[18] *Mocho Silty Clay Loam*

[19] *Pacheco Clay Loam*

[21] *Salinas Clay Loam*

[22] *Salinas Loam*

[23] *San Emigdio Variant Sandy Loam*

[26] *Water*

Figure 8 – Soil Types within the Project Area

Source: USDA, NRCS SSURGO Soil Data, Monterey and Santa Cruz County, 2006

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

This page intentionally left blank.

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

Table 8: Project Area Soils

Map Unit Symbol	Map Unit Name	Parent Material	Landform Setting	Drainage Class	Linear Extensibility	Capacity to Transmit Water	Land Capability Class (irrigated)[1,2]
121	Conejo loam	Alluvium	Terraces, alluvial fans (footslope)	Well drained	Moderate	Moderately High	IIe
122	Conejo clay loam	Alluvium	Alluvial fans, plains	Well drained	Moderate	Moderately High	I
129	Elder sandy loam	Alluvium	Plains, fans (toeslope)	Well drained	Low	Moderately high to high	I
139	Fluvaquentic Haploxerolls-aquic Xerofluvents Complex	Alluvium	Floodplains (toeslope)	Moderately well drained	Low-Moderate	Moderately low to very high	IIIw
166	San Emigdio variant sandy loam	Alluvium	Floodplains (toeslope)	Well drained	Low	High	I
Me	Metz loamy sand	Sandy alluvium	Floodplains (toeslope)	Somewhat excessively drained	Low	Moderately high to high	IIs
Mf	Metz fine sandy loam	Sandy alluvium	Floodplains (toeslope)	Somewhat excessively drained	Low	Moderately high to high	IIs
MnA	Mocho silt loam	Fine-loamy alluvium	Floodplains (toeslope)	Well drained	Moderate	Moderately high to high	I
MoC	Mocho silty clay loam	Fine-loamy alluvium	Alluvial fans (footslope)	Well drained	Moderate	Moderately High	IIe
Pa	Pacheco clay loam	Fine-loamy alluvium	Floodplains (toeslope)	Somewhat poorly drained	Moderate	Moderately high	IIw
SaA	Salinas loam	Fine-loamy alluvium	Terraces, alluvial fans (footslope)	Well drained	High	Moderately high	I
SbA; SbC	Salinas clay loam	Alluvium; fine-loamy alluvium	Alluvial fans, terraces (footslope)	Well drained	low	Moderately high	I; IIe

Notes:
1) Classes and definitions
Class I (1) soils have slight limitations that restrict their use.
Class II (2) soils have moderate limitations that reduce the choice of plants or require moderate conservation practices.
Class III (3) soils have severe limitations that reduce the choice of plants or require special conservation practices, or both.
2) Subclasses and definitions
Subclass e is made up of soils for which the susceptibility to erosion is the dominant problem or hazard affecting their use. Erosion susceptibility and past erosion damage are the major soil factors that affect soils in this subclass.
Subclass w is made up of soils for which excess water is the dominant hazard or limitation affecting their use. Poor soil drainage, wetness, a high water table, and overflow are the factors that affect soils in this subclass.
Subclass s is made up of soils that have soil limitations within the rooting zone, such as shallowness of the rooting zone, stones, low moisture-holding capacity, low fertility that is difficult to correct, and salinity or sodium content.
Sources: NRCS 2010; http://soils.usda.gov/technical/handbook/contents/part622.html

primary factors influencing the stability of a slope (i.e., susceptibility to landslides) are as follows:

- The nature of the bedrock and soil that underlie the slope
- The geometry (i.e., height and steepness) of the slope
- Rainfall and groundwater
- The presence of older landslide deposits

A landslide (also called mass movement) involves the downslope transport of soil, rock, and sometimes vegetative material en masse, primarily under the influence of gravity. Landslides occur when shear stress generated by downslope forces of overlying colluvial material or fractured rock material exceeds the shear strength of the underlying soil or rock. Landslides

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

are more likely to occur when pore pressures within the overlying material are raised by the inclusion of water within the interstitial spaces. The shear strength of the soil/rock may be reduced during high rainfall periods when materials become saturated. Landslides also may be induced by ground shaking from earthquakes. Landslides usually involve most or all of the soil profile and often part of the underlying parent material. They may take several forms, including soil creep, earthflow, slump, debris slide, debris flow, and rockfall.

Landslides occur in areas of elevated topography and steep slopes as a consequence of slope instability, either induced by seismic shaking, or a decrease in pore pressure of sediments due to elevated groundwater levels. The topography of the project area is relatively flat, the consequence of sediment deposition along the streams. The only significant slopes within the project area are the stream banks and the slope of man-made levees. Stream banks are erosional geomorphic features created by stream flows. The stability of the banks is variable and can change over time. Banks that have been subject to recent erosion are relatively steep and unstable. With time, if the banks are not exposed to frequent and/or high velocity stream flows, the steepness of the slopes will be reduced and vegetation will become better established, increasing their stability. The stability of the slopes can be compromised by natural and unnatural changes in the position of the stream channel, including lateral migration of the low flow channel, downstream migration of channel meander bends or incision of the channel (i.e., downcutting).

Although erosion is a natural process along alluvial stream channels, the rates and location of erosion change in response to modifications to the hydraulics of the steam channel caused or influenced by anthropogenic activities. Significant changes can be caused by increased runoff rates or volumes from developed land, redirection of drainage resulting from agricultural grading or urban development, construction of constrictions in the channel (e.g., bridges or culvers) and fluctuations in groundwater levels. Bank stability can be significantly affected during and immediately after major flooding events. During such events large areas of bank are subjected to relatively higher flow velocities. Increased groundwater levels adjacent to river result in increased porewater pressures which reduce the strength of the sediments which form the banks. Additionally, banks can be destabilized during strong ground shaking during earthquakes.

Following a large flood event in 1998, evidence of significant bank erosion and failure was documented along the lower Pajaro River (NHC 1998). The investigation identified 70 sites where banks had recently retreated five or more lateral feet. The bank retreat occurs as a combination of erosion of the toe (lower portion of the bank slope) by flowing water and shallow rotational landslides, or slumps. This mode of failure creates scallops or cusps in the bank; the irregularity of the bank promotes further erosion. During the period 1996 to 1998, several site experienced 50 or more feet of lateral (horizontal) migration of the banks over lengths in excess of 1,000 feet. In addition to extensive bank erosion, the high flows in 1998 resulted in overtopping and breaching of the levee on the right bank downstream of Highway 1.

Liquefaction and Ground Failure

Liquefaction is the temporary transformation of loose, saturated granular sediments from a solid state to a liquefied state as a result of seismic ground shaking and increased pore water pressures. In this process, the soil undergoes transient loss of strength, which commonly causes ground displacement or ground failure. Since saturated soils are a necessary condition for liquefaction, soil layers in areas where the groundwater table is near the surface have higher liquefaction potential than those in which the water table is deep. Clean granular materials such as sand have the highest potential for liquefaction, as compared to fine grained

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

sediments (including silt and silty clay) and coarser sediments (such as gravel).

The CGS recommends designating areas underlain by saturated Holocene alluvial sediments potentially subject to 0.1 g seismic shaking as "liquefaction hazard zones" (California Geological Survey, 2004). The susceptibility of the sediments that underlie the lower Pajaro River Valley to liquefaction has been mapped and is classified as moderate to very high (Dupre and Tinsley 1980). The project area is generally within a zone defined as having very high susceptibility to liquefaction, a condition related to the young, saturated alluvial sediments deposited along the Pajaro River. Liquefaction within the valley was documented during the 1906 San Francisco and 1989 Loma Prieta earthquakes (Dupre and Tinsley 1980; Youd and Hoose 1978; Holzer 1998). The liquefaction in 1989 resulted in extensive sand boil formation and lateral spreading, most of which occurred in younger alluvium along the river. The liquefaction and related ground failures caused cracking and other damage to the levee system within the lower Pajaro River valley (Holden undated). Approximately 3 miles of flood-control levees along the Pajaro, Salinas, and San Lorenzo rivers were damaged predominantly by bearing-capacity failures when levees settled differentially into underlying liquefied material and lateral spreading contributed to the damage to the some of the levees (Holtzer 1998). Following the earthquake, emergency repairs to the Pajaro River levees included excavation and reconstruction of up to 6 feet of levee embankments in the most severely damaged areas. The post-earthquake assessment "indicated the presence of liquefiable foundation materials throughout the Pajaro Levee system" (U.S. Army Corps of Engineers, 2009).

Regulatory Setting

Federal

Water Pollution Control Act and Clean Water Act

The federal Water Pollution Control Act of 1972 and Clean Water Act of 1977 regulate the discharge of pollutants into waters of the U.S., including the discharge of sediment to surface water as a result of erosion. The Soil Conservation Service National Engineering Handbook presents standards for planning, design, and construction of soil conservation practices to be implemented during construction projects. Additionally, the National Pollution Discharge Elimination System requires control of potential discharges of sediment and other pollutants.

State

Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Earthquake Fault Zoning Act was passed in 1972 to mitigate the hazard of surface faulting to structures for human occupancy. This state law was a direct result of the 1971 San Fernando Earthquake, which was associated with extensive surface fault ruptures that damaged numerous homes, commercial buildings, and other structures. Surface rupture is the most easily avoided seismic hazard. The Alquist-Priolo Earthquake Fault Zoning Act defines an "active" fault as a fault which exhibits evidence that surface rupture has occurred within the last 11,000 years (i.e., Holocene activity). Under this act, the state has identified active faults within California and has delineated "earthquake fault zones" along active faults. This act restricts development of structures for human habitation within the earthquake fault zones to reduce the potential for injuries and damage caused by fault rupture.

Seismic Hazard Mapping Act

Following the 1989 Loma Prieta earthquake, the State of California passed the Seismic Hazard Mapping Act in 1990. This act was passed to reduce the potential impacts on public health and safety and to minimize property damage caused by earthquakes. The act established a

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

requirement for the identification and mapping of areas prone to the earthquake hazards of liquefaction, earthquake-induced landslides, and amplified ground shaking. The act requires site specific geotechnical investigations to identify potential seismic hazards and formulate mitigation measures prior to permitting most developments designed for human occupancy within the Zones of Required Investigation. A Seismic Hazard Zone Map for the project area has not yet been published.

Local

County of Santa Cruz General Plan

Goals, Objectives and Policies regarding Environmental Constraints to development, including geological resources are found in Chapter 5, Conservation and Open Space, of the Santa Cruz County General Plan (1994). Relevant to the project are the following:

- Natural and Cultural Resources Protection Goal: To protect and restore unique, rare, threatened, endangered and other natural and cultural resources that warrant preservation because of their biological value, scarcity, scientific value, aesthetic quality or cultural significance.
- Open Space Protection Goal: To retain the scenic wooded, open space and rural character of Santa Cruz County; to provide a natural buffer between communities; to prevent development in naturally hazardous areas; and to protect wildlife habitat and other natural resources.
- Resource Utilization Goal: To provide for the conservation and environmentally sound and orderly economic use of renewable and non renewable natural resources to provide employment and income in Santa Cruz County while minimizing impacts to adjoining land uses and the environment.
    - Objective 5.9: To protect hydrological, geological and paleontological resources which stand out as rare or unique and representative in Santa Cruz County because of their scarcity, scientific or educational value, aesthetic quality, or cultural significance.
        - 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 LCP Resources and Constraints Maps where identified. Currently identified sites of Significant Hydrological, Geological and Paleontological Features are as follows:
        - Policy 5.9.2 Protecting Significant Resources Through Easements and Land Dedications: Encourage and obtain where possible Open Space Easements or other forms of land dedication to conserve as open space those areas containing hydrological, geological, or paleontological features of significant scenic or scientific value.

Goals, Objectives and Policies regarding Environmental Constraints to development, including geological hazards are found in Chapter 6, Public Safety and Noise, of the Santa Cruz County General Plan (1994). Relevant to the project are the following:

- Public Health and Safety Goal: To protect human life, private property and the environment, and to minimize public expenses by preventing inappropriate use and development or location of public facilities and infrastructure in those areas which, by virtue

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

of natural dynamic processes or proximity to other activities, present a potential threat to the public health, safety and general welfare.

- Objective 6.1, Seismic Hazards: To reduce the potential for loss of life, injury, and property damage resulting from earthquakes by: regulating the siting and design of development in seismic hazard areas; encouraging open space, agricultural or low density land use in the fault zones; and increasing public information and awareness of seismic hazards.
  - 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 6.1.2 Geologic Reports for Development in Alquist-Priolo Zones: Require a preliminary geologic report or full engineering geology report for development on parcels within Alquist-Priolo state-designated seismic review zones.
  - 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 structure within the designated fault zones.
  - Policy 6.1.4 Site Investigation Regarding Liquefaction Hazard: Require site-specific investigation by a certified engineering geologist and/or civil engineer of all development proposals of more than four residential units in areas designated as having a high or very high liquefaction potential. Proposals of four units and under and non-residential projects shall be reviewed for liquefaction hazard through environmental review and/or geologic hazards assessment, and when a significant potential hazard exists a site-specific investigation shall be required.
- Objectives 6.3, Erosion: To control erosion and siltation originating from existing conditions, current land-use activities, and from new developments, to reduce damage to soil, water, and biotic resources.
  - Policy 6.3.2, Grading projects to Address Mitigation Measures: Deny any grading project where a potential danger to soil or water resources has been identified and adequate mitigation measures cannot be undertaken.
  - Policy 6.3.3, Abatement of Grading and Drainage Problems: Require, as a condition of development approval, abatement of any grading or drainage condition on the property which gives rise to existing or potential erosion problems.
  - Policy 6.3.4, Erosion Control Plan Approval Required for Development: Require approval of an erosion control plan for all development, as specified in the Erosion Control ordinance. Vegetation removal shall be minimized and limited to that amount indicated on the approved development plans, but shall be consistent with

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

fire safety requirements.

- 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 are taken to prevent excessive sediment from leaving the property.
- Policy 6.3.6, Earthmoving in Least Disturbed or Water Supply Watersheds: Prohibit earthmoving operations in areas of very high or high erosion hazard potential and in Least Disturbed or Water-Supply Watersheds between October 15 and April 15, unless preauthorized by the Planning Director. If such activities take place, measures to control erosion must be in place at the end of each day's work.
- Policy 6.3.7, Reuse of Topsoil and Native Vegetation upon Grading Completion: Require topsoil to be stockpiled and reapplied upon completion of grading to promote regrowth of vegetation; native vegetation should be used in replanting disturbed areas to enhance long-term stability.
- Policy 6.3.8, On-Site Sediment Containment: Require containment of all sediment on the site during construction and require drainage improvements for the completed development that will provide runoff control, including onsite retention or detention where downstream drainage facilities have limited capacity. Runoff control systems or Best Management Practices shall be adequate to prevent any significant increase in site runoff over pre-existing volumes and velocities and to maximize on-site collection of non-point source pollutants.
- Policy 6.3.9, Site Design to Minimize Grading: Require site design in all areas to minimize grading activities and reduce vegetation removal based on the following guidelines:

  (a) Structures should be clustered;

  (b) Access roads and driveways shall not cross slopes greater than 30 percent; cuts and fills should not exceed 10 feet, unless they are wholly underneath the footprint and adequately retained;

  (c) Foundation designs should minimize excavation or fill;

  (d) Building and access envelopes should be designated on the basis of site inspection to avoid particularly erodible areas;

  (e) Require all fill and sidecast material to be recompacted to engineered standards, reseeded, and mulched and/or burlap covered.
- Policy 6.3.10, Land Clearing Permit: Require a land clearing permit and an erosion control plan for clearing one or more acres, except when clearing is for existing agricultural uses. Require that any erosion control and land clearing activities be consistent with all General Plan and LCP Land Use Plan policies.
- Policy 6.3.11, Sensitive Habitat Considerations for Land Clearing Permits: Require a permit for any land clearing in a sensitive habitat area and for clearing more than

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

one quarter acre in Water Supply Watershed, Least Disturbed Watershed, very high and high erosion hazard areas no matter what the parcel size. Require that any land clearing be consistent with all General Plan and LCP Land Use policies.

County of Santa Cruz Grading Ordinance

The Pajaro River Bench Excavation project is exempt from the Geologic Hazards Ordinance. Section 16.20.055 (a) states, "In areas outside of the Coastal Zone, the operation, repair and maintenance of the Pajaro river and Salsipuedes Creek levees and the areas within the levees, for the purpose of restoring flood conveyance capacity, including bench excavation, sediment removal, and similar projects shall be exempt from the provisions of Chapter 16.20 if all of the following conditions are met: (1) The work is conducted by or under the direction of the Department of Public Works; (2) The work is in accordance with a Streambed Alteration Agreement approved by the California Department of Fish & Game, to the extent that such an Agreement is required; and (3) The project has been subjected to environmental review with the County of Santa Cruz serving as lead agency."

City of Watsonville General Plan

Goals, Policies and Implementation Measures regarding Environmental Constraints to development, including seismic and other geologic hazards, are found in Chapter 12 of the City of Watsonville General Plan (1994).

- Goal 12.2, Seismic and Other Geologic Hazards: Reduce the potential for loss of life, injury, and economic damage resulting from earthquakes and associated geologic hazards such as landslides and liquefaction.
    - Policy 12.B, Seismic Hazards: The City shall use the development review process to ensure that potential geologic hazards are evaluated and mitigated prior to construction.
        - 12.B.1 Geologic Review – The City may require a geologic report prepared by a registered professional prior to the issuance of a building permit.
        - 12.B.2 Structural Design: The City shall place structural design conditions on new development to ensure that recommendations of the geotechnical evaluation are implemented.
        - 12.B.3 Setbacks: The City shall require that all structures be located a minimum of 50 feet from any active or potentially active fault trace.
        - 12.B.4 Essential Facilities Integrity: The City shall evaluate the ability of essential public facilities to maintain structural integrity as defined by the state in the event of a strong earthquake. Those facilities unable to maintain structural integrity shall be modified in order to bring them into conformance. Emergency Guidelines shall be d3eveloped in those buildings where structural modification is not feasible.
        - 12.B.7 Seismic Hazard Mapping: The City shall update current seismic hazard zone maps as new information becomes available and use those maps in the development and application of an environmental constraint matrix to evaluate proposed building sites.

County of Monterey General Plan

Goals and Policies regarding Environmental Constraints to development, including seismic and other geologic hazards, are found in Chapter 4.0 of the Monterey County General Plan (2010).

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

- Goal S-1: Minimize the potential for loss of life and property resulting from geologic and seismic hazards.
    - Policy S-1.1: Land uses shall be sited and measures applied to reduce the potential for loss of life, injury, property damage, and economic and social dislocations resulting from ground shaking, liquefaction, landslides, and other geologic hazards in the high and moderate hazard susceptibility areas.
    - Policy S-1.3: Site-specific geologic studies may be used to verify the presence or absence and extent of the hazard on the property proposed for new development and to identify mitigation measures for any development proposed. An ordinance including permit requirements relative to the siting and design of structures and grading relative to seismic hazards shall be established.
    - Policy S-1.4: The Alquist-Priolo Earthquake Fault Zoning Act shall be enforced.
    - Policy S-1.5: Structures in areas that are high risk from fault rupture, landslides, or coastal erosion shall not be permitted unless measures recommended by a registered engineering geologist are implemented to reduce the hazard to an acceptable level. Development shall be discouraged in the following areas:
        a. Areas within 50 feet of active faults. Within State or County Earthquake Fault Zones, trenching or other suitable methodology shall be used to determine the location of the fault.
        b. Areas within or adjacent to large active landslides. Large active landslides are those that are economically or technically infeasible to mitigate because of their rate of movement or size and volume.
    - Policy S-1.6: New development shall not be permitted in areas of known geologic or seismic hazards unless measures recommended by a California certified engineering geologist or geotechnical engineer are implemented to reduce the hazard to an acceptable level. Areas of known geologic or seismic hazards include:
        a. Moderate or high relative landslide susceptibility.
        b. High relative erosion susceptibility.
        c. Moderate or high relative liquefaction susceptibility.
        d. Coastal erosion and seacliff retreat.
        e. Tsunami run-up hazards.
    - Policy S-1.8: As part of the planning phase and review of discretionary development entitlements, and as part of review of ministerial permits in accordance with the California Building Code, new development may be approved only if it can be demonstrated that the site is physically suitable and the development will neither create nor significantly contribute to geologic instability or geologic hazards.
    - Policy S-1.9: A California licensed civil engineer or a California licensed landscape architect can recommend measures to reduce moderate and high erosion hazards in the form of an Erosion Control Plan.

Impacts

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.

The project area does not cross known or suspected fault rupture hazard zones as designated

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

as active by the Alquist Priolo Earthquake Fault Act (Bryant and Hart 2007). Locally, the closest recognized Holocene active fault to the project area is the San Andreas Fault Zone, which crosses the Pajaro River about 4 miles east of the upstream end of the project area. The most recent significant earthquake within the San Andreas Fault Zone was the 1989 (Magnitude 6.9) Loma Prieta Earthquake. The epicenter and characteristics of the earthquake indicate that the event may not have occurred on the main trace of the San Andreas Fault but one of the subparallel fault traces to the south. The 1989 earthquake did not result in fault rupture at the surface. Observed cracking and ground surface displacements in the Santa Cruz Mountains were generally attributed to seismically-induced mass movement (i.e., landsliding).

Although subparallel traces of the San Andreas Fault Zone have not been mapped within the project area, the mapped trace of the Zayante-Vergales Fault Zone crosses the project area between river mile 8.0 and 8.5 (Sites 4.5L, 5L, and 6R). The Zayante-Vergeles Fault zone lies west of the San Andreas Fault and extends 51 miles from the Watsonville lowlands to the Santa Cruz Mountains. This fault is not classified as an active fault under Alquist-Priolo in this location. However, the fault has been interpreted to be the source of a sequence of earthquakes (Magnitude 0.8 to M4.0) in 1998. The fault may be capable of generating surface rupture in a larger future earthquake. A maximum earthquake has not been determined for the Zayante-Vergales Fault Zone and, therefore, the amount of displacement cannot be accurately estimated at this time. However, if fault rupture at the surface occurs, the displacement could result in damage to existing levees crossing the fault. Although surface rupture cannot be prevented, possible damage to an earthen embank would be repairable. The existing levees were inspected following the 1989 Loma Prieta earthquake (Holden undated) and it is expected that a similar response would occur in the event of large magnitude earthquake on the Zayante-Vergales Fault Zone.

However, implementation of the proposed project is not expected to result in a significant impact to the existing levee structures due to the rupture of a known earthquake fault. No known Alquist-Priolo-mapped earthquake faults occur within the project area. No significant adverse impacts are anticipated.

Expose people or structures to strong seismic ground shaking.

Landslides generally occur in areas of elevated topography and steep slopes as a consequence of slope instability, either induced by seismic shaking or a decrease in pore pressure of sediments due to elevated groundwater levels. The project area overlies topography with very gentle to horizontal slopes. With the exception of localized bank failures along the Pajaro River and Salsipuedes Creek, significant slope failures are not anticipated within the project area. Although the potential for landsliding can increase under strong seismic shaking, no significant slope failures on the existing levees were identified in the area of the project during or after the 1989 Loma Prieta earthquake (Keefer 1998, Holden undated). However, it is possible that slope failures could occur during stronger seismic shaking during expected earthquakes. During the Loma Prieta earthquake, the peak ground acceleration at Watsonville was documented to be 0.4g. A Magnitude 8.3 earthquake on the San Andreas Fault Zone (similar to the 1906 earthquake) would produce stronger ground shaking (possibly up to 0.8g, a level of shaking that may induce failure of the existing levee embankments. However, the Pajaro River levee system was inspected following the Loma Prieta earthquake. Damaged levees were identified and repaired in an emergency action. It is expected that, in the future, similar response would occur. Although potentially expensive, repairs to the levees and floodwalls would be feasible.

However, implementation of the proposed project involving the excavation of bench materials

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

is not expected to result in a significant impact to existing levee structures or threaten public safety due to the high potential for strong seismic ground shaking. No significant adverse impacts are anticipated.

Expose people or structures to seismic-related ground failure including liquefaction.

The expected level of seismic shaking for the project area can induce liquefaction in some areas of the project alignment. Liquefaction is the temporary transformation of loose, saturated granular sediments from a solid state to a liquefied state as a result of seismic ground shaking and increased pore water pressures. In the process, the soil undergoes transient loss of strength, which commonly causes ground displacement or ground failure to occur. Since saturated soils are a necessary condition for liquefaction, soil layers in areas where the groundwater table is near the surface have higher liquefaction potential than those in which the water table is deep. Clean granular materials such as sand have the highest potential for liquefaction, as compared to fine grained sediments (including silt and silty clay) and coarser sediments (such as gravel). The California Geological Survey recommends designating areas underlain by saturated Holocene alluvial sediments potentially subject to 0.1 g seismic shaking as “liquefaction hazard zones” (California Geological Survey, 2004). Expected seismic shaking at the project area within the next 50 years would be between 0.3 and 0.8g, levels of shaking that are capable of causing liquefaction of the young, saturated alluvial sediments which underlain most of the project area.

Liquefaction can result in a number of ground deformations which could pose risks to the stability of the existing levees. If not confined, the loss of strength of susceptible sediments can cause the sediments to flow toward unconfined areas (i.e., “free faces”). The ground surface can serve as a “free face” and the upward flow of liquefied sediments can cause the development of sand boils or volcanoes, as pressurized sediment is ejected onto the surface. In a setting such as the project area, river banks can provide an additional free face. The flow of material from the subsurface causes a loss in subsurface volume which can result in the spreading of the ground surface, a condition known as lateral spreading. Large cracks can develop at the surface during lateral spreading. Additionally, the spreading can result in ground surface subsidence (i.e., lowering). Following liquefaction, the liquefied sediments can also undergo consolidation resulting in settlement of the ground surface.

Liquefaction and lateral spreading have occurred within the lower Pajaro River valley and within the project area. Liquefaction of the alluvial sediments within the valley was documented during the 1906 (Magnitude 8.3) San Francisco earthquake (Youd and Hoose 1978) and the 1989 (Magnitude 6.9) Loma Prieta Earthquake (Holzer 1998; Holzer et al. 1994). During the 1989 quake, the liquefaction was characterized by numerous sand boils and development of a 1.7-km-long lateral spread developed north of the river upstream of its confluence with Salsipuedes Creek. The spread occurred in response to the liquefaction of a 20-feet thick sand layer in young alluvial sediment. The result was numerous cracks with horizontal extension of up to 0.5 feet and surface settlement of up to 0.8 feet. Given the geologic conditions and the history of liquefaction, future occurrence of expected strong ground shaking in the project area is likely to result in liquefaction within the project area.

Following the 1989 Loma Prieta Earthquake, the area of the existing Pajaro River levee system was inspected by the USACE (Holden undated), the USGS (Holzer, et al. 1994) and others (Miller and Roycroft 1994). Extensive lateral spreading and settlement resulted from liquefaction of the sandy layers in the young alluvial sediments (Holzer, 1998). Significant damage to the levee system related to liquefaction and associated lateral spreading occurred and extensive repairs were required (Holden undated). Similar areas were affected by

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

liquefaction occurred during the 1906 earthquake and in earlier seismic events (Thompson et al. 2005).

Subsurface investigations following the 1989 quake indicated that the alluvial sediments and levees remain highly susceptible to future liquefaction events. In the event of future strong seismic shaking, it is expected that a similar response and levee repair to the actions taken following the 1989 earthquake would be taken.

However, implementation of the proposed project involving the excavation of bench materials is not expected to result in a significant impact to existing levee structures or threaten public safety due to the high potential for seismic-related ground failure and liquefaction. No significant adverse impacts are anticipated.

Expose people or structures to potential landslides.

Slope failure along the banks of the Pajaro River and its tributaries is occurring and is expected to continue to occur (NHC 1998). The failure of the stream banks is expected along alluvial rivers, but the rates of failure can be accelerated during adverse conditions. In the event of high flows during floods, the increased velocity of the flow can increase the erosion of the toe of the river banks. The oversteepening of the toe can result in decreased stability of the banks. Similarly, incision of the channel can result in increased bank height, a condition that could initiate bank failure. Elevated groundwater levels during prolonged high flow condition can also destabilize river banks. Removal of vegetation along river banks can cause a reduction in the overall strength of the soil mass and reduce bank stability. Any or a combination of these adverse conditions could occur in the future along the Pajaro River. Although on-going inspection of the Parjaro River levee system would be expected to continue, significant bank failures are likely to occur in the future.

However, implementation of the proposed project involving the excavation of bench materials and revegetation with native riparian species is not expected to result in a significant impact to existing levee structures or threaten public safety due to the high potential for landslides. No significant adverse impacts are anticipated.

2.	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?	☐	☐	☒	☐

***Discussion*:** See discussion under A-1.

3.	Develop land with a slope exceeding 30%?	☐	☐	☐	☒

***Discussion*:** No development would occur as part of the proposed project. In addition, no portion of the project area contains slopes greater than 30 percent. See discussion under A-1.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
4. Result in substantial soil erosion or the loss of topsoil?	☐	☒	☐	☐

***Discussion*:**

Regulatory Setting

Local

County of Santa Cruz General Plan

Goals, Objectives and Policies regarding soil erosion are found in Chapter 6, Public Safety and Noise, of the Santa Cruz County General Plan (1994). Relevant to the project are the following:

- Objectives 6.3, Erosion: To control erosion and siltation originating from existing conditions, current land-use activities, and from new developments, to reduce damage to soil, water, and biotic resources.
- 6.3.2 Grading projects to Address Mitigation Measures: Deny any grading project where a potential danger to soil or water resources has been identified and adequate mitigation measures cannot be undertaken.
- 6.3.3 Abatement of Grading and Drainage Problems: Require, as a condition of development approval, abatement of any grading or drainage condition on the property which gives rise to existing or potential erosion problems.
- 6.3.4 Erosion Control Plan Approval Required for Development: Require approval of an erosion control plan for all development, as specified in the Erosion Control ordinance. Vegetation removal shall be minimized and limited to that amount indicated on the approved development plans, but shall be consistent with fire safety requirements.
- 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 are taken to prevent excessive sediment from leaving the property.
- 6.3.6 Earthmoving in Least Disturbed or Water Supply Watersheds: Prohibit earthmoving operations in areas of very high or high erosion hazard potential and in Least Disturbed or Water-Supply Watersheds between October 15 and April 15, unless preauthorized by the Planning Director. If such activities take place, measures to control erosion must be in place at the end of each day's work.
- 6.3.7 Reuse of Topsoil and Native Vegetation upon Grading Completion: Require topsoil to be stockpiled and reapplied upon completion of grading to promote regrowth of vegetation; native vegetation should be used in replanting disturbed areas to enhance long-term stability.
- 6.3.8 On-Site Sediment Containment: Require containment of all sediment on the site during construction and require drainage improvements for the completed development that will provide runoff control, including onsite retention or detention where downstream drainage facilities have limited capacity. Runoff control systems or BMPs shall be adequate to prevent any significant increase in site runoff over pre-existing volumes and velocities

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

and to maximize on-site collection of non-point source pollutants.

- 6.3.9 Site Design to Minimize Grading: Require site design in all areas to minimize grading activities and reduce vegetation removal based on the following guidelines:

  (a) Structures should be clustered;

  (b) Access roads and driveways shall not cross slopes greater than 30 percent; cuts and fills should not exceed 10 feet, unless they are wholly underneath the footprint and adequately retained;

  (c) Foundation designs should minimize excavation or fill;

  (d) Building and access envelopes should be designated on the basis of site inspection to avoid particularly erodable areas;

  (e) Require all fill and sidecast material to be recompacted to engineered standards, reseeded, and mulched and/or burlap covered.

- 6.3.10 Land Clearing Permit: Require a land clearing permit and an erosion control plan for clearing one or more acres, except when clearing is for existing agricultural uses. Require that any erosion control and land clearing activities be consistent with all General Plan and LCP Land Use Plan policies.

- 6.3.11 Sensitive Habitat Considerations for Land Clearing Permits: Require a permit for any land clearing in a sensitive habitat area and for clearing more than one quarter acre in Water Supply Watershed, Least Disturbed Watershed, very high and high erosion hazard areas no matter what the parcel size. Require that any land clearing be consistent with all General Plan and LCP Land Use policies.

City of Watsonville General Plan

Goals and Policies regarding soil erosion are found in Chapter 9, Environmental Resources Management, of the City of Watsonville 2005 General Plan. Relevant to the project is the following:

- Goal 9.6: Preserve and protect the soil resources throughout the community and minimize the environmental degradation caused by soil erosion, construction impact on soils, and deterioration of water quality caused by suspended solids.
  - Policy E Soil Conservation: The City shall prevent degradation of local soil resources through erosion control improvement and grading guidelines.

    9.E.1 Vegetation: The City shall require that removal of vegetation from a site be limited to the area required for building, and that all exposed soils be provided with new vegetation prior to project completion.

    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.

    9.E.3 Wetland Protection: The City shall require that new construction on slopes leading towards sloughs and wetlands, maintain an undisturbed protective buffer between all cut and fill slopes and the riparian zone.

    9.E.4 Sediment Containment: The City shall require that all topsoil stored on-site during construction be contained to prevent escape of sediment from the site.

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

County of Monterey General Plan

Goals and Policies regarding soil erosion are found in Chapter 4.0, Safety Element, of the Monterey County General Plan (2010). Relevant to the project is the following:

- Goal S-2: Reduce the amount of new development in floodplains and, for any development that does occur, minimize the risk from flooding and erosion.

Impacts

Soil Erosion

The project has the potential to result in a significant impact from erosion due to the location of the proposed project. Excavation would occur between the toe of the levee and across the upper bench. The grading activities associated with the proposed project would be extensive. Large areas would be stripped of vegetation and soil would be exposed to erosion hazards. The susceptibility of soil to erosion is generally a function of six factors: soil erodibility (K-factor), rainfall-runoff (R-factor), slope (S-factor), slope length (L-factor), vegetative cover management (C-factor), and land management practices (P-factor). The soils within the study area are moderately to moderately highly susceptible to erosion with K-factors ranging from 0.17 (Metz loamy sand) to 0.43 (Mocho silt loam). The topography over the study area is generally uniform and relatively flat, conditions that would keep the S-and L-factors rather similar in the pre-and post-project conditions. During construction, the vegetative cover would be removed, generally increasing the C-factor and the erosion potential. Given the pre- and post-project site conditions being of similar use, the R-and P-factors would be similar. However, the exposure of the surface soils would significantly increase the susceptibility to erosion by runoff. Increased erosion of soil during construction could potentially result in transport of sediment away from construction areas and to the Pajaro River, possibly causing adverse sedimentation and water quality degradation.

The potential for erosion of exposed soils by wind is variable across the study area. The NRCS (2010) designates “wind erodibility groups” with values ranging from 1 (least erodible) to 8 (most erodible). Within the study area, soils with high susceptibility to wind erosion (Groups 6 through 8) include the Mocho silty clay loam, Pacheco clay loam, Salinas clay loam, and Conejo loam. These soils are concentrated along the channel of the Pajaro River.

Erosion of exposed soils during construction would be a potentially significant impact of the proposed project. The potential for significant increases in erosion hazards during construction is addressed in current regulations for the control of storm water pollution during and after excavation. The project is required to develop and implement project-specific erosion and sediment control plans for the Storm Water Pollution Prevention Plan (SWPPP) as specified by the “General Permit for Discharges of Storm Water Associated with Construction Activities (General Permit).” The General Permit presents a very specific process for construction projects to comply with the provisions of the Clean Water Act which relate to the control of pollutant discharges from “non-point” sources. The General Permit provides for compliance with the regulations through submittal of a Notice of Intent (NOI) to comply with the format and content of the process developed for the General Permit which includes the development and implementation of a SWPPP. The requirements for a SWPPP include the following documentation of the methods for implementing controls on the potential for discharge of pollutants (including sediment) that could result in degradation of water quality in receiving bodies (i.e., streams, lakes, bays, and wetlands):

- Implementation schedule

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

- Specified availability of the SWPPP at the project site
- Provisions for amending the SWPPP
- Identification (including mapping) of all potential pollutant sources and drainage patterns
- Specification of Best Management Practices (BMPs) for each source (including but not limited to areas of past releases of pollutants, storage areas for soil, waste, vehicles, construction staging areas)
- Inventory of all materials used and activities performed during construction
- Site-Specific erosion control measures (including identification of all areas of disturbance, BMPs for temporary and permanent erosion control, and an implementation schedule for BMPs)
- Methods for stabilization of disturbed areas
- Sediment control BMPs to prevent a net increase in sediment loading
- Management BMPs for control of non-storm water discharges
- Post-Construction BMPs
- Procedures for maintenance, inspection and repair of all BMPs
- Training requirements for personnel responsible for SWPPP implementation
- Specific Monitoring Program and Reporting Requirements (including storm water sampling and analysis)

The standard provisions of the General Permit include the duties to comply, mitigate, and provide information relative to implementation of the SWPPP. The permit also specifies penalties for falsification of reports or violation of permit conditions.

The existing requirements for the control of the impacts of grading and excavation would reduce the potential for adverse erosion and sedimentation to a less-than-significant level. The following mitigation measure ensures compliance with the General Permit process to provide mitigation of the potential for the project to cause discharge of storm water pollutants.

Loss of Topsoil

The proposed project would include removal of approximately 336,043 cubic yards from the benches at specific locations within the project alignment (see Table 2). These activities would involve the stripping of vegetation and the removal of the uppermost and organic soil horizons (i.e., A-horizon soils or topsoil). Soils would be removed to a depth of up to seven feet in areas of bench excavation. The excavated bench and bank areas would be revegetated as part of the proposed project.

Topsoil would not be stockpiled for reuse. Topsoil would be disposed of at either the Buena Vista Landfill or the City of Watsonville Landfill. Onsite topsoil is heavily infested with non-native upland species and would not benefit the restoration effort to reuse it. Native riparian species to be planted in the revegetation areas are well adapted to bare mineral soils found in floodways. There would be no benefit to reusing the topsoil.

Mitigation Measures

Minimize the potential for soil erosion during and after construction

GEO-1 The contract specifications for the project shall include the requirement that the contractor file for a Notice of Intent to comply with the State Water Resources Control Board's (SWRCB's) General Permit for Discharges of Storm Water Associated with

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

Construction Activities (General Permit). Prior to the initiation of construction, the contractor shall prepare a site-specific SWPPP for submittal to the SWRCB.

GEO-2 A Land Clearing Permit from the County of Santa Cruz would be required according to General Plan Policy 6.3.10. In addition, an Erosion Control Plan shall be prepared according to Section 16.22.060 of the County Code. The Erosion Control Plan shall include, as a minimum, the measures required under Sections 16.22.070, 16.22.080, 16.22.090, and 16.22.100. This would also be consistent with Section 16.12.060 of the Monterey County Code. The plan will include provisions for disturbed areas to be planted with ground cover and to be maintained to minimize surface erosion. No grading or clearing may take place on the site prior to approval of an erosion control plan for the proposed project.

A Grading Permit will be required from the County of Monterey according to Code Section 16.08.

GEO-3 Immediately following the excavation of a site, all adjacent vegetated areas disturbed during excavation activities shall be revegetated using a hydroseed mix consisting of sterile wheat. Sterile wheat shall be applied at a rate of 50 pounds per acre as has been proposed for the excavated bench areas.

Impacts would be reduced to a less than significant level with the implementation of the SWPPP, compliance with the Land Clearing Permit, and implementation of an Erosion Control Plan.

5.	Be located on expansive soil, as defined in Section 1802.3.2 of the California Building Code (2007), creating substantial risks to life or property?	☐	☐	☐	☒

***Discussion*:** No development is being proposed as part of the project. Therefore, there would be no risk to life or property associated with the proposed bench excavation activities. Therefore, no impact would occur.

6.	Place sewage disposal systems in areas dependent upon soils incapable of adequately supporting the use of septic tanks, leach fields, or alternative waste water disposal systems where sewers are not available?	☐	☐	☐	☒

***Discussion*:** The project does not propose any new development and would not require the construction of a sewage disposal system. Therefore, no impact would occur from project implementation.

7.	Result in coastal cliff erosion?	☐	☐	☐	☒

***Discussion*:** The proposed project is not located in the vicinity of a coastal cliff or bluff; and therefore, would not contribute to coastal cliff erosion. Therefore, no impact would occur from project implementation.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

B. HYDROLOGY, WATER SUPPLY, AND WATER QUALITY

Would the project:

1.	Place development within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☒

***Discussion*:**

Regional Hydrology

The proposed project is located within the lower (downstream) portion if the Pajaro River watershed. The total watershed of the Pajaro River is comprised of about 1,275 square miles of variable topographic conditions within the California Coast Ranges and interior coastal valleys of central California. Major tributaries to the Pajaro River are the San Benito River, which drains the southern end of the watershed; Uvas, Carnadero, Pescadero, Llagas, and Pacheco creeks, which flow into the Pajaro River in the southern Santa Clara Valley; and Salsipuedes and Corralitos creeks, which flow into the Pajaro Valley from the Santa Cruz Mountains. At its northern end, the watershed is oriented east-west and flows westward to Monterey Bay. The southern portion of the watershed trends northwest-southeast (conforming to the topographic fabric of the Coast Ranges) and extends about 70 miles inland to San Benito Peak.

The predominant land uses in the Pajaro River watershed include native brush and forest (25 percent), rangeland (45 percent), row crop agriculture (25 percent), and developed uses (5 percent (Harding 2001a). The Pajaro River generally forms the border between the counties of Santa Cruz and Monterey.

The upper portion of the watershed is drained by the San Benito River which flows northwestward through the southern Santa Clara River. The river collects flow from its tributaries including the Llagas, Pacheco, Uvas, Carnadero, and other creeks that drain the urbanized areas of Gilroy, Morgan Hill, and San Martin. The San Benito joins the Pajaro River near San Juan Bautista. The Pajaro River then flows westward in a narrow valley through the southern Santa Cruz Mountains. The valley forms a constriction, known as “Pajaro Gap” near Chittenden before opening into the broader coastal lower Pajaro Valley near the Monterey/San Benito County line. The major tributaries within the lower valley are Corralitos and Salsipuedes creeks. Green Valley and Casserly creeks contribute significant flows from the western Santa Cruz Mountains into the Pajaro River via College Lake and Salsipuedes Creek. The near-coastal areas are drained by sloughs, including Watsonville and Harkins Sloughs. These sloughs flow into the Pajaro Lagoon, a tidally-influenced estuary at the mouth of the Pajaro River, where it flows into the Pacific Ocean.

Regional Climate

The project area is located along the western margin of the Coast Range and the climate is dominated by the Pacific Ocean. Warm winters, cool summers, small daily and seasonal temperature ranges, and high relative humidities are characteristic of this area. With increasing distance from the ocean the maritime influence decreases. The Mediterranean climate is characterized by moderate coastal climate with mild, wet winters and generally dry summer days which are often overcast or have coastal fog and cool temperatures.

Average annual precipitation in the Pajaro River watershed varies greatly, from around 13

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

inches in the coastal valleys to 44 inches in the upper watershed. At the Watsonville Waterworks climate station, near the center of the project area, the average annual precipitation is 21.5 inches. More than half of the annual precipitation falls in the winter months (Western Regional Climate Center 2010).

The upper portions of the watersheds in the Santa Cruz Mountains, particularly Corralitos and Salsipuedes creeks, can experience heavy rainfall in the winter months (October through April). Within the watershed, snowfall is a rare occurrence, and snowmelt is not generally a significant factor in storm flows.

Project Area Hydrology and Water Resources

The lower Pajaro River flows through a wide, nearly flat, east-west trending valley between the western flank of the Santa Cruz Mountains and Monterey Bay. The project area includes the stream channels, active floodplains, and terraces along the Pajaro River and Salsipuedes Creek. The overall topography of the valley is nearly flat and generally slopes westward (i.e., in the downstream direction). The bench excavation sites are relatively level and range in elevation from about 14 feet at the west end of the project alignment to 45 feet at the east end. Levees, constructed for flood control, are located along much of the course of the river and form artificial slopes. The valley is filled with a thick sequence of relative recent alluvial deposits. The far western margin of the Pajaro River outside of the project area includes beaches and dunes that developed at the margin of Monterey Bay.

Surface Water Hydrology

Pajaro River

The lower Pajaro River valley forms a coastal watershed of about 160 square miles in the southern part of Santa Cruz County and the northern part of Monterey County; and forms the boundary between the counties (Hanson 2003). The valley is the coastal part of the larger Pajaro River Basin. The major tributaries to the lower Pajaro River are Corralitos and Salsipuedes creeks, which merge and flow into the Pajaro River at Watsonville. Within the project area, the lower Pajaro River flows in a broad alluvial valley at the margin of the Pacific Ocean. Much of the surrounding land use within and adjacent to the project area consists of extensive row-crop farming. However, two significant urban areas are located near the river. The City of Watsonville lies on the Santa Cruz side of the Pajaro River Valley and the unincorporated community of Pajaro lies on the opposite side in Monterey County.

The mouth of the Pajaro River discharges to Monterey Bay. The lower portion of the river is tidally influenced when the river mouth is open to the bay. The tidal influence extends to just upstream of the Highway 1 Bridge. Seasonally, the migration of sand along the coast results in formation of a sand spit that builds during lower flow conditions in the river, and in most years the spit closes the mouth. When the mouth is closed, the Pajaro River lagoon forms in the general area of the tidal influence. The County of Santa Cruz is permitted to artificially breach the spit and allow the lagoon to drain directly into the bay.

Daily streamflows for the mainstem Pajaro River at Chittenden have been recorded by the USGS since 1939. The USGS gage at Chittenden is the most representative of flows through the project area from Murphy Crossing Road (approximately 3 miles downstream of gage) to the Salsipuedes Creek confluence. The most useful streamflow data is for the period since 1956, when the existing upstream reservoirs (Uvas and Chesbro) began operating. Mean monthly flows since 1957 are presented in Table 9. On a yearly basis, flow in the Pajaro River is greatest from January through April and lowest from June through October. The average annual runoff past the Chittenden Gage for the 1940 to 2010 period is about 118,500 acre-feet.

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

The range of annual runoff is approximately 850-fold, ranging from 768 acre-feet in water year 1977 to 655,000 acre-feet in water year 1983. Only rarely has annual runoff exceeded 300,000 acre-feet.

The Hydrologic Engineering Center–River Analysis System (HEC-RAS) river analysis model prepared for the project was used to assess the channel hydraulics under existing conditions. The hydraulic model developed for the Pajaro River project includes only the area downstream of the Murphy Road Crossing on the mainstem. The data sets for the hydrology used in the HEC-RAS modeling of flood extents include the hydrologic record through the year 2003 from the USGS gage at Chittenden.

Table 9: Mean Monthly Streamflows (cfs) in the Pajaro River at Chittenden, California (USGS Gage 11159000), from 1956 through 2009

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
430	638	446	258	56	19	9.3	7.1	7.1	6.6	20	101

Note: cfs = cubic feet per second

The hydraulic modeling performed for flood hazards improvements provides estimates for the flood flows, or discharges, at a range of expected flood frequencies. The resulting 'flood frequency analysis' estimates the likelihood of various discharges. The probability of a flow being exceeded is conventionally expressed as a recurrence interval, such as a 100-year flood or event. The 100-year flood is more accurately referred to as the 1 percent flood, since it is a flood that has a 1 percent chance of being equaled or exceeded in any single year.

The average hydraulic properties for the Pajaro River mainstem sites under various flood event intervals are presented in Table 10. The modeling shows that the average velocities and depths generally increase with increases in flow. These results represent average conditions within each excavation site using a variable number of cross sections. However, actual conditions at the individual cross sections might differ considerably from these averages.

Groundwater Hydrology

The Pajaro Valley Groundwater Basin is comprised of three sedimentary geologic units that contain four recognizable groundwater zones. The sedimentary units comprising the groundwater basin are tilted gently to the west, and deepen from north to south towards the Pajaro River (Hanson 2003). This entire sedimentary sequence extends to a depth of about 2,000 feet, and overlies Cretaceous age granitic rock at depths of between 2,000 to 4,000 feet below the ground surface (Hanson 2003). The units comprising the aquifers in the basin are the following:

- Quaternary Units are comprised of Holocene alluvium and dune deposits overlying Pleistocene terrace deposits. These Quaternary units are composed of unconsolidated sediments ranging from gravel to clay. Terrace deposits overlying the Aromas Sand consist of gravel with high hydraulic conductivity. The quaternary units range in thickness to 300 feet (California Department of Water Resources, 2006).
- The Aromas Sands are Pleistocene in age, and comprise the major aquifer in the Pajaro Valley. The Aromas Sands outcrop from the foothills on the eastern boundary of the basin, where unit thickness is estimated to be 100 feet, and extend to the Monterey Canyon offshore. Under the mouth of the Pajaro River, the top of the unit is estimated to be approximately 900 feet in depth. The Aromas Sands Formation is composed of brown to red, well-sorted, medium-grained, weakly-cemented (by iron oxide), quartzose sands. The Formation also contains discontinuous confining clay layers, which gain lateral continuity

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

towards the west of the valley, and become rarer towards the foothills (California Department of Water Resources, 2006).

Table 10: Representative Hydraulic Properties of the Pajaro River Under Existing Conditions

Flood Event Interval (years)	Mean Channel Velocity (ft/sec)	Average Maximum Water Depth (feet)	Discharge (cfs)
Sites 1R, 1L, 2R, & 3R (portion)			
2	4.0	10.6	3,300
5	5.8	18.4	11,500
10	6.3	21.9	18,600
25	7.0	25.5	29,000
50	7.6	27.9	37,500
100	8.0	29.9	45,900
Sites 2L, 3R (portion), & 4R			
2	4.6	9.1	3,300
5	5.0	16.4	11,500
10	5.1	20.6	18,600
25	5.5	23.9	29,000
50	5.8	26.5	37,500
100	5.9	29.0	45,900
Sites 4L, 5R, 5.5R, 6R, 7R, & 8R			
2	4.5	8.4	3,100
5	6.0	14.5	10,500
10	6.4	17.5	16,600
25	6.8	21.0	26,000
50	7.1	23.2	33,200
100	7.4	25.4	40,500

Note: ft/sec = feet per second.
Source: NHC 2004.

- The Purisima Formation is a thick (1,000 to 4,000 feet thick), Miocene to Pliocene age marine sequence consisting of poorly consolidated gravels, sands, silts and silty clay. The outcrop thickens to 4,000 feet where it occupies a graben (structural depression) located between San Andreas and Zayante-Vergales Faults. The Purisima Formation outcrops to the north and east of the Pajaro Valley, where it acts as a conduit for basin recharge (California Department of Water Resources, 2006).

Based upon differences in water chemistry as well as age, different groundwater zones have been recognized in the basin (there are no formally recognized differences in aquifers). These groundwater zones are divided roughly by formation; the uppermost groundwater zone is found in the overlying alluvium, two zones of groundwater with differing quality are found in the Aromas Sand, and a fourth zone of lower quality groundwater is found in the Purisima Formation. A fifth groundwater zone is comprised of seawater that represents recent intrusion along the coastal plain, and is located within the alluvial layer between 100 to 200 feet in depth. Additionally, there is some indication that seawater may be intruding within the Aromas Sands lower groundwater zone (between 300 to 600 feet) near the coastal plain (Hanson 2003). This groundwater zone is currently considered the source of the highest quality groundwater within the Pajaro Valley, as it is under confining layers, and is therefore isolated from nitrate loading. The primary water quality impairment in the basin is presence of high total dissolved solids, which markedly differ between the five groundwater zones (California Department of Water Resources, 2006).

Extraction of local groundwater is currently the source of virtually all irrigation water used in the Pajaro Valley, and is primarily extracted from shallow alluvial and underlying Aromas aquifers (Hanson 2003). Agricultural uses comprise approximately 84 percent of groundwater withdrawal, and domestic use accounts for the remaining 16 percent of water use (Hanson 2003). In total, groundwater extraction yields 54,000 acre-feet per year. Total recharge in the

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

basin is estimated to be 61,000 acre-feet per year. The calculated sustainable yield is estimated at less than half the current volume of extraction (24,000 acre-feet per year), but is projected to have a possible increase to 48,000 acre-feet per year should there be a reduction in pumping along the coastal boundary. Total storage in the basin is estimated to be 2,000,000 acre-feet within the Aromas Sand and overlying alluvium. Additional storage in the Purisima Formation is estimated at 5,770,000 acre-feet for a total storage of 7,770,000 acre-feet (California Department of Water Resources, 2006).

Flooding

Pajaro River and Tributaries

Flood control management has been a primary concern for the lower Pajaro River and its tributaries, Salsipuedes and Corralitos creeks, since the settlement of the area. The USACE initiated a flood control study for the Pajaro River in 1936. In 1949, the current earthen levee system was constructed along the lower 12.5-mile segment of the river from Murphy Crossing to the river mouth and the first 4.5 miles of Salsipuedes Creek. The Pajaro River and its tributaries have a long history of flooding, as evidenced by the occurrence of three major flood events and several smaller events since 1936. The flood of 1955 was the most extensive in recorded history, breaching and overtopping the 1949 levees and causing severe flooding in the Monterey Bay area. Other Pajaro River flooding in the recent past occurred in 1982, 1986, 1995, 1997, and 1998. The 1995 flood event inundated significant areas of the unincorporated community of Pajaro and adjacent farmland acreage in Santa Cruz and Monterey Counties.

Maintenance of the levee system and vegetation removal from the river channel has been the primary action to mitigate flood potential along the lower Pajaro River and its tributaries. However, deposition of sediment within the channels the lower Pajaro River and Salsipuedes Creek (primarily during storm events) has resulted in a loss of capacity for the channels. A 1998 study (USACE, 1998) concluded that current water flows in the Pajaro River and Salsipuedes Creek exceed design flow capacities calculated as part of the original levee design in 1949 (22,000 cubic feet per second [cfs]).

At the time of authorization in 1944, the flood control project was believed to provide a 100-year level of flood protection or 22,000 cfs. A 100-year (1 percent) flood today would feature a discharge of about 44,000 cfs at the Chittenden gage. The stream gage records now suggest that the channel is capable of safely conveying only a 15-year flood event (22,000 cfs). The 1955 flood discharge of 24,000 cfs (25-year) breached the levee on the right bank. The 1958 flood damaged land upstream of the Chittenden gage to highway 101. Although the flow peaked at 23,500 cfs, the levees held and damage was limited to poorly-drained interior portions of the City of Watsonville, the Town of Pajaro, and on the right bank downstream of Highway 1.**Regulatory Environment**

Local

Santa Cruz County General Plan

Goals, Objectives and Policies regarding hydrologic hazards are found in Chapter 6, Public Safety and Noise, of the Santa Cruz County General Plan (1994). Relevant to the project are the following:

- Overall Goal Public Health and Safety: To protect human life, private property and the environment, and to minimize public expenses by preventing inappropriate use and development or location of public facilities and infrastructure in those areas which, by virtue of natural dynamic processes or proximity to other activities, present a potential threat to

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

the public health, safety and general welfare.

- Objective 6.4, 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 protection.
- 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 6.4.10, Flood Control Structures: Allow flood control structures only to protect existing development (including agricultural operations) where no other alternative is feasible and where such protection is necessary for public safety. The structures must not adversely affect sand supply, increase erosion or flooding on adjacent properties, or restrict stream flows below minimum levels necessary for the maintenance of fish and wildlife habitats.

City of Watsonville General Plan

Goals, Objectives and Policies regarding hydrologic resources are found in Chapter 12, Public Safety, of the City of Watsonville 2005 General Plan (1994). Relevant to the project are the following:

- 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.
    - 12.D.5 Flood Mitigation: The City shall pursue planning and financial support for the improvement of flood conditions along the Corralitos and Salispuedes Creeks, the Pajaro River, and other areas of the drainage basin impacting Watsonville as recommended by the Santa Cruz County Flood Control and Water Conservation District Zone 7.

County of Monterey General Plan

Goals and Policies regarding flood hazards are found Chapter 4.0 of the Monterey County General Plan (2010). The following Goals and Policies are relevant to the project:

- Goal S-2: Reduce the amount of new development in floodplains and, for any development that does occur, minimize the risk from flooding and erosion.
    - Policy S-2.2: Uses such as agriculture, passive to low intensity recreation, and open space/conservation are the most acceptable land uses in the 100-year floodplain to lessen the potential for loss of life, injury, property damage, and economic and social dislocations to the maximum extent feasible.
    - Policy S-2.3: All new development, including filling, grading, and construction, within designated 100-year floodplain areas shall conform to the guidelines of FEMA and the National Flood Insurance Program and ordinances established by the County Board of Supervisors. With the exception of the construction of structures, routine and ongoing Agricultural Activities shall be exempt from this policy.
    - Policy S-2.4: Monterey County shall strive to improve its National Flood Insurance Program Community Rating System classification.
- Goal S-3: Ensure effective storm drainage and flood control to protect life, property ,and the

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

environment.

- A County Flood Management Program that helps reduce flood risks shall be established consistent with FEMA requirements at a minimum. The program shall consider both structural and non-structural solutions to address flooding.

State

Section 401 Water Quality Certification

Placement of structures, fill, or dredged materials into waters of the State requires Section 401 Water Quality Certification. Activities that require a federal Section 404 permit also require a Section 401 Water Quality Certification. Water bodies that may not be covered by USACE jurisdiction may require a Section 401 Water Quality Certification for impact on waters of the state. The RWQCB issues Section 401 Water Quality Certifications.

Federal

National Flood Insurance Program

FEMA administers the National Flood Insurance Program (NFIP). FEMA has completed Flood Insurance Rate Maps that identify Special Flood Hazard Areas in the project area. To comply with the NFIP, communities must adopt a floodplain management ordinance addressing construction and habitation in flood zones. In California, the Department of Water Resources (DWR) provides and encourages communities to adopt the California Model Floodplain Management Ordinance.

Executive Order 11988-Floodplain Management

Executive Order 11988 requires federal agencies to recognize the values of floodplains and to consider the public benefits from restoring and preserving floodplains. Under this order the USACE is required to take action and provide leadership to:

- Avoid development in the base floodplain
- Reduce the risk and hazard associated with floods
- Minimize the impact of floods on human health, welfare, and safety
- Restore and preserve the beneficial and natural values of the base floodplain

Impacts

The proposed project is designed as a flood control improvement project and would not result in increased flood risk management for any homes, businesses, and agricultural lands in the lower Pajaro River valley. The proposed project would not result in increased exposure of housing to flooding hazards. Therefore, the proposed project would reduce and improve flooding hazards. No mitigation would be required.

2.	Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	☐	☐	☐	☒

***Discussion*:** The entire project area is located within the 100-year flood hazard area. However, no impact would occur because no development is being proposed. See B-1 above for a complete discussion.

3.	Be inundated by a seiche, tsunami, or	☐	☐	☐	☒

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

mudflow?

***Discussion*:**

Seismically-induced Waves

Seismic shaking during earthquakes can result in the formation of waves within open bodies of water. The two major types of seismically generated wave are tsunamis and seiches. Tsunamis are waves generated by the displacement of a large volume of water and, therefore, only occur in large water bodies such as oceans, bays, or large lakes. Displacements of water can occur by several mechanism (including subaqueous landsliding or explosions) but are most commonly caused by the submarine displacements of the earth's crust resulting from earthquakes. A seiche is a wave that oscillates in lakes, bays, or gulfs from a few minutes to a few hours as a result of seismic or atmospheric disturbances. Small seiches are almost always present on larger lakes, and the frequency of the oscillation is determined by the size of the body, its depth and contours, and the water temperature. Larger seiches can be caused by nearby or distant earthquakes and occur when the wave signature of the seismic waves is resonant with the natural period (controlled by basin geometry) of the lake. Given the size of Monterey Bay and area connected to the open Pacific Ocean, formation of seiches in the bay is unlikely.

However, the formation of a tsunami in the bay is likely. Recent modeling of tsunami hazards for the coast of Monterey Bay indicates that the coastline of the bay at the mouth of the river and portions of the tidal influence zone of the river could be inundated in a tsunami (CEMS 2009). The mapped inundation area includes the beach areas along the coast, the Pajaro Dunes and the lower portion of the Pajaro River floodplain north of the river from the mouth to about mile 3.0. The modeling considered local tsunami sources (including offshore reverse-thrust faults, restraining bends on strike-slip fault zones and large submarine landslides) and distant tsunami sources around the Pacific Basin that are known to have generated historic tsunamis.

Because the project area is located adjacent to the Pajaro River inside the existing levee system, there is little potential for inundation from a seiche or mudflow. However, an impact from the formation of a tsunami in the Monterey Bay is likely, but no adverse impact would occur because no development is being proposed.

4. Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☐	☒

***Discussion*:**

The project is located in the Pajaro Valley Groundwater Basin. The basin is comprised of three sedimentary geologic units that contain four recognizable groundwater zones. The sedimentary

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

units comprising the groundwater basin are tilted gently to the west, and deepen from north to south towards the Pajaro River (Hanson 2003). This entire sedimentary sequence extends to a depth of about 2,000 feet, and overlies Cretaceous age granitic rock at depths of between 2,000 to 4,000 feet below the ground surface (Hanson 2003).

Based upon differences in water chemistry as well as age, different groundwater zones have been recognized in the basin (no formally recognized differences in aquifers). These groundwater zones are divided roughly by formation; the uppermost groundwater zone is found in the overlying alluvium, two zones of groundwater with differing quality are found in the Aromas Sand, and a fourth zone of lower quality groundwater is found in the Purisima Formation. A fifth groundwater zone is comprised of seawater that represents recent intrusion along the coastal plain, and is located within the alluvial layer between 100 to 200 feet in depth. Additionally, some indication exists that seawater may be intruding within the Aromas Sands lower groundwater zone (between 300 to 600 feet) near the coastal plain (Hanson 2003). This groundwater zone is currently considered the source of the highest quality groundwater within the Pajaro Valley, as it is under confining layers and is, therefore, isolated from nitrate loading from surface runoff. The primary water quality impairment in the basin is presence of high total dissolved solids, which markedly differ between the five groundwater zones (California Department of Water Resources, 2006).

Extraction of local ground-water is currently the source of virtually all irrigation water used in the Pajaro Valley, and is primarily extracted from shallow alluvial and underlying Aromas aquifers (Hanson 2003). Agricultural uses comprise approximately 84 percent of groundwater withdrawal, and municipal/domestic use accounts for the remaining 16 percent of water use (Hanson 2003). In total, groundwater extraction yields 54,000 acre-feet per year. Total recharge in the basin is estimated to be 61,000 acre-feet per year. The calculated sustainable yield is estimated at less than half the current volume of extraction (24,000 acre-feet per year), but extraction is projected to potentially increase to 48,000 acre-feet per year should pumping along the coastal boundary be reduced. Total storage in the basin is estimated to be 2,000,000 acre-feet within the Aromas Sand and overlying alluvium. Additional storage in the Purisima Formation is estimated at 5,770,000-acre-feet for a total storage of 7,770,000 acre-feet (California Department of Water Resources, 2006).

Regulatory Setting

Local

Santa Cruz County General Plan

Goals, Objectives and Policies regarding hydrologic resources are found in Chapter 5, Conservation and Open Space, of the Santa Cruz County General Plan (1994). Relevant to the project are the following:

- Objective 5.8a Groundwater Protection: To protect the quantity and quality of the County's groundwater resources through an integrated program of land use regulation and runoff management in groundwater recharge areas, careful water quality monitoring and management of extractions consistent with long-term sustainable water supply yields.
- Policy 5.8.5 Developing Groundwater Resources: Allow development of groundwater resources when consistent with sustainable yield, protection of streamflows, and maintenance of groundwater quality. Require water systems serving new development to meet applicable standards for yield to ensure a reliable water supply is provided to its users.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

City of Watsonville General Plan

Goals, Policies, and Implementation Measures regarding water quality are found in Chapter 9, Environmental Resource Management, of the City of Watsonville 2005 General Plan (May 24, 1994). Relevant to the project are the following:

Goal 9.5: Ensure that surface and groundwater resources are protected.

Policy 9.D: The City shall provide for the protection of water quality to meet all beneficial uses, including domestic, agricultural, industrial, recreational, and ecological uses.

Implementation Measures:

9.D.1: Recharge Protection – The City shall direct urban development away from the groundwater recharge zones and surface water bodies. Projects with potential to jeopardize water quality shall be required to include mitigation measures prior to project approval.

9.D.4: Saltwater Intrusion – In conjunction with the Pajaro Valley Water Management Agency (PVWMA), the City shall participate in state and federally assisted studies to identify and solve saltwater intrusion problems within the Pajaro Valley.

County of Monterey General Plan

Goals and Policies regarding conservation and preservation of hydrologic resources and water quality and associated developmental constraints are found in the Monterey County General Plan (2010). The following Goals and Policies are relevant to the project:

- Goal PS-2: Assure an adequate and same water supply to meet the County's current and long-term needs.
    - Policy PS.2-1: Coordination among, and consolidation with, those public water service providers drawing from a common water table to prevent overdrawing the water table is encourage.

Impacts

The proposed project would not significantly impact groundwater supplies or conditions within the project area. The project would not require sustained pumping or use of groundwater. The shallow groundwater in the project area is generally at or below sea level (Hanson 2003). The depths to groundwater in most areas of construction would be greater than 10 feet. Therefore, the potential for adversely affecting groundwater flow patterns or rates of flow are unlikely. Although some water would be used during excavation for dust control, the amount would be insignificant. No impact to groundwater supplies is anticipated from project implementation.

5.	Substantially degrade a public or private water supply? (Including the contribution of urban contaminants, nutrient enrichments, or other agricultural chemicals or seawater intrusion).	☐	☐	☒	☐

***Discussion*:**

The grading activities proposed by the Bench Excavation project would be extensive and result in large areas exposed to erosion hazards. Increased erosion could result in the discharge of sediment and other pollutants to the Pajaro River. The Pajaro River is currently identified on

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

the Clean Water Act Section 3030(d) list as being impaired for sediment. The sources of the sediment are attributed to a wide range of activities, including: sedimentation/siltation from agriculture storm runoff; resource extraction and surface mining; hydromodification and channelization of streams; and streambank modification and channel erosion. Project activities present the potential for the release of sediment and other pollutants that could migrate to surface waters. The grading and other activities would be required to perform under a SWPPP prepared in conformance with requirements of SWRCB's "General Permit for Discharges of Storm water Associated with Construction Activities (General Permit)." The General Permit presents a very specific process for construction projects to comply with the CWA's provisions that relate to the control of pollutant discharge from "nonpoint" sources. The General Permit provides for compliance with the regulations through submittal of a Notice of Intent to comply with the format and content of the process developed for the General Permit, which includes development and implementation of a SWPPP.

Regulatory Setting

Local

Santa Cruz County General Plan

Goals, Objectives and Policies regarding water supply impacts are found in Chapter 5, Conservation and Open Space, of the Santa Cruz County General Plan (1994). Relevant to the project are the following:

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 5.7 – To protect and enhance surface water quality in the County's streams, coastal lagoons and marshes by establishing best management practices on adjacent land uses.

- Policy 5.7.3: For all new and existing development and land disturbances, require the installation and maintenance of sediment basins, and/or other strict erosion control measures, as needed to prevent siltation of streams and coastal lagoons.

Objective 6.3 Erosion – To control erosion and siltation originating from existing conditions, current land-use activities, and from new developments, to reduce damage to soil, water, and biotic resources.

- Policy 6.3.2 Grading projects to Address Mitigation Measures – Deny any grading project where a potential danger to soil or water resources has been identified and adequate mitigation measures cannot be undertaken.
- Policy 6.3.4 Erosion Control Plan Approval Required for Development – Require approval of an erosion control plan for all development, as specified in the Erosion Control ordinance. Vegetation removal shall be minimized and limited to that amount indicated on the approved development plans, but shall be consistent with fire safety requirements.
- 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 o completion of the project.

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

- Policy 6.3.7 Reuse of Topsoil and Native Vegetation Upon Grading Completion – Require topsoil to be stockpiled and reapplied upon completion of grading to promote regrowth of vegetation; native vegetation should be used in replanting disturbed areas to enhance long-term stability.
- Policy 6.3.10 Land Clearing Permit – Require a land clearing permit and an erosion control plan for clearing one or more acres, except when clearing is for existing agricultural uses. Require that any erosion control and land clearing activities be consistent with all General Plan and LCP Land Use Plan policies.
- Policy 6.3.11 Sensitive Habitat Considerations for Land Clearing Permits – Require a permit for any land clearing in a sensitive habitat area and for clearing more than one quarter acre in Water Supply Watershed, Least Disturbed Watershed, very high and high erosion hazard areas no matter what the parcel size. Require that any land clearing be consistent with all General Plan and LCP Land Use policies.

Goals, Objectives and Policies regarding hydrologic hazards are found in Chapter 6, Public Safety and Noise, of the Santa Cruz County General Plan (1994). Relevant to the project are the following:

See Section B-10 for discussion of Hydrologic Hazards Goals, Objectives and Policies.

County of Santa Cruz Code

Section 16.22.080 Land clearing approval:

Land clearing shall be kept to a minimum. Vegetation removal shall be limited to that amount necessary for building, access, and construction as shown on the approved erosion control plan. The following provisions shall apply:

(a) When no land development permit has been issued, the following extents of land-clearing require approval of an erosion-control plan according to the procedures in Chapter 18.10; Level III:

1. Any amount of clearing in a sensitive habitat, as defined in Chapter 16.22.
2. One-quarter acre or more of clearing in the Coastal Zone if also in a least-disturbed watershed, a water supply watershed, or an area of high erosion hazard.
3. One acre or more of clearing in all areas not included in Items 1 and 2.

(b) When a land development permit has been issued, land clearing may be done according to the approved development plan.

1. For land clearing in the Coastal Zone which will be more than that shown on the approved erosion-control plan, a new land-clearing approval is required if the land is located in a least-disturbed watershed, a water supply watershed, or an area of high erosion hazard.
2. For land-clearing in any area which will include more than one acre in excess of that shown on the approved plan, a new land-clearing approval is required.

(c) Approval of land clearing shall meet the following conditions. All disturbed surfaces shall be prepared and maintained to control erosion and to establish native or naturalized vegetative growth compatible with the area. This control shall consist of:

1. Effective temporary planting such as rye grass, barley, or some other fast-germinating seed, and mulching with straw and/or other slope stabilization material;

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

2. Permanent planting of native or naturalized drought resistant species of shrubs, trees, etc., pursuant to the County's Landscape Criteria, when the project is completed;
3. Mulching, fertilizing, watering or other methods may be required to establish new vegetation. On slopes less than 20 percent, topsoil shall be stockpiled and reapplied.

   The protection required by this section shall be installed prior to calling for final approval of the project and at all times between October 15 and April 15. Such protection shall be maintained for at least one winter until permanent protection is established.

(c) No land clearing shall take place prior to approval of the erosion control plan. Vegetation removal between October 15 and April 15 shall not precede subsequent grading or construction activities by more than 15 days. During this period, erosion and sediment control measures shall be in place.
(d) Land clearing of more than one-quarter acre that is not a part of a permitted activity shall not take place on slopes greater than 30 percent.

Section 16.22.100 Overall responsibility:

It shall be the responsibility of the owner and the permittee to ensure that erosion does not occur from any activity during or after project construction. Additional measures, beyond those specified, may be required by the Planning Director as deemed necessary to control accelerated erosion.

Section 16.24.030 Increase in turbidity:

Except as prescribed in Section 16.24.050, it shall be unlawful to increase the turbidity of any portion of any body of water in the following amounts:

(a) When natural turbidity measures between 0 and 50 turbidity units, the increase shall not exceed 20 percent of natural turbidity;
(b) When natural turbidity measures between 50 and 100 units, turbidity may not be increased more than 10 units above natural turbidity;
(c) When natural turbidity measures above 100 units, the increase shall not exceed 10 percent of natural turbidity.

Section 16.24.040 Increase in settleable solids:

Except as prescribed in Section 16.24.050, it shall be unlawful to increase settleable solids in any portion of any body of water in Santa Cruz County more than 0.5 milliliters per liter per hour above natural conditions of settleable solids.

City of Watsonville 2005 General Plan

- 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: Erosion Control – The City shall continue to enforce regulations over grading activities and other land use practice that expose bare soil and accelerate soil erosion and sedimentation.
- Implementation Measure 9.D.3: Water Monitoring – The City shall continue to monitor the quality of water pumped into the distribution system, and the quality of effluent leaving the system in the form of wastewater discharges.
- Implementation Measure 9.D.4: Saltwater Intrusion – In conjunction with PVWMA, the City shall participate in state- and federally-assisted studies to identify and solve saltwater

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

intrusion problems within the Pajaro Valley.

City of Watsonville Municipal Code

The project area within the City of Watsonville is zoned as Environmental Management/Open Space.

Section 14-08.070 Designation of Environmental Management Districts: The purpose of the Environmental Management Districts is to protect the public health, safety, and welfare and to manage natural environmental resources in certain selected areas having significant and critical natural resource values for purposes as follows:

(a) Minimize cut, fill, earth moving, grading operations, and other such man-made effects on the natural terrain;

(b) Minimize storm water runoff and soil erosion problems caused by the use of natural terrain for proposed developments;

(c) Regulate the use of areas with a high potential for liquefaction;

(d) Regulate the use of areas subject to inundation by the 100-year flood in accordance with applicable Federal and State laws;

(e) Preserve riparian areas through the regulation of development near the edges of lakes, streams, rivers, or sloughs;

(f) Minimize fire hazard by regulating development in areas of steep canyons and arroyos;

(g) Encourage developments which utilize the desirable, existing features of land, such as its natural vegetation and wildlife climatic characteristics, scenic amenities, and geologic and archaeological features, including any other features which preserve the land's significant natural resources and contribute to maintaining the landscape within the City; and

(h) Provide for the maintenance of those agricultural lands which have a high level of soil fertility.

County of Monterey General Plan

Goals, Objectives and Policies regarding water supply impacts are found in Chapter 3.0, Conservation and Open Space Element, of the Monterey County General Plan (2010). Relevant to the project are the following:

Goal OS-3: Prevent soil erosion to conserve soils and enhance water quality.

- Policy OS-3.1: Best Management Practices (BMPs) to prevent and repair erosion damage shall be established and enforced.
- Policy OS-3.2: Existing special district, state, and federal soil conservation and restoration programs shall be supported. Voluntary restoration projects initiated by landholders, or stakeholder groups including all affected landowners, shall be encouraged.
- Policy OS-3.3: Criteria studies to evaluate and address, through appropriate designs and BMPs, geologic and hydrologic constraints and hazards conditions, such as slope and soil instability, moderate and high erosion hazards, and drainage, water quality, and stream stability problems created by increased stormwater runoff, shall be established for new development and changes in land use designations.

County of Monterey Code

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

Section 16.12.060: Erosion Control Plan

a. Prior to permit issuance for building, grading, or land clearing, an erosion control plan indicating proposed methods for the control of runoff, erosion, and sediment movement shall be submitted and approved to the appropriate Director. Erosion control plans may also be required for other types of applications where erosion can reasonably be expected to occur. The erosion control plan may be incorporated into other required plans, provided it is identified as such. Erosion control plans shall include as a minimum the measures required under Sections 16.12.070, 16.12.090, and 16.12.110 of this Chapter. Additional measures or modification of proposed measures may be required prior to project approval. No grading or clearing may take place on the site prior to approval of an erosion control plan for that activity. Final certification of project completion may be delayed pending proper installation of measures identified in the approved erosion control plan.

Section 16.12.080: Land Clearing

Land clearing shall be kept to a minimum. Vegetation removal shall be limited to that amount necessary for building, access, and construction as shown on the approved erosion control plan. The following provisions shall apply:

a. No land clearing shall take place prior to approval of the erosion control plan. Vegetation removal between October 15th and April 15th shall not precede subsequent grading or construction activities by more than fifteen (15) days. During this period, erosion and sediment control measures shall be in place.

b. All disturbed surfaces shall be prepared and maintained to control erosion and to establish native or naturalized vegetative growth compatible with the area. This control shall consist of:

    1. Effect temporary planting such as rye grass, some other fast-germinating seed, and mulching with straw and/or other slope stabilization material;

    2. Permanent planting of native or naturalized drought resistant species of shrubs, trees, or other vegetation, pursuant to the County's Landscape Criteria, when the project is completed;

    3. Mulching, fertilizing, watering or other methods may be required to establish new vegetation. On slopes less than twenty (20) percent, topsoil should be stockpiled and reapplied.

    The protection required by this Section shall be installed prior to calling for final approval of the project and at all times between October 15th and April 15th. Such protection shall be maintained for at least one winter until permanent protection is established.

c. A land-clearing permit shall be required for any land clearing of more than two and one-half acres per year per site in excess of that shown on an approved development plan; except in water supply watersheds, or high erosion hazard areas, where a permit shall be required for any clearing in excess of one acre per year per site in excess of that shown on an approved development plan. Application for a permit shall be made on forms for that purpose and shall include submittal of an erosion control plan. A permit may be approved, conditioned, or denied pursuant to procedures established by the Board of Supervisors.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

d. Land clearing that is not a part of a permitted activity shall not take place on slopes greater than thirty (30) percent (twenty-five (25) percent for North County LUP). Exceptions may be made for special circumstances. Ref. Section 16.08.060B Monterey County Code. The process includes submitting an application for an exception and a noticed public hearing to determine if the exception is valid.

Impacts

Due to the substantial amount of excavation and hauling of material, there is potential for sediment to enter the adjacent Pajaro River. However, the Pajaro River is not used as a public water supply; and therefore, no significant impacts would occur. Therefore, no mitigation measures would be required.

A Land Clearing Permit will be required from the County of Santa Cruz. Erosion control measures will be implemented to reduce impacts from erosion and sedimentation during excavation. See discussion in Section A-4 of this Initial Study.

6.	Degrade septic system functioning?	☐	☐	☐	☒

***Discussion*:** There is no indication that existing septic systems in the vicinity would be affected by the project. Therefore, no impact would occur from project implementation.

7.	Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding, on- or off-site?	☐	☐	☒	☐

***Discussion*:** The project proposes to excavate excess sediment from select locations along the upper terrace benches inside the Pajaro River levees in order to improve the flood carrying capacity of the levee system. The proposed project would create a two-year floodplain to re-establish flow levels at bankfull capacity. The proposed bench excavation project is also specifically designed to relieve the magnitude and severity of potential flooding caused by failure of the Pajaro River levees. Additional capacity with no additional runoff would be the result of the project. No significant impact would occur.

8.	Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems, or provide substantial additional sources of polluted runoff?	☐	☐	☒	☐

***Discussion*:** See the discussion under B-7 above. The proposed project would not contribute additional runoff. Additional stormwater capacity would be the result of the project. No significant impact would result.

9.	Expose people or structures to a	☐	☐	☒	☐

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?				

***Discussion*:** The proposed project would provide additional capacity within the existing levee system, thereby providing additional freeboard that would relieve some stress from the levee system during peak flows. No significant impact is anticipated.

10. Otherwise substantially degrade water quality?	☐	☒	☐	☐

***Discussion*:**

The Pajaro River was included on California's 1998 Section 303(d) list as impaired by sedimentation/siltation. Potential sources, as referenced on the list, were identified as agriculture, irrigated crop production, rangeland, agriculture-storm runoff, resource extraction, surface mining, hydromodification, channelization, habitat modification, removal of riparian vegetation, streambank modification, and channel erosion (RWQCB 2005).

The basis for including the Pajaro River on the 1998 Section 303(d) list is the report entitled The Establishment of Nutrient Objectives, Sources, Impacts, and Best Management Practices for the Pajaro River and Llagas Creek (San Jose State University, 1994), which compiled and collected turbidity data, measured in nephelometric turbidity units (NTU), at various locations in the watershed from the early 1950s through 1993. A summary and range of values are provided for turbidity data collected from the 1950s through 1991, while individual turbidity measurements are presented for data collected from 1992 through 1993 at seven stations in the watershed. Three of these stations were located along the Pajaro River and four were located along Llagas Creek. Pajaro River turbidity ranged from 0.4 to 240 NTU. California determined that the Pajaro River should be listed as impaired by sediment on the 1998 Section 303(d) list based on a qualitative assessment of turbidity data. The report did not specify which beneficial uses are impaired as a result of sedimentation/siltation (RWQCB 2005).

Regulatory Setting

Local

See Section B-5 of this Initial Study for a complete discussion of local regulations related to water quality.

State

See Section B-5 of this Initial Study for a complete discussion of state regulations related to water quality.

Federal

See Section B-5 of this Initial Study for a complete discussion of federal regulations related to water quality.

Impacts

The proposed project has the potential to temporarily further degrade water quality during with sediment during excavation of the 336,043 cubic yards of material from the benches. However, the following mitigation measures would reduce this impact to a less than significant

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

level.

Mitigation Measures

WQ-1 The contractor would implement storm water Best Management Practices (BMPs) in accordance with the California Stormwater Quality Association "Stormwater Best Management Practice Handbook/Portal," Construction 2011 (CASQA 2011). The contractor would implement erosion and sediment control BMPs such as hydroseeding, soil binders, street sweeping and vacuuming, sandbag barrier, straw bale barrier, storm drain inlet protection, wind erosion control, stabilized construction entrance/exit/roadway, and non-stormwater management and material management BMPs such as dewater operations, clear water diversions, vehicle and equipment fueling and maintenance, material delivery and storage, stockpile management, spill prevention and control, hazardous waste management, contaminated soil management, and liquid waste management.

WQ-2 The contractor would need to submit a Storm Water Pollution Prevention Plan (SWPPP) that identifies the BMPs that would be provided for the project. The contractor would be required to monitor and inspect all stormwater BMPs and pollution prevention and control measures at least once every day, and will immediately repair or replace any SWPPP facilities that are not operating properly. The contractor would also need to certify annually that its construction activity is in compliance with the SWRCB's requirements, NPDES General Permit for Stormwater Discharges Associated with Construction Activity, and the Contractor's SWPPP. Following completion of all construction work and final inspection, the contractor would need to certify that all elements of the SWPPP have been implemented, that construction and equipment maintenance waste have been disposed of properly, and that the site(s) is in compliance with all local stormwater management requirements, including erosion/sediment control requirements, policies, and guidelines. No significant impact would occur with the implementation of the above measures.

C. BIOLOGICAL RESOURCES

Would the project:

1. 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 the California Department of Fish and Game, or U.S. Fish and Wildlife Service?	☐	☒	☐	☐

***Discussion*:**

Excavation Areas

Special Status Wildlife Species

The term "special-status" species includes those species that are listed and receive specific protection defined in federal or state endangered species legislation, as well as species not formally listed as Threatened or Endangered, but designated as "Rare" or "Sensitive" on the

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

basis of adopted policies and expertise of state resource agencies or organizations, or local agencies such as counties, cities, and special districts. A principle source for this designation is the California "Special Animals List" (CDFG, 2011b). There are 5 species listed as threatened or endangered under the federal ESA that are present or for which suitable habitat exists in or adjacent to the project area. Three of these species occur in or adjacent to the project area: the South-Central California Coast steelhead trout, the California red-legged frog (CRLF), and the tidewater goby. Brief consideration is also given to the snowy plover, which nests at the Pajaro rivermouth (3 miles downstream) and least Bell's vireo, which has not been documented in the project area.

There are six species listed as threatened or California species of special concern (SSC) under the CESA that regularly occur and/or breed in the project area. Three locally-present, federally listed species; steelhead, red-legged frog, and snowy plover, are also listed as species of concern under CESA. Western pond turtles are designated as SSC and are present throughout the project area. Pallid bat is a SSC mammal species that may make use of the remnant, mature riparian trees in the bench areas. Burrowing owl is a SSC that is an infrequent winter visitor to the lower Pajaro, and is not known to nest in the project area. Least Bell's vireo is also listed as "endangered" under CESA, but has not been observed in recent bird surveys and is not known to inhabit the project area. Yellow-breasted chat is an uncommon riparian species potentially present, but not recorded in the project area in recent surveys. Species accounts for potentially affected listed species are discussed below and shown in Table 11.

California Red-legged Frog

The CRLF (*Rana aurora draytonii*) is federally listed as threatened (Federal Register 1996), and is a California SSC (CDFG 2011b). The USFWS released a recovery plan in 2002 (USFWS 2002). Critical habitat for the CRLF was designated in 2001 (Federal Register 1996). However, on November 6, 2002, the U.S. District Court for the District of Columbia entered into a consent decree, vacating the critical habitat designation (except Units 5 and 31), and remanding the designation to the USFWS to conduct an economic analysis. Critical habitat was again designated on April 13, 2006 (Federal Register 2006). There is no designated critical habitat for CRLF in the project area. The Watsonville Slough Complex, situated just north of the Pajaro River mouth, was designated as Critical Habitat unit SCZ-2 (50 FR 19244-19292). This includes locations north of the mouth and seaward of Highway 1 and includes all or portions of Gallighan, Hanson, Harkins, Watsonville, Struve, and the West Branch of Struve sloughs.

Historically, the CRLF occurred in coastal mountains from Marin County southward to northern Baja, California, and along the floor and foothills of the Central Valley from about Shasta County southward to Kern County (Jennings et al. 1992). Currently, this subspecies generally only occurs in the coastal portions of its historic range; it has been apparently extirpated from the valley and foothills and in most of southern California south of Ventura County. CRLFs are usually confined to aquatic habitats such as creeks, streams and ponds, and occur primarily in areas having pools approximately 3 feet deep, with adjacent dense emergent or riparian vegetation (Jennings and Hayes 1988). Adult frogs move seasonally between their egg-laying sites and foraging habitat, but generally they rarely move large distances from their aquatic habitat. CRLFs breed from November to March. Egg masses are attached to emergent vegetation (Jennings and Hayes 1994), and hatch within 14 days. Metamorphosis generally occurs between July and September.

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

Table 11: Special-status Wildlife Species Potentially Occurring in the Project Vicinity	
Common Name (*Scientific Name*)	**Status**
Reptiles	
Western pond turtle (*Actinemys marmorata*)	SSC
Amphibians	
California red-legged frog (*Rana aurora draytonii*)	FT, SSC
Birds	
Western snowy plover (*Charadrius alexandrinus nivosus*)	FT, SSC
Yellow warbler (*Dendroica petechia brewsteri*)	SSC
White-tailed kite (*Elanus leucurus*)	FP
Fish	
Tidewater goby (*Eucyclogobius newberryi*)	FE
South-central California Coast ESU steelhead (*Oncorhynchus mykiss*)	FT
Mammals	
San Francisco Dusky-footed Woodrat (*Neotoma fuscipes annectens*)	SSC
Palid bat (*Antrozous pallidus*)	SSC
Notes: FE: Federally Endangered FT: Federally listed as Threatened FP: Fully Protected by the California Department of Fish and Game (CDFG 2011b)	CE: State-listed as Endangered in California SSC: California species of special concern

The CRLF is a large frog found in habitats characterized by dense, shrubby, riparian vegetation associated with deep (0.7 meter), still, or slow-moving water (Jennings 1988; Jennings and Hayes 1988). Emergent vegetation is important for cover as well as for egg attachment (Storer 1925).

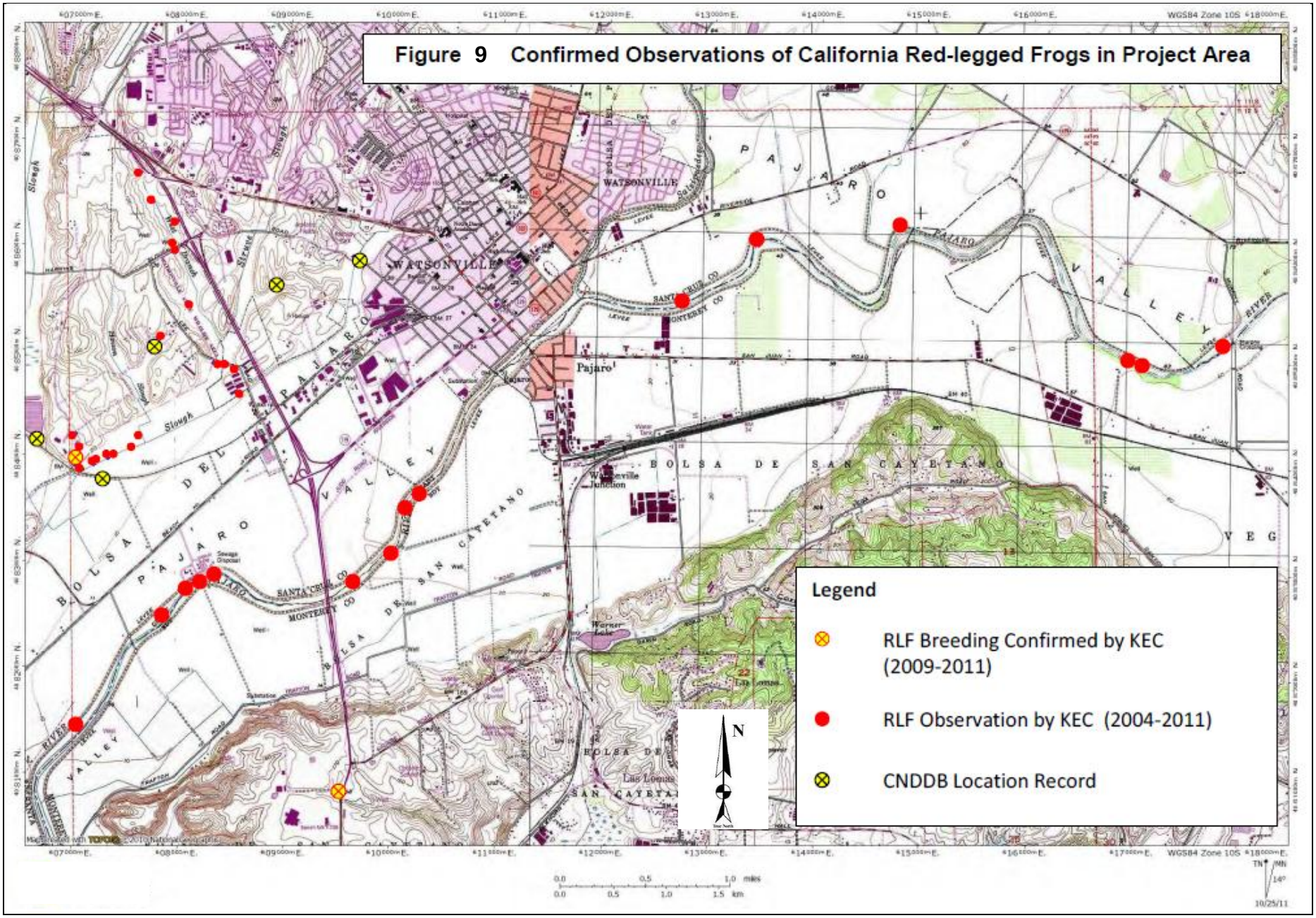
CRLFs have been observed at 15 distinct locations in the Pajaro River downstream of Murphy's Crossing since 2009 (Kittleson, personal observations). They are also known from Soda lake and Chittenden Pass upstream of the project site, the Watsonville Slough system to the north and the Elkhorn Slough system to the south. Two known breeding ponds are within one mile of the project area on the Monterey County side at the Salinas Road fire suppression pond and on the Santa Cruz County side from a pond at the Land Trust of Santa Cruz County Watsonville Slough Farm (Kittleson, personal observations). Figure 9 illustrates project-specific red-legged frog observations.

Western Pond Turtle

The western pond turtle (*Actinemys marmorata*) inhabits the Pajaro River throughout the project area. They are commonly observed during warm, sunny days basking on submerged wood and mud banks from Thurwatcher Bridge upstream to Murphy's Crossing. Kittleson Environmental Consulting (KEC) and colleagues at Biosearch Associates have conducted annual western pond turtle surveys in the project area since 2009. KEC has documented and marked 95 western pond turtles at 18 trap locations in the Pajaro downstream of Murphy's Crossing. All age classes, from hatchling to adult, were documented. Figure 10 illustrates project-specific western pond turtle observations within the project study area.

Western pond turtles occur in the Pacific Coast region of North America from Washington State to Baja California Mexico, west of the Cascade Mountains and Sierra Nevada Range (Bury 1970; Nussbaum et al. 1983; Iverson 1986; Stebbins 2003). However, the major portion of the distribution is located in California (Rathbun et al. 2002). The western pond turtle is the only native turtle in California.

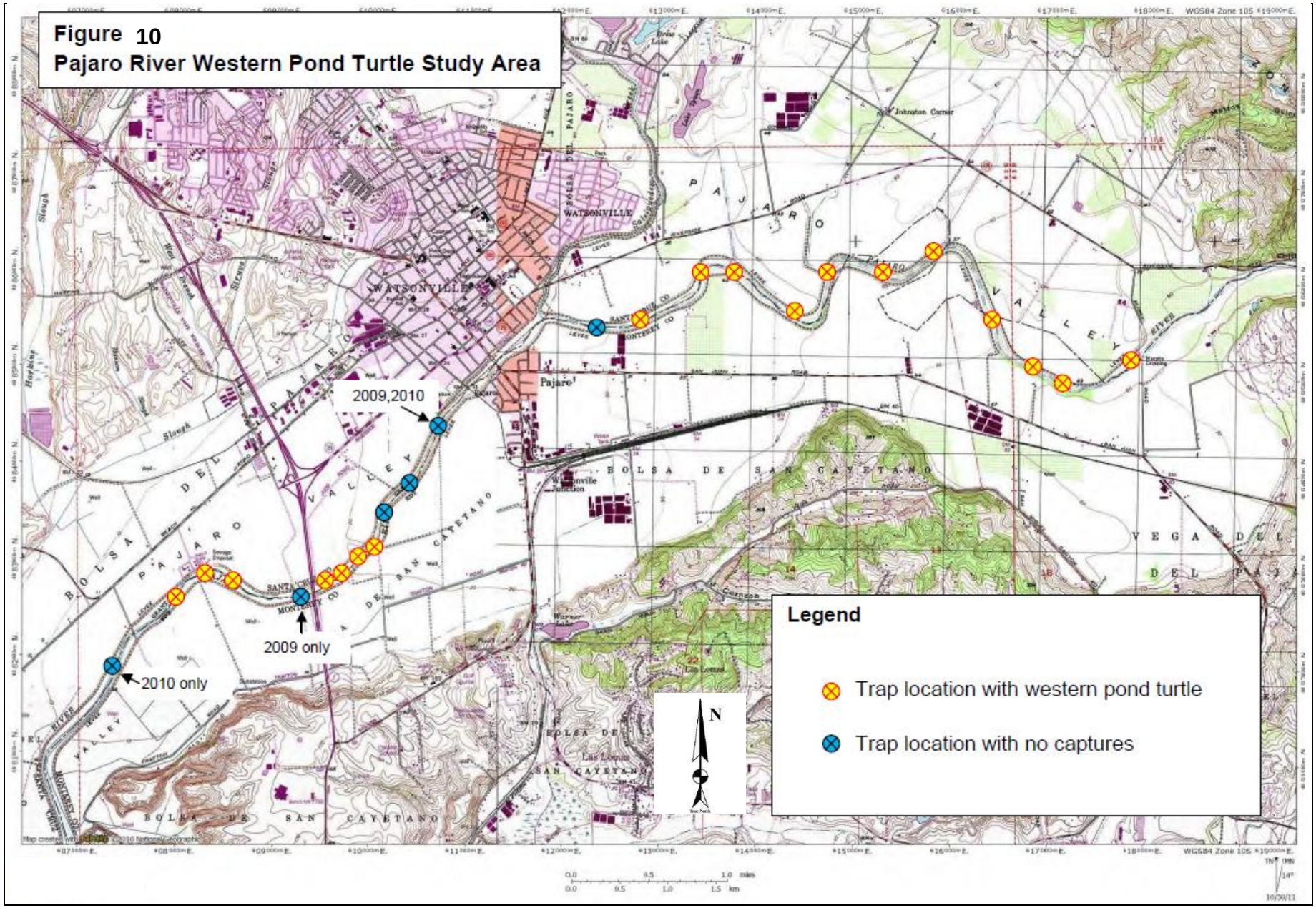
Recent genetic studies indicate the presence of four groups or clades within the species; although historically there were two recognized subspecies. (Bury and Germano, 2008) The species appears to be declining in abundance in the northernmost and southernmost portion of its range; but not in the core of its range from central California to southern Oregon. The primary threats are loss and alteration of both aquatic and terrestrial habitats. These losses



Source: Kittleson Environmental Consulting, 2011.

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

This page intentionally left blank.



Source: Kittleson Environmental Consulting, 2011.

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

This page intentionally left blank.

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

fragment remaining populations and; perhaps; magnify the effects of introduced species through predation; competition; and epidemic diseases (Bury and Germano, 2008).

Generally, adults range in size from 140-190mm CL, carapace length (Bury 1995; Lubke and Wilson 2007). Hatchlings are 20-30 mm CL (Storer 1930). The western pond turtle occupies a variety of permanent and intermittent aquatic habitats, including rivers, streams, lakes, ponds, marshes vernal pools, and man-made ponds associated with agriculture, stock, wastewater, and logging operations (Storer 1930; Germano and Bury 2001; Buskirk 2002). Habitats with abundant basking sites, underwater cover, and standing, or slow-moving, waters are preferred conditions for WPT. In rivers, WPT is most abundant in slower waters that are deep and have basking sites (Reese and Welsh 1998a). Basking sites include boulders, stumps, logs, floating vegetation or mud banks. WPT also basks in shallow waters and within areas of dense algal mats.

The species is omnivorous and a dietary generalist (Evenden 1948; Holland 1985a, b; Bury 1986; Goodman and Stewart 1998). Studies have shown that they primarily eat aquatic invertebrates, but also eat fish, carrion, and some vegetation. (Holland 1985 a; Bury 1986). The activity cycle of this species is largely determined by temperature (Bury 1972; Reese and Welsh 1998b; Rathbun et al. 2002). The species becomes most active when water temperatures are above 15° C (59° F). Turtles may be active year-round, but with reduced activity in cooler temperatures. Courtship and mating behavior has been observed from February-November (Holland 1988).

Although typically known as an aquatic species, western pond turtles may spend considerable time on land every year. Based on radio tracking studies, turtles have been observed on uplands for up to 7 months of the year (Reese and Welsh 1997; Rathbun et al. 2002). Use of upland habitats appears to be primarily for basking (males and female) and nesting (females). The ground at upland refuge/basking sites has been shown to typically be covered with dense leaf litter produced by and overstory of woody vegetation like riparian willow thickets and oak woodland habitats. Solar access to upland basking areas appears to be an important determinant of location (Rathbun et al. 2002). Predation of WPT in upland habitats by raccoons and skunks is well documented in the published radio-tracking studies. Predation by raccoons on an adult WPT in shallow water algal mats in the Pajaro River was observed in 2007 (Kittleson, personal obs.).

Most mature females nest, or “oviposit” every year, and some may oviposit twice, or “double-clutch” (Holland 1994, Goodman 1997, Reese 1996). Oviposition occurs on land, usually above the floodplain, from 1-50 meters from water’s edge (Holland 1994) although some females have been observed more than 400 meters from water and up to 90 meters in elevation above it (Storer 1930; Rathbun et al. 1992). Females tend to seek out open areas with sparse, low vegetation, low slope angle, and dry hard soil. After voiding her bladder to soften the soil, the female excavates a pear-shaped nest chamber (scrape) with her hind feet. Eggs are deposited and the nest chamber is plugged by kneading wet soil and vegetative fragments into the throat of the nest chamber (Holland 1994, Reese 1996).

Clutch sizes range from 2-13 eggs, with most clutches containing 4.5-7.3 eggs (Bury and Germano, 2008). Eggs are deposited from April to August. Eggs are hard shelled and oval in shape, measuring 31-38 mm long by 20-24 mm wide and weighing 8-10 g (Holland 1994). Incubation takes about three months and hatching rates are about 70 percent (Holland 1994).

Steelhead Trout

Steelhead trout (*Oncorhynchus mykiss*) are anadromous trout that inhabit the coastal rivers

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

and streams. Steelhead grow and mature in the ocean and return to their natal stream to spawn. The adult migration from the ocean to freshwater usually occurs during the winter, but may occur from late fall through early spring depending upon flow and temperature conditions in the stream. Spawning occurs in the tail-end of pools, or other favorable sites, where the female buries her eggs in shallow depressions (redds) excavated in a gravel-cobble substrate (Shapovalov and Taft, 1954). Incubation can take from a few weeks to several months, depending upon water temperature. Depending upon growth rates, a juvenile steelhead can spend from one to three years in freshwater before smolting to sea. Growth rates may vary considerably throughout a given stream system, depending on availability of food and suitable rearing habitat.

Steelhead in the Pajaro River watershed are part of the South-Central California Coast Evolutionary Significant Unit (ESU) as defined by NOAA Fisheries (Busby et al., 1996) The Pajaro River is one of the major drainages of the South/Central California Coast ESU, which includes rivers from the Pajaro to (but not including) the Santa Maria River (NMFS, 2000). The Pajaro River watershed unit (3305) is mapped as Critical Habitat for the South-central California Coast steelhead.

Historic population estimates for steelhead in this ESU vary widely. During the mid 1960s McEwan and Jackson (1996) estimated runs of 1,000 to 2,000 steelhead in the Pajaro River and 3,200 in the Carmel River. During the same time period, the CDFG estimated runs of 27,750 individuals in some rivers of this ESU (NMFS, 1996). NMFS (1996) indicated that by 1990, steelhead runs were as low as 500 fish in five rivers combined (Pajaro River, Salinas River, Carmel River, Little Sur River, and Big Sur River) and Nehlsen et al. (1991) estimated a run of less than 100 steelhead in the Pajaro in 1991.

In general, it is believed that adult and juvenile steelhead use the Pajaro River as a migration corridor to reach spawning and nursery habitat in the Corralitos and Salsipuedes Creek watersheds and watersheds in Santa Clara County. High quality spawning and rearing habitat does not generally occur within the project area due to seasonally high water temperatures, low summer stream flows and sandy or silty substrate. Both adult and juvenile steelhead, however, have been observed in the project area by KEC in 2010 and 2011 during western pond turtle trapping studies. Adult steelhead have been observed in pool and run habitats both upstream and downstream of Salsipuedes Creek confluence. Five adult steelhead (2 with distinctly silver coloration) were observed in the mainstem in unusually high summer flows in July and August 2011.

Spawning gravels occur in the Aromas to Chittenden Pass area upstream of Murphy's Crossing, and steelhead occasionally spawn in this area (Smith, 2002). Occurrence of suitable spawning substrates and adequate flows in the project area depend on seasonal storms and local geomorphic functions. Following late season rains, KEC observed 3 redds and young of the year salmonids in May and June 2010 approximately 1 mile upstream of the Highway 1 bridge. Steelhead smolts can potentially rear in the lagoon, although it is not likely because spawning areas are far upstream within the Pajaro River tributaries (Smith, 2002).

In Santa Cruz County, steelhead regularly spawn and rear in the Corralitos Creek watershed in Corralitos Creek, Shingle Mill Creek, Browns Creek, and Ramsey Creek. The Casserly Creek watershed, which includes College Lake and Green Valley Creek, also supports steelhead and resident rainbow trout. From the confluence of the College Lake outflow channel and lower Corralitos Creek, the levied channel reach is referred to as Salsipuedes Creek and is considered a migration corridor, due to high water temperatures, low flows and dry reaches upstream in Corralitos Creek, and periodic fluctuations in flows resulting from College Lake

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

drainage pumping.

Carlton Creek, Coward Creek and the small subwatersheds that drain to the Pajaro River Flood Control Channel through flapgates in the levees, upstream of Watsonville, do not have sufficient flow and are too modified by agriculture to support steelhead. Upstream of Murphy's Crossing several tributary creeks provide potential steelhead spawning and rearing habitat, including Pescadero, Uvas, Llagas and Pacheco creeks (Smith, 1982; Smith et al., 1983; Smith 2002).

Like many central California coastal rivers, a sandbar periodically forms at the mouth of the Pajaro River, usually in late summer or early fall. Steelhead migration in the Pajaro River system is dependent upon winter rains that open the lagoon to tidal action and allow adult steelhead to migrate upstream and downstream. The lagoon generally remains open during the steelhead smolt outmigration period (typically April through early June). In most years the mouth is partially open all summer and tidal action in the brackish lagoon can occasionally penetrate as far as 0.5 mile upstream of the Highway 1 Bridge (KEC 2009).

Steelhead may use the Pajaro River Lagoon for juvenile rearing, although conditions are less than ideal, depending on water flow, temperature, and the status of river mouth conditions. Wave wash over the closed lagoon sand bar can result in high salinity and temperature stratification. While the lagoon is generally considered downstream of the Highway 1 Bridge, tidal influence during open lagoon conditions results in notable changes in water surface elevation to areas 0.5 miles upstream of Highway 1.

Tidewater Goby

The tidewater goby is currently a federally listed endangered species and occurs in the Pajaro River and lower Watsonville Slough. Tidewater gobies were present in the Pajaro River Lagoon in 1991 and 1992 (Swanson and HRG, 1993), but have not been captured in the lagoon since 1994 (Smith, 2002). During years of mild winters and early sandbar formation at the mouth of the Pajaro (such as 1987-1991), gobies are probably abundant and distributed throughout the lagoon, including upstream to Highway 1 (Swanson and HRG, 1993). In years of heavy storms and late sandbar closure, gobies may be rare and restricted to calmer portions of the lagoon and Watsonville Slough.

Limited instream activity is proposed within the upper reaches of the potential habitat of tidewater goby. All but three instream log structures are planned for upstream reaches, above tidally influence lagoon habitat. Log structures placed in Excavation Site 2R, therefore, may interface with potential tidewater goby habitat, although their presence is not expected. No significant effects to gobies are anticipated.

Western Snowy Plover

The western snowy plover (*Charadrius alexandrines nivosus*) is listed as threatened under the federal ESA as a result of the loss of nesting habitat to urban development, nest predation, and human disturbance. The species is also designated a SSC by the CDFG. In 1999, USFWS designated critical habitat for the Pacific coast population of the western snowy plover (USFWS, 1999). Critical habitat is designated for 28 areas, totaling approximately 8,097 hectares (20,000 acres) and about 338.1 kilometers (210 miles) of coastline, or about 10 percent of the coastline California, 7 percent in Oregon, and 2 percent in Washington. The USFWS designated the beaches (Sunset State Beach and Zmudowski State Beach) on either side of the mouth of the Pajaro River as critical habitat (64 Federal Register 68507).

The Pacific coast population of the western snowy plover breeds primarily on coastal beaches

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

from southern Washington to southern Baja California Mexico. Sand spits, dune-backed beaches, unvegetated beach strands, open areas around estuaries, and beaches at river mouths are preferred nesting habitats. The breeding season is from March through late September (USFWS 2007). The incubation period is typically 24 days and the chicks fledge within 30 days. After loss of clutch or brood or successful hatching, plovers may re-nest in the same area or move up to several hundred miles to another site. The snowy plovers are opportunistic feeders and prey on a variety of common food items such as aquatic insects, crustaceans and invertebrates. The Pajaro River Lagoon, surrounding beaches and flooded agricultural fields provide favorable foraging and nesting habitat for the western snowy plover. This species has not been recorded in the project area.

Yellow Warbler

The yellow warbler is a common breeding bird in the Pajaro River flood control channel, with confirmed breeding in 2007 and 2010 bird surveys in the dense willow riparian habitat below the benches throughout the project area. Currently considered a CDFG Species of Special Concern (breeding), priority 2, the yellow warbler has been included on both prior special concern lists (Remsen 1978, 2nd priority; CDFG 1992a). This species breeds from April to late July and was a common nester in the willow riparian habitats adjacent to the proposed bench excavation sites. 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 (1979–1999, Ballard et al. 2003) and declines approaching significance in California (1968–2004, Sauer et al. 2005). Both local abundance and long-term trends, however, vary greatly by region.

Yellow Warblers generally occupy riparian vegetation in close proximity to water along streams and in wet meadows (Lowther et al. 1999). Throughout, they are found in willows (*Salix* spp.) and cottonwoods (*Populus* spp.), Based on the location of, and limit to, riparian habitat impacts, yellow warbler is not expected to be adversely affected by the proposed project. Project avoidance of the most suitable yellow warbler nesting habitat and breeding season work limitations minimize potential impacts to a level of less than significant.

White-tailed Kite

The white-tailed kite (*Elanus leucurus*) is a yearlong resident in coastal and valley lowlands, and is rarely found away from agricultural areas. They are permanent residents in California and western Oregon. The white-tail kite is listed as Fully Protected by the CDFG (Section 3511 of the California Public Resources Code). Fully protected species may not be taken or possessed at any time and no licenses or permits may be issued for their take except for collecting these species for necessary scientific research and relocation of the bird species for the protection of livestock.

Suitable habitat for white-tailed kite consists of tree-dotted lowlands or hillsides, ungrazed or fallowed grasslands, marshes, croplands, savannahs, and emergent wetlands. These areas provide foraging habitat that is abundant with preferred food sources that include: primarily voles and other small; diurnal mammals, occasionally birds, large insects, reptiles, and amphibians. White-tail kite forage by flying over undisturbed open habitats; hovering in place over a target species and then diving after its prey. Nesting for the white-tailed kite takes place in trees with nest placement well above the ground and within close proximity to foraging sites. Monogamous pairs build bulky stick platforms lined with grasses, straw, rootlets, and other soft vegetation. Breeding takes place from mid-March to early April through to late September (Fix and Bezener. 2000).

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

They are most common in winter and during spring and fall migrations. They are not known to nest in the project area, and were not recorded during either the 2007 or 2010 spring breeding season surveys. Although this species has been observed throughout the lower Pajaro River, during the summer "construction" period, white tailed kites have been observed most frequently upstream of the confluence with Salsipuedes Creek, on the Monterey County side, outside of any proposed project impact areas.

San Francisco Dusky-footed Woodrat

The San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*; SFDW) is designated as a CDFG SSC. The SFDW is one of eleven subspecies of the dusky-footed woodrat that live throughout California and the arid west. This species inhabits hardwood forests of moderate canopy with a moderate to dense understory. The subspecies occurs in Coast Ranges between San Francisco Bay and the Salinas River (Matocq, 2003). It prefers brushy riparian habitats, coast live oak woodland, and dense scrub communities. Prominent stick houses provided evidence of its presence. Nests are constructed out of leaves, shredded grass, and other material. Habitat for this species exists in the riparian communities of the project area.

Woodrats build mounded stick lodges that may range in size from 3 to 8 feet across at the base and as much as 6 feet tall, and they tend to live in colonies of 3 to 15 or more lodges. The lodges or houses can be quite complex inside, with multiple chambers for general living, nesting, latrine use, food storage, and other activities. The availability of suitably-sized sticks may limit the number of woodrat houses (Santa Cruz Mountains Bioregional Council, 2004). Arboreal woodrat nests have been observed in the bench excavation areas within the willow-covered banks on the Santa Cruz County side within excavation Sites 8R and 6R.

Pallid Bat

Pallid bat is a habitat generalist that could make use of mature trees in the project area for roosting. No records of pallid bat exist for the project area, but suitable trees exist throughout the riparian corridor and on the bench surfaces. Preconstruction surveys for pallid bat are planned to coincide with preconstruction bird nest surveys.

Special Status Plant Species

Special-status plant species with the potential to occur in the project area were identified through informal consultation with the resource agencies, and by a search of the CDFG CNDDB and California Native Plant Society (CNPS) database for the project quadrangles: Soquel, Watsonville West, Watsonville East, Moss Landing, and Prunedale (accessed July 15, 2011).

Twenty special-status plant species were identified as potentially occurring near the project. A combination of literature investigation and examination of previous field surveys was used to evaluate the potential presence of these species along the Pajaro River and Salsipuedes and Corralitos creeks. Information about habitat requirements, range, and nearest occurrence was drawn from The Jepson Manual of Higher Plants of California (Hickman 1993), A California Flora and Supplement (Munz and Keck 1968), the CNPS inventory, and the CNDDB. Using a review of habitat requirements and observed conditions within the project area, 9 of the 16 species identified on the original list were determined to have little potential for occurrence in the project area and are not discussed further. The seven special-status plant species potentially occurring in the project vicinity are described below. See Table 12 for a complete list of special status plant species potentially occurring in the project vicinity.

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

Congdon's Tarplant

Congdon's tarplant (*Centromadia parryi* ssp. *congdonii*) is categorized as a CNPS List 1B species (CDFG 2012). This species occurs from Contra Costa and San Mateo counties to San Luis Obispo County. This tarplant is found on alkaline soils in valley and foothill grassland at elevations from 0 to 230 meters (0 to 755 feet). Some soils supporting this species are described as heavy white clay. This species may be found in more ruderal grassy habitats, as well. Congdon's tarplant is an annual species that flowers from May to October or November. Although populations of Congdon's tarplant occur in the vicinity of the project and ruderal grassland areas are present in the project, this species has not been reported during surveys in the project area.

Table 12
Special-status Plant Species Potentially Occurring in the Project Vicinity

Common Name (*Scientific Name*)	Status
Congdon's tarplant (*Centromadia parryi* ssp. *Congdonii*)	CNPS 1B
Robust spineflower (*Chorizanthe robusta* var. *robusta*)	FE, CT, CNPS 1B
Coast wallflower (*Erysimum ammophilum*)	CNPS 1B
Santa Cruz tarplant (*Holocarpha macradenia*)	FE, CE, CNPS 1B
Monterey spineflower (*Chorizanthe pungens* var. *pungens*)	FT, CNPS 1B
Eastwood's goldenbush (*Ericameria fasciculate*)	CNPS 1B
Sand gilia (*Gilia tenuiflora* ssp. *arenaria*)	FE, CT, CNPS 1B

Notes:

FE:	Federally listed as Endangered	FT:	Federally listed as Threatened
CT:	State –listed as Threatened in California	CE:	State-listed as Endangered in California
CNPS 1B	California Native Plant Society List 1B: rare, threatened or endangered in California and elsewhere		

Monterey Spineflower

Monterey spineflower (*Chorizanthe pungens* var. *pungens*) is federally listed as threatened (February 4, 1994 [59 FR 5499]) and is categorized as a CNPS List 1B species (CDFG 2012). Critical habitat was designated for this species in 2002 (67 FR 37497 37546), and revised critical habitat was designated in 2008 (73 FR 1525), but no critical habitat has been designated in the project area. Historically, Monterey spineflower occurred from San Simeon north to Santa Cruz County, but currently it is found only from the Monterey Peninsula (Monterey County) northward along the coast to southern Santa Cruz County, and inland to the Salinas Valley (USFWS 1998).

Monterey spineflower is found on sandy soils derived from ancient stabilized dunes in recent coastal dunes, coastal scrub, and farther inland in maritime chaparral at elevations below 450 meters (1,475 feet). This species tends to occur within these communities on bare sandy patches with little vegetative cover (USFWS 1998). Habitat distribution within dune systems is subject to shifts caused by patterns of dune mobilization, stabilization, and successional trends in coastal dune scrub that reduce vegetation gaps. Therefore, populations of this spineflower that occur in unstable habitat are naturally subject to substantial long-term turnover and shifts in distribution and size (USFWS 1998). Monterey spineflower is a prostrate annual species in the buckwheat family (*Polygonaceae*) that flowers from April through June (CNPS 2010).

Although populations of the Monterey spineflower and designated critical habitat for this species lie north and south of the project area, Monterey spineflower has not been reported within the project area.

Robust Spineflower

Robust spineflower (*Chorizanthe robusta* var. *robusta*) is federally listed threatened (59 FR

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

5499) and is state-listed as threatened (CDFG 2012). This species is categorized as a CNPS List 1B species (CDFG 2012). Critical habitat has been designated for this spineflower (67 FR 36822). Historically, the robust spineflower ranged from Alameda County south to northern Monterey County, a range of 160 kilometers (100 miles). However, the identification of the Alameda collections with this species is uncertain. The current distribution of this species is restricted to coastal and near-coastal sites in southern Santa Cruz County and northern Monterey County.

Robust spineflower grows in loose, sandy soil on active coastal dunes, and inland from the immediate coast in sandy openings within scrub, maritime chaparral, or oak woodland habitats (66 FR 10419) at elevations below 120 meters (400 feet). Habitat distribution within dune systems is subject to shifts caused by patterns of dune mobilization, stabilization, and successional trends in coastal dune scrub that reduce vegetation gaps. Therefore, populations of robust spineflower, found in gaps between stands of scrub, shift in distribution and size over time. The robust spineflower is an annual species that flowers from April through June (CNPS 2010). Although populations of robust spineflower and designated critical habitat for this species lie immediately north of the project area, this species is not known to occur within the project area.

Eastwood's Goldenbush

Eastwood's goldenbush (*Ericameria fasciulata*) is categorized as a CNPS List 1B species (CDFG 2012). This species occurs only in Monterey County. This shrub is found in sandy openings in closed-cone coniferous forest, maritime chaparral, coastal scrub, and coastal dunes at elevations from 30 to 275 meters (CDFG 2011a). Eastwood's goldenbush is an evergreen shrub that flowers from July to October (CNPS 2011). No suitable habitat exists for this species in the project area.

Coast Wallflower

Coast wallflower (*Erysimum ammophilum*) is categorized as a CNPS List 1B species (CDFG 2012). This species occurs in San Mateo, Santa Cruz, Monterey, Santa Barbara, San Diego, counties and also on Santa Rosa Island. This wallflower is found in sandy openings in maritime chaparral, coastal dunes, and coastal scrub at elevations from 0 to 130 meters (CDFG 2011a). Coast wallflower is a perennial herb that flowers from February to June (CNPS 2010). Although a population is present in the dunes immediately north of the Pajaro River estuary, no Coast wallflowers have been observed in the project area.

Sand Gilia (Monterey Gilia)

Sand gilia (*Gilia tenuiflora* ssp. *Arenaria*) is federally listed as endangered and state-listed as threatened (57 FR 27848). No critical habitat has been designated or proposed for this taxon. This gilia is a Monterey County endemic species, restricted to the coastal dune scrub community of the Monterey Bay dunes and the Asilomar dunes of the Monterey Peninsula. It is distributed in discontinuous populations from Spanish Bay on the Monterey Peninsula north to Moss Landing (USFWS 1998).

The sand gilia grows in sandy soils of dune scrub, coastal sage scrub, and maritime chaparral in the coastal dunes of Monterey County at elevations from 0 to 45 meters (0 to 150 feet). This species is associated with dune scrub vegetation on sedimentary rocks and aeolian deposits formed as sea level rose since the end of the last ice age (Barbour and Johnson 1977). Sand gilia is found in sand substrates with some soil development and litter accumulation and with limited exposure to strong winds, salt spray, and waves. It grows in open areas and wind-sheltered openings in the low-growing dune scrub vegetation and in areas where the sand has

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

experienced some disturbance, such as along trails and roads. The species is usually tolerant of small amounts of drifting sand, but tends to occur in stable sites with minimal sand accretion or deflation (USFWS 1998). Sand gilia is an annual species that flowers from April to June (CNPS 2010). Seeds are dispersed by wind throughout the dune openings; but dispersal can be inhibited by dense stands of low-growing dune scrub.

This species is not known to occur within the project area. The nearest occurrence of sand gilia is in Watsonville Slough approximately 1.5 miles north of the Pajaro River mouth.

Santa Cruz Tarplant

The Santa Cruz tarplant (*Holocarpha macradenia*) is federally listed as threatened (March 20, 2000 [65 FR 14898]) and is state-listed as endangered. This species is categorized as a CNPS List 1B species (CDFG 2012). Critical habitat for this species has been designated (10/16/2002). This tarplant historically occurred from Monterey County, north to Marin County, but is currently known from only 20 populations; 8 of which are a result of experimental seedings (64 FR 14898). Eleven of the native populations are in Santa Cruz County, while only one population occurs in Monterey County, just south of the Santa Cruz County line and the City of Watsonville. No critical habitat for this species is present in the project area, although Unit I (Watsonville) is approximately one mile north of the project area and Unit K (Elkhorn Slough), is approximately one mile south of the project area (64 FR 14898).

Santa Cruz tarplant is found in grasslands and prairies on coastal terraces at elevations below 260 meters (855 feet). Populations of this species occur on the alluvium resulting from the terrace deposits. Because the soils where this tarplant occurs typically include a subsurface clay component, they hold moisture longer into the growing season compared to the surrounding sandy soils (64 FR 14898). As a summer-blooming species, the Santa Cruz tarplant may benefit from this late season moisture. This tarplant is an annual species that flowers from June to October (CNPS 2010). Like other members of the genus, the Santa Cruz tarplant establishes seed banks, so that sites that support a population of this plant, particularly those that support small populations (fewer than 100 individuals), might not display individuals in any given year, but still have a viable population in other years.

Although populations of the Santa Cruz tarplant and designated critical habitat for this species lie north and south of the project area, no populations of this species have been reported in the project area.

Offsite Stockpile Areas

City of Watsonville Landfill

No special status species are expected to occur at the City of Watsonville Landfill. Therefore, no impacts to special-status species are anticipated from the placement of fill material.

Buena Vista Landfill

No special status species are expected to occur at the Buena Vista Landfill. Therefore, no impacts to special-status species are anticipated from the placement of fill material.

Manabe-Ow Business Park

An EIR for the Manbe-Ow Business Park was certified by the City of Watsonville City Council on October 26, 2010. The Manbe-Ow project authorizes the placement of approximately 225,000 cubic yards of fill within both the east and west Business Park planning areas. The following discussion summarizes impacts and mitigation associated with the certified EIR.

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

Fifteen (15) special status plant species have the potential to occur in the vicinity of the Manabe-Ow stockpile area. In addition to surveys completed in January 2006 (which is outside of the blooming season for mist plant species), a predictive evaluation was conducted for each special status species. Based on the field surveys, an evaluation of the habitat type and an evaluation of the habitat needs of the species, Biotic Resources determined the potential occurrence of the species. As a result of the habitat evaluation, the planning area provides low potential for plant species of concern. The history of disturbance of the site (i.e., use as row crop agriculture) significantly lowers the potential for occurrence of special status plant species. No special status plant species were observed in the planning area during the surveys conducted as part of the Watsonville Slough Watershed Plan and none are expected to occur within the planning area based on an evaluation of the site's habitat features.

California Red-Legged Frog

Federal Listing Status: Threatened; State Listing Status: SSC. CRLF were observed at the edge of the open water of Watsonville Slough, along old Harkins Slough Road approximately 0.3 mile upstream of the planning area (Dana Bland & Assoc. 2004). They may occasionally utilize the open water/freshwater marsh areas within the planning area during dispersal between more suitable habitats within the slough. It is unlikely that red-legged frogs breed within the Manabe-Ow project area due to unfavorable site conditions including abundance of non-native predators (i.e., crayfish, fish, and bullfrogs), variable water levels (including high flows during winter rains) within the ditched portions of the slough, and sparse vegetation within the winter open water areas to provide cover and attachment for eggs.

Western Pond Turtle

Federal Listing Status: None; State Listing Status: SSC. No Western pond turtles (*Actinemys marmorata*) were observed during the site reconnaissance (Dana Bland & Assoc. 2004). Impacts to and development of important wildlife habitat are restricted under the City of Watsonville General Plan goals, policies and implementation measures (Goal 9.8, Policy 9.F, Implementation Measure 9F.1).

Northern Harrier

Federal Listing Status: None; State Listing Status: SSC. Northern harriers (*Circus cyaneus*) are common during winter in the Pajaro Valley, and nest in spring and summer. This species is not currently known to nest within the planning area, but potentially suitable nesting habitat occurs in marshy undeveloped portions of Struve Slough and Watsonville Slough.

California Yellow Warbler

Federal Listing Status: None; State Listing Status: SSC. The California yellow warbler (*Dendroica petchia brewsteri*) is expected to nest in the vicinity of Struve and Watsonville Sloughs.

Tricolored Blackbird (*Agelaius tricolor*)

Federal listing status: None; State Listing Status: SSC. This species typically nests in tall, dense stands of cattails or tules, but also nests in blackberry, wild rose bushes, and tall herbaceous vegetation near water. There are no recent records of tricolored blackbirds nesting in the planning area (CNDDB 2005). Suitable habitat occurs for this species at Struve and Watsonville Sloughs, and Tricolored Blackbirds could colonize such areas.

San Francisco Dusky-footed Woodrat

Federal Listing Status: None; State Listing Status: SSC. The San SFDW prefers hardwood

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

forests, riparian habitats, and brushlands and often forages above ground. Food includes berries, fungi, leaves, flowers, and nuts. Woodrats construct large nests of sticks. The species is expected to occur in suitable riparian habitat in the vicinity of Struve and Watsonville Sloughs.

Special-status Bat Species

The planning area may provides potential roosting habitat within the wooded areas, buildings, and structures for four special-status bat species: pallid bat (*Antrozous pallidus*), western red bat (*Lasiurus blossevillii*), fringed myotis (*Myotis thysanodes*), and long-legged myotis (*Myotis volans*). The pallid bat and the western red bat are CDFG SSC. All four bats are considered 'High Priority' on the Western Bat Working Group's (WBWG) Western Bat Species Regional Priority Matrix (1998). Special-Status Bats. Limited access to many of the residential uses within the planning area and the lack of survey data prevents a definitive determination as to whether or not bats roost within the planning area. Due to the lack of trees and abandoned buildings within the planning area, the potential for bats to forage or migrate through the planning area is considered very low.

Elkhorn Slough Sites

Seal Bend Stockpile Area

The proposed Seal Bend stockpile area is intensively used by dairy cattle; and therefore, wildlife surveys within the feedlot were not conducted due to the high level of ground disturbance and lack of suitable habitat. It is unlikely that the unvegetated area provides substantial wildlife habitat for any sensitive or endangered species (Attachment 4).

The offsite eucalyptus grove has been documented to provide habitat for:

- overwintering monarch butterflies (*Danaus plexippus*) (California Natural Diversity Database, 2008 edition, and A. Woolfolk, pers. obs.)
- a heron-egret-cormorant rookery (*Ardea herodias*, *Ardea alba*, *Phalacrocorax auritus*) (ESNERR, unpubl. data)
- resident winter wren (*Troglodytes troglodytes*) (D. Roberson, pers. comm.)
- nesting Pacific-slope flycatcher (*Empidonax difficilis*), brown creeper (*Certhia americana*), downy woodpecker (*Picoides pubescens*), and chestnut-backed chickadees (*Poecile rufescens*) (D. Roberson, pers. comm.).

Based on an occurrence reported in 1951, the 2008 edition of the California Natural Diversity Database indicates that the bank swallow (*Riparia riparia*), a State of California threatened species, may occur on the property. However, it is unlikely that this species occurs in the existing feedlot due to lack of suitable habitat. According to the California Department of Fish and Game (CDFG) "in their present range in California, bank swallows primarily nest in steep earthen river banks" (CDFG 1992b), and the proposed site does not include any vertical banks. Presently the only known Monterey County nesting sites are on the Salinas River and one of its tributaries; two sightings of bank swallows near the proposed stockpile site (1978 and 1986) are thought to have been non-breeding migrants (Roberson 2002).

Therefore, the placement of fill at the Seal Bend stockpile area would not result in 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 the California Department of Fish and Game, or U.S. Fish and Wildlife Service.

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

Minhoto Hester's Stockpile Area

The proposed Minhoto-Hester's stockpile area was actively cultivated until 2010; and therefore, wildlife surveys within the agricultural land were not conducted due to the high level of ground disturbance. It is unlikely that the agricultural land would provide substantial wildlife habitat for any sensitive or endangered species due to lack of suitable habitat (Attachment 4).

The 2008 edition of the California Natural Diversity Database indicates that the mimic tryonia (*Tryonia imitator*) and the California clapper rail (*Rallus longirostris obsoletus*) may occur on the proposed site, but the occurrence of either is highly unlikely. The mimic tryonia is restricted to estuarine wetlands and the site is upland. The California clapper rail is locally extinct, and was last recorded in Elkhorn Slough in 1980 (Roberson 2002). Furthermore, the California clapper rail inhabits tidal salt marshes, and the proposed stockpile area is located entirely in upland.

Therefore, the placement of fill at the Minhoto-Hester's stockpile area would not result in 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 the California Department of Fish and Game, or U.S. Fish and Wildlife Service.

A.R. Wilson Quarry

No special status species are expected to occur at the A.R. Wilson Quarry. Therefore, no impacts to special-status species are anticipated from the placement of fill material.

Regulatory Environment

Federal

Endangered Species Act

Section 7 of the ESA of 1973, as amended (16 USC 1531), requires federal agencies to consult with the Secretary of the Interior (USFWS) and the Secretary of Commerce (NOAA Fisheries) to ensure that agency actions do not jeopardize the continued existence of endangered or threatened species or adversely modify critical habitat that supports such species. The federally threatened south-central California Coast ESU steelhead, the federally endangered tidewater goby, the federally threatened CRLF, and the federally endangered western snowy plover are listed under the federal ESA and are known to occur within the project area.

The USACE has been informally consulting on an ongoing basis with NOAA Fisheries regarding the steelhead. In addition, the County of Santa Cruz has prepared a Biological Assessment (BA) that addresses the effects on steelhead from bench excavation, project mitigation, and ongoing vegetation management within the river channel (Attachment 1). The BA will be used by the USACE to determine the potential for incidental take of listed species. The USACE assumes that the project might affect listed species and that incidental take authorization for the project might be necessary, warranting formal consultation under Section 7 of the ESA. NOAA Fisheries is expected to issue a BO regarding steelhead in Spring 2012.

The USACE has also been informally consulting with the Service regarding the CRLF. In addition, the USACE is preparing a BA that addresses the effects from bench excavation activities, mitigation, and ongoing vegetation maintenance within the river channel and the resulting potential for incidental take of this listed species. The USACE assumes that incidental take authorization for the project might be necessary, thus formal consultation under Section 7

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

of the ESA is warranted. The USFWS is expected to issue a BO regarding the CRLF in Spring 2012.

Clean Water Act of 1972

Section 404 of the Clean Water Act (CWA) requires a permit before dredged or fill material may be discharged into waters of the United States, including wetlands. The USACE, in coordination and consultation with the U.S. Environmental Protection Agency (EPA), is responsible for the 404 permit program. The basic premise of the 404 permit program is that no discharge of dredged or fill material may be permitted if "(1) a practicable alternative exists that is less damaging to the aquatic environment or (2) the nation's waters would be significantly degraded" (U.S. EPA 2007). The 404 permit program includes general permits and individual permits, with the former being applicable to most discharges that will have only minimal adverse effects and the latter being applicable to activities that have the potential for significant impacts. Both general permits and individual permits must also demonstrate compliance with a number of other federal laws such as NEPA, the ESA, Section 106 of the National Historic Preservation Act, Section 401 of the CWA, and the Coastal Zone Management Act.

Fish and Wildlife Coordination Act

The FWCA (16 USC 661 et seq.) requires federal agencies to consult with the USFWS, or, in some instances, with NOAA Fisheries, and with state fish and wildlife resource agencies before undertaking or approving water projects that control or modify surface water. The purpose of this consultation is to ensure that wildlife resources held in public trust receive appropriate consideration and be coordinated with the features of these water resource development projects. Federal agencies undertaking water projects are required to fully consider recommendations made by the USFWS, NOAA Fisheries, and state fish and wildlife resource agencies in project reports, such as documents prepared to comply with NEPA and CEQA, and to include measures to reduce impacts on wildlife in project plans.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) (16 USC 703 et seq.) implements various treaties and conventions among the United States, Canada, Japan, Mexico, and Russia, providing protection for migratory birds as defined in 16 USC 715j. The MBTA makes it unlawful for any "person" to take, kill, capture, collect, possess, buy, sell, trade, ship, import, or export any migratory bird, including feathers, parts, nests, or eggs. The MBTA does not protect the habitat of migratory birds. Violations of the MBTA are considered criminal offenses.

Executive Order 11990 – Protection of Wetlands

Executive Order 11990 directs federal agencies, in carrying out their responsibilities, to provide leadership to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands. This policy states that federal agencies should avoid, to the extent possible, the long-and short-term adverse impacts associated with destruction or modification of wetlands. It also states that agencies should avoid undertaking and providing support for new construction in wetlands, including draining, dredging, channelizing, filling, diking, impounding, and other related activities, unless the agency finds that no practicable alternatives exist and all practical measures have been taken to minimize harm to wetlands.

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

State

California Environmental Quality Act

The California Environmental Quality Act (CEQA) requires all California public agencies to comply with requirements that avoid or reduce environmental damage, inform the public of projects that significantly affect the environment, and implement feasible alternatives or mitigation when environmental damage can be prevented (Public Resource Code 21000 et. Seq.). CEQA applies to all discretionary activities proposed to be carried out or approved by California public agencies, including state, regional, county, and local agencies, unless an exemption applies. CEQA's substantive provisions require agencies to address environmental impacts disclosed in an appropriate document. It requires that public agencies comply with both procedural and substantive requirements. Procedural requirements include the preparation of the appropriate environmental documentation, mitigation measures, mitigation monitoring and reporting, public notices, responses to comments, and State Clearinghouse review.

California Fish and Game Code (Section 1600 Lake or Streambed Alteration Agreement Program)

The CDFG regulates work that will substantially affect resources associated with rivers, streams, and lakes in California, pursuant to California Fish and Game Code Sections 1600-1607. Under Section 1601 of the Fish and Game Code, any state or local governmental agency or public utility must notify CDFG if it proposes to divert, obstruct, or change the natural flow or bed, channel, or bank of any river, stream, or lake designated by the CDFG in which there is at any time an existing fish or wildlife resource or from which these resources derive benefit; (2) use materials from the streambeds designated by CDFG; or (3) dispose or deposit debris, waste, or other materials containing crumbled, flaked, or ground pavement where it can pass into any river, stream, or lake designated by CDFG. Any person, governmental agency, or public utility proposing any activity that will divert or obstruct the natural flow or change the bed, channel, or bank of any river, stream, or lake or proposing to use any material from a streambed must first notify CDFG of such proposed activity.

California Endangered Species Act

The CESA of 1974, as amended, is part of the California Fish and Game Code. As a guide to state agencies, Section 2053 states that, "it is the policy of the state that state agencies should not approve projects as proposed which would jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat essential to the continued existence of those species, if there are reasonable and prudent alternatives consistent with conserving the species or its habitat which would prevent jeopardy." CESA prohibits take of species listed or proposed for listing as endangered or threatened. Under Section 2081 of CESA, the CDFG may authorize "take" of state-listed species that is incidental to otherwise lawful activities. Consultation with CDFG under CESA is also required for species designated as "fully protected" under state law.

California Fully Protected Species

As stated in Section 3511(a)(1) of the California Fish and Game Code, "Except as provided in Section 2081.7, fully protected birds or parts thereof may not be taken or possessed at any time. No provision of this code or any other law shall be construed to authorize the issuance of permits or licenses to take any fully protected bird, and no permits or licenses heretofore issued shall have any force or effect for that purpose. However, the department may authorize the taking of those species for necessary scientific research, including efforts to recover fully

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

protected, threatened, or endangered species, and may authorize the live capture and relocation of those species pursuant to a permit for the protection of livestock." The white-tailed kite, known to occupy the project site, is listed as a Fully Protected species.

Native Plant Protection Act; California Fish and Game Code §1900 et seq.

The Native Plant Protection Act (NPPA) is part of the California Fish and Game Code. The purpose of this act is to preserve, protect and enhance endangered or rare native plants of the state. The NPPA allows for the designation of endangered and rare native plant species and states that no person shall take any native plant, or any part or product thereof that the commission has determined to be an endangered native plant or rare native plant, except as otherwise provided in the NPPA.

Local

County of Santa Cruz General Plan

Goals, Objectives and Policies regarding sensitive species and their habitats are found in Chapter 5, Conservation and Open Space, of the Santa Cruz County General Plan (1994). Relevant to the project are the following:

Goal, Natural and Cultural Resources Protection: To protect and restore unique, rare, threatened, endangered and other natural and cultural resources that warrant preservation because of their biological value, scarcity, scientific value, aesthetic Quality, or Cultural significance.

- Objective 5.1 Biological Diversity: To maintain the biological diversity of the County through an integrated program of open space acquisition and protection, identification and protection of plant habitat and wildlife corridors and habitats, low-intensity and resources compatible land uses in sensitive habitats and mitigations on projects and resources extraction to reduce impacts on plant and animal life.
    - Policy 5.1.1 Sensitive Habitat Designation: Designate the following areas as sensitive habitats: (a) areas shown on the County General Plan and LCP Resources and Constraints Maps; (b) any undesignated areas which meet the criteria (policy 5.1.2) and which are identified through the biotic review process or other means; and (c) areas of biotic concern as shown on the Resources and Constraints Maps which concentrations of rare, endangered, threatened or unique species.
    - Policy 5.1.2 Definition of Sensitive Habitat: An area is defined as a sensitive habitat if it meets one or more of the following criteria:

        (c) Areas adjacent to essential habitats of rare, endangered or threatened species is defined in (e) and (f) below.

        (d) Areas which provide habitat for Species of Special Concern as listed by the California Department of Fish and Game in the Special Animals List, Natural Diversity Database.

        (e) Areas which provide habitat for rare or endangered species which meet the definition of Section 15380 of the California Environmental Quality Act Guidelines.

        (f) Areas which provide habitat for rare, endangered or threatened species as designated by the State Fish and Game Commission, United States Fish and Wildlife Service, or California Native Plant Society.

        (i) All lakes, wetlands, estuaries, lagoons, streams and rivers.

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

(j) Riparian corridors.

- Policy 5.1.4 Sensitive Habitat Protection Ordinance: Implement the protection of sensitive habitats by maintaining the existing Sensitive Habitat Protection Ordinance. The ordinance identifies sensitive habitats, determines the uses which are allowed in and adjacent to sensitive habitats, and specifies required performance standards for land in or adjacent to these areas. Any amendments to this ordinance shall require a finding that sensitive habitats shall be afforded equal or greater protection by the amended language.
- Policy 5.1.6 Development within Sensitive Habitats: Sensitive habitats shall 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 5.1.8 Chemicals within Sensitive Habitats: Prohibit the use of insecticides, herbicides, or any toxic chemical substance in sensitive habitats, except when an emergency has been declared, when the habitat itself is threatened, when a substantial risk to public health and safety exists, including maintenance for flood control by Public Works, or when such use is authorized pursuant to a permit issued by the Agricultural Commissioner.
- Policy 5.1.9 Biotic Assessments: Within the following areas, require a biotic assessment as part of normal project review to determine whether a full biotic report should be prepared by a qualified biologist: (a) Areas of biotic concern, mapped; (b) Sensitive habitats, mapped & unmapped.
- Policy 5.1.10 Species Protection: Recognize that habitat protection is only one aspect of maintaining biodiversity and that certain wildlife species such as migratory birds, may not utilize specific habitats. Require protection of these individual rare, endangered and threatened species and continue to update policies as new information becomes available.

Santa Cruz County Zoning Ordinance and Other County Ordinances

The Santa Cruz County Zoning Ordinance implements the elements of the County General Plan and serves to establish various districts, regulations, and permit processes for the unincorporated area within the County. Other County ordinances establish specific standards for land use and development within the unincorporated areas for purposes of conforming to and implementing General Plan and Local Coastal Program land use policies. County ordinances relevant to the Pajaro Bench Excavation project are described in Section P (Land Use and Planning) of this Initial Study. Santa Cruz County will assure consistency with the provisions of the County's Zoning Ordinance and all other pertinent county ordinances.

The Pajaro River Bench Excavation project is exempt from the Riparian Corridor and Wetlands Protection Ordinance. Section 16.30.050 (e) of the County Code states, "In areas outside of the Coastal Zone, the operation, repair, and maintenance of the Pajaro River and Salsipuedes Creek levees and the areas within the levees, for the purpose of restoring flood conveyance capacity, including bench excavation, sediment removal, and similar projects, if all of the following conditions are met: (1) The work is conducted by or under the direction of the Department of Public Works; (2) The work is in accordance with a Streambed Alteration

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

Agreement approved by the California Department of Fish and Game, to the extent that such an Agreement is required; and (3) The project has been subjected to environmental review with the County of Santa Cruz serving as the lead agency."

City of Watsonville General Plan

The City of Watsonville General Plan, adopted in 1994, includes the following goals and policies with relevance to the Pajaro Bench Excavation project:

Goal 9.1: Preserve a comprehensive network of open space land uses for outdoor recreation and environmental protection.

Goal 9.8: Preserve and protect the remaining areas of wildlife habitat for their scenic and scientific value.

Policy 9.F Wildlife Habitat Protection: The City shall designate for open space and environmental management those areas rich in wildlife species and fragile in ecological make-up. These habitat zones shall be made part of the greenbelt where appropriate.

Implementation Measures:

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; and c) Woodlands and Steep Slopes.

9.F.2 Restoration – The City shall support and encourage public and private efforts to restore degraded natural habitat zones and, when possible, to acquire them for preservation.

9.F.3 Pesticide Control – The City shall carefully regulate and monitor, within the limits of its authority, the use of pesticides, herbicides, and fungicides in and adjacent to wildlife habitat zones.

9.F.4 Fish and Game Consultation – The City shall refer development proposals to the California Department of Fish and Game for its recommendations on conservation measures for native plant communities, riparian vegetation, wildlife habitat, and wetland preservation.

The City of Watsonville will assure consistency with the provisions of the City's General Plan.

County of Monterey General Plan

Goals and Policies regarding sensitive species and their habitats are found in Chapter 3.0, Conservation and Open Space Element, of the Monterey County General Plan (2010). Relevant to the project are the following:

Goal OS-5: Conserve listed species critical habitat, habitat and species protected in area plans; avoid, minimize and mitigate significant impacts to biological resources.

- Policy OS-5.1: The extent and acreages of critical habitat shall be inventoried to the extent feasible and mapped in GIS. Conservation of listed species shall be promoted.
- Policy OS-5.4: Development shall avoid, minimize and mitigate impacts to listed species and critical habitat to the extent feasible.

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

- Policy OS-5.12: The California Department of Fish and Game shall be consulted and appropriate measures shall be taken to protect Areas of Special Biological Significance.
- Policy OS-5.13: Efforts to obtain and preserve natural areas of particular biologic, scientific, or educational interest, and restrict incompatible uses from encroaching upon them, shall be encouraged.
- Policy OS-5.16: A biological study shall be required for any development project requiring a discretionary permit and having the potential to substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, or substantially reduce the number or restrict the range of an endangered, rare, or threatened species.
- Policy OS-5.18: Prior to disturbing any federal or state jurisdictional areas, all applicable federal and state permitting requirements shall be met, including all mitigation measures for development of jurisdictional areas and associated riparian habitats.
- Policy OS-5.24: The County shall require discretionary projects to retain movement corridors of adequate size and habitat quality to allow for continued wildlife use based on the needs of the species occupying the habitat. The County shall require that expansion of its roadways and public infrastructure projects provide movement opportunities for terrestrial wildlife and ensure that existing stream channels and riparian corridors continue to provide for wildlife movement and access.
- Policy OS-5.25: Occupied nests of statutory protected migratory birds and raptors shall not be disturbed during the breeding season (generally February 1 to September 15). The county shall:

  A. Consult, or require the developer to consult, with a qualified biologist prior to any site preparation or construction work in order to:

     (1) Determine whether work is proposed during nesting season for migratory birds or raptors,

     (2) Determined whether site vegetation is suitable to nesting migratory birds or raptors,

     (3) Identify any regulatory requirements for setbacks or avoidance measures for migratory birds and raptors which could nest on the site, and

     (4) Establish project-specific requirements for setbacks, lock-out periods, or other methods of avoidance of disruption of nesting birds.

  B. Require the development to follow the recommendations of the biologist. This measure may be implemented in one of two ways:

     (1) Preconstruction surveys may be conducted to identify active nests and , if found, adequate buffers shall be provided to avoid active nest disruption until after the young have fledged; or

     (2) Vegetation removal may be conducted during the non-breeding season (generally September 16 to January 31); however, removal of vegetation along waterways shall require approval of all appropriate local, state, and federal agencies.

Monterey County Zoning Ordinance and Other County Ordinances

The Monterey County Zoning Ordinance implements the elements of the county General Plan and serves to establish various districts, regulations, and permit processes for the

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

unincorporated area within the county. Listed activities and uses consistent with the General Plan may be allowed subject to issuance of appropriate permits.

Other county ordinances establish specific standards for land use and development within the unincorporated areas for purposes of conforming to and implementing General Plan and other land use policies. County ordinances relevant to the Pajaro River project are described in Section P (Land Use) of this Initial Study.

Monterey County will assure consistency with the provisions of the County's Zoning Ordinance and all other pertinent county ordinances.

Impacts

California Red-legged Frog

Direct Impacts

Removal of existing ruderal and riparian vegetation during the first phase of construction at each excavation area could result in direct take of metamorph, sub-adult, or adult red-legged frogs that are foraging, traversing, or estivating in existing bench habitat. California red-legged frogs have been documented throughout the project area, particularly at the water's edge, but also on the willows on dry banks and on the levee crest, as road kill following high water in 2011.

Placement of 19 salvaged-log habitat enhancement structures will result in approximately 276 cubic yards of fill (logs, boulders and soil) in jurisdictional wetland/open water habitat. Temporary construction impacts to excavate and place logs and boulders, cable the structure together, and backfill with native material could result in trampling or injury to frogs. Temporary dewatering in localized areas next to streambanks may result in take, or death, of frogs by relocation activities (electroshocker, dipnet, or seine), construction (placement and removal of coffer dams), or water quality degradation (excessive turbidity or hydrocarbon spills).

Indirect Impacts

Indirect impacts to CRLF resulting from implementation of the Bench Excavation project could occur through changes in vegetation management and changes in the vegetation community on the benches. Increased native plant diversity is assumed to have a beneficial effect on the frog population.

Changes in the frequency and duration of overbank flows may result in changes in channel morphology and sediment deposition that could contribute to the formation of point and cross-channel bars that could impede steelhead passage in low flow periods.

Western Pond Turtle

Direct Impacts

Mortality to western pond turtles may occur during upland phases of their life history. Western pond turtles are known to travel upland to nest, forage, estivate and seek flow refuge. Direct take by trampling or crushing eggs or individuals may occur throughout the construction period. The greatest risk is loss of gravid females during nesting attempts and the loss of eggs or hatchlings in the excavation areas and haul routes.

Indirect Impacts

Indirect effect to western pond turtles may result from changes in habitat composition resulting from lower bench surfaces, more frequent inundation in these areas, and implementation of

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

revegetation plans. No significant indirect impacts are expected, however, due to the reliance on appropriate native plant species for revegetation and continued field studies done for adaptive management planning.

Steelhead Trout

Direct Impacts

Placement of 19 salvaged-log habitat enhancement structures will result in approximately 276 cubic yards of fill (logs, boulders and soil) in jurisdictional wetland/open water habitat. Temporary dewatering through the construction of sandbag and visquine coffer dams may be necessary to place logs and boulders, cable the structure together, and backfill with native material. Temporary dewatering in localized areas next to streambanks may result in take, or death, of steelhead by relocation activities (electroshocker, dipnet, or seine), construction (placement and removal of coffer dams), or water quality degradation (excessive turbidity or hydrocarbon spills).

Indirect Impacts

Indirect impacts to steelhead resulting from implementation of the Bench Excavation project could occur through changes in sediment transport and deposition of sediment and organic material within the project area. Changes in the frequency and duration of overbank flows may result in changes in channel morphology and sediment deposition that could contribute to the formation of point and cross-channel bars that could impede steelhead passage in low flow periods.

Tidewater Goby

Direct Impacts

Direct take, or mortality, of tidewater goby may occur during dewatering for LWM habitat enhancement structures in Excavation Area 2R. Goby relocations, if necessary, shall be conducted by a qualified biologist.

Indirect Impacts

No significant adverse indirect impacts to tidewater goby are expected.

Pallid Bat

Direct Impacts

Mortality to pallid bats may occur during vegetation removal efforts. Direct take of individuals may occur when trees are cut.

Indirect Impacts

Indirect effect to pallid bats may result from changes in habitat composition resulting from implementation of revegetation plans. No significant adverse indirect impacts are expected.

San Francisco Dusky-footed Woodrat

Direct Impacts

Mortality to dusky-footed woodrat may occur during vegetation removal efforts. Direct take by trampling individuals or crushing nest structures may occur when trees are cut. Relocation of woodrat house structures will be done by hand, under the direction of a qualified biologist.

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

Indirect Impacts

Indirect impacts to dusky-footed woodrats may result from changes in habitat composition resulting from implementation of revegetation plans. No significant adverse indirect impacts are expected. Additional native plant species used for revegetation should increase potential habitat for this species.

Offsite Stockpile Areas

City of Watsonville Landfill

No impacts to special-status species are anticipated from the placement of fill material; and therefore, no mitigation measures will be required.

Buena Vista Landfill

No impacts to special-status species are anticipated from the placement of fill material; and therefore, no mitigation measures will be required.

Manabe-Ow Business Park

Although the CRLF is located in the vicinity of the Manabe-Ow project area, due to the agricultural nature of the planning area, the potential for CRLF to be located within the planning area and to be harmed is considered low. No special status plant species were observed in the planning area during the surveys conducted as part of the Watsonville Slough Watershed Plan and none are expected to occur within the planning area based on an evaluation of the site's habitat features. As a result, the Manabe-Ow Business Park Specific Plan Draft EIR states that the proposed project would result in a less than significant impact to the CRLF. Therefore, no mitigation is required.

Elkhorn Slough Sites

Seal Bend Stockpile Area

The placement of fill at the Seal Bend stockpile area would not result in 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 the California Department of Fish and Game, or U.S. Fish and Wildlife Service. No mitigation measures will be required.

Minhoto Hester's Stockpile Area

The placement of fill at the Minhoto-Hester's stockpile area would not result in 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 the California Department of Fish and Game, or U.S. Fish and Wildlife Service. No mitigation measures will be required.

A.R. Wilson Quarry

No impacts to special-status species are anticipated from the placement of fill material; and therefore, no mitigation measures will be required.

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

Mitigation Measures

Project Area

General Measures

BIO-1 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-2 All refueling, maintenance, and staging of equipment and vehicles will occur within the established staging areas away from any riparian habitat or water body. The County will ensure contamination of habitat does not occur during such operations. Prior to the onset of work, the County 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-3 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.

BIO-4 Prior to any on-site work in areas where Covered 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-5 Prior to the commencement of work, the limits of the work area (including haul routes, levee 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 area.

BIO-6 Each morning before work begins, a qualified monitor (as identified and trained by the USFWS approved biologist) will survey the work site and habitat immediately surrounding the active work site for conditions that could impact Covered Species, and will remain on-site whenever work is occurring. No work will be allowed to begin each morning until the monitor has inspected the work site.

BIO-7 To protect water quality, water pumped from construction areas for log features will be discharged into a basin created out of straw bales lined with filter fabric or other commonly accepted sediment control method.

BIO-8 To reduce the potential for erosion after project, project sites will be revegetated with an appropriate assemblage of native riparian, wetland, and upland vegetation suitable for the area. Planted material will include native seed mixes, pole cuttings, and container stock.

BIO-9 Scour protection elements, such as erosion control fabric and buried rock groins, will be placed on newly graded bench and bank areas.

BIO-10 To control erosion during and after project implementation, the applicant will implement best management practices, including:

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

- Install straw wattles/silt fencing to break up and filter surface runoff.
- Install sterile wheat hydroseed on new bench surfaces.
- Installation of energy dissipaters on pump/dewatering equipment outlets.
- Revegetation with site-specific native materials on streambanks and new 3:1 slopes.
- Conduct activities during the low flow season (April 1 and November 1) to the extent practicable).
- Avoidance of disturbance of retained riparian/wetland vegetation where practicable.
- Limit removal of riparian vegetation abutting excavation areas and log enhancement structures to pruning/trimming where practicable.
- Minimize excavation in the active stream channel for placement of log structures
- Isolation of the channel from flowing water through temporary bypass before beginning work on log structures (i.e. coffer dam).
- Storing construction and erosion control materials and equipment outside of the stream channel.

BIO-11 A Service-approved biologist or biological monitor will permanently remove from within the project area, any individuals of exotic species, such as bullfrogs, crayfish, and centrarchid fishes to the extent practicable.

BIO-12 Upon locating individuals of Covered Species that are dead or injured as a direct result of project activities, 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-13 Nesting Bird Surveys. Prior to any project construction activities, the project proponent shall 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 shall be required.
- During the breeding bird season (February 1 through August 31), a qualified biologist shall 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 shall 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 shall be adopted, if necessary, on a case-by-case basis. These may include implementation of buffer areas (minimum 50' buffer for passerines and 250' minimum buffer for raptors) or seasonal avoidance.

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

BIO-14 Placement of 12 swallow nesting boxes and 4 owl boxes will be done to offset loss of mature riparian trees that may support these local nesting species.

California Red-Legged Frog

The measures for avoidance and minimization of adverse impacts to CRLF during construction of the Bench Excavation project 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.

BIO-15 The County 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 County receives approval from the USFWS that the biologist(s) is qualified to conduct the work.

BIO-16 A USFWS-approved biologist will survey the work site 48 hours prior to the onset of activities. If CRLF, 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 CRLF.

BIO-17 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 CRLF and its habitat, the importance of the CRLF and its habitat, general measures that are being implemented to conserve the CRLF 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.

BIO-18 A USFWS-approved biologist will be present at the work site until such time as all removal of CRLF, 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 SSM-10 above and in the identification of CRLF. The monitor and the USFWS-approved biologist will have the authority to stop work if CRLF are in harm's way.

BIO-19 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. Where impacts occur in these staging areas and access routes, restoration will occur as identified in the general BMP measures above.

BIO-20 Work activities will be completed between April 1 and November 1 to the extent practicable. Should the County demonstrate a need to conduct activities outside this period, the County may conduct such activities after obtaining the USFWS's approval.

BIO-21 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 CRLF from entering the pump system. Water will be released or pumped downstream at an appropriate rate to maintain downstream flows during construction. Upon completion

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

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.

BIO-22 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.

Western Pond Turtle

The measures for avoidance and minimization of adverse impacts to WPT during construction of the Bench excavation project 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 western pond turtles before vegetation removal and during the construction and revegetation phase. Ongoing western pond turtle mark and recapture studies will be expanded to include radio-tagging tracking of adult females (and possibly a small percentage of males) for a minimum of two years to rack locations of females and, if possible, nesting locations in and around the proposed excavation areas.

BIO-23 The County 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 CDFG that the biologist(s) is qualified to conduct the work.

BIO-24 To develop a greater understanding of habitat use by WPT, The county will conduct a focused WPT tracking study in 2012 and 2013 to compliment the previous population estimate study. The purpose of the study is to track a sufficient sample of both males and females to study upland habitat use and determine if nests and over-wintering sites are present prior to and during the sediment removal project.

- There are limitations to the proposed study. Fewer than 20 females have been captured to date, and females may only produce eggs every other year. Also, eggs can typically only be detected by palpation within ~2 weeks of begin deposited. Older females greater than 130 mm are expected to nest. Females typically enter upland late in the day and may deposit eggs and return in less than 24 hours. It is therefore not likely that a nest will be found for each gravid female.
- Efforts will be made to record locations late each day when tracking gravid females and if an individual is found in the uplands, efforts will be made to follow it to the nest with as little disturbance as possible by checking every two hours. In addition, radio signals are less effective or lost when individuals submerge deeper than ~1-foot in either water or mud, so not all over-wintering sites will be found. However, the proposed sample size is expected to provide sufficient data to study upland habitat use and improve long-term management of the species within the lower Pajaro watershed.
- Two live-trapping sessions will be scheduled: the first prior to 1 June 2012 to target gravid females before they nest, and the second prior to 1 September to capture both sexes before they over-winter. Some males will be also tagged during the first session. The actual starting date of the first session may be delayed if flows are high to minimize negatively affecting native fishes. Efforts will be made to tag up to 10 males and 10 females.
- In addition, the annual western pond turtle mark/recapture study will continue as

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

described below. Twenty trap locations will be set, generally at or near past locations depending on where deeper pools form in 2012. Some new locations may be trapped if needed to ensure that the reach of river adjacent to an area targeted for sediment removal is appropriately sampled. Traps will be monitored for 4 consecutive days and shall consist of 12-20 fyke traps (hoop/net traps); if pools are not deep enough, welded-wire cage traps will be used. Traps will be checked daily and baited with mackerel or sardines. Captured individuals will be weighed and measured, sexed, palpated for eggs, aged (if possible), inspected for health, photographed and marked by notching marginal scutes with a triangular file according to a standardized numbering pattern.

BIO-25 A CDFG-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 CDFG-approved biologists will participate in activities associated with the capture, handling, and moving of WPT.

BIO-26 Before any activities begin on a project, a CDFG-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.

BIO-27 A CDFG-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.

BIO-28 The number of access routes, number and size of staging areas, and the total area of the activity will be limited to the areas shown on 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 measures above.

BIO-29 Work activities will be completed between April 1 and November 1 to the extent practicable. Should the County need to conduct activities outside this period, the County may conduct such activities after providing notification to the Service.

Steelhead Trout

Steelhead and/or resident rainbow trout inhabit the Pajaro River and have been observed in the project area during the proposed construction season. Potential impacts to steelhead are limited. Placement of instream LWM structures may require localized dewatering and temporary loss of available steelhead habitat. Relocation of steelhead from dewatered areas may be necessary. The following measures are suggested:

BIO-30 A 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.

BIO-31 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.

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

Installation and removal of the temporary coffer dams will be monitored by the qualified fisheries biologist.

BIO-32 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.

BIO-33 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 tidewater gobies 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.

BIO-34 The installation and removal of the coffer dam structures would be controlled to minimize turbidity in the water.

BIO-35 The use of best management practices would be implemented to reduce the probability of sediment and/or contaminated material from entering the creek.

Tidewater Goby

While tidewater goby presence is highly unlikely upstream of tidal influence, installation of salvaged-log habitat enhancement structures in Excavation Area 2R has the potential to affect tidewater goby if they are present. The following measures will be implemented to minimize and avoid impacts to tidewater goby:

BIO-36 If work areas are to be de-watered in Excavation Area 2R, as many tidewater gobies as possible will be removed prior to draining the site. After barriers are constructed, tidewater gobies will be captured, transported in buckets, and released in the most appropriate (i.e., similar water quality parameters) habitat immediately adjacent to the de-watered area. If a seine is used, it will be pulled in a deliberate manner with care being taken to avoid rolling the lead line inward. The number of tidewater gobies will be estimated prior to release. Electrofishing will not be conducted in areas where tidewater gobies may occur. All debris and aquatic and emergent vegetation in the pumped area will be carefully inspected for tidewater gobies and other vertebrates. As the work site is de-watered, remaining pools will be inspected for tidewater gobies. As many individuals as possible will be captured using dipnets and other appropriate tools and moved as described above. Handling time for tidewater gobies will be minimized to the maximum extent practicable.

BIO-37 Only qualified personnel authorized by the USFWS (Service-approved biologists) will participate in activities associated with the capture, handling, and monitoring of tidewater gobies. The County will provide the Service with the names and credentials of personnel who they desire to conduct these activities for review and approval at least 15 days prior to the onset of the activities. No project activities will begin until the Service notifies the County and Corps in writing that the biologist(s) is qualified to conduct the work.

BIO-38 Prior to the onset of activities that result in disturbance of potential tidewater goby habitat or individuals, a Service-approved biologist will conduct a training session for all construction personnel. At a minimum, the training will include: a description of the tidewater goby; a description of the species' habitat; the importance of the species

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

and its habitat; the general measures that are being implemented to conserve the species 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.

BIO-39 A Service-approved biologist will monitor the work site until all removal of tidewater gobies, instruction of workers, and habitat disturbance have been completed. After this time, the Service-approved biologist will designate a person to monitor on-site compliance with all minimization measures. The Service-approved biologist will ensure that this individual receives training in the identification of tidewater gobies. The monitor and the Service-approved biologist will have the authority to halt any action that might result in impacts that exceed the levels anticipated by the Service in this biological opinion. If work is stopped, the City will notify the Corps and Service immediately.

BIO-40 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 tidewater gobies 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.

BIO-41 If project activities could degrade water quality, the existing water quality parameters will be determined (e.g., salinity, temperature, dissolved oxygen, and turbidity) prior to the onset of work. Water samples will be taken in a manner that minimizes disturbance, injury, or mortality of tidewater gobies. Results will be used to monitor water quality parameters during and after maintenance and sediment removal activities.

Pallid Bat

Trees within 250 feet of all project areas also have the potential to support roosts of the pallid bat, which could be indirectly impacted by project noise. Open water and agricultural fields in the vicinity of the project site provide foraging habitat abundant with insects, and pallid bats could establish roosts in willow and other large riparian trees adjacent to the project area. Disruption of roosts in trees could adversely impact pallid bat reproduction; however, this impact is not anticipated to affect bat reproduction after implementation of the following minimization measure:

BIO-42 Prior to initiation of any project activities, the project proponent shall take the following steps to avoid indirect impacts to bat breeding success:

- Prior to project activities within 250 feet of trees with at least a moderate potential to support special-status bats, a qualified biologist shall survey for bats. If no evidence of bats (i.e., visual or acoustic detection, guano, staining, strong odors) is present, no further mitigation is required.
- If bats raising pups are present within 250 feet of the studied area during project construction activities (typically April 15 through August 15), the project sponsor shall create a no-disturbance buffer (size to be determined by the bat biologist) around the bat roosts. Bat roosts initiated within 250 feet of the studied area after construction has already begun are presumed to be unaffected by project-related disturbance, and no buffer would be necessary.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

San Francisco Dusky-footed Woodrat

BIO-43 Prior to vegetation removal, a field survey for dusky-footed woodrats will be conducted by a qualified biologist. Locations of woodrat nests will be mapped and flagged for avoidance.

BIO-44 If woodrat nests are present in areas to be cleared of vegetation, animals and structures will be relocated by "Live Trapping and Structure Relocation," a procedure that requires live-trapping individuals and installing an artificial replacement house with modified, inverted redwood planter box and available nest material.

- In this procedure, 12-inch Sherman live-traps are placed late afternoon around SFDW houses that are be removed. Typically about five traps are set at each house. In the morning after traps are set, the individual woodrats are held in captivity until each house is destroyed with heavy equipment or by hand.
- The captured SFDW will then be released just offsite, into a structure built around a 12-inch redwood planter that is inverted at an angle and placed slightly below grade. Wooden stakes and wood screws are used to stabilize the inverted redwood box.
- Salvaged nest material and food will be placed in the chamber. Woody debris will be salvaged from the original house if practical and additional branches and logs will be placed in and around the artificial structure. A small, single entrance is created.
- The captured SFDW will then be released and observed entering the house. The entrance will be observed for 10-15 minutes and the animal remained inside.

Offsite Stockpile Areas

No mitigation measures would be required.

2.	Have a substantial adverse effect on any riparian habitat or sensitive natural community identified in local or regional plans, policies, regulations (e.g., wetland, native grassland, special forests, intertidal zone, etc.) or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☒	☐

***Discussion*:**

Project Area

Wildlife Habitat Communities

Four wildlife habitat communities were identified in the project area during surveys conducted along the Pajaro River in 1999 (Harding ESE 2001). These habitats include ruderal/annual grasslands, central coast arroyo willow riparian forest/valley foothill riparian, mixed riparian forest, and coastal and valley freshwater marsh. A discussion of wildlife habitats in the project area was derived from "*A Guide to Wildlife Habitats of California*" (Mayer and Laudenslayer

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

1988) and is presented below.

Ruderal/Annual Grasslands

Ruderal areas are dominated by annual grasslands and provide limited wildlife habitat and generally support only generalist, and sometimes nonnative, wildlife species that are tolerant of human presence and activities. Terrestrial wildlife species commonly associated with annual grasslands in the project area include western fence lizard (*Sceloporus occidentalis*), California kingsnake (*Lampropeltis zonata*), gopher snake (*Pituophis melanoleucus*), western harvest mouse (*Reithrodontomys megalotis*), deer mouse (*Peromyscus maniculatus*), California ground squirrel (*Spermophilus beecheyi*), and Botta's pocket gopher (*Thomomys bottae*).

Avian species commonly associated with annual grasslands in the project area include white-crowned sparrow (*Zonotrichia leucophrys*), Brewer's blackbird (*Euphagus cyanocephalus*), and dark-eyed junco (*Junco hyemalis*). In addition, annual grassland provides foraging habitat for predatory birds that nest in the adjacent woodlands such as red-tailed hawk (*Buteo jamaicensis*) and American kestrel (*Falco sparverius*).

Central Coast Arroyo Willow Riparian Forest/Valley Foothill Riparian

Valley-foothill riparian habitats provide food, water, migration and dispersal corridors, and escape, nesting, and thermal cover for an abundance of wildlife. Approximately 50 amphibians and reptiles, 147 bird species, and 55 mammals occur in lowland riparian systems. Many are permanent residents; others are transient or temporal visitors.

Several wildlife species dependent on standing or flowing water for breeding are found in the Pajaro River. Amphibians such as California red-legged frog (*Rana aurora draytonii*), bullfrog (*Rana catesbeiana*), Pacific tree frog (*Pseudacris regilla*), and California slender salamander (*Batrachoseps attenuatus*) have been reported from the Pajaro River corridor (Harding ESE 2001). Reptiles known to use the Pajaro River include the western pond turtle (*Actinemys marmorata*) and western aquatic garter snake (*Thamnophis couchii*).

The riparian communities currently found along the Pajaro River support a variety of breeding birds and nonbreeding seasonal migrants. The avifauna of the study area has been intensively studied since the mid1980s. Information presented in Suddjian (2000b) was drawn from Dr. Suddjian's observations, the Santa Cruz County bird records maintained by the Santa Cruz Bird Club, the Santa Cruz County Breeding Atlas (1987-1993, unpubl. Data in Suddjian 2000b), the Atlas of the Breeding Birds of Monterey County (Roberson and Tenney 1993), Monterey Birds (Roberson 1985), Birds of Santa Cruz County (Suddjian in prep.), the Moss Landing Christmas Bird Count (1977-2000 in Suddjian 2000b), and a study of breeding birds conducted along the river corridor in 1996 (Suddjian unpubl. Data).

Fairly common to abundant breeding species associated with riparian areas within the project area include Anna's hummingbird (*Calypte anna*), Allen's hummingbird (*Selasphorus sasin*), downy woodpecker (*Picoides pubescens*), Pacific-slope flycatcher (*Empidonax difficilis*), black phoebe (*Sayornis nigricans*), warbling vireo (*Vireo gilvus*), western scrub jay (*Aphelocoma californica*), tree swallow (*Tachycineta bicolor*), northern rough-winged swallow (*Stelgidopteryx serripennis*), chestnut-backed chickadee (*Poecile rufescens*), bushtit (*Psaltriparus minimus*), Bewick's wren (*Thryomanes bewickii*), Swainson's thrush (*Catharus ustulatus*), yellow warbler (*Dendroica petechia*), Wilson's warbler (*Wilsonia pusilla*), California towhee (*Pipilo crissalis*), song sparrow (*Melospiza melodia*), black-headed grosbeak (*Pheuticus melanocephalus*), American Goldfinch (*Carduelis tristis*), and mallard (*Anas platyrhynchos*) (Suddjian 2000b).

Other fairly common to abundant species known to breed in the Pajaro River corridor that are

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

not specifically associated with riparian vegetation include red tailed hawk (*Buteo jamaicensis*), killdeer (*Charadrius vociferus*), mourning dove (*Zenaida macroura*), cliff swallow (*Hirundo pyrrhonota*), barn swallow (*Hirundo rustica*), American robin (*Turdus migratorius*), European starling (*Sturnus vulgaris*), orange crowned warbler (*Vermivora celata*), red winged blackbird (*Agelaius phoeniceus*), Brewer's blackbird (Euphagus cyanocephalus), brown headed cowbird (*Molothrus ater*), house finch (*Carpodacus mexicanus*), and house sparrow (*Passer domesticus*) (Suddjian 2000b).

Species that are known to breed in the Pajaro River corridor, but are considered uncommon include green heron (*Butorides virescens*), gadwall (*Anas strepera*), American kestrel (*Falco sparverius*), California quail (*Callipepla californica*), spotted sandpiper (*Actitis macularia*), belted kingfisher (*Ceryle alcyon*), acorn woodpecker (*Melanerpes formicivorus*), Nuttall's woodpecker (*Picoides nuttallii*), wrentit (*Chamaea fasciata*), northern mockingbird (*Mimus polyglottos*), common yellowthroat (*Geothlypis trichas*), spotted towhee (*Pipilo maculatus*), purple finch (*Carpodacus purpureus*), lesser goldfinch (*Carduelis psaltria*), and Lawrence's goldfinch (*Carduelis lawrencei*) (Suddjian 2000b).

Bird species that are fairly common visitors, but do not breed along the Pajaro River include double-crested cormorant (*Phalacrocorax auritus*), great blue heron (*Ardea herodias*), great egret (Ardea alba), snowy egret (*Egretta thula*), black crowned night heron (Nycticorax nycticorax), Forster's tern (*Sterna forsteri*), American coot (*Fulica americana*), and American crow (*Corvus brachyrhynchos*) (Suddjian 2000b).

Fairly common species observed in the lower Pajaro River (below Highway 1) and Pajaro estuary include the brown pelican (*Pelecanus occidentalis*), green winged teal (*Anas crecca*), black bellied plover (*Pluvialis squatarola*), snowy plover (*Charadrius nivosus*), willet (*Catoptrophorus semipalmatus*), marbled godwit (*Limosa fedoa*), sanderling (*Calidris alba*), Heermann's gull (*Larus heermanni*), and western gull (*Larus occidentalis*) (Suddjian 2000b).

Mammals known to use riparian communities within the project area include brush rabbit (Sylvilagus bachmani), black-tailed hare (*Lepus californicus*), Virginia opossum (*Didelphis virginiana*), muskrat (*Ondatra zibethicus*), San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*), broad-footed mole (*Scapanus latimanus*), deer mouse (*Peromyscus maniculatus*), western harvest mouse (*Reithrodontomys megalotis*), red bat (*Lasiurus borealis*), and hoary bat (*Lasiurus cinereus*) (Harding ESE 2001). Mammals that inhabit the study area generally do not require a continuous riparian corridor, have relatively small home ranges, and are tolerant of ongoing human activity and disturbance associated with agriculture and urbanization.

Mixed Riparian Forest

Riparian forests and scrubs are extremely rich in their associated fauna. Many species of birds such as yellow warblers (*Dendroica petechia*) are riparian obligate breeders. Riparian forests in the study area provide habitat for many of the species presented above in Central Coast Arroyo Willow Riparian Forest/Valley Foothill Riparian. However, the taller trees in riparian forests also provide habitat for nesting raptors such as red-shouldered hawks (*Buteo lineatus*).

Coastal and Valley Freshwater Marsh

Coastal and Valley freshwater marsh provides a high quality seasonal resource for red-winged blackbirds (*Agelaius phoeniceus*), egrets and herons (family Ardeidae), garter snakes (*Thamnophis* spp.), ranid frogs (family Ranidae) and waterfowl—such as American coots (*Fulica americana*) and mallard ducks (*Anas platyrhynchos*)—and many others.

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

Off-Site Stockpile Areas

City of Watsonville Landfill

No impacts to sensitive habitats would be impacted from the placement of fill material; and therefore, no mitigation measures will be required.

Buena Vista Landfill

No impacts to sensitive habitats would be impacted from the placement of fill material; and therefore, no mitigation measures will be required.

Manabe-Ow Business Park

Potential Wetlands and "Other Waters" of the United States

The marsh within Watsonville Slough was determined to meet the definition of "wetlands," (Biotic Resources Group 2006) under ACOE parameters which are jurisdictional under Section 404 of the Clean Water Act. The entire Watsonville Slough system has been designated an Area of Special Biological Importance by the CDFG, and is identified as a Significant Biological Resource in Santa Cruz County's Growth Management Plan and the County of Santa Cruz's Local Coastal Program Land Use Plan.

Waters of the State of California

Watsonville and Struve Slough would be considered waters of the State of California, subject to the regulation by the State Water Resource Control Board (SWRCB) and the Wetlands Resources Policy of the CDFG and the Fish and Game Commission. These features are all considered sensitive habitats under CEQA and local General Plan policies.

The Struve Slough forms the northern most boundary of the planning area. The Watsonville Slough traverses the site from east to west. These sloughs are part of the Watsonville Freshwater Slough System. The National Wetland Inventory classification system describes the Watsonville Slough as palustrine, emergent, seasonally flooded wetland.

Elkhorn Slough Sites

Seal Bend Stockpile Area

The proposed Seal Bend stockpile area is intensively used by dairy cattle and is currently unvegetated with no sensitive habitat areas. Therefore, the placement of fill at the Seal Bend stockpile area would not result in a substantial adverse effect, either directly or indirectly to sensitive habitat areas.

Minhoto Hester's Stockpile Area

The proposed Minhoto Hester's Stockpile Area was actively cultivated until 2010. As a result, no sensitive habitat areas occur on the site due to the high level of routine ground disturbance from past agricultural uses.

Regulatory Environment

Federal

Clean Water Act of 1972

Section 404 of the Clean Water Act (CWA) requires a permit before dredged or fill material may be discharged into waters of the United States, including wetlands. The USACE, in coordination and consultation with the U.S. Environmental Protection Agency (EPA), is

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

responsible for the 404 permit program. The basic premise of the 404 permit program is that no discharge of dredged or fill material may be permitted if "(1) a practicable alternative exists that is less damaging to the aquatic environment or (2) the nation's waters would be significantly degraded" (U.S. EPA 2007). The 404 permit program includes general permits and individual permits, with the former being applicable to most discharges that will have only minimal adverse effects and the latter being applicable to activities that have the potential for significant impacts. Both general permits and individual permits must also demonstrate compliance with a number of other federal laws such as NEPA, the ESA, Section 106 of the National Historic Preservation Act, Section 401 of the CWA, and the Coastal Zone Management Act.

Executive Order 11990 – Protection of Wetlands

Executive Order 11990 directs federal agencies, in carrying out their responsibilities, to provide leadership to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands. This policy states that federal agencies should avoid, to the extent possible, the long-and short-term adverse impacts associated with destruction or modification of wetlands. It also states that agencies should avoid undertaking and providing support for new construction in wetlands, including draining, dredging, channelizing, filling, diking, impounding, and other related activities, unless the agency finds that no practicable alternatives exist and all practical measures have been taken to minimize harm to wetlands.

State

California Environmental Quality Act

The California Environmental Quality Act (CEQA) requires all California public agencies to comply with requirements that avoid or reduce environmental damage, inform the public of projects that significantly affect the environment, and implement feasible alternatives or mitigation when environmental damage can be prevented (Public Resource Code 21000 et. Seq.). CEQA applies to all discretionary activities proposed to be carried out or approved by California public agencies, including state, regional, county, and local agencies, unless an exemption applies. CEQA's substantive provisions require agencies to address environmental impacts disclosed in an appropriate document. It requires that public agencies comply with both procedural and substantive requirements. Procedural requirements include the preparation of the appropriate environmental documentation, mitigation measures, mitigation monitoring and reporting, public notices, responses to comments, and State Clearinghouse review.

California Fish and Game Code (Section 1600 Lake or Streambed Alteration Agreement Program)

The CDFG regulates work that will substantially affect resources associated with rivers, streams, and lakes in California, pursuant to California Fish and Game Code Sections 1600-1607. Under Section 1601 of the Fish and Game Code, any state or local governmental agency or public utility must notify CDFG if it proposes to divert, obstruct, or change the natural flow or bed, channel, or bank of any river, stream, or lake designated by the CDFG in which there is at any time an existing fish or wildlife resource or from which these resources derive benefit; (2) use materials from the streambeds designated by CDFG; or (3) dispose or deposit debris, waste, or other materials containing crumbled, flaked, or ground pavement where it can pass into any river, stream, or lake designated by CDFG. Any person, governmental agency, or public utility proposing any activity that will divert or obstruct the natural flow or change the

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

bed, channel, or bank of any river, stream, or lake or proposing to use any material from a streambed must first notify CDFG of such proposed activity.

Local

County of Santa Cruz General Plan

Goals, Objectives and Policies regarding riparian habitat protection are found in Chapter 5, Conservation and Open Space, of the Santa Cruz County General Plan (1994). Relevant to the project are the following:

Goal, Natural and Cultural Resources Protection: To protect and restore unique, rare, threatened, endangered and other natural and cultural resources that warrant preservation because of their biological value, scarcity, scientific value, aesthetic Quality, or Cultural significance.

Objective 5.2 Riparian Corridors and Wetlands: 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 the conveyance and storage of flood waters.

- Policy 5.2.1 Designation of Riparian Corridors and Wetlands: Designate and define the following areas as Riparian Corridors:

  (a) 50' from the top of a distance channel or physical evidence of high water mark of a perennial stream;

  (b) 30' from the top of a distinct channel or physical evidence of high water mark of an intermittent stream as designated on the General Plan maps and through field inspection of undesignated intermittent and ephemeral streams;

  (c) 100' 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 plant community;

  (e) Wooded arroyos within urban areas.

  Designate and define the following areas as Wetlands:

  Transitional areas between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is covered by shallow water periodically or permanently. Examples of wetlands are saltwater marshes, freshwater marshes, open or closed brackish water marshes, swamps, mudflats, and fens.

  The U.S. Army Corps of Engineers, and other federal agencies utilize a "unified methodology" which defines wetlands as "those areas meeting certain criteria for hydrology, vegetation, and soils."

- Policy 5.2.2 Riparian Corridor and Wetland Protection Ordinance: Implement the protection of Riparian Corridors and Wetlands through the Riparian Corridor and Wetland Protection ordinance to ensure no net loss of riparian corridors and riparian wetlands. 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 shall require a finding that riparian corridors and wetlands shall be afforded equal or greater protection by the amended language.

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

- Policy 5.2.3 Activities within Riparian Corridors and Wetlands: Development activities, land alteration and vegetation disturbance within riparian corridors and wetlands and required buffers shall be prohibited unless an exception is granted per the Riparian Corridor and Wetlands Protection ordinance. As a condition of riparian exception, require evidence of approval for development from the U.S. Army Corps of Engineers, California Department of Fish and Game, and other federal or state agencies that may have regulatory authority over activities within riparian corridors and wetlands.
- Policy 5.2.8 Environmental Review for Riparian Corridor and Wetland Protection: Require environmental review of all proposed development projects affecting riparian corridors or wetlands and preparation of an Environmental Impact Report or Biotic Report for projects which may have a significant effect on the corridors or wetlands.

Santa Cruz County Riparian Corridor and Wetlands Protection Ordinance

The Pajaro River Bench Excavation project is exempt from the Riparian Corridor and Wetlands Protection Ordinance. Section 16.30.050 (e) of the County Code states, "In areas outside of the Coastal Zone, the operation, repair, and maintenance of the Pajaro River and Salsipuedes Creek levees and the areas within the levees, for the purpose of restoring flood conveyance capacity, including bench excavation, sediment removal, and similar projects, if all of the following conditions are met: (1) The work is conducted by or under the direction of the Department of Public Works; (2) The work is in accordance with a Streambed Alteration Agreement approved by the California Department of Fish and Game, to the extent that such an Agreement is required; and (3) The project has been subjected to environmental review with the County of Santa Cruz serving as the lead agency."

County of Santa Cruz Sensitive Habitat Protection Ordinance

Section 16.32.060 of the County of Santa Cruz Code states that no person shall commence any development activity within an area of biotic concern until a biotic approval has been issued unless such activity has been reviewed for biotic concerns concurrently with the review of a development or land-division application. Section 16.32.070 states that a biotic assessment shall be required for all development activities and applications in areas of biotic concern, as identified on maps on file in the Planning Department or as identified during inspection of the site by Planning Department staff.

County of Monterey General Plan

Goals and Policies regarding riparian habitat protection are found in Chapter 3.0, Conservation and Open Space Element, of the Monterey County General Plan (2010). Relevant to the project are the following:

- Goal OS-5: Conserve listed species, critical habitat, habitat and species protected in area plans; avoid, minimize and mitigate significant impacts to biological resources.
    - Policy OS-5.18: Prior to disturbing any federal or state jurisdictional areas, all applicable federal and state permitting requirements shall be met, including all mitigation measures for development of jurisdictional areas and associated riparian habitats.
    - Policy OS-5.22: In order to preserve riparian habitat, conserve the value of streams and rivers as wildlife corridors and reduce sediment and other water quality impacts of new development, the county shall develop and adopt a Stream Setback Ordinance. The ordinance shall establish minimum standards for the avoidance and setbacks for new development relative to streams. The ordinance shall identify standardized inventory

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

methodologies and mapping requirements. A stream classification system shall be identified to distinguish between different stream types (based on hydrology, vegetation, and slope, etc.) and thus allow application of standard setbacks to different stream types. The ordinance shall identify specific setbacks relative to the following rivers and creeks so they can be implemented in the Area Plan: Salinas, Carmel River, Arroyo Seco, Pajaro River, Nacimiento, San Antonio, Gabilan Creek, and Toro Creek. The ordinance may identify specific setbacks for other creeks or may apply generic setbacks based on the stream classification developed for the ordinance. The ordinance shall delineate appropriate uses within the setback area that shall not cause removal of riparian habitat, compromise identified riparian wildlife corridors, or compromise water quality of the relevant stream while also taking into consideration uses that serve health and safety purposes. The Stream Setback Ordinance shall apply to all discretionary development, County public projects, and to conversion of lands uncultivated for the previous 30 years, on normal soil slopes over 15% or on highly erodible soils on slopes over 10%. The steam setback ordinance shall be adopted within three (3) years of adoption of the General Plan.

Monterey County Zoning Ordinance and Other County Ordinances

The Monterey County Zoning Ordinance implements the elements of the county General Plan and serves to establish various districts, regulations, and permit processes for the unincorporated area within the county. Listed activities and uses consistent with the General Plan may be allowed subject to issuance of appropriate permits.

Other county ordinances establish specific standards for land use and development within the unincorporated areas for purposes of conforming to and implementing General Plan and other land use policies. County ordinances relevant to the Pajaro River project are described in Section P (Land Use) of this Initial Study.

Monterey County will assure consistency with the provisions of the County's Zoning Ordinance and all other pertinent county ordinances.

City of Watsonville General Plan

The City of Watsonville General Plan, adopted in 1994, includes the following goals and policies with relevance to the Pajaro Bench Excavation project:

Goal 9.3 – Natural Resources: Identify and protect the natural resources of the Watsonville Planning Area.

Implementation Measure 9.B.2 – Natural Resource Mitigations: The City shall require implementation of environmental mitigations on projects that may destroy or impair the future use or existence of natural resources.

Policy 9.E.3 – The City shall require that new construction on slopes leading toward sloughs and wetlands, maintain an undisturbed protective buffer between all cut and fill slopes and the riparian zone.

Policy 9.F – Wildlife Habitat Protection: The City shall designate for open space and environmental management those areas rich in wildlife species and fragile in ecological make-up. These habitat zones shall be made part of a greenbelt where appropriate.

Implementation Measure – 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

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

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: a) Riparian Corridors; b) Freshwater Marshes and Sloughs; c) Woodlands and Steep Slopes.

Implementation Measure 9.F.2 – Restoration: The City shall support and encourage public and private efforts to restore degraded natural habitat zones and, when possible, to acquire them for preservation.

Implementation Measure 9.F.3 – Pesticide Control: The City shall carefully regulate and monitor, within the limits of its authority, the use of pesticides, herbicides, and fungicides in and adjacent to wildlife habitat zones.

Implementation Measure 9.F.4 – Fish and Game Consultation: The City shall refer development proposals to the California Department of Fish and Game for its recommendations on conservation measures for native plant communities, riparian vegetation, wildlife habitat, and wetland preservation.

Impacts

Project Area

A total of 35 mature riparian trees would be removed during vegetation clearing prior to bench excavation activities (see Table 5). Of these trees, 29 cottonwoods, five willows, and one box elder would be removed. The project proposes to construct steelhead habitat enhancement features along the banks of the Pajaro River using salvaged wood from mature native trees removed during vegetation clearing. Habitat features composed of salvaged wood would be placed slightly above the summer water level. Fish habitat enhancement features would be placed at 19 locations within the project area. Single, double and triple root wads and logs would be anchored into the banks of the river at eight excavation sites and cabled down to boulders. Figure 6 provides typical details of a fish habitat enhancement area.

Under the proposed project, the project area would be revegetated following construction. The proposed riparian revegetation efforts would be phased. Erosion control and hydroseeding would be completed no later than October 15 immediately following earth moving activities. The majority of proposed willow and black cottonwood short cuttings would be planted the first winter after construction (Year 1). Whereas, the proposed container stock and live transplants or divisions would be planted the second fall and winter after construction is complete (Year 2).

Cuttings would include black cottonwood, red willow, Arroyo willow, and sandbar willow. Cuttings would be collected from the Pajaro River or nearby Watsonville slough outside of the nesting season (see Table 6).

As part of soil erosion control, the total square footage of each excavation site would be hydroseeded by October 15 the first fall after construction (Year 1). Two mixes would be applied using the 2-step process, Mix A and Mix B (see Table 7). Mix A would be composed of sterile wheat, meadow barley, California brome, white yarrow and Hookers primrose. Sterile wheat and the components would be provided by a professional hydroseeder for both Mix A and Mix B; whereas, the County or its agents would provide the seed of the native species for Mix A. Mix B is 100% sterile wheat.

Mix A would be applied to the newly constructed 3:1 riverbanks (11.4 acres), and Mix B would be applied to the excavated benches (27.7 acres). Sterile wheat is intended to cover well the

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

first year, allowing the site seed bank to respond in subsequent years.

No impacts are anticipated from the proposed project with the implementation of the proposed revegetation efforts; therefore, no mitigation is required.

Offsite Stockpile Areas

City of Watsonville Landfill

No impacts to riparian habitat or sensitive natural communities would occur from the placement of fill material; and therefore, no mitigation measures will be required.

Buena Vista Landfill

No impacts to riparian habitat or sensitive natural communities would occur from the placement of fill material; and therefore, no mitigation measures will be required.

Manabe-Ow Business Park

As stated in the Manabe-Ow Business Park Specific Plan Draft Master EIR, "The planning area supports only small patches of willow riparian scrub vegetation. This patch is located near Kearney Road and near the southeastern property line. This area of habitat is located within the Environmental/Open Space District, which will remain undeveloped and be utilized for the protection of the onsite willow riparian scrub. No adverse impacts are anticipated.

Elkhorn Slough Sites

Seal Bend Stockpile Area

The placement of fill at the Seal Bend stockpile area would not result in a substantial adverse effect to any riparian habitat or sensitive natural community. No mitigation measures will be required.

Minhoto Hester's Stockpile Area

The placement of fill at the Minhoto-Hester's stockpile area would not result in a substantial adverse effect to any riparian habitat or sensitive natural community. No mitigation measures will be required.

A.R. Wilson Quarry

No impacts to any riparian habitat or sensitive natural community are anticipated from the placement of fill material; and therefore, no mitigation measures will be required.

3.	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 or migratory wildlife nursery sites?	☐	☒	☐	☐

***Discussion*:**

The mainstem Pajaro River and tributaries support anadromous and resident fish species

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

typical of coastal central California rivers and streams. The Pajaro estuary (outside the project limits) supports saltwater fish with broad salinity tolerances and freshwater fish that tolerate brackish water.

The project area supports a range of aquatic fish both resident and anadromous. Resident species are fish that spend their entire lives in fresh water. Native resident species present in the Pajaro River downstream of the Murphy Road Crossing include Sacramento sucker (*Catostomus occidentalis*), hitch (*Lavinia exilicauda*), Sacramento blackfish (Orthodon microlepidotus), Sacramento pikeminnow (*Ptychocheilus grandis*), prickly sculpin (*Cottus asper*), and threespine stickleback (*Gasterosteus aculeatus*) (Smith 1982). Several species including the hitch and Sacramento blackfish can tolerate brackish water and are found in the upper Pajaro estuary (Mitchell Swanson & Associates and The Habitat Restoration Group, 1993).

Anadromous species are fish that spawn and spend a portion of their life in freshwater before migrating to the marine environment. Anadromous species found in the Pajaro River include steelhead (*Oncorhynchus mykiss*) and Pacific lamprey (*Lampetra tridentata*). Historically, Coho salmon (*O. kisutch*) may have been present in the Pajaro River watershed, but successful spawning populations have not been present for over 30 years (Smith 1982). Steelhead in the Pajaro River are considered part of the South-Central California Coast Evolutionarily Significant Unit for steelhead.

Several wildlife species dependent on standing or flowing water for breeding also use the Pajaro River. Reptiles known to use the Pajaro River include the western pond turtle (*Actinemys marmorata*) and western aquatic garter snake (*Thamnophis couchii*). Amphibians such as bullfrog (*Rana catesbeiana*), Pacific tree frog (*Hyla regilla*), and California slender salamander (*Batrachoseps attenuatus*) are also known to use the Pajaro River corridor (Harding ESE 2001).

Existing Threats/Key Factors Affecting Aquatic Resources

Habitat within riverine systems is created by geomorphic processes. These processes include the topography and geology of the area and of upstream areas, runoff patterns, sediment transport, and riparian dynamics. These factors interact to create areas of sediment scour and deposition along the river channel, which govern its local hydraulics, channel size, and cover and complexity. This forms the underlying structure of habitats (riffles, runs, glides, pools) that influence invertebrate and fish production and distribution. These factors have been profoundly affected within the project area and in the surrounding watershed by human alterations. Key factors that affect fish and fish habitat in the Pajaro River include hydrologic and hydraulic conditions, channel erosion and deposition, river geomorphology, water temperature, suspended solids and toxic constituents, and cover.

Regulatory Environment

Federal

See discussion under C-2 above.

State

See discussion under C-2 above.

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

Local

County of Santa Cruz General Plan

The General Plan for Santa Cruz County was adopted in 1994, and certified by the California Coastal Commission in December 1994. Objectives related to migratory wildlife and wildlife corridors listed in the General Plan are included below:

- Objective 5.2 Riparian Corridors and Wetlands: 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 the conveyance and storage of flood waters.
- Objective 5.6 Maintaining Adequate Streamflows: To protect and restore in-stream flows to ensure a full range of beneficial uses including recreation, fish and wildlife habitat and visual amenities as part of an ecosystem-based approach to watershed management.
- Objective 5.7 Maintaining Surface Water Quality: To protect and enhance surface water quality in the County's streams, coastal lagoons and marshes by establishing best management practices on adjacent land uses.
- Objective 6.3 Erosion: To control erosion and siltation originating from existing conditions , current land-use activities, and from new developments, to reduce damage to soil, water, and biotic resources.
- Objective 6.4 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 protection.

Santa Cruz County Zoning Ordinance and Other County Ordinances

The project would be subject to the requirements of the County of Santa Cruz County Code Chapter 16.32:

- Sensitive Habitat Protection for the purposes of (1) minimizing disturbance to biotic communities that are rare or especially valuable because of their special nature or role in an ecosystem, and that could easily be disturbed or degraded by human activity; and (2) protecting and preserving these biotic resources for their genetic, scientific, and educational values.

County of Monterey General Plan

Goals and Policies regarding sensitive species and their habitats are found in Chapter 3.0, Conservation and Open Space Element, of the Monterey County General Plan (2010). Relevant to the project are the following:

Goal OS-5: Conserve listed species critical habitat, habitat and species protected in area plans; avoid, minimize and mitigate significant impacts to biological resources.

- Policy OS-5.24: The County shall require discretionary projects to retain movement corridors of adequate size and habitat quality to allow for continued wildlife use based on the needs of the species occupying the habitat. The County shall require that expansion of its roadways and public infrastructure projects provide movement opportunities for terrestrial wildlife and ensure that existing stream channels and riparian corridors continue to provide for wildlife movement and access.

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

City of Watsonville General Plan

- Goal 9.1 Open Space Network: Provide a comprehensive network of open space land uses for outdoor recreation and environmental protection.
- Goal 9.3 Natural Resources: Identify and protect the natural resources of the Watsonville Planning Area.
- Goal 9.8 Wildlife Habitat: Preserve and protect the remaining areas of wildlife habitat for their scenic and scientific value.

Impacts

Project Area

Construction activity adjacent to the active channel could result in adverse effects to both migrating and resident aquatic species.

Construction activities that occur outside of the active channel are not expected to directly impact aquatic species, but may indirectly impact them through runoff of sediments or pollutants. The BMPs outlined in Section B-10, Hydrology, Water Supply and Water Quality, would avoid or minimize these impacts. These BMPs would include erosion and sediment control practices such as hydroseeding, soil binders, street sweeping and vacuuming, use of sandbag barriers, straw bale barriers, storm drain inlet protection, wind erosion control, stabilized construction entrance/exit/roadways, and non-stormwater management and material management practices such as isolating and dewatering in-stream construction areas, , vehicle and equipment fueling and maintenance, material delivery and storage, stockpile management, spill prevention and control, hazardous waste management, contaminated soil management, and liquid waste management.

The contractor would need to submit a Storm Water Pollution Prevention Plan (SWPPP) that identifies the BMPs that would be provided for the project. The contractor would be required to monitor and inspect all stormwater BMPs and pollution prevention and control measures at least once every day, and will immediately repair or replace any SWPPP facilities that are not operating properly. The contractor would also need to certify annually that its construction activity is in compliance with the SWRCB's requirements, NPDES General Permit for Stormwater Discharges Associated with Construction Activity, and the Contractor's SWPPP. Following completion of all construction work and final inspection, the contractor would need to certify that all elements of the SWPPP have been implemented, that construction and equipment maintenance waste have been disposed of properly, and that the site(s) is in compliance with all local stormwater management requirements, including erosion/sediment control requirements, policies, and guidelines. Impacts would be less than significant with the implementation of the SWPPP.

Construction activity within the active channel could result in adverse effects to both migrating and resident aquatic species.

Offsite Stockpile Areas

City of Watsonville Landfill

No impacts to the movement of any native resident or migratory fish or wildlife species would occur from the placement of fill material; and therefore, no mitigation measures will be required.

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

Buena Vista Landfill

No impacts to the movement of any native resident or migratory fish or wildlife species would occur from the placement of fill material; and therefore, no mitigation measures will be required.

Manabe-Ow Business Park

As stated in the Manabe-Ow Business Park Specific Plan Draft Master EIR, "The planning area supports only small patches of willow riparian scrub vegetation that may be used by migrating wildlife. This patch is located near Kearney Road and near the southeastern property line. This area of habitat is located within the Environmental/Open Space District, which will remain undeveloped and be utilized for the protection of the onsite willow riparian scrub. No adverse impacts are anticipated.

Elkhorn Slough Sites

Seal Bend Stockpile Area

The placement of fill at the Seal Bend stockpile area would not result in a substantial adverse effect to any riparian habitat or sensitive natural community. No mitigation measures will be required.

Minhoto Hester's Stockpile Area

The placement of fill at the Minhoto-Hester's stockpile area would not result in a substantial adverse effect to any riparian habitat or sensitive natural community used by migrating wildlife. No mitigation measures will be required.

A.R. Wilson Quarry

No impacts to any riparian habitat or sensitive natural community used by migrating wildlife are anticipated from the placement of fill material; and therefore, no mitigation measures will be required.

Mitigation Measures

Project Area

BIO-45 Limit work in or near channel until after May. During cool, wet years when steelhead may be present in the project area due to a shift in the run timing of adult fish (Shapovalov and Taft 1954), avoid any work in or immediately adjacent to the channel until after May. Construction work before June will be limited to areas away from the channel to ensure no impacts occur to steelhead adults.

BIO-46 Preconstruction surveys prior to in-water construction. Perform preconstruction surveys in areas where in-water construction would be required. Preconstruction surveys will be performed by a qualified biologist to determine if steelhead, CRLF, and WPT are present in the construction area. Protocol surveys will be performed for the CRLF and WPT. Steelhead surveys will consist of visual and seine surveys. If any of these species are present, these organisms will be captured and relocated to areas of suitable habitat that will not be affected by the construction activity.

BIO-47 Biological Monitor for Dewatering Activities. During the isolation of the work area after preconstruction surveys have been conducted, an on-site biological monitor will be resent during all working hours from prior to the time activities to isolate the site begin, until the site is dewatered and completely isolated. The monitor will inspect

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

the work area to determine if any steelhead, CRLF, or WPT are present during the dewatering. If any of these species are detected, all construction activity will cease, except as directed by the monitor, until these species can be captured and relocated.

BIO-48 Relocate special-status species if found in the construction area. If steelhead, CRLF, or WPT are found in the construction area and need to be relocated, NMFS and USFWS, as appropriate, and CDFG will be notified prior to commencing the relocation effort. Prior to capturing the organisms, the biologist will propose a capture method, handling procedures and area to which the organisms will be moved with the agencies listed above. The person performing the relocation will have all necessary permits for doing such work including, ESA Section 10(a)(1)(A) permit and a California Scientific Collectors permit.

Impacts would be reduced to a less than significant level with the implementation of the above mitigation measures.

4.	Produce nighttime lighting that would substantially illuminate wildlife habitats?	☐	☐	☐	☒

***Discussion*:** The project proposes to excavate sediment from the benches located inside the existing levees beginning at Murphy's Crossing and ending on the inland side of the Highway 1 Bridge. No structures are proposed and no nighttime lighting would be used. Therefore, no impact would occur to adjacent riparian areas.

5.	Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☒	☐

***Discussion*:**

All of the proposed excavation occurring on the benches would occur above the "ordinary high watermark;" and therefore, would not encroach into waters of the U.S. However, 19 fish habitat enhancement features would be placed on the banks of eight of the excavation sites within the project area (see Table 13). Nationwide 27 and 33 Permits issued by the ACOE would be required as well as a 401 Water Quality Certification from the RWQCB and Section 1602 Streambed Alteration Agreement from CDFG. However, because the placement of the features is considered to be habitat restoration, a beneficial impact would occur. Best management practices would be implemented (see discussion under C-3 above). No mitigation would be required.

In addition, no adjacent wetland would be impacted. Therefore, no impacts would occur to federally protected wetlands or waters of the U.S. Please see discussion under C-2.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

Table 13: Pajaro River Bench Excavation Fish Habitat Enhancement Features				
Site No.	Fish Habitat Enhancement Feature Type (Count for Site)	Area (sq. ft.)	Fill Volume (cu. ft.)	Fill Volume (cu. yds.)
2R	2 root wad (3)	636	1,266	47
3R	1 root wad (1)	146	233	9
2L	2 root wad (1) 3 root wad (1)	490	1,224	45
4L	2 root wad (2)	424	844	31
5R	2 root wad (5)	1060	2,110	78
5.5R	1 root wad (1)	146	233	9
6R	1 root wad (3)	438	699	26
8R	2 root wad (2)	424	844	31
Total	**19**	**3764***	**7,453**	**276**

Note: * Total area fill = .086 acre
Source: NHC 2011.

6. Conflict with any local policies or ordinances protecting biological resources (such as the Sensitive Habitat Ordinance, Riparian and Wetland Protection Ordinance, and the Significant Tree Protection Ordinance)? ☐ ☐ ☒ ☐

***Discussion*:** The proposed project is exempt from Section 16.30 of the County of Santa Cruz Code. Section 16.30.050(e) states, "In areas outside of the Coastal Zone, the operation, repair, and maintenance of the Pajaro River and Salsipuedes Creek levees and the areas within the levees, for the purpose of restoring flood conveyance capacity, including bench excavation, sediment removal, and similar projects, if all the following conditions are met: 1) The work is conducted by or under the direction of the Department of Public Works; 2) The work is in accordance with a Streambed Alteration Agreement approved by the California Department of Fish & Game, the extent that such an Agreement is required; and 3) The project has been subjected to environmental review with the County of Santa Cruz serving as lead agency." The "General Conditions" of the Streambed Alteration Agreement are expected to include the following:

- Prior to beginning work, the identified spoils disposal sites(s) shall be provided to the Department. As work progresses, any additional disposal site shall be provided to the Department as it becomes known. The location of the site, approximate capacity and time it will be used shall be identified, accompanied by a vicinity map and site map, if available.
- After review of the materials identifying the disposal sites, the Department will notify the Counties whether further permits are required or unmitigated impacts are likely. If further permits are required or mitigations need to be developed, the Counties agree to not utilize the specific fill site in question until these issues are resolved.
- Prior to beginning work, the arborists map, analysis and mitigations shall meet the following minimum criteria: at least a 3:1 replacement ratio; a varied mix of native, broad canopy trees; genetic material to be from the same area; protective structures to be placed around each plant to guard against browse, vandalism and mowing or other maintenance activities, planting locations to maximize shad cover along the river.
- Any mitigation plantings removed to allow subsequent grading shall also be replaced, but

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

at a doubled ratio for each time it is removed. For example, if the initial mitigation trees have to be removed, then they must be replaced at another site, but at a 6:1 ratio relative to the original impacts. This is intended to compensate for the ongoing temporal loss occurring from this type of impact. This condition applies only to the interim bench excavation measures and will not apply if the corps of Engineers project is approved and built.

- Riparian vegetation shall not be removed under this Agreement. If field reviews shows removal of limited amounts of riparian vegetation is unavoidable, the Counties shall request a meeting with the Department to discuss the specific issues. After agreement is reached, the Department shall notify the Counties by e-mail of approval or disapproval of the action(s).
- In the event that the project scope, nature, or environmental impact is altered by the imposition of subsequent permit conditions by any local, state or federal regulatory authority, the Operator shall notify the Department of any imposed project modifications that interfere with compliance to Department conditions.
- At least three working days prior to beginning of work, the County must notify the Department's contact, by phone or e-mail, that work is scheduled to begin. At that time, the County must provide the name and phone number(s) of a contact who will be the County's lead for the operation.
- Materials and/or construction equipment shall not be stockpiled or stored where they could be washed into the water or where they will cover aquatic or riparian vegetation.
- Debris, soil, silt, bark, rubbish, creosote-treated wood, raw cement/concrete or washings thereof, asphalt, paint or other coating material, oil or other petroleum products, or any other substances which could be hazardous to aquatic life, resulting from project related activities, shall be prevented from contaminating the soil and/or entering the waters of the state. Any of these materials, placed within or where they may enter a stream or lake, by Operator or any party working under contract, or with the permission of the Operator, shall be removed immediately.
- The contractor shall not dump any litter or construction debris within the riparian/stream zone. All such debris and waste shall be picked up daily and properly disposed of at an appropriate site.

The proposed project would ensure consistency with Section 16.32 of the County Code, Sensitive Habitat Protection. The project would not conflict with any local policies or ordinances. No adverse impact is anticipated.

7.	Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒

***Discussion*:** The proposed project would not conflict with the provisions of any adopted Habitat Conservation Plan Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan. Therefore, no impact would occur.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

D. AGRICULTURE AND FOREST RESOURCES

In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. Would the project:

1.	Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒

***Discussion*:** The project area is located in the middle of the Pajaro Valley containing some of the most fertile agricultural land in the state. A total of 11 Prime Farmland soils and one of Statewide Importance occur within the project area (see Table 14). However, no commercial agriculture occurs inside the levee system within the project area. Therefore, the bench excavation proposed within the project alignment would not impact convert prime farmland soils or soils of statewide importance.

Table 14: Prime Farmland Soils and Soils of Statewide Importance within the Project Area

Type	Symbol	Farmland Category
Santa Cruz County		
Conejo loam, 2 to 9 percent slopes	121	Prime
Conejo clay loam, 0 to 2 percent slopes	122	Prime
Elder sandy loam, 0 to 2 percent slopes	129	Prime
San Emigdio variant sandy loam, 0 to 2 percent slopes	166	Prime
Metz loamy sand	Me	Prime
Metz fine sandy loam	Mf	Prime
Fluvaquentic Haploxerolls – Aquic Xerofluvents complex, 0 to 15 percent slopes	139	Statewide Importance
Monterey County		
Metz loamy sand	Me	Prime
Metz fine sandy loam	Mf	Prime
Mocho silty clay loam, 2 to 9 percent slopes	MoC	Prime
Pacheco clay loam	Pa	Prime
Salinas loam, 0 to 2 percent slopes	SaA	Prime
Salinas clay loam, 0 to 2 percent slopes	SbA	Prime
Salinas clay loam, 2 to 9 percent slopes	SbC	Prime

Source: California Department of Conservation, 2010 and 2011.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
2. Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒

***Discussion*:** Although most of the project area is zoned Commercial Agriculture, none of the project area is considered to be viable farmland (see discussion under D-1 above). Additionally, the project site's land is not under a Williamson Act Contract. Therefore, the project does not conflict with existing zoning for agricultural use, or a Williamson Act Contract. No impact is anticipated.

3. 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))?	☐	☐	☐	☒

***Discussion*:** The project area does not contain land designated as Timber Resource. No impacts would occur.

4. Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒

***Discussion*:** No forest land occurs on the project site or in the immediate vicinity. No impact is anticipated.

5. 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?	☐	☐	☐	☒

***Discussion*:** The project site and surrounding area does contain lands designated as Prime Farmland and Farmland of Statewide Importance as shown. However, no impacts would occur outside of the existing levee structures where active agriculture currently exists. No impacts are anticipated.

E. MINERAL RESOURCES

Would the project:

1. Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☒

***Discussion*:** The proposed project alignment does not contain any areas classified by the

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

State Geologist and designated by the State Mining and Geology Board as "Regionally or Statewide Significant Mineral Resource Areas or areas classified by the State as MRZ-2 Zones (areas containing significant mineral deposits). As a result, no impact is anticipated from project implementation.

2.	Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☐	☒

***Discussion*:** The project area is zoned "Commercial Agriculture" in Santa Cruz County, "Environmental Management Open Space" in Watsonville, and "Resource Conservation" in Monterey County, which are not considered to be Extractive Use Zones (M-3). Nor does the area have a Land Use Designation with a Quarry Designation Overlay (Q) (County of Santa Cruz 1994). Therefore, no potentially significant loss of availability of a known mineral resource of locally important mineral resource recovery (extraction) site delineated on a local general plan, specific plan or other land use plan would occur as a result of this project. Therefore, no impact would occur from project implementation.

F. VISUAL RESOURCES AND AESTHETICS

Would the project:

1.	Have an adverse effect on a scenic vista?	☐	☐	☒	☐

***Discussion*:** Highway 1 in Santa Cruz County from the Monterey County line to the San Mateo County line is designated as a scenic road according to the County of Santa Cruz General Plan (County of Santa Cruz, 1994). Portions of the project area would be visible from Highway 1. Impacts would occur only during construction. Following construction, the project area would be revegetated with native riparian species. As a result, impacts would be less than significant.

2.	Substantially damage scenic resources, within a designated scenic corridor or public view shed area including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☒	☐

***Discussion*:** Although the project site is located along a County designated scenic road, impacts would be temporary (see discussion under F-1 above). As a result, impacts would be less than significant.

3.	Substantially degrade the existing visual character or quality of the site and its surroundings, including substantial change in topography or ground surface relief features, and/or	☐	☐	☒	☐

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

development on a ridgeline?

Discussion: Impacts would be less than significant (see discussion under F-1 above).

4.	Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☐	☒

***Discussion*:** The project would not create a new source of light or glare. No impact would occur.

G. CULTURAL RESOURCES

Would the project:

1.	Cause a substantial adverse change in the significance of a historical resource as defined in CEQA Guidelines Section 15064.5?	☐	☐	☒	☐

***Discussion*:** The California Inventory of Historical Resources (March 1976), California Historical Landmarks, and the National Register of Historic Places were checked for listed historic resources in the project APE. No listed resources were found.

No evidence of historic period historical resources, such as patinated glass and ceramics sherds with historic patterns or maker's marks, etc., was noted during the survey in any part of the APE. No significant impacts are anticipated.

2.	Cause a substantial adverse change in the significance of an archaeological resource pursuant to CEQA Guidelines Section 15064.5?	☐	☒	☐	☐

***Discussion*:**

Background Research

A background search was conducted by Archaeological Consulting. The background research included a records search of the archaeological site records, maps, and project files of the Northwest Regional Information Center of the California Historical Resources Information System (CHRIS), located at Sonoma State University, Rohnert Park. The literature search at the Northwest Regional Information Center found no prehistoric or historic archaeological sites recorded within the project Area of Potential Effects (APE). Eight cultural resources, two prehistoric and six historic, are recorded within 0.6 mile of the APE. The historic resources include several road alignments and the City of Watsonville (Attachment 2).

Portions of the Pajaro River watershed within the project APE have been subject to previous surveys (Edwards and Farley 1974, Peak et al. 1977, Jones 1988, Runnings and Breschini 1990, U.S. Army Corps of Engineers 1996, Chisholm 1998). No significant historic resources were identified in the APE in those studies.

The project area lies within the currently recognized ethnographic territory of the Costanoan (often called Ohlone) linguistic group. In brief, the group followed a general hunting and

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

gathering subsistence pattern with partial dependence on the natural acorn crop. Habitation is considered to have been semi-sedentary and occupation sites can be expected most often at the confluence of streams, other areas of suitable topography along streams, or in the vicinity of springs. These original sources of water may no longer be present or adequate. Resources gathering and processing areas and associated temporary campsites are frequently found on the coast and in other locations containing resources utilized by the group. Factors that may influence the locations of these sites include the presence of suitable exposures of rock for bedrock mortars or other milling activities, ecotones, the presence of specific resources (oak groves, marshes, quarries, game trails, trade routes, etc.), proximity to water, and the availability of shelter. Temporary camps and other activity areas can also be found along ridges or other travel corridors.

Field Survey

A field survey was conducted by Archaeological Consulting between December 14 and 20, 2011. The survey consisted of a "general surface reconnaissance" of all areas in the APE that could reasonably be expected to contain visible cultural resources and that could be viewed without major vegetation or pavement removal or excavation. None of the materials frequently associated with prehistoric cultural resources in this area (dark greasy or ashy midden soil, fragments of weathered marine shell, flaked or ground stone, fire-affected rock, bone fragments, etc.) were observed in the soil in any part of the project APE. The exposed soil throughout the APE ranged from light brown silt to tan sand.

Impacts

Based on the research through the CHRIS and the field survey conducted by Archaeological Consulting, no significant cultural resources have been identified within the Pajaro River Bench Excavation project area. Therefore, the proposed project would have no significant adverse effect on archaeological resources.

Mitigation Measure

However, because the possibility of unidentified (e.g., buried) archaeological resources being found during construction, the following standard language shall be implemented.

CUL-1 All ground disturbing activity in the project area shall be monitored by a qualified archaeologist in the event a substantial intact deposit is found within the property. Pursuant to Section 16.40.040 of the Santa Cruz County Code, if archeological resources are uncovered during construction, the responsible persons shall immediately cease and desist from all further site excavation and comply with the notification procedures given in County Code Chapter 16.40.040. With implementation of the above mitigation, impacts to archaeological resources would be less than significant.

3.	Disturb any human remains, including those interred outside of formal cemeteries?	☐	☒	☐	☐

***Discussion*:**

Impacts

No impacts to human remains are expected to occur (Attachment 2). However, because the remote possibility of a burial being found during construction, the following standard language

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

shall be implemented during bench excavation activities.

Mitigation Measure

CUL-2 Pursuant to Section 16.40.040 of the Santa Cruz County Code, if at any time during site preparation, excavation, or other ground disturbance associated with this project, human remains are discovered, the responsible persons shall immediately cease and desist from all further site excavation and notify the sheriff-coroner and the Planning Director. If the coroner determines that the remains are not of recent origin, a full archeological report shall be prepared and representatives of the local Native California Indian group shall be contacted. Disturbance shall not resume until the significance of the archeological resource is determined and appropriate mitigations to preserve the resource on the site are established.

4. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☐	☒	☐

***Discussion*:**

Paleontological Resources

Paleontology is defined as the science dealing with the life of past geological periods as known from fossil remains. Paleontological resources include fossil remains, as well as fossil localities and formations that have produced fossil material. Such locations and specimens are important nonrenewable resources. CEQA offers protection for these sensitive resources and requires that they be addressed during the environmental review process.

A January 10, 2012 search of the University of California Museum of Paleontology (UCMP) collections database identified paleontological resources in Monterey and Santa Cruz counties (http://paleodb.org). However, no paleontological resources were identified within the project APE. No significant impacts to paleontological resources are anticipated.

Unique Geologic Features

No unique geologic features are known to occur in the project APE. No impacts are anticipated.

H. HAZARDS AND HAZARDOUS MATERIALS

Would the project:

1. Create a significant hazard to the public or the environment as a result of the routine transport, use or disposal of hazardous materials?	☐	☒	☐	☐

***Discussion*:**

Impacts

Implementation of the proposed project would involve the use of small quantities of fuels (e.g., diesel and gasoline), oils, lubricants, paints and solvents necessary for the routine operation of earthwork equipment. Spills or leaks of these compounds could potentially result in releases of contaminants to the Pajaro River or groundwater.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

Standard construction procedures and Best Management Practices (BMPs) will be implemented to reduce the emissions of dust and pollutants during construction. Some standard BMPs for construction projects include:

- Using a covered, paved area dedicated to vehicle maintenance and washing;
- Ensuring that the areas are properly connected to a storm drain system;
- Developing a spill prevention and cleanup plan;
- Preventing hazardous chemical leaks by properly maintaining vehicles and equipment;
- Properly covering and providing secondary containment for fuel drums and toxic materials;
- Properly handling and disposing of vehicle wastes and wash water.

The transport of non-visible pollutants by surface runoff from the construction site would be regulated by a site-specific SWPPP. The SWPPP should identify any location where fuels or other hydrocarbons would be stored on-site, as well as any other construction materials that could result in non-visible surface water pollution, such as cement, tackifier, or other materials. The SWPPP will also identify (BMPs such that any spills or leakage would be adequately contained.

Mitigation Measure

Additionally, the following mitigation measure would apply:

HAZ-1 In the event of a spill of hazardous materials over soil the contractor will immediately control the source of the leak and contain the spill. Contaminated soils will be excavated, tested and disposed of off-site at a facility approved to accept such soils. The likelihood of spills from vehicles would be lessened by use of designated parking areas, maintenance of construction equipment, and other preventive measures outlined in the project SWPPP.

2. 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?	☐	☒	☐	☐

***Discussion*:** The project area was evaluated in the Phase I Environmental Site Assessment (ESA) prepared by Weston Solutions, Inc., in 2005. The Phase I ESA assessed the alignment and general area along Pajaro River for areas of identified soil contamination and/or groundwater impacts, and potential areas of concern. The assessment identified a total of 18 sites of potential concern along the project alignment (Table 15). One area of known groundwater and soils impact was identified. The site consists of an open case of a Leaking Underground Storage Tank (LUST) that is relatively close to the project alignment (APN 117-333-001). This site is upgradient of the alignment and thus has an increased likelihood of having transported hydrocarbon constituents down gradient (towards the Pajaro River). The areas of potential concern showed no visible signs of soils impact, but have appurtenances that could potentially generate chemical impacts to soils or groundwater.

Impacts

The nearest excavation site to LUST is Site 2L, located approximately 450 feet down gradient.

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

Should excavation occur to shallow groundwater near the abovementioned site with known pollution of soils and groundwater, the potential exists for intercepting contaminated groundwater and/or soils.

Table 15: Current Use, Past Use and Potential Environmental Concerns along the Proposed Project Alignment

Assessor's Parcel Number	Current Use	Past Use	Potential Environmental Concerns
051-221-01	Cement plant, mineral processing plant	Not available	Air pollutants
052-581-10	Tractor storage with 100-gallon fuel AST	Not available	Past release of petroleum contaminant
017-231-05	Driver training facility	Bus maintenance facility	Fuel or waste oil spill, batteries, tires, etc.
017-241-04	PG&E Electrical substation	Power plant, manufactured gas plant	Romer CERCLIS – residual contamination from petroleum, PAH and metals
017-291-02	Vacant lot	Radiator shop	Residual metals or organic liquids
017-251-07	PG&E construction yard	Manufactured gas plant	Petroleum/semi-volatile organic compounds/Metals (cleanup completed July 2010)
017-651-01	Auto parking, sales structure	Auto repair facility	Fuel and waste oil storage, solvents, batteries, tires
117-341-01 to 03	Construction yard	Not available	Petroleum or metal contamination
n/a	Industrial gas distribution facility	Fruit drying facility – furnace and dryer (1920), ice manufacturing facility, furniture manufacturing facility (1962)	Past PCBs, metals, solvents, and petroleum contamination
117-333-001	Quik Stop gas station #77	Gas station	Open LUST case- groundwater and soil impacted with gasoline constituents including MTBE
n/a	Ken's Auto Parts	Gas station (1962)	Subsurface fuel contamination
117-005-27	Gas station	Business area	Fuel constituents, groundwater may be impacted
117-022-18	Not available	Farm storage area (1978)	Past pesticides or petroleum spill
117-021-01	Not available	3 ASTs (1978)	Fuel spill
017-291-15	Residence	Pajaro Brewery (1908)	Past waste oil spill
017-651-09	Lavanderia El Campo	Gas Station	Subsurface fuel contamination
n/a	Municipal park	Junk yard (1962)	Junk yard waste residual- metals, waste oil
267-011-06	Strawberry farm- two large fuel ASTs, hazardous material containers	Not available	Fuel constituents and hazardous material release
267-011-11	Residence with several abandoned ASTs	Not available	Residual fuel contamination

Source: Weston Solutions, Inc., 2005.

Mitigation Measure

This potential impact would be mitigated to less than significant by implementing the following mitigation measure.

HAZ-2 Personnel responsible for construction oversight should be adequately trained to recognize and evaluate the potential presence of soil and groundwater contamination. During excavation downgradient of existing commercial properties, field screening should take place as necessary to evaluate excavated soils for the presence of pollutants and shall include systematic random sampling of soils and testing for agricultural chemicals (including but not limited to Dichlorodiphenyldichloroethane (DDD), Dichlorodiphenyltrichloroethane (DDT), and toxaphane). If evidence of a past spill is identified, all work within 100 feet of the evidence shall be halted until a Professional Geologist, Professional Engineer, or Registered Environmental Assessor evaluates the area. If hazardous materials are identified, the Construction

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

Contractor shall notify the Environmental Health Director in the appropriate jurisdiction within two days and ensure that all other required release reporting is performed.

3.	Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☒	☐	☐

***Discussion*:**

Impacts

The project would be located within one-quarter mile of the following schools: Watsonville High School; Pajaro Middle School; J.W. Linscott Elementary School; Linscott Charter School; Ohlone Elementary School; Ceiba College Preparatory Academy; Radius Academy; Potter House Community Christian School; and El Jardin Preschool.

The listed schools are not adjacent to any proposed work or staging areas. No hazardous materials storage is proposed within 0.25 mile of these schools. However, operation of heavy equipment during construction would possibly require fueling and maintenance of the equipment, activities that would involve the use and handling of hazardous materials.

Mitigation Measure

The following mitigation measure would reduce any potential impacts to a less than significant level.

HAZ-3 The SWPPP prepared for the proposed project shall include provisions for notification to schools prior to the initiation of grading activities within 0.25 miles of any school or school grounds. The notification shall include information on the expected duration of construction activities and project security to minimize the potential for exposure of children to the active work environment. Additionally, the SWPPP shall provide specific best management practices for preventing fueling of vehicles within 0.25 mile of schools. The SWPPP will also require controls on emissions from construction equipment (see Mitigation Measures AQ-1 and AQ-2 in Section K-1) and emissions of fugitive dust from active construction areas, staging areas and soil stockpiles. The contractor shall establish specific construction traffic and parking protocols in the vicinity of schools to minimize the potential for vehicular or pedestrian accidents.

4.	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?	☐	☐	☒	☐

***Discussion*:** The Environmental Data Resources (EDR) database did not identify any sites within one mile of the proposed project area as a National Priority List or state equivalent site.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

There were no Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) sites present within one half-mile radius of the project alignment or equivalent CalEPA sites within the same radius. There is, however, one area of known groundwater and soils impact identified proximal to the construction area (see H-2 above). However, this "Cortese list" site is not located within the proposed project alignment.

Soil sampling of the excavation area was conducted by Environmental Risk Specialties Corporation in 2010 (Attachment 5). Soil samples were taken from excavation area Site 2R. The laboratory results for each soil sample were compared to the Environmental Screening Levels (ESLs) from *Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater, California Regional Water Quality Control Board, Interim Final-November 2007 (Revised May 2008).* The ESL values for lead and mercury for Industrial/Commercial land use are 750,000 and 10,000 micrograms/kilogram (ug/Kg), respectively. No ESL values for total chromium are posted. The ESL value for trivalent chromium for residential and Industrial/Commercial land use are both 750,000 ug/Kg. The ESL values for hexavalent chromium for residential and Industrial/Commercial land use are both 8,000 ug/Kg.

Based on laboratory results, for each soil sample no ESLs were exceeded for lead or mercury. However, the ESL value established for hexavalent chromium (8,000 ug/Kg) was exceeded by the total chromium values for each of the sample results.

Results from groundwater and sediment samples indicate that the chromium is naturally occurring in the Aromas Red Sands aquifer, possibly by Cr (III) mineral deposits being oxidized to Cr (VI) by manganese oxides in the aquifer (Gonzalez, et al., 2005). The levels of chromium contained in the soil samples taken from the project area appear to be those of naturally occurring in the background. Therefore, impacts would be considered less than significant.

5.	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 for people residing or working in the project area?	☐	☐	☐	☒

***Discussion*:** The project alignment is not located with an adopted airport land use plan or within two miles of a public or public use airport. The closest airport to the project area is the Watsonville Municipal Airport, which is located approximately 2.7 miles north of the closest project excavation area. No impacts on public airports would result from project implementation. In addition, no impacts would occur at any of the offsite fill areas. No mitigation would be required.

6.	For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒

***Discussion*:** A short private airstrip is located on the north bench of the Pajaro River, approximately 100 feet southwest of the Thurwachter Road bridge. This private airstrip is located approximately 1.4 miles southwest of the nearest excavation site (Site 1R). Due to the distance away from the project area, no impacts are anticipated to people working in the

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

project area. The Monterey Bay Academy Airport is located approximately 4 miles northwest of site 1R, the closest excavation area to the airstrip. Due to the distance away from the project area, no impacts are anticipated to people working in the project area. In addition, no impacts would occur at any of the offsite fill areas. No mitigation would be required.

7.	Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒

***Discussion*:** The proposed project would not interfere with implementation of any emergency plan or emergency response activities. The project would not present any interruption with provisions of the Monterey County Multijurisdictional Hazard Mitigation Plan (MCOES 2007) or the Santa Cruz County Local Hazard Mitigation Plan (SCCOES, 2010). The project would not result in any permanent change to existing activities or functions within the project area that would cause interference with these plans. Therefore, no impact would occur and no mitigation would be required.

8.	Expose people to electro-magnetic fields associated with electrical transmission lines?	☐	☐	☐	☒

***Discussion*:** The proposed project would not expose people to electro-magnetic fields associated with transmission lines. No impact is anticipated.

9.	Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☐	☒

***Discussion*:** The proposed bench excavation would not expose people or structures to a significant risk of loss, injury or death involving wildland fires. No impact is anticipated.

I. TRANSPORTATION/TRAFFIC

Would the project:

1.	Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and	☐	☒	☐	☐

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

freeways, pedestrian and bicycle paths, and mass transit?

Discussion:

Impacts

Truck Sediment Transport Scenarios

A Transportation Analysis was prepared by Fehr & Peers for the proposed project (Attachment 3). The amount of truck trips generated by the proposed project was estimated by adding the estimated average daily number of trips that would occur due to project activities. Trips are made by two types of vehicles: trucks and light duty vehicles. For the purposes of this analysis, trucks are considered to be large sediment removal dump trucks with a capacity of 13-cy and other large semi-trucks that would be used to haul equipment of similar amounts of materials. Light duty vehicles include, but are not limited to, vehicles types such as cargo vans, pickup trucks, sport utility vehicles, minivans, and sedans. Light duty vehicles are used for activities such as inspections, crew transport, and minor hauling of materials.

The analysis includes the following assumptions to estimate maintenance vehicle trip generation:

- Sediment removal dump trucks have a 13-cubic yard capacity
- 1,352 cubic yards of sediment can be removed per day under typical loading rates and procedures
- Proposed yearly work period consists of approximately 107 work days in Year 1 and 142 work days in Year 2
- The daily work period consists of 8 hours
- Three trucks are used to deliver materials or equipment to each excavation site
- One delivery of materials and equipment is made from the South County Public Works Yard (Roy Wilson Yard) to each excavation site, each light duty vehicle makes only two trips per day (once to the job site from the Yard and once back to its origin at the Yard)
- Light duty vehicles usage is approximately 25 percent of the number of sediment removal truck trips

The number of trips generated by light duty vehicles was added to the number of trips generated by trucks. The number of trips generated by trucks was calculated by dividing the sediment removal amounts by the truck hauling capacity of 13-cubic yards and then adding the delivery truck usage.

Under a two year construction scenario, it is estimated that the proposed project would generate an estimated 260 daily truck trips during the dry season for both years one and two. In annual terms, under a two-year scenario, the proposed project would generate an estimated 27,800 annual vehicle trips in Year 1 and 37,000 annual vehicle trips in Year 2. If the material were to be removed in only one year, this project would generate an estimated 64,800 annual maintenance vehicle trips. Under a one year construction scenario, it is estimated that the proposed project would generate an estimated 456 total daily trips during the dry season. Table 16 shows the trip generation estimates for each excavation area.

The maximum amount of daily construction traffic added to SR 1 would be less than one percent of the total traffic volume on SR 1 under a 2 year construction scenario, and less than 2 percent under a one year construction scenario. Similarly, the maximum amount of daily construction traffic added to SR 129 would be less than three percent of the total traffic volume on SR 129 under a 2 year construction scenario, and approximately five percent under a one

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

year construction scenario. In the peak hour, the maximum amount of construction traffic

Table 16: Daily and Annual project Trip Estimates for Trucking Scenarios

Year	Site	Truck Trips[1]	Light Duty Vehicle Trips[2]	Total Trips
Year 1	1R	3,414	852	4,266
	2R	6,120	1,528	7,648
	3R	2,468	614	3,082
	4R	8,886	2,220	11,106
	2L	1,366	340	1,706
Subtotal (Year 1)		*22,254*	*5,554*	*27,808*
Total Daily Trips		***208***	***52***	***260***
Year 2	5R	6,066	1,514	7,580
	5.5R	1,076	266	1,342
	6R	14,370	3,590	17,960
	7R	958	238	1,196
	8R	4,298	1,072	5,370
	4L	2,820	702	3,522
Subtotal (Year 2)		*29,588*	*7,382*	*36,970*
Total Daily Trips		***208***[3]	***52***	***260***
Total (One Year Scenario)		51,842	12,936	64,778
Total Daily Trips (One Year Scenario)		***365***[3]	***91***	***456***

Notes:

1. Trucks are considered to be large sediment removal dump trucks with a capacity of 13-cubic yards and other large semi-trucks that would be used to haul equipment or similar amounts of materials. Truck trips include both sediment removal and delivery trips.
2. Light duty vehicles include, but are not limited to, vehicle types such as cargo vans, pickup trucks, sport utility vehicles, minivans, and sedans. Light duty vehicle usage is approximately 25% of the amount of sediment removal truck trips.
3. The amount of daily trucks to be used per day was provided by the County of Santa Cruz Department of Public Works and is based on typical off-haul truck capacity as well as typical loading rates and procedures. The amount of trucks was converted into trips by multiplying by two.

Source: Fehr & Peers, August 2011.

added to SR 1 would be approximately one percent of the peak hour traffic volume on SR 1 under the 2 year construction scenario, and approximately two percent under the one year construction scenario. The maximum amount of construction traffic added to SR 129 during the peak hour would be less than four percent of the peak hour traffic volume on SR 129 under the 2 year construction scenario, and less than seven percent under the 1 year construction scenario. The maximum amounts of daily and peak hour traffic added to SR 1 and SR 129 are presented in Table 17.

The added construction traffic of the proposed project that would occur during the dry season would be distributed throughout the day, and the level of peak hour trips generated by the project would generally be low. The temporary maintenance activities may result in localized effects on the transportation system as individual excavation sites are initiated including at the access and egress at river access points, and the sediment disposal sites.

Truck and Rail Sediment Transport Scenarios

Under the truck and rail transport scenarios, sediment would be transported by both rail and heavy-duty trucks under either a two-year work window or a one-year work window. The excavated material at excavation sites 3R, 4R, and 2L would be transported by rail to the disposal sites rather than by heavy-duty trucks. The sediment removal by rail would decrease the overall amount of truck trips and truck VMT. However, the amount of light duty vehicle usage would remain the same since activities such as inspections, crew transport, and minor hauling of materials would still occur at these sites.

It is estimated that the proposed project with rail haul would generate an estimated 141 daily project trips during the first year and 260 daily project trips during the second year, both during the dry season. In annual terms, under a two-year scenario, this project would generate an estimated 15,124 annual project vehicle trips in Year 1 and 36,970 annual project vehicle trips

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

Table 17: Maximum Added Construction Trips to State Routes for Trucking Scenarios[1]

Route	Location	Daily Added Volumes				Peak Hour Added Volumes		
		ADT[2,3]	2 Year Option (Year 1/ Year 2)	1 Year Option	Percent Added[4] (2 Year/1 Year)	Peak Hour Volume[2]	Added Volume (2 Year/1 Year)	Percent Added (2 Year/1 Year)
SR 1	SR 129 (Riverside Drive) to Harkins Slough Road/Green Valley Road	39,000	260/260	456	0.67/1.16	3,500	32/56	0.91/1.60
	Harkins Slough Road/Green Valley Road to SR 152 (Main Street)	30,000	260/260	456	0.87 / 1.52	2,700	32/56	1.19/2.07
	SR 152 (Main Street) to Airport Boulevard	53,000	260/260	456	0.49 / 0.86	4,600	32/56	0.70/1.22
SR 129	SR 1 (Cabrillo Highway) to Main Street	20,000	260/260	456	1.30 / 2.28	1,700	32/56	1.88/3.29
	Main Street to Blackburn Street	26,000	260/260	456	1.00 / 1.75	2,950	32/56	1.08/1.90
	Blackburn Street to Lakeview Road	11,800	260/260	456	2.20 / 3.86	1,100	32/56	2.91/5.09
	Lakeview Road to Carlton Road	12,000	260/260	456	2.17 / 3.80	1,350	32/56	2.37/4.15
	Carlton Road to Rogge Lane	9,000	260/260	456	2.89 / 5.07	860	32/56	3.72/6.51

Notes:
1. The amount of traffic added to each roadway would not occur for the entire duration of the project because not all sites are active at all times. The amount of traffic added to each roadway is also dependent on the location of active excavation sites and disposal locations. The amount of traffic added is a maximum number because some traffic such as light duty vehicles may use alternate routes due to inspection schedules of minor delivery pick-up/drop-off locations.
2. ADT = Average Daily Traffic Volume
3. Source: California Department of Transportation (Caltrans), Traffic Data Branch http://traffic-counts.dot.ca.gov/final2009AADT.xls Accessed 1/11/2011.
4. Year 2 daily added traffic volumes were used to calculate percent added under the 2 Year scenario.

Source: Fehr & Peers, 2011 and County of Santa Cruz 2012.

in Year 2. If the material were to be removed in only one year, this project would generate an estimated 52,094 annual vehicle trips. The ability to remove sediment by rail rather than by truck reduces the trip generation by up to 12,684 trips (all in Year 1 if a two year scenario is chosen). Table 18 shows the trip generation estimates for each excavation site.

The maximum amount of daily construction traffic added to SR 1 is less than one percent of the total traffic volume on SR 1 under the 2 year construction scenario and less than two percent under the 1 year construction scenario. Similarly, the amount of daily construction traffic added to SR 129 is less than two percent of the total traffic volume on SR 129 under the 2 year construction scenario, and approximately four percent under the 1 year construction scenario. In the peak hour under the 2 year construction scenario, the amount of construction traffic added to SR 1 is less than two percent of the peak hour traffic volume on SR 1, and less than four percent of the peak hour traffic volume on SR 129. In the peak hour under the 1 year construction scenario, the amount of construction traffic added to SR 1 is less than two percent of the peak hour traffic volume on SR 1, and less than six percent of the peak hour traffic volume on SR 129. The amount of daily and peak hour traffic added to SR 1 and SR 129 are presented in Table 19.

Note that the amount of traffic added to each roadway would not occur for the entire duration of the project because not all sites are active at all times. The amount of traffic added to each roadway is also dependent on the location of active excavation sites and disposal locations,

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

Table 18: Daily and Annual Project Trip Estimates for Trucking with Rail Scenarios				
Year	**Site**	**Truck Trips[1]**	**Light Duty Vehicle Trips[2]**	**Total Trips**
Year 1	1R	3,414	852	4,266
	2R	6,120	1,528	7,648
	3R	12	614	626
	4R	12	2,220	2,232
	2L	12	340	352
Subtotal (Year 1)		*9,570*	*5,554*	*15,124*
Total Daily Trips (Year 1)		***89***	***52***	***141***
Year 2	5R	6,066	1,514	7,580
	5.5R	1,076	266	1,342
	6R	14,370	3,590	17,960
	7R	958	238	1,196
	8R	4,298	1,072	5,370
	4L	2,820	702	3,522
Subtotal (Year 2)		*29,588*	*7,382*	*36,970*
Total Daily Trips (Year 2)		**208**	**52**	**260**
Total (One Year Scenario)		39,158	12,936	52,094
Total Daily Trips (One Year Scenario)		***276***	***91***	***367***

Notes:
1. Trucks are considered to be large sediment removal dump trucks with a capacity of 13-cubic yards and other large semi-trucks that would be used to haul equipment or similar amounts of materials. Truck trips include both sediment removal and delivery trips.
2. Light duty vehicles include, but are not limited to, vehicle types such as cargo vans, pickup trucks, sport utility vehicles, minivans, and sedans. Light duty vehicle usage is approximately 25% of the amount of sediment removal truck trips.

Sources: Fehr & Peers, August 2011 and the County of Santa Cruz 2012.

e.g. some roadway segments such as SR 1 between SR 152 and Airport Boulevard would not experience an increase in traffic if an active excavation site uses the Elkhorn Slough disposal site since any vehicles would travel southward on SR 1 toward Elkhorn Slough rather than northward towards Airport Boulevard. Also, the amount of traffic added is a maximum number because some traffic such as light duty vehicles may use alternate routes due to inspection schedules or minor delivery pick-up/ drop-off locations.

Anticipated Construction-related Impacts for all Scenarios

Potential temporary construction-related impacts associated with the proposed project transport scenarios include:

- Road and Lane Closures (RC) – project activities may require the temporary closure of a lane or an entire roadway.
- Truck Access (TA) – Trucks may need to use local roadways when other access routes to an excavation site are not feasible. Trucks may also have a difficult time entering the traffic stream on the primary roadway from a secondary roadway or access driveway at an intersection that does not have traffic controls for the primary roadway.
- Local Access (LA) – Access to homes and businesses may be temporarily blocked by construction equipment or activities.
- Transit Services (TS) – Bus routes and performance may temporarily be disrupted due to roadway or lane closures.
- Bicycle Facilities (BF) – Bicycle facilities may be temporarily disrupted due to roadway or lane closures as well as Class I path closures.
- Pedestrian Facilities (PF) – Pedestrian facilities may be disrupted due to sidewalk or shared-use path closures.
- Parking (PK) – Workers personal vehicles and other maintenance-related vehicles may

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

park on roadways near the maintenance site and temporarily reduce the availability of on-street parking for local residents or businesses.

Table 19: Maximum Added Construction Trips to State Routes with Rail[1]

Route	Location	Daily Added Volumes				Peak Hour Added Volumes		
		ADT[2,3]	2 Year Option (Year1/Year 2)	1 Year Option	Percent Added (2 Year/1 Year)	Peak Hour Volume[2]	Added Volume (2 Year/1 Year)	Percent Added (2 Year/1 Year)
SR 1	SR 129 (Riverside Drive) to Harkins Slough Road/Green Valley Road	39,000	141/260	367	0.36/0.94	3,500	32/45	0.91/1.29
	Harkins Slough Road/Green Valley Road to SR 152 (Main Street)	30,000	141/260	367	0.47/1.22	2,700	32/45	1.19/1.67
	SR 152 (Main Street) to Airport Boulevard	53,000	141/260	367	0.27/0.69	4,600	32/45	0.70/0.98
SR 129	SR 1 (Cabrillo Highway) to Main Street	20,000	141/260	367	0.71/1.83	1,700	32/45	1.88/2.65
	Main Street to Blackburn Street	26,000	141/260	367	0.54/1.41	2,950	32/45	1.08/1.53
	Blackburn Street to Lakeview Road	11,800	141/260	367	1.19/3.10	1,100	32/45	2.91/4.09
	Lakeview Road to Carlton Road	12,000	141/260	367	1.18/3.05	1,350	32/45	2.37/3.33
	Carlton Road to Rogge Lane	9,000	141/260	367	1.57/4.06	860	32/45	3.72/5.23

Notes:
1. The amount of traffic added to each roadway would not occur for the entire duration of the project because not all sites are active at all times. The amount of traffic added to each roadway is also dependent on the location of active excavation sites and disposal locations. The amount of traffic added is a maximum number because some traffic such as light duty vehicles may use alternate routes due to inspection schedules of minor delivery pick-up/drop-off locations.
2. ADT = Average Daily Traffic Volume
3. Source: California Department of Transportation (Caltrans), Traffic Data Branch http://traffic-counts.dot.ca.gov/final2009AADT.xls Accessed 1/11/2011.

Source: Fehr & Peers, 2011 and County of Santa Cruz 2012.

Mitigation Measures

The following mitigation measures shall be implemented to reduce potentially significant construction-related traffic impacts to a less than significant level. The BMPs may be adjusted and modified on a site-by-site basis and as needed to provide the most protection of the transportation operations, the site, and the surrounding area. Adjustments to BMPs made in the field should require approval of maintenance site managers or Department of Public Works staff. Implementation and functioning of the BMPs should be evaluated and revised annually as needed to ensure the most adequate and appropriate protection of the transportation system. Where appropriate the BMPs described below incorporate Caltrans Transportation Management Plan Guidelines.

General Measures

GM-1 The public shall be informed of stream maintenance work prior to the start of work and signs shall be posted near the excavation site to notify the public at least two weeks in advance of construction activities, trail closures, and road/land closures.

- Public notification may include brochures and mailers, press releases and media alerts, paid advertisements, a telephone hotline, a project website, public meetings, and emails to stakeholders, and information kiosks.

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

- Any lane closures on state facilities shall be added to the statewide Lane Closure System.

GM-2 A stage Construction Plan shall be created to identify the sequence of construction activities. The Order of Work specification shall identify portions of the project to be completed in a specific sequence to minimize delays.

GM-3 Work shall be coordinated with other maintenance activities along a travel corridor so that adequate capacity remains available to accommodate the anticipated travel demand within the corridor by not implementing work zones on parallel routes at the same time. This may entail communicating information about the timing of lane closures and coordinating diversion routes.

Road and Lane Closure Measures

RC-1 Construction shall be staged and conducted in a manner that maintains two-way traffic flow on public roadways in the vicinity of the work site to the maximum extent practicable.

- If temporary roadway or lane closures are necessary, DPW will use a Caltrans Transportation Management Plan (TMP) lane closure chart to identify the number of lanes that must be open to traffic each hour of the day to minimize delay when work activities are being conducted. The charts shall restrict construction hours so that traffic is not affected during periods of peak travel demand.
- If temporary full roadway closures are necessary and if the closure affects a state facility, DPW shall coordinate with the Caltrans District Public Information Officer to ensure that a public information campaign with adequate advance notification is developed and implemented and DPW shall submit a closure plan to the District Lane Closure Review Committee.
- If one-way reversing traffic control is determined to be needed, DPW will determine the maximum time that each direction should be stopped so that motorists do not experience undue delays. If this type of traffic control occurs on a state facility, DPW will coordinate with the Caltrans TMP Manager.
- Any lane or roadway closures will be coordinated with the appropriate jurisdictional agency. Any lane closures should include advance warning signage, a detour route and flaggers in both directions.

RC-2 When work may have the potential to affect traffic flow, work will be coordinated with local emergency service providers as necessary to ensure that emergency vehicle access and response is not impeded.

Truck Access Measures

TA-1 Heavy equipment and haul traffic shall be prohibited in residential areas to the maximum extent practicable. When no other route to and from the site is available, local routes through residential areas may be used.

TA-2 Any truck access points shall include advance warning signage. If trucks have trouble entering the traffic stream on the primary roadway from a secondary roadway or access driveway at an intersection that does not have traffic controls for the primary roadway, either:

- Flaggers in both directions shall be used to control traffic on the primary roadway to

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

allow trucks to exit and enter the secondary roadway or access driveway.

or

- A lane shall be temporarily closed on the primary roadway to allow trucks to exit and enter the secondary roadway or access driveway.

TA-3 Existing access points will be used to the extent practicable. If necessary to avoid large mature trees, native vegetation, or other significant habitat features, temporary access points will be constructed in a manner that minimizes impacts.

TA-4 When needed, paved access roads will be swept and cleared of any residual vegetation or dirt resulting from the construction activity (also see AQ-3).

Local Access

LA1 Access for driveways and private roads shall be maintained to the extent practicable. If construction would temporarily block access, property owners must be notified prior to the construction activities. Signage and other specific information to direct traffic for all travel modes to the properties affected would be required (Caltrans 2009).

Transit Services

TS-1 Work shall be staged and conducted in a manner that maintains transit services in the vicinity of the work site. If temporary roadway or lane closures are necessary, they shall be coordinated with the appropriate transit service agency and to the maximum extent practicable. Any transit service changes due to roadway or lane closures shall include signs posted within the vehicles on the affected routes at least two weeks in advance of maintenance activities.

TS-2 If temporary roadway or lane closures require the temporary closure of a bus stop, the closure shall be coordinated with the appropriate transit service agency and scheduled to occur outside of peak hours (7:00 – 10:00 a.m. and 3:00 – 6:00 p.m.) to the maximum extent practicable. Any bus stop closure shall include signs posted at the affected stops at least two weeks in advance of maintenance activities.

TS-3 Bus-only lanes or other features may be provided to ensure buses can travel through a maintenance area with minimal delay to entice the public to use transit and decrease the number of vehicles to travel along a corridor (Caltrans 2009).

Bicycle Facilities

BF-1 Work shall be staged and conducted in a manner that maintains bicycle facilities in the vicinity of the work site. If temporary roadway, lane, or Class I path closures are necessary, they shall be coordinated with the appropriate jurisdictional agency and scheduled to occur outside of peak traffic hours (7:00 – 10:00 a.m. and 3:00 – 6:00 p.m.) to the maximum extent practicable. Any closures shall include advance warning signage. Alternate facilities shall be provided (Caltrans 2009).

Pedestrian Facilities

PF-1 Work shall be staged and conducted in a manner that maintains pedestrian facilities in the vicinity of the work site. If temporary sidewalk or shared-use path closures are necessary, they shall be coordinated with the appropriate jurisdictional agency and scheduled to occur outside of peak traffic hours (7:00 – 10:00 a.m. and 3:00 – 6:00 p.m.) to the maximum extent practicable. Any closures shall include advance warning signage. Alternate facilities shall be provided (Caltrans 2009).

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

Parking

PK-1 Off-street parking shall be provided or designated public parking areas shall be used for maintenance workers' personal vehicles and maintenance-related vehicles not in use during the maintenance period. Similarly, workers may park at the nearest County office building or Public Works Yard and be shuttled to the project site.

2. Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☐	☒

***Discussion*:** The proposed project involves the removal of sediment from numerous sites along the Pajaro River. No change in air traffic patterns would occur. Therefore, no impact would occur.

3. Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☒	☐	☐

***Discussion*:** The transport of sediment by truck could result in temporary hazards from truck access to local roadways, and impacts on both pedestrian and bicycle facilities. Mitigation measures outlined in I-1 would reduce impacts to a less than significant level.

4. Result in inadequate emergency access?	☐	☐	☒	☐

***Discussion*:** Project area roadways will remain open at all times. Fire trucks, ambulances and other emergency vehicles will not be blocked from using the local roads at any time. No significant impact is anticipated.

5. Cause an increase in parking demand which cannot be accommodated by existing parking facilities?	☐	☒	☐	☐

***Discussion*:** Construction workers personal vehicles and other construction-related vehicles may park on roadways near the construction areas and temporarily reduce the availability of on-street parking for local residents and businesses. See mitigation outlined in Section I-1 above. Impacts would be reduced to a less than significant impact.

6. Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	☐	☒	☐	☐

***Discussion*:** With the implementation of mitigation measures outlined in I-1 above, the proposed project would comply with current road requirements to prevent potential hazards to

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

motorists, bicyclists, and/or pedestrians. Impacts would be reduced to a less than significant level.

7.	Exceed, either individually (the project alone) or cumulatively (the project combined with other development), a level of service standard established by the County General Plan for designated intersections, roads or highways?	☐	☐	☒	☐

***Discussion*:** See response I-1 above. The proposed project would result in temporary construction impacts. No cumulative traffic impacts would occur from project implementation.

J. NOISE

Would the project result in:

1.	A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☒	☐

***Discussion*:** The project would create temporary construction impacts that are considered to be less than significant (see discussion under J-3).

2.	Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☒	☐

***Discussion*:** The use of construction equipment would potentially generate vibration in the project area. Construction equipment would be expected to use some of the equipment listed in Table 21. Based on the activities that would be expected for the proposed project, the equipment with the greatest vibratory levels of 0.089 inch per second peak particle velocity (PPV) at a distance of 25 feet. The nearest residential properties located adjacent to Sites 3R and 4R would be exposed to a 0.055 inch per second PPV level. It requires a vibration level of 0.5 and 0.1 inch per second PPV for structural damage and annoyance, respectively. Based on these thresholds, none of the nearest residences along Sites 3R and 4R would experience vibration levels during construction activities associated with the proposed project. Therefore, impacts would be less than significant.

3.	Exposure of persons to or generation of noise levels in excess of standards established in the General Plan or noise ordinance, or applicable standards of other agencies?	☐	☒	☐	☐

***Discussion*:** Please see discussion under J-4. A less than significant impact would occur as a result of temporary construction noise with the incorporation of mitigation measures.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
4. A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☒	☐	☐

***Discussion*:**

County of Santa Cruz General Plan

The Santa Cruz County General Plan (County of Santa Cruz 1994) contains the following table, which specifies the maximum allowable noise exposure for stationary noise sources (Table 20). The County of Santa Cruz has not adopted noise thresholds for construction noise.

Table 20: Maximum Allowable Noise Exposure for Stationary Noise Sources[1]

	Daytime[5] (7:00 pm to 10:00 pm)	Nighttime[2, 5] (7:00 pm to 10:00 pm)
Hourly Leq average hourly noise level, dB[3]	50	45
Maximum Level, dB[3]	70	65
Maximum Level, dB – Impulsive Noise[4]	65	60

Notes:
1 As determined at the property line of the receiving land use. When determining the effectiveness of noise mitigation measures, the standards may be applied to the receptor side of noise barriers or other property line noise mitigation measures.
2 Applies only where the receiving land use operates or is occupied during nighttime hours
3 Sound level measurements shall be made with "slow" meter response.
4 Sound level measurements shall be made with "fast" meter response
5 Allowable levels shall be raised to the ambient noise levels where the ambient levels exceed the allowable levels. Allowable levels shall be reduced to 5 dB if the ambient hourly Leq is at least 10 dB lower than the allowable level.
Source: County of Santa Cruz 1994

The following are other applicable noise related policies found in the Public Safety and Noise Element of the Santa Cruz County General Plan (Santa Cruz County 1994).

- Policy 6.9.7 Construction Noise. Require mitigation of construction noise as a condition of future project approvals.
- Policy 6.10.2 Evaluation and Mitigation. Require the evaluation of mitigation measures for any project that would cause significant degradation of the noise environment by:

  (a) causing the L_{dn} in existing residential areas to increase by 5 dB or more and remain below 60 dB;

  (b) causing the L_{dn} in existing residential areas to increase by 3 dB or more and, thereby, exceed an L_{dn} of 60 dB; or

  (c) causing the L_{dn} in existing residential areas to increase by 3 dB or more if the L_{dn} currently exceeds 60 dB.

County of Santa Cruz Code

There are no County of Santa Cruz ordinances that regulate construction noise.

Section 8.30.010 (Curfew—Offensive noise) of the Santa Cruz County Code contains the following language regarding noise impacts:

A. No persons shall, between the hours of ten p.m. and eight a.m., make, cause, suffer, or permit to be made any offensive noise:

   1. Which is made within one hundred feet of any building or place regularly used for sleeping purposes; or

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

2. Which disturbs any person of ordinary sensitivities within his or her place of residence.

B. "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, meeting, gathering, game, dance, or amusement, or by any appliance, contrivance, device, structure, *construction*, ride, machine, implement, instrument or vehicle. (Ord. 4001 § 1 (part), 1989)

County of Monterey General Plan

The following are applicable noise related goals and policies found in Chapter 4.0 of the Monterey County General Plan (County of Monterey 2010).

Goal S-7: Maintain a healthy and quiet environment free from annoying and harmful sounds.

- Policy S-7.9: No construction activities pursuant to a County permit that exceed "acceptable" levels listed in Policy S-7.1 shall be allowed within 500 feet of a noise sensitive land use during the evening hours of Monday through Saturday, or anytime on Sunday or holidays, prior to completion of a noise mitigation study. Noise protection measures, in the event of any identified impact, may include but not be limited to:
    - Constructing temporary barriers, or
    - Using quieter equipment than normal.
- Policy S-7.10: Construction projects shall include the following standard noise protection measures:
    - Construction shall occur only during times allowed by ordinance/code unless such limits are waived for public convenience;
    - All equipment shall have properly operating mufflers; and
    - Lay-down yards and semi-stationary equipment such as pumps or generators shall be located as far from noise-sensitive land uses as practical.

County of Monterey Code

No person shall, within the unincorporated limits of the County of Monterey, operate any machine, mechanism, device, or contrivance which produces a noise level exceeding eighty-five (85) dbA measured fifty (50) feet therefrom. (Monterey County Code Title 10, Chapter 10.60.030).

City of Watsonville General Plan (2005)

Chapter 12 of the City of Watsonville 2005 General Plan, the maximum acceptable exterior noise level in residential and sensitive receptor areas is 60 dBA (City of Watsonville 1994). The following applicable implementation measures found in the General Plan are relevant to the proposed project:

Goal 12.8: Noise Hazard Control – Evaluate new and existing land uses in the City for compatibility related to noise effects and require, as appropriate, mitigation where harmful effects can be identified and measurable improvement will result.

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-

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

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.

City of Watsonville Municipal Code

There are no City of Watsonville ordinances that regulate construction noise.

Sensitive Receptors

Some land uses are generally regarded as being more sensitive to noise than others due to the type of population groups or activities involved. Sensitive population groups generally include children and the elderly. Noise sensitive land uses typically include all residential uses (single- and multi-family, mobile homes, dormitories, and similar uses), hospitals, nursing homes, schools, and parks.

Table 21: Typical Noise Levels for Common Construction Equipment (at 50 feet)

Equipment	L_{max} (dBA)
Air Compressor	78
Backhoe	78
Cement Mixer Truck	79
Cement Pump Truck	81
Chain Saw	84
Compactor	83
Crane	81
Concrete Saw	90
Dozer	82
Excavator	81
Dump Truck	76
Flat Bed Truck	74
Front End Loader	79
Fork Lift	75
Generator	81
Grader	85
Paver	77
Pick-up Truck	40
Roller	80
Scraper	85
Tractor	40
Tree Chipper	87

Source: Federal Highway Administration 2006.

The use of construction equipment to accomplish the proposed project would result in noise in the project area, i.e., construction zone. Table 21 shows typical noise levels for common construction equipment. The sources noise that levels are normally measured at 50 feet, are used to determine the noise levels at nearby sensitive receptors by attenuating 6 dB for each doubling of distance for point sources of noise such as operating construction equipment. Noise levels at the nearest sensitive receptors for each site were analyzed on a worst-case basis, using the equipment with the highest noise level expected to be used.

The closest hospital and nursing homes to the project area are located in Watsonville. The Watsonville Community Hospital is located approximately 2.7 miles northwest of Site 3R, and the closest nursing home is located 1.1 miles north northwest of Site 3R. The nearest sensitive receptors to the construction area are outlined in Table 22.

Impacts

Although construction activities would likely occur during daytime hours, noise could still be considered substantially disruptive to residents. However, periods of intrusive noise exposure would be temporary. Noise from construction activity could vary significantly on a day-to-day basis, and the noise levels shown in Table 22 represent a worst-case scenario. Such worst-

case scenarios would likely exist only for short periods at any particular residence on a given day.

Potential Temporary Construction Noise Impacts

Construction activity would be expected to use equipment listed in Table 21. Based on the activities proposed for the proposed project, the equipment with the loudest operating noise level that would be used often during activity would be a dozer which would produce noise levels of 82 dBA at a distance of 50 feet. Both the County of Santa Cruz and the City of Watsonville have not adopted significance thresholds for construction noise. The County of

Table 22: Estimated Noise Levels for Construction Activities

Excavation Site	Nearest Sensitive Receptor/ Distance[1]	Source Level at 50 feet (dBA)	Noise Level at Receptor (dBA)
1R	None	82	---
2R	None	82	---
3R	Residences/ 65 feet north	82	80
4R	Residences and Park/ 55 feet north	82	81
5R	None	82	---
5.5R	Residences/ 400 feet south	82	64
6R	None	82	---
7R	None	82	---
8R	Residence/ 260 feet west	82	68
2L	None	82	---
4L	None	82	---

Note: (1) Only receptors 400 feet or closer have been noted.

Monterey uses eighty-five (85) dBA measured fifty (50) as a threshold of significance. As discussed above, the most common equipment used would generate 82 decibels at 50 feet, which is less than the 85 decibel threshold adopted by the County of Monterey. The nearest sensitive receptors located in Monterey County are at least 250 feet from the construction site. Noise levels at the nearest receptor would be reduced to approximately 68 dBA, well below the 85 decibel level. As a result, no significant noise impacts would occur during construction activities.

Mitigation Measures

However, the following measures will be implemented to ensure that no significant noise impacts occur during construction.

NOI-1 Limit construction and maintenance activity (not including emergency maintenance activity) to between the hours of 7:00 a.m. to 7:00 p.m. Monday through Friday, 9:00 a.m. to 5:00 p.m. Saturday in order to avoid noise during more sensitive nighttime hours. Prohibit construction and maintenance activity on Sundays.

NOI-2 Stationary noise sources shall be located as far from sensitive receptors as possible. If they must be located near receptors, adequate muffling (with enclosures) shall be used and enclosure opening or venting will face away from sensitive receptors. Enclosures will be designed by a registered engineer regularly involved in noise control analysis and design.

NOI-3 Require that all construction and maintenance equipment powered by gasoline or diesel engines have sound-control devices that are at least as effective as those originally provided by the manufacturer and that all equipment be operated and maintained to minimize noise generation.

NOI-4 Prohibit gasoline or diesel engines from having unmuffled exhaust.

NOI-5 Use noise-reducing enclosures around stationary noise-generating equipment capable of 6 dB attenuation.

NOI-6 A noise barrier shall be constructed between noise sources and noise-sensitive land uses (residential and park) near Sites 3R and 4R to block sound transmission during

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

excavation. Ten-foot high temporary construction sound walls shall be placed along the top of the levee at these locations. An acoustical blanket supported by a single K-Railing shall be used as a barrier to reduce noise generated by project construction.

NOI-7 A noise barrier shall be constructed around construction staging area located on East Front Street in the City of Watsonville to block sound transmission to adjacent sensitive receptors. Ten-foot high temporary construction sound walls shall be placed along the top of the levee at these locations. An acoustical blanket supported by a single K-Railing shall be used as a barrier to reduce noise generated by within the staging area.

NOI-8 Limited truck trips through residential areas to or from project area to the hours of 9:00 a.m. until 4:00 p.m., Monday through Saturday, to minimize the associated noise impacts to less sensitive time periods. Best available noise control techniques (including mufflers, intake silencers, ducts, engine closures, and acoustically attenuating shields or shrouds) shall be used for all equipment and trucks as necessary.

NOI-9 As practicable, material stockpiles, maintenance/equipment staging, and parking areas shall be located as far as possible from residential receptors.

NOI-10 Prior to construction, the City of Watsonville shall conduct door to door community outreach in English and Spanish along Front Street (near Sites 3R and 4R).

NOI-11 The City of Watsonville shall hold at least one community meeting to discuss the proposed project and its effect on the residential neighborhood adjacent to Sites 3R and 4R with concurrent bilingual translation.

NOI-12 The project sites shall be posted with signage containing project contact information for residents in cases of disturbance or damage to residences as a result of project construction.

NOI-13 Construction staging areas shall be located away from residential uses.

NOI-14 Designated access to the construction area shall be located as far away as feasibly possible from residential uses.

5. 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 expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

***Discussion*:** The project site is located nearly three miles south of the Watsonville Municipal Airport. The City of Watsonville is located between the project area and the airport. No impact is anticipated.

6. For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise	☐	☐	☐	☒

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

levels?

***Discussion*:** See response to J-5. No impact is anticipated.

K. AIR QUALITY

Where available, the significance criteria established by the Monterey Bay Unified Air Pollution Control District (MBUAPCD) may be relied upon to make the following determinations. Would the project:

1. Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☒	☐	☐

***Discussion*:** The North Central Coast Air Basin (NCCAB) does not meet state standards for ozone and particulate matter (PM_{10}) (MBUAPCD 2009). These pollutants are both emitted during construction activities. However, emissions from construction activities represent temporary impacts that are typically short in duration, depending on the size, phasing, and type of project. Air quality impacts can nevertheless be acute during construction periods, resulting in significant localized impacts to air quality. Table 23 summarizes the threshold of significance for construction activities.

Table 23: Construction Activity with Potentially Significant Impacts from Pollutant PM_{10}

Activity	Potential Threshold*
Construction site with minimal earthmoving	8.1 acres per day
Construction site with earthmoving (grading, excavation)	2.2 acres per day

*Based on Midwest Research Institute, Improvement of Specific Emission Factors (1995). Assumes 21.75 working weekdays per month and daily watering of site.

Note: Construction projects below the screening level thresholds shown above are assumed to be below the 82 lb/day threshold of significance, while projects with activity levels higher than those above may have a significant impact on air quality. Additional mitigation and analysis of the project impact may be necessary for those construction activities.

Source: Monterey Bay Unified Air Pollution Control District, 2008.

Impacts

As required by the Monterey Bay Unified Air Pollution Control District (MBUAPCD), construction activities (e.g., excavation, grading, on-site vehicles) which directly generate 82 pounds per day or more of PM_{10} would have a significant impact on local air quality when they are located nearby and upwind of sensitive receptors such as the City of Watsonville or the community of Pajaro (Table 23). Construction projects below the screening level thresholds shown in Table 23 are assumed to be below the 82 lb/day threshold of significance, while projects with activity levels higher than those thresholds may have a significant impact on air quality. Although the proposed Bench Excavation project would ultimately grade up to 39 acres of bench area along the Pajaro River, it would actively grade no more than 2.2 acres per day as outlined in Table 23. A total of 29.2 pounds per day of PM_{10} would be the maximum generated during excavation with the incorporation of the proposed mitigation measures (Table 24) under the trucking only scenario. This is far below the 82 pounds per day threshold. This would result in less than significant impacts on air quality from the generation of PM_{10}.

Construction projects using typical construction equipment such as dump trucks, scrapers, bulldozers, compactors and front-end loaders that temporarily emit precursors of ozone [i.e., volatile organic compounds (VOC) or oxides of nitrogen (NOx)], are accommodated in the emission inventories of State- and federally-required air plans and would not have a significant

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

impact on the attainment and maintenance of ozone AAQS (MBUAPCD 2008).

Table 24: Estimated Construction Emissions from Excavation and Hauling (Trucking Only Scenario)

	Pounds/Day									
Project Phases	**ROG**	**CO**	**NO_x**	**Total PM_{10}**	***Exhaust PM_{10}***	***Fugitive Dust PM_{10}***	**Total $PM_{2.5}$**	***Exhaust $PM_{2.5}$***	***Fugitive Dust $PM_{2.5}$***	**CO_2**
Grubbing/Land Clearing	**10.7**	**39.5**	**50.3**	**25.1**	*3.1*	*22.0*	**7.4**	*2.8*	*4.6*	**5,712.9**
Excavation	**18.7**	**95.3**	**151.4**	**29.2**	*7.2*	*22.0*	**10.8**	*6.2*	*4.6*	**22,801.8**
Maximum (pounds/day)	**18.7**	**95.3**	**151.4**	**29.2**	*7.2*	*22.0*	**10.8**	*6.2*	*4.6*	**22,801.8**
Total (project tons)	**2.7**	**13.5**	**21.2**	**2.9**	*1.0*	*1.8*	**1.3**	*0.9*	*0.4*	**3,153.6**

Assumptions:
- Project Start Year: 2012
- Project Length (months): 14 total (seven months x two construction seasons)
- Total project Area (acres): 39.1
- Maximum Area Disturbed/Day (acres): 2.2
- PM_{10} and $PM_{2.5}$ estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.
- Total PM_{10} emissions shown are the sum of exhaust and fugitive dust emissions. Total $PM_{2.5}$ emissions are the sum of exhaust and fugitive dust emissions.

Source: Sacramento Metropolitan Air Quality Management District, Road Construction Emissions Model, Version 6.3.2.

Although not a mitigation measure per se (i.e., required by law), California ultralow sulfur diesel fuel with a maximum sulfur content of 15 ppm by weight will be used in all diesel-powered equipment, which minimizes sulfur dioxide and particulate matter.

Mitigation Measures

The project impacts would be reduced to a less than significant level with implementation of the required MBUAPCD emission control measures, i.e., diesel engine and fugitive dust controls.

AQ-1 Contracted Diesel Control Measures: In addition to the use of Tiered engines and California ultralow sulfur diesel fuel, the following requirements will be incorporated into contract specifications:

- To minimize potential diesel odor impacts on nearby receptors (pursuant to MBUAPCD Rule 402, Nuisances), construction equipment will be properly tuned. A schedule of tune-ups will be developed and performed for all equipment operating within the project area. A written log of required tune-ups will be maintained and a copy of the log will be submitted to the County of Santa Cruz Department of Public Works (DPW) Planning Director for review every 2,000 service hours.
- Fixed temporary sources of air emissions (such as portable pumps, compressors, generators, etc.) will be electrically powered unless the contractor submits documentation and receives written approval from the County of Santa Cruz DPW that the use of such equipment is not practical, feasible, or available (generally contingent upon power line proximity, capacity, and accessibility). California ultralow sulfur diesel fuel with maximum sulfur content of 15 ppm by weight (ppmw S), or an approved alternative fuel, will be used for on-site fixed equipment not using line power.
- To minimize diesel emission impacts, construction contracts will require off-road compression ignition equipment operators to reduce unnecessary idling with a 2-minute time limit, subject to monitoring and written documentation.
- On-road material hauling vehicles will shut off engines while queuing for loading

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

and unloading for time periods longer than 2 minutes, subject to monitoring and written documentation.

- Off-road diesel equipment will be fitted with verified diesel emission control systems (e.g., diesel oxidation catalysts) to the extent reasonably and economically feasible.
- Utilize alternative fuel equipment (i.e., compressed or liquefied natural gas, biodiesel, electric) to the extent reasonably and economically feasible.

Feasibility will be determined consistent with Best Available Control Technology (BACT) general criteria: 1) achieved in practice; 2) contained in adopted control measures; 3) technologically feasible; and 4) cost-effective.

AQ-2 Diesel Particulate Matter Emissions Control Measures: In addition, the project will implement the following measures to reduce particulate matter emissions from diesel exhaust:

- Grid power will be used instead of diesel generators where it is feasible to connect to grid power (generally contingent upon power line proximity, capacity, and accessibility).
- The project specifications will include 13 CCR Sections 2480 and 2485, which limit the idling of all diesel-fueled commercial vehicles (weighing over 10,000 pounds, both California- or non-California-based trucks) to 30 seconds at a school or 5 minutes at any location. In addition, the use of diesel auxiliary power systems and main engines will be limited to 5 minutes when within 100 feet of homes or schools while the driver is resting.
- The project specifications will include 17 CCR Section 93115, Airborne Toxic Control Measure for Stationary Compression Ignition Engines, which specifies fuel and fuel additive requirements; emission standards for operation of any stationary, diesel-fueled, compression-ignition engines; and operation restrictions within 500 feet of school grounds when school is in session.
- A schedule of low-emissions tune-ups will be developed and such tune-ups will be performed on all equipment, particularly for haul and delivery trucks.
- Low-sulfur (≤ 15 ppmw S) fuels will be used in all stationary and mobile equipment.

AQ-3 Dust Control Measures: The following controls will be implemented at the construction and staging sites as applicable:

- Water all active construction areas at least twice daily as necessary and indicated by soil and air conditions.
- Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least 2 feet of freeboard.
- Pave, apply water three times daily, or apply (nontoxic) soil stabilizers on all unpaved access roads, parking areas and staging areas at construction sites.
- Sweep daily (with water sweepers) all paved access roads, parking areas and staging areas at construction sites.
- Sweep streets daily (with water sweepers) if visible soil material is carried onto adjacent public streets.
- All disturbed areas, including storage piles, which are not being actively utilized for construction purposes, will be effectively stabilized of dust emissions using water, chemical stabilizer/suppressant, covered with a tarp or other suitable cover or vegetative ground cover.
- All on-site unpaved roads and off-site unpaved access roads will be effectively

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

stabilized of dust emissions using water or chemical stabilizer/suppressant.

- All land clearing, grubbing, scraping, excavation, land leveling, grading, cut & fill, and demolition activities will be effectively controlled of fugitive dust emissions utilizing application of water or by presoaking.
- Where applicable, for demolition of buildings up to six stories in height, all exterior surfaces of the building will be wetted during demolition.
- When materials are transported off site, all material will be covered, or effectively wetted to limit visible dust emissions, and at least 6 inches of freeboard space from the top of the container will be maintained.
- All operations will limit or expeditiously remove the accumulation of mud or dirt from adjacent public streets at the end of each workday. (The use of dry rotary brushes is expressly prohibited except where preceded or accompanied by sufficient wetting to limit the visible dust emissions. Use of blower devices is expressly forbidden.)
- Following the addition of materials to, or the removal of materials from, the surface of outdoor storage piles, said piles will be effectively stabilized of fugitive dust emissions utilizing sufficient water or chemical stabilizer/suppressant.
- Within urban areas, trackout will be immediately removed when it extends 50 or more feet from the site and at the end of each workday.
- Any site with 150 or more vehicle trips per day will prevent carryout and trackout.
- Hydroseed or apply (nontoxic) soil stabilizers to inactive construction areas (previously graded areas inactive for 10 days or more).
- Enclose, cover, water twice daily, or apply (nontoxic) soil binders to exposed stockpiles (dirt, sand, etc.).
- Limit traffic speeds on unpaved roads to 15 miles per hour.
- Install sandbags or other erosion control measures to prevent silt runoff to public roadways from sites with a slope greater than 1 percent.
- Replant vegetation in disturbed areas as quickly as possible.
- Install wheel washers for all exiting trucks, or wash off all trucks and equipment leaving the site.
- Install wind breaks at windward side(s) of construction areas.
- Suspend excavation and grading activity when winds (instantaneous gusts) exceed 20 miles per hour.
- Limit the area subject to excavation, grading, and other construction activity at any one time.

Implementation of the above mitigation measures would reduce the impact from diesel particulate matter (DPM) and fugitive dust emissions to less than significant.

2.	Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☒	☐

***Discussion*:** The project would not conflict with or obstruct any long-range air quality plans of the MBUAPCD. Because general construction activity related emissions (i.e., temporary sources) are accounted for in the emission inventories included in the plans, impacts to air quality plan objectives are less than significant. See K-1 above.

General estimated basin-wide construction-related emissions are included in the MBUAPCD emission inventory (which, in part, form the basis for the air quality plans cited above) and are not expected to prevent long-term attainment or maintenance of the ozone and particulate

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

matter standards within the NCCAB. Therefore, temporary construction impacts related to air quality plans for these pollutants from the proposed project would be less than significant, and no mitigation would be required, since they are presently estimated and accounted for in the District's emission inventory, as described above. No stationary sources would be constructed that would be long-term permanent sources of emissions.

3. 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 (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☐	☐	☒	☐

***Discussion*:** Project construction would have a limited and temporary potential to contribute to existing violations of California air quality standards for ozone and PM_{10} primarily through diesel engine exhaust and fugitive dust. However, the Watsonville monitoring station has not had any recent violations of federal or state air quality standards mainly through dispersion of construction-related emission sources. Mitigation measures described above under K-1 would reduce emissions to below a level of significance. Therefore, the proposed project would not result in a cumulatively considerable net increase in criteria pollutants. The impact on ambient air quality would be less than significant.

4. Expose sensitive receptors to substantial pollutant concentrations?	☐	☒	☐	☐

***Discussion*:**

Impacts

Diesel exhaust contains substances (DPM, toxic air contaminants [TACs], mobile source air toxics [MSATs]) that are suspected carcinogens, along with pulmonary irritants and hazardous compounds, which may affect sensitive receptors such as young children, senior citizens, or those susceptible to respiratory disease. Where construction activity occurs in proximity to long-term sensitive receptors, a potential could exist for unhealthful exposure of those receptors to diesel exhaust, including residential receptors.

Many of the excavation sites are located on the perimeter of the City of Watsonville and Town of Pajaro and sensitive receptors are likely within 1,000 feet. Therefore, the excavation areas on the perimeter of the City of Watsonville and Town of Pajaro should be considered a sensitive receptor zone during the construction period. Since construction is anticipated to occur over 2 yet-to-be determined consecutive years at different locations throughout the project alignment, the sensitive receptor zones would be affected for a maximum of six months in aggregate over the life of the project, which is less than 1/10 of one percent of the 70-year maximum exposed individual (MEI) criteria used for assessing public health risk due to emissions of certain air pollutants (MBUAPCD 2008).

Due to the intermittent and short-term temporary nature of construction activities (i.e., 6 months per year over 2 yet-to-be determined consecutive years), emissions of DPM, TACs, or MSATs would not be sufficient to pose a significant risk to sensitive receptors from construction equipment operations dispersed over a wide area and at different locations during the course

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

of the project.

Mitigation Measures

MBUAPCD control measures for diesel exhaust would be implemented as described in Mitigation Measures AQ-1 and AQ-2. The project would not be expected to expose sensitive receptors to substantial pollutant concentrations. The impact would be less than significant with mitigation.

Implementation of the above mitigation measures would reduce the impact on sensitive receptors to less than significant.

5. Create objectionable odors affecting a substantial number of people?	☐	☐	☐	☒

***Discussion*:** California ultralow sulfur diesel fuel with a maximum sulfur content of 15 ppm by weight will be used in all diesel-powered equipment, which minimizes emissions of sulfurous gases (sulfur dioxide, hydrogen sulfide, carbon disulfide, and carbonyl sulfide). Therefore, no objectionable odors are anticipated from construction activities associated with the proposed project, and no mitigation measures would be required. The proposed project would not create objectionable odors affecting a substantial number of people; therefore, no impact would occur.

L. GREENHOUSE GAS EMISSIONS

Would the project:

1. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☒	☐	☐

***Discussion*:**

Impacts

Transportation is a major contributor to greenhouse gas emissions. According to the U.S. Environmental Protection Agency (EPA), the transportation sector was responsible for approximately 27 percent of all greenhouse gas (GHG) emissions in the United States in 2009 (U.S. EPA 2011), and transportation in California was responsible for about 36.5 percent of GHG emissions in 2008 (CARB 2010). Transportation is the direct result of population and employment growth, which generates vehicles trips to move goods, provide public services, and connect people with work, school, shopping, and other activities such as construction or maintenance. Virtually all of the GHG emissions generated by the proposed project is from excavation and transportation of the excavated materials to receiving sites.

A performance measure used to quantify the amount of travel is vehicle miles travelled (VMT). VMT is a useful performance measure, since the amount of travel and conditions under which the travel occurs directly relate to how much fuel vehicles burn. As a result, increases in VMT directly cause increases in GHG emissions and air pollution.

- Sediment removal trucks would take sediment to the following disposal sites: 38,000 cubic yards would be taken to the Buena Vista Landfill, 40,000 cubic yards would be taken to the City of Watsonville Landfill, 58,000 cubic yards would be taken to the Manbe-Ow site, and 201,000 cubic yards would be taken to two stockpile areas near Elkhorn Slough.

- Trip length distances were estimated by calculating the length between each excavation site and each disposal location or the Roy Wilson Yard.
- These trip lengths were multiplied by the estimated trips calculated (Table 25) to determine the VMT.

In Year 1, it is estimated that the proposed project would create approximately 141,000 annual VMT, which equates to approximately 1,330 daily VMT (approximately 5.1 miles per trip). In Year 2, it is estimated that the proposed project would create approximately 471,500 annual VMT, which equates to approximately 3,320 daily VMT (approximately 12.8 miles per trip). There is more VMT created in Year 2 because the sediment disposal location at Elkhorn Slough is further from the individual excavation sites than the disposal sites in Year 1 such as Buena Vista Landfill. Table 25 shows the VMT estimates for each excavation site.

Table 25:
Project Vehicle Miles Traveled (Trucking Scenario)

Year	Excavation Site	Truck VMT[1]	Light Duty Vehicle VMT[2]	Total VMT
Year 1	1R	27,574	5,714	33,289
	2R	39,985	10,073	50,058
	3R	18,111	3,116	21,226
	4R	21,345	10,479	31,823
	2L	3,313	1,641	4,953
Subtotal (2011)		***110,328***	***31,022***	***141,350***
Year 2	5R	83,833	7,269	91,102
	5.5R	14,407	1,001	15,408
	6R	204,829	15,888	220,718
	7R	15,143	1,450	16,593
	8R	73,583	7,838	81,421
	4L	40,931	5,282	46,213
Subtotal (2012)		***432,726***	***38,729***	***471,455***
Total		**543,054**	**69,751**	**612,805**
Daily VMT (Year 1)[3]		*1,034*	*291*	*1,325*
Daily VMT (Year 2)[3]		*3,050*	*273*	*3,323*
VMT per Trip (Year 1)		*3.0*	*5.6*	*3.6*
VMT per Trip (Year 2)		*14.6*	*5.2*	*12.8*

Notes:
1. Trucks are considered to be large sediment removal dump trucks with a capacity of 13-cubic yards and other large semi-trucks that would be used to haul equipment or similar amounts of materials. Truck trips include both sediment removal trips and delivery trips.
2. Light duty vehicles include, but are not limited to, vehicle types such as cargo vans, pickup trucks, sport utility vehicles, minivans, and sedans. Light duty vehicle usage is approximately 25% of the amount of sediment removal truck trips.
3. VMT per day calculated by dividing the VMT from each year by the number of workdays per year. There are 122 workdays in 2011 and 116 workdays in 2012.

Source: Fehr & Peers, 2011.

Project GHG emissions were calculated using the Sacramento Metropolitan Air Quality Management District, Road Construction Emissions Model, Version 6.3.2. As shown in Table 24, project GHG emissions are estimated to total approximately 3,154 tons CO_2 equivalents over the course of two construction seasons (or about 1,577 tons annually). These emissions would be temporary and, after two consecutive years, would permanently cease upon completion of the project. Compared to the California 2008 GHG inventory, mitigated annual construction emissions would comprise about 0.0006 percent of California's 2008 emissions. Such small percentage contributions are well within the estimation error of emissions inventories, generally plus or minus 10 percent (CARB 2007). Impacts would be reduced to a less than significant level with the implementation of the following mitigation measures.

Mitigation Measures

During Construction, contractors will implement the following measures to reduce GHG emissions from fuel combustion and construction activities.

GHG-1 On-road and off-road vehicle tire pressure will be maintained to manufacturer specifications. Tires will be checked and reinflated at regular intervals.

GHG-2 Lower-carbon fuels such as biodiesel blends will be used where feasible.

GHG-3 Engine retrofits to remove emissions such as diesel particulate matter filters with diesel oxidation catalysts will be used where feasible.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

GHG-4 Construction equipment engines will be maintained to manufacturer's specifications.

GHG-5 Locally made material for construction will be used to the extent feasible.

GHG-6 Any existing on-site trees and vegetation will be preserved or replaced (if removal is necessary for project activities) as a means of providing carbon sequestration.

GHG-7 Feasibility will be determined consistent with Best Available Control Technology (BACT) general criteria: 1) achieved in practice; 2) contained in adopted control measures; 3) technologically feasible; and 4) cost-effective.

2. Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☒	☐

***Discussion*:**

On a local and statewide basis, agencies in California are in the process of implementing identified strategies to reduce GHG emissions. Leading this effort is the California Air Resources Board (CARB), which issued its AB 32 Climate Change Scoping Plan on December 12, 2008. The scoping plan identifies GHG reduction strategies and measures, which include the following major components (CARB 2008):

- Cap-and-Trade Program
- Transportation Technology and Design
- Electricity Generation and Energy Efficiency
- Industrial Source Controls
- High Global Warming Potential Gas Management
- Forestry and Agricultural Practices
- Waste Reduction and Recycling

Several California agencies have developed methodologies for assessing GHG emissions impacts, such as Bay Area Air Quality Management District's 2010 CEQA Air Quality Guidelines. However, the MBUAPCD has not yet issued guidance specific to GHG emissions or climate change for Santa Cruz County. In general, the project would maintain consistency with established GHG emission reduction strategies identified by CARB and other California agencies, which would likely be incorporated into any future guidance issued by the local agency.

At this time, Santa Cruz County is in the process of developing a Climate Action Strategy (CAS) intended to establish specific emission reduction goals and necessary actions to reduce GHG levels to 1990 levels by 2020 as required under AB 32 legislation. Until the CAS is completed and adopted, there are no specific local standards or criteria to apply to the proposed project. All project construction equipment would be required to comply with the California Air Resources Board emissions requirements for construction equipment.

Due to its temporary and intermittent status, the project would not conflict with currently adopted state or local plans, policies or guidelines aimed at curbing emissions of GHGs over the long term. Therefore, the individual impact would be less than significant with mitigation measures outlined above under L-1 incorporated, and the incremental cumulative impact would not be considerable.

M. PUBLIC SERVICES

Would the project:

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
1. 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:				
a. Fire protection?	☐	☐	☒	☐
b. Police protection?	☐	☐	☒	☐
c. Schools?	☐	☐	☐	☒
d. Parks or other recreational activities?	☐	☐	☒	☐
e. Other public facilities; including the maintenance of roads?	☐	☐	☐	☒

***Discussion (a through e)*:**

a. Fire Protection

The City of Watsonville Fire Department provides fire and emergency services within the City limits to unincorporated areas north of the City of Watsonville (Watsonville Fire Department 2011). Santa Cruz County contracts with the Department of Forestry and Fire Protection (Cal Fire) to provide fire protection services in the portion of the unincorporated County located within the project area (Santa Cruz LAFCO 2007). The portion of the project area within Monterey County is located within the Monterey County Regional Fire District, which responds to structure, wildland, vehicle, and other fires and emergency medical situations in the District (LAFCO of Monterey County 2005).

The project would marginally increase demand for additional fire protection services in the unincorporated portions of Santa Cruz and Monterey counties and the City of Watsonville during the short-term construction period. Additional construction workers and use of construction equipment would introduce additional fire hazards into the project study area and could result in an increase in emergency calls.

The predominant land use within and adjacent to the project area is row crop agriculture and

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

the potential for the development. The spread of wildfire is low in agricultural areas due to the lack of fire fuel and the numerous firebreaks formed by public and private access roadways and irrigation canals and ditches. As such, construction work in these areas would not substantially increase the risk of wildfires. Additionally, the small increase in demand for fire protection services due to an increase in people on the site during project construction would only be in the short-term. The project does not include any components that would result in an increased demand for fire protection or emergency medical services in the long-term. Therefore, the project's short-term increase in demand would not require new fire department facilities to maintain acceptable service ratios or response times and the impact would be less than significant.

b. Police Protection

The Watsonville Police Department provides police protection services to land within the City limit. The Police Department operates one station within the City along with two satellite stations, one at the Freedom Library and the other at the East Lake Village Shopping Center (Watsonville Police Department 2011). The Santa Cruz County Sheriff's Office provides police protection services to the portions of southern Santa Cruz County located within the project study area through the Aptos (Beat 9) and South County (Beat 11) Service Centers (Santa Cruz County Sheriff's Office 2011). The Monterey County Office of the Sheriff provides law enforcement and other police protection services to unincorporated Monterey County out of three stations. The Central Station, located in Salinas, patrols the northern portion of the County, including the project study area, and operates three community field offices, including one in the town of Pajaro (County of Monterey Office of the Sheriff 2011).

The project would result in a short-term, marginal increase in demand for police services due to an increase in people in the project study area during construction. However, the project does not include any components that would substantially increase demand for police protection services in the long-term. Therefore, the project would not require new police facilities to maintain acceptable service ratios or response times and the impact to police services would be less than significant.

c. Schools

The closest schools to the project study area are the Watsonville High School at 250 East Beach Street (0.10 mile), and the Pajaro Middle School at 250 Salinas Road (0.23 mile). Since the project would not result in any new residential units, it would not directly increase the student population at these or any other schools in the City of Watsonville or in Santa Cruz or Monterey counties. Therefore, the project would not impact school services and would not require the construction of new school facilities.

d. Parks

Construction-related activities associated with the flood risk management features along the Pajaro River would result in a temporary disruption of river-related recreational activities in all segments. The public would not have access to levee roads during construction periods. Recreational opportunities within the project area are currently limited because direct public access to most of the lower Pajaro River is restricted. Public access is provided only along the levee roads and informal pathways.

Over the short term, construction would affect use of the levee roads and informal pathways. However, construction activities in the river channel would take place only during the summer low-flow period and construction activities would be staggered such that not all sites would be affected during every construction period. The impact on public access and recreational

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

activities during construction would be less than significant because the construction-related activities would not cause a substantial long-term disruption of public access and recreational activities.

In addition, bench excavation activities under the proposed project would not have substantial long-term impacts on public access and recreational opportunities. Bench areas would be excavated along the main-stem Pajaro River. Following excavation, The levees would continue to provide public access along the Pajaro River similar to that provided under existing conditions. Thus, the impact on public access and recreational activities would be less than significant because excavation of the bench areas would not cause a substantial long-term disruption of recreational opportunities.

e. Other Public Facilities

The project would not result in the construction of new residential units or any permanent structures that would increase demand for other public services, such as libraries and hospitals. Therefore, the project would have no impact on these other public services.

N. RECREATION

Would the project:

1.	Would the project 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?	☐	☐	☐	☒

***Discussion*:** The proposed project in intended to address flood control issues along the lower reaches of the Pajaro River. The project would not result in an increase in the demand for existing neighborhood and regional parks or other recreational facilities. Therefore, no impact would occur.

2.	Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☐	☒

***Discussion*:**

Although direct public access to most of the lower Pajaro River is limited, the Pajaro River main-stem offers surrounding residents an open-space corridor of riparian vegetation and a system of informal pathways and informal neighborhood open-space areas. The river accommodates activities that depend on water, such as fishing and recreational boating, as well as activities that are enhanced by water, such as walking and nature viewing. Although no boat launch ramps exist, limited recreational boating occurs on the Pajaro River. During moderate to high flows, the river is navigable by small watercraft, such as canoes and kayaks. Boating opportunities are limited during low-flow conditions from May to November. Other recreational opportunities along the river include hiking, jogging, bicycling, and nature viewing. Recreational access along the main-stem is via the maintenance roads on top of the levees. The public can access the river at its mouth through Zmudowski State Beach. The estuary and

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

adjacent Watsonville Slough area provide opportunities for kayaking.

In the City of Watsonville, the Santa Cruz County bicycle path is located along the levee adjacent to sites 1R through 4R. No other formally established trails currently border or cross the Pajaro River within the project area.

Other recreational facilities around the project area include the Santa Cruz County Fairgrounds along Highway 152 near College Lake, Sunset State Beach (Santa Cruz County), and Zmudowski State Beach (Monterey County) along the Pajaro River estuary near the mouth of the Pajaro River. Several area roadways are part of the Master Plan of Santa Cruz County bicycle trail system, including: Highway 129, San Andreas Road, Sunset Beach Road, and Beach Road.

The proposed project is intended for flood control. No additional recreational facilities are proposed to be constructed as part of the project. Therefore, no impact would occur to the environment from the construction or expansion of recreational facilities.

O. UTILITIES AND SERVICE SYSTEMS

Would the project:

1.	Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒

***Discussion*:** The project proposes to excavate several bench areas located along the Pajaro River main-stem from the Highway 1 Bridge to Murphy's Crossing. The project does not propose to construct new storm drainage facilities or expand existing facilities. Therefore, no impact would occur from project implementation.

2.	Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒

***Discussion*:** The project proposes to excavate several bench areas located along the Pajaro River main-stem from the Highway 1 Bridge to Murphy's Crossing. The project does not propose to construct new wastewater treatment facilities or expand existing facilities. Therefore, no impact would occur from project implementation.

3.	Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☐	☒

***Discussion*:** No impact would occur. See discussion under O-2 above.

4.	Have sufficient water supplies	☐	☐	☐	☒

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?

***Discussion*:** The project proposes to excavate several bench areas located along the Pajaro River main-stem from the Highway 1 Bridge to Murphy's Crossing. The project does not propose to expand existing entitlements or issue new entitlements that would increase water demand. Therefore, no impact would occur from project implementation.

5. Result in determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments? ☐ ☐ ☐ ☒

***Discussion*:** The project proposes to excavate several bench areas located along the Pajaro River main-stem from the Highway 1 Bridge to Murphy's Crossing. The project does not propose to expand existing entitlements or issue new entitlements that would increase demand for wastewater treatment. Therefore, no impact would occur from project implementation.

6. Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs? ☐ ☐ ☐ ☒

***Discussion*:** The project proposes to excavate several bench areas located along the Pajaro River main-stem from the Highway 1 Bridge to Murphy's Crossing. The project does not propose to expand existing entitlements or issue new entitlements that would increase solid waste generation and disposal. Therefore, no impact would occur from project implementation.

7. Comply with federal, state, and local statutes and regulations related to solid waste? ☐ ☐ ☐ ☒

***Discussion*:** See discussion under O-6 above. No impact is anticipated.

P. LAND USE AND PLANNING

Would the project:

1. Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) ☐ ☐ ☒ ☐

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

adopted for the purpose of avoiding or mitigating an environmental effect?

***Discussion*:** The proposed project does not conflict with any regulations or policies adopted for the purpose of avoiding or mitigating an environmental effect.

County of Santa Cruz General Plan

The Santa Cruz County General Plan incorporates the County's Local Coastal Program, which includes natural and agricultural resource protection policies, as well as policies designed to maintain the rural character of that portion of the County located outside of the "Urban Services Line" (Santa Cruz County 1994). A number of objectives and policies are listed in the General Plan related to planning activities, land use, and other environmental issues within the project area.

Objective 6.4: 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 protection.

Policy 6.4.10: Allow flood control structures only to protect existing development (including agricultural operations) where no other alternative is feasible and where such protection is necessary for public safety. The structures must not adversely affect sand supply, increase erosion or flooding on adjacent properties, or restrict stream flows below minimum levels necessary for the maintenance of fish and wildlife habitats.

Objective 7.23: To provide necessary flood control facilities to prevent flooding and consequent damage to property and improvements.

Program c: In conjunction with the USACE and other responsible federal, state and local agencies, continue to examine flooding problems and potential projects to help reduce the frequency and extent of flood damages along the Pajaro River, Corralitos and Soquel Creeks. (Responsibility: Public Works, flood Control Zone 7, City of Watsonville, Monterey County, Planning Department , Board of Supervisors)

County of Santa Cruz Code

Santa Cruz County ordinances establish specific standards for land use and development within the unincorporated areas for purposes of conforming to and implementing General Plan and Local Coastal Program land use policies. Those land use policies, along with other applicable policies related to flood control and other environmental issues in the project area, are discussed below.

Section 16.20.055 provides a special exemption to the Grading Ordinance for prevention or mitigation of Pajaro River/ Salsipuedes Creek flooding.

(a) In areas outside of the Coastal Zone, the operation, repair and maintenance of the Pajaro River and Salsipuedes Creek levees and the areas within the levees, for the purpose of restoring flood conveyance capacity, including bench excavation, sediment removal, and similar projects shall be exempt from the provisions of Chapter 16.20 if all of the following conditions are met:

1. The work is conducted by or under the direction of the Department of Public Works;
2. The work is in accordance with a Streambed Alteration Agreement approved by the California Department of Fish & Game, to the extent that such an Agreement is

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

required; and

3. The project has been subjected to environmental review with the County of Santa Cruz serving as the lead agency.

Section 16.30.050 (e) provides a special exemption to the Riparian Corridor and Wetlands Protection Ordinance for areas outside of the Coastal Zone, for the operation, repair, and maintenance of the Pajaro River and Salsipuedes Creek levees.

(f) In areas outside of the Coastal Zone, the operation, repair, and maintenance of the Pajaro River and Salsipuedes Creek levees and the areas within the levees, for the purpose of restoring flood conveyance capacity, including bench excavation, sediment removal, and similar projects, if all of the following conditions are met:

1. The work is conducted by or under the direction of the Department of Public Works;
2. The work is in accordance with a Streambed Alteration Agreement approved by the California Department of Fish & Game, to the extent that such an Agreement is required; and
3. The project has been subjected to environmental review with the County of Santa Cruz serving as the lead agency.

<u>City of Watsonville General Plan</u>

Goal 9.1: Open Space Network – Provide a comprehensive network of open space land uses for outdoor recreation and environmental protection.

Policy 9.A: Open Space land use – The City shall designate land as environmental management to protect ecological, scientific, and scenic values.

9.A.1: Environmental Protection – The City shall use planning measures, such as an urban limit line, greenbelts, open space zoning, conservation easements, and other tools, to restrict urban development in environmentally sensitive areas.

9.A.2: Landscape Restoration – The City shall require landscape restoration with native plants from regional seed stocks on sites disturbed by urban development.

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.

9.D.2: Erosion Control – 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.

Policy 9.F: Wildlife Habitat Protection – The City shall designate for open space and environmental management those areas rich in wildlife species and fragile in ecological make-up. These habitat zones shall be made part of the greenbelt where appropriate.

9.F.2: Restoration – The City shall support and encourage public and private efforts to restore degraded natural habitat zones and, when possible, to acquire them for preservation.

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

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

existing development from the impacts of flooding up to the 100-year event.

12.D.5: Flood Mitigation: The City shall pursue planning and financial support for the improvement of flood conditions along the Corralitos and Salsipuedes creeks, the Pajaro River, and other areas of the drainage basin impacting Watsonville as recommended by the Santa Cruz County Flood Control and Water Conservation District (Zone 7).

City of Watsonville Municipal Code

7-6.404(a) - Design standards for erosion and sediment control.

(5) Erosion control with project installations.

(i) All vegetative and/or structural measures required to discharge any accelerated runoff generated by the project shall be installed during the first or initial construction phase of the project.

(ii) Land shall be developed in increments of workable size which can be completed in a single construction season. Erosion and sediment control measures shall be coordinated with a sequence of grading, development, and construction operations, and erosion control measures shall be put into effect prior to the commencement of the next increment and/or winter rainy season.

(iii) Prior to the completion and final acceptance of the project, all erosion control measures shall be in place, and the soil shall be mulched, fertilized, and otherwise prepared so that the exposed bare soil is planted to a permanent vegetative cover. Native or naturalized vegetation should be used.

7-6.404(b) - Summer operations: April 16 to October 14.

(1) Vegetative removal: Development plans shall indicate the areas where vegetation is to be removed and replaced within the building and access envelopes. Vegetation removal shall be limited to that amount necessary and as indicated on the approved development plan. The method and time shall be such that the erosive effects are minimized.

(2) Vegetative disposal: Vegetation removed during disposal operations shall be disposed of by chipping, used as mulch or compost, or be burned or hauled away. Burning shall comply with local air pollution district regulations, and no long branches or charred pieces shall be permitted to remain.

(3) Topsoil: To promote the regrowth of vegetation, the topsoil shall be stockpiled and reapplied upon the completion of the grading on slopes of less than five to one (5:1) twenty (20%) percent. Soil stockpiles and exposed soils shall be protected from wind and water erosion at all times.

(4) Temporary vegetation: Temporary vegetation of annual grass sufficient to stabilize the soil while permanent vegetation cover is maturing shall be used on all disturbed areas when needed and as each stage of grading is completed.

(5) Dust control: Dust from grading operations shall be controlled. The permittee shall be required to keep adequate equipment on the grading site to prevent dust problems.

(6) Seedbeds: A firm, rough seedbed free of rocks, stumps, and/or other debris shall be established. “New crop” certified seed, ninety-five (95%) percent pure, with a minimum of eighty (80%) percent germination, shall be used. Legume seed shall be inoculated

Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

with the proper strain of nitrogen-fixing bacteria. Fertilizer and seed may be applied by hydromulching or other methods.

(7) Planting: Maintenance: Within fifteen (15) working days after the completion of the final grading, all bare earth slopes shall be planted. Within fifteen (15) days after planting, the permittee shall commence the watering or irrigation of the planted area and continue until the ground cover is fully developed or the winter rains start.

County of Monterey General Plan

Goal S-3: Ensure effective storm drainage and flood control to protect life, property, and the environment.

- Policy S-3.2: Best management practices to protect groundwater and surface water quality shall be incorporated into all development.
- A County Flood Management Program that helps reduce flood risks shall be established consistent with FEMA requirements at a minimum. The program shall consider both structural and non-structural solutions to address flooding.
- The Monterey County Water Resources Agency shall prepare a Flood Criteria or Drainage Design Manual that establishes floodplain management policies, drainage standards and criteria, stormwater detention, and erosion control and stormwater quality protection measures in order to prevent significant impacts from flooding and ensure that development does not increase flooding risk over present conditions. The manual shall include, as appropriate, hydrologic and hydraulic analysis procedures, procedures to assess stream geomorphology and stability, potential development impacts on streams, and design guidelines for channel design, including biotechnical bank stabilization. Until the Drainage Design manual is prepared, the County shall continue to apply existing policies and ordinances to manage floodplains and minimize flood risk, erosion control, and water quality impacts.

County of Monterey Code

See Section B-5 of this Initial Study for Section 16.12.060 Erosion Control Plan, and Section 16.12.080 Land Clearing.

Section 16.16.010: Purpose and Objectives

A. Constitutional and Statutory Authority. Pursuant to Article XI of the California Constitution and pursuant to statute, including Government Code Sections 65302, 65560, and 65800, the County of Monterey may adopt and enforce ordinances and regulations to protect and promote the health, safety, and general welfare of its citizens. Therefore, the County of Monterey enacts the floodplain management regulations set forth in this Chapter.

B. Findings of Fact.

1. The flood hazard areas of Monterey County are subject to periodic inundation which results in loss of life and property, health and safety hazards, disruption of commerce and governmental services, extraordinary public expenditures for flood protection and relief, and impairment of the tax base, all of which adversely affect the public health, safety and general welfare.

2. These flood losses are caused by uses that are inadequately elevated, floodproofed, or protected from flood damage. The cumulative effect of obstructions in Special Flood Hazard Areas which increase flood heights and velocities also contribute to flood losses.

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

C. Statement of Purpose. It is the purpose of this Chapter to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas by provisions designed to:

1. Protect human life and health;
2. Minimize expenditure of public money for costly flood control projects;
3. Minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
4. Minimize prolonged business interruptions;
5. Minimize damage to public facilities and utilities such as water and gas mains; electric, telephone and sewer lines; and streets and bridges located in Special Flood Hazard Areas;
6. Help maintain a stable tax base by providing for the sound use and development of Special Flood Hazard Areas so as to minimize future blighted areas caused by flooding;
7. Ensure that potential buyers are notified that property is in a Special Flood Hazard Area; and
8. Ensure that those who occupy Special Flood Hazard Areas assume responsibility for their actions.

D. Methods of Reducing Flood Losses. In order to accomplish its purposes, this Chapter includes regulations to:

1. Restrict or prohibit uses which are dangerous to health, safety and property due to water or erosion hazards, or which result in damaging increases in erosion or in flood heights or velocities;
2. Require that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction;
3. Control the alteration of natural floodplains, stream channels, and natural protective barriers, which help accommodate or channel flood waters;
4. Control filling, grading, dredging, and other development which may increase flood damage;
5. Prevent or regulate the construction of flood barriers which will unnaturally divert floodwaters or which may increase flood hazards in other areas.

The proposed project would conform to the applicable land use plans, policies and regulations either through project design or with the implementation of mitigation measures. The project would be consistent with the General Plan land use and code for the County of Santa Cruz, City of Watsonville, and the County of Monterey. Implementation of the proposed project would result in a less than significant impact.

2.	Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	☒

***Discussion*:** No adopted habitat conservation plans or natural community conservation plans cover the project area. And therefore, the proposed project would not conflict with any applicable habitat conservation plan or natural community conservation plan. As a result, no

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact

impact would occur from project implementation.

3.	Physically divide an established community?	☐	☐	☐	☒

***Discussion*:** The project would not include any element that would physically divide an established community. No impact would occur.

Q. POPULATION AND HOUSING

Would the project:

1.	Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	☒

***Discussion*:** The proposed project would not induce substantial population growth in an area because the project does not propose any physical or regulatory change that would remove a restriction to or encourage population growth in an area including, but limited to the following: new or extended infrastructure or public facilities; new commercial or industrial facilities; large-scale residential development; accelerated conversion of homes to commercial or multi-family use; or regulatory changes including General Plan amendments, specific plan amendments, zone reclassifications, sewer or water annexations; or LAFCO annexation actions.

2.	Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

***Discussion*:** The proposed project would not displace any existing housing since the project alignment is currently intended for flood control. No impact would occur as a result of project implementation.

3.	Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

***Discussion*:** The proposed project would not displace a substantial number of people since the alignment is currently intended for flood control. No impact would occur as a result of project implementation.

R. MANDATORY FINDINGS OF SIGNIFICANCE

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
1. Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☒	☐	☐

***Discussion*:** The potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory were considered in the response to each question in Section III of this Initial Study. Resources that have been evaluated as significant would be potentially impacted by the project, particularly special-status species and riparian and wetland resources. However, mitigation has been included that clearly reduces these effects to a level below significance. This mitigation included in Section C (Biological Resources) of this Initial Study would reduce these impacts to a less than significant level. As a result of this evaluation, there is no substantial evidence that, after mitigation, significant effects associated with this project would result. Therefore, this project has been determined not to meet this Mandatory Finding of Significance.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
2. Does the project have impacts that are individually limited, but cumulatively considerable? (“cumulatively considerable” means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☐	☒	☐	☐

***Discussion*:** In addition to project specific impacts, this evaluation considered the projects potential for incremental effects that are cumulatively considerable. As a result of this evaluation, there were determined to be potentially significant cumulative effects related to greenhouse gas emissions. However, mitigation has been included that clearly reduces these cumulative effects to a level below significance. This mitigation included in Section L-1 of this Initial Study would reduce significant impacts to a less than significant level. As a result of this evaluation, there is no substantial evidence that, after mitigation, there are cumulative effects associated with this project. Therefore, this project has been determined not to meet this Mandatory Finding of Significance.

	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
3. Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☒	☐	☐

***Discussion*:** In the evaluation of environmental impacts in this Initial Study, the potential for adverse direct or indirect impacts to human beings were considered in the response to specific questions in Section III. As a result of this evaluation, there were determined to be potentially significant effects to human beings related to the following: Air Quality, Hazards and Hazardous Materials, Hydrology and Water Quality, Noise, Transportation and Traffic, and Greenhouse Gas Emissions. However, mitigation has been included that clearly reduces these effects to a level below significance. This mitigation includes mitigation measures contained in Chapter III of this Initial Study. As a result of this evaluation, there is no substantial evidence that, after mitigation, there are adverse effects to human beings associated with this project. Therefore, this project has been determined not to meet this Mandatory Finding of Significance.

IV. TECHNICAL REVIEW CHECKLIST

	REQUIRED	DATE COMPLETED
Agricultural Policy Advisory Commission (APAC) Review	Yes ☐ No ☒	N/A
Archaeological Review	Yes ☒ No ☐	December 27, 2011
Biotic Report/Assessment	Yes ☒ No ☐	January 20, 2012
Geologic Hazards Assessment (GHA)	Yes ☐ No ☒	N/A
Geologic Report	Yes ☐ No ☒	N/A
Geotechnical (Soils) Report	Yes ☐ No ☒	N/A
Riparian Pre-Site	Yes ☐ No ☒	N/A
Septic Lot Check	Yes ☐ No ☒	N/A
Transportation/Traffic Analysis:	Yes ☒ No ☐	August 12, 2011
Greenhouse Gas Emissions	Yes ☒ No ☐	February 7, 2012
Revegetation Plan	Yes ☒ No ☐	November 2011

This page intentionally left blank.

V. REFERENCES USED IN THE COMPLETION OF THIS ENVIRONMENTAL REVIEW INITIAL STUDY

Ballard, G., G.R. Geupel, N. Nur, and T. Gardalli. 2003.
Long-term declines and decadal patterns in populations of songbirds in western North America, 1979-1999. Condor 105: 737-755.

Biotic Resources Group, 2006.
Manabe Property Wetland Restoration project Biotic Assessment. 2006.

Brabb. 1986.
Preliminary Geologic Map of Santa Cruz County. Open File Report 86-577.

Bryant, W.A., and Hart, E.W., 2007.
Rupture hazard zones in California–Alquist-Priolo Earthquake Fault Zoning Act with index to earthquake fault zones maps: California Geological Survey Special Publication 42, 46 p., [available at ftp://ftp.consrv.ca.gov/pub/dmg/pubs/sp/SP42.PDF, last accessed June 25, 2009].

Bury, R. B.. and Germano, D.J. 2008.
Actinemys marmorata (Baird and Girard 1852) – Western Pond Turtle, Pacific Pond Turtle.

Bury, R.B., 1995.
Western Pond Turtle: *Clemmys marmorata* (Baird and Girard), In Storm, R.M., and Leonard, W.P. (Eds.). Reptiles of Washington and Oregon. Seattle Audubon Society, Washington. pp. 24-37.

Bury, R.B. 1986.
Feeding ecology of the turtle, *Clemmys marmorata*. Journal of Herpetology 20(4):515-521.

Bury, R.B. 1972.
Habits and Home Range of the Pacific Pond Turtle, *Clemmys marmorata*, in a stream community. Unpublished PhD dissertation, University of California, Berkeley, 205 pp.

Bury, R.B., 1970.
Clemmys marmorata (Baird and Girard) Western Pond Turtle. Catalogue of American Amphibians and Reptiles 100.1-100.3.

Busby et al., 1996.
Busby, P.J., T.C. Wainwright, G.J. Bryant, L.J. Lierheimer, R.S. Waples, F.W. Waknitz and I.V. Lagomarsino. 1996. Status Review of West Coast Steelhead from Washington, Idaho, Oregon, and California.

Buskirk, James R, 2002.
The Western Pond Turtle, Emys marmorata. Radiata 11(3):3-30.

California Air Resources Board (CARB), 2007.
Emissions Inventory Criteria and Guidelines for the Air Toxics "Hot Spots" Program. Available online at http://www.arb.ca.gov/ab2588/fina/reg.pdf.

California Air Resources Board (CARB), 2008.
Climate Change Scoping Plan, a framework for change. Pursuant to AB 32 The California Global Warming Solutions Act of 2006. Prepared by the California Air Resources Board, December 2008.

California Air Resources Board (CARB), 2010.
Trends in California Greenhouse Gas Emissions for 2000 to 2008 – by Category as Defined in the Scoping Plan. May 2010.

California Department of Conservation, 2011.
California Department of Conservation, Farmland Mapping Program, Soil Candidate Listing for Prime Farmland and Farmland of Statewide Importance for Monterey County. July 19, 1995 (updated July 19, 2011).

California Department of Conservation, 2010.
California Department of Conservation, Farmland Mapping Program, Soil Candidate Listing for Prime Farmland and Farmland of Statewide Importance for Santa Cruz County. August 3, 1995 (updated June 30, 2010).

California Department of Fish and Game (CDFG). 2011a.
Rarefind 3, California Natural Diversity Database. Records for Soquel, Watsonville West, Watsonville East, Moss Landing, and Prunedale quadrangles. Electronic database. Sacramento, California.

California Department of Fish and Game (CDFG) 2011b.
State of California Department of Fish and Game Habitat Conservation Division. Special animals. January 2011. Available at: http://www.dfg.ca.gov/biogeodata/cnddb/pdfs/spanimals.pdf. Site accessed January 2012.

California Department of Fish and Game (CDFG) 2012.
California Department of Fish and Game, Natural Diversity Database. January 2012. Special Vascular Plants, Bryophytes, and Lichens List. Quarterly publication. 71 pp.

California Department of Fish and Game, 2009
Natural Diversity Database, Special Animals (901 Taxa), http://www.dfg.ca.gov/biogeodata/cnddb/pdfsSPAnimals.pdf, accessed March 10, 2011, dated 2009.

California Department of Fish and Game (CDFG). 1992a.
Bird species of special concern. Unpublished list, July 1992, Calif. Dept. Fish & Game, 1416 Ninth St., Sacramento, CA 95814.

California Department of Fish and Game (CDFG). 1992b.
Recovery Plan: Bank Swallow (*Riparia riparia*). Nongame Bird and Mammal Section Report 93.02.

California Department of Transportation (Caltrans) 2009.
Transportation Management Plan Guidelines, Division of Traffic Operations, Office of System Management Operations, June 2009.

California Department of Water Resources (DWR), 2006
California's Groundwater Bulletin 118, Central Coast Hydrologic Region Pajaro Valley Groundwater Basin.

California Emergency Management Service (CEMS). 2009.
Tsunami Inundation Map for Emergency Planning, Watsonville West Quadrangle. Scale: 1:24,000.

California Geological Survey. 2004.
Recommended Criteria for Delineating Seismic Hazard Zones in California. Special Publication 118.

California Geological Survey. 2007.
Probabilistic Seismic Hazards Mapping. Available online at http://redirect.conservation.ca.gov/cgs/rghm/pshamap/psha12238.html.City of Watsonville. 1994.

California Native Plant Society (CNPS). 2011.
Inventory of Rare and Endangered Plants (online edition, v7-12jan). California Native Plant Society. Sacramento, CA. Accessed on Fri, Jan. 13, 2012 from http://www.cnps.org/inventory

CASQA, 2011.
The Construction BMP Handbook/Portal provides general guidance for selecting and implementing Best Management Practices (BMPs).

CNDDB 2005.
California Natural Diversity Data Base (CNDDB), Rarefind (California Department of Fish and Game, Sacramento, CA). 2005.

Central Coast RWQCB 1995.
Regional Board adopted an updated Water Quality Control Plan for the Lahontan Region (Basin Plan) that became effective on March 31, 1995http://www.pajarowatershed.org/Content/10017/flood_protection.html.

Chisholm, R. 1998
Cultural Resource Assessment, Pajaro River and Salsipuedes Creek, Monterey and Santa Cruz Counties, California. Report on file with the Northwest Information Center, Sonoma State University.

City of Watsonville Municipal Code Title 14. 2010.
Zoning. Website (http://www.codepublishing.com/ca/watsonville/).

City of Watsonville. 1994.
Watsonville 2005 General Plan. Website (http://www.ci.watsonville.ca.us/departments/cdd/general_plan_05/watsonsonvillegp05.html)

County of Monterey Office of the Sheriff. 2011.
Enforcement Operations Bureau – Sheriff's Patrol Division. Website (http://www.co.monterey.ca.us/sheriff/patrol.htm) accessed on April 11.

County of Santa Cruz 1994.
1994 General Plan and Local Coastal Program for the County of Santa Cruz, California. Adopted by the Board of Supervisors on May 24, 1994, and certified by the California Coastal Commission on December 15, 1994.

Dupré, W.R., and Tinsley, J.C., III. 1980.
Maps showing geology and liquefaction potential of northern Monterey and southern Santa Cruz counties, California: U.S. Geological Survey Miscellaneous Field Studies Map MF-1199, scale 1:62,500. URL: http://pubs.er.usgs.gov/pubs/mf/mf1199.

Edwards, R. and M. Farley 1974.
Pajaro River Basin Archaeological Survey. Report on file with the Northwest Information Center, Sonoma State University.

Evenden FG. 1948.
Distribution of turtles in western Oregon. Herpetologica 4(6):201-204.

Federal Highway Administration (FHWA), 2006.
Construction Noise Handbook, Prepared for the U.S. Department of Transportation Federal Highway Administration Office of Natural and Human Environment; prepared by the U.S. Department of Transportation Research and Innovative Technology Administration John A. Volpe National Transportation Systems Center Environmental Measurement and Modeling Division, Acoustics Facility Federal Register. 1967. Final Report, August 2006.

Page 4001. Native Fish and Wildlife Endangered Species. March 11, 1967 (Volume 32 Number 48).

Federal Register. 1970.
50 CFR Part 17, Page 8491-8498. Conservation of endangered species and other fish or wildlife (First list of endangered foreign fish and wildlife as Appendix A). June 2, 1970 (Volume 35).

Federal Register. 1986.
50 CFR Part 17 Page 16474-16481. Endangered and threatened wildlife and plants: determination of endangered status for the least Bell's vireo. May 2, 1986 (Volume 51, Number 85).

Federal Register. 1994.
50 CFR Part 17, Page 4845-4867. Endangered and threatened wildlife and plants; designation of critical habitat for the least Bell's vireo. February 2, 1994. (Volume 59, Number 2)

Federal Register. 1996.
50 CFR Part 17, Page 25813-25833. Endangered and Threatened Wildlife and Plants; Threatened Status for the California Red-Legged Frog. February 2, 1994. (Volume 61, Number 101)

Federal Register. 2006.
50 CFR Part 17, Page 19244-19346. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the California Red-Legged Frog, and Special Rule Exemption Associated with Final Listing for Existing Routine Ranching Activities; Final Rule. April 13, 2006. (Volume 71, Number 71)

Fix, D. and A. Bezener. 2000.
Birds of Northern California. Lone Pine Publishers. Edmonton.

Germano, D. J., and R. B. Bury, 2001.
Western Pond Turtles (*Clemmys marmorata*) in the Central Valley of California: Status and Population Structure. 2001 Transactions of the Western Section, The Wildlife Soc. 37:22-

A. R .Gonzalez, K., Ndung'u, and A. R. Flegal, 2005.
Natural Occurrence of Hexavalent Chromium in the Aromas Red Sands Aquifer, California, Vol. 39, No. 15, 2005/Environmental Science & Technology, pp. 5505-5511.

Goodman, R. H., Jr., and Stewart G. R., 1998.
Clemmys marmorata pallida (Southwestern Pond Turtle). Coprophagy, Herp Review No. 29, page 98.

Goodman, R.H., Jr. 1997.
Occurrence of double clutching in the Southwestern Pond Turtle, Clemmys marmorata pallida, in the Los Angeles Basin. Chelonian Conservation and Biology 2:419-420.

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

Harden, D., 2001.
California Geology, Second Edition. Prentice Hall Publishers.

Harding ESE. 2002.

Final Environmental Impact Report, Pajaro River and Salsipuedes and Corralitos Creeks Management and Restoration Plan, Santa Cruz County, California. Prepared by Harding ESE for the County of Santa Cruz, Dated February 2002.

Harding ESE. 2001.
Draft Environmental Impact Report, Pajaro River and Salsipuedes and Corralitos Creeks Management and Restoration Plan, Santa Cruz County, California. Harding ESE project No. 47455.007. Prepared for County of Santa Cruz. September 2001.

Hart, E.W. and Bryant, W.A., 1997 (revised)
Fault-rupture hazard zones in California: California Department of Conservation, Division of Mines and Geology Special Publication 42, (Revised periodically; information on state law and zoning program for regulating development near hazardous faults.)

Hickman, J.C. (ed.). 1993.
The Jepson Manual Higher Plants of California. University of California Press. Berkeley, California.

Holden, L. (undated)
Geotechnical Post Earthquake Assessment, San Lorenzo River and Pajaro River Levees, U.S. Army Corps of Engineers, San Francisco District.

Holland, D.C. 1994.
United States Forest Service/Western Aquatic Turtle Research Consortium Western Pond Turtle Survey Protocol Study. Protocol for United States Forest Service and Western Aquatic Turtle Research Consortium.

Holland, D.C. 1988.
Western pond turtle *Clemmys marmorata*: Behavior. Herpetological Review 19(4):87-88.

Holland, D.C. 1985a.
An Ecological and Quantitative Study of the Western Pond Turtle *Clemmys marmorata* in San Luis Obispo County, California. Unpublished Master's Thesis, California State University-Fresno, CA. 181pp.

Holland, D.C. 1985b.
Western pond turtle *Clemmys marmorata*: Feeding. Herpetological Review. 16(4):112.3.

Holzer, T.L., Tinsley, J.C., III, Bennett, M.J., and Mueller, C.S. 1994.
Observed and Predicted Ground Deformation – Miller Farm Lateral Spread, Watsonville, California, in, O'Rourke, T.D. and M. Hamada, eds., Proceedings from the 5th U.S.-Japan Workshop on Earthquake Resistant Design of Lifeline Facilities and Countermeasures Against Soil Liquefaction: Buffalo, NY, National Center for Earthquake Engineering Research Technical Report NCEER-94-0026, p. 79-99.

Holzer, T.L., ed., 1998.
The Loma Prieta, California, earthquake of October 17, 1989: liquefaction: U.S. Geological Survey Professional Paper 1551-B. URL: http://pubs.er.usgs.gov/pubs/pp/pp1551B.

Iverson, J. B., 1986.
A Checklist with Distribution Maps of Turtles of the World, Paust Printing, Richmond Indiana 282 pp.

Jenkins, O. P. 1973.
Pleistocene Lake San Benito. California Geology 26 (7):151-163.

Jennings, M. R. 1988.

Natural history and decline of native ranids in California. Proceedings of the Conference on California Herpetology. eds H. F. De Lisle, P. R. Brown, B. Kaufman and B. M. McGurty. Southwestern Herpetologists Society

Jennings, M.R., Hayes, M.P. 1988.
Habitat correlates of distribution of the California red-legged frog (*Rana aurora draytonii*) and the foothill yellow-legged frog (Rana boylii):
Implications for management. Pages 144-158 In: R. Sarzo, K. E. Severson, and D. R. Patton (technical coordinators). Proceedings of the Symposium on the Management of Amphibians, Reptiles, and Small Mammals in North America. U.S.D.A. Forest Service General Technical Report RM-166.

Jennings, M.R., Hayes, M.P. and Holland, D.C., 1992.
A petition to the U.S. Fish and Wildlife Service to place the California Red-legged Frog (*Rana aurora draytonii*) and the Western Pond Turtle (*Clemmys marmorata*) on the list of endangered and threatened wildlife and plants.

Jennings M. R., and M. P. Hayes. 1994.
Amphibian and Reptile Species of Special Concern in California. Submitted to the California Department of Fish and Game Inland Fisheries Division. Rancho Cordova, CA.

Jennings, C.W., 1994.
Fault activity map of California and adjacent areas, with locations and ages of recent volcanic eruptions: California Division of Mines and Geology, Geologic Data Map No. 6, map scale 1:750,000

Johnson, M.J., Londquist, C.J., Laudon, J., and Mitten, H.T. 1988.
Geohydrology and mathematical simulation of the Pajaro Valley aquifer system, Santa Cruz and Monterey counties, California:
U.S. Geological Survey Water-Resources Investigation 87-4281. URL:
http://pubs.er.usgs.gov/pubs/wri/wri874281.

Johnson, W. M. 1854.
Map of Part of the Coast of Cal. From Pajaro River Southward. U.S. Coast and Geodetic Survey, Department of Commerce.

Jones, T. 1988.
Archaeological Survey Report, proposed modifications to five bridges along Highway 1, 104-SCR-1 P.M. 0.0/3.4 4273-124740 (Caltrans). Report on file with the Northwest Information Center, Sonoma State University.

Keefer, David K., 1998.
Statistical analysis of an earthquake-induced landslide distribution — the 1989 Loma Prieta, California event.

Kittleson Environmental Consulting (KEC). 2007.
Assessment of Streambank Riparian Habitat Potentially Impacted by Pajaro River Bench Excavation project, Santa Cruz County Department of Public Works. January 31, 2007.

Kittleson Environmental Consulting and Biosearch Associates, 2009.
Pajaro River Western Pond Turtle Survey Data Report. Santa Cruz County Department of Public Works

LAFCO of Monterey County, 2005.
Final Municipal Services Review for the Salinas Rural Fire Protection District. Website (http://www.comonterey.ca.us/lafco/MSR/Final%20Salinas%20Rural%20Fire%20MSR.pdf).

Lubke, G.M. and Wilson, D. 2007.
Variation in shell morphology of the wetsern pond turtle (Actinemys marmorata, Baird and Girard) from three aquatic habitats in Northern California. Journal of Herpetology 41:107-114.

Lowther, P., S. Lanyon, C. Thompson. 1999.
The Birds of North America. The American Ornithologists' Union, 398: 1-21.

Matocq, M., 2003
Dusky-footed Woodrats (*Neotoma fuscipes*) at Hastings: A Research Tradition. Hastings Natural History Reserve http://www.hastingsreserve.org/Woodrats, 2003.

McEwan, D. and T. A. Jackson. 1996.
Steelhead restoration and management plan for California. California Department of Fish and Game, Sacramento. 234 pp.

MCOES 2007
Monterey County Multijurisdictional Hazard Mitigation Plan, September 2007. Prepared by URS Corporation for the County of Monterey Department of Emergency Services.

Miller, E.A. and Roycroft, M. 1994.
Seismic Performance and deformation of Levees: Four Case Studies, Journal of Geotechnical and GEoenvironmental Engineering, Vol. 130, No. 4.

Mitchell Swanson & Associates and The habitat Restoration Group 1993.
Final Pajaro River Lagoon Management Plan. Prepared for Santa Cruz County Public Works Department and California State Coastal Conservancy. May 8.

Monterey County Code Title 21. 2010.
Zoning. Website (http://library.municode.com/HTML/16111/level1/T21.html) accessed on February 19.

Monterey County 1982.
Monterey County General Plan adopted by the Monterey County Board of Supervisors on September 30, 1982. Amendments included.

Monterey County 2010.
Monterey County General Plan adopted by the Monterey County Board of Supervisors on October 26, 2010.

Munz, P.A., and D.D. Keck. 1968.
A California Flora and Supplement. University of California Press. Berkeley, California.

National Marine Fisheries Service (NMFS). 2000.
Critical habitat for 19 ESUs of salmon and steelhead in Washington, Oregon, Idaho and California. 50 CFR Part 226. Federal Register, 65 (32): pp. 7764-7787.

Natural Resource Conservation Service (NRCS). 2010.
Soils mapping database. Available online at http://websoilsurvey.nrcs.usda.gov/app/>. Accessed February 23, 2010.

Natural Resources Conservation Service (NRCS). 1997.
Soils (Soil Survey Geographic database, 1:24,000 scale) - Monterey County. GIS shapefile provided by California Coastal Commission --Watershed Analysis Tool, www.ccjdc.org/resources/WaterData/soils/montco/

Nehlsen et al. 1991.

Nehlsen, W., J.E. Williams and J.A. Lichatowich. 1991. Pacific salmon at the crossroads: Stocks at risk from California, Oregon, Idaho and Washington. Fisheries 16(2):4-21.

Northwest Hydraulic Consultants (NHC). 1998.
Pajaro River 1998 Bank Erosion Assessment. Prepared for Santa CruzCounty Flood Control and Water Conservation District, Zone 7.

Nussbau, R.A., Brodie, E.D., and Storm, R.C.1983.
Amphibians and Reptiles of the Pacific Northwest. University Press of Idaho. Moscow ID, 332 pp.

Peak, A.S. and Associates 1977.
Santa Cruz Regional Wastewater Treatment System project, Santa Cruz County, California. Report on file with the Northwest Information Center, Sonoma State University.

Rathbun, G.B.; Scott, N. J.; Murphey T.G., 2002.
Terrestrial habitat use by Pacific Pond turtles in a Mediterranean climate. Southwestern Naturalist 47:225-235.

Reese, Devin A., and Hartwell H. Welsh Jr., 1998b.
Comparative Demography of *Clemmys marmorata* Populations in the Trinity River of California in the Context of Dam-induced Alterations. Journal of Herpetology Vol. 32, No. 4, pp. 505-515.

Reese, D.A. and H.H. Welsh. 1997.
Use of terrestrial habitat by western pond turtles, *Clemmys marmorata*: implications for management. In: Van Abbema, J (ed) Proceedings: Conservation, restoration and management of tortoises and turtles ; An international conference. New York WCS Turtle Recovery program and New York Turtle and Tortoise Society, pp 352-357.

Reese, D., 1996.
Comparative Demography and Habitat Use of Western Pond Turtles in Northern California: The Effects of Damming and Related Alterations. Ph.D. thesis.

Regional Water Quality Control Board (RWQCB), 2005.
Phase 5: Regulatory Action Selection, Preliminary Project Report, Total Maximum Daily Load for Sediment in the Pajaro River Watershed including Pajaro River, Llagas Creek, Rider Creek, and San Benito River. Prepared by the Regional Water Quality Control Board, Central Coast Region, February 2005.

Remsen, J. V., Jr. 1978.
Bird species of special concern in California. Calif. Dept. of Fish and Game, Sacramento. Wildl. Manage. Admin. Rep. No. 78-1. 54pp.

Roberson, D. 2002.
Monterey Birds: Status and Distribution of Birds in Monterey County, CA, Second Ed. Monterey Peninsula Audubon Society, Carmel, CA.

Runnings, A. and G.S. Breschini 1990.
Preliminary Cultural Resources Reconnaissance of the Porter Drive Bridge, Pajaro, Monterey County, California. Report on file with the Northwest Information Center, Sonoma State University.

Santa Cruz County Sheriff's Office. 2011.
My Community. Website (http://www.scsheriff.com/mycommunity.html) accessed on April 11.

Santa Cruz LAFCO. 2007.

South County Fire Service Study – Public Review Draft. Website 9 http://www.santacruzlafco.org accessed on April 11.

Santa Cruz Mountains Bioregional Council, 2004.
Sensitive Fauna of the Santa Cruz Bioregion, March 2004. http://www.scmbc.net/speciesatrisk04.htm.

Sauer, J. R., Hines, J. E., and Fallon, J. 2005.
The North American Breeding Bird Survey, results and analysis 1966–2004, version 2005.2. USGS Patuxent Wildl. Res. Ctr., Laurel, MD.

SCCOES, 2010.
Santa Cruz County Local Hazards Mitigation Plan, 2010-2015, adopted September 14, 2010. Prepared by the County of Santa Cruz Department of Emergency Services.

Seltenrich, C. P. and A. C. Pool. 2002.
A standardized approach for habitat assessments and visual encounter surveys for the foothill yellow-legged frog (Rana boylii). Pacific Gas and Electric Company.

Shapovalov and Taft, 1954.
Shapovalov, L. and A. C. Taft. 1954. The life histories of the steelhead rainbow trout (Salmo gairdneri gairdneri) and silver salmon (Oncorhynchus kisutch). California Department of Fish and Game Bulletin 98. 275 pp.

Shuford, W.D and T. Gardali. 2008.
California Bird Species of Special Concern. Western Field Ornithologists and California Department of Fish and Game.

Smith, J.J. 1982.
Fishes of the Pajaro River System. *University of Calif. Pub. Zool.* 115:83-170.

Smith, J. J. et al. 1983.
Detailed field study report. Pajaro River Habitat Management Study Report to the Association of Monterey Bay Area Governments. Harvey and Stanley and Associates.

Smith, J.J. 2002.
Steelhead distribution and ecology in the upper Pajaro River system.

Stebbins, R.C. 2003.
A Field Guide to Western Reptiles and Amphibians. Houghton Mifflin Co., Boston, MA 533 pp.

Storer, T.I. 1925.
A synopsis of the Amphibia of California. University of California Publications in Zoology, Number 27, Berkeley, California.

Storer, T.I., 1930.
Notes on the range and life history of the Pacific Fresh-water Turtle, Clemmy marmorata. University of California Publications in Zoology 32:429-441.

Swanson and HRG, 1993.
Swanson & Associates and the Habitat Restoration Group (Swanson and HRG). 1993. Pajaro River Lagoon Management Plan and Technical Appendices. Report prepared for Santa Cruz County Department of Public Works. 37 pp. + Appendices.

Thompson, S.C., Witter, R.C., and Gilver, R.W. 2005.
Evidence for Repeated Lateral Spreading along the Lower Pajaro River, Watsonville, California, Geological Society of America, Abstracts with Programs, vol 37, No. 4.

Thompson, B. C., J. A. Jackson, J. Burger, L. A. Hill, E. M. Kirsch, and J. L. Atwood. 1997.
Least Tern (Sterna antillarum). In The Birds of North America, No. 290 (A. Poole and F. Gill eds.). The Academy of Natural Sciences, Philadelphia, PA and The American Ornithologists' Union, Washington, D.C.

U.S. Army Corps of Engineers. 2009.
General Reevaluation of the Pajaro River project, California. U.S. Army Corps of Engineers, San Francisco Division. May 2009.

U.S. Army Corps of Engineers (USACE). 1998.
Environmental Assessment and Biological Assessment Pajaro River PL 84-99 Levee Rehabilitation project, Monterey and Santa Cruz Counties, California.

U.S. Fish and Wildlife Service (USFWS).1998.
Draft recovery plan for the least Bell's vireo. Region One. Portland, Oregon.

U.S. Army Corps of Engineers 1996.
Cultural Resource Assessment, Pajaro River Reconnaissance Survey, U.S. Army Corps of Engineers San Francisco district, Pajaro River Flood Control project 1996. Report on file with the Northwest Information Center, Sonoma State University.

U.S. Army Corps of Engineers (USACE). 1994.
Reconnaissance Report Pajaro River General Investigation Study. County of Santa Cruz, Santa Cruz, California. U.S. Army Corps of Engineers, San Francisco District. March 1994.

U.S. Environmental Protection Agency (U.S. EPA), 2011.
Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990 – 2009, April 15, 2011.

U.S. Fish and Wildlife Service (USFWS). 1999.
Draft Revised Recovery Plan for Santa Cruz Long-toed Salamander. US Fish and Wildlife, Portland, Oregon.

U.S. Fish and Wildlife Service, 2002.
Recovery Plan for the California Red-legged Frog (*Rana aurora draytonii*), Region 1, U.S. Fish and Wildlife Service, Portland Oregon. May 28, 2002.

U.S. Fish and Wildlife Service (USFWS).2006.
California least tern (*Sternula antillarum* (*Sterna*,=*albifrons*) *browni*) 5-Year Review Summary and Evaluation. Carlsbad Fish and Wildlife Office. Carlsbad, California. September 2006.

U.S. Fish and Wildlife Service (USFWS) 2007.
Recovery Plan for the Pacific Coast Population of the Western Snowy Plover, August 2007. Sacramento California.

U.S. Fish and Wildlife Service (USFWS). 2009.
Santa Cruz Long-Toed Salamander (*Ambystoma macrodactylum croceum*), 5-Year Review: Summary and Evaluation. Ventura Fish and Wildlife Office Ventura, California May 2009.

U.S. Geological Survey (USGS). 2008.
Working Group on California Earthquake The Uniform California Earthquake Rupture Forecast, Version 2 (UCERF 2). U.S. Geol. Surv. Open File Report 2007-143.7, CGS Special Report 203, SCEC Contribution #1138.

U.S. Geological Survey (USGS). 2010.
Earthquake Probability MappingQuaternary Fault and Fold Database for the United States. Website: http://geohazards.usgs.gov/eqprob/2009/index.php.

U.S. Geological Survey (USGS). 2010.
ShakeMap for the Loma Prieta Earthquake. Website: http://earthquake.usgs.gov/eqcenter/shakemap/nc/shake/Loma_Prieta/. Accessed March 10, 2010.

Watsonville Fire Department. 2011.
Our Department. Website (http://www.ci.watsonville.ca.us/departments/fire/department.html) accessed on April 11.

Watsonville Police Department. 2011.
Operations Division. Website (http://watsonvillepolice.org/operations.html) accessed on April 11.

Western Bat Working Group, 1998.
Western Bat Working Group, Regional Bat Species Priority Matrix, prepared during the Western Bat Working Group Workshop held in Reno, Nevada, February 9-1 3, 1998.

Western Regional Climate Center. 2010.
Climate Summary, Watsonville Waterworks Station. Available on – line at: http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca9473. Accessed: April 2.

Youd, T.L. and Hoose, S.E. 1978
Historic Ground Failures in Northern California Triggered by Earthquakes, United States Geological Survey Professional Paper 993, 177p.

Zeiner, D.C., W.F. Laudenslayer, Jr., and K.E. Mayer, editors. 1988.
California's wildlife. Volume I: Amphibians and reptiles. Sacramento, CA: California Department of Fish and Game.

Zeiner, D.C., W.F. Laudenslayer, Jr., K.E. Mayer, and M. White. 1990.
California's Wildlife: Volume II, Birds. Sacramento, CA: California Department of Fish and Game.

VI. ATTACHMENTS

1. *Biological Assessment, Pajaro Valley Bench Excavation project*, prepared by Gary Kittleson of Kittleson Environmental Consulting, dated January 20, 2012.
2. *Phase 1 Archaeological Survey for the Pajaro River Sediment Excavation project, in Watsonville, Santa Cruz County, California*, prepared by Mary Doane, B.A., and Gary S. Breschini, Ph.D., RPA, of Archaeological Consulting, dated December 27, 2011.
3. *Pajaro River Bench Excavation project – Transportation Analysis and Best Management Practices*, prepared by Daniel Rubins, P.E. and Greg Ripa, of Fehr & Peers, dated August 12, 2011.
4. *Elkhorn Slough Tidal Marsh Sites Restorable by Sediment Addition Sediment Stockpile Site Descriptions: Preliminary Biological Assessment,* dated April 11, 2011.
5. *Soil Sampling Report, Pajaro River Bench Excavation project, Watsonville, CA,* Prepared by Environmental Risk Specialties Corporation, dated August 2010.
6. *Pajaro River Bench Excavation Project Revegetation Plan,* Prepared for the County of Santa Cruz, Department of Public Works by the Native Vegetation Network, dated November 2011.

ATTACHMENT 1

Biological Assessment

BIOLOGICAL ASSESSMENT

Pajaro River Bench Excavation Project

Location: Counties of Santa Cruz and Monterey, California
[12S/2E-17, 12S/2E-09, 12S/2E-16, 12S/2E-10, 12S/2E-03, 12S/2E-02, 12S/2E-11, 12S/2E-01, 12S/2E-12, 12S/3E-07]

Prepared for:

Bruce Leclerque
Santa Cruz County Department of Public Works
701 Center Street, Room 410
Santa Cruz, CA 95060

January 20, 2012

Prepared by:

Kittleson Environmental Consulting
3284 Malibu Drive
Santa Cruz, CA 95062

Contact Person: Gary Kittleson **Phone Number: 831-251-0215**

TABLE OF CONTENTS

List of Tables

List of Figures

CHAPTER 1. Executive Summary

1.1 Introduction

The Pajaro River Bench Excavation Project proposes to excavate up to 336,000 cubic yards of sediment from 11 select locations along the upper terrace benches within Pajaro River levees in order to improve the flood capacity within the existing flood control system. The proposed bench excavation sites are located along 7.5 miles of the levee benches between Hwy 1 and Murphy Road Crossing. Figure 1. The 11 excavation sites span 39.1 acres and include 9 excavation sites on the right bank in Santa Cruz County and 2 sites on the left bank in Monterey County. Figure 2.

Within the project area, the Pajaro River is confined by an earthen levee system that was constructed from Murphy's Crossing to the river mouth in 1949. During the past 25 years, the levee system overtopped as a result of high stream flows in 1986, 1989, 1995 and 1998. Emergency actions done in response to major Pajaro Valley flooding in 1995 included removing most of the mature riparian habitat along the Pajaro River from Murphy's Crossing Bridge to Highway 1. This action, as well as subsequent routine maintenance activities conducted by the Counties of Santa Cruz and Monterey, have substantially impacted the overall project area riparian habitat and have resulted in bench surfaces that are primarily non-native annual grasses, weedy annual broad-leaf species and widely-spaced residual, mature riparian trees.

The purpose of the Bench Excavation Project is to increase flood conveyance capacity through the project area by lowering a portion of the upper terrace surfaces to the 2-year water surface level in areas that are now predominantly ruderal habitat with scattered mature riparian trees. Current vegetation maintenance practices on the benches include mowing up to 8' down from the top of the streambank, leaving a minimum 3' wide willow riparian buffer along open water habitat. The Bench Excavation Project would not affect the required buffer or impact jurisdictional wetland and waters of the U.S, except where salvaged-log large woody material (LWM) habitat structures would be placed at the toe of the lower streambank to help mitigate for the loss of 35 mature riparian trees within planned bench excavation areas. Total wetland and "waters of the US" fill area associated with the LWM habitat enhancement features is approximately 0.08 acres

As proposed, the bench areas will be excavated to an elevation that corresponds with water level produced by a peak flow with a 2-year recurrence interval. The Pajaro River 2-year peak flow is generally recognized to be about 3900 cubic feet per second (cfs) downstream of Salsipuedes confluence. This is expected to emulate a "bankfull discharge" channel configuration, thereby enhancing the river's natural ability to move sediment more effectively through the project area. Typical examples from the proposed 75% bench excavation plans are included in Figure 3 and 4, which show a set of cross sections and a representative revegetation plan sheet.

The design concept would result in more frequent overbank flows in the proposed excavation areas. While designed to increase channel conveyance capacity, the project is likely to provide other benefits, such as increasing the ecological connectivity between the main channel and adjacent floodplain within

the levee corridor through extensive revegetation efforts on newly created 3:1 slopes and natural ecological succession on the lowered bench surfaces following more frequent inundation events. In addition, soils removed from the project area would be used locally for structural upland fills, tidal restoration projects in nearby Elkhorn Slough and landfill cover. Soil disposal sites range in distance from 1.6 miles to 12 miles away. Soils will be transported from the project area by diesel truck and/or rail.

Three species known to use project area are listed as threatened or endangered under the Federal Endangered Species Act (ESA):

- California red-legged frog (*Rana aurora draytonii*) - Threatened
- steelhead (*Oncorhynchus mykiss*) - Threatened
- tidewater goby (*Uecyclogobius newberryi*) - Endangered

Including the above species, there are 6 species listed as threatened or "species of concern" (SSC) under the California Endangered Species Act (CESA) that regularly occur and/or breed in the project area. California State Species of Special Concern known to inhabit the project area. The additional three species are:

- western pond turtle (*Actinemys marmorata*) - Species of Special Concern
- yellow warbler (*Dendroica petechia brewsteri)* - Species of Special Concern
- San Francisco dusky-footed woodrat (*Neotoma fuscipes*) - Species of Special Concern

The Pajaro River corridor supports a wide array of migratory and breeding bird species. Numerous raptors use the project area and red-tailed hawks regularly nest within and adjacent to the proposed project impact areas. California species of special concern, white tailed kite, burrowing owl, and northern harrier are periodically observed in the project area, but are not considered local breeders at this time. No listed plants are known to occur in the project impact areas, which have been the subject of extensive mowing and flood control management activities since 1995. A full list of potential listed species is included in Appendix A.

FIGURE 1. Project Location

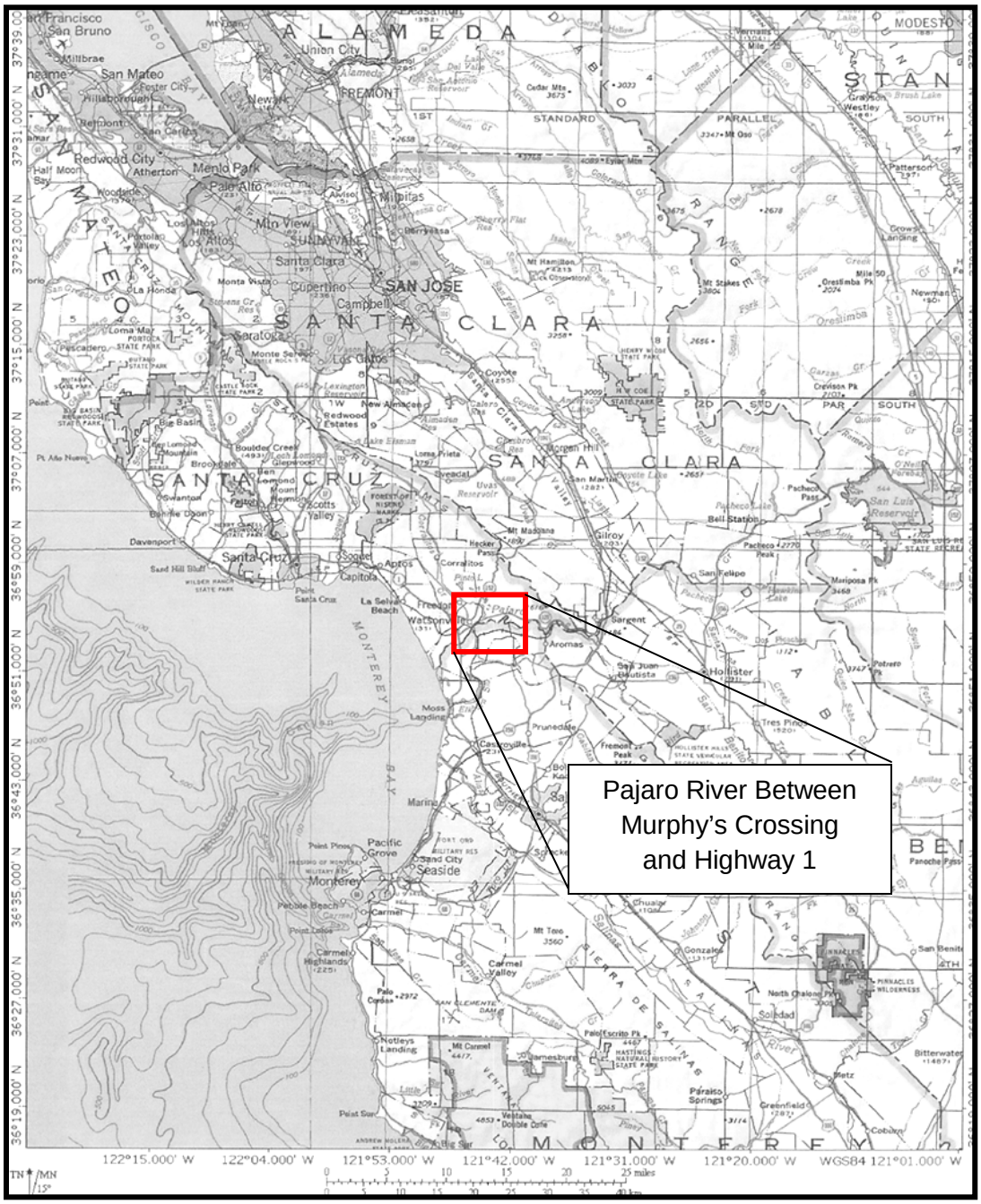
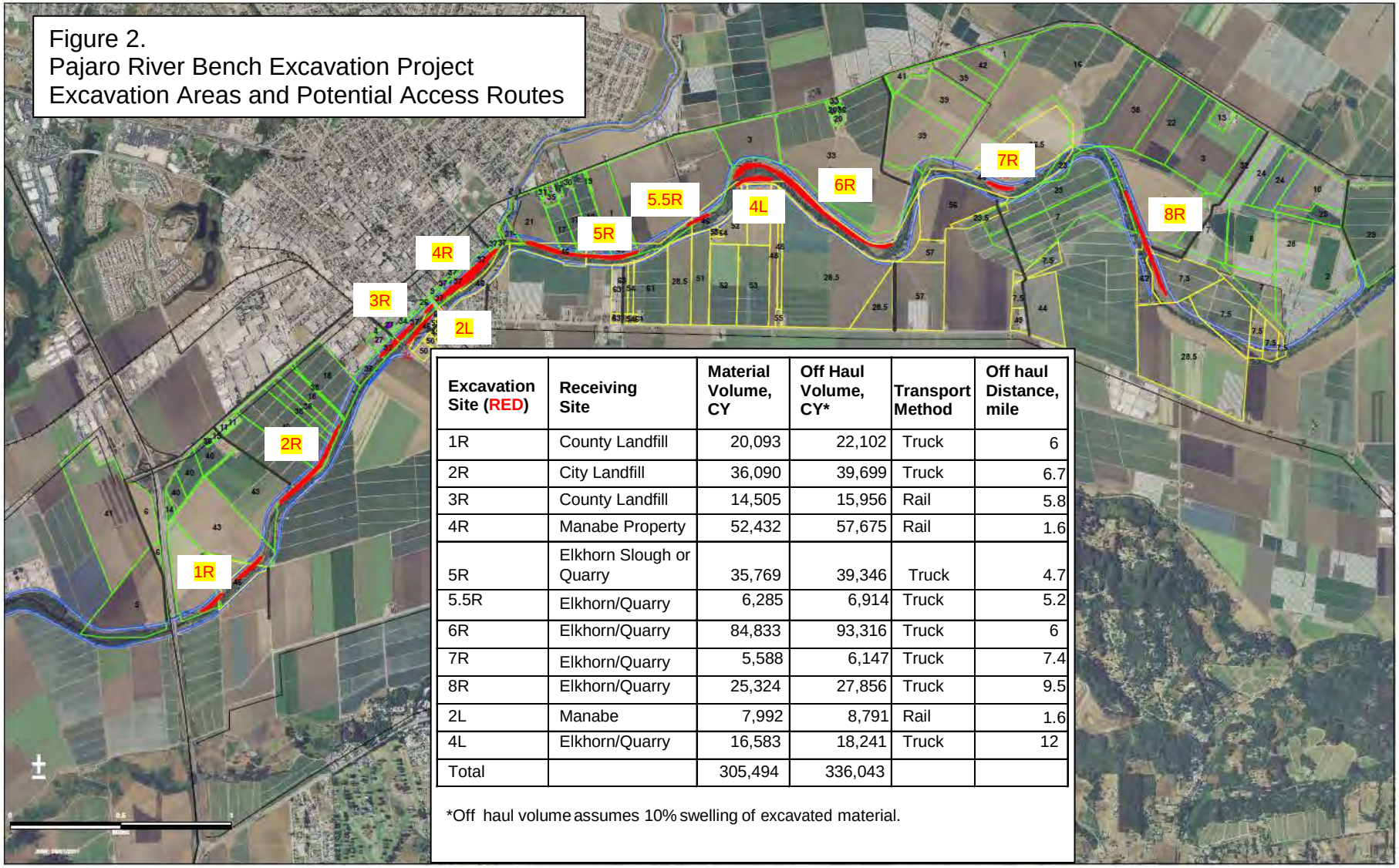


Figure 2.
Pajaro River Bench Excavation Project
Excavation Areas and Potential Access Routes



Excavation Site (RED)	Receiving Site	Material Volume, CY	Off Haul Volume, CY*	Transport Method	Off haul Distance, mile
1R	County Landfill	20,093	22,102	Truck	6
2R	City Landfill	36,090	39,699	Truck	6.7
3R	County Landfill	14,505	15,956	Rail	5.8
4R	Manabe Property	52,432	57,675	Rail	1.6
5R	Elkhorn Slough or Quarry	35,769	39,346	Truck	4.7
5.5R	Elkhorn/Quarry	6,285	6,914	Truck	5.2
6R	Elkhorn/Quarry	84,833	93,316	Truck	6
7R	Elkhorn/Quarry	5,588	6,147	Truck	7.4
8R	Elkhorn/Quarry	25,324	27,856	Truck	9.5
2L	Manabe	7,992	8,791	Rail	1.6
4L	Elkhorn/Quarry	16,583	18,241	Truck	12
Total		305,494	336,043		

*Off haul volume assumes 10% swelling of excavated material.

1.2. Proposed Project and Authority

This biological assessment (BA) documents habitats, sensitive species, and sensitive natural communities potentially occurring in the vicinity of the project site. This BA has been prepared as part of the process to permit the Bench Excavation Project under Section 7 of the federal ESA, the California Endangered Species Act, and Section 1600 of the California Fish and Game Code. The intent of the BA is to evaluate whether the Bench Excavation Project is likely to adversely affect a listed species or designated critical habitat; jeopardize the continued existence of a listed species; or adversely modify proposed critical habitat.

Under the federal ESA, the National Oceanic and Atmospheric Administration National Marine Fisheries Service (NOAA Fisheries) and United States Fish and Wildlife Service (USFWS) have regulatory authority over projects that may affect the continued existence of a federally listed species. Under the federal ESA, a permit to “take” a listed species is required for any project that may harm or harass an individual of that species.

The California Endangered Species Act, Section 2080 of the California Fish and Game Code, prohibits "take" of any species that the State Fish and Game Commission determines to be an endangered species or a threatened species. Take is defined in Section 86 of the Fish and Game Code as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." CESA allows for incidental take of listed species during implementation of projects through early consultation to avoid potential impacts to rare, endangered, and threatened species and to develop appropriate mitigation planning to offset project caused losses of listed species populations and their essential habitats.

Within California, a SSC is a species, subspecies, or distinct population of an animal native to California that (1) is extirpated from California or, in the case of birds, in its primary seasonal or breeding role; (2) is listed as federally-, but not state-, threatened or endangered; (3) meets the state definition of threatened or endangered but has not formally been listed;(4) is experiencing, or formerly experienced, serious (noncyclical) population declines or range retractions (not reversed) that, if continued or resumed, could qualify it for state threatened or endangered status; has naturally small populations exhibiting high susceptibility to risk from any factor(s), that if realized, could lead to declines that would qualify it for State threatened or endangered status.

Project activities, including vegetation removal, heavy equipment operation, grading, trucking traffic, noise, and dust, may result in adverse impacts to these species and their habitats. Avoidance, minimization and mitigation measures to address significant impacts to listed species are suggested in this BA.

1.3. Protected Species and Associated Habitat Types Considered in the BA

The term “special-status” species includes those species that are listed and receive specific protection defined in federal or state endangered species legislation, as well as species not formally listed as Threatened or Endangered, but designated as “Rare” or “Sensitive” on the basis of adopted policies and expertise of state resource agencies or organizations, or local agencies such as counties, cities, and special districts. A principle source for this designation is the California “Special Animals List” (CDFG, 2011). There are 5 species listed as threatened or endangered under the federal ESA that are present or for which suitable habitat exists in or adjacent to the Project area. Three of these species occur in or adjacent to the Project area: the South-Central California Coast steelhead trout, the California red-legged frog (CRLF), and the tidewater goby. Brief consideration is also given to the snowy plover, which nests at the Pajaro rivermouth (3 miles downstream) and least Bell’s vireo, which has not been documented in the project area.

There are 6 species listed as threatened or "species of special concern" under the California Endangered species act that regularly occur and/or breed in the project area. Three locally-present, federally listed species; steelhead, red-legged frog, and snowy plover, are also listed as species of concern under CESA. Western pond turtles (WPT) are CA species of special concern and are present throughout the project area. Pallid bat is a special concern mammal species that may make use of the remnant, mature riparian trees in the bench areas. Burrowing owl is a state species of special concern that is an infrequent winter visitor to the lower Pajaro, and is not known to nest in the project area. Least Bell's vireo is also listed as "endangered" under CESA, but has not been observed in recent bird surveys and is not known to inhabit the project area. Yellow-breasted chat is an uncommon riparian species potentially present, but not recorded in the project area in recent surveys. Species accounts for potentially affected listed species are included in this BA. A full list of potential listed species that may occur in the project vicinity is attached as Appendix A.

Affected Habitat Types in the project area include (1) ruderal uplands on the bench surfaces dominated by non-native weedy species, (2) willow-cottonwood riparian woodland along the streamside edge of proposed excavation areas, (3) isolated residual riparian trees on the existing, managed bench surfaces, and (4) emergent wetland/open water habitat along the margin of the Pajaro River low flow channel. As designed, the bench excavation sites are primarily located in areas of ruderal vegetation, with a strand of disturbed, periodically-thinned willow riparian woodland habitat. Loss of 35 mature riparian trees within the currently ruderal habitats on the benches is expected, although those trees will be salvaged for use in 19 small streamside habitat features.

Impacts to jurisdictional wetland and/or open-water habitat are limited to areas identified for placement of 19 instream, salvaged-wood and cabled boulder habitat enhancement structures which are generally located in the plans. Total wetland/open water habitat fill area is estimated at 0.08 acres with a total fill volume of 267 cubic yards Final locations for placement of log habitat structures would be determined in the field by the project engineer and project biologist. As planned, efforts would be made to minimize riparian tree disruption when placing the streambank structures.

Chapter 2. Project Description and Plan Elements

2.1. Project Description

Santa Cruz County has developed a project design to increase flood conveyance capacity in the Pajaro River within the existing levee alignment and configuration. The project is essentially a grading project that would excavate up to 336,000 cubic yards of sediment from 11 select locations along these upper terrace benches within the Pajaro River levees existing. The proposed bench excavation sites are located along 7.5 miles of the levee benches between Hwy 1 and Murphy Road Crossing. The 11 excavation sites span 34 acres and include 9 excavation sites on the right bank in Santa Cruz County and 2 sites on the left bank in Monterey County.

The 11 proposed bench excavation areas are located in predominantly ruderal, upland habitats on bench areas previously cleared of substantial riparian woodland habitat following the 1995 Pajaro flood event and during subsequent maintenance actions. Areas proposed for bench excavation are depicted in Figure 2. Figure 5 illustrates Typical Bench Excavation Design cross sections. Excavated materials would be removed from the site by heavy equipment (i.e., excavator, bulldozer, scraper and dump truck) and will be transported in the project area along existing unsurfaced levee-toe access roads and/or the levee crest. Excavated materials will be transported from the flood control channel by truck, using existing farm roads and surface streets, or by rail, which bisects the project area at Walker Street in Watsonville. Fill material will be moved to the Manabe property in Watsonville, local South County municipal landfills, A.O. Wilson Quarry in Aromas, and Elkhorn Slough, for use in approved tidal restoration efforts. A temporary bridge across Salsipuedes Creek near its confluence with the Pajaro River may be used to transport materials within the flood control channel, rather than using city streets and state highway 129 within the city limits. Temporary bridge footings would be placed on bench surfaces outside of jurisdictional wetland or open water habitats. No wetland fill would be placed.

During design of the proposed excavation areas, efforts have been made to avoid mature riparian trees on the bench surface and to minimize impacts to the vegetated streambank. As a result, the proposed project will remove 35 of the large riparian trees that survived the 1995 clearing and generally avoids the periodically thinned riparian trees on the streambank. In addition, over 20,500 linear feet of upper streambank along the active channel will be impacted by lowering of the adjacent bench surfaces in the excavation areas.

Typical current flood control vegetation management concentrates mowing activities on flat bench surfaces and willow thinning of vegetated in-channel bars. Steep riverbanks are thinned periodically with a flail mower that can extend up to 8 feet down the streambank and larger trees are removed by chainsaw. Existing maintenance permits specify that a required 3 foot riparian buffer is maintained along open water. Due to this intensive mowing regime, willow riparian habitat exists throughout the waterside project edge in a greatly diminished form, with numerous young willow and cottonwood sprouts rising from cut-over stumps. Precise quantification of riparian tree losses is confounded by this regular disturbance, and efforts to mitigate the impacts to the waterside edge are based on visual field estimates made by project designers. See Figure 3 for photos of current bench area habitat conditions.

Figure 3. Photos of typical bench surface and waterside edge conditions under current vegetation management practices


LEFT: Right bank streambank in Excavation Area 8R
RIGHT: Right bank streambank in Excavation Area 6R


LEFT: Right bank streambank in Excavation Area 2R
RIGHT: Bench surface in Excavation Area 2R


LEFT: Left bank bench surface upstream of Excavation area 4L
RIGHT: Typical top of bank along low flow channel after mowing.

To mitigate the loss of the 35 mature riparian trees, the county will replace each mature riparian tree removed as a result of construction with 3 container trees. Native tree species shall be replaced in kind. The contractor shall only remove trees at the approval of the Engineer and Project Biologist.

Native trees, shrubs, groundcover and herbaceous plants will be planted on the waterside margin of the new lowered bench surface and on the 3:1 slope at the outside margin of the new bench excavation areas. Upstream of the Salsipuedes confluence, clusters of 3 native riparian trees will be planted on the new bench surfaces, near the waterside edge, to provide mitigation for mature riparian trees to be removed. These mature riparian trees are primarily black cottonwood and yellow willow trees and range in size from just under 12" DBH to 36" DBH. Details are provided in Table 1.

Table 1. Mature Riparian Trees Present in Proposed Excavation Sites

	Number of Mature Trees to be Removed	
Tree DBH, inch	Santa Cruz Side	Monterey Side
6-12	1	0
12.1-24	15	7
24.1-30	7	2
30.1-36	3	0
Total	26	9

Revegetation with native species includes 456 box elder, 51 red alder, 42 sycamore, and 24 coast live oak container-stock trees; 11,145 black cottonwood cuttings and 4040 willow cuttings; 4,708 native shrubs (9 species) and 2,029 perennial herbs and grasses (9 species). The Revegetation Plan is described in greater detail below.

The County proposes to construct 19 instream habitat enhancement features using the salvaged wood from the removed mature riparian trees. The salvaged logs would be placed near the vicinity of removal to reduce wood transport costs and shall be used to construct multiple root wad habitat features at locations identified by Engineer and Project Biologist in the field. A minimum of 50% tree trunk shall be buried in waterside bench slope at or below the summer flow water level. Log features would be made from 1, 2, or 3 logs with root wads left attached. Each root wad would be anchored with two approximately 3.5-feet diameter boulder.

Although the excavation of bench sediments will occur entirely above Ordinary High Water (OHW), wetland fill associated with the placement of the log and boulder structures may require a total of approximately 0.08 acres (3,764 square feet) of disturbance to jurisdictional wetlands and waters of the US. These 19 habitat enhancement structures consist of native logs, steel cables, imported anchor boulders, and native backfill. The structures will result in placement of total of 276 cubic yards of fill into emergent marsh wetland/open water habitat. See Figure 3. Placement of fill below ordinary high water will require a US Army Corps of Engineer Section 404 Nationwide Permit. Section 7 consultation with

USFWS on California red-legged frog and tidewater goby, and with NOAA/NMFS on steelhead would be required.

Table 2. Pajaro River Bench Excavation Project LWM Structures (sheet D1)					
Reach #	**Sheet #**	**LWM type/(structure count)**	**Area (sq. ft.)**	**Fill Volume (cu. ft.)**	**Fill Volume (cu. yds.)**
2R	C4	2 tree (3)	636	1,266	47
2L	C6	2 tree (1), 3 tree (1)	490	1,224	45
3R	C5	1 tree (1)	146	233	9
4L	C13	2 tree (2)	424	844	31
5R	C10	2 tree (5)	1060	2,110	78
5.5R	C12	1 tree (1)	146	233	9
6R	C15	1 tree (3)	438	699	26
8R	C19	2 tree (2)	424	844	31
			3764	**7453**	**276**
			Total number of structures = **19**		
			Total area fill = **0 .08 acres**		
			Total fill volume = **276 cubic yards**		

Figure 4. Photos of typical waterside edge wetland habitat and existing low flow channel

Typical potential location for placement of LWM habitat structure on left. Emergent marsh and riparian plants will be salvaged and replanted in LWM impact areas.

2.2. Proposed Schedule

The Pajaro River Flood Control Bench Excavation Project is anticipated to take place over construction seasons, from 2012 to 2013. During those first two years, it is anticipated that excavation areas will be completed from downstream to upstream, with the reach below the Salsipuedes confluence to be done in 2012. Areas upstream of Salsipuedes Creek are planned for 2013. Revegetation plant performance, project-related roughness estimation and hydraulic cross-section monitoring will be conducted for 10 years, through 2023. The conceptual adaptive management program is outlined below under Section 2.4.

2.3. Revegetation Plan

As proposed, each of the excavation sites shall be revegetated to mitigate for temporary construction impacts to the riparian corridor. The entire square footage of each site will be hydroseeded for erosion control and portions planted with native trees, shrubs and herbs. A planting list has been prepared for each of the eleven revegetation areas. Total numbers and a full list of proposed species are included in the B.A. (See Figures 6 and 7 / Revegetation Plan Sheet and Plant Palette).

Sediment removal associated with the Bench Excavation project will likely take two years (or two construction seasons), with phased riparian plantings to be installed in each excavation area following initial construction, and then a year later, after the sites weather one winter and a growing season. The goals of the phased revegetation are (1) to take advantage of the natural geomorphic processes and ecological succession trends that occur in dynamic river systems and (2) to optimize revegetation efforts by collecting and using local plant material to the greatest extent possible.

Under the supervision of the Project Biologist, the Revegetation Contractor will collect willow and black cottonwood cuttings along the Pajaro River and nearby sloughs. The County or its agents will provide the local native plant seed needed for the hydroseed mix, and will provide the contract-grown container stock to the landscape contractor for planting. A portion of the herbaceous material will be collected and transplanted from the river channel as divisions, including bog rush and California tule. Willow stakes and plant divisions will be salvaged from the log habitat structure locations and used to revegetate those disturbed areas. No formal irrigation is proposed; therefore, water needed for hydroseeding and planting will be trucked into the revegetation areas, as needed.

Erosion control BMPs and hydroseeding will occur by October 15, during the fall immediately following grading activities. The majority of proposed willow (*Salix* spp.) and black cottonwood (*Populus trichocarpa*) short cuttings will be planted the first winter after construction (2012/2013). The proposed container stock and live transplants or divisions will be planted the second fall and winter after construction is complete (2013/2014).

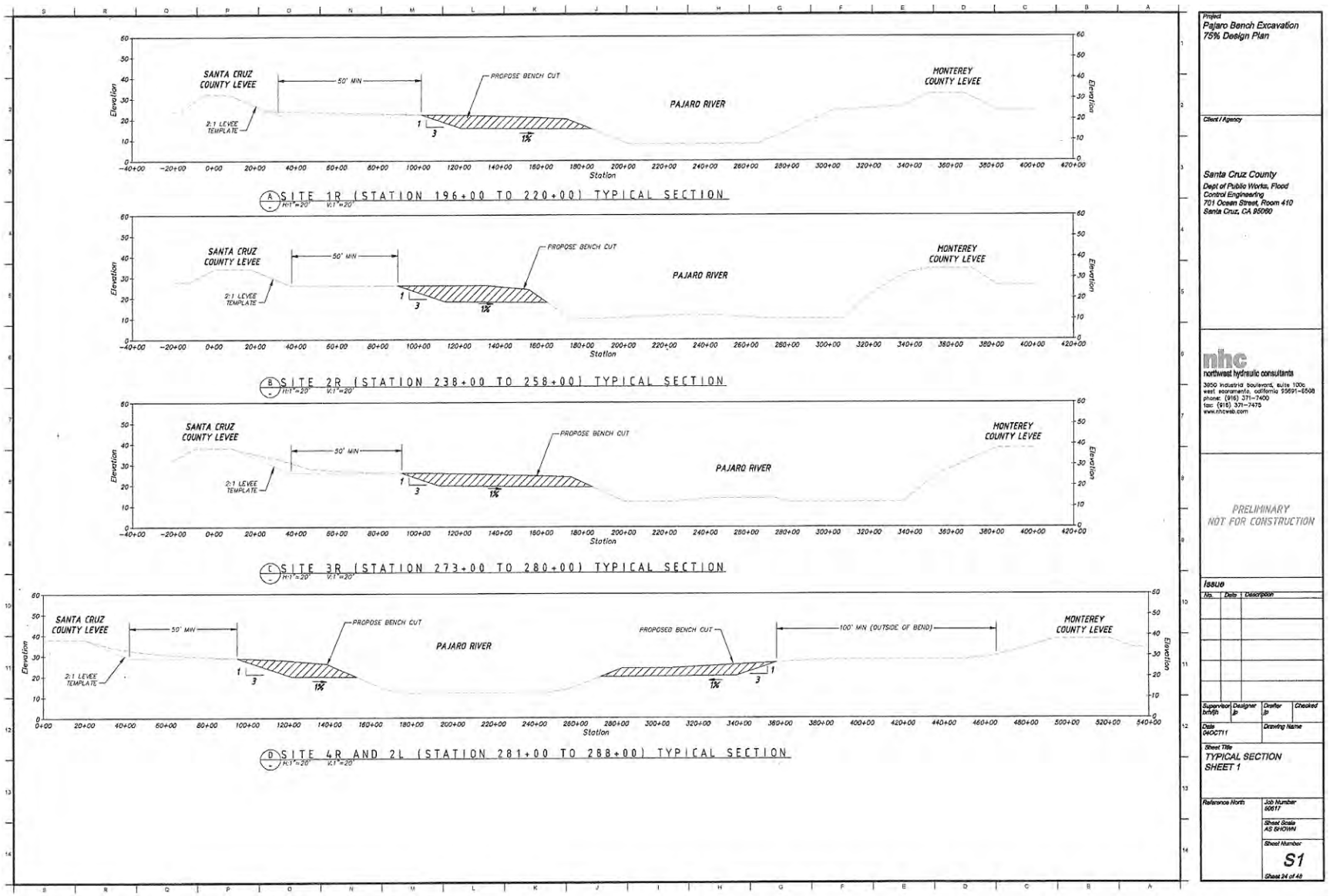


Figure 5. Typical Bench Excavation Design Cross Sections

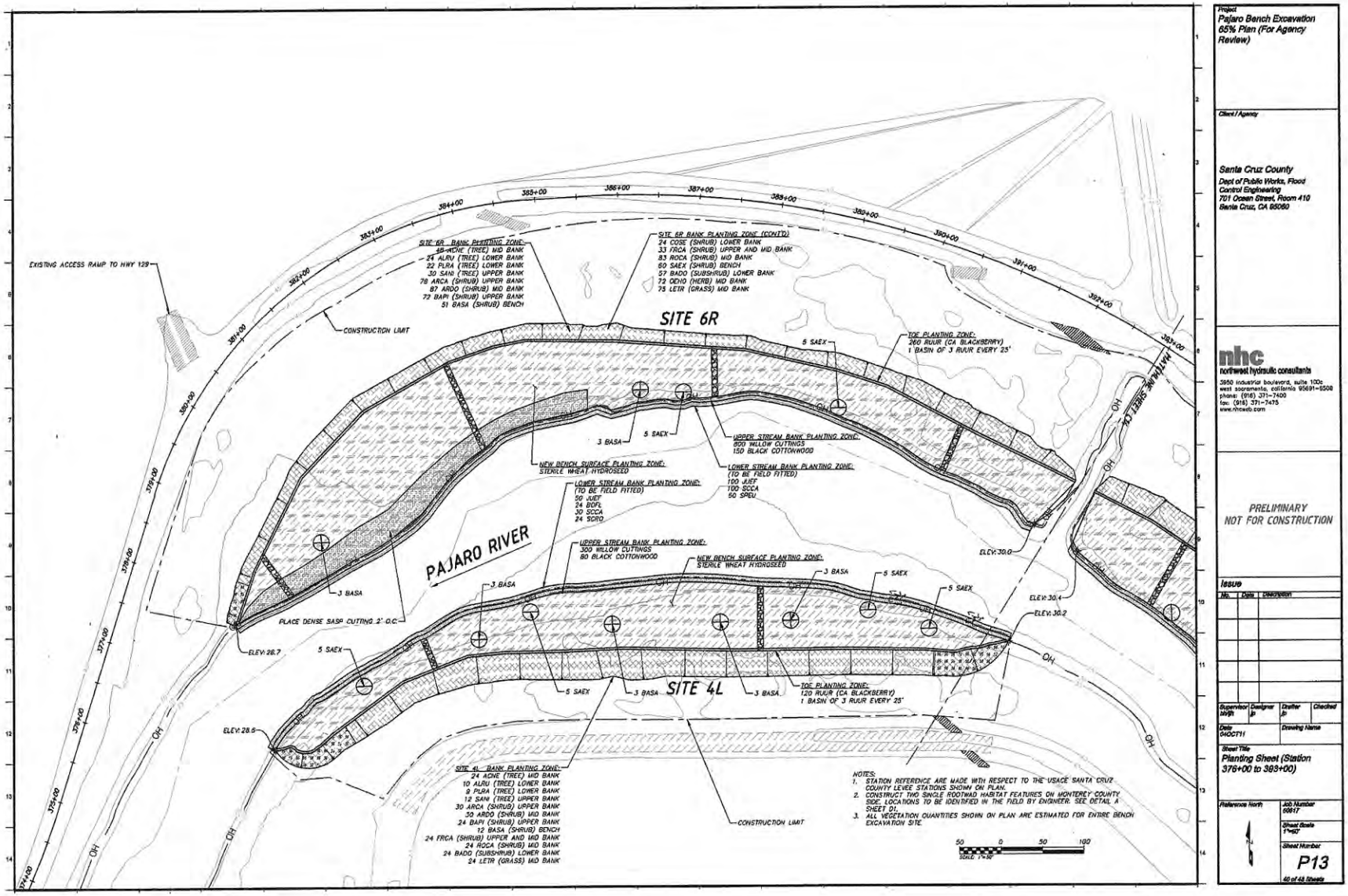


Figure 6. Typical Bench Excavation Area Design Revegetation Plan Sheet

PLANTING LIST FOR THE PAJARO RIVER BENCH EXCAVATION

	SPECIES CODE	SCIENTIFIC NAME	COMMON NAME	CONTAINER TYPE OR CUTTING[1]	APPROX. ON-CENTER SPACING (FEET)[2]	PLANTING LOCATION	ESTIMATED QUANTITIES
TREES							
	ACNE	ACER NEGUNDO	BOX ELDER	TREEPOT	12.0–15.0	MID BANK	456
	ALRU	ALNUS RUBRA/OREGONA	RED ALDER	TREEPOT	12.0–15.0	BENCH, LOWER BANK	51
	PLRA	PLATANUS RACEMOSA	CALIFORNIA SYCAMORE	TREEPOT	12.0–15.0	LOWER BANK	42
	POTR	POPULUS TRICHOCARPA	BLACK COTTONWOOD	SHORT CUTTINGS	6.0–8.0	BENCH, LOWER BANK	1145
	QUAG	QUERCUS AGRIFOLIA	COAST LIVE OAK	TREEPOT ACORN	12.0–15.0	UPPER BANK	24
	SASP	SALIX SPP (I.E. S. LASIOLEPIS, S. LAEVIGATA AND LASIANDRA)	ARROYO, RED, AND YELLOW WILLOW	SHORT CUTTINGS	4.0–5.0	BENCH, CHANNEL EDGE	4040
	SANI	SAMBUCUS NIGRA	BLUE ELDERBERRY	TREEPOT	12.0–15.0	UPPER BANK	90
SHRUBS							
	ARCA	ARTEMISIA CALIFORNICA	CALIFORNIA SAGE	1-GALLON	8.0	UPPER BANK	528
	ARDO[3]	ARTEMISIA DOUGLASIANA	MUGWORT	1-GALLON	8.0	MID BANK	909
	BAPI	BACCHARIS PILULARIS	COYOTE BRUSH	TREEPOT	12.0	MID BANK, UPPER BANK	420
	BASA	BACCHARIS SALICIFOLIA	MULE FAT	TREEPOT	10.0	BENCH	84
	COSE	CORNUS SERICEA	CREEK DOGWOOD	TREEPOT	10.0–12.0	LOWER BANK	48
	FRCA	FRANGULA CALIFORNICA	COFFEEBERRY	TREEPOT	10.0–12.0	MID BANK, UPPER BANK	198
	ROCA	ROSA CALIFORNICA	WILD ROSE	1-GALLON	8.0	MID BANK	474
	RUUR[3]	RUBUS URSINUS	CALIFORNIA BLACKBERRY	DEEPOT	5.0	LOWER BANK	1827
	SAEX	SALIX EXIGUA	SANDBAR WILLOW	SHORT CUTTING	4.0–5.0	BENCH, CHANNEL EDGE	130
PERENNIAL HERBS & GRASSES							
	BADO	BACCHARIS DOUGLASII	MARSH BACCHARIS	1-GALLON	5.0	LOWER BANK	264
	CYER	CYPERUS ERAGROSTIS	TALL CYPERUS	1-GALLON OR DIVSIONS	8.0	BENCH, CHANNEL EDGE	40
	JUEF	JUNCUS EFFUSUS SSP.	BOG RUSH	1-GALLON OR DIVISIONS	6.0	CHANNEL EDGE	230
	LETR[3]	LEYMUS TRITICOIDES	CREEPING WILD RYE GRASS	1-GALLON	5.0	MID BANK	489
	OEHO	OENOTHERA ELATA SSP. HOOKERI	HOOKER'S PRIMROSE	1-GALLON	4.0	MID BANK	160
	BOFL	BOLBOSCHOENUS FLUVIATILIS	RIVER TULE	DIVISIONS	8.0	BENCH	136
	SCRO	SCHOENOPLECTU S ROBUSTUS	PRAIRIE BULRUSH	DIVISIONS	8.0	BENCH	181
	SCCA	SCHOENPLECTUS CALIFORNICUS	CALIFORNIA TULE	1-GALLON OR DIVISION	8.0	BENCH, CHANNEL EDGE	435
	SPEU	SPARGANIUM EURYCARPUM	BROAD-FRUITED BURREED	1-GALLON OR DIVISIONS	8.0	BENCH, CHANNEL EDGE	94

1. CONTAINER SIZES: TREEPOTS @ 4" BY 4" BY 14" DEEP; DEEPOTS @ 2.5" BY 2.5" BY 10" DEEP.
2. EXACT SPACING AND QUANTITIES WILL NEED TO BE FIELD FIT FOR EACH REVEGETATION AREA, DEPENDING ON EXISTING VEGETATION AND RATE OF NATURAL RECRUITMENT. DISTANCES AREA APPROXIMATE GUILDLINES.
3. CALIFORNIA BLACKBERRY, CREEPING WILD RYE GRASS, AND MUGWORT WILL BE PLANTED 3 PER LARGER PLANTING BASIN (3 FT BY 6 FT).

REVEGETATION PLANTING LEGEND

HATCH PATTERN	PLANTING AREA
	NEW EXCAVATION BANK
	NEW EXCAVATION TOE
	NEW BENCH SURFACE
	UPPER STREAM BANK
	LOWER STREAM BANK
	DENSE SASP CUTTING
	PLANT 3 BASA
	PLANT 5 SAEX

HYDROSEED MIX A (3:1 BANKS)
TOTAL AREA: 12.9 ACRES

COMMON NAME	SCIENTIFIC NAME	APPLICATION RATE (LB/ACRE)
WHITE YARROW	ACHILLEA MLLEFOLIUM	4
CALIFORNIA BROME	BROMUS CARINATUS	10
MEADOW BARLEY	HORDEUM BRACHYANTHERUM	10
STERILE WHEAT	ELYMUS X TRITICUM	30
HOOKERS PRIMROSE	OENOTHERA ELATA HOOKERI	1

HYDROSEED MIX B (LEVEL BENCH)
TOTAL AREA: 27.7 ACRES

COMMON NAME	SCIENTIFIC NAME	APPLICATION RATE (LB/ACRE)
STERILE WHEAT	ELYMUS X TRITICUM	50

Project: Pajaro Bench Excavation 65% Plan (For Agency Review)

Client / Agency: Santa Cruz County
Dept of Public Works, Flood Control Engineering
701 Ocean Street, Room 410
Santa Cruz, CA 95060

nhc
northwest hydraulic consultants

PRELIMINARY
NOT FOR CONSTRUCTION

Sheet Title: Planting Program

Sheet Number: P21

Figure 7. Native Plant Palette and Quantities for Bench Excavation Revegetation Plan

2.4. Adaptive Management, Monitoring and Maintenance Plan

Both revegetation planting performance monitoring and long-term maintenance of the Bench Excavation project area is proposed to be accomplished under an Adaptive Management, Monitoring and Maintenance Program that will provide regular field observations, qualitative and quantitative assessment of channel roughness conditions, and management recommendations. The primary elements of the adaptive management approach include:

- annual botanical surveys within mitigation areas for the first five years following construction with bi-annual surveys in years 6-10,
- annual western pond turtle surveys (with radio-telemetry surveys in years 1 and 2 of construction),
- bi-annual project area nesting season bird surveys
- bi-annual post-project hydraulic cross section surveys to assess channel capacity and vegetation-related channel roughness

The goal of the adaptive management program is (1) to guide flood control channel maintenance practices with biological and hydraulic information and (2) to provide successful mitigation for the Bench Excavation Project impacts. A general outline of likely adaptive management tasks and targets is included below:

November 2011- ongoing

- Collect native grass and shrub seeds as per Native Vegetation Network (NVN) planting specifications (V. Haley)
- Secure contracts w/ nursery growers to propagate container plants for Fall/winter 2013 mitigation plantings (staff and V. Haley)

April-October 2012

- Mow <u>all</u> benches 2-3x (to keep exotic grasses from seeding & exclude nesting birds); [DPW Drainage crew]
- Initiate exclusion and monitoring measures for species of concern at excavation sites and access routes
- *Year 1 excavation*-- Clear and excavate benches at 1R, 2R, 2L, 3R, 4R (123,000 cy.)
- Apply erosion control BMPs, hydroseed with sterile native grass at excavated sites, some willow staking on water-side edge of excavated benches

October 2012

- Initiate WPT trapping/tracking as per mitigation plan (KEC)

Winter 2013

- Track WPTs (KEC)

April 2013-October 2013

- Survey/monitor 1R, 2R, 2L, 3R, 4R for native veg. re-establishment (Val Haley)

- Mow benches 2-3x
- Initiate exclusion and monitoring measures @ excavation sites and access routes
- *Year 2 excavation*—Clear and excavate 4L, 5R, 5.5R, 6R, 7R, 8R (182,000 cy)
- Apply erosion control BMPs, hydroseed w/ sterile native grass @ excavated sites

November 2013-October 2014

- Survey/monitor 4L, 5R, 5.5R, 6R, 7R, 8R for native veg. re-establishment (Val Haley)
- @ *Year 1* reaches 1R, 2R, 2L, 3R, 4R,
    - Assess and quantify recruitment/establishment of native grasses/shrubs on bench ex. slopes and bottoms (V. Haley)
    - As needed, hydroseed bench bottoms and slopes w/ native grasses and install container plants on 3:1 slopes. (Contractor TBD under direction of V. Haley)
    - Irrigate new plantings as necessary
- Mow un-excavated benches 2x (April and August) to control establishment of exotic weeds
- Track/Monitor WPTs, conduct surveys of nesting birds (KEC)

November 2014- October 2015

- @ *Year 1* reaches 1R, 2R, 2L, 3R, 4R,
    - Assess/quantify re-veg. success on bench bottoms and slopes (V. Haley)
    - Replace/re-install failed plantings as needed (Contractor)
- @ *Year 2* reaches 4L, 5R, 5.5R, 6R, 7R, 8R
    - Assess and quantify recruitment/establishment of native grasses/shrubs on bench ex. slopes and bottoms (V. Haley)
    - As needed, hydroseed bench bottoms and slopes w/ native grasses and install container plants on 3:1 slopes. (Contractor TBD under direction of V. Haley)
    - Irrigate new plantings as necessary
- Track/monitor WPTs, conduct surveys of nesting birds (KEC)

November 2015- November 2016

- Survey x-sections on all reaches to assess channel roughness values (V. Haley and NHC)
- Continue re-vegetation efforts at all excavation locations;
    - Assess and quantify recruitment/establishment of native grasses/shrubs on bench ex. slopes and bottoms (V. Haley)
    - Irrigate re-planted areas as needed (Contractor)
    - Replace/re-install failed plantings as needed (Contractor); *end 2017?*
    - Train DPW Drainage crew in maintenance of re-vegetation sites (Contractor, V. Haley)
- Track/Monitor WPTs, conduct surveys of nesting birds (KEC)

2016 - 2023

- Survey x-sections on all reaches to assess channel roughness values every 2 years, or more frequently if needed (V. Haley and NHC)
- Mow/trim emergent and mature vegetation as per permitting requirements
- Continue tracking/monitoring of WPTs and surveys of nesting birds

Chapter 3 Potential Project Impacts

3.1. Types of Potential Impacts

Both direct and indirect effects on listed species are analyzed during Section 7 consultation and CEQA review. Direct effects are defined as the direct or immediate effects of the project on the species or its habitat, and typically involve direct harm, such as causing injury to an individual during construction. Direct effects may also occur when individuals of the species are present at the time habitat modification occurs and when the habitat modification is such that it reduces the suitability of the habitat or the ability of individuals to use the habitat. Indirect effects are caused by or result from the proposed action, are later in time, and are reasonably certain to occur. Indirect effects may occur outside of the area or season directly affected by the action. This BA includes mitigation measures to prevent or minimize the potential for adverse effects summarized below to impact federally listed species as a result of Project activities.

The proposed Project has the potential to adversely affect California red-legged frog, steelhead trout and western pond turtle both directly and indirectly through direct mortality and disturbance of habitat during the period of construction. Mitigation measures have been included in the design and planning of the proposed Project to prevent or minimize these direct and indirect adverse impacts. The proposed project was found to have no adverse effects on the least Bell's vireo, tidewater goby, tricolored blackbird, yellow-breasted chat or burrowing owl due to low likelihood of occurrences in the project impact area

The bench areas subject to excavation impacts are dominated by weedy vegetation and, at this time, support limited riparian shrub-scrub and riparian woodland habitats. Some 35 mature riparian cottonwoods, and willows located in proposed excavation areas will be removed and the wood will be salvaged for use in instream habitat structures. Loss of these remnant mature riparian trees represents the loss of potential raptor roosting and nesting habitat, as well as the loss of potential nesting sites for tree swallows or other cavity nesting birds. Pallid bats, though not known from the site at this time, may make use of the large remnant riparian trees.

Current flood control maintenance activities include annual mowing of the subject areas that will be potentially impacted by excavation of the bench surfaces, including the top 8 feet of streambank above ordinary high water. Both the existing conditions and post-project riparian habitat conditions require substantial vegetation management that reduces potential habitat values. Implementation of the proposed native revegetation plan and development of an adaptive management approach, however, is designed to result in a net increase in native riparian habitat in the Pajaro River flood control project area.

3.2 Cumulative Effects

There are several activities in the watershed that may have a cumulative effect on listed steelhead,

California red-legged frog and other protected species. These activities include regular Pajaro River flood control maintenance activities, the Pajaro River Lagoon Flood Control Program conducted by Santa Cruz County, the Salsipuedes and Corralitos Creek Flood Control Program conducted by Santa Cruz County, operation of the College Lake Reclamation Project, and impaired water quality from agricultural and urban runoff.

3.3. Conclusions

As a result of mitigation measures included in the proposed project, incidental take for the project is not expected to jeopardize the continued existence of federally or state listed species or their recovery.

Avoidance of wetland habitats and riparian habitats below ordinary high water, except for habitat enhancement structures, will minimize potential adverse impacts to California red-legged frogs, steelhead, and tidewater goby. In general, the proposed project is unlikely to adversely affect least Bell's vireo, snowy plover, yellow-breasted chat or burrowing owl because they are not likely to be present in the project area during the construction period.

The project has the potential for direct adverse effects to individual steelhead trout during placement of the salvaged log habitat structures and red-legged frogs during vegetation clearing, log-structure placement, excavation and transport of materials on the benches and along the toe of the levees.

Western pond turtle, a state species of special concern, ranges throughout the project area and is particularly vulnerable to direct take due to its reliance on dry upland nesting and estivation sites that may be within bench excavation work areas. Despite confirmation of an existing WPT breeding population in the project area, no data on actual breeding areas or specific local breeding habitat preferences are known at this time. A combination of preconstruction surveys, radio-tracking, and daily monitoring is planned to minimized impacts to that species, while developing additional life history information to be used in the Bench Excavation Project's adaptive management and maintenance program.

Loss of 35 mature riparian cottonwoods and willows that survived the pre-1995 clearing represents a loss of potential raptor perches and nest sites. Loss of these 35 trees also represents loss of potential cavity nesting sites for tree swallow (which has been observed nesting on bench surface cottonwood trees), downy woodpecker, barn owl and other large tree, snag-dependent species. Installation of 12 swallow boxes and 4 owl boxes are proposed to mitigate for the loss of this potential breeding habitat.

Revegetation plans include 27.7 acres of sterile wheat hydroseed to be placed on new bench surfaces and 12.9 acres of native seed/sterile wheat hydroseed on new 3:1 slopes. Approximately 20,500 linear feet of currently mowed top-of-bank, disturbed riparian habitat will be graded and replanted with locally collected and locally grown native species. A total of more than 5,780 native trees and willow stakes are proposed in the revegetation plan.

Maintenance and monitoring of the revegetation plan shall be driven by and adaptive management approach that will respond to annual botanical and wildlife surveys, in addition to regular hydraulic surveys and analysis. A ten-year monitoring and adaptive management plan is included in the project.

Chapter 4. Fish and Wildlife Resources Considered in the Biological Assessment

4.1 Biological Assessment Methods

The proposed Bench Excavation project is designed to provide additional flood capacity through the levied reach of the Pajaro River from Murphy's Crossing downstream to the Highway 1 bridge. The primary objectives of the Bench Excavation project are to increase flood capacity under the current levee configuration and preserve habitat value and ecological function for state and federally listed species. The components of the project evaluated in this BA include: (1) vegetation removal conducted to clear bench excavation areas; and (2) removal and transport of bench sediments from the Pajaro River Flood Control Channel to improve hydraulic capacity, (3) revegetation of disturbed areas with hydroseed and native plant species for mitigation and scour protection, and (4) placement of salvaged-log instream habitat structures to benefit listed steelhead, CA red-legged frogs and western pond turtles.

Kittleson Environmental Consulting (KEC) has conducted biological studies within the Pajaro River Flood Control Channel since 2002, including riparian inventories, nesting bird surveys, California red-legged frog surveys, and western pond turtle trapping studies. Through these efforts, California red-legged frog, western pond turtle, steelhead and nesting raptors have all been documented within the project area. Confirmed sighting locations are mapped on USGS topographic maps and included in the BA.

A list of special-status species recorded in the vicinity of the project site was compiled from records in California Department of Fish and Game's California Natural Diversity Database (CNDDB) (CDFG, 2011), U.S. Fish and Wildlife Service's Endangered Species List (USFWS, 2011), and the California Native Plant Society's Rare Plant Inventory (CNPS, 2011). All three databases were queried for the Soquel, Watsonville West, Watsonville East, Moss Landing, and Prunedale 7.5-minute USGS topographic quadrangles in order to capture any species that could potentially be present in the project site. The search radius was limited to the five quads listed above due to the relatively small size of the project site. Additionally, sensitive resources in habitats not present at the project site (i.e. sand dunes, maritime chaparral) are abundant in the area, and capturing species in these habitats would not to be relevant to the proposed project. A full list of these species is attached in Appendix A. Species were then individually assessed based on their habitat requirements and distribution along with habitats present in and around the project site, and species with a moderate or high potential to occur were assessed in further detail.

4.2. Special Status Species Considered in the Biological Assessment

Under the federal Endangered Species Act (ESA), the National Oceanic and Atmospheric Administration National Marine Fisheries Service (NOAA Fisheries) and United States Fish and Wildlife Service (USFWS) have regulatory authority over projects that may affect the continued existence of a federally listed species. Under the federal ESA, a permit to "take" a listed species is required for any project that may harm or harass an individual of that species. This BA has been prepared as part of the process to permit the Bench Excavation Project under Section 7 of the federal ESA, the California

Endangered Species Act, and Section 1600 of the California Fish and Game Code. The intent of the BA is to evaluate whether the Bench Ex Project is likely to adversely affect a listed species or designated critical habitat; jeopardize the continued existence of a listed species; or adversely modify proposed critical habitat.

For the proposed action, federal interagency consultation under Section 7 of the ESA (16 U.S.C. 1531 et seq.) is required, because the action requires a federal permit from the ACOE and there is the potential to take a federally listed species as a result of the proposed actions. This BA has been prepared as part of the Section 7 process to permit the proposed actions under the ESA. The BA is intended to determine whether the proposed action is likely to adversely affect a species or designated critical habitat; jeopardize the continued existence of (a listed) species; or adversely modify proposed critical habitat.

The occurrence and/or potential occurrence of federally listed marine species, including anadromous species, in the proposed action area (e.g. steelhead) requires consultation with NOAA Fisheries to obtain an incidental take permit for activities that may affect the species and/or their critical habitat. The occurrence of federally listed terrestrial and freshwater aquatic species in the proposed action area requires consultation with USFWS to obtain an incidental take permit.

The proposed action to be authorized through this Section 7 consultation process is the issuance of an ACOE 404 Permit to place fill (i.e., log and boulder habitat structures) in jurisdictional wetland and/or waters of the Pajaro River. The bench excavation project proposed has the potential to affect listed species in the Pajaro River and the associated riparian habitat.

There are five species listed as threatened or endangered under the federal ESA that are present or for which suitable habitat exists in or adjacent to the Project area. Three of these species occur in or adjacent to the Project area: the South-Central California Coast steelhead trout, the California red-legged frog, and the tidewater goby. Brief consideration is also given to the snowy plover, which nests at the Pajaro rivermouth (3 miles downstream) and least Bell's vireo, which is not known from the project area.

There are 6 species listed as threatened or "species of concern" under the California Endangered species act that regularly occur and/or breed in the project area. Three federally listed species; steelhead, red-legged frog, and snowy plover, are also listed as species of concern under CESA. Western pond turtles are CA species of special concern and are present throughout the project area. Pallid bat is a special concern mammal species that may make use of the remnant, mature riparian trees in the bench areas. Burrowing owl state species of special concern that is an infrequent winter visitor to the lower Pajaro, and is not known to nest in the project area. Least Bell's vireo is also listed as "endangered" under CESA.

4.3. Special Status Species Overview and Agency Consultation

Due to the size of the proposed project and scope of potential impacts, KEC and the County of Santa Cruz staff met with USACE, NOAA/NMFS, USFWS and CDFG biologists in the field and in formal meetings to discuss the development of the plan and associated permitting issues. KEC toured the

project area with Jacob Martin/USFWS and Suzanne Deleon on 11/11/201o. KEC then toured the site and reviewed the 30% plan with Chad Mitchum/USFWS on 5/16/2011. On 9/12/2011 in Santa Rosa, CA a formal meeting was conducted with USACE/SF Regulatory Chief Cameron Johnson, Joyce Ambrosius/NMFS, Jon Ambrose/NMFS, Ann Riley/SWRCB, Julia Dyer/RWQCB3 and County staff to discuss the 65% plans, proposed schedule and associated permit issues.

4.3.1 Steelhead

Steelhead trout (Oncorhynchus mykiss) are anadromous trout that inhabit the coastal rivers and streams. Steelhead grow and mature in the ocean and return to their natal stream to spawn. The adult migration from the ocean to freshwater usually occurs during the winter, but may occur from late fall through early spring depending upon flow and temperature conditions in the stream. Spawning occurs in the tail-end of pools, or other favorable sites, where the female buries her eggs in shallow depressions (redds) excavated in a gravel-cobble substrate (Shapovalov and Taft, 1954). Incubation can take from a few weeks to several months, depending upon water temperature. Depending upon growth rates, a juvenile steelhead can spend from one to three years in freshwater before smolting to sea. Growth rates may vary considerably throughout a given stream system, depending on availability of food and suitable rearing habitat.

Steelhead in the Pajaro River watershed are part of the South-Central California Coast Evolutionary Significant Unit (ESU) as defined by NOAA Fisheries (Busby et al., 1996) The Pajaro River is one of the major drainages of the South/Central California Coast ESU, which includes rivers from the Pajaro to (but not including) the Santa Maria River (*NMFS, 2000*). The Pajaro River watershed unit (3305) is mapped as Critical Habitat for the South-central California Coast steelhead.

Historic population estimates for steelhead in this ESU vary widely. During the mid 1960s McEwan and Jackson (*1996*) estimated runs of 1,000 to 2,000 steelhead in the Pajaro River and 3,200 in the Carmel River. During the same time period, the California Department of Fish and Game estimated runs of 27,750 individuals in some rivers of this ESU (*NMFS, 1996*). NMFS (*1996*) indicated that by 1990, steelhead runs were as low as 500 fish in five rivers combined (Pajaro River, Salinas River, Carmel River, Little Sur River, and Big Sur River) and Nehlsen et al. (*1991*) estimated a run of less than 100 steelhead in the Pajaro in 1991.

In general, it is believed that adult and juvenile steelhead use the Pajaro River as a migration corridor to reach spawning and nursery habitat in the Corralitos and Salsipuedes Creek watersheds and watersheds in Santa Clara County. High quality spawning and rearing habitat does not generally occur within the Project area due to seasonally high water temperatures, low summer stream flows and sandy or silty substrate. Both adult and juvenile steelhead, however, have been observed in the project area by KEC in 2010 and 2011 during western pond turtle trapping studies. Adult steelhead have been observed in pool and run habitats both upstream and downstream of Salsipuedes Creek confluence. Five adult steelhead (2 with distinctly silver coloration) were observed in the mainstem in unusually high summer flows in July and August 2011. Figure 8.

Spawning gravels occur in the Aromas to Chittenden Pass area upstream of Murphy's Crossing, and

steelhead occasionally spawn in this area (Smith, 2002). Occurrence of suitable spawning substrates and adequate flows in the project area depend on seasonal storms and local geomorphic functions. Following late season rains, KEC observed 3 redds and young of the year salmonids in May and June 2010 approximately 1 mile upstream of the Highway 1 bridge. Steelhead smolts can potentially rear in the lagoon, although it is not likely because spawning areas are far upstream within the Pajaro River tributaries (Smith, 2002).

In Santa Cruz County, steelhead regularly spawn and rear in the Corralitos Creek watershed in Corralitos Creek, Shingle Mill Creek, Browns Creek, and Ramsey Creek. The Casserly Creek watershed, which includes College Lake and Green Valley Creek, also supports steelhead and resident rainbow trout. From the confluence of the College Lake outflow channel and lower Corralitos Creek, the levied channel reach is referred to as Salsipuedes Creek and is considered a migration corridor, due to high water temperatures, low flows and dry reaches upstream in Corralitos Creek, and periodic fluctuations in flows resulting from College Lake drainage pumping.

Carlton Creek, Coward Creek and the small subwatersheds that drain to the Pajaro River Flood Control Channel through flapgates in the levees, upstream of Watsonville, do not have sufficient flow and are too modified by agriculture to support steelhead. Upstream of Murphy's Crossing several tributary creeks provide potential steelhead spawning and rearing habitat, including Pescadero, Uvas, Llagas and Pacheco creeks (Smith, 1982; Smith et al., 1983; Smith 2002).

Like many central California coastal rivers, a sandbar periodically forms at the mouth of the Pajaro River, usually in late summer or early fall. Steelhead migration in the Pajaro River system is dependent upon winter rains that open the lagoon to tidal action and allow adult steelhead to migrate upstream and downstream. The lagoon generally remains open during the steelhead smolt outmigration period (typically April through early June). In most years the mouth is partially open all summer and tidal action in the brackish lagoon can occasionally penetrate as far upstream as 0.5 miles upstream the Highway 1 Bridge (KEC 2009).

Steelhead may use the Pajaro River Lagoon for juvenile rearing, although conditions are less than ideal, depending on water flow, temperature, and the status of river mouth conditions. Wave wash over the closed lagoon sand bar can result in high salinity and temperature stratification. While the lagoon is generally considered downstream of the Highway 1 Bridge, tidal influence during open lagoon conditions results in notable changes in water surface elevation to areas 0.5 miles upstream of Highway 1.

Direct Effects

Placement of 19 salvaged-log habitat enhancement structures would result in approximately 276 cubic yards of fill (logs, boulders and soil) in potentially jurisdictional wetland/open water habitat. Actual placement of habitat structures will be directed in the field by the project biologist and project engineer. During actual field fitting of log habitat structures, efforts would be made to minimize riparian disturbance and wetland impacts.

Temporary dewatering through the construction of sandbag and visquine coffer dams *may* be necessary to place logs and boulders, cable the structure together, and backfill with native material.

Temporary dewatering in localized areas next to streambanks may result in take, or death, of steelhead by relocation activities (electroshocker, dipnet, or seine), construction (placement and removal of sandbag coffer dams), or water quality degradation (excessive turbidity or hydrocarbon spills).

The purpose of the salvaged tree streamside habitat structures is habitat enhancement and mitigation for the riparian loss on the affected bench surfaces. Revegetation of the affected steambanks and new 3:1 slopes with native plant species and the use of an adaptive management approach to vegetation would result in eventual improvement in currently ruderal species-dominated habitat.

Indirect Effects

Indirect effects to steelhead resulting from implementation of the Bench Excavation Project could occur through changes in sediment transport in the Pajaro River flood control channel and resultant changes in channel geomorphology. Changes in the frequency and duration of overbank flows may result in small changes in sediment deposition within the low flow channel. Such changes could contribute to the formation of critically-shallow riffles that could impede steelhead passage in low flow periods. These potential indirect effects are not considered significant.

Changes in the frequency and duration of overbank flows may result in changes in channel morphology and sediment deposition that could contribute to the expansion of emergent marsh and native riparian scrub habitat within the floodplain, a beneficial indirect effect.

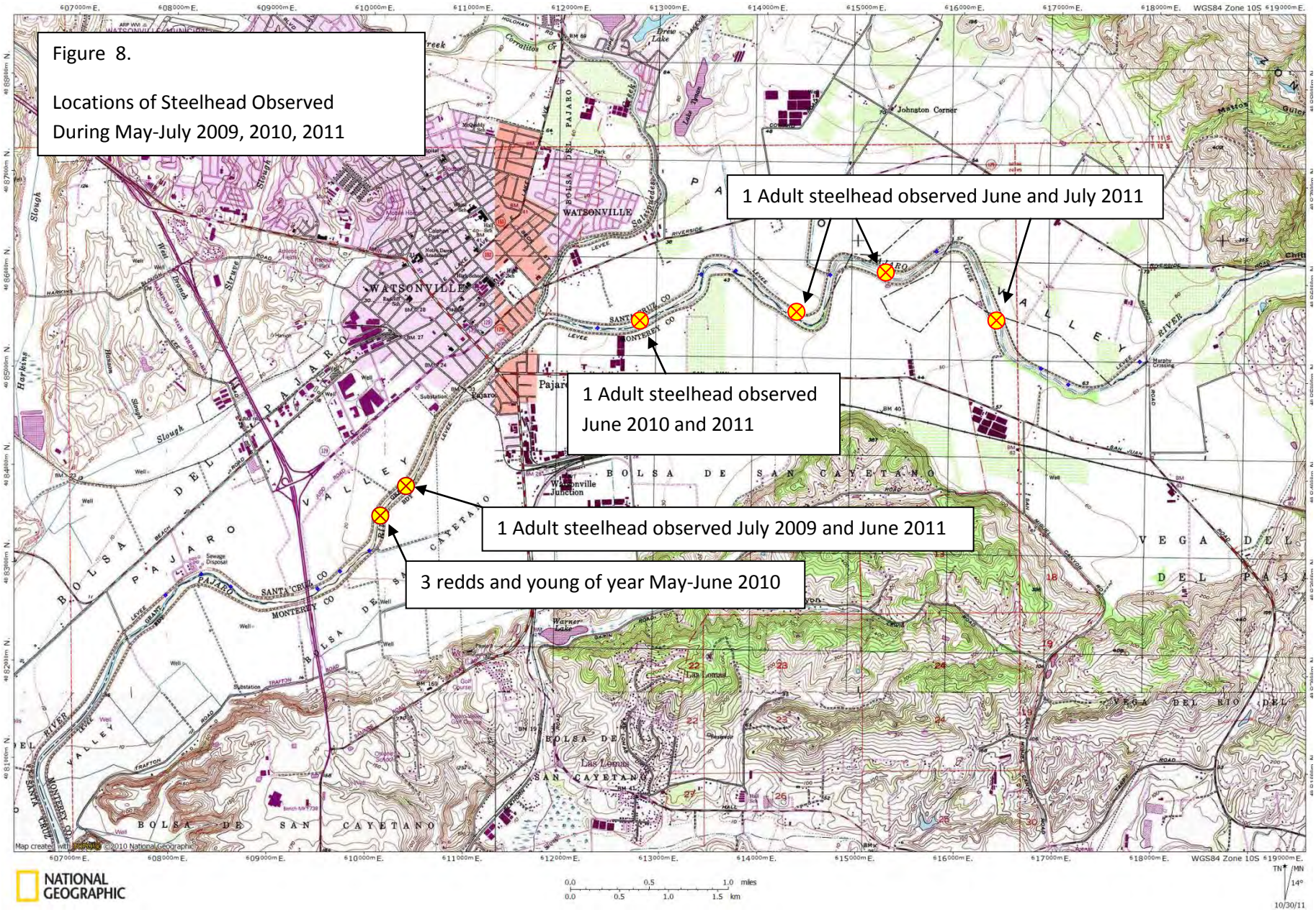


Figure 8.
Locations of Steelhead Observed
During May-July 2009, 2010, 2011
1 Adult steelhead observed June and July 2011
1 Adult steelhead observed
June 2010 and 2011
1 Adult steelhead observed July 2009 and June 2011
3 redds and young of year May-June 2010
WATSONVILLE
BOLSA DE SAN CAYETANO
VEGA DEL PAJARO
Johnston Corner
Watsonville Junction
Las Lomas
Warner Lake
NATIONAL GEOGRAPHIC
WGS84 Zone 10S
10/30/11

4.3.2. California Red-Legged Frog

The California red-legged frog (*Rana aurora draytonii*) is listed as threatened under the federal ESA. California red-legged frogs are present in the Pajaro River in the project area. CRLF have been observed at 15 distinct locations in the Pajaro River downstream of Murphy's Crossing since 2009 (Kittleson, personal observations). Figure 9 is a collection of CA red-legged frog images from the project area. They are also known from Soda lake and Chittenden Pass upstream of the project site, the Watsonville Slough system to the north and the Elkhorn Slough system to the south. Two known breeding ponds are within 1 mile of the project area on the Monterey County side at the Salinas Road fire suppression pond and on the Santa Cruz County side from a pond at the Land Trust of Santa Cruz County Watsonville Slough Farm (Kittleson, personal observations). Figure 10 illustrates project-specific red-legged frog observations. Figure 11 is a Google Map aerial photograph that depicts documented CNDDB and KEC locations within approximately 5 miles of the project area.

The California red-legged frog was once common throughout much of lowland California. Loss of habitat and the introduction of aquatic predators, including bullfrogs and non-native fish, have drastically reduced populations of this species throughout its range. Life history information was obtained primarily from the final rule for listing the species as threatened (61 Federal Register 25813) or the final critical habitat designation (66 Federal Register 14626). The Pajaro River is not mapped as Critical Habitat for the California red-legged frog.

California red-legged frogs inhabit a wide range of aquatic habitats including creeks, streams, and ponds that have perennial or near perennial standing water. Breeding sites include streams, deep pools, backwaters within streams and creeks, ponds, marshes, sag ponds, dune ponds, lagoons, and artificial impoundments such as stock ponds with emergent vegetation. Preferred habitats have water 2 to 3 feet deep with dense emergent or shoreline vegetation. Although they may move between breeding pools and foraging areas, they rarely leave the dense cover of the riparian corridor. California red-legged frogs breed from November through March.

Direct Effects

Removal of existing ruderal and riparian vegetation during the first phase of construction at each excavation area could result in direct take of metamorph, sub-adult, or adult red-legged frogs that are foraging, traversing, or estivating in upland habitat. California red-legged frogs have been documented throughout the project area, particularly at the water's edge, but also on the willows on dry banks and on the levee crest(as road kill following high water in 2011).

Placement of 19 salvaged-log habitat enhancement structures would result in approximately 276 cubic yards of fill (logs, boulders and soil) in potentially jurisdictional wetland/open water habitat. Actual placement of habitat structures will be directed in the field by the project biologist and project engineer. During actual field fitting of log habitat structures, efforts would be made to minimize riparian disturbance and wetland impacts.

Construction impacts to excavate and place logs and boulders, cable the structure together, and backfill with native material could result in trampling or injury to frogs. Temporary dewatering in localized areas next to streambanks may result in take, or death, of frogs by relocation activities, construction

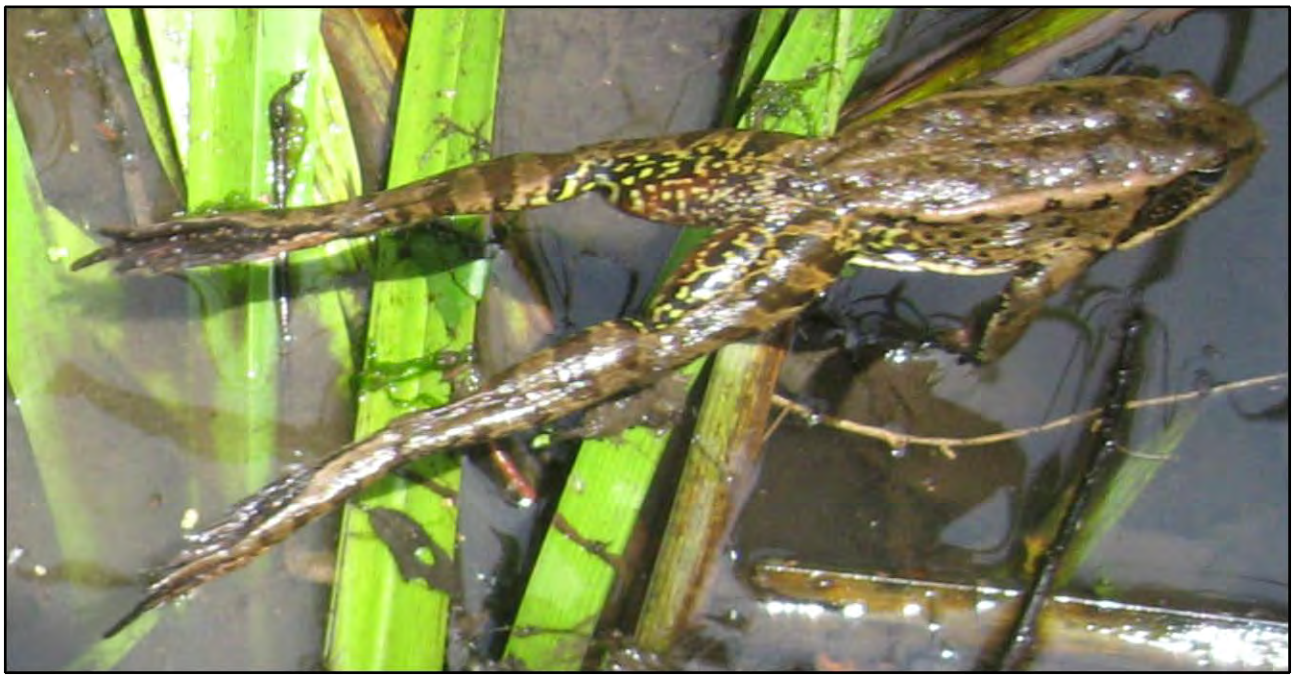
(placement and removal of coffer dams), or water quality degradation (excessive turbidity or hydrocarbon spills).

Indirect Effects

Indirect effects to CRLF resulting from implementation of the Bench Excavation Project could occur through changes in vegetation management and changes in the vegetation community on the benches. Increased native plant diversity is assumed to have a beneficial effect on the frog population.

Changes in the frequency and duration of overbank flows may result in changes in channel morphology and sediment deposition that could contribute to the expansion of emergent marsh and native riparian scrub habitat, a beneficial indirect effect.

Figure 9.
Photos of California Red-legged Frogs in Pajaro Bench Excavation Project Area



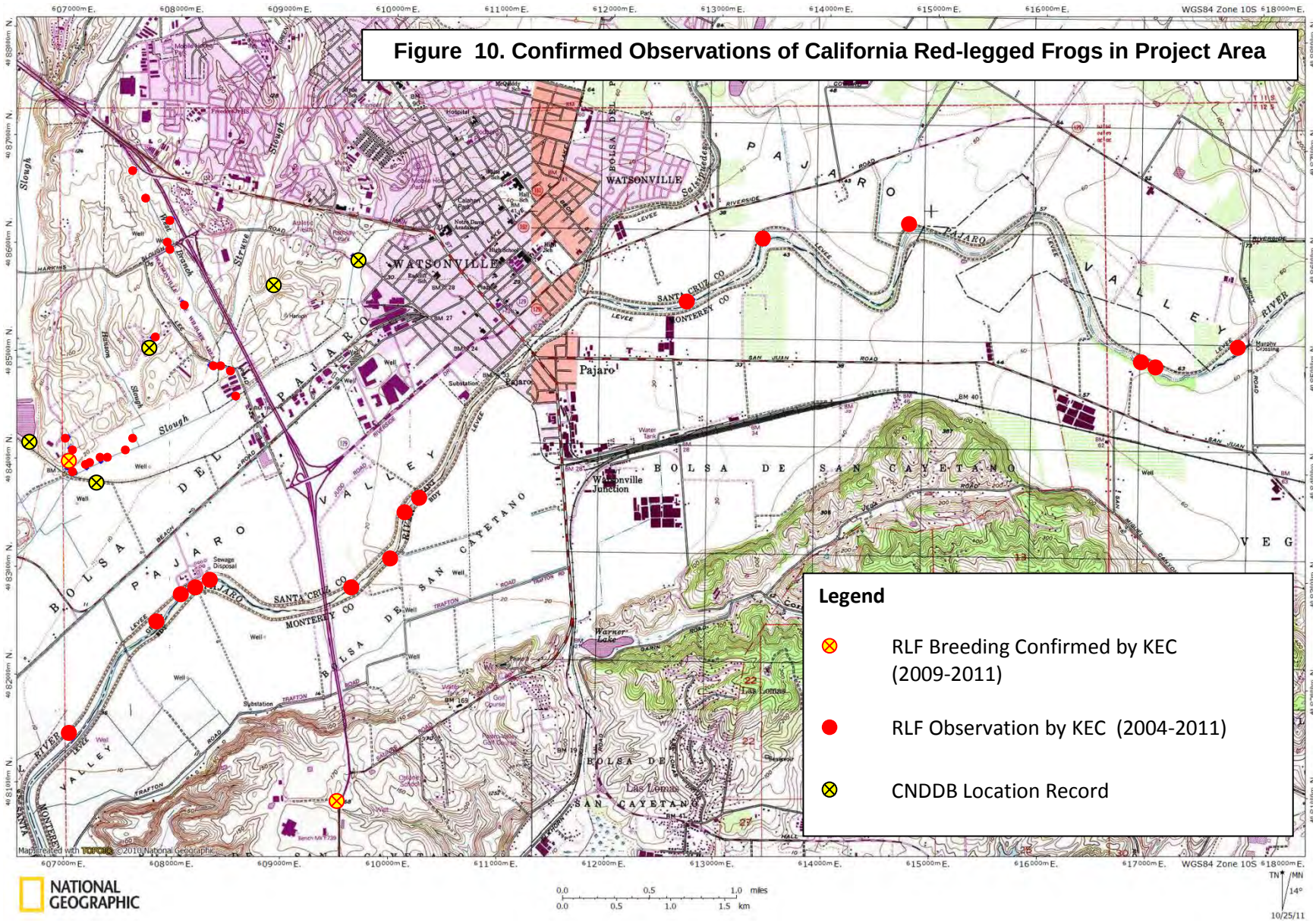


Figure 10. Confirmed Observations of California Red-legged Frogs in Project Area
Legend
RLF Breeding Confirmed by KEC (2009-2011)
RLF Observation by KEC (2004-2011)
CNDDB Location Record
WATSONVILLE
Pajaro
Watsonville Junction
Warner Lake
Las Lomas
BOLSA DE SAN CAYETANO
PAJARO VALLEY
SANTA CRUZ CO
MONTEREY CO
NATIONAL GEOGRAPHIC
WGS84 Zone 10S
10/25/11

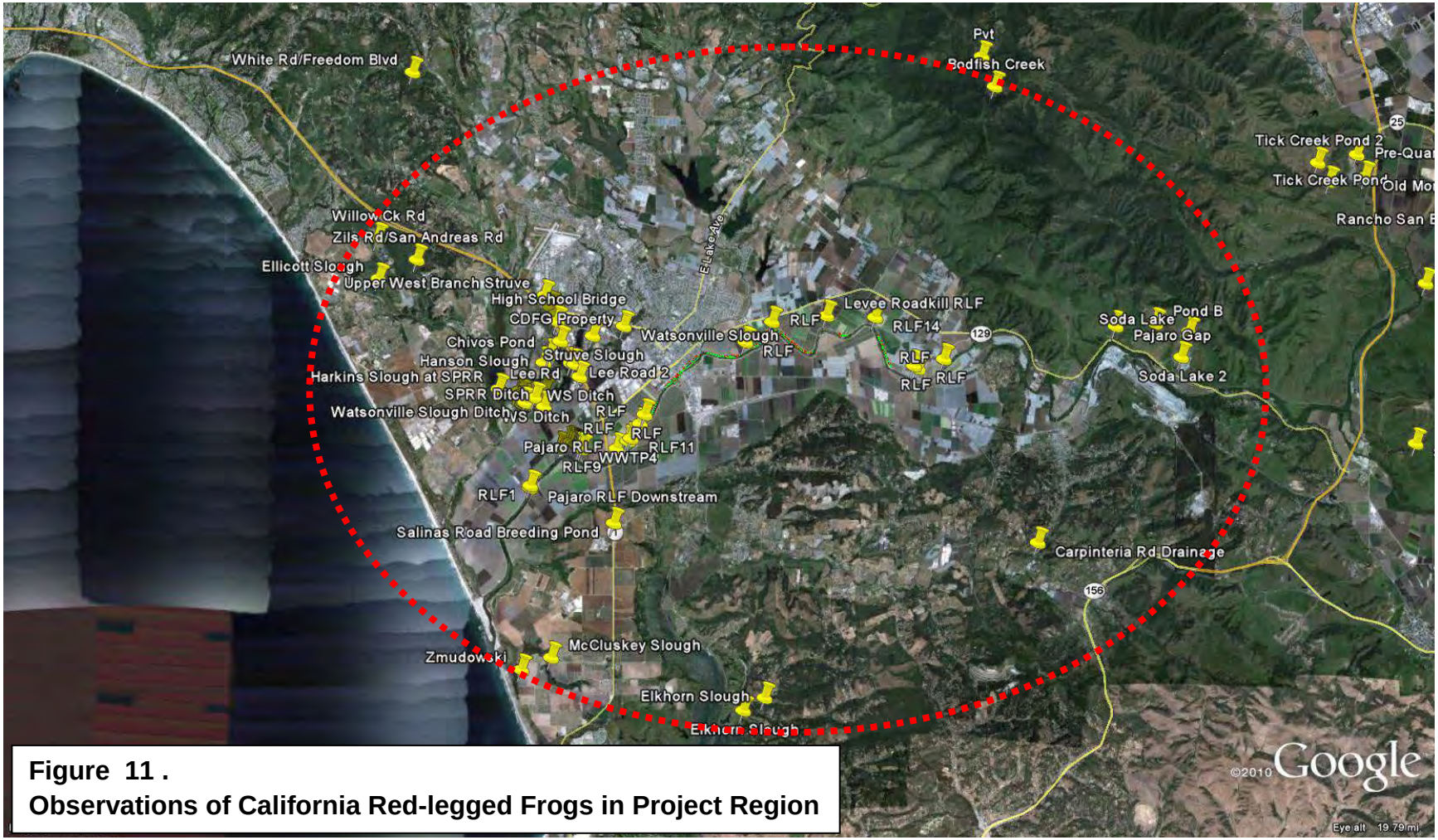


Figure 11 .
Observations of California Red-legged Frogs in Project Region

4.3.3. Western Pond Turtle

The western pond turtle (*Actinemys marmorata*) inhabits the Pajaro River throughout the project. They are commonly observed during warm, sunny days basking on submerged wood and mud banks from Thurwatcher Bridge upstream to Murphy's Crossing. KEC and colleagues at Biosearch Associates have conducted annual western pond turtle surveys in the project area since 2009. To date, KEC has documented and marked 95 western pond turtles at 18 trap locations in the Pajaro downstream of Murphy's Crossing. All age classes, from hatchling to adult, have been documented. Figure 12.

Western pond turtle occurs in the Pacific Coast region, of North America from Washington State to Baja California, west of the Cascade Mountains and Sierra Nevada Range (Bury 1970; Nussbaum et al. 1983; Iverson 1986; Stebbins 2003). The major portion of the distribution is in California (Rathburn et al. 2002). It is the only native turtle in California.

Recent genetic studies indicate the presence of four groups or clades within the species; although historically there were two recognized subspecies. (Bury and Germano, 2008) The species appears to be declining in abundance in the northernmost and southernmost portion of its range; but not in the core of its range from central California to southern Oregon. The primary threats are loss and alteration of both aquatic and terrestrial habitats. These losses fragment remaining populations and; perhaps; magnify the effects of introduced species through predation; competition; and epidemic diseases (Bury and Germano, 2008).

Generally, adults range in size from 140-190mm CL, carapace length (Bury 1995; Lubke and Wilson 2007). Hatchlings are 20-30 mm CL (Storer 1930). Actinemys marmorata occupies a variety of permanent and intermittent aquatic habitats, including rivers, streams, lakes, ponds, marshes vernal pools, and man-made ponds associated with agriculture, stock, wastewater, and logging operations (Storer 1930; Germano and Bury 2001; Buskirk 2002). Habitats with abundant basking sites, underwater cover, and standing, or slow-moving, waters are preferred conditions for WPT. In rivers, WPT is most abundant in slower waters that are deep and have basking sites (Reese and Welsh 1998a). Basking sites include boulders, stumps, logs, floating vegetation or mud banks. WPT also basks in shallow waters and within areas of dense algal mats.

The species is omnivorous and a dietary generalist (Evenden 1948; Holland 1985a, b; Bury 1986; Goodman and Stewart 1998). Studies have shown that they primarily eat aquatic invertebrates, but also eat fish, carrion, and some vegetation. (Holland 1985 a; Bury 1986). The activity cycle of this species is largely determined by temperature (Bury 1972; Reese and Welsh 1998b; Rathbun et al. 2002). The species becomes most active when water temperatures are above 15^{o} C. Turtles may be active year-round, but with reduced activity in cooler temperatures. Courtship and mating behavior has been observed from February-November (Holland 1988).

Figure 12 .
Pajaro River Western Pond Turtle Study Area

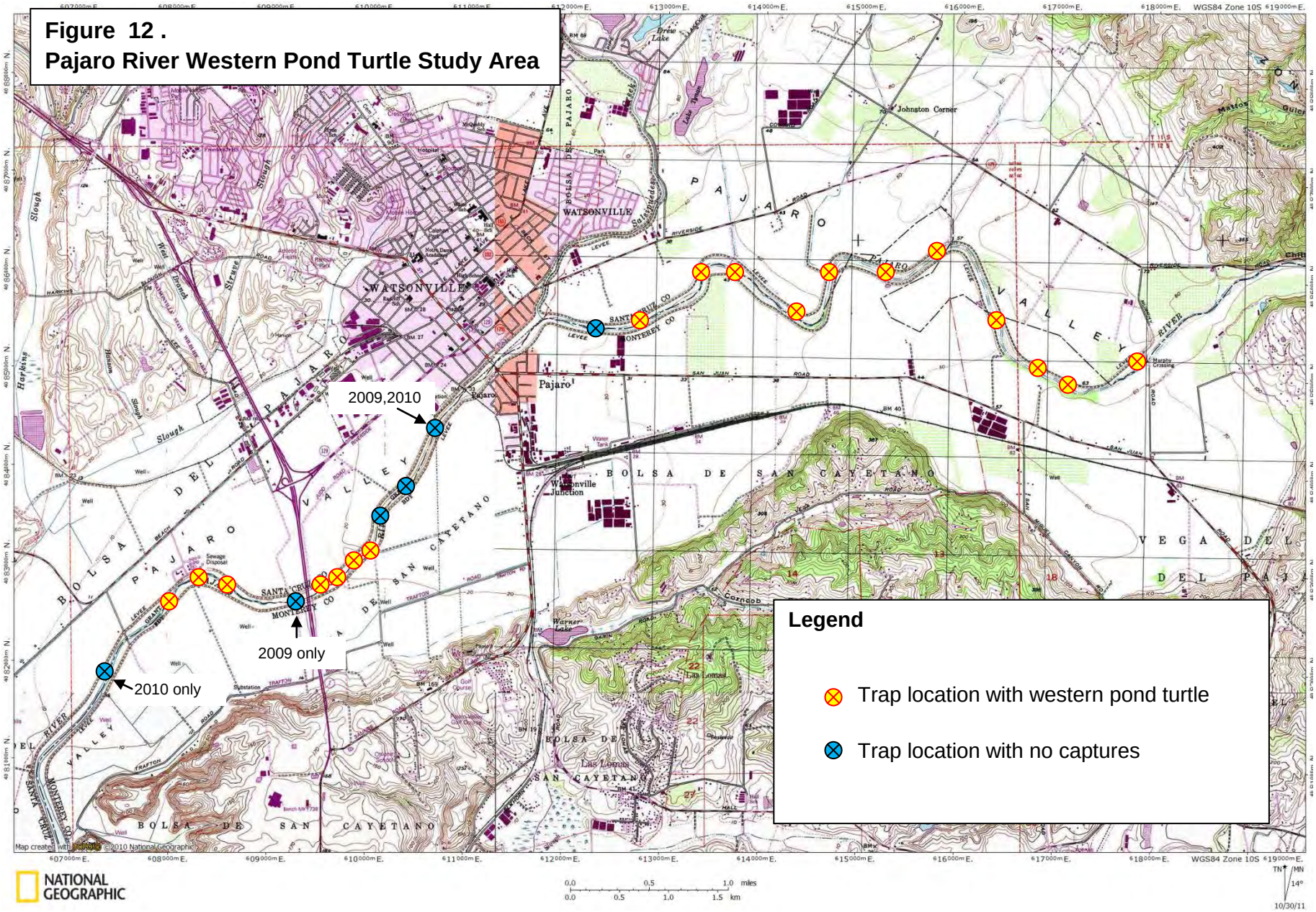
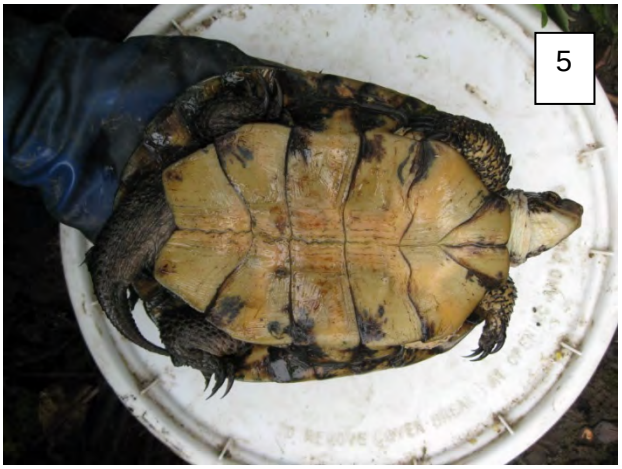


Figure 13. Western pond turtles observed in project area. (1) hatchling turtle, (2) adult turtles basking on submerged log, (3) gravid female turtle on bench surface seeking nest site, (4) measuring large adult WPT during 2011 study, (5) large adult male WPT, and (6) adult female WPT traversing mid channel bar.



Although typically known as an aquatic species, western pond turtles may spend considerable time on land every year. Based on radio tracking studies, turtles have been observed on uplands for up to 7 months of the year (Reese and Welsh 1997; Rathbun et al. 2002). Use of upland habitats appears to be primarily for basking (males and female) and nesting (females). The ground at upland refuge/basking sites has been shown to typically be covered with dense leaf litter produced by and overstory of woody vegetation like riparian willow thickets and oak woodland habitats. Solar access to upland basking areas appears to be an important determinant of location (Rathbun et al. 2002). Predation of WPT in upland habitats by raccoons and skunks is well documented in the published radio-tracking studies. Predation by raccoons on an adult WPT in shallow water algal mats in the Pajaro River was observed in 2007 (Kittleson, personal obs.)

Most mature females nest, or "oviposit" every year, and some may oviposit twice, or "double-clutch" (Holland 1994, Goodman 1997, Reese 1996). Oviposition occurs on land, usually above the floodplain, from 1-50 meters from water's edge (Holland 1994) although some females have been observed more than 400 meters from water and up to 90 meters in elevation above it (Storer 1930; Rathbun et al. 1992). Females tend to seek out open areas with sparse, low vegetation, low slope angle, and dry hard soil. After voiding her bladder to soften the soil, the female excavates a pear-shaped nest chamber (scrape) with her hind feet. Eggs are deposited and the nest chamber is plugged by kneading wet soil and vegetative fragments into the throat of the nest chamber (Holland 1994, Reese 1996).

Clutch sizes range from 2-13 eggs, with most clutches containing 4.5-7.3 eggs (Bury and Germano, 2008). Eggs are deposited from April to August. Eggs are hard shelled and oval in shape, measuring 31-38 mm long by 20-24 mm wide and weighing 8-10 g (Holland 1994). Incubation takes about three months and hatching rates are about 70% (Holland 1994).

Direct Effects

Mortality to western pond turtles may occur during upland phases of their life history. Western pond turtles are known to travel upland to nest, forage, estivate and seek flow refuge. Direct take by trampling or crushing eggs or individuals may occur throughout the construction period. The greatest risk is loss of gravid females during nesting attempts and the loss of eggs or hatchlings in the excavation areas and haul routes.

Indirect Effects

Indirect effect to western pond turtles may result from changes in habitat composition resulting from lower bench surfaces, more frequent inundation in these areas, and implementation of revegetation plans. No significant indirect effects are expected, however, due to the reliance on appropriate native plant species for revegetation and continued field studies done for adaptive management planning. Post-project effects are ultimately likely to benefit WPT's.

4.3.4. Yellow warbler

The yellow warbler is a common breeding bird in the Pajaro River flood control channel, with confirmed breeding in 2007 and 2010 bird surveys in the dense willow riparian habitat below the benches throughout the project area. Currently considered a Bird Species of Special Concern (breeding), priority 2, the yellow warbler has been included on both prior special concern lists (Remsen 1978, 2nd priority; CDFG 1992). This species breeds from April to late July and was a common nester in the willow riparian habitats adjacent to the proposed bench excavation sites. 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 (1979–1999, Ballard et al. 2003) and declines approaching significance in California (1968–2004, Sauer et al. 2005). Both local abundance and long-term trends, however, vary greatly by region.

Yellow Warblers generally occupy riparian vegetation in close proximity to water along streams and in wet meadows (Lowther et al. 1999). Throughout, they are found in willows (*Salix* spp.) and cottonwoods (*Populus* spp.), Based on the location of, and limit to, riparian habitat impacts, yellow warbler is not expected to be adversely affected by the proposed project. Project avoidance of the most suitable yellow warbler nesting habitat and breeding season work limitations minimize potential impacts to a level of less than significant.

4.3.5. Tidewater Goby

The tidewater goby is currently a federally listed endangered species and occurs in the Pajaro River and lower Watsonville Slough. Tidewater gobies were present in the Pajaro River Lagoon in 1991 and 1992 (Swanson and HRG, 1993), but have not been captured in the lagoon since 1994 (Smith, 2002). During years of mild winters and early sandbar formation at the mouth of the Pajaro (such as 1987-1991), gobies are probably abundant and distributed throughout the lagoon, including upstream to Highway 1 (Swanson and HRG, 1993). In years of heavy storms and late sandbar closure, gobies may be rare and restricted to calmer portions of the lagoon and Watsonville Slough.

Limited instream activity is proposed within the upper reaches of the potential habitat of tidewater goby. All but 3 instream log structures are planned for upstream reaches, above tidally influence lagoon habitat. Log structures placed in Excavation area 2R, therefore, may interface with potential tidewater goby habitat, although their presence is not expected. No significant effects to gobies are anticipated.

Direct Effects

Direct take, or mortality, of tidewater goby may occur during placement of LWM habitat enhancement structures in Excavation Area 2R. Log structure site will be cleared by qualified biologists with seines or dipnets and isolated by blocknet during log placement. Goby relocations, if dewatering is necessary, shall be conducted by seine or dipnet by a qualified biologist.

Indirect Effects

No significant indirect effects to tidewater goby are expected.

4.3.6. Western Snowy Plover

The Western snowy plover (Charadrius alexandrinus) is listed as threatened under the federal ESA as a result of the loss of nesting habitat to urban development, nest predation, and human disturbance. In 1999, USFWS designated critical habitat for the Pacific coast population of the Western snowy plover (USFWS, 1999). Critical habitat is designated for 28 areas, totaling approximately 8,097 hectares (20,000 acres) and about 338.1 kilometers (210 miles) of coastline, or about 10 percent of the coastline California, 7 in Oregon, and 2 in Washington. The USFWS designated the beaches (Sunset State Beach and Zmudowski State Beach) on either side of the mouth of the Pajaro River as critical habitat (64 Federal Register 68507).

The Pacific coast population of the snowy plover breeds primarily on coastal beaches from southern Washington to southern Baja California. Sand spits, dune-backed beaches, unvegetated beach strands, open areas around estuaries, and beaches at river mouths are preferred nesting habitats. The breeding season is from March through late September. The incubation period is typically 24 days and the chicks fledge within 30 days. After loss of clutch or brood or successful hatching, plovers may re-nest in the same area or move up to several hundred miles to another site. The snowy plovers are opportunistic feeders and prey on a variety of common food items such as aquatic insects, crustaceans and invertebrates. The Pajaro River Lagoon, surrounding beaches and flooded agricultural fields provide favorable foraging and nesting habitat for the Western snowy plover. This species has not been recorded in the project area.

4.3.7. Least Bell's Vireo

Least Bell's vireo (Vireo bellii pusillus) is listed as endangered under both the state and federal ESAs. The population and geographic range of the species has decreased due to loss of riparian habitat, habitat fragmentation and nest parasitism by brown-headed cowbirds (Molothrusater).

Least Bell's vireo preferred habitat is a well-developed riparian canopy with a dense shrub understory. Least Bell's vireos arrive at their breeding habitat in mid to late March and typically leave by the end of September. Breeding occurs April through August. Foraging typically occurs in habitats that are close to nesting sites in riparian habitat and adjacent chaparral, scrub and oak woodlands. The Pajaro River is not within the breeding range of least Bell's vireos. The species was not observed in KEC's 2007 or 2010 bird surveys. Due to a paucity of mature riparian habitat, potential for Least Bell's vireo in the project area is limited.

4.3.8. Pallid Bat

Pallid bat is a habitat generalist that could make use of mature trees in the project for roosting. No records of pallid bat exist for the project area, but suitable trees exist throughout the riparian corridor and on the bench surfaces. Preconstruction surveys for pallid bat are planned to coincide with preconstruction bird nest surveys.

Direct Effects

Mortality to pallid bats may occur during vegetation removal efforts. Direct take of individuals may occur when trees are cut.

Indirect Effects

Indirect effect to pallid bats may result from changes in habitat composition resulting from implementation of revegetation plans. No significant adverse indirect effects are expected.

4.3.9. San Francisco dusky-footed Woodrat

San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*) is a common rodent species in area riparian woodlands, oak woodland and oak scrub habitats in the Monterey Bay region, where it build large, long lasting house structures from sticks and woody material. It is currently listed as a CA species of Special Concern and is present in low numbers throughout the project area riparian corridor. Arboreal woodrat nests have been observed in the bench excavation areas within the willow-covered banks on the Santa Cruz County side. Arboreal nests are present in Excavation area 8R and 6R.

Direct Effects

Mortality to dusky-footed woodrat may occur during vegetation removal efforts. Direct take by trampling individuals or crushing nest structures may occur when trees are cut. Relocation of woodrat house structures will be done by hand, under the direction of a qualified biologist.

Indirect Effects

Indirect effects to dusky-footed woodrats may result from changes in habitat composition resulting from implementation of revegetation plans. No significant adverse indirect effects are expected. Additional native plant species used for revegetation should increase potential habitat for this species.

Chapter 5. Findings

5.1.Environmental Setting

The project site is located within the Central Coast Bioregion, as defined by California's Environmental Resources Evaluation System (CERES). This bioregion is at the confluence of the San Francisco Bay, Central Coast, and South Coast Range floristic provinces. The flora of Santa Cruz and Monterey Counties are some of the most diverse in California as the Monterey Bay region represents the population range limits of many rare species endemic to northern and southern portions of the state. Sand dunes and inland habitats with sandy soils host a diverse range of rare plants that are restricted to these sandy soils. Several large complexes of sloughs southwest and south of the City of Watsonville, including the Watsonville, Elkhorn, and Moro Coho Sloughs, are some of the largest remaining wetland complexes on California's coastal plain; the Elkhorn slough alone is the second-largest remaining salt marsh in California. Sloughs in the area contain freshwater, brackish water, and saline emergent wetlands, and support a broad assemblage of wildlife and plant species and relatively undisturbed habitat.

Existing riparian habitat conditions in the Bench Excavation project area were degraded by extensive vegetation clearing activities that took place in the wake of the 1995 flood event. Based on habitat mapping done for the 1992 Final Pajaro River Corridor Management Plan and follow-up bird surveys in 1996, it has been estimated that approximately 243 acres of riparian habitat was cleared or directly impacted by the post flood management. (Suddjian in Swanson & Assoc. 1992 and Suddjian 2002) Figures 14 and 15 illustrate the loss of overall riparian habitat size and integrity that resulted from the 1995 actions in the area of Excavation Area 6R and 4L. Figure 16 includes land photos of that area to show the recent and current habitat condition that have developed under the current mowing and vegetation thinning practices.

Wildlife Biologist David Suddjian characterizes the status and value of the project area's riparian corridor in the following terms: *The cleared, or "cutover" habitat was greatly simplified in structure and extent, reducing cover and foraging and nesting opportunities. But the cutover areas still retained some riparian habitat values by virtue of their position along the stream channel and the presence of at least some remnant deciduous riparian vegetation.* (Suddjian, 2002) In discussions with Mr. Suddjian about the proposed bench excavation impacts to remaining large trees, he stated that as individual trees separated by great distances, the mature cottonwoods and willows have less overall value to riparian bird species than the dense multi-level riparian habitats still found downstream of Highway 1. (D. Suddjian, pers. comm. 2010). Project area bird surveys conducted in spring 2007 and 2010 confirmed this opinion.

The benefit to bird species provided by the remaining isolated mature trees then is weighted towards raptors and cavity nesting species like tree swallows and downy woodpeckers, rather than neotropical migrants, including species of conservation concern such as Warbling Vireo, Western Wood-Pewee, Pacific-slope Flycatcher, Swainson's Thrush and Yellow Warbler. High rates of nest parasitism by brown-headed cowbird and increased nest predation noted in Suddjian's 1996 surveys and the 2007 and 2010 surveys are likely the result of habitat fragmentation and increased exposure of nests to

predators as the dense multi-leveled riparian canopy was eliminated.

By locating the proposed Bench Excavation areas in previously disturbed, ruderal habitats, the County will avoid significant impacts to the current riparian bird population. Construction-period impacts will be focused on ruderal grasslands and mitigation will be accomplished through riparian revegetation and re-use of mature riparian trees as streambank habitat enhancement features.

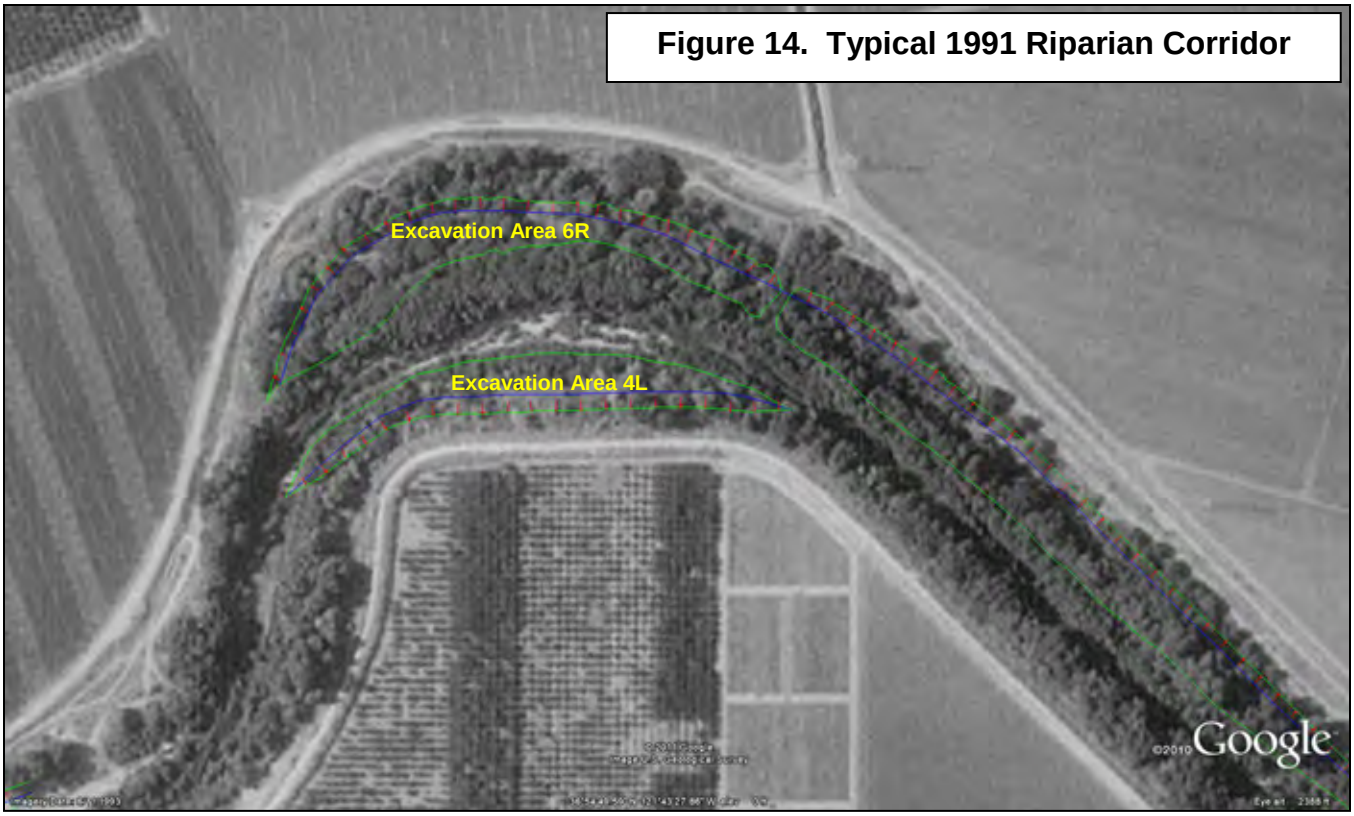


Figure 14. Typical 1991 Riparian Corridor

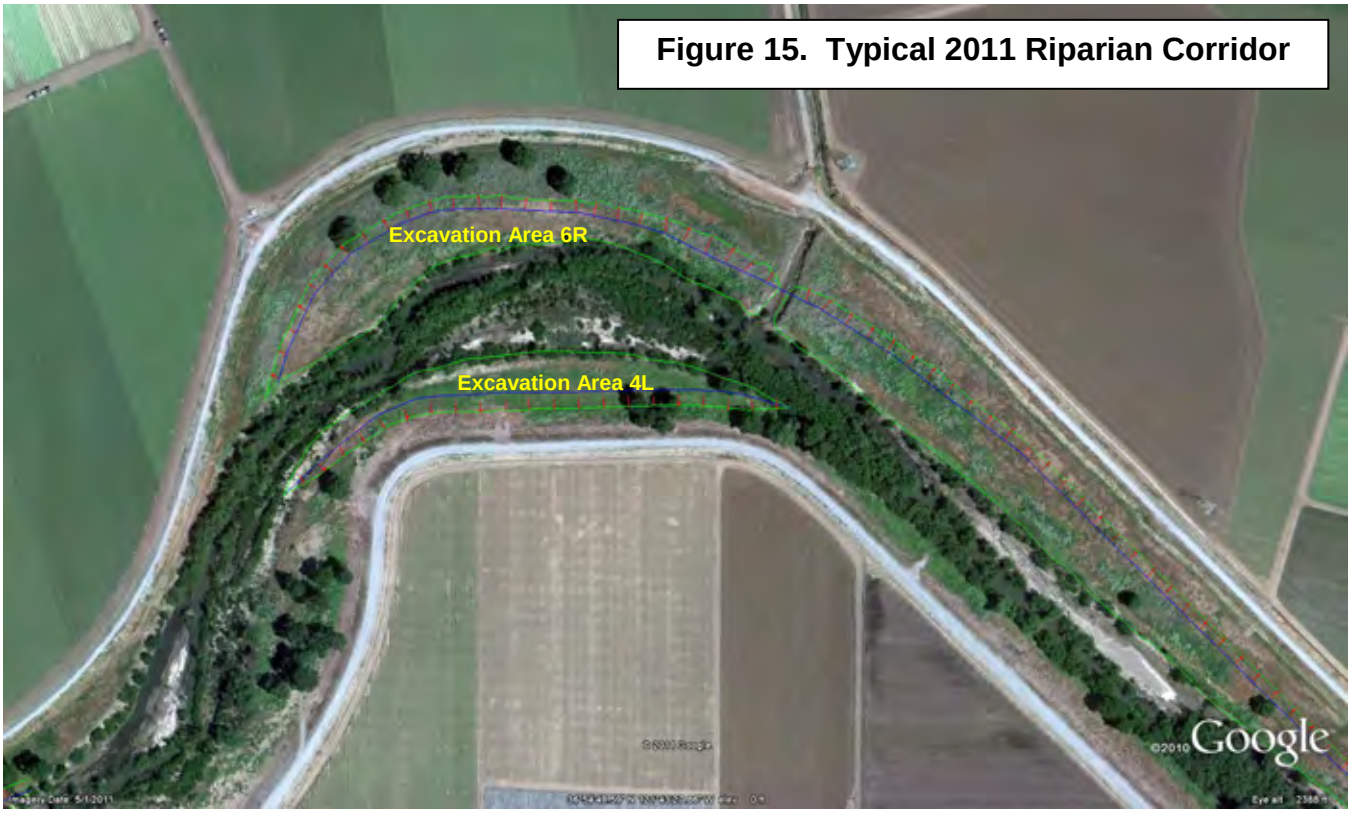


Figure 15. Typical 2011 Riparian Corridor

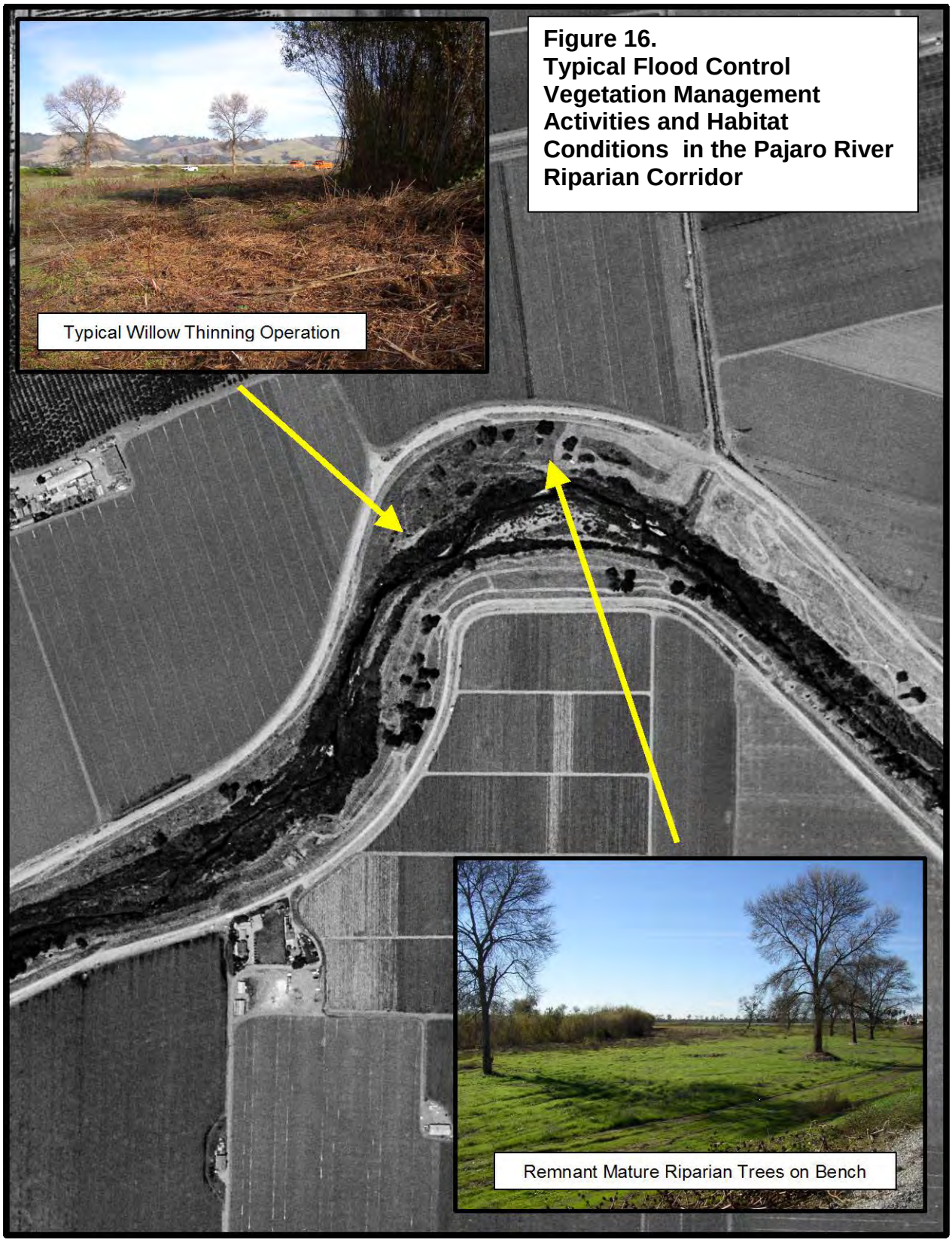


Figure 16.
Typical Flood Control Vegetation Management Activities and Habitat Conditions in the Pajaro River Riparian Corridor

5.2. Habitat Types

The vegetation/habitat classification presented herein is based on field observations and on *Preliminary Descriptions of the Terrestrial Natural Communities of California* (Holland, 1986). This biotic assessment also relies on *A Guide to Wildlife Habitats of California* (Mayer and Laudenslayer, 1988), which details wildlife potentially present in habitats at the project site. Some of the vegetation communities in the project site are considered sensitive natural communities tracked by the California Department of Fish and Game (CDFG), including freshwater emergent wetland and riparian woodland. These and other vegetation community types present in the region and at the project site are described below.

The project site supports four principal vegetation and wildlife habitat types: Ruderal, Willow Riparian Woodland, Freshwater Emergent Wetland, and Aquatic Habitat/Open Water. As proposed, approximately 39 acres of principally ruderal upland habitat will be excavated and replanted with sterile wheat hydroseed on flat surfaces and native trees, shrubs and herbaceous plant species planted on 3:1 embankments and along the approximately 20,500 linear feet of presently mowed and disturbed willow riparian streambank. Truck routes to transport excavated materials will utilize the existing unsurfaced, ruderal-species dominated roadway along the levee toe and the levee crest road, which is both partially paved and gravel surfaced.

Wetland and open water habitats are present throughout the project corridor, between and downslope of the proposed bench excavation areas, but impacts to these habitats are limited to the disturbance caused by the placement of 19 salvaged log and boulder habitat enhancement structure.

5.2.1 Riparian and Bench Habitat Characteristics within the Project Area

Pajaro River Mainstem from Murphy's Crossing to Salsipuedes Creek Confluence

The portion of the Pajaro River mainstem from Murphy's Crossing to the confluence with Salsipuedes Creek has a variety of plant communities or habitat types due to the varying channel morphology present. In areas of deposition such as sandbars or gravel bars, mulefat (*Baccharis viminea*) scrub and sandbar willow (*Salix exiqua*) thickets are common in the channel bottom. In more stable areas, willow dominated riparian or mixed riparian habitats occur. The dominant tree species in the mixed riparian forest are arroyo willow (*Salix lasiolepis*), yellow willow/shining willow (*Salix lucida* ssp. *lasiandra*), and black cottonwood (*Populus trichocarpa*). A few California sycamore (*Platanus racemosa*) and scattered box elder (*Acer negundo*) trees were also observed. Note that no sycamore trees were observed downstream of the confluence with Salsipuedes Creek. California blackberry (*Rubus ursinus*) is the prevalent shrub on the riverbanks. Additional common shrub species include mulefat, big saltbush (*Atriplex lentiformis*), California sage (*Artemesia californica*), coyote brush (*Baccharis pilularis*), tree tobacco (*Nicotiana glauca*), mugwort (*Artemesia douglasiana*), blue elderberry (*Sambucus mexicana*), and marsh baccharis (*Baccharis douglasii*).

On the upper terrace or floodplain, non-native annual grassland and scattered patches of ruderal scrub

occur. The ruderal scrub is composed of weedy and early successional species such as coyote brush, white sweet clover (*Melilotus alba*), pepper grass (*Lepidium* sp.), cocklebur (*Xanthium* spp.), rabbit's foot grass (Polypogon monspeliensis), curley dock (*Rumex crispus*), and horseweed (*Conyza canadensis).* Poison hemlock (*Conium maculatum*) was the most prevalent invasive non-native plant species in these upper reaches. Kikuyu grass (*Pennisetum clandestinum*), an invasive species from South Africa is also common in the reach adjacent to Murphy's Crossing. Scattered patches of arundo/giant reed (*Arundo donax*) also grow in the majority of the reaches upstream of the confluence with Salsipuedes Creek.

Salsipuedes Creek Below Highway 129

The riparian vegetation along Salsipuedes Creek just upstream of the confluence with the Pajaro River is different in species composition compared to the riparian corridor along the Pajaro River mainstem. More mature, large trees and invasive, non-native plant species are present. The tree over story is representative of a mixed type of riparian forest and is dominated by mature arroyo willow, box elder, black cottonwood, black locust (*Robinia pseudoacacia*), and pecan trees. To lesser extent, coast live oak (*Quercus agrifolia*) and green wattle acacia (*Acacia decurrens)* also occur. The vegetative cover for trees in these reaches ranges from 50 to 60%. Creek dogwood was only observed along Salsipuedes Creek, and not along the Pajaro River mainstem. California blackberry was less common in the shrub layer along the creek compared to the reaches along the river.

The groundcover vegetation along Salsipuedes Creek is dominated by invasive, non-native vines, Cape/German ivy (*Senecio mikanioides*), English ivy (*Hedera helix*), and periwinkle (*Vinca major*). English ivy was observed climbing up several of the box elder and black cottonwood trees. Additional invasive, non-native species observed include poison hemlock, arundo/giant reed, Kikuyu grass, mustard (Brassica spp.), wild radish (*Raphanus sativus*), and bristly ox-tongue (*Picris echioides*).

Mainstem Through Watsonville Urban Area

The riparian corridor of the urban reaches around Watsonville/Pajaro is primarily composed of arroyo willow – yellow willow riparian forest. Arroyo willow and yellow willow are the dominant tree species present with scattered occurrences of black cottonwood and red willow. Sandbar willows were not prevalent in the riparian corridor downstream of the confluence with Salsipuedes Creek.

The common species in the shrub layer are similar to those present upstream of the confluence with Salsipuedes Creek, and include California blackberry, coyote brush, tree tobacco (considered a small tree or shrub), California sage and mugwort. As in most of the other reaches, California blackberry is the dominant plant species in the shrub layer on the riverbanks. Scattered clumps of arroyo willow trees, coyote brush, occasional mature black cottonwood and yellow willow trees occur in the floodplain. The majority of the terrace surface is composed of non-native annual grassland.

Invasive, non-native species observed include poison hemlock, sweet white clover, yellow dock, purple star thistle (*Centaurea calcitrapa*), cocklebur, arundo/giant reed, Kikuyu grass, black mustard (*Hirschfeldia incana*), wild radish, pepper-grass, and bristly ox-tongue. Clumps of arundo may be found scattered in the riparian corridor, comprising approximately 5% of the vegetative cover in some areas.

Mainstem Downstream of Watsonville

The riparian corridor downstream of the urban reach is primarily composed of arroyo willow – black

cottonwood riparian forest habitat. Arroyo willow, black cottonwood and yellow willow are the dominant tree species present; while further downstream, fewer black cottonwood trees are present. As observed in the urban reaches, the common plant species in the shrub layer are California blackberry, coyote brush, tree tobacco, California sage, mugwort, and blue elderberry.

Invasive, non-native species observed include poison hemlock, sweet white clover, yellow dock, purple star thistle, slender-flowered thistle, horseweed, cocklebur, arundo/giant reed, Kikuyu grass, black mustard, wild radish, pepper-grass, and bristly ox-tongue. Less arundo/giant reed, but more Cape/German ivy were observed in the reaches downstream of the City of Watsonville.

5.3 Pajaro River Bench Excavation Project Area Habitat Use by the Bird Community

The bird community of the Lower Pajaro River was investigated by KEC, David Suddjian, Bryan Mori, and Steve Gerow, in May and June of 2007 and 2010 to document the current status of bird populations using the project area during the breeding season. Both general surveys and fixed study plots were conducted to characterize the current avian use by general habitat type and to provide baseline data at specific locations for post-project mitigation monitoring and long-term studies.

Each year a General Survey was conducted along the whole length of the project area to document the diversity and abundance of the area's breeding season species assemblage, and to provide general information on habitat use and, in particular, use of the residual riparian trees. A second method – time-constrained total area searches in fixed study plots – was employed to compare and contrast the bird community in "treatment areas" (i.e., areas within bench excavation polygons) versus "control areas" (i.e., areas not directly affected by bench excavation). The sampling of the fixed study plots will permit a post-project examination to monitor changes in bird populations.

All individuals recorded on the 2007 General Surveys were retained in the sample for summary analysis. The 2010 general survey and plot surveys data are consistent, in terms of species diversity, and will be used for post-project comparisons in 2013. A total of 70 species were recorded during formal surveys over the course of 2007 and 2010 (Table 3). The most common species in the general surveys, those with observed occurrence greater than 100 individuals, were song sparrow, house finch, American goldfinch, brown-headed cowbird, American robin, bushtit, European starling, and yellow warbler.

The data from the Fixed Plot Surveys was treated in varying ways for the 2007 dataset. For all analyses, a subset of **core species** was selected which *excluded*: (1) species observed only in flight (except for swallows and raptors, which were retained); (2) species which are primarily associated with aquatic habitats, as these were incompletely sampled due to vegetation that obscured views of the river channel; (3) and migrants which do not nest in the project area. The counts of individuals for each plot used in analyses were the high counts for each species from the three samples, excluding birds flying over (except for swallows and raptors, which were retained).

Table 3. Bird Species Observed in 2007 and 2010 Pajaro Bird Surveys

Allen's Hummingbird	*Selasphorus sasin*
American Coot	*Fulica americana*
American Crow	*Corvus brachyrhynchos*
American Goldfinch	*Spinus tristis*
American Kestrel	*Falco sparverius*
American Robin	*Turdus migratorius*
Anna's Hummingbird	*Calypte anna*
Ash-throated Flycatcher	*Myiarchus cinerascens*
Band-tailed Pigeon	*Columba fasciata*
Barn Swallow	*Hirundo rustica*
Belted Kingfisher	*Ceryle alcyon*
Bewick's Wren	*Thryomanes bewickii*
Black Phoebe	*Sayornis nigricans*
Black Swift	*Chaetura vauxi*
Black-headed Grosbeak	*Pheucticus melanocephalus*
Brewer's Blackbird	*Euphagus cyanocephalus*
Brown-headed Cowbird	*Molothrus ater*
Bullock's Oriole	*Icterus bullockii*
Bushtit	*Psaltriparus minimus*
California Quail	*Callipepla californica*
California Thrasher	*Toxostoma redivivum*
California Towhee	*Pipilo crissalis*
Canada Goose	*Branta canadensis*
Cedar Waxwing	*Bombycilla cedrorum*
Chestnut-backed Chickadee	*Poecile rufescens*
Cliff Swallow	*Petrochelidon pyrrhonota*
Common Raven	*Corvus corax*
Common Yellowthroat	*Geothlypis trichas*
Dark-eyed Junco (Oregon)	*Junco hyemalis*
Double-crested Cormorant	*Phalacrocorax auritus*
Downy Woodpecker	*Picoides pubescens*
Eurasian Collared-Dove	*Streptopelia decaocto*
European Starling	*Sturnus vulgaris*
Gadwall	*Anas strepera*
Great Egret	*Ardea alba*
Great-tailed Grackle	*Quiscalus mexicanus*
Green Heron	*Butorides virescens*
Hooded Oriole	*Icterus cucullatus*

House Finch	*Carpodacus mexicanus*
House Sparrow	*Passer domesticus*
Hutton's Vireo	*Vireo huttoni*
Killdeer	*Charadrius vociferus*
Lazuli Bunting	*Passerina amoena*
Lesser Goldfinch	*Spinus psaltria*
Mallard	*Anas platyrhynchos*
Mourning Dove	*Zenaida macroura*
Northern Mockingbird	*Mimus polyglottos*
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*
Pacific-slope Flycatcher	*Empidonax difficilis*
Purple Finch	*Carpodacus purpureus*
Red-shouldered Hawk	*Buteo lineatus*
Red-tailed Hawk	*Buteo jamaicensis*
Red-winged Blackbird	*Agelaius phoeniceus*
Rock Pigeon	*Columba livia*
Song Sparrow	*Melospiza melodia*
Spotted Sandpiper	*Actitis macularia*
Spotted Towhee	*Pipilo maculatus*
Swainson's Thrush	*Catharus ustulatus*
Tree Swallow	*Tachycineta bicolor*
Violet-green Swallow	*Tachycineta thalassina*
Warbling Vireo	*Vireo gilvus*
Western Scrub-Jay	*Aphelocoma californica*
Western Tanager	*Piranga ludoviciana*
Western Wood-Pewee	*Contopus sordidulus*
Whimbrel	*Numenius phaeopus*
White-throated Swift	*Aeronautes saxatalis*
Wilson's Warbler	*Wilsonia pusilla*
Wrentit	*Chamaea fasciata*
Yellow Warbler	*Dendroica petechia*

The critical analysis conducted in the 2007 bird surveys was species' use of specific habitat types; in particular, (1) the ruderal grasslands potentially subject to direct grading impacts, (2) residual mature riparian trees potentially subject to removal, and (3) the existing lowland willow riparian habitat which extends throughout the project area, but will not be directly impacted by the bench excavation project.

Table 4. presents the percent of individuals in each habitat type. The majority of the potentially impacted habitat is ruderal grassland on the bench surfaces. Loss of residual riparian trees is the second notable direct impact. Table 5 summarizes habitat use by all individual of core species in 0.5 hectare plots, with results showing both percent of all individuals and percent of all excluding aerial observations.

Raptor and owl use in the project area is high, especially in fall and spring migration periods. Raptor and owl species observed in flight, roosting, or foraging in the project area are shown in Table 6. For the past 4 years, several red-tailed hawk nests have been closely observed in and around the impact zones in the existing large, mature riparian trees. While no raptor nests were active during the 2007 bird surveys, each subsequent year has seen successful nesting by red-tailed hawks in the area. 2011 was unusually productive, in terms of red-tailed hawks, with 7 active nests observed in the lower Pajaro valley, Figure 17 shows and example of an active red-tailed hawk nest in the project area and a migrant burrowing owl observed in the project vicinity in 2007. Figure 18 illustrates the location of red-tailed hawk nests documented by KEC in late spring/early summer 2011.

White-tailed kite, a CDFG fully protected species, is regularly observed in the project area foraging and roosting on streamside riparian trees. They are most common in winter and during spring and fall migrations. They are not known to nest in the project area, and were not recorded during either the 2007 or 2010 spring breeding season surveys. Although this species has been observed throughout the lower Pajaro River, during the summer "construction" period, white tailed kites have been observed most frequently upstream of the confluence with Salsipuedes Creek, on the Monterey County side, outside of any proposed project impact areas.

Figure 17. Example of red-tailed hawk nest in mature riparian tree and migrant burrowing owl

LEFT: Red-tailed hawk nest in mature riparian tree on Monterey County side across from Excavation Area 8R.
RIGHT: Burrowing owl is an infrequent winter visitor to the Pajaro River project area. This individual was observed throughout January 2007 on the landside of the levee downstream of Murphy's Crossing.

Table 4. Percent of individuals in each habitat type during 0.5 ha plot surveys in 2007.

Note: Bold-faced species are those with a sample of at least 10 individuals.
Bold-faced percentages are those >15% for species with a sample of 10+ individuals.

	Habitat [1]						
Species	**RW**	**RR**	**RU**	**L**	**M**	**A**	**n**
Wild Turkey	0.0	0.0	100.0	0.0	0.0	0.0	1
California Quail	**22.2**	3.7	**48.1**	**25.9**	0.0	0.0	27
White-tailed Kite	0.0	0.0	0.0	0.0	0.0	100.0	3
Red-shouldered Hawk	0.0	100.0	0.0	0.0	0.0	0.0	1
Red-tailed Hawk	0.0	60.0	0.0	0.0	0.0	40.0	5
Eurasian Collared-Dove	0.0	22.2	0.0	11.1	0.0	66.7	9
Mourning Dove	**19.1**	11.5	8.4	**26.7**	0.0	**34.4**	134
Anna's Hummingbird	**35.7**	14.3	**42.9**	0.0	0.0	7.1	30
Allen's Hummingbird	10.0	**40.0**	10.0	0.0	0.0	**40.0**	10
Downy Woodpecker	**28.6**	**57.1**	4.8	0.0	0.0	9.5	21
Western Wood-Pewee	5.3	**94.7**	0.0	0.0	0.0	0.0	19
Pacific-slope Flycatcher	83.3	16.7	0.0	0.0	0.0	0.0	6
Black Phoebe	**24.1**	13.8	**55.2**	6.9	0.0	0.0	30
Warbling Vireo	**80.0**	**20.0**	0.0	0.0	0.0	0.0	20
Western Scrub-Jay	100.0	0.0	0.0	0.0	0.0	0.0	6
Tree Swallow	0.0	8.9	0.0	0.0	0.0	**91.1**	146
Violet-green Swallow	0.0	0.0	0.0	0.0	0.0	**100.0**	5
Northern Rough-winged Swallow	0.0	0.0	0.0	0.0	0.0	**100.0**	19
Cliff Swallow	0.0	0.0	0.0	0.0	0.0	**100.0**	50
Barn Swallow	0.0	0.0	0.0	0.0	0.0	**100.0**	101
Chestnut-backed Chickadee	**67.9**	**26.8**	5.4	0.0	0.0	0.0	56

RW: Riparian willow strip; RR: Residual riparian tree; RU: Ruderal; L: Levee; M: Marsh; A: Aerial

Table 4. continued.

Species	Habitat [1]						
	RW	RR	RU	L	M	A	n
Bushtit	**61.3**	6.6	**32.1**	0.0	0.0	0.0	106
Bewick's Wren	**78.7**	13.1	8.2	0.0	0.0	0.0	61
Swainson's Thrush	**97.0**	0.0	3.0	0.0	0.0	0.0	66
American Robin	**37.3**	**20.9**	16.4	17.3	0.0	8.2	112
Wrentit	100.0	0.0	0.0	0.0	0.0	0.0	1
California Thrasher	**87.5**	0.0	12.5	0.0	0.0	0.0	16
European Starling	0.0	10.5	0.0	0.0	0.0	**89.5**	19
Yellow Warbler	**91.3**	2.6	6.1	0.0	0.0	0.0	115
Common Yellowthroat	**78.3**	0.0	**15.2**	2.2	4.3	0.0	48
Wilson's Warbler	**90.9**	0.0	9.1	0.0	0.0	0.0	11
Spotted Towhee	**89.7**	0.0	10.3	0.0	0.0	0.0	29
California Towhee	**32.5**	**16.3**	**40.0**	11.3	0.0	0.0	80
Song Sparrow	**31.1**	2.3	**66.1**	0.4	0.0	0.0	475
Black-headed Grosbeak	**67.6**	**17.6**	**14.9**	0.0	0.0	0.0	74
Red-winged Blackbird	14.1	11.5	**32.1**	0.0	0.0	**42.3**	78
Brewer's Blackbird	10.6	2.1	8.5	**18.1**	0.0	**60.6**	94
Brown-headed Cowbird	**47.7**	10.9	6.9	0.0	0.0	**34.5**	178
Bullock's Oriole	100.0	0.0	0.0	0.0	0.0	0.0	2
Purple Finch	0.0	100.0	0.0	0.0	0.0	0.0	1
House Finch	**19.0**	**25.3**	**41.2**	2.0	0.0	12.4	588
Lesser Goldfinch	**17.0**	9.1	**58.0**	0.0	0.0	**15.9**	88
Lawrence's Goldfinch	0.0	0.0	100.0	0.0	0.0	0.0	2
American Goldfinch	**32.8**	10.0	**28.9**	0.5	0.0	**27.9**	201

RW: Riparian willow strip; RR: Residual riparian tree; RU: Ruderal; L: Levee; M: Marsh; A: Aerial

Table 5. Habitat use by all individuals of core species in 0.5 ha plots.

Habitat	% of All Individuals	% of All excluding Aerial
Riparian Willow Strip	33.7%	43.2%
Residual Riparian Tree	12.3%	15.8%
Ruderal	28.5%	36.6%
Levee	3.4%	4.4%
Marsh	0.1%	0.1%
Aerial	22.1%	- -
Sample size	3143	

Table 6. Raptors and Owl Observed by KEC in Project Area from 2002-2011

American kestrel	*Falco sparverius*
barn owl	*Tyto alba*
burrowing owl	*Athene cunicularia*
Cooper's hawk	*Accipiter cooperii*
golden eagle	*Aquila chrysaetos*
great horned owl	*Bubo virginianus*
merlin	*Falco columbarius*
northern harrier	*Circus cyaneus*
osprey	*Pandion haliaetus*
peregrine falcon	*Falco peregrinus*
red-shouldered hawk	*Buteo lineatus*
red-tailed hawk	*Buteo jamaicensis*
sharp-shinned hawk	*Accipiter striatus*
Swainson's hawk	*Buteo swainsoni*
turkey vulture	*Cathartes aura*
white-tailed kite	*Elanus leucurus*

Based on detailed review of the spring 2007 plot sampling, more than 33.7% of all birds utilized the willow riparian habitat, which will be largely unaffected by the proposed bench project. 28.5% of all individuals were observed in the actual project impact areas characterized by ruderal grassland,. 12.3% used the mature residual riparian trees, while 22.1% were observed in the air. 3.4% of birds observed were on the sparsely vegetated levee, and 0.1% were observed in marsh habitat, which was under-sampled due to limited visibility and extent within the study plots.

By species, the willow riparian habitat supports the greatest diversity of species (31), most of which were also observed feeding in the ruderal grasslands. Yellow warblers were relatively common throughout the willow riparian habitat, as were Swainson's thrush, Wilson's warbler, spotted towhee, California thrasher and warbling vireo, all typical riparian associate species in the Central California Coast.

The mature riparian trees did host a wide range of species in low numbers (27 species), most notable being downy woodpecker, western wood-pewee, and Allen's hummingbird. Some use by cavity-nesting tree swallows was observed, although the 91.1% of observations of that species were made aloft.

Ruderal grasslands were used by 27 species, 25 of which were also observed in the adjacent willow riparian habitat. Notable populations of song sparrow, house finch, lesser goldfinch, California quail and red-wing blackbird were observed in the ruderal habitat type most likely to be impacted by the bench excavation project. Only 2 species, wild turkey and Lawrence's goldfinch were observed exclusively on the bench surfaces in the 2007 data, but those were only 3 individual birds.

One of the more common birds throughout the study area was the brown-headed cowbird, which has been observed to be a significant nest parasite in the Lower Pajaro in previous studies. During Pajaro bird surveys in 1996, 79% of all species' breeding records were subjected to cowbird parasitism (Suddjian, 2002). No specific data was collected on parasitism rates in 2007 or 2010, but the frequency of observations implies a significant cowbird population.

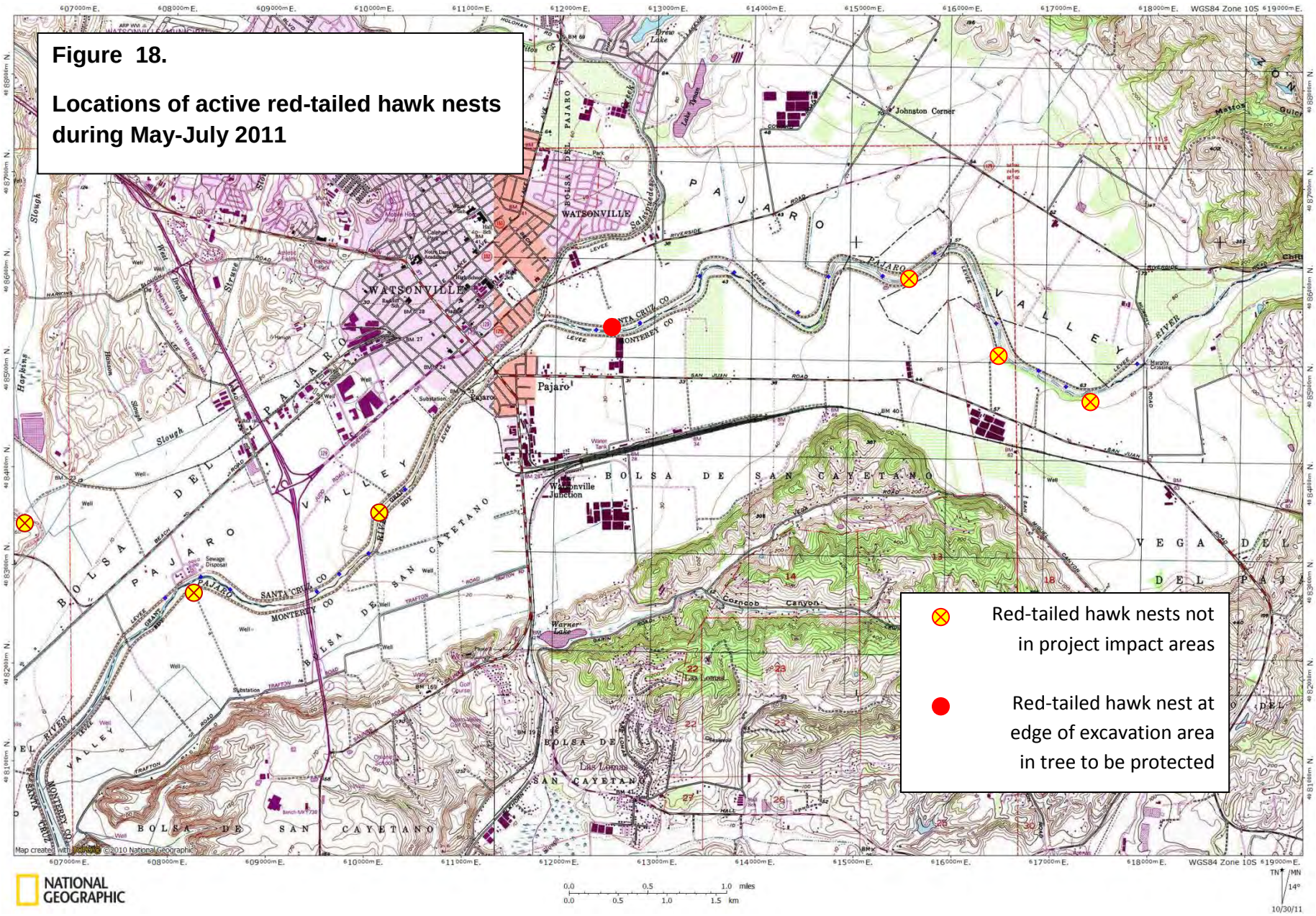


Figure 18.
Locations of active red-tailed hawk nests during May-July 2011
Red-tailed hawk nests not in project impact areas
Red-tailed hawk nest at edge of excavation area in tree to be protected
WATSONVILLE
Pajaro
Watsonville Junction
Johnston Corner
Corncob Canyon
Las Lomas
Warner Lake
BOLSA DE SAN CAYETANO
VEGA DEL PAJARO
PAJARO VALLEY
SANTA CRUZ CO
MONTEREY CO
WGS84 Zone 10S
NATIONAL GEOGRAPHIC
10/30/11

5.4 Other Wildlife Use in the project area

5.4.1 Pajaro River Fish

The character of the project-area mainstem Pajaro riverbed is generally braided with midstream point bars. Tidal influences extend upriver for approximately 0.5 miles upstream of Highway 1. From Murphy's Crossing to the river mouth, the channel is contained within levees along both banks. Flows vary considerably in the Pajaro River. Peak flows can range from 25,100 cfs, in winter to as little as 5-8 cfs in the summer. Coupled with low water levels in the summer and inconsistent riparian shading, the Pajaro River is generally considered poor steelhead habitat. However, nine other species of fish are found in the Pajaro River in the project area.

Fish species present in the Pajaro River downstream of Murphy's Crossing include: steelhead (*Oncorhynchus mykiss*), Sacramento sucker (*Catostomus occidentalis*), Sacramento pikeminnow (or squawfish) (*Ptychocheilus grandis*), hitch (*Lavinia exilicauda*), Sacramento blackfish (*Orthodon microlepidotus*), prickly sculpin (*Cottus asper*), threespine stickleback (*Gasterosteus aculeatus*), carp (*Cyprinus carpio*) and Pacific lamprey (*Lampetra tridentata*) (Smith, 2002; Smith, 1982). Introduced mosquitofish (*Gambusia affinis*) are also present.

Pacific lamprey is an anadromous fish, which migrates into freshwater to spawn and rear, and with juveniles that migrate to the ocean to mature. In the Pajaro River system, lamprey spawning and rearing occurs in upper tributaries and in portions of the Pajaro River and Salsipuedes Creek where cobble and gravel provide suitable nesting sites. Coho salmon (*O. kisutch*) have not been present anywhere in the Pajaro River system since at least the late 1960's, and occasional sightings in the 1960's may have been due to hatchery strays from the San Lorenzo River. Scarcity of suitable cool, low-gradient rearing habitat, and lack of regular access preclude sustaining runs of coho in the watershed.

Most of the fish inhabiting the Pajaro River lagoon are saltwater fishes with broad salinity tolerances (*Swanson and HRG, 1993*), including Pacific herring (*Clupea harengus*), topsmelt (*Atherinops affinis*), staghorn sculpin (*Leptocottus armatus*), starry flounder (*Platichthyes stellatus*), shiner perch (*Cymatogaster aggregata*), and striped bass (*Morone saxitilis*). Tidewater goby (*Eucyclogobius newberryi*) is a resident in the lagoon.

5.4.2 Mammals

The mammal population in the project area has not been extensively studied. The Pajaro River riparian zone and benches serve as a wildlife corridor for all types of wildlife, especially mammals. During the course of regular field studies, KEC has documented black-tailed deer (*Odocoileus hemionus columbianus),* bobcat (*Lynx rufus),* Botta pocket gopher (*Thomomys bottae),* broad footed mole (*Scapanus latimanus),* California ground squirrel (*Spermophilus beecheyi,),* California vole (*Microtus californicus),* coyote (*Canis latrans),* domestic cat (*Felis catus),* domestic dog (*Canis familiaris),* dusky-footed woodrat *(Neotoma fuscipes*), grey fox (*Urocyon cinereoargenteus),* long tailed weasel (*Mustela frenata),* opossum (*Didelphis virginiana),* raccoon (*Procyon lotor), and* striped skunk (*Mephitis mephitis).*

5.4.3. Reptiles and Amphibians

Within the project area the assemblage of upland, riparian and wetland habitats supports a variety of non-threatened reptiles and amphibians. In the project area, KEC has observed bullfrog (*Rana catesbeiana),* California slender salamander (*Batrachoseps sp.),* common garter snake (*Thamnophis sirtalis),* northern alligator lizard (*Elgaria coerulea,),* Pacific gopher snake (*Pituophis catenifer catenife), r*acer (*Coluber constrictor*), red-eared slider (*Trachemys scripta elegans),* Santa Cruz garter snake (*Thamnophis atratus atratus),* tree frog *Pseudacris regilla,* western fence lizard (*Sceloporus occidentalis*) , and western ring-neck snake (*Diadophis punctatus).*

Chapter 6. Avoidance, Minimization and Mitigation Measures

6.1. Introduction

The County will implement conservation measures during construction activities to avoid and minimize incidental take or adverse effects on individuals, populations, or habitat of Covered Species to the maximum extent practicable. The following conservation measures will be incorporated into the Covered Activities, as appropriate, to ensure that the effects of Covered Activities are avoided, minimized, and mitigated.

6.2 General Minimization and Best Management Practices

GM-1. 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.

GM-2. All refueling, maintenance, and staging of equipment and vehicles will occur at least 65 ft. from any riparian habitat or water body. The County will ensure contamination of habitat does not occur during such operations. Prior to the onset of work, the County 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.

GM-3. 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.

GM-4. Prior to any on-site work in areas where Covered 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.

GM-5. Prior to the commencement of work, the limits of the work area (including haul routes, levee 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 area.

GM-6. Each morning before work begins, a qualified monitor will survey the work site and habitat immediately surrounding the active work site for conditions that could impact Covered Species, and will remain on-site whenever work is occurring. No work will be allowed to begin each morning until the monitor has inspected the work site.

GM-7. To protect water quality, water pumped from construction areas for log features will be discharged into a basin created out of straw bales lined with filter fabric.

GM-8. To reduce the potential for erosion after project, project sites will be revegetated with an

appropriate assemblage of native riparian, wetland, and upland vegetation suitable for the area. Planted material will include native seed mixes, pole cuttings, and container stock.

GM-9. Scour protection elements, such as erosion control fabric and buried rock groins, will be placed on newly graded bench and bank areas.

GM-10. To control erosion during and after project implementation, the applicant will implement best management practices, including:

- Install straw wattles/silt fencing to break up and filter surface runoff.
- Install sterile wheat hydroseed on new bench surfaces.
- Installation of energy dissipaters on pump/dewatering equipment outlets.
- Revegetation with site-specific native materials on streambanks and new 3:1 slopes.
- Conduct activities during the low flow season (April 1 and November 1) to the extent practicable).
- Avoidance of disturbance of retained riparian/wetland vegetation where practicable.
- Limit removal of riparian vegetation abutting excavation areas and log enhancement structures to pruning/trimming where practicable.
- Minimize excavation in the active stream channel for placement of log structures
- Isolation of the channel from flowing water through temporary bypass before beginning work on log structures (i.e. coffer dam).
- Storing construction and erosion control materials and equipment outside of the stream channel.

GM-11. A Service-approved biologist or biological monitor will permanently remove from within the project area, any individuals of exotic species, such as bullfrogs, crayfish, and centrarchid fishes to the extent practicable.

GM-12. Upon locating individuals of Covered Species that are dead or injured as a direct result of activities conducted by the City, 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.

GM-13. Nesting Bird Surveys. Prior to any project construction activities, the project proponent shall 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 shall be required.

- During the breeding bird season (February 1 through August 31), a qualified biologist shall 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 shall 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 shall be adopted, if necessary, on a case-by-case basis. These may include implementation of buffer areas (minimum 50' buffer for passerines and 250' minimum buffer for raptors) or seasonal avoidance.

GM-14 Placement of 12 swallow nesting boxes and 4 owl boxes will be done to offset loss of mature riparian trees that may support these local nesting species.

6.3. Species Specific Avoidance, Minimization and Mitigation Measures

6.3.1 California Red-Legged Frog (*Rana draytonii*)

Minimization Measures

The measures for avoidance and minimization of adverse impacts to CRLF during construction of the Bench Excavation project 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.

SSM-1. The County 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 County receives approval from the Service that the biologist(s) is qualified to conduct the work.

SSM-2. A Service-approved biologist will survey the work site 48 hours prior to the onset of activities. If CRLF, 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 Service-approved biologists will participate in activities associated with the capture, handling, and moving of CRLF.

SSM-3. Before any activities begin on a project, a Service-approved biologist will conduct a training session for all construction personnel. At a minimum, the training will include a description of the CRLF and its habitat, the importance of the CRLF and its habitat, general measures that are being implemented to conserve the CRLF 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.

SSM-4. A Service-approved biologist will be present at the work site until such time as all removal of CRLF, 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 Service-approved biologist will ensure that this individual receives training outlined in measure SSM-10 above and in the identification of CRLF. The monitor and the Service-approved biologist will have the authority to stop work if CRLF are in harm's way.

SSM-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. Where impacts occur in these staging areas and access routes, restoration will occur as identified in the general BMP measures above.

SSM-6. Work activities will be completed between April 1 and November 1 to the extent practicable. Should the County demonstrate a need to conduct activities outside this period, the County may conduct such activities after obtaining the Service's approval.

SSM-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 CRLF 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.

SSM-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.

6.3.2 Western Pond Turtle (*Actinemys marmorata*)

From 2009-2011, KEC and Biosearch Associates have collected enough data from the mark-recapture study to estimate a population of ~150 WPT within the study area. Although the population appears to be skewed towards adults with a male-biased sex ratio, enough juveniles and subadults have been observed to confirm that a reproducing population inhabits the lower Pajaro River watershed. Potential nesting habitat is present in the non-native grassland and weedy, ruderal habitat near the river and within the channelized floodplain where sediment is scheduled to be removed.

Minimization Measures

The measures for avoidance and minimization of adverse impacts to western pond turtle (WPT) during construction of the Bench excavation project 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 western pond turtles before vegetation removal and during the construction and revegetation phase. Ongoing western pond turtle mark and recapture studies will be expanded to include radio-tagging tracking of adult females (and possibly a small percentage of males) for a minimum of two years to rack locations of females and, if possible, nesting locations in and around the proposed excavation areas.

SSM-9. The County 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 CDFG that the biologist(s) is qualified to conduct the work.

SSM-10. To develop a greater understanding of habitat use by WPT, The county will conduct a focused WPT tracking study in 2012 and 2013 to compliment the previous population estimate study. The purpose of the study is to track a sufficient sample of both males and females to study upland habitat use and determine if nests and over-wintering sites are present prior to and during the sediment removal project.

- There are limitations to the proposed study. Fewer than 20 females have been captured to date, and females may only produce eggs every other year. Also, eggs can typically only be detected by palpation within ~2 weeks of begin deposited. Older females greater

than 130 mm are expected to nest. Females typically enter upland late in the day and may deposit eggs and return in less than 24 hours. It is therefore not likely that a nest will be found for each gravid female.

- Efforts will be made to record locations late each day when tracking gravid females and if an individual is found in the uplands, efforts will be made to follow it to the nest with as little disturbance as possible by checking every two hours. In addition, radio signals are less effective or lost when individuals submerge deeper than ~1-foot in either water or mud, so not all over-wintering sites will be found. However, the proposed sample size is expected to provide sufficient data to study upland habitat use and improve long-term management of the species within the lower Pajaro watershed.

- Two live-trapping sessions will be scheduled: the first prior to 1 June 2012 to target gravid females before they nest, and the second prior to 1 September to capture both sexes before they over-winter. Some males will be also tagged during the first session. The actual starting date of the first session may be delayed if flows are high to minimize negatively affecting native fishes. Efforts will be made to tag up to 10 males and 10 females.

- In addition, the annual western pond turtle mark/recapture study will continue as described below. Twenty trap locations will be set, generally at or near past locations depending on where deeper pools form in 2012. Some new locations may be trapped if needed to ensure that the reach of river adjacent to an area targeted for sediment removal is appropriately sampled. Traps will be monitored for 4 consecutive days and shall consist of 12-20 fyke traps (hoop/net traps); if pools are not deep enough, welded-wire cage traps will be used. Traps will be checked daily and baited with mackerel or sardines. Captured individuals will be weighed and measured, sexed, palpated for eggs, aged (if possible), inspected for health, photographed and marked by notching marginal scutes with a triangular file according to a standardized numbering pattern.

SSM-11. A CDFG-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 CDFG-approved biologists will participate in activities associated with the capture, handling, and moving of WPT.

SSM-12. Before any activities begin on a project, a CDFG-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.

SSM-13. A CDFG-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.

SSM-14 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 measures above.

SSM-15. Work activities will be completed between April 1 and November 1 to the extent practicable. Should the County need to conduct activities outside this period, the County may conduct such activities after providing notification to the Service.

6.3.3 Steelhead (*Oncorhynchus mykiss*)

Steelhead and/or resident rainbow trout inhabit the Pajaro River and have been observed in the project area during the proposed construction season. Potential impacts to steelhead are limited. Placement of instream LWM structures may require localized dewatering and temporary loss of available steelhead habitat. Relocation of steelhead from dewatered areas may be necessary. The following measures are suggested:

SSM-16. A 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.

SSM-17. 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 will be monitored by the qualified fisheries biologist.

SSM-18. 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.

SSM-19. 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 tidewater gobies 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.

SSM-20. The installation and removal of the coffer dam structures would be controlled to minimize turbidity in the water.

SSM-21. The use of best management practices would be implemented to reduce the probability of sediment and/or contaminated material from entering the creek.

6.3.4 Tidewater Goby (*Eucyclogobius newberryi*)

While tidewater goby presence is highly unlikely upstream of tidal influence, installation of salvaged-log habitat enhancement structures in Excavation Area 2R has the potential to affect tidewater goby if they are present. The following measures will be implemented to minimize and avoid effects to tidewater goby:

SSM-22. If work areas are to be de-watered in Excavation Area 2R, as many tidewater gobies as possible will be removed prior to draining the site. After barriers are constructed, tidewater gobies will be captured, transported in buckets, and released in the most appropriate (i.e., similar water quality parameters) habitat immediately adjacent to the de-watered area. If a seine is used, it will be pulled in a deliberate manner with care being taken to avoid rolling the lead line inward. The number of tidewater gobies will be estimated prior to release. Electrofishing will not be conducted in areas where tidewater gobies may occur. All debris and aquatic and emergent vegetation in the pumped area will be carefully inspected for tidewater gobies and other vertebrates. As the work site is de-watered, remaining pools will be inspected for tidewater gobies. As many individuals as possible will be captured using dipnets and other appropriate tools and moved as described above. Handling time for tidewater gobies will be minimized to the maximum extent practicable.

SSM-23. Only qualified personnel authorized by the Service (Service-approved biologists) will participate in activities associated with the capture, handling, and monitoring of tidewater gobies. The County will provide the Service with the names and credentials of personnel who they desire to conduct these activities for review and approval at least 15 days prior to the onset of the activities. No project activities will begin until the Service notifies the County and Corps in writing that the biologist(s) is qualified to conduct the work.

SSM-24. Prior to the onset of activities that result in disturbance of potential tidewater goby habitat or individuals, a Service-approved biologist will conduct a training session for all construction personnel. At a minimum, the training will include: a description of the tidewater goby; a description of the species' habitat; the importance of the species and its habitat; the general measures that are being implemented to conserve the species 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.

SSM-25. A Service-approved biologist will monitor the work site until all removal of tidewater gobies, instruction of workers, and habitat disturbance have been completed. After this time, the Service-approved biologist will designate a person to monitor on-site compliance with all minimization measures. The Service-approved biologist will ensure that this individual receives training in the identification of tidewater gobies. The monitor and the Service-approved biologist will have the authority to halt any action that might result in impacts that exceed the levels anticipated by the Service in this biological opinion. If work is stopped, the City will notify the Corps and Service immediately.

SSM-26. 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 tidewater gobies 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.

SSM-27. If project activities could degrade water quality, the existing water quality parameters will be determined (e.g., salinity, temperature, dissolved oxygen, and turbidity) prior to the onset of work. Water samples will be taken in a manner that minimizes disturbance, injury, or mortality of tidewater gobies. Results will be used to monitor water quality parameters during and after maintenance and sediment removal activities.

6.3.5 Pallid bat (*Antrozous pallidus*)

Trees within 250 feet of all project areas also have the potential to support roosts of the pallid bat, which could be indirectly impacted by project noise. Open water and agricultural fields in the vicinity of the project site provide foraging habitat abundant with insects, and pallid bats could establish roosts in willow and other large riparian trees adjacent to the project area. Disruption of roosts in trees could adversely impact pallid bat reproduction; however, this impact is not anticipated to affect bat reproduction after implementation of the following minimization measure:

SSM-28: Prior to initiation of any project activities, the project proponent shall take the following steps to avoid indirect impacts to bat breeding success:

- Prior to project activities within 250 feet of trees with at least a moderate potential to support special-status bats, a qualified biologist shall survey for bats. If no evidence of bats (i.e., visual or acoustic detection, guano, staining, strong odors) is present, no further mitigation is required.

- If bats raising pups are present within 250 feet of the studied area during project construction activities (typically April 15 through August 15), the project sponsor shall create a no-disturbance buffer (size to be determined by the bat biologist) around the bat roosts. Bat roosts initiated within 250 feet of the studied area after construction has already begun are presumed to be unaffected by project-related disturbance, and no buffer would be necessary.

6.3.6 Dusky-footed Woodrat (*Neotoma fuscipes annectens*)

SSM-29: Prior to vegetation removal, a field survey for dusky-footed woodrats will be conducted by a qualified biologist. Locations of woodrat nests will be mapped and flagged for avoidance.

SSM: 30: If woodrat nests are present in areas to be cleared of vegetation, animals and structures will be relocated by "**Live Trapping and Structure Relocation**," a procedure that requires live-trapping individuals and installing an artificial replacement house with modified, inverted redwood planter box and available nest material.

- In this procedure, 12-inch Sherman live-traps are placed late afternoon around SFDW houses that are be removed. Typically about five traps are set at each house. In the morning after traps are set, the individual woodrats are held in captivity until each house is destroyed with heavy equipment or by hand.
- The captured SFDW will then be released just offsite, into a structure built around a 12-inch redwood planter that is inverted at an angle and placed slightly below grade. Wooden stakes and wood screws are used to stabilize the inverted redwood box.
- Salvaged nest material and food will be placed in the chamber. Woody debris will be salvaged from the original house if practical and additional branches and logs will be placed in and around the artificial structure. A small, single entrance is created.
- The captured SFDW will then be released and observed entering the house. The entrance will be observed for 10-15 minutes and the animal remained inside.

References

Army Corps of Engineers,1987. *Corps of Engineers Wetlands Delineation Manual,* Wetlands Research Program

Technical Report Y-87-1.

Army Corps of Engineers. 2002. DRAFT: Pajaro River Channel Planform and Channel Forming Discharge Analysis. U.S. Army Engineer District, San Francisco, California.

Army Corps of Engineers. 2003a. Memo: Summary of Alternatives for the Resource Agency Presentation (September, 2003). U.S. Army Engineer District, San Francisco, California.

Army Corps of Engineers. 2003b. Pajaro River Stable Planform Study (July, 2003). U.S. Army Engineer District, San Francisco, California.

Army Corps of Engineers, 2008. *Regional Supplement to the Corps of Engineers Wetland*

Delineation Manual: Arid West Region (Version 2.0).

Ballard, G., G.R. Geupel, N. Nur, and T. Gardalli. 2003. Long-term declines and decadal patterns in populations of songbirds in western North America, 1979-1999. Condor 105: 737-755.

Beier, P. and R.F. Noss, *Do Habitat Corridors Provide Connectivity?*, Conservation Biology, 12:6, pp. 1241-1252, 1998.

Bury, R.B. 1963. Occurrence of *Clemmys marmorata marmorata* in north coastal California. Herpetologica 18(4):283.

Bury, R.B. 1970a. *Clemmys marmorata* (Baird and Girard) Western Pond Turtle. Catalogue of American Amphibians and Reptiles 100.1-100.3.

Bury, R.B. 1972. Habits and home range of the Pacific pond turtle, *Clemmys marmorata*, in a stream community. Unpublished PhD dissertation, University of California, Berkeley. 205 pp.

Bury, R.B. 1979. Population ecology of freshwater turtles. pp. 571-602. In: Harless, M. and H. Murdock (Eds). Turtles: Perspectives and Research. John Wiley and Sons, New York :695 pp.

Bury, R.B. 1986a. Feeding ecology of the turtle, *Clemmys marmorata*. Journal of Herpetology 20(4):515-521.

Bury, R.B., 1995. Western Pond Turtle: Clemmys marmorata (Baird and Girard), In Storm, R.M., and Leonard, W.P. (Eds.). Reptiles of Washington and Oregon. Seattle Audubon Society, Washington. pp. 24-37.

Bury, R. B., and Wolfheim, J. 1973. Aggression in Free-Living Pond Turtles (Clemmys marmorata).

Bury, R. B.. and Germano, D.J. 2008. *Actinemys marmorata* (Baird and Girard 1852) – Western Pond Turtle, Pacific Pond Turtle

Busby, P.J., T.C. Wainwright, G.J. Bryant, L.J. Lierheimer, R.S. Waples, F.W. Waknitz and I.V. Lagomarsino. 1996. Status Review of West Coast Steelhead from Washington, Idaho, Oregon, and California.

National Marine Fisheries Service Northwest Fisheries Science Center and Southwest Region. NOAA Technical Memorandum NMFS-NWFSC-27.

Buskirk, James R. 2002. The Western Pond Turtle, *Emys marmorata*. Radiata 11(3):3-30.

California Department of Fish and Game (CDFG), California Natural Diversity Database (CNDDB), data request for U.S. Geological Survey 7.5-minute topographic quadrangles: Soquel, Watsonville West, Watsonville East, Moss Landing, and Prunedale, information accessed July 15, 2011.

CDFG, California Natural Diversity Database, Special Animals (901 Taxa), http://www.dfg.ca.gov/biogeodata/cnddb/pdfs/SPAnimals.pdf, accessed March 10, 2011, dated 2009.

CDFG. 1998. Memorandum of Understanding between CDFG and MCWRA Regarding Streambed Alteration Notification and Routine Maintenance Activities Subject to CDFG Code Section 1601.

California Department of Fish and Game (CDFG). 1992. Bird species of special concern. Unpublished list, July 1992, Calif. Dept. Fish & Game, 1416 Ninth St., Sacramento, CA 95814.

California Native Plant Society (CNPS), CNPS Electronic Inventory data request for U.S.

Geological Survey 7.5-minute topographic quadrangles: Soquel, Watsonville West, Watsonville East, Moss Landing, and Prunedale, information accessed July 15, 2011.

CH_2M Hill. 1997. Phase II Report: Pajaro River Management & Restoration Plan. Prepared in partnership with Northwest Hydraulic Consultants, Inc. and Greening Associates. Prepared for Santa Cruz County Flood Control and Water Conservation District, Zone 7.

Evenden FG. 1948. Distribution of turtles in western Oregon. Herpetologica 4(6):201-204.

Franzreb, K. E. 1989. Draft Least Bell's Vireo Recovery Plan. Prepared for U.S. Fish and Wildlife Service, Portland, OR.

Germano, D. J., and R. B. Bury. 2001. Western Pond Turtles (*Clemmys marmorata*) in the Central Valley of California: Status and Population Structure. 2001 Transactions of the Western Section, The Wildlife Soc. 37:22-

Goodman, R.H., Jr. 1997a. Occurrence of double clutching in the Southwestern Pond Turtle, Clemmys marmorata pallida, in the Los Angeles Basin. Chelonian Conservation and Biology 2:419-420.

Goodman, R. H., Jr., and Stewart G. R., 1998. *Clemmys marmorata pallida* (Southwestern Pond Turtle). Coprophagy, Herp Review No. 29, page 98.

Gray, M. V. and J. M. Greaves. 1984. Riparian Forest as Habitat for the Least Bell's Vireos. In Warner and Hendrix, pp. 605-611.

Greaves, J. M. 1989. Maintaining Site Integrity for Breeding Least Bell's Vireos. In Abell (ed.), California Riparian Systems: Ecology, Conservation and Productive Management, University of California Press, CA, pp. 293-298.

Grinnell, J. and A. H. Miller. 1944. The Distribution of the Birds of California. Cooper Ornithological Society. Artemisia Press.

Harding ESE. 2001a. Biological Assessment: Pajaro River and Salsipuedes and Corralitos Creeks Management and Restoration Plan. Prepared for County of Santa Cruz.

Harding ESE. 2001b. Draft Environmental Impact Report: Pajaro River and Salsipuedes and Corralitos Creeks Management and Restoration Plan. Prepared for County of Santa Cruz.

Holland, D.C. 1985a. An Ecological and Quantitative Study of the Western Pond Turtle Clemmys marmorata in San Luis Obispo County, California. Unpublished Master's Thesis, California State University-Fresno, CA. 181pp.

Holland, D.C. 1985b. Western pond turtle *Clemmys marmorata*: Feeding. Herpetological Review. 16(4):112.3.

Holland, D.C. 1988. Western pond turtle *Clemmys marmorata*: Behavior. Herpetological Review 19(4):87-88.

Holland, D.C. 1994a. Western Pond Turtle: Habitat and History. DOE/BP #62137-1. Bonneville Power Administration, Portland, OR. www.efw.bpa.gov/environment/ew/ewp/docs/reports/wildlife/w62137-1.pdf

Holland, D.C. 1994b. United States Forest Service/Western Aquatic Turtle Research Consortium Western Pond Turtle Survey Protocol Study. Protocol for United States Forest Service and Western Aquatic Turtle Research Consortium.

Holland, R.F., *Preliminary Descriptions of the Terrestrial Natural Communities of California,*California Department of Fish and Game, Sacramento, CA, 1986.

Iverson, J. B., 1986.A Checklist with Distribution Maps of Turtles of the World, Paust Printing, Richmond Indiana 282 pp.

Jennings, M. R. and M. P. Hayes, Amphibian and Reptile Species of Special Concern in California, Final Report submitted to the California Department of Fish and Game, Inland Fisheries Division, Rancho Cordova, California, 1994.

Kittleson, G. 2003. Estimated Riparian Acreage Impacted by Salsipuedes Creek Sediment and Vegetation Removal Activities.

Kittleson, G. 2006. Final Preliminary Biotic Impact and Mitigation Assessment –Proposed Pajaro River Levee Bench Sediment Excavation Project.

Kittleson, G. and V. Haley. 2004. Riparian Habitat Acreage Impacted by Pajaro River Vegetation Thinning Activities, Santa Cruz County Department of Public Works

Kittleson Environmental Consulting, Memo re: Vegetation and Sediment Removal at Harkins Slough Pump Station, dated April 26, 2011. Santa Cruz County Department of Public Works

Kittleson Environmental Consulting and Biosearch Associates, 2009. Pajaro River Western Pond Turtle Survey Data Report. Santa Cruz County Department of Public Works

Kittleson Environmental Consulting Kittleson Environmental Consulting and Biosearch Associates, 2010. Pajaro River Western Pond Turtle Survey Data Summary. Santa Cruz County Department of Public Works

Kittleson Environmental Consulting and Biosearch Associates, 2011. Pajaro River Western Pond Turtle Survey Draft Data Summary. Santa Cruz County Department of Public Works

Kittleson, G., Mori, B. and Suddjian, D. 2007. Pajaro River Bird Survey Data Report. Santa Cruz County Department of Public Works

Kittleson, G., Mori, B. and Suddjian, D. 2010. Pajaro River Bird Survey Draft Data Summary. Santa Cruz County Department of Public Works

Lowther, P., S. Lanyon, C. Thompson. 1999. The Birds of North America. *The American Ornithologists' Union,* 398: 1-21.

Lubke, G.M. 2006. *Actinemys marmorata* (Pacific pond turtle). Size. Herpetological Review

Lubke, G.M. and Wilson, D. 2007. Variation in shell morphology of the wetsern pond turtle (Actinemys marmorata, Baird and Girard) from three aquatic habitats in Northern California. Journal of Herpetology 41:107-114.

Mayer, K.E. and W.F. Laudenslayer, ed., *A Guide to Wildlife Habitats of California*, California Department of Forestry and Fire Protections, Sacramento, CA, 165 pp.

McEwan, D. and T. A. Jackson. 1996. Steelhead restoration and management plan for California. California Department of Fish and Game, Sacramento. 234 pp.

National Oceanic and Atmospheric Administration (NOAA), Endangered and Threatened Species; Designation of Critical Habitat for Seven Evolutionary Significant Units of Pacific Salmon and Steelhead in California, 50 CFR 226, September 2, 2005.

Nehlsen et al. (1991) Nehlsen, W., J.E. Williams and J.A. Lichatowich. 1991. Pacific salmon at the crossroads: Stocks at risk from California, Oregon, Idaho and Washington. Fisheries 16(2):4-21.

NMFS, 2000 National Marine Fisheries Service (NMFS). 2000. Critical habitat for 19 ESUs of salmon and steelhead in Washington, Oregon, Idaho and California. 50 CFR Part 226. Federal Register, 65 (32): pp. 7764-7787.

Northwest Hydraulic Consultants, Inc. 1998. Pajaro River 1998 Bank Erosion Assessment. Prepared for Santa Cruz County Flood Control and Water Conservation District, Zone 7.

Northwest Hydraulic Consultants, Inc. 2011a. Pajaro River Bench Excavation Project 65% Revised Basis of Design Memorandum. Prepared for Santa Cruz County Flood Control and Water Conservation District, Zone 7.

Northwest Hydraulic Consultants, Inc. 2011b. Pajaro River Bench Excavation Project 75% Basis of Design Memorandum. Prepared for Santa Cruz County Flood Control and Water Conservation District, Zone 7.

Nussbaum et al. 1983 Nussbau, R.A., Brodie, E.D., and Storm, R.C.1983. Amphibians and Reptiles of the Pacific Northwest. University Press of Idaho. Moscow ID, 332 pp.

Philip Williams and Associates (PWA). 1997. Lower Pajaro River Sediment Assessment Study. Prepared for the U.S. Army Corps of Engineers, San Francisco District.

Philip Williams and Associates. 1996. Corralitos and Salsipuedes Creeks Reconnaissance Level Sediment Assessment Study. Prepared for the U.S. Army Corps of Engineers, San Francisco District.

Rathbun, G.B., N.R. Seipel, D.C. Holland. 1992. Nesting behavior and movements of western pond

turtles, *Clemmys marmorata*, Southwestern Naturalist 37:319-24.

Rathbun, G.B.; Scott, N. J.; Murphey T.G. 2002. Terrestrial habitat use by Pacific Pond turtles in a Mediterranean climate. Southwestern Naturalist 47:225-235.

Reese, D., 1996 Comparative Demography and Habitat Use of Western Pond Turtles in Northern California: The Effects of Damming and Related Alterations. Ph.D. thesis.

Reese, D.A. and H.H. Welsh. 1997. Use of terrestrial habitat by western pond turtles, Clemmys marmorata: implications for management. In: Van Abbema, J (ed) Proceedings: Conservation, restoration and management of tortoises and turtles ; An international conference. New York WCS Turtle Recovery program and New York Turtle and Tortoise Society, pp 352-357.

Reese, D. A., and H. H. Welsh HJr. 1998a. Habitat Use by Western Pond Turtles in the Trinity River, California. Journal of Wildlife Management 62(3:842-853.

Reese, Devin A., and Hartwell H. Welsh Jr., 1998b. Comparative Demography of *Clemmys marmorata* Populations in the Trinity River of California in the Context of Dam-induced Alterations. Journal of Herpetology Vol. 32, No. 4, pp. 505-515.

Remsen, J. V., Jr. 1978. Bird species of special concern in California. Calif. Dept. of Fish and Game, Sacramento. Wildl. Manage. Admin. Rep. No. 78-1. 54pp.

Sauer, J. R., Hines, J. E., and Fallon, J. 2005. The North American Breeding Bird Survey, results and analysis 1966–2004, version 2005.2. USGS Patuxent Wildl. Res. Ctr., Laurel, MD.

Shapovalov and Taft, 1954 Shapovalov, L. and A. C. Taft. 1954. The life histories of the steelhead rainbow trout (Salmo gairdneri gairdneri) and silver salmon (Oncorhynchus kisutch). California Department of Fish and Game Bulletin 98. 275 pp.

Scott, N. J.; Rathbun, G.B.; Murphey T.G.: Harker, M.B. 2008. Reproduction of Pacific Pond Turtles (*Actinemys marmorata*) in Coastal Streams of Central California. Herpetological Conservation and Biology 3(2):143-148.

Society for the Study of Reptiles and Amphibians (SSAR), Scientific and Standard English Names of Amphibians and Reptiles of North America North of Mexico, With Comments Regarding Confidence In Our Understanding, accessed August 3, 2011, available online at http://www.ssarherps.org/pages/comm_names/Actinemys_main.php

Smith, J. J. 2002. Steelhead distribution and ecology in the upper Pajaro River system (DRAFT).

Smith, J. J. 1982. Fishes of the Pajaro River System. In Studies on the Distribution and Ecology of Stream Fishes of the Sacramento-San Joaquin Drainage System, California. Moyle, P. B. et.al. University of California Publications in Zoology, 115: 83 – 169.

Smith, J. J. et al. 1983. Detailed field study report. Pajaro River Habitat Management Study Report to the Association of Monterey Bay Area Governments. Harvey and Stanley and Associates.

Stebbins, R.C., Peterson Field Guides: Western Reptiles and Amphibians, Houghton Mifflin Company, New York, N.Y., 1985.

Stebbins, R.C. 2003. A Field Guide to Western Reptiles and Amphibians. Houghton Mifflin Co., Boston, MA 533 pp.

Storer, T.I. 1930. Notes on the range and life history of the Pacific Fresh-water Turtle, *Clemmy marmorata*. University of California Publications in Zoology 32:429-441.

Suddjian, D. 2002. Riparian Bird Populations at the Pajaro River: A Look at the Impacts of the 1995 Vegetation Clearing And Subsequent Bird Use Of The Intact and Cutover Riparian Forest

Swanson and HRG, 1993 Swanson & Associates and the Habitat Restoration Group (Swanson and HRG). 1993. Pajaro River Lagoon Management Plan and Technical Appendices. Report prepared for Santa Cruz County Department of Public Works. 37 pp. + Appendices.

USFWS, Recovery Plan for Insect and Plant Taxa from the Santa Cruz Mountains in California, Region 1, Portland, OR, vii + 83 pp, 1998.

USFWS, Final Recovery Plan for the California Red-legged Frog (*Rana aurora draytonii*), Region 1, Portland, OR, viii + 173 pp, 2002.

USFWS, Revised Designation of Critical Habitat for the California Red-Legged Frog; Final Rule, 75 FR 12816, 2010.

USFWS, Unofficial Endangered Species Act Species List for Santa Cruz County, Information, Planning and Conservation System ver. 1.4, accessed August 3, 2011.

Zeiner, D.C., Laudenslayer, W.F., Mayer, W.E., and White, M., ed., *California's Wildlife, Volume II, Birds*, California Department of Fish and Game, Sacramento, CA, 1990.

APPENDIX A:

Full List of Special Status Species in the Pajaro River Bench Excavation Project Region

Common Name **Scientific Name** **Animals**	**Status USFWS/ CDFG/**	**General Habitat Requirements**	Potential for Species Occurrence Within the Project Site
Fish			
Tidewater goby *Eucyclogobius newberryi*	FE/--	Occurs in shallow waters of bays and estuaries; requires fairly still brackish water with high oxygen levels.	**Low.** Tidal influence in Pajaro River is limited to areas downstream of Excavation Area 1
Steelhead, south-central California coast DPS *Onchorhynchus mykiss*	FT/CSC	Free-flowing coastal rivers and streams. Spawning habitat: clear, cool streams with overhanging vegetation.	**High. Steelhead are present in project area.**
Central California coast coho salmon ESU *Oncorhynchus kisutch* Critical habitat designated	--/CE	Rivers and creeks from Punta Gorda south to the San Lorenzo River, as well as waterways south of San Francisco Bay.	**Not present.** This species' current range does not extend south of Aptos Creek, which is several miles north of the project site.
Amphibians			
California red-legged frog *Rana draytonii*	FT/CSC	Streams, freshwater pools and ponds with overhanging vegetation. Requires pools of >0.5 m depth for breeding.	**High. CRLF are present in the Pajaro River in the project area. KEC has observed CRLF at 15 distinct locations along the Pajaro River downstream of Murphy's Crossing.** Wetland and riparian habitat in the Pajaro River channel supports summering and/ or dispersing

			frogs. Breeding has been documented in agricultural ponds approximately 1.0 miles north and south of the project area.
Santa Cruz long-toed salamander *Ambystoma macrodactylum croceum*	FE/SE	Freshwater wetlands with surrounding riparian vegetation. Upland habitat consists of riparian habitats, oak woodlands, and chaparral with small mammal burrows. This species has not been detected more than 1 kilometer away from breeding ponds.	**Low.** Nearest recorded breeding habitat is more than 3.5 miles north of the project site. Pajaro River has high velocity fast seasonal flows that would likely prevent breeding of this species, and occurrences have not been documented in the project area.
California tiger salamander *Ambystoma californiense*	FT/ST	Vernal or temporary pools in annual grasslands, or open stages of woodlands. Adults migrate upland and take refuge in small mammal burrows, typically in annual grasslands.	**Low.** Nearest recorded breeding habitat is more than 1.5 miles southwest of the project site. Suitable oak woodland and grassland habitat in not present.
Birds			
western snowy plover *Charadrius alexandrinus nivosus*	FT/CSC	Resident on coastal beaches and salt panne habitat.	**Low.** No suitable habitat in project site. Known from Pajaro River mouth and beach.
southwestern willow flycatcher *Empidonax trailii extimus*	FE/SE	Breeds in mature riparian habitat. Now extirpated from coastal California	**Low.** No recent records of breeding birds west of the San Joaquin Valley. Not observed in 2007 or 2010 bird surveys.
American peregrine falcon *Falco peregrinus*	FD/SE	Forages for other birds over a variety of habitats. Breeds primarily on rocky cliffs.	**Low.** Individuals foraging or flying over could occur throughout the project site. Suitable nesting habitat not present within the project site.

California condor *Gymnogyps californianus*	FE/SE	Forages for carrion over a variety of open habitats	**Low.** Limited open areas for foraging and large carrion are absent within the project site
bald eagle *Haliaeetus leucocephalus*	FD/SE	Forages in rivers and lakes for large fish. Does not breed locally.	**Low.** Individuals foraging or flying over could occur throughout the project site. Suitable nesting habitat not present within the project site.
California clapper rail *Rallus longirostris obsoletus*	FE/SE	Salt water and brackish marshes with tidal sloughs; associated with cordgrass (*Spartina* spp.) and pickleweed (*Salicornia* spp.).	**Not Present.** Suitable saltwater emergent wetland habitat not present within the project site.
bank swallow *Riparia riparia*	--/ST	Nests in colonies in sandy banks along riparian habitat.	**Low.** Nesting colonies are located nearby at the mouth of the Salinas River and in Moss Landing, but vertical sandy creek banks are not present within the project site.
Least Bell's vireo *Vireo bellii pusillus*	FE, SE	Breeds in thick willow riparian groves. Range, once thought to be limited to southern California, is expanding.	**Low.** Not observed in surveys in 2007 and 2010. No recorded observations in project impacts areas.
Invertebrates			
Ohlone tiger beetle *Cicndela* *ohlone*	FE/CSC	Remnant native grasslands with California oatgrass and purple needlegrass in Santa Cruz County	**Not present.** Native grassland habitat not present within the project site. Outside of existing range; i.e., the eastern edge of the City of Santa Cruz, north Santa Cruz County.
Smith's blue butterfly	FE/--	Dune habitats with host buckwheat plants.	**Not Present.** Occurs west of Highway 1 at

Euphilotes enoptes smithi			Fort Ord; no coastal dune habitat capable of supporting host plant for this species is present within the project site.
Zayante band-winged grasshopper *Trimerotropis infantalis*	FE/--	In sandy chaparral and grasslands habitats associated with the Zayante Sand Hills ecosystem in the Santa Cruz Mountains.	**Not Present.** Suitable Zayante Sand Hill habitats are limited to north Santa Cruz County.
Plants			
Ben Lomond spineflower *Chorizanthe pungens*	FE/--/1B.1	Lower montane coniferous forest, in maritime ponderosa pine sandhills.	**Not Present.** Suitable habitat not present at the project site.
Monterey spineflower *Chorizanthe pungens* var. *pungens*	FT/--/1B.2	Sandy soils in maritime chaparral, cismontane woodland, coastal dunes, coastal scrub, and valley and foothill grassland habitats.	**Not Present.** Suitable habitat not present at the project site
robust spineflower *Chorizanthe robusta* var. *robusta*	FE/--/1B.1	Sandy or gravelly soils in coastal dunes, coastal scrub, and openings in cismontane woodland habitats.	**Low.** Currently known populations are limited to Santa Cruz and Marin Counties, and no maritime chaparral habitat is present at the project site.
seaside bird's beak C*ordylanthus rigidus* ssp. *littoralis*	--/SE/1B.1	Closed-cone coniferous forest, maritime chaparral, cismontane woodland, coastal dunes, sandy or disturbed coastal scrub.	**Low.** Marginally suitable habitat is present at the project site. Nearest occurrence is more than 8 miles south of the project site
Monterey gilia *Gilia tenuiflora* ssp. *arenaria*	FE/ST/1B.2	Sandy soils and openings in maritime chaparral, cismontane woodland, coastal dunes, and coastal	**Low.** No maritime chaparral or dune habitat present at the project site. Nearest

		scrub habitats.	occurrence is more than 6 miles southeast of the project site in sand dune habitat.
Santa Cruz tarplant *Holocarpha macradenia*	FT/SE/1B.1	In sandy and often clayey soils in coastal prairie, coastal scrub, and valley and foothill grassland.	**Low.** While extant populations of this species, as well as critical habitat, are present less at Tarplant Hill than 3 miles north in Struve Slough, open upland habitats in the project site are heavily disturbed. Not known from the site.
White-rayed pentachaeta *Pentachaeta bellidiflora*	FE/SE/1B.1	Open dry rocky slopes and grassy areas, often on soils derived from serpentine bedrock.	**Not Present.** No suitable habitat in the project site.
San Francisco popcornflower *Plagiobothrys diffusus*	--/CE/1B.1	Coastal prairie and grasslands.	**Low.** Nearest known location is at the western edge of the City of Santa Cruz, north of Highway 1. No grassland habitat present at project site.
Yadon's rein orchid *Piperia yadonii*	FE/--/1B.1	Closed-cone coniferous forest, chaparral, coastal bluff scrub; on poorly drained and often dry sandy soils.	**Low.** No maritime chaparral habitat present at the project site.
OTHER SPECIAL-STATUS SPECIES			
Reptiles and Amphibians			
western pond turtle *Actinemys marmorata*	--/CSC	Permanent or nearly permanent water in a variety of habitats.	**High. Western pond turtles are present in project area.**
black legless lizard *Anniella pulchra* ssp. *nigra*	--/CSC	Present in sand dunes and sandy soils with moist soil.	**Not Present.** Coastal dune habitat not present in project site.

silvery legless lizard *Anniella pulchra* ssp. *pulchra*	--/CSC	Sandy or loose loamy soils under sparse vegetation; moist soils are essential.	**Low.** No sandy dune habitat is present at the project site.
foothill yellow-legged frog *Rana boylii*	--/CSC	Frequents 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.	**Low.** Anecdotally known from Browns Creek in Corralitos Creek watershed. Occurs in Aptos and Soquel Creek north of project site. Not known to occur in Pajaro mainstem.
Mammals			
pallid bat *Antrozous pallidus*	--/CSC	Present in a wide variety of habitats, including deserts, grasslands, forests, and shrublands. Most common in open, dry habitats with rocky areas for roosting.	**Moderate.** This species is a habitat generalist that could roost in mature riparian trees and riparian woodlands within the vicinity of the project site.
Santa Cruz kangaroo rat *Dipodomys venustus venustus*	--/*	In silverleaf manzanita mixed chaparral in the Zayante Sand Hills of Santa Cruz County	**Not Present.** No Zayante Sand Hill habitats are present within the vicinity of the project site.
Salinas harvest mouse *Reithrodontomys megalotis distichlis*	--/*	Present in fresh and brackish wetlands in the Monterey Bay region.	**Low.** Freshwater wetlands in the project site are limited in size and periodically scoured high flows
American badger	--/CSC	Grasslands and other	**Low.** Most annual grasslands

Taxidea taxus		open habitats with friable soils.	formerly existing in the project area have been replaced by agricultural fields.
Dusky-footed woodrat *Neotoma fuscipes*	-/CSC	Riparian woodlands, oak woodland, oak scrub, and chaparral habitats	**High.** Present throughout project area in riparian corridor. Arboreal nests existing in Excavation Area 8R riparian trees.
Invertebrates			
Globose dune beetle *Coelus globosus*	--/*	Inhabits coastal sand dune habitat, often in foredunes and sand hammocks, where it burrows beneath the sand surface and beach dune vegetation.	**Low.** Coastal dune habitat is not present within the project site.
monarch butterfly (wintering) *Danaus plexippus*	--/*	Winter roost sites are present in wind-protected tree groves typically composed of eucalyptus, cypress, or Monterey pine trees; roost sites require sources of water and nectar nearby.	**Low.** Sparse mature riparian trees are present in vicinity of the project site, but would not provide the sheltered habitat necessary for a colony.
California linderella *Linderiella occidentalis*	--/*	Seasonal pools in unplowed grasslands with hardpan soils; in vernal pools with low alkalinity.	**Low.** Vernal pool habitats are not present within the project site.
Mimic tryonia (= California brackishwater snail) *Tryonia imitator*	--/*	Coastal lagoons, estuaries, and salt marshes	**Low Potential.** Suitable habitat not present in project site.
Birds			
Cooper's hawk	--/*	Breeds in riparian	**Moderate.** Potential nesting habitat is

Accipiter cooperii		woodlands and wooded canyons.	present in willow riparian habitat within the project site.
tricolored blackbird *Agelaius tricolor*	--/CSC	Breeds near freshwater in dense emergent vegetation.	**Low.** Formerly known to breed in dense emergent cattail/tule stands in privately-owned reaches of Hanson and Harkins Sloughs. Occasionally observed in Pajaro River flood control channel as passerine.
short-eared owl *Asio flammeus*	--/CSC	Found in freshwater and saltwater marshes, wet meadows, and irrigated alfalfa fields; nesting in a dry ground depression within vegetation.	**Low.** Marsh habitats or suitable agricultural fields for this species are not present within the project site.
golden eagle *Aquila chrysaetos*	--/CSC, CFP	Breeds on cliffs or in large trees or structures	**Low.** Individuals foraging or flying over could occur throughout the project site. Suitable nesting habitat not present within the project site.
western burrowing owl *Athene cunicularia*	--/CSC	Grassland habitat with ground squirrel burrows (used for nesting).	**Low.** Occassionally observed in lower Pajaro River region, but not known to nest in project area. Few ground squirrel burrows observed in the project site. Last recorded in project area by KEC in 2007 on landside of Santa Cruz County levee near Murphy's Crossing. Recent wintering individual noted at Pajaro Valley High School/ Upper Hanson Slough.
northern harrier	--/CSC	Forages in open to	**Moderate.** This species could nest or

Circus cyaneus		herbaceous stages of many habitats. Breeds in marshes and prairies.	forage within the vicinity of the project site.
white-tailed kite *Elanus leucurus*	--/CFP	Open grasslands, meadows, or marshes for foraging close to isolated, dense-topped trees for nesting and perching	**Moderate.** This species could nest or forage within the vicinity of the project site.
Plants			
Anderson's manzanita *Arctostaphylos andersonii*	--/--/1B.2	Broad leaved upland forest, chaparral, north coast coniferous forest, open sites in redwood forest.	**Low.** Suitable habitat not present within the project site.
Hooker's manzanita *Arctostaphylos hookeri* ssp. *hookeri*	--/--/1B.2	Sandy areas in closed cone coniferous forest, chaparral, cismontane woodland, and coastalscrub habitats.	**Low.** Suitable habitat not present within the project site.
Toro manzanita *Arctostaphylos montereyensis*	--/--/1B.2	Sandy areas in maritime chaparral, cismontane woodland, and coastal scrub habitats.	**Low.** Suitable habitat not present within the project site.
Pajaro manzanita *Arctostaphylos pajaroensis*	--/--/1B.1	Sandy soils in chaparral habitat.	**Low.** Suitable habitat not present within the project site.
King's mountain manzanita *Arctostaphylos regismontana*	--/--/1B.2	Broad leaved upland forest, north coast coniferous forest, granitic or sandstone outcrops.	**Low.** Suitable habitat not present within the project site.
Congdon's tarplant *Centromadia parryi* ssp. *congdonii*	--/--/1B.2	Valley & foothill grassland habitat, particularly in areas with alkaline substrates and in sumps or disturbed areas where water collects	**Low.** Neither grassland nor alkaline habitats are present at the project site.

Eastwood's goldenbush *Ericameria fasciculata*	--/--/1B.1	Openings with sandy soils in closed-cone coniferous forest, maritime chaparral, coastal dunes, and coastal scrub habitats.	**Not Present.** Suitable sandy soils and dune habitat not present at the project site.
sand-loving wallflower *Erysimum ammophilum*	--/--/1B.2	Sandy areas and openings in maritime chaparral, coastal dunes, and coastal scrub habitats.	**Not Present.** Suitable sandy soils and dune habitat not present at the project site.
fragrant fritillary *Fritillaria liliacea*	--/--/1B.2	Coastal scrub, valley and foothill grassland, coastal prairie, often on serpentine but usually on clay soils in grasslands.	**Low.** Grassland habitat not present at the project site.
Loma Prieta hoita *Hoita strobilina*	--/--/1B.1	Chaparral, cismontane woodland, riparian woodland; usually serpentine, mesic.	**Low.** While limited riparian habitat is present at the project site, no recorded occurrences are present within 10 miles of the project site.
Kellogg's horkelia *Horkelia cuneata* ssp. *serica*	--/--/1B.1	forests, maritime chaparral, coastal dunes, sandy or gravelly openings in coastal scrub.	**Low.** Suitable sandy soils and dune habitat not present at the project site.
Mt. Diablo cottonweed *Micropus amphibolus*	--/--/3.2	Broadleaved upland forest, chaparral, cismontane woodland, rocky valley and foothill grasslands	**Low.** Suitable habitat not present at the project site.
Woodland woolythreads *Monolopia gracilens*	--/--/1B.2	Chaparral, serpentine valley and foothill	**Low.** Suitable habitat not present at the project site.

		grasslands, cismontane woodland, broad leaved upland forests, north coast coniferous forest.	Few recorded occurrences are south of Santa Cruz County line.
Dudley's lousewort *Pecularis dudleyii*	--/--/1B.2	Chaparral, north coast coniferous forest, valley and foothill grasslands; deep shady woods of older coast redwood forests, also in maritime chaparral.	**Low.** Suitable habitat not present in the project site.
Santa Cruz Mountains beardtounge *Penstemon rattanii* var. *kleei*	--/--/1B.2	On sandy shale slopes in chaparral, lower montane coniferous forest.	**Low.** Chaparral habitat not present in the project site.
Monterey pine *Pinus radiata*	--/--/1B.1	Though widespread in California, only three primary stands on dry bluffs and slopes are native to California	**Not Present.** No stands of native Monterey pine are present within the project site.
Choris' popcorn-flower *Plagiobothrys chorisanthus* var. *chorisanthus*	--/--/1B.2	Chaparral, coastal scrub, coastal prairie; mesic sites.	**Low.** No undisturbed coastal prairie habitat is present at the project site.
pine rose *Rosa pinetorum*	--/--/1B.2	Closed-cone coniferous forest habitat.	**Low.** Suitable habitat not present at the project site.
Santa Cruz clover *Trifolium buckwestiorum*	--/--/1B.1	On margins of broadleaved upland forest, cismontane woodland, and coastal	**Low.** No undisturbed coastal prairie or moist grassland habitats are present at the project site.

		prairie; moist grasslands.	
saline clover *Trifolium hydrophilum*	--/--/1B.2	Marshes and swamps, vernal pools, and alkaline, mesic areas in valley and foothill grassland.	**Low.** No vernal pool habitats are present in the vicinity of the project site, and freshwater wetlands are subject to annual scour.

STATUS CODES:
FEDERAL: (U.S. Fish and Wildlife Service)
FE = Listed as Endangered (in danger of extinction) by the Federal Government.
FT = Listed as Threatened (likely to become Endangered within the foreseeable future) by the Federal Government.
FC = Candidate to become a *proposed* species.
FD = Federally Delisted
STATE: (California Department of Fish and Game
CE = Listed as Endangered by the State of California
CT = Listed as Threatened by the State of California
CD = Delisted by the State of California
CR = Listed as Rare by the State of California (plants only)
CSC = California Species of Special Concern
CFP = California Department of Fish and Game Fully Protected
* = Special Animals included on the CDFG list of special animals (CDFG, 2009)
California Native Plant Society
List 1A=Plants presumed extinct in California
List 1B=Plants rare, threatened, or endangered in California and elsewhere
List 2= Plants rare, threatened, or endangered in California but more common elsewhere
List 3= Plants about which more information is needed
List 4= Plants of limited distribution
SOURCE: ESA, 2011; CDFG, 2011; CDFG, 2009; CNPS, 2011; USFWS, 1998; USFWS, 1984; NOAA, 2005.

Appendix B.

Pajaro River Mainstem Vascular Plant Species Observed in January 2007 [1,2]*

FLOWERING PLANTS-DICOTS

ACERACEAE
Acer negundo var. *californicum* (box elder)
ADOXACEAE
Sambucus nigra (blue elderberry)

ANACARDIACEAE
Toxicodendron diversilobum (poison oak)

APIACEAE
*Conium maculatum** (poison hemlock)
*Foeniculum vulgare** (fennel)

ASTERACEAE
Artemisia californica (California sagebrush)
Artemisia douglasiana (mugwort)
Artemisia dracunculus (tarragon)
Aster chilensis (Chilean aster)
Aster radulinus (rough-leaved aster)
Baccharis douglasii (marsh baccharis)
Baccharis pilularis (coyote brush)
*Baccharis salicifolia ssp. salicifolia (*Mulefat)
*Carduus pycnocephalus** (Italian thistle)
*Carduus tenuiflorus** (slender-flowered thistle)
*Centaurea calcitrapa** (purple star-thistle)
*Centaurea soltitialis** (yellow star-thistle)
*Cirsium vulgare** (bull thistle)
*Delairea odorata** (Cape/German ivy)
Erigeron canadensis (horseweed)
Euthamia occidentalis (western goldenrod)
*Gnaphalium luteo-album** (weedy cudweed)
Gnaphalium palustre (lowland cudweed)
*Gamochaeta ustulata (*purple cudweed*)*
Helenium puberulum (sneezeweed)
Heterotheca grandiflora (telegraph weed)
*Lactuca serriola** (prickly lettuce)
*Helminthotheca echioides** (bristly ox-tongue)
*Silybum marianum** (milk thistle)
*Sonchus asper** (prickly sow thistle)
*Sonchus oleraceus** (common sow thistle)
*Taraxacum officinale** (dandelion)
Xanthium spinosum (spiny cocklebur)
Xanthium strumarium (cocklebur)

BETULACEAE
Alnus rubra (Red Alder)

BRASSICACEAE
*Brassica rapa** (field mustard)
*Hirschfeldia incana** (black mustard)
Lepidium nitidum (shining pepper-grass)
Lepidium virginicum var. *pubescens* (wild pepper-grass)
*Raphanus sativus** (radish)
Rorrippa palustris ssp. palustris (watercress)

CAPRIFOLIACEAE
Symphoricarpos mollis (creeping snowberry)

CHENOPODIACEAE
Atriplex lentiformis (big saltbush)
Atriplex triangularis (fat hen)
*Dysphania ambrosioides** (epizoté)
Chenopodium californicum (California goosefoot)
Chenopodium macrospermum var. *halophilum* (large-seeded goosefoot)
*Chenopodium murale** (nettle-leaved goosefoot)

CORNACEAE
Cornus sericea ssp. sericea
(creek dogwood)

DIPSACEAEAE
*Dipsacus sativus** (Fuller's teasel)

EUPHORBIACEAE
*Ricinus communis** (castor bean)

FABACEAE
*Genista monspessulana** (French broom)
*Medicago polymorpha** (California burclover)
*Melilotus alba** (white sweet clover)
*Trifolium angustifolium** (Mediterranean clover)
*Trifolium dubium** (shamrock)
*Trifolium repens** (white clover)
*Trifolium subterraneum** (subterraneum clover)
Vicia sativa ssp. *sativa** (spring vetch)

GERANIACEAE
*Erodium botrys** (long-beaked filaree)
*Erodium cicutarium** (red-stemmed filaree)
*Erodium moschatum** (white-stemmed filaree)
*Geranium dissectum** (cut-leaved geranium)

JUGLANDACEAE
Juglans hindsii (Northern California black walnut)

Juglans regia (English Walnut)

LAMIACEAE
*Marrubium vulgare** (horehound)
*Melissa officinalis** (bee balm)
Mentha arvensis (field mint)

LYTHRACEAE
*Lythrum hyssopifolium** (hyssop loosestrife)

MALVACEAE
Lavatera arborea* (tree-mallow)
*Malva nicaeensis** (bull mallow)
*Malva parviflora** (cheeseweed)

ONAGRACEAE
Epilobium ciliatum ssp. *ciliatum* (ciliate willow herb)
Epilobium ciliatum ssp. *watsonii* (Watson's ciliate willow herb)
Oenothera elata ssp. *hookeri* (Hooker's evening primrose)

OXALIDACEAE
*Oxalis pes-caprae** (Bermuda buttercup)
PHRYMACEAE
Mimulus guttatus (common monkeyflower)

PLANTAGINACEAE
*Plantago coronopus** (cut-leaved plantain)
*Plantago lanceolata** (English plantain)
*Plantago major** (common plantain)

PLATANACEAE
Platanus racemosa (sycamore)

POLYGONACEAE
*Polygonum arenastrum** (common knotweed)
Polygonum punctatum (water smartweed)
*Rumex acetosella** (sheep sorrel)
*Rumex crispus** (curly dock)

RHAMNACEAE
Frangula californica ssp. *californica* (California coffeeberry)

ROSACEAE
*Rubus discolor** (Himalayan blackberry)
Rubus ursinus (California blackberry)

SALICACEAE
Populus balsamifera ssp. *trichocarpa* (black cottonwood)
Salix exigua var. hindsiana (sandbar willow)
Salix laevigata (red willow)
Salix lasiolepis (arroyo willow)
Salix lasiandra ssp. *lasiandra* (yellow willow)

SCROPHULARIACEAE
Scrophularia californica ssp. *californica* (California figwort)

SOLANACEAE
*Datura stramonium (*Jimson weed*)*
Nicotiana acuminata var*. multiflora*
(multi flowered tobacco)
*Nicotiana glauca** (tree tobacco)
*Solanum nigrum** (black nightshade)

TROPAEOLACEAE
*Tropaeolum majus** (nasturtium)

URTICACEAE
Parietaria hespera var. *californica* (pellitory)
Urtica dioica ssp. *holosericea* (stinging nettle)

*Urtica urens** (dwarf nettle)

VISCACEAE
Phoradendron villosum (oak mistletoe)

FLOWERING PLANTS - MONOCOTS

CYPERACE
Carex amplifolia (large-leaved sedge)
Carex densa (dense sedge)
Carex obnupta (slough sedge)
Cyperus erythrorhizos (red-rooted cyperus)
Cyperus esculentus (yellow nutsedge)
Cyperus laevigatus (smooth cyperus
Schoenoplectus americanus (American bulrush)
Schoenoplectus californicus (California bulrush)

JUNCACEAE
Juncus buffonius (toad rush)
Juncus effusus ssp. *pacificus* (Pacific bog rush)
*Juncus hesperius (*brown bog rush)
Juncus patens (spreading rush)
Juncus phaeocephalus (brown-headed rush)

POACEAE
*Arundo donax** (giant reed)
*Avena barbata** (slender wild oat)
*Bromus diandrus** (ripgut grass)
*Bromus hordeaceus** (soft chess)
*Cynodon dactylon** (Bermuda grass)
*Cynosurus echinatus** (dogtail grass)
*Dactylis glomerata** (orchard grass)
*Digitaria sanguinalis** (crab grass)
Distichlis spicata (salt grass)
Elymus glaucus (blue wildrye)
*Festuca myuros** (rattail fescue)
*Festuca perennis** (perennial ryegrass)
*Hordeum jubatum** (foxtail barley)
Leymus triticoides ssp. triticiodes (alkali wild rye)
*Paspalum dilatatum** (dallis grass)
*Pennisetum clandestinum** (kikuyu grass)
*Phalaris canariensis** (canary grass)
*Piptatherum miliaceum** (rice grass)
*Polypogon monspeliensis** (rabbit's foot grass)

TYPHACEAE
Sparganium eurycarpum var.. *eurycarpum* (bur-reed)
Typha angustifolia (narrow-leaved cattail)
Typha latifolia (broad-leaved cattail)

[2] Nomenclature from revised Jepson Manual (in press and online, 2011); common names according to Hickman (1993), and Bailey (1973).
* Non-native species.

ATTACHMENT 2

Phase I Archaeological Survey

ARCHAEOLOGICAL CONSULTING

P.O. BOX 3377
SALINAS, CA 93912
(831) 422-4912

PHASE 1 ARCHAEOLOGICAL SURVEY FOR THE PAJARO RIVER SEDIMENT EXCAVATION PROJECT, IN WATSONVILLE, SANTA CRUZ COUNTY, CALIFORNIA

by

Mary Doane, B.A., and Gary S. Breschini, Ph.D., RPA

December 27, 2011

Prepared for

County of Santa Cruz
Department of Public Works
Flood Control Management

SUMMARY: PROJECT 4587
RESULTS: NEGATIVE
LINEAR: ± 7.5 MILES
SITES: NONE
UTMG: EAST END 6.0800/40.8510, WEST END 6.0950/40.8250
MAP: USGS 7.5 MINUTE WATSONVILLE EAST AND WATSONVILLE WEST QUADRANGLES

For Planning Department:		Yes	No	N/A	See text
Evidence of:	Sacred/Religious site			X	
	Native American Remains		X		
	Anything of Archaeological Significance		X		
	Findings of Historical Significance		X		

	ROUTE DATA	COPY	ATT.
1	DIRECTOR	✓	
2	ASST. DIR. SPEC. SVCS.	✓	
	RECYCLING/SOLID WASTE		
	LANDFILL OPERATIONS		
3	WATER CON/FLOOD CONT.	✓	✓
	STORM WATER MANG.		
	CONSTRUCTION ENG.		
	SANITATION ENG.		
	WATER & WASTEWATER		
	ASST. DIR. TRANSPORT.		
	ROAD OPS. ENG.		
	PERMITS / ENCROACH.		
	DRAINAGE OPERATIONS		
	RD. MAINT. OPERATIONS		
	RDA ENG.		
	ROAD DESIGN ENG.		
	SURVEY / DEVELOPMENT		
	TRANSP / RD. PLANNING		
	ASST. DIR. ADMIN. SVCS.		
	REAL PROPERTY / FLEET		
	CSA / PRGM ADMIN.		
	SAFETY OFFICER / LIVE OAK P.		
	PERSONNEL / MIS		

ARCHAEOLOGICAL CONSULTING

P.O. BOX 3377
SALINAS, CA 93912
(831) 422-4912

PHASE 1 ARCHAEOLOGICAL SURVEY FOR THE PAJARO RIVER SEDIMENT EXCAVATION PROJECT, IN WATSONVILLE, SANTA CRUZ COUNTY, CALIFORNIA

by

Mary Doane, B.A., and Gary S. Breschini, Ph.D., RPA

December 27, 2011

Prepared for

County of Santa Cruz
Department of Public Works
Flood Control Management

SUMMARY: PROJECT 4587
RESULTS: NEGATIVE
LINEAR: ± 7.5 MILES
SITES: NONE
UTMG: EAST END 6.0800/40.8510, WEST END 6.0950/40.8250
MAP: USGS 7.5 MINUTE WATSONVILLE EAST AND WATSONVILLE WEST QUADRANGLES

For Planning Department:		Yes	No	N/A	See text
Evidence of:	Sacred/Religious site	___	___	_X_	_____
	Native American Remains	___	_X_	___	_____
	Anything of Archaeological Significance	___	_X_	___	_____
	Findings of Historical Significance	___	_X_	___	_____

INTRODUCTION

In November 2011 Archaeological Consulting was authorized by the County of Santa Cruz to prepare a Phase 1 Archaeological Survey report for the Pajaro River Sediment Excavation project in Watsonville, Santa Cruz County, California.

As part of our methodology in the preparation of this report, we have conducted: 1) a background records search of the files of the Northwest Regional Information Center of the California Historical Resources Information System (CHRIS), located at Sonoma State University; and 2) a field survey of the project Area of Potential Effects (APE). The following report contains the results of our investigations as well as our conclusions and recommendations.

PROJECT LOCATION AND DESCRIPTION

The project APE includes the several portions of the north bank of the Pajaro River between Murphy Crossing and State Highway 1 in Watsonville, Santa Cruz County, California (see Maps 1 through 3). In addition the APE includes two areas on the south bank of the Pajaro River in northern Monterey County. A potential construction bridge crossing of Salsipuedes Creek as well as a staging area on Walker Road were included in the APE. The project proposes reducing the sediment profile within the existing levees, creating new slopes and benches that will better manage water flow (see Construction Plans C1 through C20).

The Universal Transverse Mercator Grid (UTMG) coordinates for the approximate ends of the project APE are as follows: East end, Murphy Road crossing of the Pajaro River, 6.0746/40.8915 and West end, Highway 1 over the Pajaro River 6.0822/40.8878 on the USGS 7.5 minute Watsonville East and Watsonville West Quadrangles (1954; photorevised 1980).

The project proposes removal of sediment from eleven areas along the Pajaro River bank, recontouring the slopes in those areas and revegetation of the area. Temporary access ramps to the levees will be required in several places.

Because of variations in types and management of vegetation and the presence of existing bridges and drainage features surface visibility was variable throughout the project APE. Many areas in and near the APE afforded good soil visibility, while vegetation in others allowed only poor intermittent surface access. Copious gopher activity in most areas augmented otherwise limited surface visibility. Overall, soil visibility was considered adequate for the purposes of this survey.

PROJECT METHODOLOGY

The methodology used in the preparation of this report included two primary steps, as follows:

Background Research

The background research included a records search of the archaeological site records, maps, and project files of the Northwest Regional Information Center of the California Historical Resources Information System (CHRIS), located at Sonoma State University, Rohnert Park. In addition, our own extensive files and maps were examined for supplemental information, such as rumored locations of historic or prehistoric resources in the general project area.

Established by the California Office of Historic Preservation, the Regional Information Centers are the local repository for all reports prepared under cultural resource management regulations. A literature search at the Regional Information Center is required by state guidelines and current professional standards. Following completion of a project, a copy of the report must be deposited there.

These literature searches are undertaken to determine if there are any recorded cultural resources within or immediately adjacent to the project area, and whether the area has been included in any previous archaeological studies.

Field Survey

The field survey was conducted by Mary Doane, B.A., with over 25 years of experience in Central Coast Archaeology and Patrick Cave, with over 20 years experience. The field studies occurred between December 14 and 20, 2011. The survey consisted of a "general surface reconnaissance" of all areas in the APE that could reasonably be expected to contain visible cultural resources and that could be viewed without major vegetation or pavement removal or excavation.

RESULTS OF THE STUDY

Background Research

The literature search at the Northwest Regional Information Center found no prehistoric or historic archaeological sites recorded within the project APE (see Attachment 1). Eight cultural resources, two prehistoric and six historic, are recorded within one kilometer of the APE. The historic resources include several road alignments and the City of Watsonville.

Portions of the Pajaro River watershed within the project APE have been subject to previous surveys (Edwards and Farley 1974, Peak et al. 1977, Jones 1988, Runnings and Breschini 1990, US Army Corps of Engineers 1996, Chisholm 1998). No significant historic resources were identified in the APE in those studies.

The California Inventory of Historical Resources (March 1976), California Historical Landmarks, and the National Register of Historic Places were checked for listed historic resources in the project APE. No listed resources were found.

The project area lies within the currently recognized ethnographic territory of the Costanoan (often called Ohlone) linguistic group. Discussions of this group and their territorial boundaries can be found in Breschini, Haversat, and Hampson (1983), Kroeber (1925), Levy (1978), Margolin (1978), and other sources. In brief, the group followed a general hunting and gathering subsistence pattern with partial dependence on the natural acorn crop. Habitation is considered to have been semi-sedentary and occupation sites can be expected most often at the confluence of streams, other areas of suitable topography along streams, or in the vicinity of springs. These original sources of water may no longer be present or adequate. Resource gathering and processing areas and associated temporary campsites are frequently found on the coast and in other locations containing resources utilized by the group. Factors that may influence the locations of these sites include the presence of suitable exposures of rock for bedrock mortars or other milling activities, ecotones, the presence of specific resources (oak groves, marshes, quarries, game trails, trade routes, etc.), proximity to water, and the availability of shelter. Temporary camps or other activity areas can also be found along ridges or other travel corridors.

Field Survey

None of the materials frequently associated with prehistoric cultural resources in this area (dark greasy or ashy midden soil, fragments of weathered marine shell, flaked or ground stone, fire-affected rock, bone fragments, etc.) were observed in the soil in any part of the project APE. The exposed soil throughout the APE ranged from light brown silt to tan sand.

No evidence of historic period cultural resources, such as patinated glass and ceramics sherds with historic patterns or maker's marks, etc., was noted during the survey in any part of the APE.

CONCLUSIONS AND RECOMMENDATIONS

Based on the research through the California Historic Resources Information System and our field survey, we have identified no significant cultural resources within the Pajaro River Sediment Excavation project APE. Therefore we have concluded that the proposed project will have no effect on significant historic resources.

Because of the possibility of unidentified (e.g., buried) cultural resources being found during any construction project, we recommend that the following standard language, or the equivalent, be included in any permits issued for the project area:

- If archaeological resources or human remains are unexpectedly discovered during construction, work shall be halted within 50 meters (±160 feet) of the find until it can be evaluated by a qualified professional archaeologist. If the find is determined to be significant, appropriate mitigation measures shall be formulated, with the concurrence of the Lead Agency, and implemented.

REFERENCES

Breschini, G. S., T. Haversat, and R. P. Hampson

1983 **A Cultural Resources Overview of the Coast and Coast-Valley Study Areas [California].** Coyote Press, Salinas.

Chisholm, R.

1998 Cultural Resource Assessment, Pajaro River and Salsipuedes Creek, Monterey and Santa Cruz Counties, California. Report on file with the Northwest Information Center, Sonoma State University.

Edwards, R. and M. Farley

1974 Pajaro River Basin Archaeological Survey. Report on file with the Northwest Information Center, Sonoma State University.

Jones, T.

1988 Archaeological Survey Report, proposed modifications to five bridges along Highway 1, 104-SCR-1 P.M. 0.0/3.4 4273-124740 (Caltrans). Report on file with the Northwest Information Center, Sonoma State University.

Kroeber, A. L.

1925 Handbook of the Indians of California. **Bureau of American Ethnology Bulletin** 78.

Levy, R.

1978 Costanoan. Pp. 485-495 in **Handbook of North American Indians, Vol. 8, California.** Smithsonian Institution, Washington, D.C.

Margolin, M.

1978 **The Ohlone Way.** Heyday Books, Berkeley.

Peak, A. S. and Associates

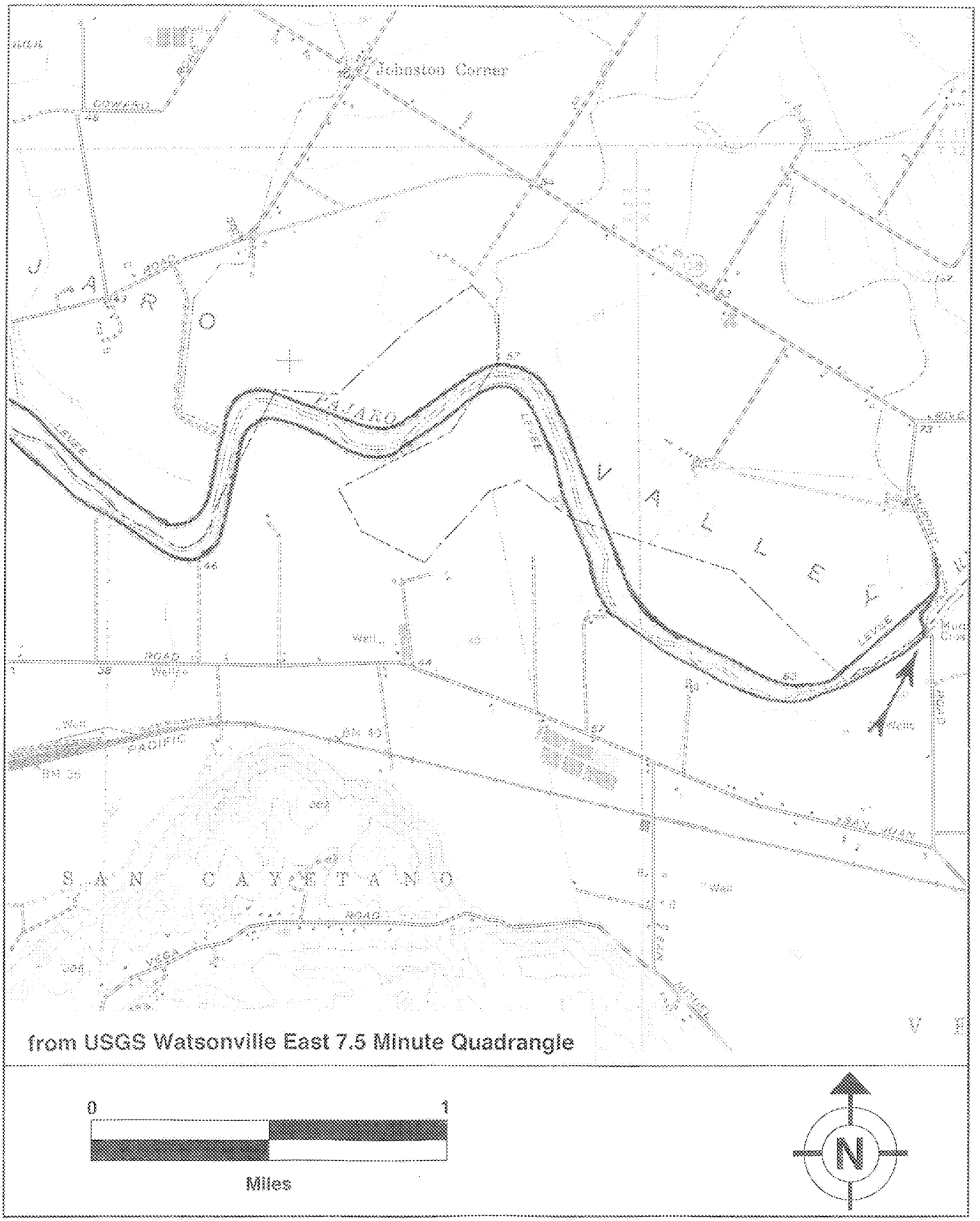
1977 Santa Cruz Regional Wastewater Treatment System Project, Santa Cruz County, California. Report on file with the Northwest Information Center, Sonoma State University.

Runnings, A. and G. S. Breschini

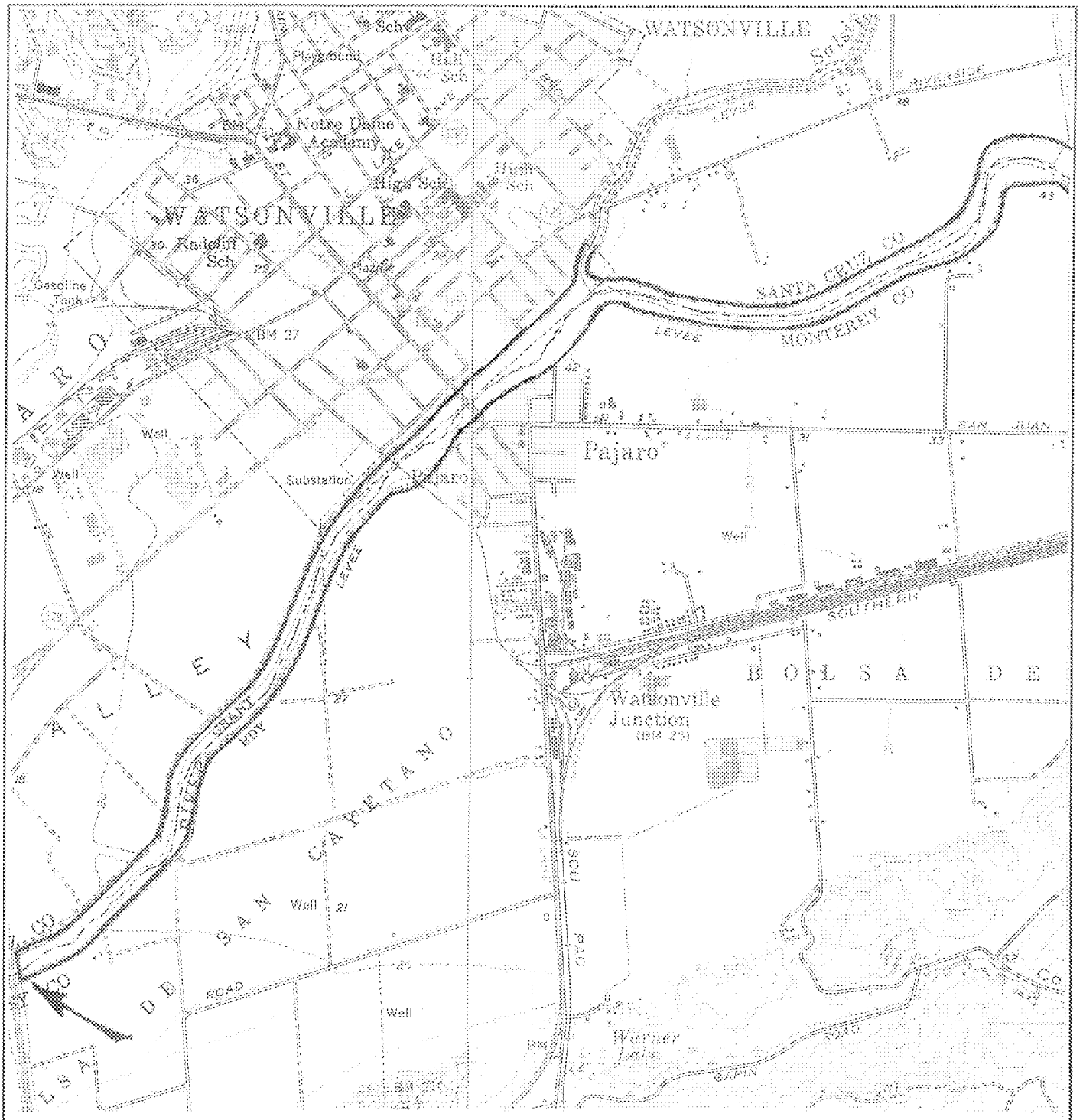
1990 Preliminary Cultural Resources Reconnaissance of the Porter Drive Bridge, Pajaro, Monterey County, California. Report on file with the Northwest Information Center, Sonoma State University.

U. S. Army Corps of Engineers

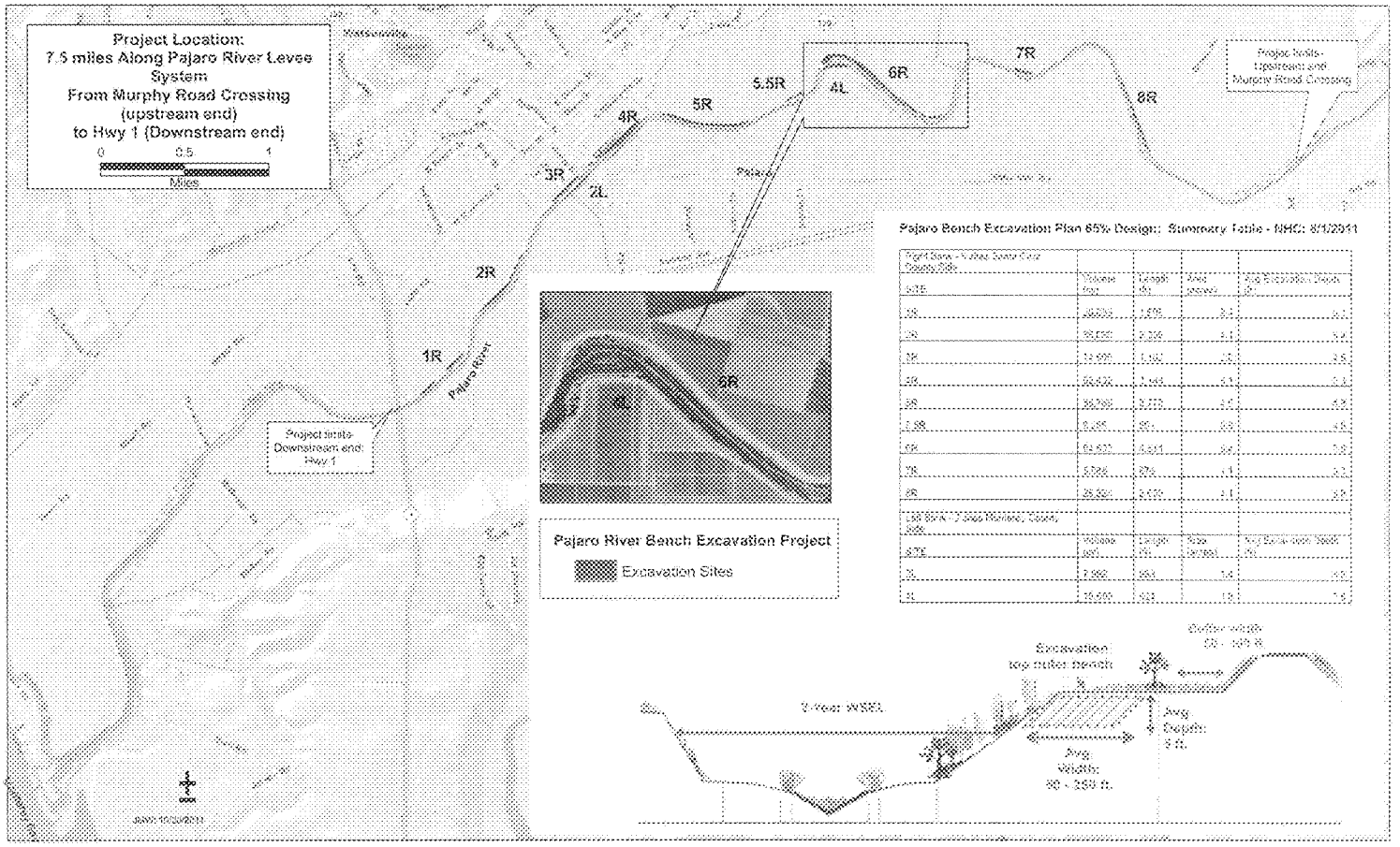
1996 Cultural Resource Assessment, Pajaro River Reconnaissance Survey, U. S. Army Corps of Engineers San Francisco District, Pajaro River Flood Control Project, 1996. Report on file with the Northwest Information Center, Sonoma State University.



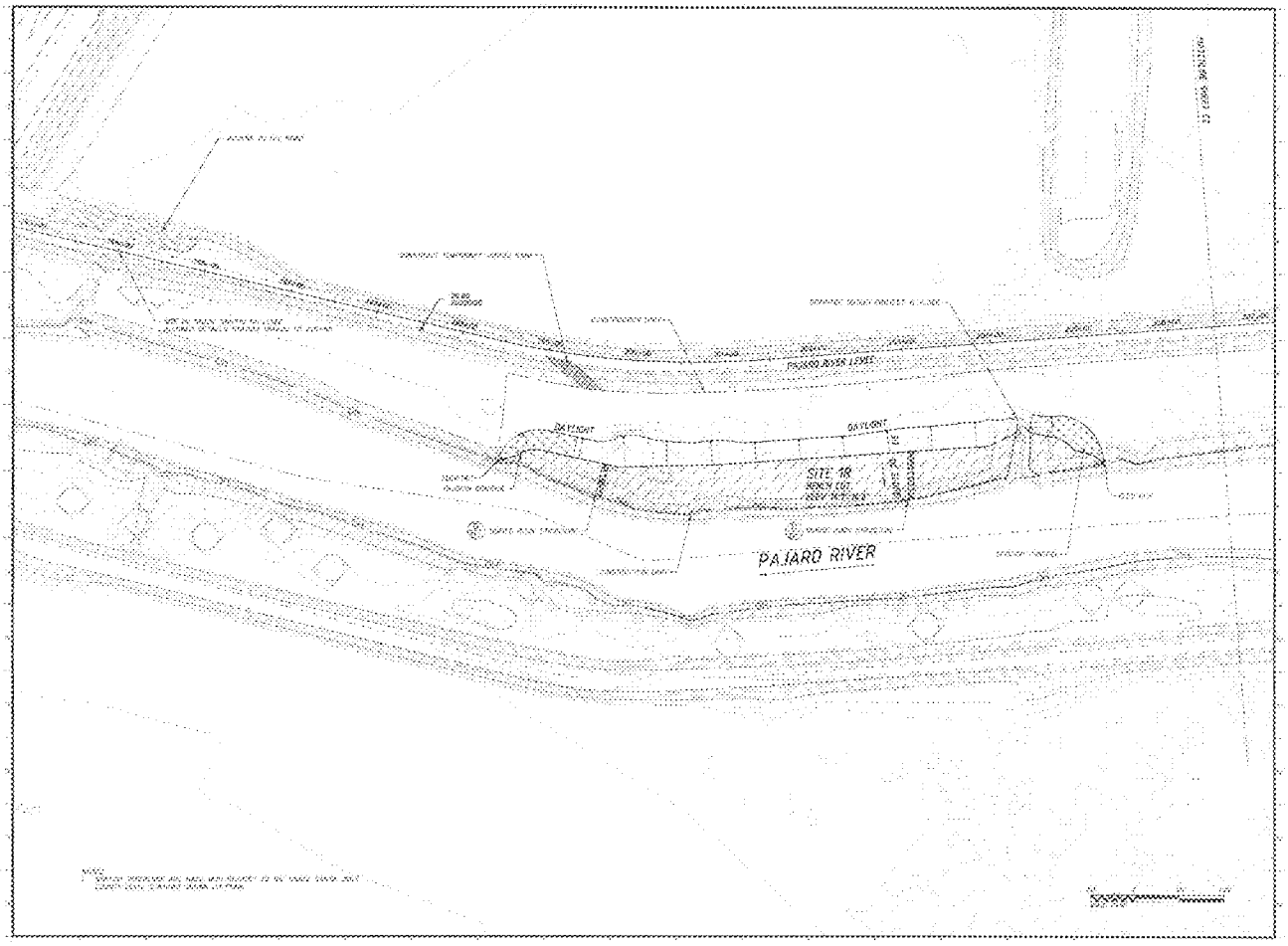
Map 1. Project Location.

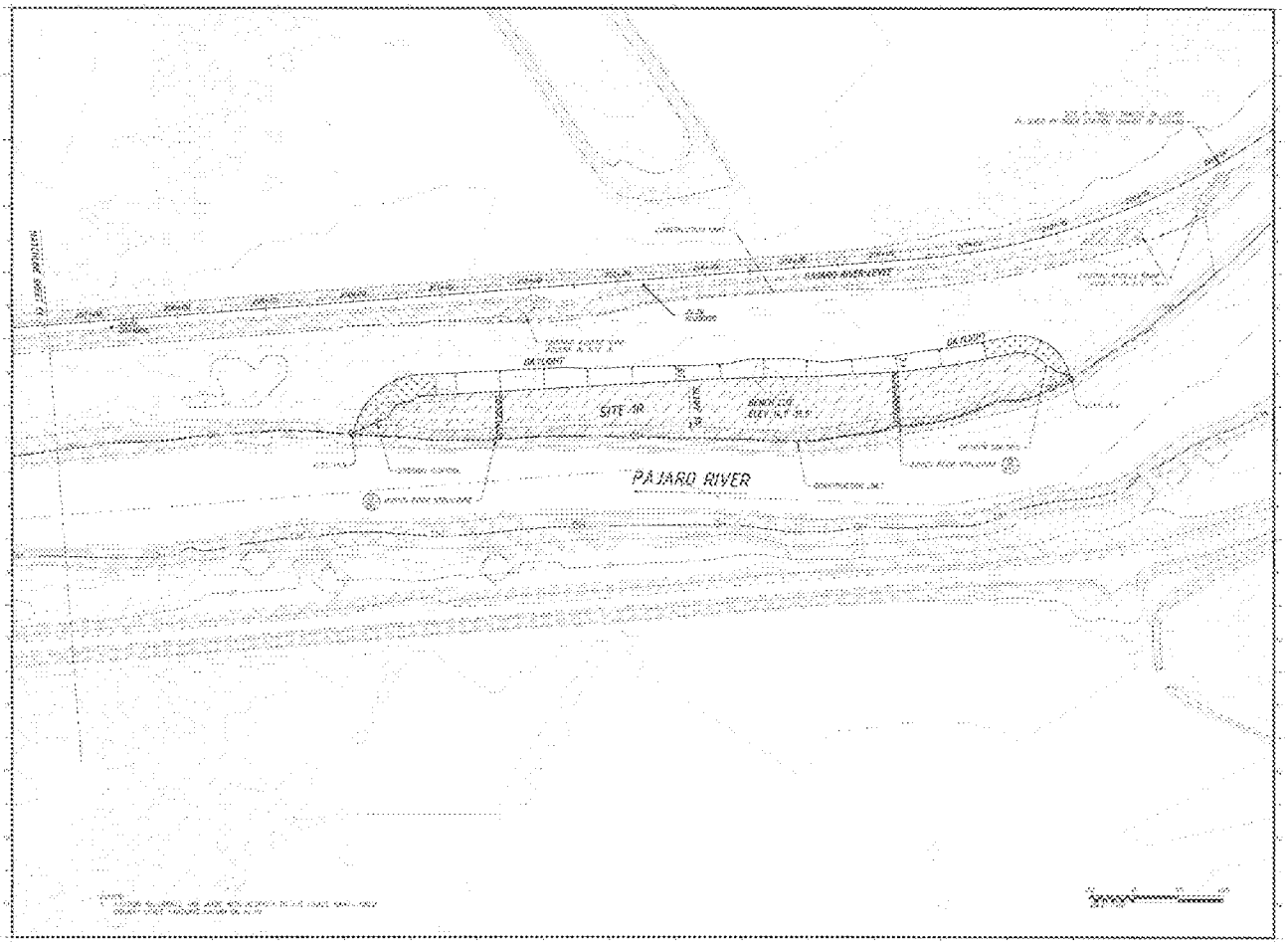


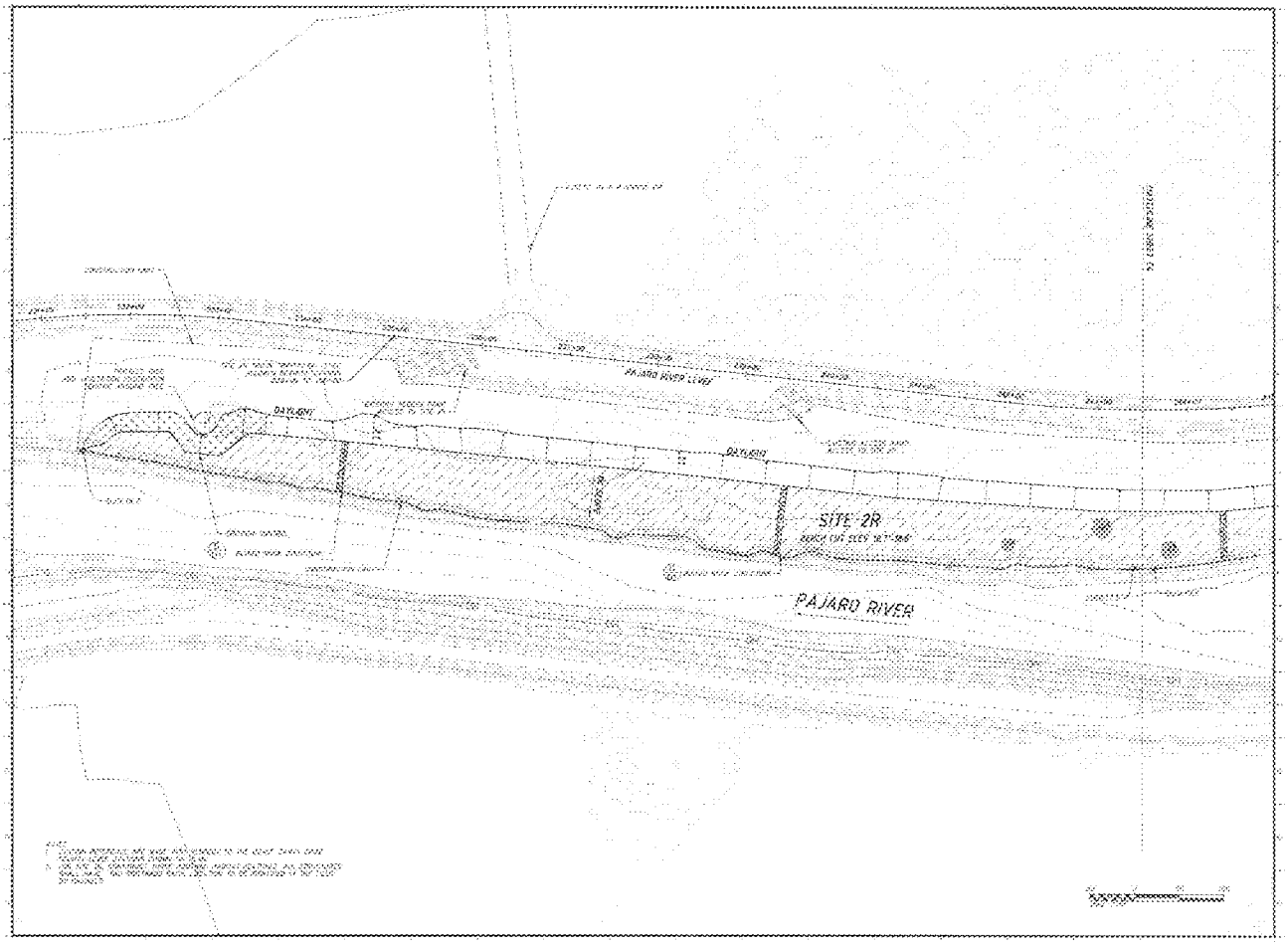
Map 2. Project Location



Map 3. Project Location


PAJARO RIVER
SITE 1R
DAYLIGHT
DAYLIGHT

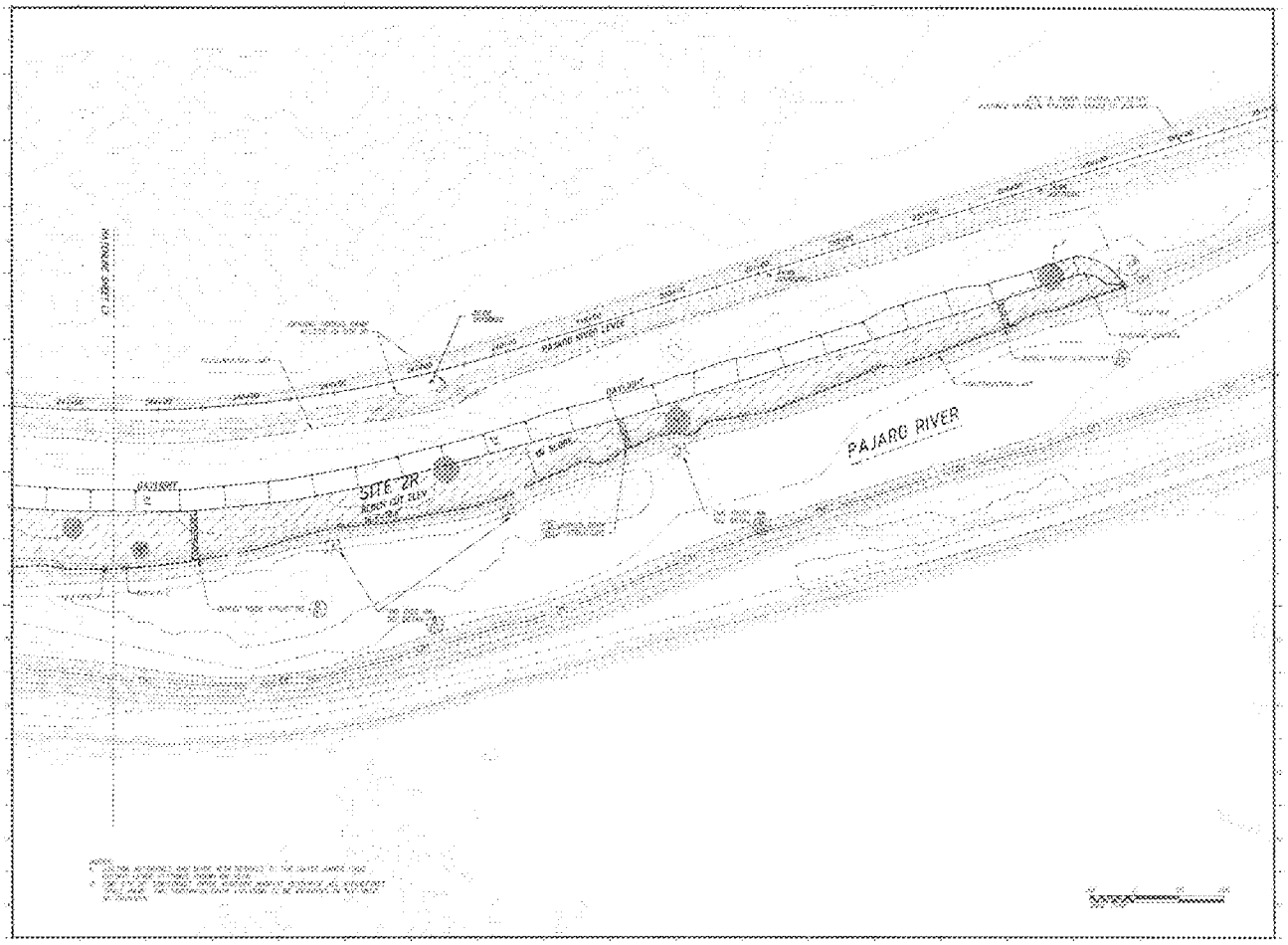

PAJARO RIVER
SITE 4R

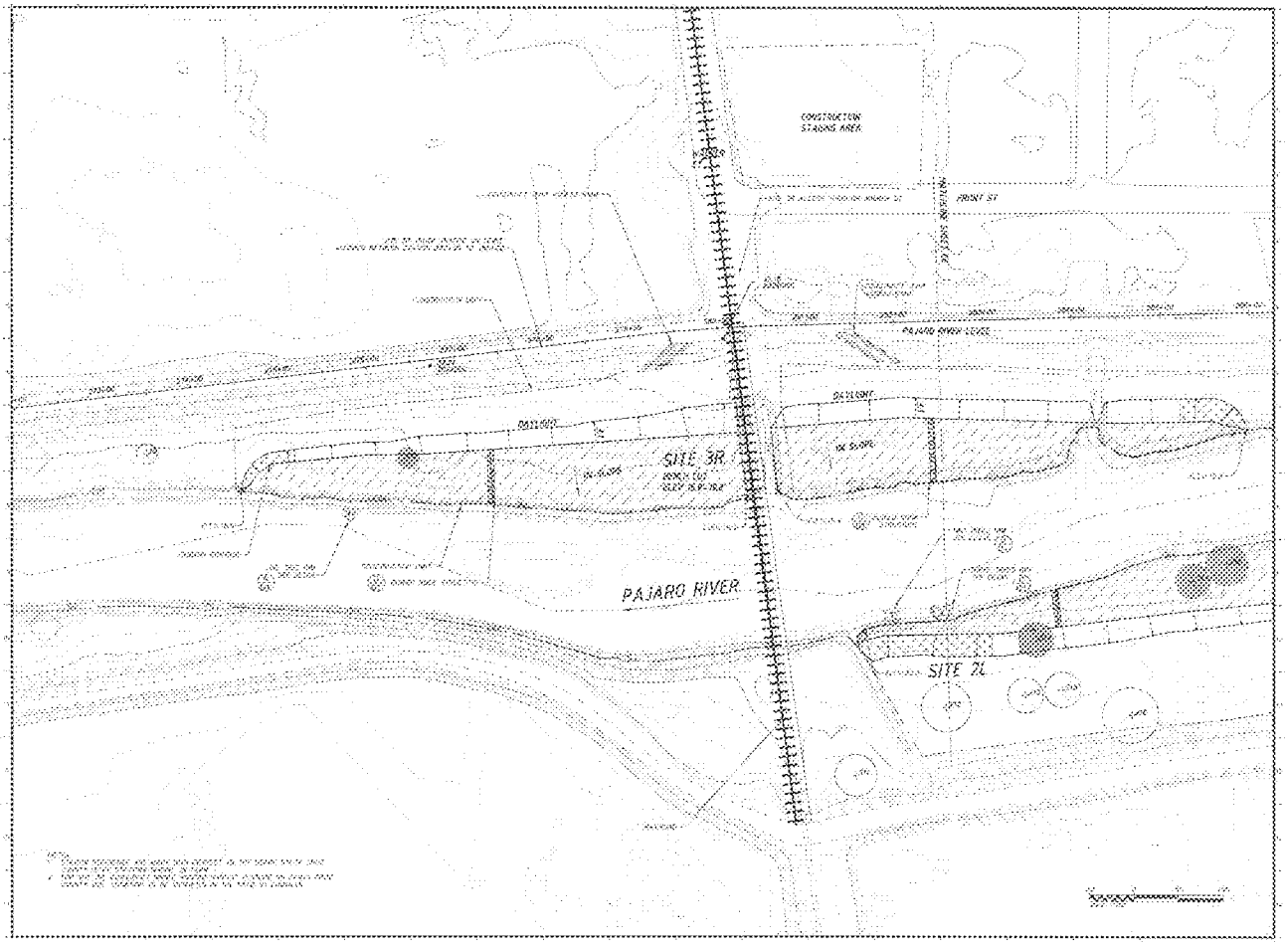


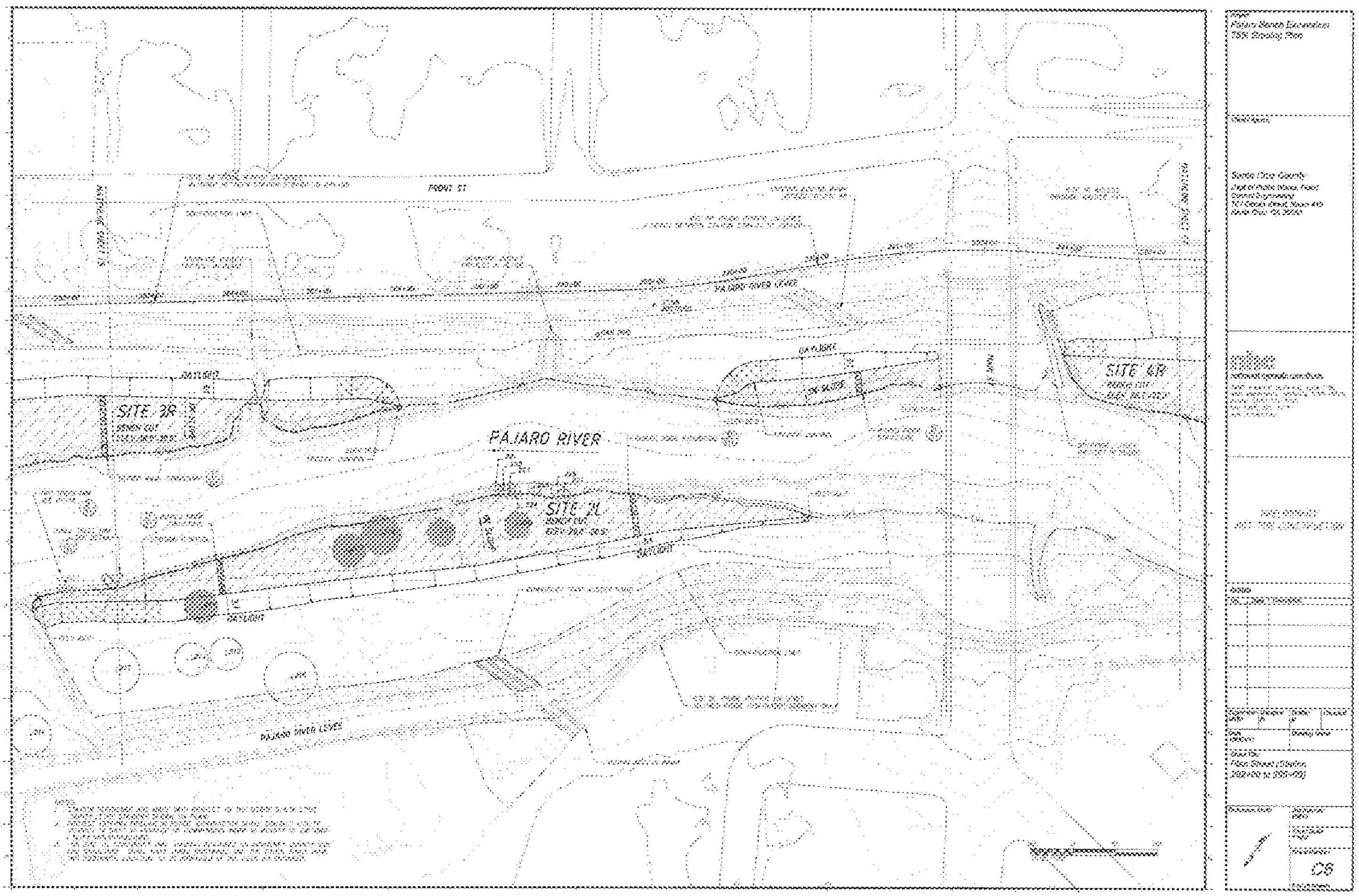
Pajaro Bench Excavation
75% Grading Plan

Santa Cruz County
Dept of Public Works, Road
Design Engineering
701 Ocean Street, Room 410
Santa Cruz, CA 95060

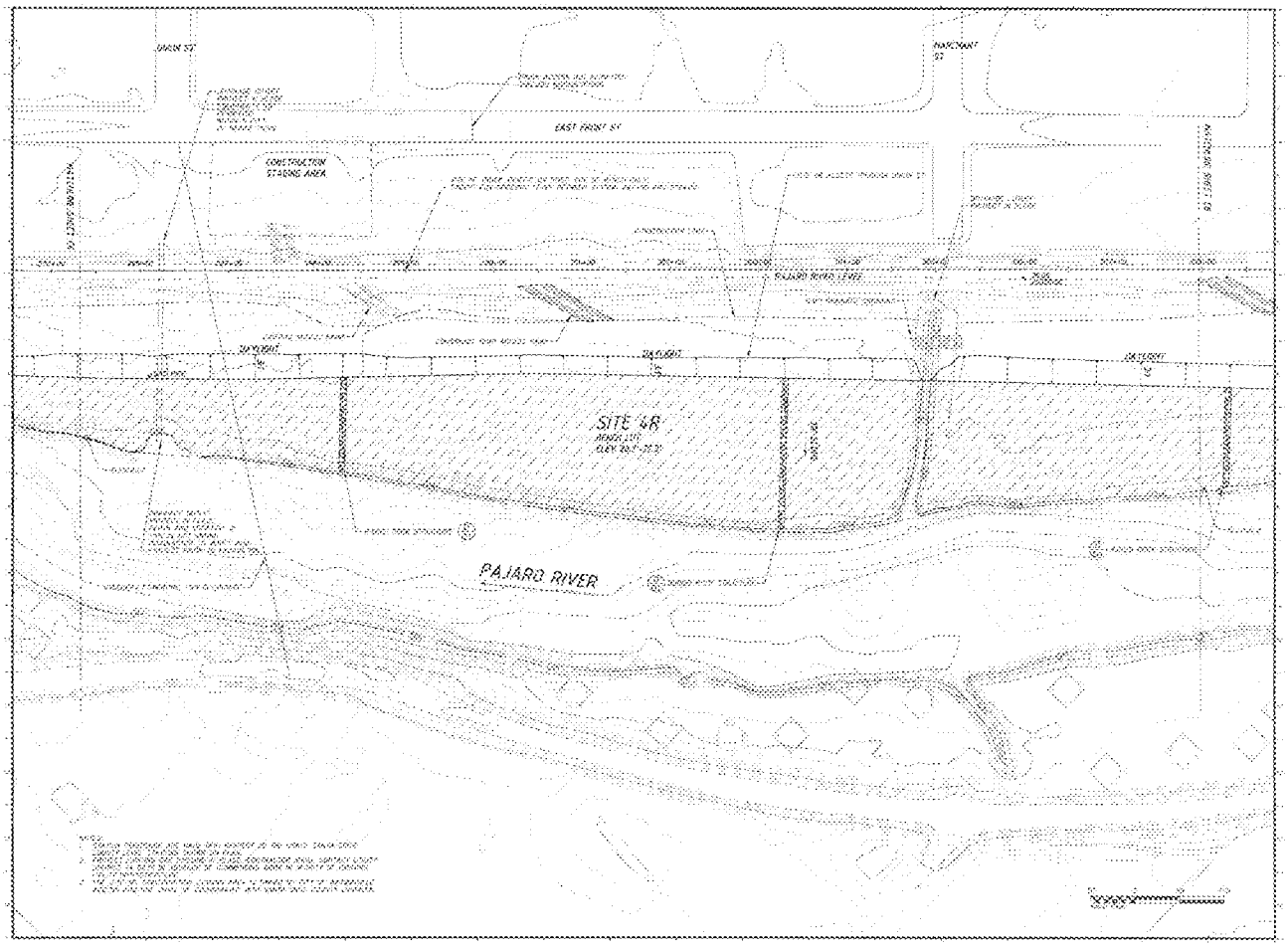
C3

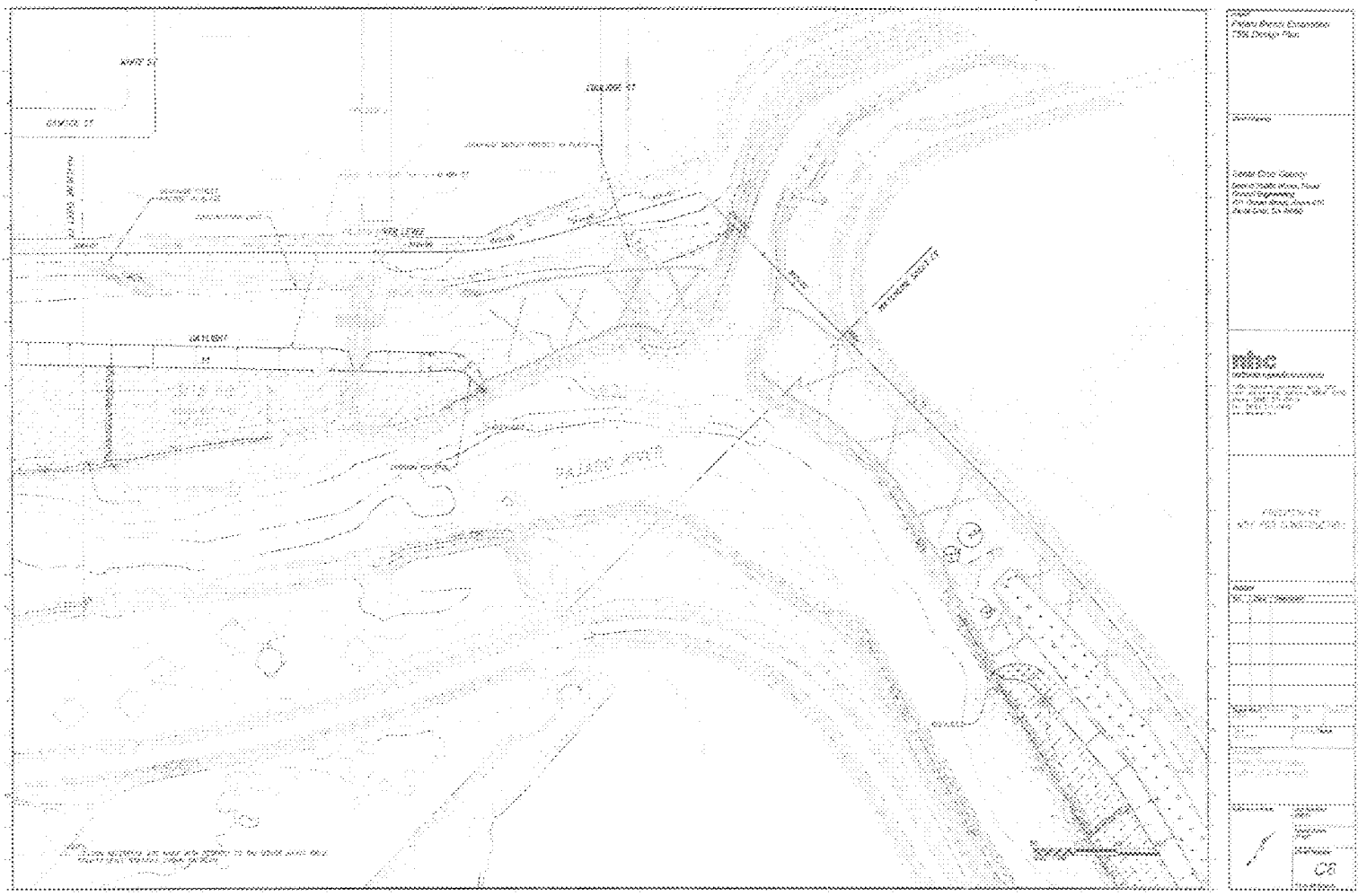

SITE 2R
PAJARO RIVER

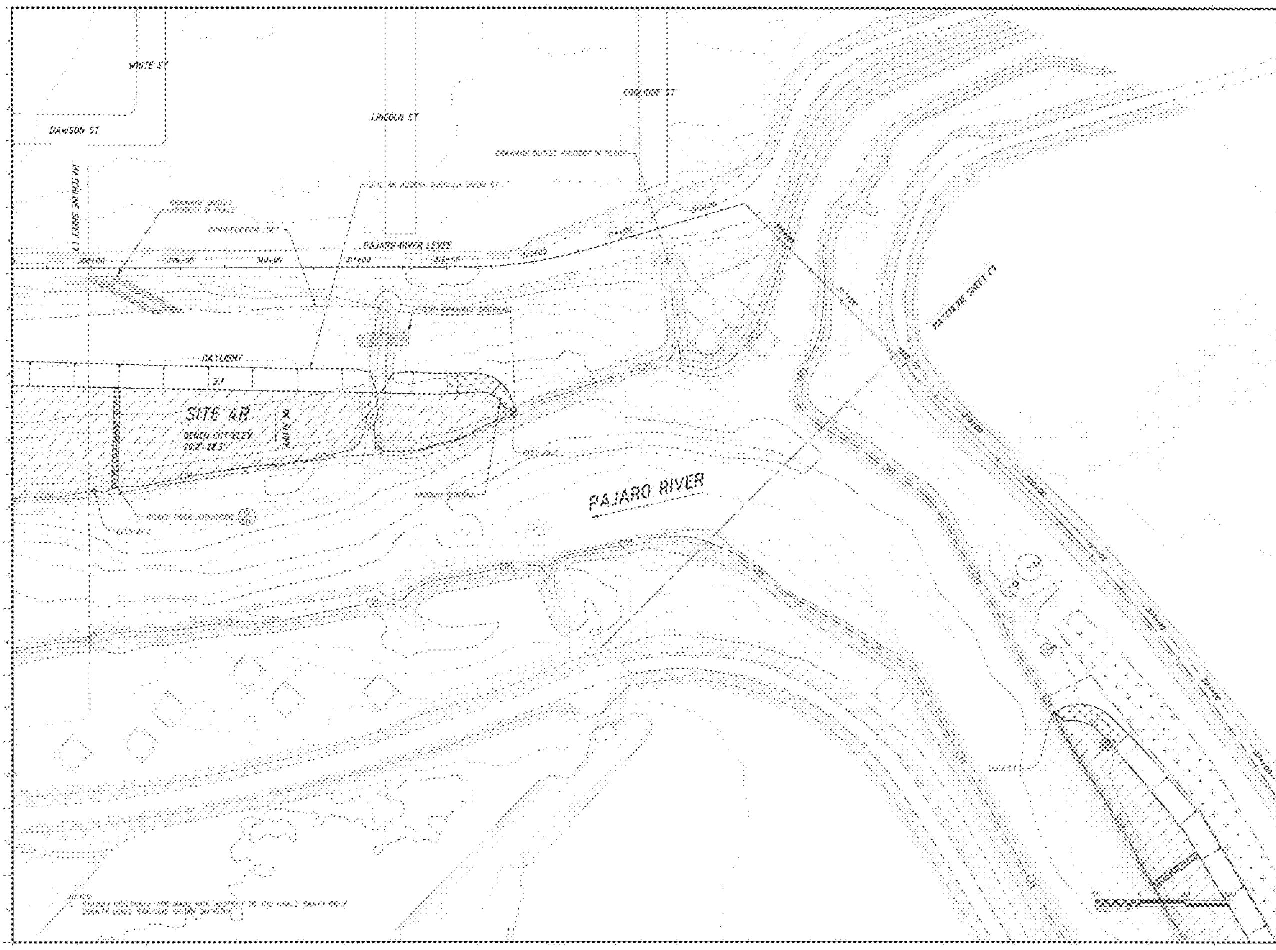

CONSTRUCTION STAGING AREA
FRONT ST
PAJARO RIVER LEVEE
SKYLIGHT
SITE 3R
SITE 2L
PAJARO RIVER



FRONT ST
PAJARO RIVER LEVEE
SITE 3R
BENCH CUT
PAJARO RIVER
SITE 2L
BENCH CUT
DAYLIGHT
SITE 4R
PAJARO RIVER LEVEE
Santa Cruz County
CS


MAIN ST
EAST FRONT ST
MONTEREY ST
CONSTRUCTION STAGING AREA
SITE 4B
PAJARO RIVER



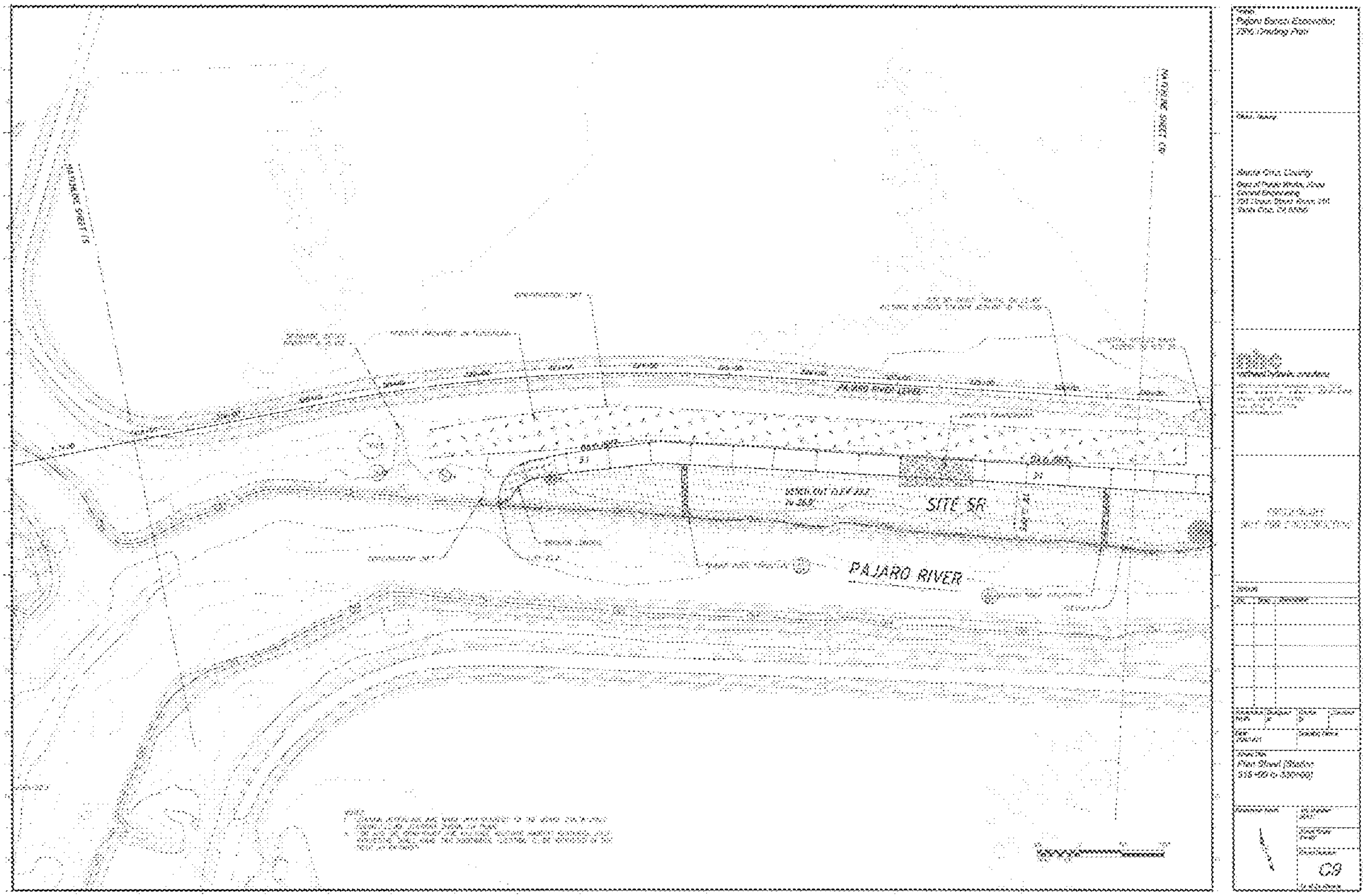


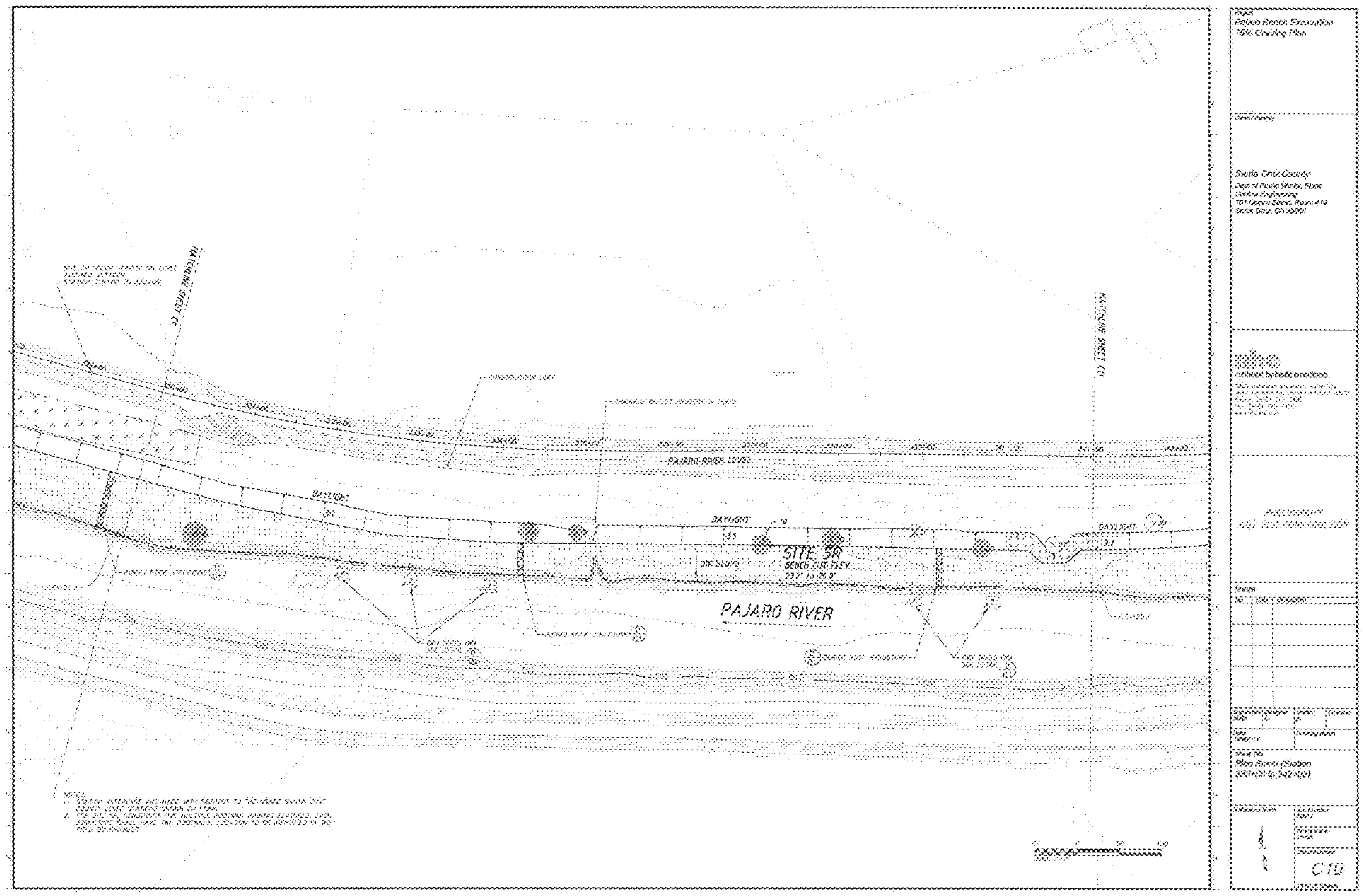
Pajaro Bench Excavation
75% Grading Plan

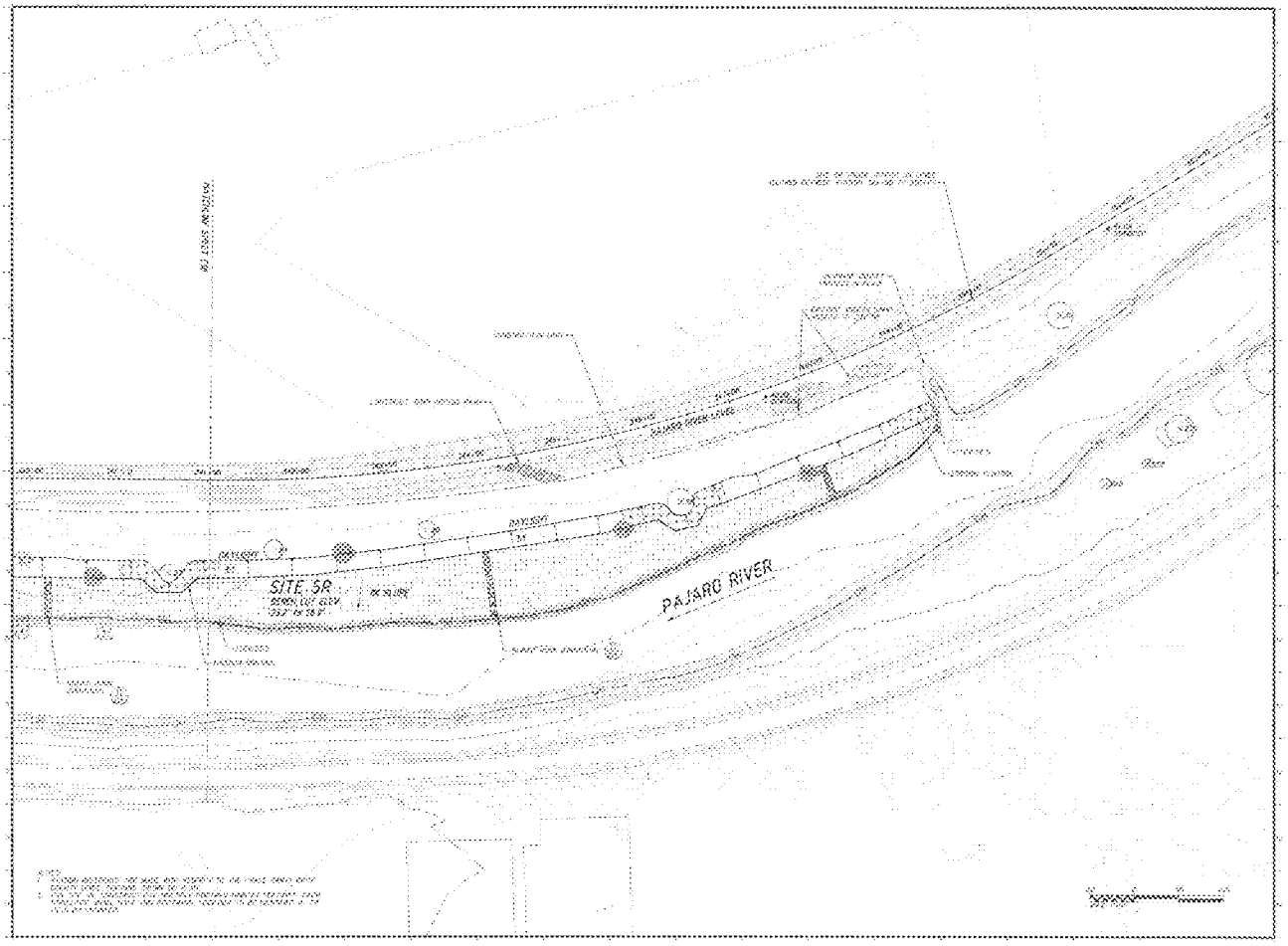
Santa Cruz County

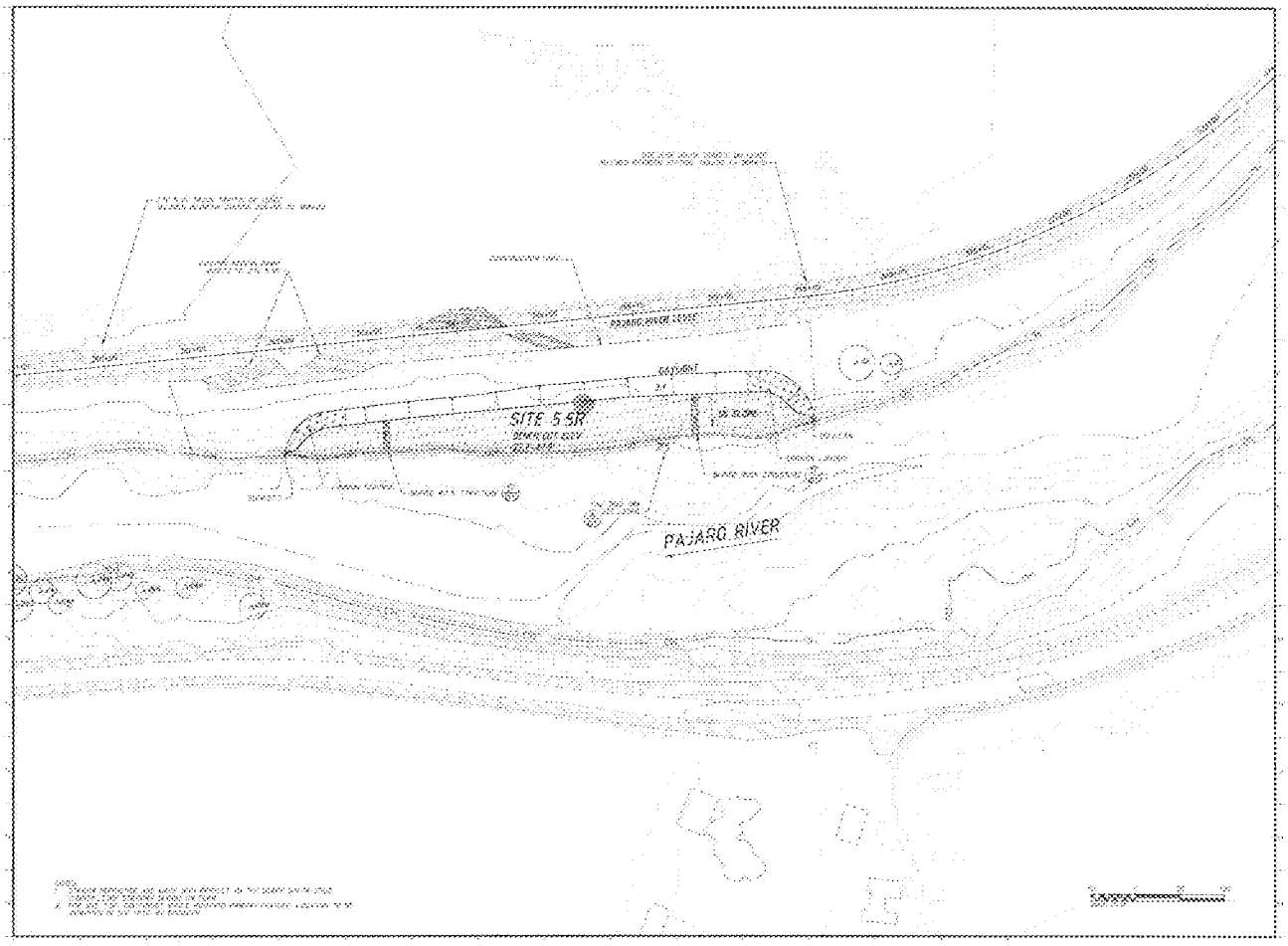
Plan Sheet (Station

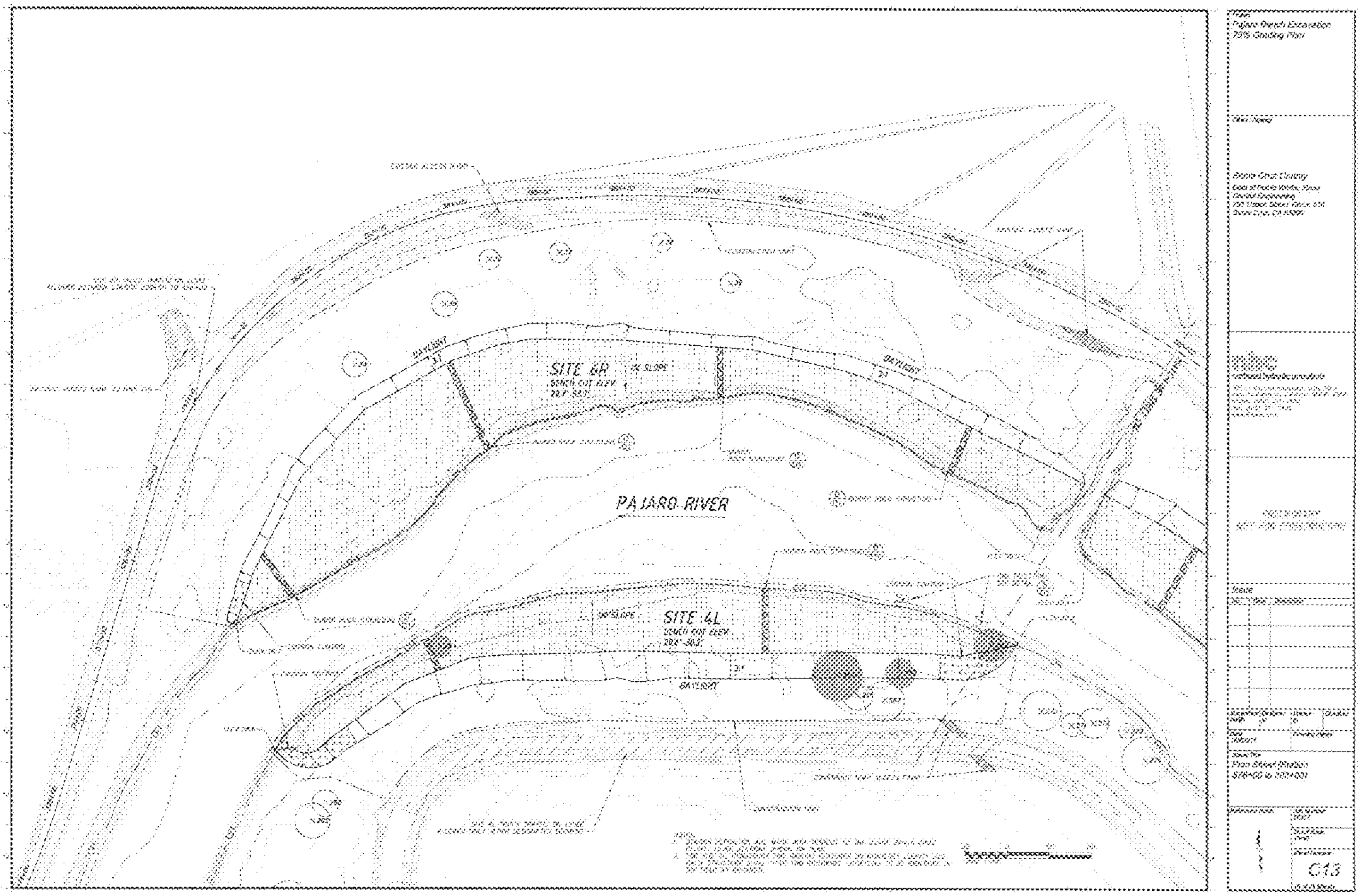
C8

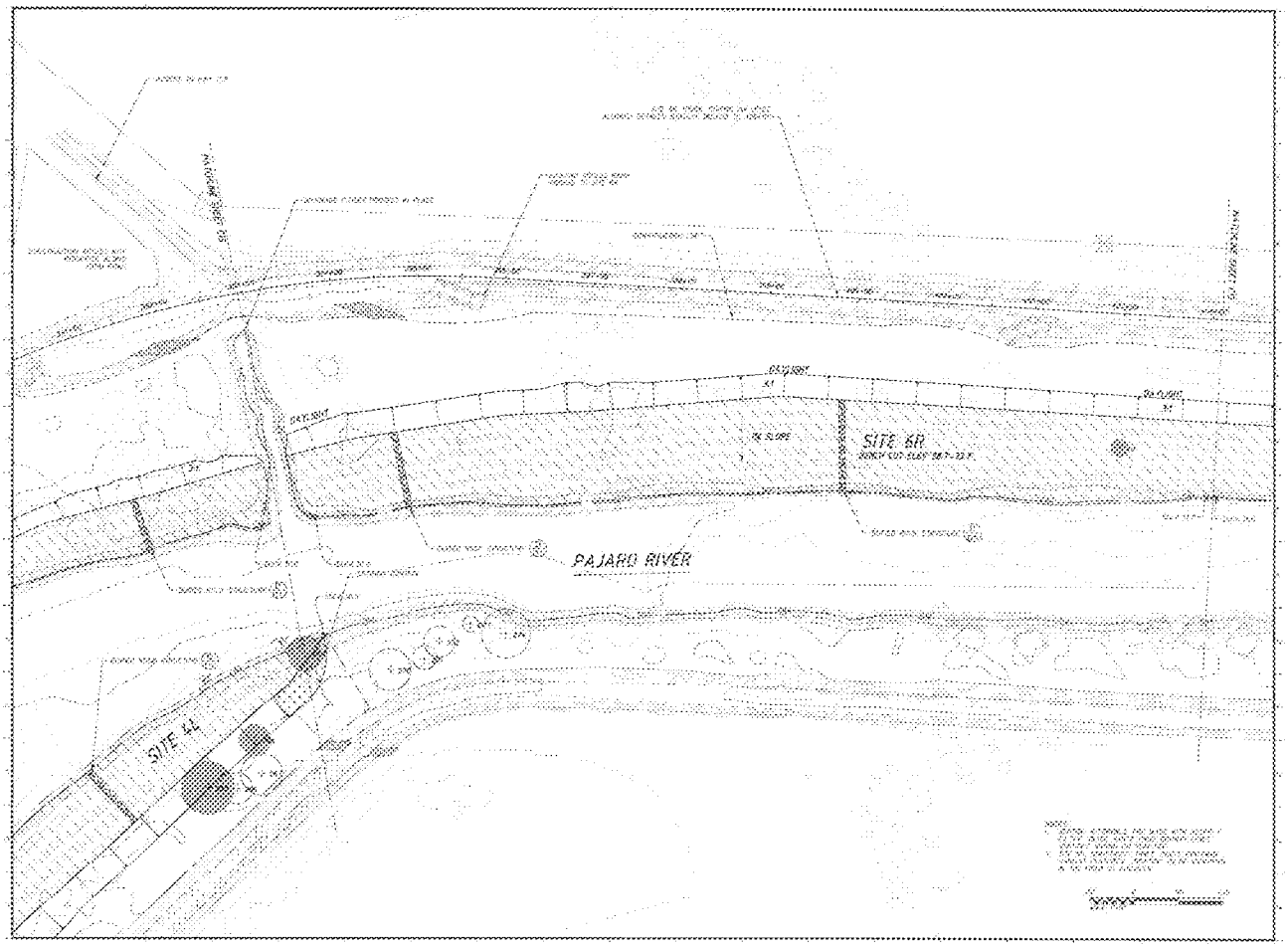

SITE SR
PAJARO RIVER
Santa Cruz County
C9

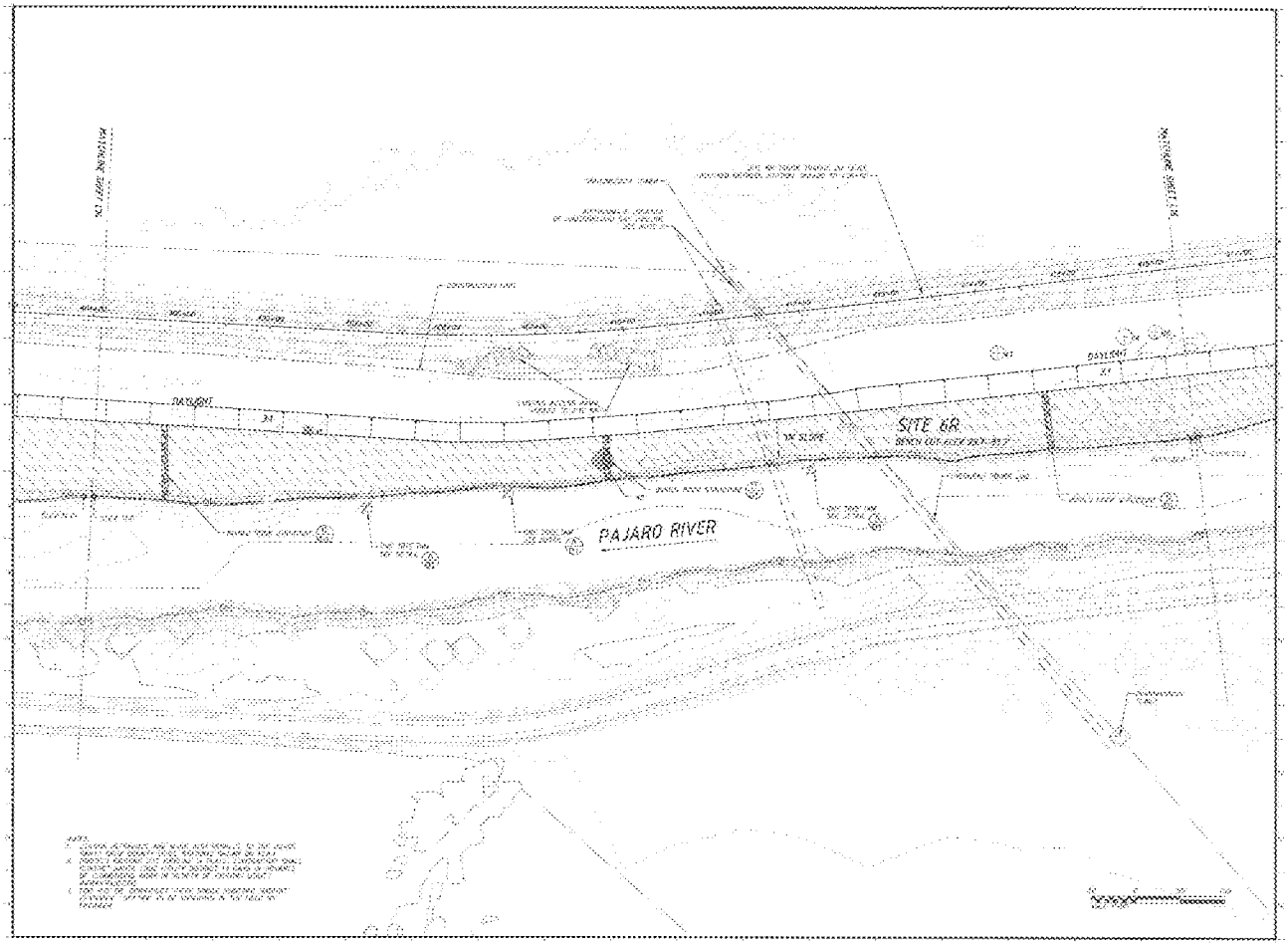

PAJARO RIVER
SITE 5R
PAJARO RIVER LEVEE
DAYLIGHT
Santa Cruz County
C10

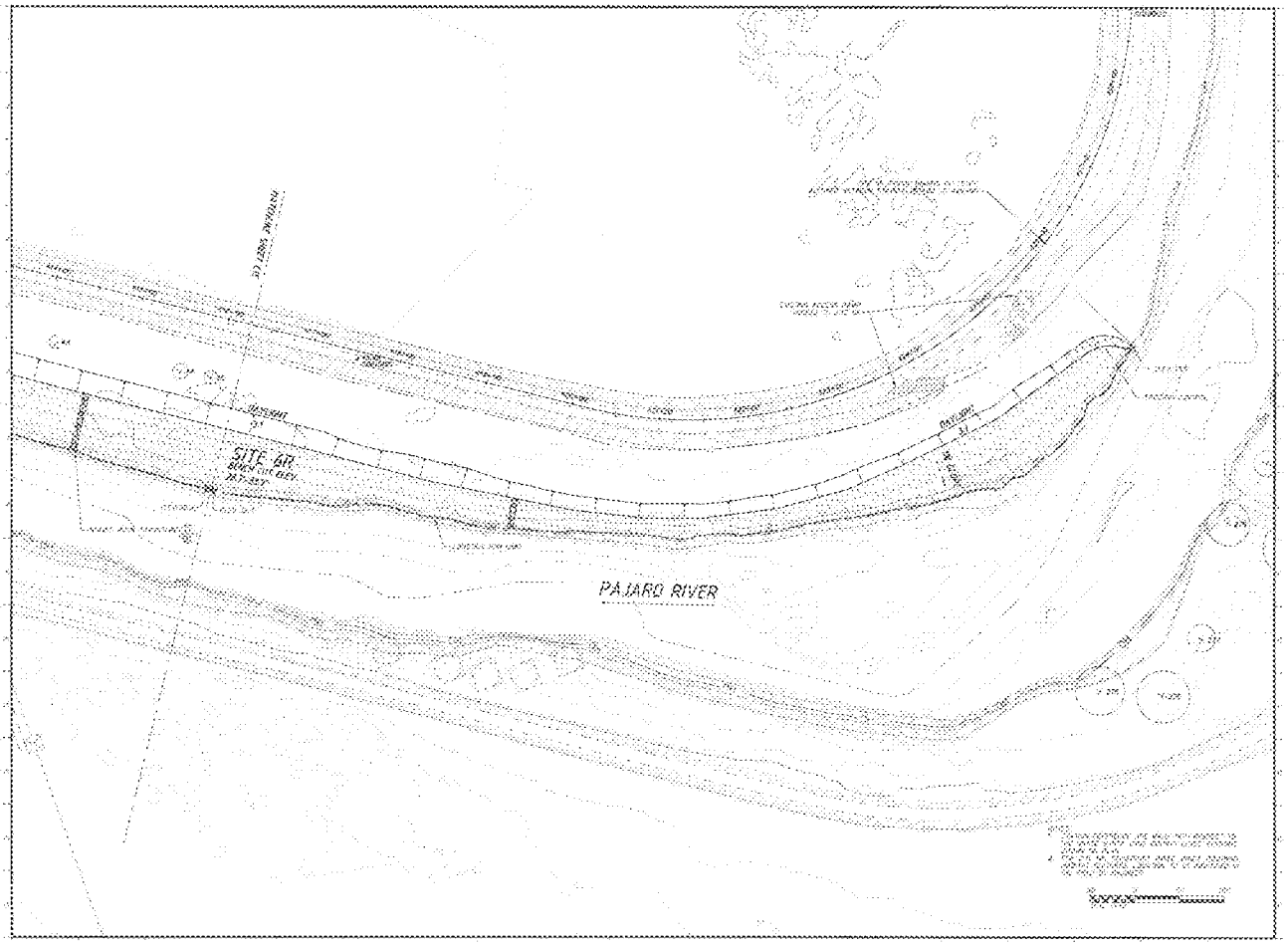

SITE SR
PAJARO RIVER


SITE 5 SR
PAJARO RIVER


Pajaro Bench Excavation
75% Grading Plan
Santa Cruz County
SITE 6R
PAJARO RIVER
SITE 4L
DAYLIGHT
C13


SITE 6R
PAJARO RIVER
SITE 44


SITE 6R
PAJARO RIVER



Pajaro Beach Restoration
60% Grading Plan

Santa Cruz County
Board of Supervisors
First District
Zone 7 Water Agency
State Dept. of Parks

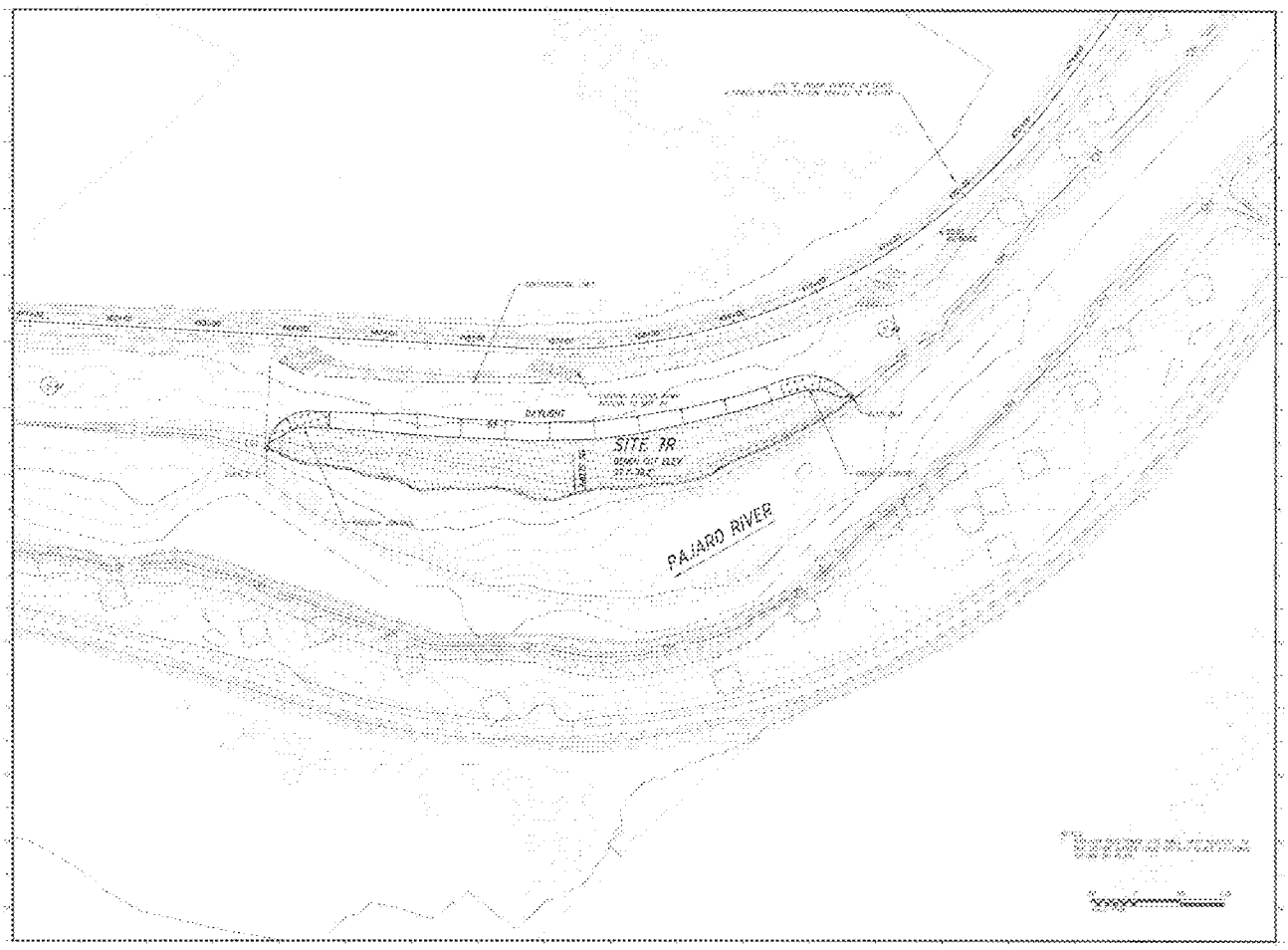
Wallace Group
A California Corporation
Civil Engineering
Water Resources
Surveying
Landscape Architecture
Planning
San Luis Obispo, California
(805) 544-4011

No.	Date	Revision

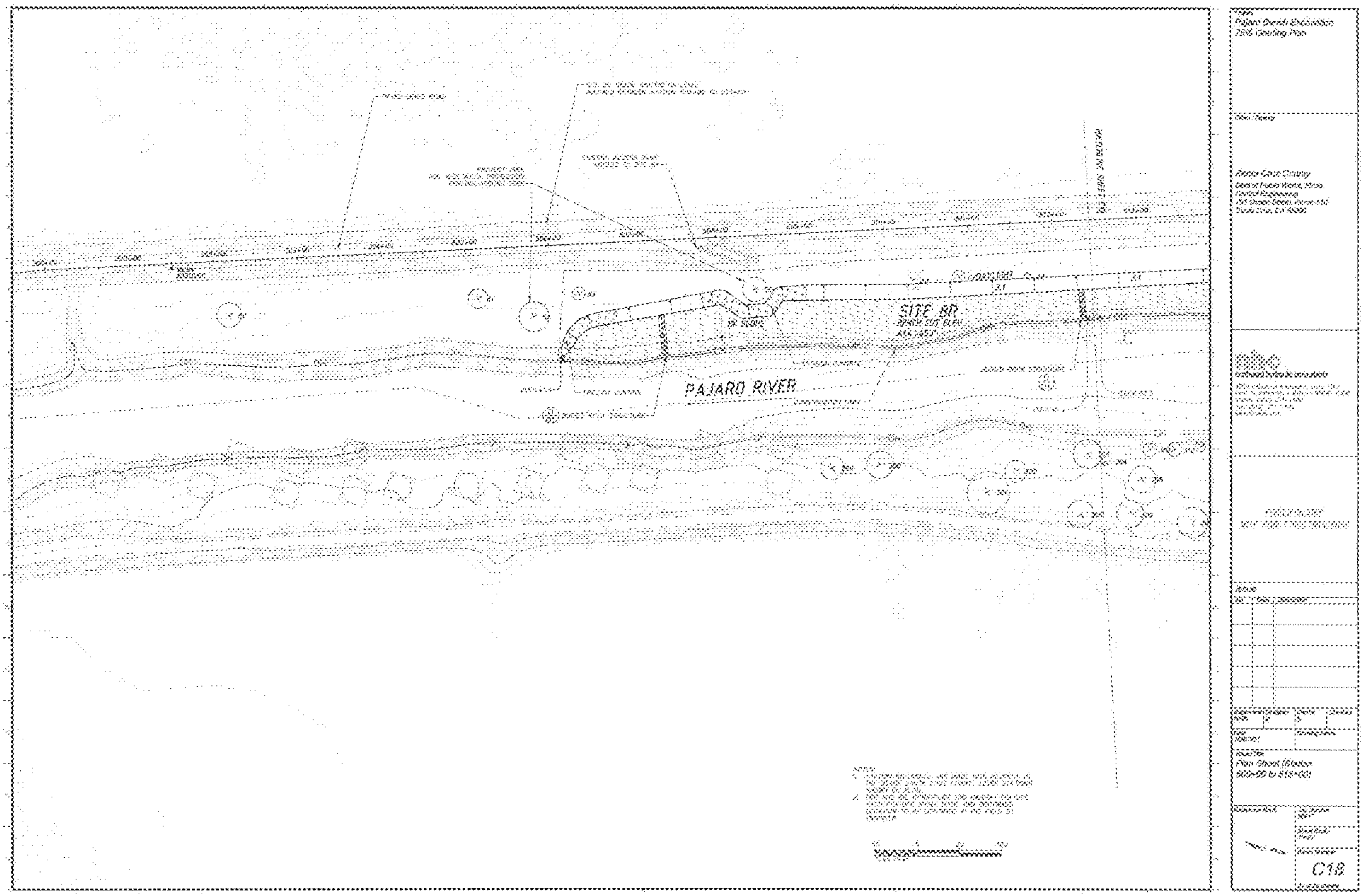
Date: 7-2-09
Scale: 1"=40'
Drawn: SMA
Checked: JJ

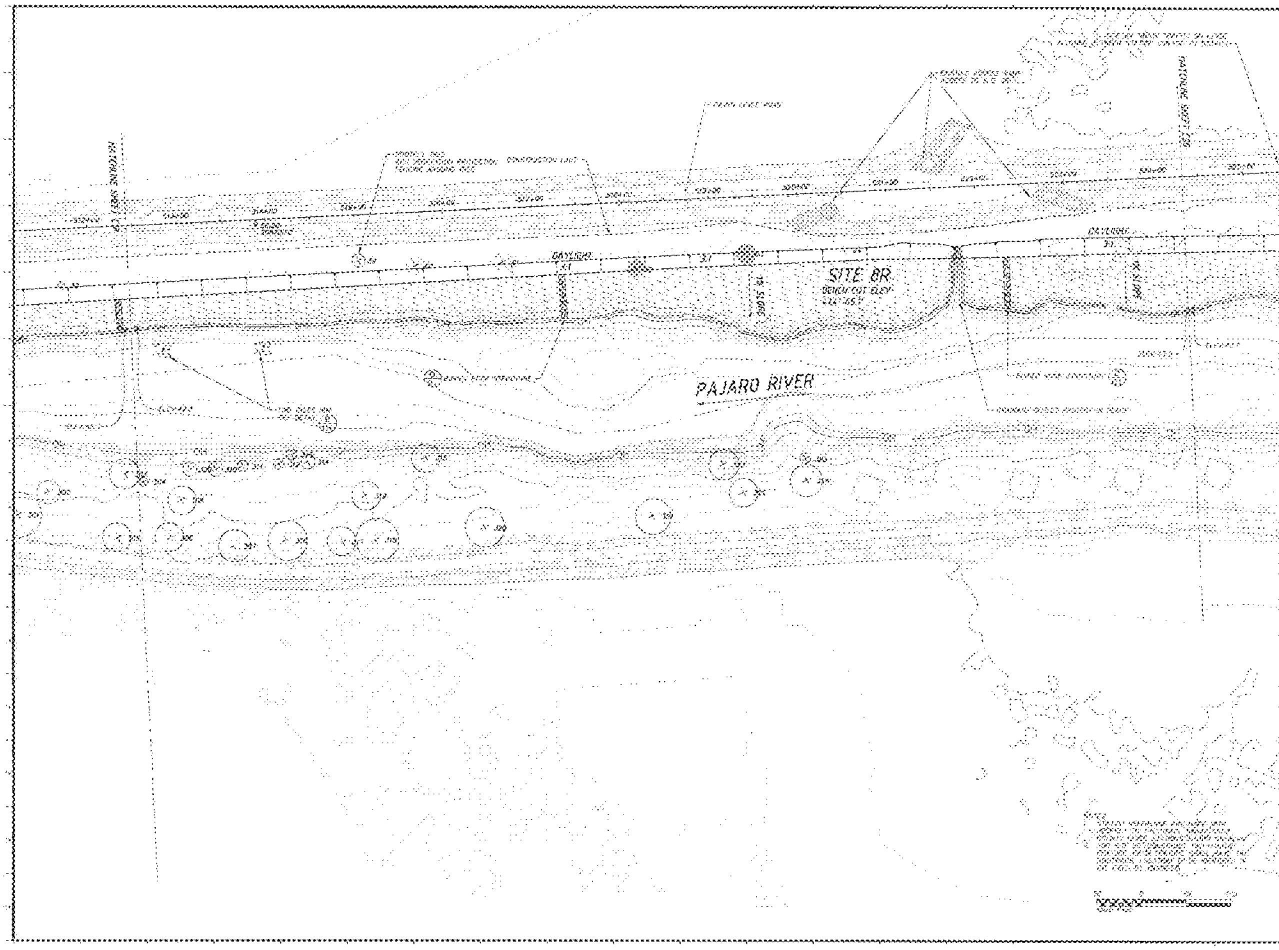
Sheet Title:
Plan Sheet (Beach)
STA 100+00 to 430+00

Sheet No.
C16



C17


PAJARO RIVER
SITE 8R
Santa Cruz County
C18



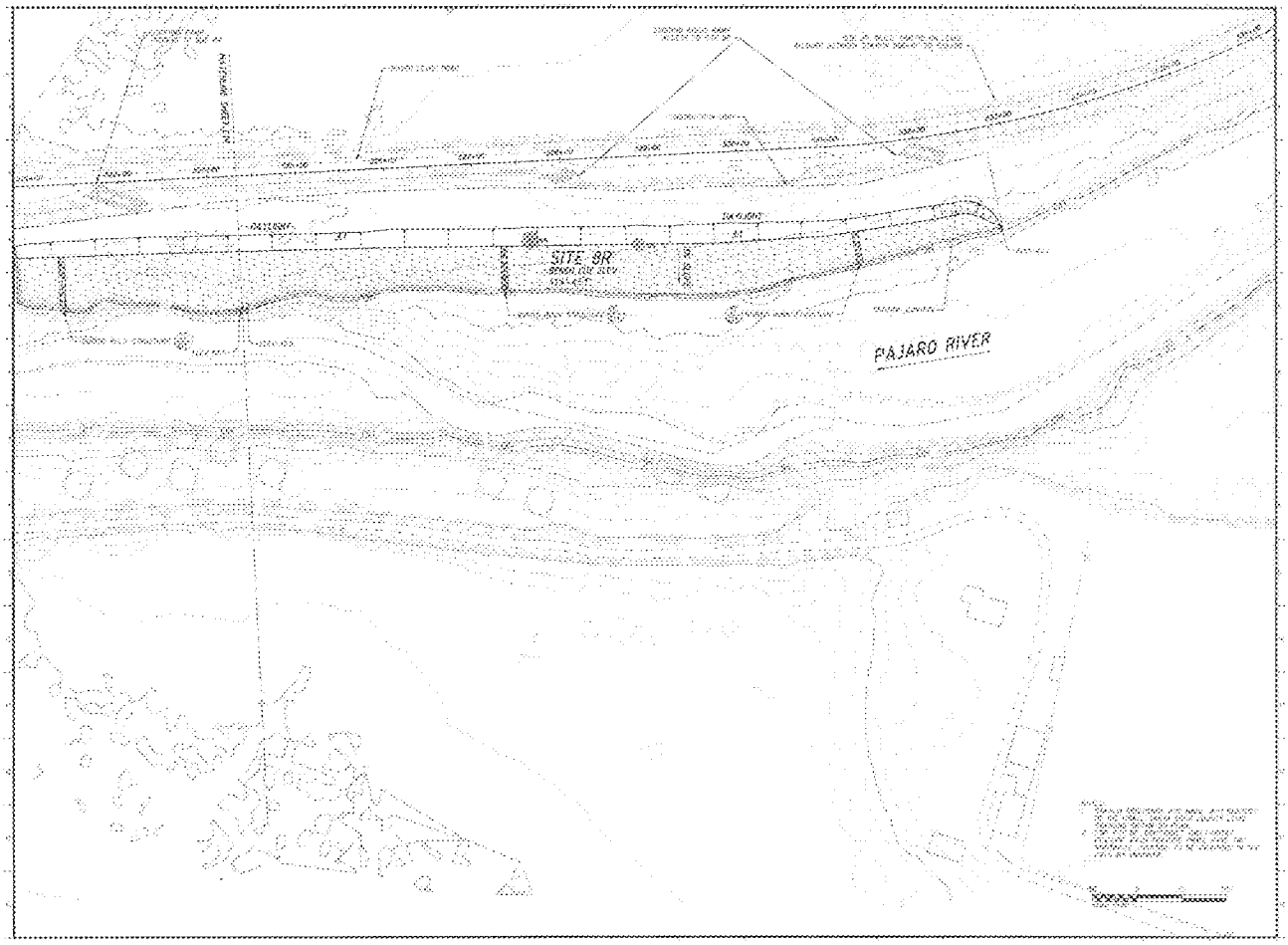
Pajaro Bench Excavation
75% Grading Plan

Santa Cruz County
Dept of Public Works, Flood Control Engineering
701 Ocean Street, Room 410
Santa Cruz, CA 95060

PRELIMINARY
NOT FOR CONSTRUCTION

Sheet Title
Plan Sheet (Station ... to ...)

C19



Title:
Pajaro Bench Excavation
75% Grading Plan

Plan Name:

Santa Cruz County
Dept. of Public Works, Parks
Central Operations
701 Ocean Street, Room 410
Santa Cruz, CA 95060

Scale:

Date:

Drawn:

Checked:

Plan Sheet (Scale)
1"=400' to 1"=40'

Revisions:

Date:

By:

Description:

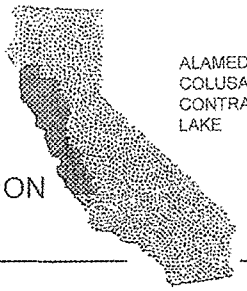
C20

Sheet Number:

Attachment 1

CHRIS Documentation

CALIFORNIA
HISTORICAL
RESOURCES
INFORMATION
SYSTEM



ALAMEDA
COLUSA
CONTRA COSTA
LAKE
MARIN
MENDOCINO
MONTEREY
NAPA
SAN BENITO
SAN FRANCISCO
SAN MATEO
SANTA CLARA
SANTA CRUZ
SOLANO
SONOMA
YOLO

Northwest Information Center
Sonoma State University
150 Professional Center Drive, Suite E
Rohnert Park, California 94928-3609
Tel: 707.588.8455
Email: leigh.jordan@sonoma.edu
http://www.sonoma.edu/nwic

Date: November 18, 2011 NWIC File No.: 11-0524

To: Mary Doane, Archaeological Consulting, P.O. Box 3377, Salinas, CA 93912

From: Liz Black and Leigh Jordan

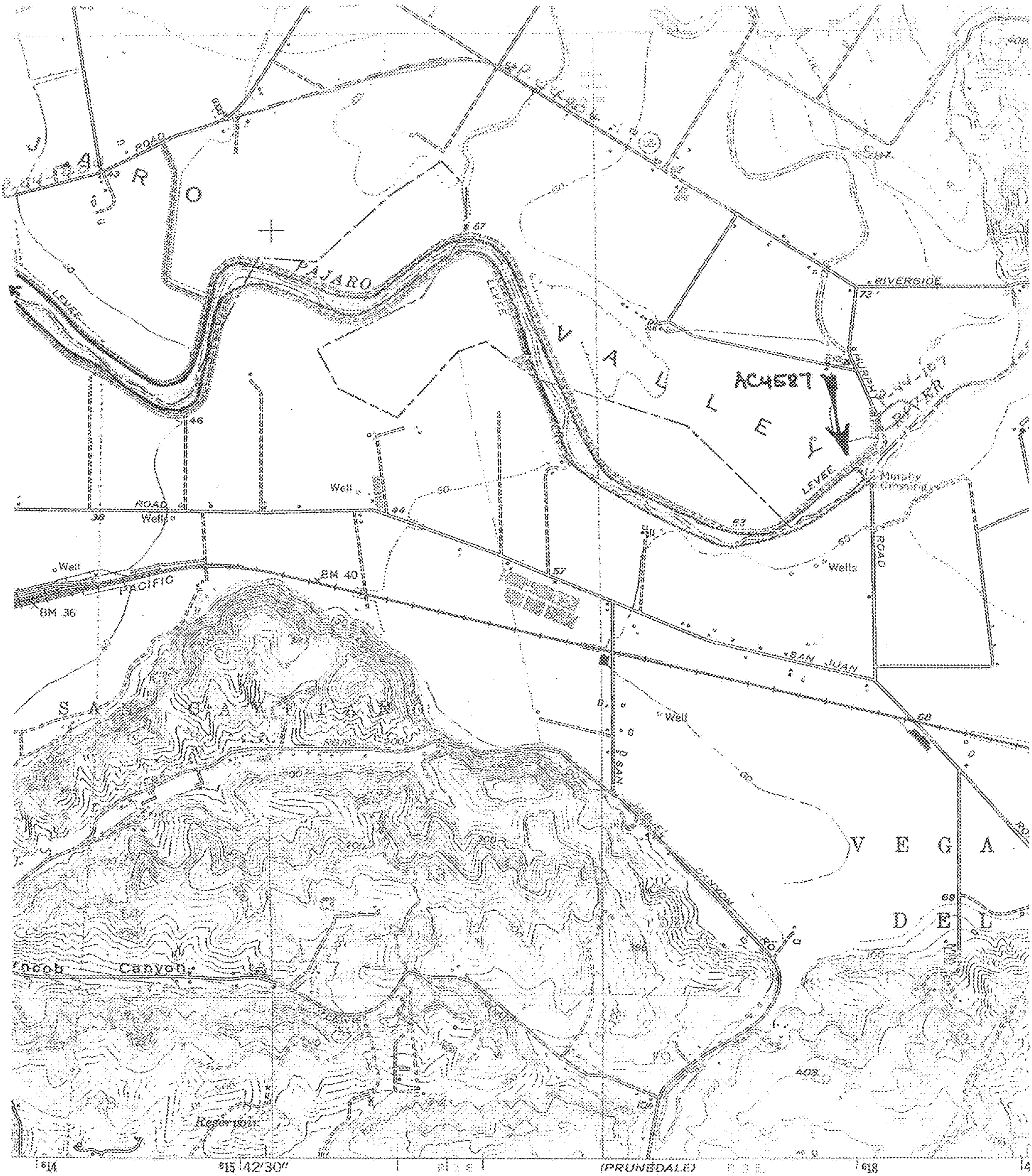
Re: **Rapid Response** Summary Letter for 11-0524

Watsonville East and West 7.5' Quad AC-4587

Resources In	There are none.
Resources within 5/8-mile radius	There are eight and they are: P-27-002566, P-44-000107, P-44-000404, 44-000406, 44-000408, 44-000598. They have been mapped.
Reports In	There are five: S-3964, 10227, S-12313, 22093 and 25169. They have been mapped.
OHP HPD	There are no listings.
OHP ADOE	There are no listings.
CA Inventory	There are no listings.

Northwest Information Center Report Listing

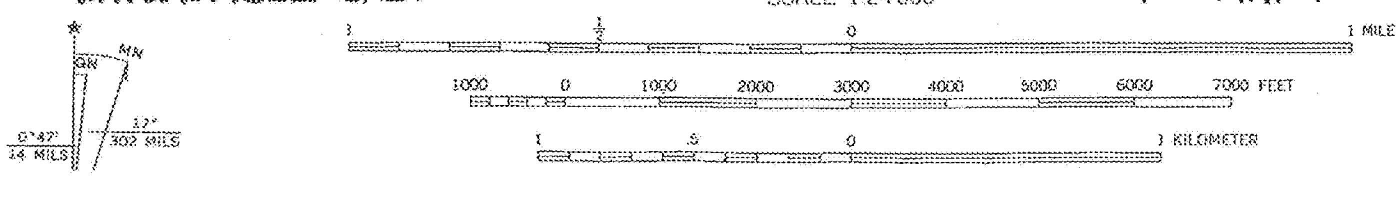
S-number	Year	Author(s)	Title	Affiliation
S-003964	1977	Ann S. Peak & Associates	Santa Cruz Regional Wastewater Treatment System Project, Santa Cruz County, California	Ann S. Peak & Associates
S-010227	1988	Terry Jones	Archaeological Survey Report, proposed modifications to five bridges along Highway 1, 04-SCR-1 P.M.0.0/3.4 4273-124740 (Caltrans)	
S-012313	1990	Anna Runnings and Gary S. Breschini	Preliminary Cultural Resources Reconnaissance of the Porter Drive Bridge, Pajaro, Monterey County, California	Archaeological Consulting
S-022093	1996	U.S. Army Corps of Engineers	Cultural Resource Assessment, Pajaro River Reconnaissance Survey, U.S. Army Corps of Engineers San Francisco District, Pajaro River Flood Control Project, 1996	U.S. Army Corps of Engineers
S-025169	1998	Roderick Chisholm	Cultural Resource Assessment, Pajaro River and Salsipuedes Creek, Monterey and Santa Cruz Counties, California	U.S. Army Corps of Engineers

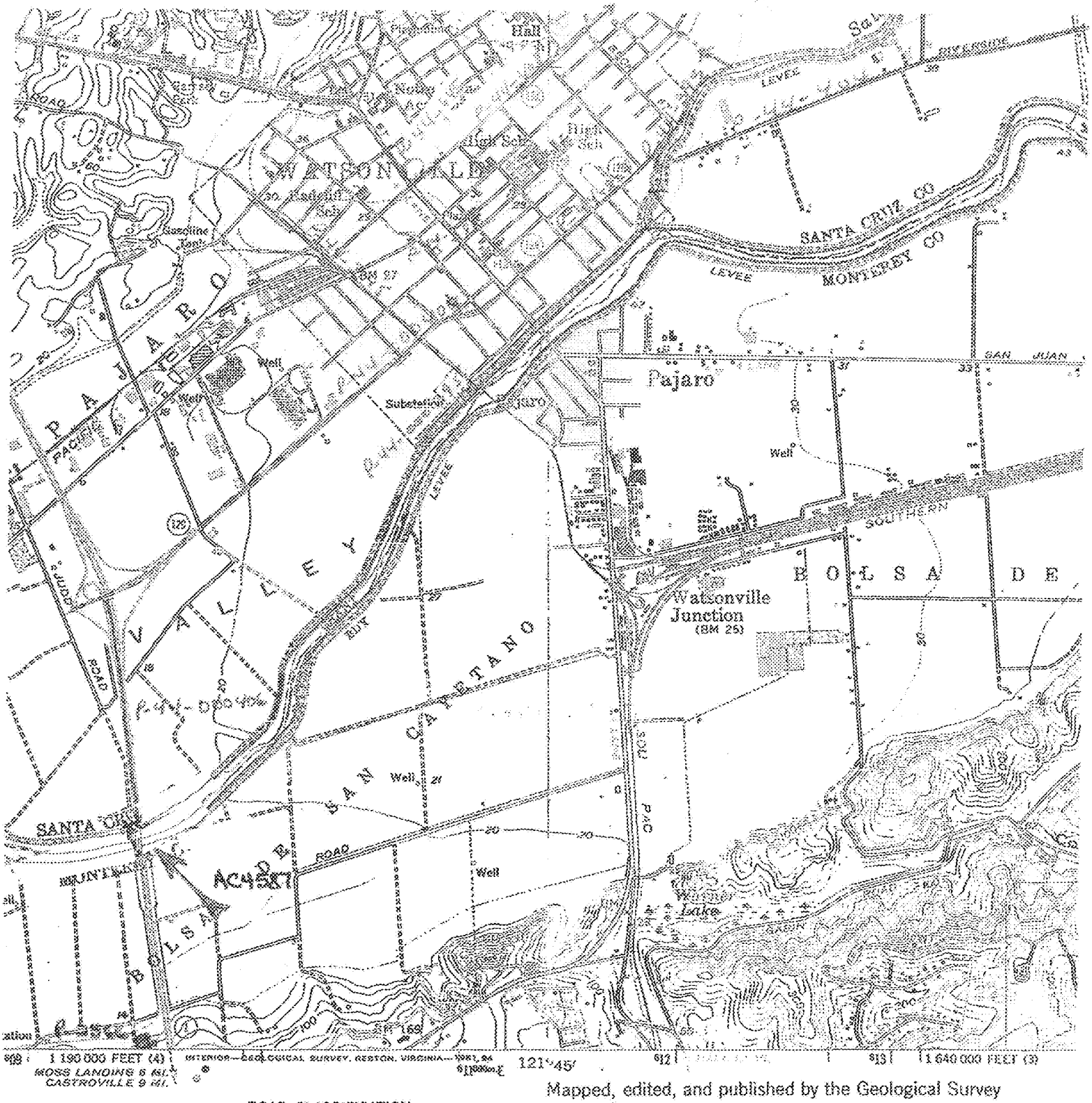


WATSONVILLE EAST

SCALE 1:24 000

4587 MAP 1





INTERIOR—GEOLOGICAL SURVEY, RESTON, VIRGINIA—1961, 54

ROAD CLASSIFICATION

Heavy-duty ——— Light-duty ———

Medium-duty ——— Unimproved dirt ———

State Route

WATSONVILLE WEST, CALIF.

N3652.5—W12145/7.5

1954

PHOTOREVISED 1980

DMA 1657 IV NE—SERIES V895

Mapped, edited, and published by the Geological Survey

Control by USGS and USC&GS

Topography from aerial photographs by multiplex methods and by planetable surveys 1955. Aerial photographs taken 1952

Polyconic projection. 1927 North American datum

10,000-foot grids based on California coordinate system, zones 3 and 4

Red tint indicates areas in which only landmark buildings are shown

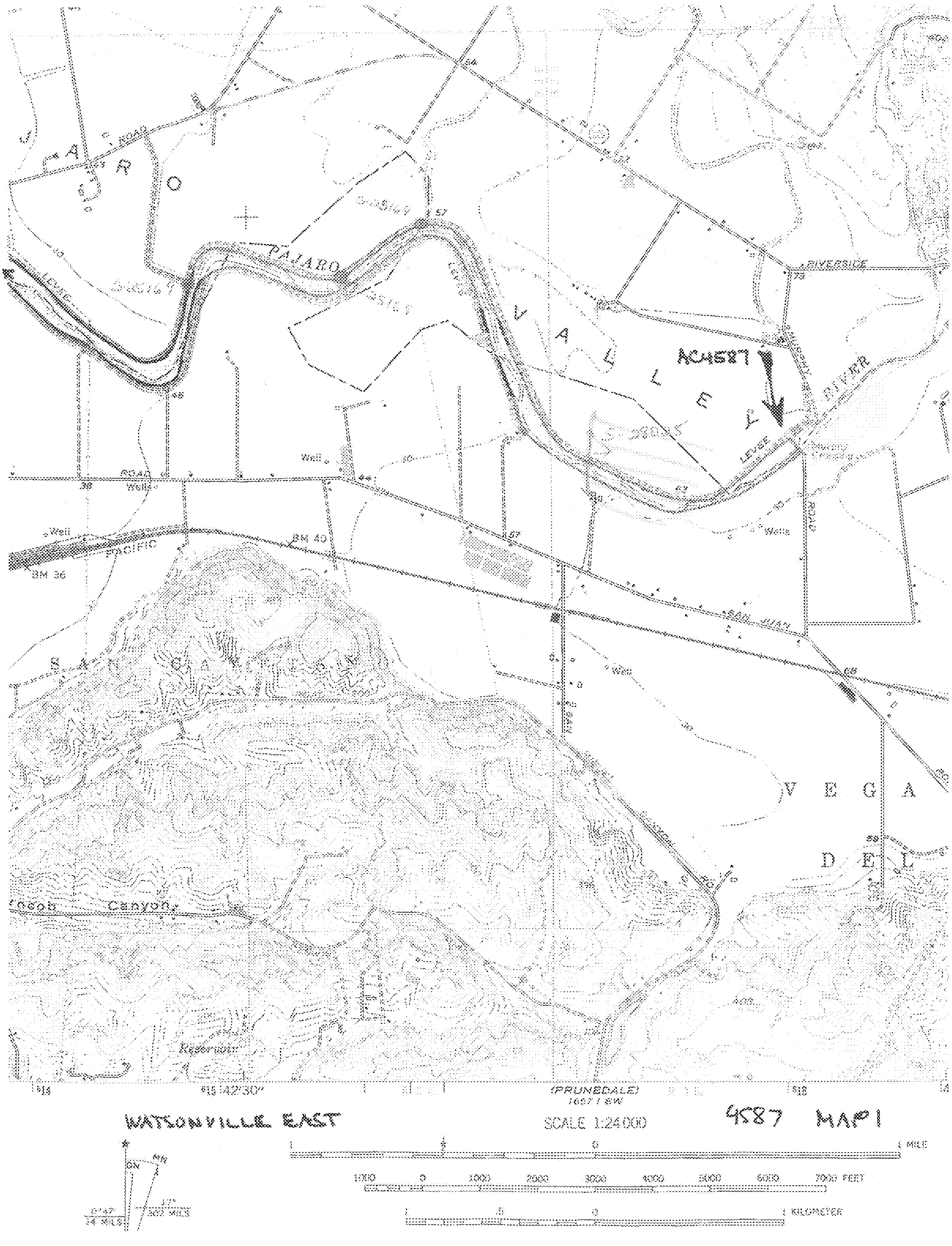
Dashed land lines indicate approximate locations

1000-meter Universal Transverse Mercator grid ticks, zone 10, shown in blue

Areas covered by dashed light-blue pattern are subject to controlled inundation

WATSONVILLE EAST

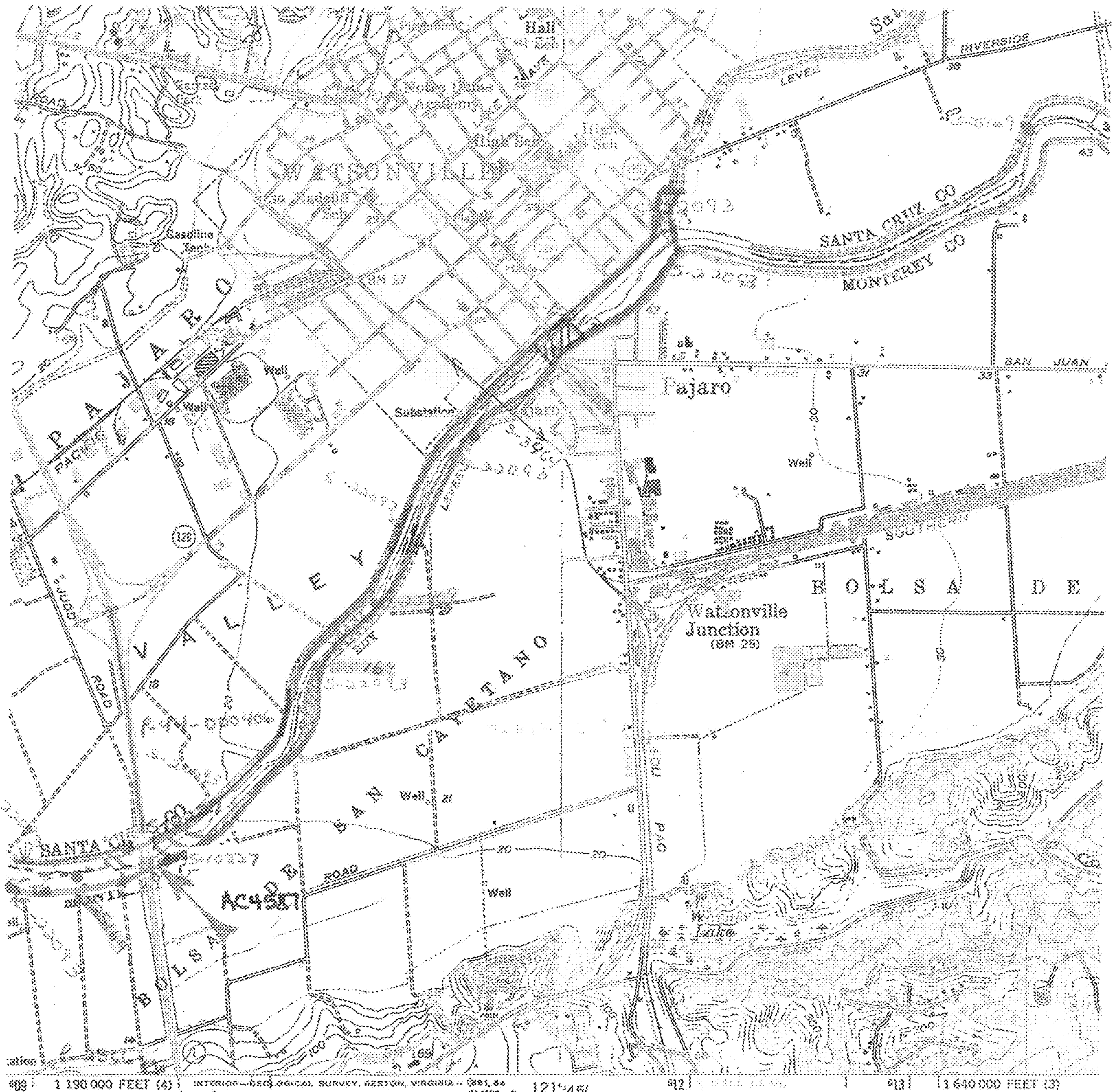
4587 MAP 2



WATSONVILLE EAST

SCALE 1:24 000

4587 MAP 1



Mapped, edited, and published by the Geological Survey

Control by USGS and USC&GS

Topography from aerial photographs by multiplex methods and by planetable surveys 1955. Aerial photographs taken 1952

Polyconic projection. 1927 North American datum
10,000-foot grids based on California coordinate system, zones 3 and 4

Red tint indicates areas in which only landmark buildings are shown

Dashed land lines indicate approximate locations

1000-meter Universal Transverse Mercator grid ticks, zone 10, shown in blue

Areas covered by dashed light-blue pattern are subject to controlled inundation

ROAD CLASSIFICATION

Heavy-duty	Light-duty
Medium-duty	Unimproved dirt
	State Route

S-25769
S-22093
S-12373
S-12227
S-3964

WATSONVILLE WEST, CALIF

N3652.5—W12145/7.5

1954
PHOTOREVISED 1980
DMA 1857 IV NE—SERIES V895

WATSONVILLE EAST

4587
MAP 2

ATTACHMENT 3

Transportation Analysis

FEHR PEERS

MEMORANDUM

Date: August 12, 2011

To: Jack Sohriakoff, County of Santa Cruz

From: Daniel Rubins, P.E. and Greg Ripa

Subject: ***Pajaro River Bench Excavation Project – Transportation Analysis and Best Management Practices***

SJ10-1230

This memorandum summarizes the technical approach and results of the transportation analysis for the Pajaro River Bench Excavation Project (PRBEP) including an estimate of maintenance vehicle trips generated and vehicle miles traveled (VMT) of a typical excavation site project. This memorandum also summarizes best management practices (BMPs) for maintenance vehicle access and egress at river access points, and the sediment disposal sites that could be implemented as individual excavation site projects are initiated.

The PRBEP proposes to excavate a series of benches within the Pajaro River between approximately SR 1 near Watsonville, California and Murphy Road near Aromas, California. This area will be referred to as the "Project Area" in this memorandum. The excavations will remove approximately 336,000 cubic yards (cy) of sediment from the river, which will increase flood conveyance capacity by excavating a portion of the existing floodplain to about the 2-year water level[1]. Eleven (11) excavation sites will provide ingress and egress of the Pajaro River access points. **Attachment A** shows the amount of sediment to be removed from each Excavation site and the location of each excavation site in the Project Area.

KEY FINDINGS

- The PRBEP will generate up to an estimated 260 maintenance trips per day during the dry season (up to an average of 32 hourly trips). In annual terms, this project would generate up to an estimated 27,900 annual maintenance vehicle trips in Year 1 and 37,000 maintenance vehicle trips in Year 2, or up to an estimated 64,800 annual maintenance vehicle trips if the work were to be completed in one year.

- The amount of daily and peak hour traffic added to SR 1 is less than two percent and the amount of daily and peak hour traffic added to SR 129 is less than four percent.

- In Year 1, the PRBEP will generate up to an estimated 141,400 annual vehicle miles traveled (VMT) or 1,325 daily VMT. In Year 2, the PRBEP will generate up to an estimated 471,500 annual VMT, which equates to approximately 3,300 daily VMT. If the work were to be completed in one year, the PRBEP will generate up to an estimated annual 612,900 VMT, which equates to approximately 2,500 daily VMT.

Table 1 shows a summary of the total trips and VMT produced for each of the four scenarios.

[1] Source: Howard, Joey and Pan, Jimmy. *Pajaro River Bench Excavation Project 65% Design Basis Memorandum* to Bruce Laclergue, June 30, 2011.

TABLE 1
SCENARIO SUMMARY TABLE

Scenario	Total Trips			Total VMT (miles)		
	Year 1	Year 2	Total	Year 1	Year 2	Total
1. Sediment transported by heavy-duty trucks under a two-year work window to all disposal sites	27,808	36,970	64,778	141,350	471,455	612,805
2. Sediment transported by heavy-duty trucks under a one-year work window to all disposal sites	64,778			612,805		
3. Sediment transported by rail and heavy-duty trucks under a two-year work window. The excavated material at sites 3R, 4R, and 2L will be transported by rail to the disposal sites rather than by heavy-duty trucks	15,124	36,970	52,094	98,757	471,455	570,212
4. Sediment transported by rail and heavy-duty trucks under a one-year work window. The excavated material at sites 3R, 4R, and 2L will be transported by rail to the disposal sites rather than by heavy-duty trucks	52,094			570,212		

Source: Fehr & Peers, August 2011.

TECHNICAL APPROACH

The PRBEP is a maintenance activity that would occur during the dry season, truck traffic would be spread out over the day, and the level of peak hour trips generated by the project would generally be low (e.g., an average of 32 hourly trips, or one trip every 1½ to 2 minutes). For reference purposes, the percent contribution of project traffic to state roadway facilities is included in our analysis. Furthermore, the individual projects are temporary in nature and will vary in location. Therefore, intersection and roadway level of service analysis was not conducted. Thus, this section discusses the method for estimating the PRBEP traffic estimates and VMT.

Proposed Project Traffic Estimates

The estimate of the maintenance vehicle trips that would be generated by the PRBEP activities were developed using information provided by the Santa Cruz County Department of Public Works (DPW), including estimated annual gross sediment removal totals, defined dry season maintenance window, typical off-haul truck capacity, and typical loading rates and procedures.

The amount of traffic generated by the PRBEP was estimated by adding the estimated average daily number of maintenance trips that would occur due to project activities. Trips are made by two types of vehicles: trucks and light duty vehicles. For the purposes of this analysis, trucks are considered to be large sediment removal dump trucks with a capacity of 13-cy and other large semi-trucks that would be used to haul equipment or similar amounts of materials. Light duty vehicles include, but are not limited to, vehicle types such as cargo vans, pickup trucks, sport utility vehicles, minivans, and sedans. Light duty vehicles are used for activities such as inspections, crew transport, and minor hauling of materials.

This analysis includes the following assumptions to estimate maintenance vehicle trip generation:

- Sediment removal dump trucks have a 13-cy capacity
- 1,352-cy of sediment can be removed per day under typical loading rates and procedures
- Proposed yearly work period consists of approximately 107 work days in Year 1 and 142 work days in Year 2.
- The daily work period consists of 8 work hours
- Three trucks are used to deliver materials or equipment to each excavation site
- One delivery of materials and equipment is made from the South County Public Works Yard (Roy Wilson Yard) to each excavation site, each light duty vehicle makes only two trips per day (once to the job site from the Yard and once back to its origin at the Yard)
- Light duty vehicle usage is approximately 25 percent of the number of sediment removal truck trips

For the PRBEP, the number of trips generated by light duty vehicles was added to the number of trips generated by trucks. The number of trips generated by trucks was calculated by dividing the sediment removal amounts by the truck hauling capacity of 13-cy and then adding the delivery truck usage.

Proposed Project Vehicle Miles Traveled

Transportation is a major contributor to greenhouse gas emissions. According to the US Environmental Protection Agency (EPA), the transportation sector was responsible for nearly 28 percent of all greenhouse gas (GHG) emissions in the United States in 2006[2], and transportation in California was responsible for about 38 percent of GHG emissions in 2004[3]. Transportation is the direct result of population and employment growth, which generates vehicle trips to move goods, provide public services, and connect people with work, school, shopping, and other activities such as construction or maintenance.

A performance measure used to quantify the amount of travel is VMT. VMT is a useful performance measure, since the amount of travel and conditions under which the travel occurs directly relate to how much fuel vehicles burn. As a result, increases in VMT directly cause increases in greenhouse gas emissions and air pollution.

The VMT due to the Proposed Project was estimated as the trips generated due to the Proposed Project multiplied by the estimated distance those trips would travel. For the purposes of this analysis, we made the following assumptions:

- Sediment removal trucks would take sediment to the following disposal sites: approximately 38,000-cy would be taken to the Buena Vista Landfill, 40,000-cy would be taken to the Watsonville Landfill, 58,000-cy would be taken to the Manabe OW site, and 201,000-cy would be taken to Elkhorn Slough[4].
- Trip length distances were estimated by calculating the length between each excavation site and each disposal location or the Roy Wilson Yard.

[2] United States Environmental Protection Agency, Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2006, #430-R-08-005, April 2008.

[3] California Air Resources Board (CCARB). http://www.climatechange.ca.gov/inventory/index.html. September 2008.

[4] Data provided by Santa Cruz County DPW

- Trip lengths include both on and off-road distances from each excavation site to each disposal location or the Roy Wilson Yard.

- These trip lengths were multiplied by the trips calculated in the *Project Traffic Estimates* section above to determine the VMT.

ANALYIS SCENARIOS

Four scenarios were studied in this analysis:

1. Sediment transported by heavy-duty trucks under a two-year work window to all disposal sites

2. Sediment transported by heavy-duty trucks under a one-year work window to all disposal sites

3. Sediment transported by rail and heavy-duty trucks under a two-year work window. The excavated material at sites 3R, 4R, and 2L will be transported by rail to the disposal sites rather than by heavy-duty trucks

4. Sediment transported by rail and heavy-duty trucks under a one-year work window. The excavated material at sites 3R, 4R, and 2L will be transported by rail to the disposal sites rather than by heavy-duty trucks

For the purposes of this memorandum, the first two scenarios will collectively be called the "Trucking Scenarios" and the third and fourth scenarios will collectively be called the "Rail Scenarios."

ANALYIS RESULTS

The results for both sets of scenarios are discussed below:

Trucking Scenarios

Under the trucking scenarios, sediment would be transported by heavy-duty trucks under either a two-year work window for Scenario 1 or a one-year work window for Scenario 2. The excavated material at all excavation sites will be transported by truck to the disposal sites.

It is estimated that the PRBEP will generate an estimated 260 daily maintenance trips during the dry season. In annual terms, under a two-year scenario, this project would generate an estimated 27,800 annual maintenance vehicle trips in Year 1 and 37,000 annual maintenance vehicle trips in Year 2. If the material were to be removed in only one year, this project would generate an estimated 64,800 annual maintenance vehicle trips. **Table 2** shows the trip generation estimates for each excavation site. **Attachment B** shows the trip estimate calculations.

The maximum amount of daily traffic added to SR 1 is less than one percent of the total traffic volume on SR 1. Similarly, the maximum amount of daily traffic added to SR 129 is less than three percent of the total traffic volume on SR 129. In the peak hour, the maximum amount of traffic added to SR 1 is less than two percent of the peak hour traffic volume on SR 1 and the maximum amount of traffic added to SR 129 is less than four percent of the peak hour traffic volume on SR 129.The maximum amounts of daily and peak hour traffic added to SR 1 and SR 129 are presented in **Table 3**.

Note that the amount of traffic added to each roadway would not occur for the entire duration of the project because not all sites are active at all times. The amount of traffic added to each roadway is also dependent on the location of active excavation sites and disposal locations, e.g.

some roadway segments such as SR 1 between SR 152 and Airport Boulevard would not experience an increase in traffic if an active excavation site uses the Elkhorn Slough disposal site since any vehicles would travel southward on SR 1 toward Elkhorn Slough rather than northward towards Airport Boulevard. Also, the amount of traffic added is a maximum number because some traffic such as light duty vehicles may use alternate routes due to inspection schedules or minor delivery pick-up/ drop-off locations.

TABLE 2:
DAILY AND ANNUAL PROJECT TRIP ESTIMATES FOR TRUCKING SCENARIOS

Year	Excavation site	Truck Trips[1]	Light Duty Vehicle Trips[2]	Total Trips
Year 1	1R	3,414	852	4,266
	2R	6,120	1,528	7,648
	3R	2,468	614	3,082
	4R	8,886	2,220	11,106
	2L	1,366	340	1,706
Subtotal (Year 1) [A]		***22,254***	***5,554***	***27,808***
Year 2	5R	6,066	1,514	7,580
	5.5R	1,076	266	1,342
	6R	14,370	3,590	17,960
	7R	958	238	1,196
	8R	4,298	1,072	5,370
	4L	2,820	702	3,522
Subtotal (Year 2) [B]		***29,588***	***7,382***	***36,970***
Total [A+B] (or One Year Scenario)		**51,842**	**12,936**	**64,778**
Daily Trips		*208*[3]	*52*	*260*

Notes:

1. Trucks are considered to be large sediment removal dump trucks with a capacity of 13-cy and other large semi-trucks that would be used to haul equipment or similar amounts of materials. Truck trips include both sediment removal trips and delivery trips.
2. Light duty vehicles include, but are not limited to, vehicle types such as cargo vans, pickup trucks, sport utility vehicles, minivans, and sedans. Light duty vehicle usage is approximately 25% of the amount of sediment removal truck trips.
3. The amount of daily trucks to be used per day was provided by DPW and is based on typical off-haul truck capacity as well as typical loading rates and procedures. The amount of trucks was converted into trips by multiplying by two.

Source: Fehr & Peers, August 2011.

TABLE 3:
MAXIMUM ADDED TRIPS TO STATE FACILITIES FOR TRUCKING SCENARIOS[1]

Route	Location	Daily Volumes			Peak Hour Volumes		
		ADT[2,3]	Added Volume	Percent Added	Peak Hour Volume[3]	Added Volume	Percent Added
SR 1	SR 129 (Riverside Drive) to Harkins Slough Road/ Green Valley Road	39,000	260	0.67%	3,500	32	0.91%
	Harkins Slough Road/ Green Valley Road to SR 152 (Main Street)	30,000	260	0.87%	2,700	32	1.19%
	SR 152 (Main Street) to Airport Boulevard	53,000	260	0.49%	4,600	32	0.70%
SR 129	SR 1 (Cabrillo Highway) to Main Street	20,000	260	1.30%	1,700	32	1.88%
	Main Street to Blackburn Street	26,000	260	1.00%	2,950	32	1.08%
	Blackburn Street to Lakeview Road	11,800	260	2.20%	1,100	32	2.91%
	Lakeview Road to Carlton Road	12,000	260	2.17%	1,350	32	2.37%
	Carlton Road to Rogge Lane	9,000	260	2.89%	860	32	3.72%

Notes:

1. The amount of traffic added to each roadway would not occur for the entire duration of the project because not all sites are active at all times. The amount of traffic added to each roadway is also dependent on the location of active excavation sites and disposal locations. The amount of traffic added is a maximum number because some traffic such as light duty vehicles may use alternate routes due to inspection schedules or minor delivery pick-up/ drop-off locations.
2. ADT = Average Daily Traffic Volume
3. Source: California Department of Transportation (Caltrans), Traffic Data Branch. <http://traffic-counts.dot.ca.gov/final2009AADT.xls> Accessed 1/11/2011.

Source: Fehr & Peers, August 2011.

Under a two year scenario, in Year 1, it is estimated that the PRBEP will create approximately 141,400 annual VMT, which equates to approximately 1,330 daily VMT (approximately 5.1 miles per trip). In Year 2, it is estimated that the PRBEP will create approximately 471,500 annual VMT, which equates to approximately 3,320 daily VMT (approximately 12.8 miles per trip). There is more VMT created in Year 2 because the sediment disposal location at Elkhorn Slough is further from the individual excavation sites than the disposal sites in Year 1 such as Buena Vista Landfill. Under a one year scenario, it is estimated that the PRBEP will create approximately 612,800 annual VMT, which equates to approximately 2,470 daily VMT (approximately 9.5 miles per trip). **Table 4** shows the VMT estimates for each excavation site. **Attachment D** shows the VMT calculations.

The VMT was also prepared by 5 mile-per-hour (mph) speed bins using the average default EMFAC speed distributions for Santa Cruz and Monterey Counties. **Table 5** shows the VMT estimates by speed increments (e.g., 0-7.5, 7.5-12.5, miles per hour etc.) for use with emissions models such as EMFAC to generate final emissions estimates. Emissions models such as EMFAC use emissions rates for different vehicle types in conjunction with travel activity statistics (i.e., VMT by speed-bin) to calculate vehicle-based emissions in metric tons per day.

TABLE 4:
PROJECT VEHICLE MILES TRAVELED FOR TRUCKING SCENARIOS

Year	Excavation site	Truck VMT[1]	Light Duty Vehicle VMT[2]	Total VMT
Year 1	1R	27,574	5,714	33,289
	2R	39,985	10,073	50,058
	3R	18,111	3,116	21,226
	4R	21,345	10,479	31,823
	2L	3,313	1,641	4,953
Subtotal (2011) [A]		***110,328***	***31,022***	***141,350***
Year 2	5R	83,833	7,269	91,102
	5.5R	14,407	1,001	15,408
	6R	204,829	15,888	220,718
	7R	15,143	1,450	16,593
	8R	73,583	7,838	81,421
	4L	40,931	5,282	46,213
Subtotal (2012) [B]		***432,726***	***38,729***	***471,455***
Total [A+B] (or One Year Scenario)		**543,054**	**69,751**	**612,805**
Daily VMT (Year 1)[3]		*1,034*	*291*	*1,325*
Daily VMT (Year 2)[3]		*3,049*	*273*	*3,323*
Daily VMT (One Year Scenario)		*2,184*	*281*	*2,465*
VMT per Trip (Year 1)		*5.0*	*5.6*	*5.1*
VMT per Trip (Year 2)		*14.6*	*5.2*	*12.8*
VMT per Trip (One Year Scenario)		*10.5*	*5.4*	*9.5*

Notes:

1. Trucks are considered to be large sediment removal dump trucks with a capacity of 13-cy and other large semi-trucks that would be used to haul equipment or similar amounts of materials. Truck trips include both sediment removal trips and delivery trips.
2. Light duty vehicles include, but are not limited to, vehicle types such as cargo vans, pickup trucks, sport utility vehicles, minivans, and sedans. Light duty vehicle usage is approximately 25% of the amount of sediment removal truck trips.
3. VMT per day calculated by dividing the VMT from each year by the number of workdays per year. There are 107 workdays in Year 1 and there are 142 workdays in Year 2.

Source: Fehr & Peers, August 2011.

TABLE 5
VEHICLE MILES TRAVLED (VMT) DISTRIBUTION BY SPEED BIN FOR TRUCKING SCENARIOS

Speed Bin (miles per hour)	Distribution[1]	Dry Season Vehicle Miles Traveled Estimates		
		Year 1	Year 2	Total (or One Year Scenario)
0 to 7.49	1%	1,041	3,476	4,517
7.5 to 12.49	1%	1,826	6,089	7,915
12.5 to 17.49	5%	6,970	23,248	30,218
17.5 to 22.49	7%	9,656	32,205	41,861
22.5 to 27.49	10%	13,509	45,057	58,566
27.5 to 32.49	11%	15,414	51,412	66,826
32.5 to 37.49	8%	11,583	38,632	50,215
37.5 to 42.49	4%	5,004	16,689	21,693
42.5 to 47.49	7%	10,373	34,599	44,972
47.5 to 52.49	17%	23,363	77,923	101,286
52.5 to 57.49	23%	31,937	106,522	138,459
57.5 to 62.49	7%	10,383	34,631	45,014
62.5 and higher	<1%	291	972	1,263
Total		**141,350**	**471,455**	**612,805**

Notes:

[1] Distribution is based on default EMFAC speed distributions for the summer season in the North Central Coast Air Basin (Monterey, Santa Cruz, and San Benito Counties). The percentages have been rounded for presentation purposes.

Source: EMFAC 2007 and Fehr & Peers, August 2011.

Rail Scenarios

Under the rail scenarios, sediment would be transported by both rail and heavy-duty trucks under either a two-year work window for Scenario 3 or a one-year work window for Scenario 4. The excavated material at excavation sites 3R, 4R, and 2L will be transported by rail to the disposal sites rather than by heavy-duty trucks. The sediment removal by rail would decrease the overall amount of truck trips and truck VMT. However, the amount of light duty vehicle usage would remain the same since activities such as inspections, crew transport, and minor hauling of materials would still occur at these sites.

It is estimated that the PRBEP will generate an estimated 210 daily maintenance trips during the dry season. In annual terms, under a two-year scenario, this project would generate an estimated 15,100 annual maintenance vehicle trips in Year 1 and 37,000 annual maintenance vehicle trips in Year 2. If the material were to be removed in only one year, this project would generate an estimated 52,100 annual maintenance vehicle trips. The ability to remove sediment by rail rather than by truck reduces the trip generation by up to 12,800 trips (all in Year 1 if a two year scenario is chosen). **Table 6** shows the trip generation estimates for each excavation site. **Attachment C** shows the trip estimate calculations.

The amount of daily traffic added to SR 1 is less than one percent of the total traffic volume on SR 1. Similarly, the amount of daily traffic added to SR 129 is less than three percent of the total traffic volume on SR 129. In the peak hour, the amount of traffic added to SR 1 is one percent or

less of the peak hour traffic volume on SR 1 and the amount of traffic added to SR 129 is less than four percent of the peak hour traffic volume on SR 129.The amount of daily and peak hour traffic added to SR 1 and SR 129 are presented in **Table 7**.

Note that the amount of traffic added to each roadway would not occur for the entire duration of the project because not all sites are active at all times. The amount of traffic added to each roadway is also dependent on the location of active excavation sites and disposal locations, e.g. some roadway segments such as SR 1 between SR 152 and Airport Boulevard would not experience an increase in traffic if an active excavation site uses the Elkhorn Slough disposal site since any vehicles would travel southward on SR 1 toward Elkhorn Slough rather than northward towards Airport Boulevard. Also, the amount of traffic added is a maximum number because some traffic such as light duty vehicles may use alternate routes due to inspection schedules or minor delivery pick-up/ drop-off locations.

TABLE 6:
DAILY AND ANNUAL PROJECT TRIP ESTIMATES FOR RAIL SCENARIOS

Year	Excavation Site	Truck Trips[1]	Light Duty Vehicle Trips[2]	Total Trips
Year 1	1R	3,414	852	4,266
	2R	6,120	1,528	7,648
	3R	12	614	626
	4R	12	2,220	2,232
	2L	12	340	352
Subtotal (Year 1) [A]		***9,570***	***5,554***	***15,124***
Year 2	5R	6,066	1,514	7,580
	5.5R	1,076	266	1,342
	6R	14,370	3,590	17,960
	7R	958	238	1,196
	8R	4,298	1,072	5,370
	4L	2,820	702	3,522
Subtotal (Year 2) [B]		***29,588***	***7,382***	***36,970***
Total [A+B] (or One Year Scenario)		**39,158**	**12,936**	**52,094**
Daily Trips		*158*[3]	*52*	*210*

Notes:

1. Trucks are considered to be large sediment removal dump trucks with a capacity of 13-cy and other large semi-trucks that would be used to haul equipment or similar amounts of materials. Truck trips include both sediment removal trips and delivery trips.
2. Light duty vehicles include, but are not limited to, vehicle types such as cargo vans, pickup trucks, sport utility vehicles, minivans, and sedans. Light duty vehicle usage is approximately 25% of the amount of sediment removal truck trips.
3. The amount of daily trucks to be used per day was provided by DPW and is based on typical off-haul truck capacity as well as typical loading rates and procedures. The amount of trucks was converted into trips by multiplying by two.

Source: Fehr & Peers, August 2011.

TABLE 7:
MAXIMUM ADDED TRIPS TO STATE FACILITIES FOR RAIL SCENARIOS[1]

Route	Location	Daily Volumes			Peak Hour Volumes		
		ADT[2,3]	Added Volume	Percent Added	Peak Hour Volume[3]	Added Volume	Percent Added
SR 1	North of Jct. SR 129	39,000	210	0.54%	3,500	27	0.77%
	North of Harkins Slough overcrossing	30,000	210	0.70%	2,700	27	1.00%
	North of Jct. SR 152	53,000	210	0.40%	4,600	27	0.59%
SR 129	East of Jct. SR 1	20,000	210	1.05%	1,700	27	1.59%
	East of Main Street	26,000	210	0.81%	2,950	27	0.92%
	East of Blackburn Street	11,800	210	1.78%	1,100	27	2.45%
	East of Lakeview Road	12,000	210	1.75%	1,350	27	2.00%
	East of Carlton Road	9,000	210	2.33%	860	27	3.14%

Notes:

1. The amount of traffic added to each roadway would not occur for the entire duration of the project because not all sites are active at all times. The amount of traffic added to each roadway is also dependent on the location of active excavation sites and disposal locations. The amount of traffic added is a maximum number because some traffic such as light duty vehicles may use alternate routes due to inspection schedules or minor delivery pick-up/ drop-off locations.
2. ADT = Average Daily Traffic Volume
3. Source: California Department of Transportation (Caltrans), Traffic Data Branch. <http://traffic-counts.dot.ca.gov/final2009AADT.xls> Accessed 1/11/2011.

Source: Fehr & Peers, August 2011.

Under a two year scenario, in Year 1, it is estimated that the PRBEP will create approximately 98,800 annual VMT, which equates to approximately 930 daily VMT (approximately 3.6 miles per trip). In Year 2, it is estimated that the PRBEP will create approximately 471,500 annual VMT, which equates to approximately 3,300 daily VMT (approximately 12.8 miles per trip). There is more VMT created in Year 2 because the sediment disposal location at Elkhorn Slough is further from the individual excavation sites than the disposal sites in Year 1 such as Buena Vista Landfill. Under a one year scenario, it is estimated that the PRBEP will create approximately 570,200 annual VMT, which equates to approximately 2,300 daily VMT (approximately 8.8 miles per trip). The ability to remove sediment by rail rather than by truck reduces vehicle miles traveled by up to 44,000 miles – or 177.0 VMT per day and 0.7 VMT per vehicle trip (all in Year 1 if a two year scenario is chosen). **Table 8** shows the VMT estimates for each excavation site. **Attachment D** shows the VMT calculations.

The VMT was also prepared by 5 mile-per-hour (mph) speed bins using the average default EMFAC speed distributions for Santa Cruz and Monterey Counties. **Table 9** shows the VMT estimates by speed increments (e.g., 0-7.5, 7.5-12.5, miles per hour etc.) for use with emissions models such as EMFAC to generate final emissions estimates. Emissions models such as EMFAC use emissions rates for different vehicle types in conjunction with travel activity statistics (i.e., VMT by speed-bin) to calculate vehicle-based emissions in metric tons per day.

TABLE 8:
PROJECT VEHICLE MILES TRAVELED FOR RAIL SCENARIOS

Year	Excavation Site	Truck VMT[1]	Light Duty Vehicle VMT[2]	Total VMT
Year 1	1R	27,574	5,714	33,289
	2R	39,985	10,073	50,058
	3R	61	3,116	3,176
	4R	57	10,479	10,535
	2L	58	1,641	1,698
Subtotal (2011) [A]		***67,735***	***31,022***	***98,757***
Year 2	5R	83,833	7,269	91,102
	5.5R	14,407	1,001	15,408
	6R	204,829	15,888	220,718
	7R	15,143	1,450	16,593
	8R	73,583	7,838	81,421
	4L	40,931	5,282	46,213
Subtotal (2012) [B]		***432,726***	***38,729***	***471,455***
Total [A+B] (or One Year Scenario)		**500,461**	**69,751**	**570,212**
Daily VMT (Year 1)[3]		*635*	*291*	*926*
Daily VMT (Year 2)[3]		*3,050*	*273*	*3,323*
Daily VMT (One Year Scenario)		*2,014*	*281*	*2,295*
VMT per Trip (Year 1)		*3.0*	*5.6*	*3.6*
VMT per Trip (Year 2)		*14.6*	*5.2*	*12.8*
VMT per Trip (One Year Scenario)		*9.7*	*5.4*	*8.8*

Notes:

1. Trucks are considered to be large sediment removal dump trucks with a capacity of 13-cy and other large semi-trucks that would be used to haul equipment or similar amounts of materials. Truck trips include both sediment removal trips and delivery trips.
2. Light duty vehicles include, but are not limited to, vehicle types such as cargo vans, pickup trucks, sport utility vehicles, minivans, and sedans. Light duty vehicle usage is approximately 25% of the amount of sediment removal truck trips.
3. VMT per day calculated by dividing the VMT from each year by the number of workdays per year. There are 107 workdays in Year 1 and there are 142 workdays in Year 2.

Source: Fehr & Peers, August 2011.

TABLE 9
VEHICLE MILES TRAVLED (VMT) DISTRIBUTION BY SPEED BIN FOR RAIL SCENARIOS

Speed Bin (miles per hour)	Distribution[1]	Dry Season Vehicle Miles Traveled Estimates		
		Year 1	Year 2	Total (or One Year Scenario)
0 to 7.49	1%	728	3,476	4,204
7.5 to 12.49	1%	1,275	6,089	7,364
12.5 to 17.49	5%	4,870	23,248	28,118
17.5 to 22.49	7%	6,746	32,205	38,951
22.5 to 27.49	10%	9,438	45,057	54,495
27.5 to 32.49	11%	10,770	51,412	62,182
32.5 to 37.49	8%	8,092	38,632	46,724
37.5 to 42.49	4%	3,496	16,689	20,185
42.5 to 47.49	7%	7,248	34,599	41,847
47.5 to 52.49	17%	16,323	77,923	94,246
52.5 to 57.49	23%	22,313	106,522	128,835
57.5 to 62.49	7%	7,254	34,631	41,885
62.5 and higher	<1%	204	972	1,176
Total		**98,757**	**471,455**	**570,212**

Notes:
[1] Distribution is based on default EMFAC speed distributions for the summer season in the North Central Coast Air Basin (Monterey, Santa Cruz, and San Benito Counties). The percentages have been rounded for presentation purposes.
Source: EMFAC 2007 and Fehr & Peers, August 2011.

Granite Rock Arthur Wilson Quarry

The Granite Rock Arthur Wilson Quarry located on Quarry Road in Aromas, California could be used as an alternative disposal site location; rather, than the Elkhorn Slough disposal location. Since the quarry site is generally closer to the excavation sites, the VMT would be reduced by up to approximately 187,000 vehicle miles.

MAINTENANCE ACTIVITIES

As previously discussed the PRBEP is a maintenance activity that would occur during the dry season, truck traffic would be spread out over the day, and the level of peak hour trips generated by the project would generally be low. The temporary maintenance activities may result in localized effects on the transportation system as individual excavation site projects are initiated including at the access and egress at river access points, and the sediment disposal sites.

Transportation-related Best Management Practices (BMPs) are operational or procedural practices and structural or engineered controls which are implemented to protect the operations of transportation systems. BMPs are usually developed to not only protect the operations of the transportation system including minimizing or avoiding negative localized effects due to maintenance activities, but also to protect maintenance workers and the general public.

Possible Effects of Maintenance

Below is a list of possible negative localized effects due to maintenance activities.

- Road and Lane Closures (RC) – Maintenance activities may require the closure of a lane or an entire roadway.
- Truck Access (TA) – Trucks may need to use local roadways when other access routes to an excavation site are not feasible. Trucks may also have a difficult time entering the traffic stream on the primary roadway from a secondary roadway or access driveway at an intersection that does not have traffic controls for the primary roadway.
- Local Access (LA) – Access to homes and businesses may be temporarily blocked by maintenance equipment or activities.
- Transit Services (TS) – Bus routes and performance may be disrupted due to roadway or lane closures.
- Bicycle Facilities (BF) – Bicycle facilities may be disrupted due to roadway or lane closures as well as Class I path closures.
- Pedestrian Facilities (PF) – Pedestrian facilities may be disrupted due to sidewalk or shared-use path closures.
- Parking (PK) – Workers personal vehicles and other maintenance-related vehicles may parking on roadways near the maintenance site and reduce the availability of on-street parking for local residents or businesses.

Recommended BMPs

The recommended BMPs listed below are intended for application project-wide, as directed by DPW staff. BMP measures may be adjusted and modified on a site-by-site basis and as needed to provide the most protection of the transportation operations, the site, and the surrounding area. Adjustments to BMPs made in the field should require approval of maintenance site managers or DPW staff. Implementation and functioning of the BMPs should be evaluated and revised annually as needed to ensure the most adequate and appropriate protection of the transportation system. Where appropriate the best management practices described below incorporate Caltrans Transportation Management Plan Guidelines.

<u>General Practices</u>

- BMP GP1 – The public should be informed of stream maintenance work prior to the start of work and signs should be posted near the excavation site work site to notify the public at least two weeks in advance of maintenance activities, trail closures, and road/lane closures.
  - Public notification may include brochures and mailers, press releases and media alerts, paid advertisements, a telephone hotline, a project website, public meetings, e-mails to stakeholders, and information kiosks[5].
  - Any lane closures on state facilities should be added to the statewide Lane Closure System[6].

[5] Caltrans Transportation Management Plan Guidelines, Section 1.2 (hereafter referred to as "TMP"), A1-A12

[6] Caltrans TMP A6

- BMP GP2 – A Stage Maintenance Plan should be created to identify the sequence of maintenance activities. The Order of Work specification may identify portions of the project to be completed in a specific sequence to minimize delays[7].

- BMP GP3 – If work is performed during the overnight hours (the time from the end of the evening peak period – approximately 7pm – to the beginning of the morning peak period – approximately 6am) to minimize the effects to motorists and local businesses, consideration should be given to potential noise effects on local residents[8].

- BMP GP4 – Work should be coordinated with other maintenance activities along a travel corridor so that adequate capacity remains available to accommodate the anticipated travel demand within the corridor by not implementing work zones on parallel routes at the same time. This may entail communicating information about the timing of lane closures and coordinating diversion routes[9].

Road and Lane Closures

- BMP RC1 – Work should be staged and conducted in a manner that maintains two-way traffic flow on public roadways in the vicinity of the work site to the maximum extent practicable.

  - If temporary roadway or lane closures are necessary, DPW will use a Caltrans TMP lane closure chart to identify the number of lanes that must be open to traffic each hour of the day to minimize delay when work activities are being conducted. The charts restrict work hours so that traffic is not affected during periods of peak travel demand[10].

  - If temporary full roadway closures are necessary and if the closure affects a state facility, DPW will coordinate with the Caltrans district Public Information Officer to ensure that a public information campaign with adequate advance notification is developed and implemented and DPW will submit a closure plan to the District Lane Closure Review Committee[11].

  - If one-way reversing traffic control is determined to be needed, DPW will determine the maximum time that each direction should be stopped so that motorists do not experience undue delays. If this type of traffic control occurs on a state facility, DPW will coordinate with the Caltrans TMP Manager[12].

  - Any lane or roadway closures will be coordinated with the appropriate jurisdictional agency. Any lane closures should include advance warning signage, a detour route and flaggers in both directions.

- BMP RC2 – When work may have the potential to affect traffic flow, work will be coordinated with local emergency service providers as necessary ensure that emergency vehicle access and response is not impeded.

[7] Caltrans TMP D2
[8] Caltrans TMP D10
[9] Caltrans TMP D18
[10] Caltrans TMP D1
[11] Caltrans TMP D4
[12] Caltrans TMP D6

Truck Access

- BMP TA1 – Heavy equipment and haul traffic should be prohibited in residential areas to the maximum extent practicable. When no other route to and from the site is available, local routes through residential areas may be used.

- BMP TA2 – Any truck access points should include advance warning signage. If trucks would have trouble entering the traffic stream on the primary roadway from a secondary roadway or access driveway at an intersection that does not have traffic controls for the primary roadway, either:

  - Flaggers in both directions may be used to control traffic on the primary roadway to allow trucks to exit and enter the secondary roadway or access driveway.

    OR

  - A lane may be temporarily closed on the primary roadway to allow trucks to exit and enter the secondary roadway or access driveway.

- BMP TA3 – Existing access points will be used to the extent practicable. If necessary to avoid large mature trees, native vegetation, or other significant habitat features, temporary access points will be constructed in a manner that minimizes impacts according to the following guidelines

- BMP TA3 – When needed, paved access roads will be swept and cleared of any residual vegetation or dirt resulting from the maintenance activity.

Local Access

- BMP LA1 – Access for driveways and private roads should be maintained to the extent practicable. If maintenance would temporarily block access, property owners must be notified prior to the maintenance activities. Signage and other specific information to direct traffic for all travel modes to the properties affected would be required[13].

Transit Services

- BMP TS1 – Work should be staged and conducted in a manner that maintains transit services in the vicinity of the work site. If temporary roadway or lane closures are necessary, they should be coordinated with the appropriate transit service agency and scheduled to occur outside of peak traffic hours (7:00 – 10:00 a.m. and 3:00 – 6:00 p.m.) to the maximum extent practicable. Any transit service changes due to roadway or lane closures should include signs posted within the vehicles on the affected routes at least two weeks in advance of maintenance activities.

- BMP TS2 – If temporary roadway or lane closures require the temporary closure of a bus stop, the closure should be coordinated with the appropriate transit service agency and scheduled to occur outside of peak traffic hours (7:00 – 10:00 a.m. and 3:00 – 6:00 p.m.) to the maximum extent practicable. Any bus stop closures should include signs posted at the affected stops at least two weeks in advance of maintenance activities.

[13] Caltrans TMP D13

- BMP TS3 – Bus-only lanes or other features may be provided to ensure buses can travel through a maintenance area with minimal delay to entice the public to use transit and decrease the number of vehicles the travel along a corridor[14].

Bicycle Facilities

- BMP BF1 – Work should be staged and conducted in a manner that maintains bicycle facilities in the vicinity of the work site. If temporary roadway, lane, or Class I path closures are necessary, they should be coordinated with the appropriate jurisdictional agency and scheduled to occur outside of peak traffic hours (7:00 – 10:00 a.m. and 3:00 – 6:00 p.m.) to the maximum extent practicable. Any closures should include advance warning signage. Alternate facilities should be provided[15].

Pedestrian Facilities

- BMP PF1 – Work should be staged and conducted in a manner that maintains pedestrian facilities in the vicinity of the work site. If temporary sidewalk or shared-use path closures are necessary, they should be coordinated with the appropriate jurisdictional agency and scheduled to occur outside of peak traffic hours (7:00 – 10:00 a.m. and 3:00 – 6:00 p.m.) to the maximum extent practicable. Any closures should include advance warning signage. Alternate facilities should be provided[16].

Parking

- BMP PK1 – Off-street parking should be provided or designated public parking areas should be used for maintenance workers' personal vehicles and maintenance-related vehicles not in used during the maintenance period. Similarly, workers may park at the nearest County office building or Public Works Yard and be shuttled to the job site.

Attachments

Attachment A – Sediment Removal Amounts by Excavation Site and Locations of Excavation Sites in the Project Area
Attachment B – Trip Estimate Calculations
Attachment C – VMT Calculations

[14] Caltrans TMP D21

[15] Caltrans TMP D12

[16] Caltrans TMP D12

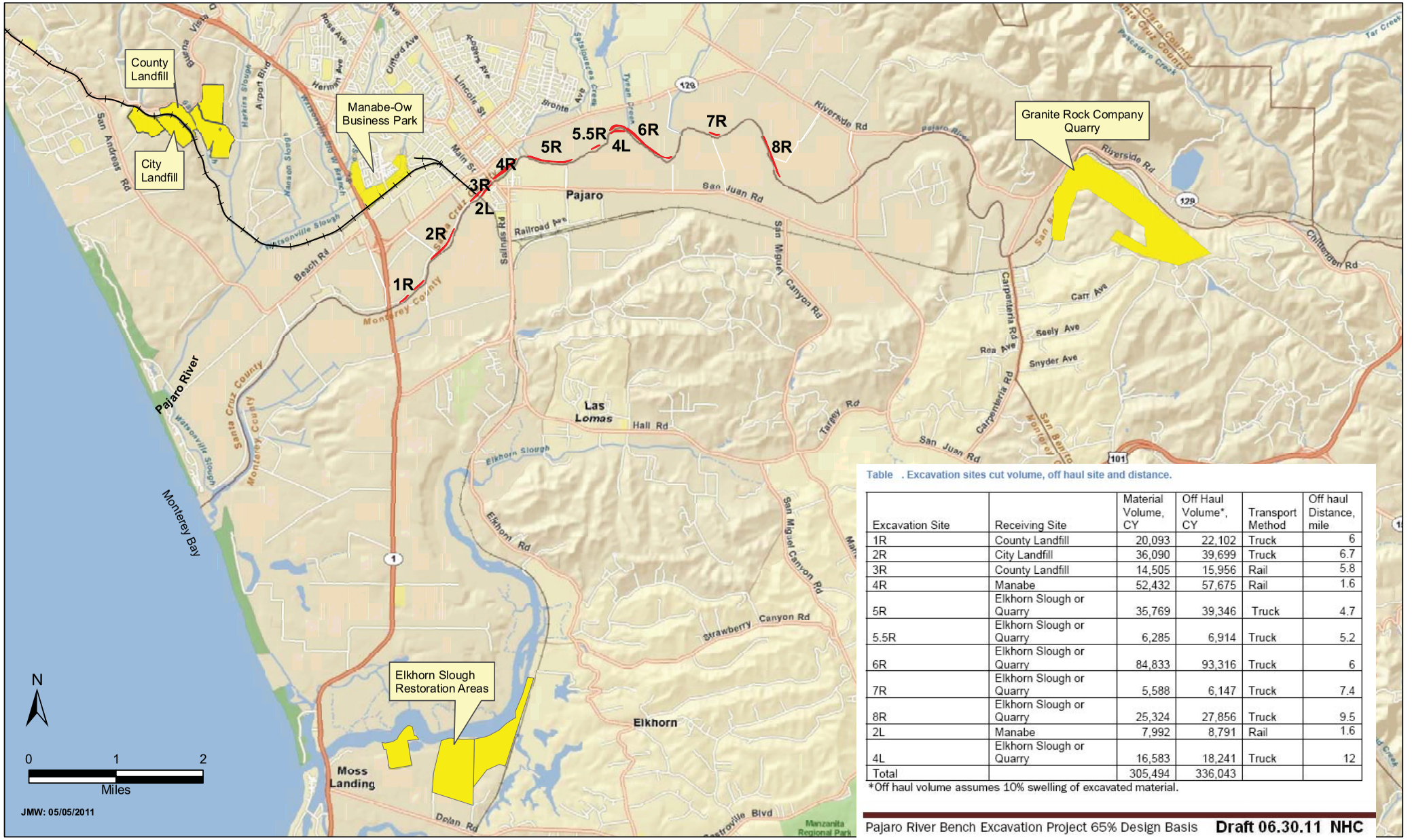


Table . Excavation sites cut volume, off haul site and distance.

Excavation Site	Receiving Site	Material Volume, CY	Off Haul Volume*, CY	Transport Method	Off haul Distance, mile
1R	County Landfill	20,093	22,102	Truck	6
2R	City Landfill	36,090	39,699	Truck	6.7
3R	County Landfill	14,505	15,956	Rail	5.8
4R	Manabe	52,432	57,675	Rail	1.6
5R	Elkhorn Slough or Quarry	35,769	39,346	Truck	4.7
5.5R	Elkhorn Slough or Quarry	6,285	6,914	Truck	5.2
6R	Elkhorn Slough or Quarry	84,833	93,316	Truck	6
7R	Elkhorn Slough or Quarry	5,588	6,147	Truck	7.4
8R	Elkhorn Slough or Quarry	25,324	27,856	Truck	9.5
2L	Manabe	7,992	8,791	Rail	1.6
4L	Elkhorn Slough or Quarry	16,583	18,241	Truck	12
Total		305,494	336,043		

*Off haul volume assumes 10% swelling of excavated material.

Source: Santa Cruz County staff. Based on Howard, Joey and Pan, Jimmy. Pajaro River Bench Excavation Project 65% Design Basis Memorandum to Bruce Laclergue, June 30, 2011.

Attachment B

Trip Generation - Truck Scenarios

Truck Size (CY)	Trucks/Day	CY/Day
13	104	1352

Year	LandFill	Site	Access	Off Haul Vol by Truck (CY)	Days	Total Sed Trucks
[A]	[B]	[C]	[D]	[E]	[F]	[G]
-	-	-	-	-	= [E]/ 1352-cy/dy	= [E] / 13-cy
1	County Landfill	1R	Lee to SR 1	22,102	16.3	1,701
1	City Landfill	2R	Judd to SR 1	39,699	29.4	3,054
1	County Landfill	3R	Walker to Riverside	15,956	11.8	1,228
1	Manabe OW	4R	Union to Riverside	57,675	42.7	4,437
2	Elkhorn Slough	5R	Riverside	39,346	29.1	3,027
2	Elkhorn Slough	5.5R	Riverside	6,914	5.1	532
2	Elkhorn Slough	6R	Riverside	93,316	69.0	7,179
2	Elkhorn Slough	7R	Riverside	6,147	4.5	473
2	Elkhorn Slough	8R	Riverside	27,856	20.6	2,143
1	Manabe OW	2L	Main to Riverside	8,791	6.5	677
2	Elkhorn Slough	4L	San Juan to Riveride	18,241	13.5	1,404

Trip Generation - Truck Scenarios

Site	Light Duty Vehicles	Delivery Vehicles	Truck Trips	Light Duty Trips	Total Trips
[C]	[H]	[I]	[J]	[K]	[L]
-	= [G] / 4	(3 per site)	= [G] x 2 + [I] x 4	= [H] x 2	= [J] + [K]
1R	426	3	3,414	852	4,266
2R	764	3	6,120	1,528	7,648
3R	307	3	2,468	614	3,082
4R	1110	3	8,886	2,220	11,106
5R	757	3	6,066	1,514	7,580
5.5R	133	3	1,076	266	1,342
6R	1795	3	14,370	3,590	17,960
7R	119	3	958	238	1,196
8R	536	3	4,298	1,072	5,370
2L	170	3	1,366	340	1,706
4L	351	3	2,820	702	3,522

Attachment B

Trip Generation - Rail Scenarios

Truck Size (CY)	Trucks/Day	CY/Day
13	104	1352

Year	LandFill	Site	Access	Off Haul Vol by Truck (CY)	Days	Total Sed Trucks
[A]	[B]	[C]	[D]	[E]	[F]	[G]
-	-	-	-	-	= [E]/ 1352-cy/dy	= [E] / 13-cy
1	County Landfill	1R	Lee to SR 1	22,102	16.3	1,701
1	City Landfill	2R	Judd to SR 1	39,699	29.4	3,054
1	County Landfill	3R	Walker to Riverside	0	11.8	0
1	Manabe OW	4R	Union to Riverside	0	42.7	0
2	Elkhorn Slough	5R	Riverside	39,346	29.1	3,027
2	Elkhorn Slough	5.5R	Riverside	6,914	5.1	532
2	Elkhorn Slough	6R	Riverside	93,316	69.0	7,179
2	Elkhorn Slough	7R	Riverside	6,147	4.5	473
2	Elkhorn Slough	8R	Riverside	27,856	20.6	2,143
1	Manabe OW	2L	Main to Riverside	0	6.5	0
2	Elkhorn Slough	4L	San Juan to Riveride	18,241	13.5	1,404

Trip Generation - Rail Scenarios

Site	Light Duty Vehicles	Delivery Vehicles	Truck Trips	Light Duty Trips	Total Trips
[C]	[H]	[I]	[J]	[K]	[L]
-	= [G] / 4	(3 per site)	= [G] x 2 + [I] x 4	= [H] x 2	= [J] + [K]
1R	426	3	3,414	852	4,266
2R	764	3	6,120	1,528	7,648
3R	307	3	12	614	626
4R	1110	3	12	2,220	2,232
5R	757	3	6,066	1,514	7,580
5.5R	133	3	1,076	266	1,342
6R	1795	3	14,370	3,590	17,960
7R	119	3	958	238	1,196
8R	536	3	4,298	1,072	5,370
2L	170	3	12	340	352
4L	351	3	2,820	702	3,522

Attachment C

VMT - Truck Scenarios

Truck Size (CY)	Trucks/Day	CY/Day
13	104	1352

Year	LandFill	Site	Access	Off Haul Vol by Truck (CY)	Total Sed Round-Trips	Truck Distance (one-way)
[A]	[B]	[C]	[D]	[E]	[F]	[G]
-	-	-	-	-	= ([E] / 13-cy) x 2	-
1	County Landfill	1R	Lee to SR 1	22,102	3,402	8.1
1	City Landfill	2R	Judd to SR 1	39,699	6,108	6.5
1	County Landfill	3R	Walker to Riverside	15,956	2,456	7.3
1	Manabe OW	4R	Union to Riverside	57,675	8,874	2.4
2	Elkhorn Slough	5R	Riverside	39,346	6,054	13.8
2	Elkhorn Slough	5.5R	Riverside	6,914	1,064	13.5
2	Elkhorn Slough	6R	Riverside	93,316	14,358	14.3
2	Elkhorn Slough	7R	Riverside	6,147	946	15.9
2	Elkhorn Slough	8R	Riverside	27,856	4,286	17.1
1	Manabe OW	2L	Main to Riverside	8,791	1,354	2.4
2	Elkhorn Slough	4L	San Juan to Riveride	18,241	2,808	14.6

VMT - Truck Scenarios

Site	Truck VMT	Light Duty Round-Trips	L.D. Distance (one-way)	L.D. VMT	Delivery Round-Trips	Delivery VMT
[C]	[H]	[I]	[J]	[K]	[L]	[M]
-	= [F] x [G]	= [F] / 4	-	=[I] x [J]	= 3 trucks x 2 deliveries x 2	= [K] x [L]
1R	27,494	852	6.7	5,714	12	80
2R	39,906	1528	6.6	10,073	12	79
3R	18,050	614	5.1	3,116	12	61
4R	21,288	2220	4.7	10,479	12	57
5R	83,775	1514	4.8	7,269	12	58
5.5R	14,362	266	3.8	1,001	12	45
6R	204,776	3590	4.4	15,888	12	53
7R	15,070	238	6.1	1,450	12	73
8R	73,495	1072	7.3	7,838	12	88
2L	3,255	340	4.8	1,641	12	58
4L	40,886	702	7.5	5,282	12	45

VMT - Truck Scenarios

Site	Truck VMT	Light Duty VMT	Total VMT
[C]	[N]	[O]	[P]
-	= [H] + [M]	= [K]	= [N] + [O]
1R	27,574	5,714	33,289
2R	39,985	10,073	50,058
3R	18,111	3,116	21,226
4R	21,345	10,479	31,823
5R	83,833	7,269	91,102
5.5R	14,407	1,001	15,408
6R	204,829	15,888	220,718
7R	15,143	1,450	16,593
8R	73,583	7,838	81,421
2L	3,313	1,641	4,953
4L	40,931	5,282	46,213

VMT - Rail Scenarios

Truck Size (CY)	Trucks/Day	CY/Day
13	104	1352

Year	LandFill	Site	Access	Off Haul Vol by Truck (CY)	Total Sed Round-Trips
[A]	[B]	[C]	[D]	[E]	[F]
-	-	-	-	-	= ([E] / 13-cy) x 2
1	County Landfill	1R	Lee to SR 1	22,102	3,402
1	City Landfill	2R	Judd to SR 1	39,699	6,108
1	County Landfill	3R	Walker to Riverside	0	0
1	Manabe OW	4R	Union to Riverside	0	0
2	Elkhorn Slough	5R	Riverside	39,346	6,054
2	Elkhorn Slough	5.5R	Riverside	6,914	1,064
2	Elkhorn Slough	6R	Riverside	93,316	14,358
2	Elkhorn Slough	7R	Riverside	6,147	946
2	Elkhorn Slough	8R	Riverside	27,856	4,286
1	Manabe OW	2L	Main to Riverside	0	0
2	Elkhorn Slough	4L	San Juan to Riveride	18,241	2,808

VMT - Rail Scenarios

Site	Sed Truck Distance (one-way)	Sed Truck VMT	Light Duty Round-Trips	L.D. Distance (one-way)	L.D. VMT
[C]	[G]	[H]	[I]	[J]	[K]
-	-	= [F] x [G]	= [F] / 4	-	=[I] x [J]
1R	8.1	27,494	852	6.7	5,714
2R	6.5	39,906	1528	6.6	10,073
3R	7.3	0	614	5.1	3,116
4R	2.4	0	2220	4.7	10,479
5R	13.8	83,775	1514	4.8	7,269
5.5R	13.5	14,362	266	3.8	1,001
6R	14.3	204,776	3590	4.4	15,888
7R	15.9	15,070	238	6.1	1,450
8R	17.1	73,495	1072	7.3	7,838
2L	2.4	0	340	4.8	1,641
4L	14.6	40,886	702	7.5	5,282

VMT - Rail Scenarios

Site	Delivery Round-Trips	Delivery VMT	Truck VMT	Light Duty VMT	Total VMT
[C]	[L]	[M]	[N]	[O]	[P]
-	= 3 trucks x 2 deliveries x 2	= [K] x [L]	= [H] + [M]	= [K]	= [N] + [O]
1R	12	80	27,574	5,714	33,289
2R	12	79	39,985	10,073	50,058
3R	12	61	61	3,116	3,176
4R	12	57	57	10,479	10,535
5R	12	58	83,833	7,269	91,102
5.5R	12	45	14,407	1,001	15,408
6R	12	53	204,829	15,888	220,718
7R	12	73	15,143	1,450	16,593
8R	12	88	73,583	7,838	81,421
2L	12	58	58	1,641	1,698
4L	12	45	40,931	5,282	46,213

ATTACHMENT 4

Elkhorn Slough Biological Assessment

Elkhorn Slough Tidal Marsh Sites Restorable by Sediment Addition
Sediment Stockpile Site Descriptions: Biological Assessment
Draft, April 11, 2011

SEAL BEND: EXISTING CONDITIONS

Location
The proposed stockpile site is on the Elkhorn Slough National Estuarine Research Reserve (ESNERR) in Monterey County, CA. The ESNERR Seal Bend parcel is located off of Dolan Road, Castroville, CA on Monterey County APN 133 181 002.

Land use
ESNERR lands are protected for long-term research, water quality monitoring, education, and coastal stewardship. The proposed stockpile site is 12.7 acres, unvegetated and frequently disturbed by cattle. Ponded water occurs in the southeast portion of the parcel.

Surrounding the parcel are the tidal wetlands of Elkhorn Slough; a privately owned parcel, used as a residence; the Moonglow Dairy; and PG&E land, developed with power transmission infrastructure.

Topography
The proposed stockpile site is located on flat land (approximately 1 percent slope, derived from 2004 Light Detection and Ranging (LiDAR) data using Spatial Analyst, ArcGIS 10).

Soils
Soils in the proposed stockpile site are primarily Oceano loamy sands, as characterized in the in the Monterey County soil survey (NRCS 1997).

Vegetation
The proposed site is currently unvegetated. To the north of the site on the same ESNERR parcel is a 21 acre blue gum eucalyptus grove. A topographic survey completed in 1854 by the U.S. Coast Survey included the western portion of the Seal Bend parcel (Johnson 1854). That survey indicates that the proposed site and eucalyptus grove were historically grasslands.

Wildlife
The proposed stockpile site is dominated by dairy cattle, and wildlife surveys within the potential stockpile site have not been conducted. It is unlikely that the unvegetated area provides significant wildlife habitat.

The adjacent eucalyptus grove has been documented to provide habitat for:

- overwintering monarch butterflies (*Danaus plexippus*) (California Natural Diversity Database, 2008 edition, and A. Woolfolk, pers. obs.)
- a heron-egret-cormorant rookery (*Ardea herodias, Ardea alba, Phalacrocorax auritus)* (ESNERR, unpubl. data)

- resident winter wren (*Troglodytes troglodytes*) (D. Roberson, pers. comm.)
- nesting Pacific-slope flycatcher (*Empidonax difficilis*), brown creeper (*Certhia americana)*, downy woodpecker (*Picoides pubescens*), and chestnut-backed chickadees (*Poecile rufescens*) (D. Roberson, pers. comm.).

Spatial data from the 2011 edition of the California Natural Diversity Database (CNDDB) do not indicate any sensitive species in the proposed stockpile area.

MINHOTO (TO INCLUDE STOCKPILING FOR HESTER'S MARSH): EXISTING CONDITIONS

Location
The proposed stockpile site is on ESNERR in Monterey County, CA. The ESNERR Minhoto parcel is located off of Dolan Road, Castroville, CA on Monterey County APN 133 181 004.

Land use
ESNERR lands are protected for long-term research, water quality monitoring, education, and coastal stewardship. The proposed stockpile site is 35 acres and is currently planted in annual barley, recently developed as a vegetated buffer between the adjacent tidal wetlands and agriculture. Calla lilies and food crops (currently strawberries, but brussels sprouts may be grown in near future) are grown on the other 104 acres of the Minhoto parcel, under a lease agreement between Golden State Bulbs and the California Department of Fish and Game.

Surrounding the parcel are the tidal wetlands of Elkhorn Slough; another ESNERR parcel; a privately owned parcel, including fallowed fields and junk yards; the Moonglow Dairy; and open land owned and operated by the Dynegy power plant company

Topography
The proposed stockpile site is located on slightly sloped lands (1 to 10 percent slopes, derived from 2004 LiDAR data using Spatial Analyst, ArcGIS 10).

Soils
Soils in the proposed stockpile site are mixed, and include both Oceano loamy sand and Santa Ynez fine sandy loam, as characterized in the in the Monterey County soil survey (NRCS 1997).

Vegetation
The proposed site is currently cover cropped with annual barley. The adjacent uplands are covered in agriculture. Historic surveys of the parcel are not available, and the parcel was in cultivation when the first aerials and vegetation maps were produced in 1931 and 1932, respectively. However, extrapolating from other primary historical sources, it appears very likely that site was grassland before it was converted to crops.

Wildlife

The proposed stockpile site was planted with crops until 2010, and wildlife surveys within the proposed site have not been conducted.

Spatial data from the 2011 edition of the CNDDB indicates that the mimic tryonia (*Tryonia imitator*) may occur on the proposed site, but its occurrence is highly unlikely. The mimic tryonia is restricted to estuarine wetlands and the site is upland.

SIXTH FINGER: EXISTING CONDITIONS

Location
The proposed stockpile site is on ESNERR in Monterey County, CA. The ESNERR Avila parcels are located off of Avila Road, Castroville, CA on Monterey County APN 131 054 005 and 131 061 017.

Land use
ESNERR lands are protected for long-term research, water quality monitoring, education, and coastal stewardship. The proposed stockpile site is approximately 1 acre and is open space, closed to the public. PG&E infrequently accesses the property to maintain three transmission towers located on the property. Currently ESNERR researchers use the site as a look-out site for marine mammal monitoring and for long-term monitoring of salt marsh vegetation.

Surrounding the parcel are the tidal wetlands of Elkhorn Slough; another ESNERR parcel; the UPRR railroad; three privately owned parcels; and two PG&E parcels. One of the PG&E parcels lies between the Avila property and Avila Road. ESNERR currently has an agreement with PG&E to cross its parcel when necessary, and ESNERR deeds indicate that a formal easement across the PG&E parcel for access exists (we do not have the easement on file). ESNERR is currently investigating the possibility of reintroducing cattle to the property as a grassland management technique and is working with PG&E to arrange a grazing license on their adjacent parcel.

Topography
The proposed stockpile site is located on slightly sloped lands (1 to 10 percent slopes, derived from 2004 LiDAR data using Spatial Analyst, ArcGIS 10).

Soils
Soils in the proposed stockpile site are Diablo clays, neutral to mildly alkaline clay about 20 inches thick. It is underlain by moderately alkaline clay to about 40 inches. Permeability is slow (SCS 1989).

Vegetation

The vegetation on the Avila property is dominated by grassland species in the uplands, and a narrow band (~10 feet) of salt marsh at tidal elevations. Scattered oaks grow on east facing slopes. Portions of the property are characterized by native perennial grasses (*Danthonia californica*, *Hordeum brachyantherum*, and *Leymus triticoides*) and native

wildflowers (*Camissonia ovata*, Sisyrinchium *bellum*), but native plants are absent from the property's ridgeline and the area identified as a potential stockpile site. These areas are dominated by non-native *Phalaris aquatica*, *Bromus diandrus*, *Lolium multiflorum*, *Brassica* sp., *Plantago lanceolata*, *Sonchus asper*, and *Hordeum marinum* (SCS 1989 and pers. obs.)

Early historical surveys are not available for the Avila parcels, but aerials and vegetation maps dating to the early 1930s show the uplands as grassland, with only a few oaks growing on the east facing slopes. This, combined primary historical sources from nearby sites suggest that the uplands were grassland historically, as well.

Wildlife

No source of freshwater is available on the Avila property, although livestock troughs on nearby parcels may provide water to resident species. Ground squirrels have been observed on the property during field visits.

Spatial data from the 2011 edition of the CNDDB indicates that the mimic tryonia (*Tryonia imitator*) may occur on the proposed site, but its occurrence is highly unlikely. The mimic tryonia is restricted to estuarine wetlands and the site is upland. 2011 CNDDB spatial data indicate that burrowing owls (*Athene cunicularia*) may be found to the south of the Avila parcel in a swath along Dolan Road. However, a 1989 inventory of the parcel (SCS 1989) and an ESNERR survey done in the mid-2000s (pers. obs.) failed to find evidence of burrowing owls on site. More surveys may be needed.

References Cited

Johnson, W. M. 1854. Map of Part of the Coast of Cal. From Pajaro River Southward. U.S. Coast and Geodetic Survey, Department of Commerce.

Natural Resources Conservation Service (NRCS). 1997. Soils (Soil Survey Geographic database, 1:24,000 scale) - Monterey County. GIS shapefile provided by California Coastal Commission --Watershed Analysis Tool, www.ccjdc.org/resources/WaterData/soils/montco/

Roberson, D. 2002. Monterey Birds: Status and Distribution of Birds in Monterey County, CA, Second Ed. Monterey Peninsula Audubon Society, Carmel, CA.

Soil Conservation Service. 1989. Elkhorn Slough National Estuarine Research Reserve Avila Property Resource Inventory for CDFG.

ATTACHMENT 5

Soil Sampling Report

Soil Sampling Report

Pajaro River Bench Excavation Project
Watsonville, CA

August 2010

ers

Environmental Risk Specialties Corporation

August 6, 2010

Mr. Michael Sapunor
County of Santa Cruz
Department of Public Works
701 Ocean Street, Room 410
Santa Cruz, CA 95060

Re: Soil Sampling Report- Pajaro
River Bench Excavation Project
Santa Cruz County, CA

Dear Mr. Sapunor:

Environmental Risk Specialties, Corp. (ERS) is pleased to present our soil sampling report performed in connection with the Pajaro River Bench Excavation Project. The County of Santa Cruz Department of Public Works (DPW) is pursuing a project to excavate approximately 300,000 cubic yards of soil sediment from selected locations along the levee benches of the lower Pajaro River. The goal of the excavation project is to increase flood carrying capacity within the levee system. The area of excavation includes eleven predetermined areas extending along 7.5 miles of the Pajaro River located on the Santa Cruz County side between Murphy Road Crossing on the east to Highway 1 on the west. This report summarizes our work related to the characterization of the soil in one of those areas (Area 2R).

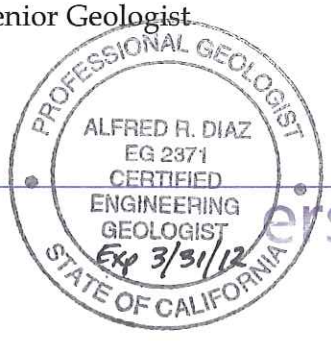
Should you have any questions or require supplemental data, please feel free to contact us at your convenience.

Very truly yours,

ENVIRONMENTAL RISK SPECIALTIES CORPORATION

Kendall W. Price CEG, REA
Principal Consultant/Regional Manager

Alfred R. Diaz
Senior Geologist



ARD/ard
Attachments

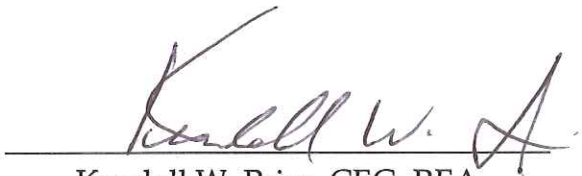
SOIL SAMPLING REPORT

Pajaro River Bench Excavation Project
Watsonville, CA

August 2010

Submitted to:
County of Santa Cruz Department
Of Public Works

Prepared by:
Environmental Risk Specialties Corporation
Santa Clara, California



Kendall W. Price, CEG, REA

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

1. INTRODUCTION

Environmental Risk Specialties Corporation (ERS) has prepared this letter report for soil characterization in connection with the Pajaro River Bench Excavation Project. The County of Santa Cruz Department of Public Works (DPW) is pursuing a project to excavate approximately 300,000 cubic yards of soil sediment from selected locations along the levee benches of the lower Pajaro River. The goal of the excavation project is to increase flood carrying capacity within the levee system. The area of excavation includes eleven predetermined areas extending along 7.5 miles of the Pajaro River located on the Santa Cruz County side between Murphy Road Crossing on the east to Highway 1 on the west. The focus of this investigation was to perform a limited soil investigation to assess the presence of lead, mercury and chromium in the soil within one of the eleven predetermined areas of the project.

2. LOCATION AND SITE DESCRIPTION

The subject site is one of the predetermined eleven areas to be excavated (Area 2R) located on the Santa Cruz County side of the Pajaro River in Watsonville, California. The site is approximately 3.4 acres in size and aproximately 2,800 feet long. The average excavation depth proposed for Area 2R is 6.4 feet with a volume of 35,000 cubic yards of soil expected to be excavated. This volume represents approximately 12.5% of the total volume of excavated soil for the project. A site location map is presented in Figure 1 and a site plan showing the Area 2R including soil boring locations is presented in Figure 2.

3. FIELD INVESTIGATION

To assess the presence of lead, mercury and chromium in the soil within Area 2R, ERS developed a soil sampling strategy and provided personnel to sample and collect soil samples from four soil boring locations (2R-1 through 2R-4) for laboratory analysis. The field investigation was conducted on July 13, 2010. Soil sampling consisted of

excavating the soil at each soil boring location with a hand auger and collecting soil samples continuously from the ground surface to the predetermined average depth of excavation for Area 2R. Soil samples were obtained directly from the hand auger and laid out on plastic sheeting with index cards marking the corresponding depths of each auger bucket. Soil types were classified and recorded using the Unified Soil Classification System. The soil types encountered and a soil profile for each soil boring location is presented on Geotechnical Boring Logs (see Appendix A).

Soil samples were collected in pre-cleaned, laboratory-supplied glass jars. Following sample collection, each soil sample was labeled with a unique location and depth designation. All soil samples were delivered to Torrent Laboratory, Inc. (State of California ELAP Certification No. 1991) under chain of custody documentation.

With the contribution of Mr. Guilherme Lessa of the Elkhorn Slough National Estuarine Research Reserve, discrete and field composited soil samples were collected from each soil boring for chemical laboratory analyses. Discrete soil samples consisted of soil collected from no more than a one foot length of soil column within the same soil boring while field composited soil samples consisted of soil collected from a length of three feet or more of the soil column within the same soil boring. All excavated soil sampling locations were backfilled using the excavated soil. The longitude and latitude of each soil boring were recorded using GPS. All soil boring locations are depicted in Figures 2 and GPS readings are presented on the Geotechnical Boring Logs and on Table 1.

4. LABORATORY INVESTIGATION

In addition to the chemical laboratory analyses of discrete and field composited soil samples, the laboratory was instructed to composite field composited samples from different soil borings into one sample and analyze. All chemical laboratory results are presented in Appendix B and a summary of the results is presented in Table 1. All discrete, field composited and laboratory composited soil samples were analyzed for lead and total chromium utilizing EPA Test Method SW6020 and for mercury utilizing EPA Test Method 7471B.

5. CONCLUSIONS AND RECOMMENDATIONS

Based on the results of our soil sampling we conclude that the soil to be excavated from the predetermined excavation area (Area 2R) represents fluvial deposits of clay, silt, and some sands deposited from sediments carried and deposited by the Pajaro River. No evidence was noted to suggest that these deposits represent developed soil horizons. Except for the occurrence of shreds of plastic sheeting noted at a depth of approximately one foot in a clay layer in Soil Boring 2R-1, no evidence of fill, debris or other human related activity was noted.

The laboratory results for each soil sample were compared to the Environmental Screening Levels (ESLs) from *Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater, California Regional Water Quality Control Board, Interim Final- November 2007 (revised May 2008)*. The ESL values for lead and mercury for residential land use are 200,000 and 1,300 ug/Kg, respectively. The ESL values for lead and mercury for Industrial/Commercial land use are 750,000 and 10,000 ug/Kg, respectively. No ESL values for total chromium are posted. The ESL value for trivalent chromium for residential and Industrial/Commercial land use are both 750,000 ug/Kg. The ESL values for hexavalent chromium for residential and Industrial/Commercial land use are both 8,000 ug/Kg.

Based on the laboratory results for each soil sample no ESLs were exceeded for lead or mercury. The ESL value established for hexavalent chromium (8,000 ug/Kg) was exceeded by the total chromium values for each of the sample results. We recommend that additional anaylses for hexavalent chromium be performed on some or all of the discrete and field composited soil samples in order to assess the degree of hexavalent chromium component, if any, to the total chromium values.

Table 1
Summary of Site 2R Soil Sample
Laboratory Results

Site	Length (ft)	Area (acres)	Ave. Excavation Depth (ft)	Soil Volume (cu yds)	% of Total Volume	Sample ID	Date/ Time Sampled	Soil Boring Location	Laboratory Sample Results (ug/Kg)		
									Lead	Mercury	Chromium
2R	2800	3.4	6.4	35000	12.5%	2R-1 1.0'-2.0'	7/13/2010 1010	36^0 53.566' N 121^0 45.794' W	28,000	ND	41,000
						2R-1 Field Comp 0.0'-3.0'	7/13/2010 1015		13,000	ND	40,000
						2R-1 Field Comp 3.0'-6.4'	7/13/2010 1020		8,800	0.11	38,000
						2R-2 0.5'-0.75'	7/13/2010 1115	36^0 53.650' N 121^0 45.687' W	11,000	ND	36,000
						2R-2 Field Comp 0.0'-3.0'	7/13/2010 1120		5,600	ND	35,000
						2R-2 Field Comp 3.0'-6.4'	7/13/2010 1125		4,500	ND	39,000
						2R-3 Field Comp 0.0'-3.0'	7/13/2010 1345	36^0 53.700 N 121^0 45.632 W	5,200	ND	32,000
						2R-3 Field Comp 3.0'-7.0'	7/13/2010 1350		6,800	ND	32,000
						2R-3 6.5'-7.0'	7/13/2010 1355		9,900	ND	26,000
						2R-4 Field Comp 0.0'-3.0'	7/13/2010 1455	36^0 53.843 N 121^0 45.554 W	8,000	ND	38,000
						2R-4 Field Comp 3.0'-6.4'	7/13/2010 1500		4,700	ND	34,000
						2R-4 5.0'-5.5'	7/13/2010 1505		9,400	0.10	34,000
						2R-1 Field Comp 0.0'-3.0'	7/13/2010 1015	36^0 53.566' N 121^0 45.794' W	8,200	ND	36,000
						2R-2 Field Comp 0.0'-3.0'	7/13/2010 1125	36^0 53.650' N 121^0 45.687' W			
						2R-3 Field Comp 0.0'-3.0'	7/13/2010 1345	36^0 53.700 N 121^0 45.632 W			
						2R-4 Field Comp 0.0'-3.0'	7/13/2010 1500	36^0 53.843 N 121^0 45.554 W			
						2R-1 Field Comp 3.0'-6.4'	7/13/2010 1020	36^0 53.566' N 121^0 45.794' W	6,200	ND	35,000
						2R-2 Field Comp 3.0'-6.4'	7/13/2010 1125	36^0 53.650' N 121^0 45.687' W			
						2R-3 Field Comp 3.0'-7.0'	7/13/2010 1350	36^0 53.700 N 121^0 45.632 W			
						2R-4 Field Comp 3.0'-6.4'	7/13/2010 1500	36^0 53.843 N 121^0 45.554 W			

FIGURES

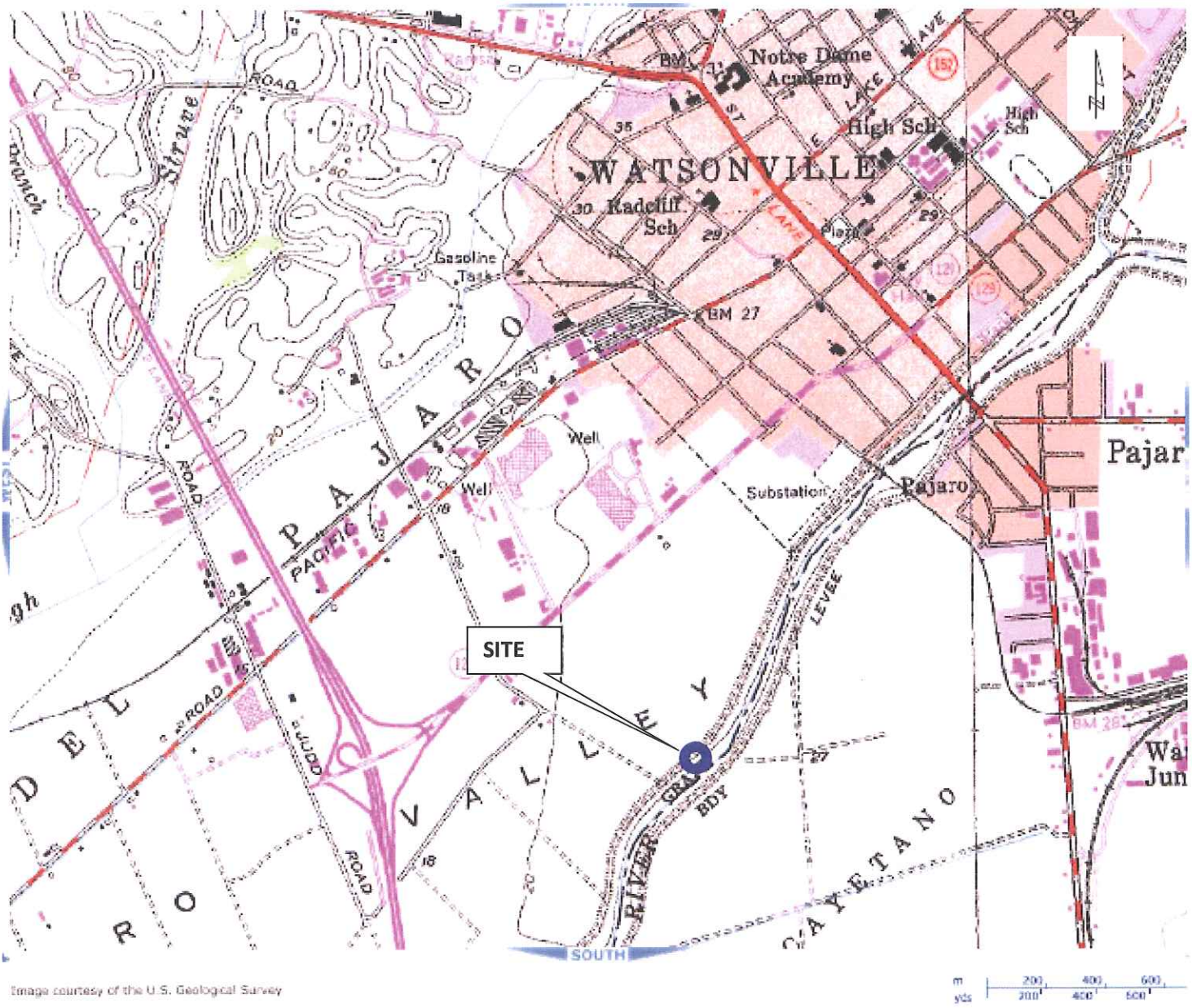
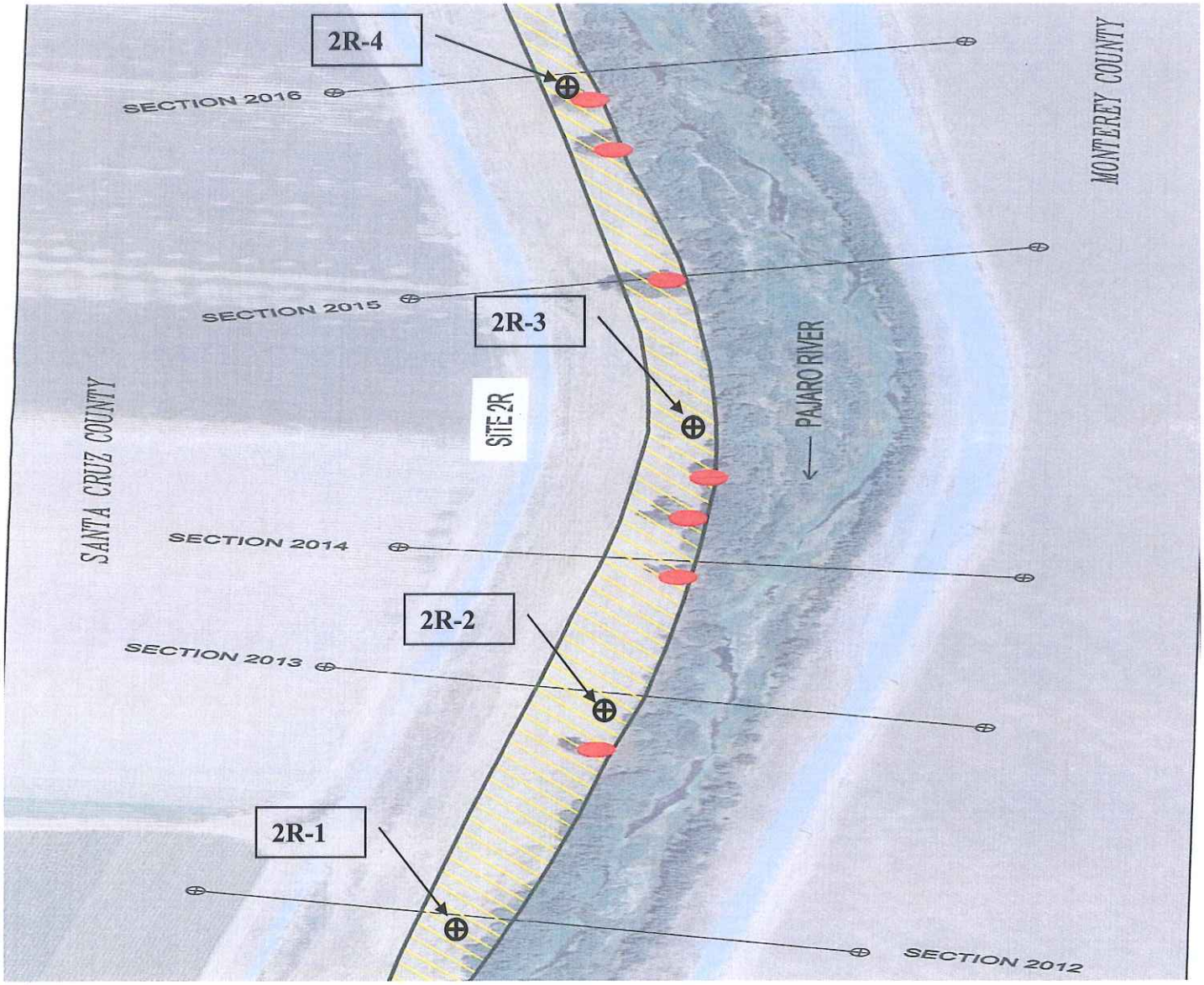


FIGURE 1
SITE LOCATION MAP

Project Name: Pajaro River Bench Excavation Project
Client Name: County of Santa Cruz DPW
Date: August 2010

ers



LEGEND

⊕ Soil Boring Locations (Approx.)

FIGURE 2
SAMPLE LOCATIONS 2R

Project Name: Pajaro River Bench Excavation Project
Client Name: County of Santa Cruz DPW
Date: August 2010

ers

APPENDIX A
GEOTECHNICAL BORING LOGS

ers

GEOTECHNICAL BORING LOG | **REPORT OF BORING: 2R - 1**

CLIENT: Santa Cruz County Dept of Public Works
PROJECT LOCATION: Pajaro River Bench Excvation
FILE NO.:

Boring Location: 36° 53.566' N 121° 45.794' W
Drilling equip.: Hand Auger
Sampling Equip.: 4 oz. Glass Jar
Hammer:
Weight: **Fall:**

DEPTH TO GROUND WATER (DTGW): NA

BORING COMPANY: ERS Corp
FOREMAN:
ERS GEOLOGIST: Fred Diaz

Start date: 7/13/2010
Completion date: 7/13/2010
Backfill Material : Native

DEPTH BELOW GRADE	SAMPLE INTERVAL (FEET)/ SAMPLE ID	BLOWS /6"	PENETR/ RECOVERY (inches)	"N" Value [1]	SAMPLE DESCRIPTION	UNIFIED SOIL CLASSIF. SYSTEM	GEOTECHNICAL TEST RESULTS: DRY DENSITY (pcf)	MOIS-TURE %	DIRECT SHEAR Φ (°)	DIRECT SHEAR UNIT COHES. (ksf)
0					SILT, light brown, slightly sandy, clayey, firm, damp to dry. Live garter snake encountered at approx. 6 inches (did not surive).	ML				
1					CLAY, medium brown, slightly sandy, silty, firm, damp (Shreds of plastic sheeting encountered, black on one side dark green	CL				
2										
3					SILT, light brown, slightly sandy, clayey, firm, damp to dry. Increase in silt component and color change to lighter brown at 3.5 feet.	ML				
4										
5										
6										
7					Bottom of boring at 6.4 feet					
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										

Notes: [1] Blow counts obtained from Modified CA Sampler converted to N value by using conversion factor of 0.63.

Geologist Signature:

ers

GEOTECHNICAL BORING LOG

REPORT OF BORING: 2R - 2

CLIENT: Santa Cruz County Dept of Public Works
PROJECT LOCATION: Pajaro River Bench Excvation
FILE NO.:

Boring Location: 36° 53.650' N 121° 45.687' W
Drilling equip.: Hand Auger
Sampling Equip.: 4 oz. Glass Jar
Hammer:
Weight: **Fall:**

DEPTH TO GROUND WATER (DTGW): NA

BORING COMPANY: ERS Corp
FOREMAN:
ERS GEOLOGIST: Fred Diaz

Start date: 7/13/2010
Completion date: 7/13/2010
Backfill Material : Native

DEPTH BELOW GRADE	SAMPLE INTERVAL (FEET)/ SAMPLE ID	BLOWS /6"	PENETR/ RECOVERY (inches)	"N" Value [1]	SAMPLE DESCRIPTION	UNIFIED SOIL CLASSIF. SYSTEM	GEOTECHNICAL TEST RESULTS: DRY DENSITY (pcf)	MOIS-TURE %	DIRECT SHEAR Φ (°)	DIRECT SHEAR UNIT COHES. (ksf)
0					SILT, light brown, slightly sandy, clayey, firm, damp to dry.	ML				
1					CLAY, med brwn, slightly sandy, silty, firm, damp.	CL				
2					SILT, light brown, slightly sandy, clayey, firm, damp to dry. Becomes sandier at 3.25 feet.	ML				
3										
4					SAND, med brown, fine grained, med dense, damp	SM				
5					SILT, light brown, slightly sandy, clayey, firm, damp to dry.	ML				
6										
7					Bottom of boring at 6.4 feet					
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										

Notes: [1] Blow counts obtained from Modified CA Sampler converted to N value by using conversion factor of 0.63.

Geologist Signature:

ers

GEOTECHNICAL BORING LOG

REPORT OF BORING: 2R - 3

CLIENT: Santa Cruz County Dept of Public Works
PROJECT LOCATION: Pajaro River Bench Excvation
FILE NO.:

Boring Location: 36° 53.700 N 121° 45.632 W
Drilling equip.: Hand Auger
Sampling Equip.: 4 oz. Glass Jar
Hammer:
Weight: **Fall:**

DEPTH TO GROUND WATER (DTGW): NA

BORING COMPANY: ERS Corp
FOREMAN:
ERS GEOLOGIST: Fred Diaz

Start date: 7/13/2010
Completion date: 7/13/2010
Backfill Material : Native

DEPTH BELOW GRADE	SAMPLE INTERVAL (FEET)/ SAMPLE ID	BLOWS /6"	PENETR/ RECOVERY (inches)	"N" Value [1]	SAMPLE DESCRIPTION	UNIFIED SOIL CLASSIF. SYSTEM	GEOTECHNICAL TEST RESULTS: DRY DENSITY (pcf)	MOIS-TURE %	DIRECT SHEAR Φ (°)	DIRECT SHEAR UNIT COHES. (ksf)
0					SILT, light brown, slightly sandy, clayey, firm, damp to dry.	ML				
1										
2										
3										
4										
5					SAND, med brown, very fine grained, med dense, damp	SM				
6										
7					CLAY, med brown, slightly sandy, silty, firm, damp	CL				
8					Bottom of boring at 7.0 feet					
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										

Notes: [1] Blow counts obtained from Modified CA Sampler converted to N value by using conversion factor of 0.63.

Geologist Signature:

ers

GEOTECHNICAL BORING LOG | **REPORT OF BORING: 2R - 4**

CLIENT: Santa Cruz County Dept of Public Works
PROJECT LOCATION: Pajaro River Bench Excvation
FILE NO.:

Boring Location: 36° 53.843 N 121° 45.554 W
Drilling equip.: Hand Auger
Sampling Equip.: 4 oz. Glass Jar
Hammer:
Weight: **Fall:**

DEPTH TO GROUND WATER (DTGW): NA

BORING COMPANY: ERS Corp
FOREMAN:
ERS GEOLOGIST: Fred Diaz

Start date: 7/13/2010
Completion date: 7/13/2010
Backfill Material : Native

DEPTH BELOW GRADE	SAMPLE INTERVAL (FEET)/ SAMPLE ID	BLOWS /6"	PENETR/ RECOVERY (inches)	"N" Value [1]	SAMPLE DESCRIPTION	UNIFIED SOIL CLASSIF. SYSTEM	GEOTECHNICAL TEST RESULTS: DRY DENSITY (pcf)	MOIS-TURE %	DIRECT SHEAR Φ (°)	DIRECT SHEAR UNIT COHES. (ksf)
0					SILT, light brown, slightly sandy, clayey, firm, damp to dry.	ML				
5					CLAY, med brown, slightly sandy, silty, firm, damp	CL				
					SAND, med brown, very fine grained, med dense, damp	SM				
6					CLAY, med brown, slightly sandy, silty, firm, damp	CL				
					Bottom of boring at 6.4 feet					

Notes: [1] Blow counts obtained from Modified CA Sampler converted to N value by using conversion factor of 0.63.

Geologist Signature:

APPENDIX B
Laboratory Reports

ERS (Santa Clara)
2366 Walsh Ave
Santa Clara, California 95051
Tel: 4084960801
Fax: 4084960806

RE: Pajaro River Bench Excavation

Work Order No.: 1007056

Dear Fred Diaz:

Torrent Laboratory, Inc. received 12 sample(s) on July 15, 2010 for the analyses presented in the following Report.

All data for associated QC met EPA or laboratory specification(s) except where noted in the case narrative.

Torrent Laboratory, Inc. is certified by the State of California, ELAP #1991. If you have any questions regarding these test results, please feel free to contact the Project Management Team at (408)263-5258; ext 204.

N. S. Kabir

Nutan Kabir

July 22, 2010
Date

Date: 7/22/2010

Client: ERS (Santa Clara)

Project: Pajaro River Bench Excavation

Work Order: 1007056

CASE NARRATIVE

No issues encountered with the receiving, preparation, analysis or reporting of the results associated with this work order.

Analytical Comments for method S_6020CAM17, 1007056-001A MS/MSD, QC Analytical Batch ID 401518, Note:The % recoveries for lead are outside of laboratory control limits but are within % RPD limits. The associated LCS/LCSD % recoveries and % RPD are within limits. No corrective action required.

483 Sinclair Frontage Rd., Milpitas, CA 95035 | tel: 408.263.5258 | fax: 408.263.8293 | www.torrentlab.com

Total Page Count: 28

Torrent LABORATORY, INC.

Sample Result Summary

Report prepared for: Fred Diaz
ERS (Santa Clara)

Date Received: 07/15/10
Date Reported: 07/22/10

2R-4 Field Comp (3.0' - 6.4') 1007056-011

Parameters:	Analysis Method	DF	MDL	PQL	Results	Unit
Lead	SW6020	5	9.0	500	4700	ug/Kg
Chromium	SW6020	5	58	500	34000	ug/Kg

2R-4 5.0' - 5.5' 1007056-012

Parameters:	Analysis Method	DF	MDL	PQL	Results	Unit
Lead	SW6020	5	9.0	500	9400	ug/Kg
Chromium	SW6020	5	58	500	34000	ug/Kg
Mercury	7471B	1	0.01	0.10	0.10	mg/Kg

Comp2R(1-4)0.0'-3.0' 1007056-013

Parameters:	Analysis Method	DF	MDL	PQL	Results	Unit
Lead	SW6020	5	9.0	500	8200	ug/Kg
Chromium	SW6020	5	58	500	36000	ug/Kg

Comp2R(1-4)3.0'-6.4' 1007056-014

Parameters:	Analysis Method	DF	MDL	PQL	Results	Unit
Lead	SW6020	5	9.0	500	6200	ug/Kg
Chromium	SW6020	5	58	500	35000	ug/Kg

Torrent LABORATORY, INC.

SAMPLE RESULTS

Report prepared for: Fred Diaz
ERS (Santa Clara)

Date Received: 07/15/10
Date Reported: 07/22/10

Client Sample ID:	2R-1 1.0' - 2.0'	**Lab Sample ID:**	1007056-001A
Project Name/Location:	Pajaro River Bench Excavation	**Sample Matrix:**	Soil
Project Number:			
Date/Time Sampled:	07/13/10 / 10:10		
Tag Number:	Pajaro River		

Parameters:	Analysis Method	Prep Date	Date Analyzed	DF	MDL	PQL	Results	Lab Qualifier	Unit	Analytical Batch	Prep Batch
Lead	SW6020	7/19/10	07/21/10	5	9.0	500	28000		ug/Kg	401518	0710
Chromium	SW6020	7/19/10	07/21/10	5	58	500	41000		ug/Kg	401518	0710

Parameters:	Analysis Method	Prep Date	Date Analyzed	DF	MDL	PQL	Results	Lab Qualifier	Unit	Analytical Batch	Prep Batch
Mercury	7471B	7/19/10	07/21/10	1	0.01	0.10	ND		mg/Kg	401519	0711

Torrent LABORATORY, INC.

SAMPLE RESULTS

Report prepared for: Fred Diaz
ERS (Santa Clara)

Date Received: 07/15/10
Date Reported: 07/22/10

Client Sample ID:	2R-2 0.5' - 0.75'	**Lab Sample ID:**	1007056-004A
Project Name/Location:	Pajaro River Bench Excavation	**Sample Matrix:**	Soil
Project Number:			
Date/Time Sampled:	07/13/10 / 11:15		
Tag Number:	Pajaro River,Bench Excavation		

Parameters:	Analysis Method	Prep Date	Date Analyzed	DF	MDL	PQL	Results	Lab Qualifier	Unit	Analytical Batch	Prep Batch
Lead	SW6020	7/19/10	07/21/10	5	9.0	500	11000		ug/Kg	401518	0710
Chromium	SW6020	7/19/10	07/21/10	5	58	500	36000		ug/Kg	401518	0710

Parameters:	Analysis Method	Prep Date	Date Analyzed	DF	MDL	PQL	Results	Lab Qualifier	Unit	Analytical Batch	Prep Batch
Mercury	7471B	7/19/10	07/21/10	1	0.01	0.10	ND		mg/Kg	401519	0711

Torrent LABORATORY, INC.

SAMPLE RESULTS

Report prepared for: Fred Diaz
ERS (Santa Clara)

Date Received: 07/15/10
Date Reported: 07/22/10

Client Sample ID:	2R-2 Field Comp (0.0'-3.0)	**Lab Sample ID:**	1007056-005A
Project Name/Location:	Pajaro River Bench Excavation	**Sample Matrix:**	Soil
Project Number:			
Date/Time Sampled:	07/13/10 / 11:20		
Tag Number:	Pajaro River,Bench Excavation		

Parameters:	Analysis Method	Prep Date	Date Analyzed	DF	MDL	PQL	Results	Lab Qualifier	Unit	Analytical Batch	Prep Batch
Lead	SW6020	7/19/10	07/21/10	5	9.0	500	5600		ug/Kg	401518	0710
Chromium	SW6020	7/19/10	07/21/10	5	58	500	35000		ug/Kg	401518	0710

Parameters:	Analysis Method	Prep Date	Date Analyzed	DF	MDL	PQL	Results	Lab Qualifier	Unit	Analytical Batch	Prep Batch
Mercury	7471B	7/19/10	07/21/10	1	0.01	0.10	ND		mg/Kg	401519	0711

Torrent LABORATORY, INC.

SAMPLE RESULTS

Report prepared for: Fred Diaz
ERS (Santa Clara)

Date Received: 07/15/10
Date Reported: 07/22/10

Client Sample ID:	2R-3 Field Comp(3.0'-7.0')	**Lab Sample ID:**	1007056-008A
Project Name/Location:	Pajaro River Bench Excavation	**Sample Matrix:**	Soil
Project Number:			
Date/Time Sampled:	07/13/10 / 13:50		
Tag Number:	Pajaro River		

Parameters:	Analysis Method	Prep Date	Date Analyzed	DF	MDL	PQL	Results	Lab Qualifier	Unit	Analytical Batch	Prep Batch
Lead	SW6020	7/19/10	07/21/10	5	9.0	500	6800		ug/Kg	401518	0710
Chromium	SW6020	7/19/10	07/21/10	5	58	500	32000		ug/Kg	401518	0710

Parameters:	Analysis Method	Prep Date	Date Analyzed	DF	MDL	PQL	Results	Lab Qualifier	Unit	Analytical Batch	Prep Batch
Mercury	7471B	7/19/10	07/21/10	1	0.01	0.10	ND		mg/Kg	401519	0711

Torrent LABORATORY, INC.

SAMPLE RESULTS

Report prepared for: Fred Diaz
ERS (Santa Clara)

Date Received: 07/15/10
Date Reported: 07/22/10

Client Sample ID:	2R-3 6.5' - 7.0'	**Lab Sample ID:**	1007056-009A
Project Name/Location:	Pajaro River Bench Excavation	**Sample Matrix:**	Soil
Project Number:			
Date/Time Sampled:	07/13/10 / 13:55		
Tag Number:	Pajaro River		

Parameters:	Analysis Method	Prep Date	Date Analyzed	DF	MDL	PQL	Results	Lab Qualifier	Unit	Analytical Batch	Prep Batch
Lead	SW6020	7/19/10	07/21/10	5	9.0	500	9900		ug/Kg	401518	0710
Chromium	SW6020	7/19/10	07/21/10	5	58	500	26000		ug/Kg	401518	0710

Parameters:	Analysis Method	Prep Date	Date Analyzed	DF	MDL	PQL	Results	Lab Qualifier	Unit	Analytical Batch	Prep Batch
Mercury	7471B	7/19/10	07/21/10	1	0.01	0.10	ND		mg/Kg	401519	0711

Torrent LABORATORY, INC.

SAMPLE RESULTS

Report prepared for: Fred Diaz
ERS (Santa Clara)

Date Received: 07/15/10
Date Reported: 07/22/10

Client Sample ID:	2R-4 5.0' - 5.5'	**Lab Sample ID:**	1007056-012A
Project Name/Location:	Pajaro River Bench Excavation	**Sample Matrix:**	Soil
Project Number:			
Date/Time Sampled:	07/13/10 / 15:05		
Tag Number:	Pajaro River		

Parameters:	Analysis Method	Prep Date	Date Analyzed	DF	MDL	PQL	Results	Lab Qualifier	Unit	Analytical Batch	Prep Batch
Lead	SW6020	7/19/10	07/21/10	5	9.0	500	9400		ug/Kg	401518	0710
Chromium	SW6020	7/19/10	07/21/10	5	58	500	34000		ug/Kg	401518	0710

Parameters:	Analysis Method	Prep Date	Date Analyzed	DF	MDL	PQL	Results	Lab Qualifier	Unit	Analytical Batch	Prep Batch
Mercury	7471B	7/19/10	07/21/10	1	0.01	0.10	0.10		mg/Kg	401519	0711

Torrent LABORATORY, INC.

SAMPLE RESULTS

Report prepared for: Fred Diaz
ERS (Santa Clara)

Date Received: 07/15/10
Date Reported: 07/22/10

Client Sample ID:	Comp2R(1-4)0.0'-3.0'	**Lab Sample ID:**	1007056-013A
Project Name/Location:	Pajaro River Bench Excavation	**Sample Matrix:**	Soil
Project Number:			
Date/Time Sampled:	07/13/10 /		
Tag Number:	Pajaro River		

Parameters:	Analysis Method	Prep Date	Date Analyzed	DF	MDL	PQL	Results	Lab Qualifier	Unit	Analytical Batch	Prep Batch
Lead	SW6020	7/19/10	07/21/10	5	9.0	500	8200		ug/Kg	401518	0710
Chromium	SW6020	7/19/10	07/21/10	5	58	500	36000		ug/Kg	401518	0710

Parameters:	Analysis Method	Prep Date	Date Analyzed	DF	MDL	PQL	Results	Lab Qualifier	Unit	Analytical Batch	Prep Batch
Mercury	7471B	7/19/10	07/21/10	1	0.01	0.10	ND		mg/Kg	401519	0711

Torrent LABORATORY, INC.

LCS/LCSD Summary Report

Raw values are used in quality control assessment.

Work Order:	1007056	**Prep Method:**	6020S	**Prep Date:**	07/19/10	**Prep Batch:**	0710
Matrix:	Soil	**Analytical Method:**	SW6020	**Analyzed Date:**	07/21/10	**Analytical Batch:**	401518
Units:	ug/Kg						

Parameters	MDL	PQL	Method Blank Conc.	Spike Conc.	LCS % Recovery	LCSD % Recovery	LCS/LCSD % RPD	% Recovery Limits	% RPD Limits	Lab Qualifier
Lead	4.0	500		25000	99.8	94.3	5.90	80 - 120	20	
Chromium	3.2	500		25000	88.1	81.1	8.18	80 - 120	20	

Work Order:	1007056	**Prep Method:**	7471	**Prep Date:**	07/19/10	**Prep Batch:**	0711
Matrix:	Soil	**Analytical Method:**	7471B	**Analyzed Date:**	07/21/10	**Analytical Batch:**	401519
Units:	mg/Kg						

Parameters	MDL	PQL	Method Blank Conc.	Spike Conc.	LCS % Recovery	LCSD % Recovery	LCS/LCSD % RPD	% Recovery Limits	% RPD Limits	Lab Qualifier
Mercury	0.01	0.10		1.25	110	111	1.39	80.5 - 133	30	

Torrent LABORATORY, INC.

MS/MSD Summary Report

Raw values are used in quality control assessment.

Work Order:	1007056	**Prep Method:**	6020S	**Prep Date:**	07/19/10	**Prep Batch:**	0710
Matrix:	Soil	**Analytical Method:**	SW6020	**Analyzed Date:**	07/21/10	**Analytical Batch:**	401518
Spiked Sample:	1007056-001A						
Units:	ug/Kg						

Parameters	MDL	PQL	Sample Conc.	Spike Conc.	MS % Recovery	MSD % Recovery	MS/MSD % RPD	% Recovery Limits	% RPD Limits	Lab Qualifier
Lead	4.0	500	57	25000	67.7	72.1	2.25	75 - 125	20	S
Chromium	3.2	500	83	25000	91.4	110	6.11	75 - 125	20	

Work Order:	1007056	**Prep Method:**	7471	**Prep Date:**	07/19/10	**Prep Batch:**	0711
Matrix:	Soil	**Analytical Method:**	7471B	**Analyzed Date:**	07/21/10	**Analytical Batch:**	401519
Spiked Sample:	1007056-001A						
Units:	mg/Kg						

Parameters	MDL	PQL	Sample Conc.	Spike Conc.	MS % Recovery	MSD % Recovery	MS/MSD % RPD	% Recovery Limits	% RPD Limits	Lab Qualifier
Mercury	0.01	0.10	0.00119	1.25	104	103	1.01	80.5 - 133	30	

Torrent LABORATORY, INC.

Login Summary Report

Client ID: TL5157 ERS (Santa Clara)
Project Name: Pajaro River Bench Excavation
Project # :
Report Due Date: 7/22/2010

QC Level:
TAT Requested: 5+ day:0
Date Received: 7/15/2010
Time Received: 10:30

Comments: 5 day TAT!!Recv'd 12 soils for Hg and Lead and Cr,Plus composite of 2R-1;2R-2;2R-3;2R-4 (Field Comp 0.0' - 3.0') and 2R-1;2R-2;2R-4(Field Comp3.0' - 6.4')+2R-3(Field Comp 3.0' - 7.0').Pls. email to adiaz@erscorp.us.

Work Order # : *1007056*

WO Sample ID	Client Sample ID	Collection Date/Time	Matrix	Scheduled Disposal	Sample On Hold	Test On Hold	Requested Tests	Subbed
1007056-001A	2R-1 1.0' - 2.0'	07/13/10 10:10	Soil	01/11/11			S_6020Master S_7471BHG	
Sample Note:	Hg by 7471 and Pb,Cr by 6020 for all samples.							
1007056-002A	2R-1 Field Comp(0.0'-3.0')	07/13/10 10:15	Soil	01/11/11			S_6020Master S_7471BHG	
1007056-003A	2R-1 Field Comp(3.0'-6.4')	07/13/10 10:20	Soil	01/11/11			S_6020Master S_7471BHG	
1007056-004A	2R-2 0.5' - 0.75'	07/13/10 11:15	Soil	01/11/11			S_6020Master S_7471BHG	
1007056-005A	2R-2 Field Comp (0.0'-3.0)	07/13/10 11:20	Soil	01/11/11			S_6020Master S_7471BHG	
1007056-006A	2R-2 field Comp (3.0'-6.4')	07/13/10 11:25	Soil	01/11/11			S_6020Master S_7471BHG	
1007056-007A	2R-3 Field Comp (0.0'-3.0')	07/13/10 13:45	Soil	01/11/11			S_6020Master S_7471BHG	
1007056-008A	2R-3 Field Comp(3.0'-7.0')	07/13/10 13:50	Soil	01/11/11			S_7471BHG S_6020Master	
1007056-009A	2R-3 6.5' - 7.0'	07/13/10 13:55	Soil	01/11/11			S_7471BHG S_6020Master	
1007056-010A	2R-4 Field Comp(0.0' - 3.0')	07/13/10 14:55	Soil	01/11/11			S_7471BHG S_6020Master	
1007056-011A	2R-4 Field Comp (3.0' - 6.4')	07/13/10 15:00	Soil	01/11/11			S_6020Master S_7471BHG	

Torrent LABORATORY, INC.

Login Summary Report

Client ID: TL5157 ERS (Santa Clara)
Project Name: Pajaro River Bench Excavation
Project # :
Report Due Date: 7/22/2010

QC Level:
TAT Requested: 5+ day:0
Date Received: 7/15/2010
Time Received: 10:30

Comments: 5 day TAT!!Recv'd 12 soils for Hg and Lead and Cr,Plus composite of 2R-1;2R-2;2R-3;2R-4 (Field Comp 0.0' - 3.0') and 2R-1;2R-2;2R-4(Field Comp3.0' - 6.4')+2R-3(Field Comp 3.0' - 7.0').Pls. email to adiaz@erscorp.us.

Work Order # : 1007056

WO Sample ID	Client Sample ID	Collection Date/Time	Matrix	Scheduled Disposal	Sample On Hold	Test On Hold	Requested Tests	Subbed
1007056-012A	2R-4 5.0' - 5.5'	07/13/10 15:05	Soil	01/11/11			S_6020Master S_7471BHG	
1007056-013A	Comp2R(1-4)0.0'-3.0'	07/13/10	Soil	01/11/11			S_6020Master S_7471BHG	
Sample Note:	Composite 002,005,007,010							
1007056-014A	Comp2R(1-4)3.0'-6.4'	07/13/10	Soil	01/11/11			S_6020Master S_7471BHG	
Sample Note:	Composite 003,006,008,011							

ATTACHMENT 6

Revegetation Plan

Pajaro River Bench Excavation Project
Revegetation Plan

Prepared for:

County of Santa Cruz

Department of Public Works

Prepared by:

Native Vegetation Network

Valerie Haley, Botanist & Revegetation Specialist
Christine McKenna, Administrative Assistant

PV-200 November 2011

TABLE OF CONTENTS

Page

List of Tables

Table

List of Figures

Figure

List of Appendices

Appendix

CHAPTER 1.0 INTRODUCTION

1.1 DESCRIPTION

The Counties of Santa Cruz and Monterey are proposing a bank excavation project to improve the channel conveyance capacity of the Pajaro River. The project extends from Highway 1 upstream 7.5 miles to Murphy's Crossing. Approximately 40 acres of the existing riverbanks will be excavated. An additional 30 acres are estimated to be disturbed by project activities. Two excavation sites are proposed on the Monterey County side; whereas, nine sites are proposed on the Santa Cruz County side of the river.

Phased Construction

Two excavation sites: 1R and 2R are anticipated to be constructed in Phase 1 (summer 2012). The remaining nine excavation sites 3R, 4R, 5R, 5.5R, 6R, 7R, 8R, 2L and 4L are anticipated to be constructed in Phase 2 (spring and summer 2013). The timing and completion of both phases are subject to change and will depend on project logistics, primarily the availability of receiver sites for the excavated soil materials and trucking access.

Each of the excavation sites shall be revegetated to mitigate for the removal of vegetation in the riparian corridor. The entire square footage of each site will be hydroseeded for erosion control and portions planted with native trees, shrubs and herbs. A planting list has been prepared for each of the eleven revegetation areas (see Appendix A and Planting Plan Sheets). The scientific names are according to The Jepson Manual of Vascular Plants of California, 2nd Edition (in press, 2011).

Phased Revegetation Project

The proposed riparian revegetation project will be phased. Erosion control and hydroseeding will occur in fall following grading and hauling work. The majority of proposed willow (*Salix* spp.) and black cottonwood (*Populus trichocarpa*) short cuttings will be planted the first fall and winter after construction. The proposed container stock and live transplants or divisions will be planted the second fall and winter after construction is complete. Following hydroseeding, a Revegetation Contractor (henceforth referred to as the "Contractor") qualified in native riparian restoration will maintain the revegetation areas and their buffers for five years. After a five-year establishment period, maintenance will be transferred to the County of Santa Cruz Department of Public Works.

Under the supervision of the Project Botanist, the Contractor will collect willow and black cottonwood (*Populus trichocarpa*) cuttings along the Pajaro River and nearby sloughs. The County or its agents will provide the native grass seed and Hooker's Primrose seed needed for the hydroseed mix. The County will also provide the contract-grown container stock to the Contractor for planting. A portion of the herbaceous material will

be transplanted by the Contractor from the river channel as divisions, including broad-fruited bur reed (*Sparganium eurycarpum*) and California tule (*Schoenoplectus californicus*). No formal irrigation is proposed; water needed for hydroseeding and planting will be trucked into the revegetation areas.

Managing invasive, non-native vegetation will be a key component for having a successful revegetation program, especially the high priority species listed in Table 1 such as Cape Ivy, giant reed, star thistle, and poison hemlock.

1.2 GOALS AND OBJECTIVES

The proposed revegetation program will focus on increasing the cover of native vegetation to improve the habitat value of the excavated benches and river banks, and their 25-foot wide buffers for improved fisheries and wildlife habitat. Revegetation of the excavation sites will also be an important factor in controlling soil erosion and sediment deposition into the Pajaro River.

Restoration Goals

The primary goals of this Revegetation Plan are to:

- Increase the abundance and diversity of native plant species and the habitat value of the riparian corridor,
- Re-create a natural plant community that will provide optimal habitat for native wildlife, and
- Re-establish native riparian vegetation habitat that will become self-sustaining in the long-term.

Several other goals for the project involve minimizing routine maintenance efforts, minimizing opportunities for noxious weed establishment, and reducing supplemental watering needs. During the five-year establishment period, proper maintenance will be important. When plants are well established, maintenance efforts should be minimal.

Revegetation Objectives

To accomplish the above stated goals, the objectives of this Revegetation Plan are to:

- Restore and manage native riparian forest to promote species diversity, structural diversity, and density along the inner river banks.
- Increase width of riparian corridor, consistent with flood protection needs to provide increased stream shading and in-stream cover for aquatic organisms.
- Enhance native populations of riparian species via exotic plant removal, natural recruitment and active revegetation.

Table 1. Pajaro River Bench Excavation Project
Target Invasive, Non-Native Plants for Removal

Invasive, Non-Native Species		Priority for Control
Common Names	**Scientific**	
Bindweed	*Convolvulus arvensis*	High
Bristly Ox-tongue	*Helminthotheca echioides*	Medium
Bull Thistle	*Cirsium vulgare*	High
Bur clover	*Medicago polymorpha*	Low
Buttercup Oxalis	*Oxalis pes-caprae*	Medium
Cape Ivy	*Delaireia odorata*	High
Common Fennel	*Foeniculum vulgare*	Medium
Cocklebur	*Xanthium strumarium*	Medium
English Ivy	*Hedera helix*	High
Field Mustard	*Brassica rapa*	High
French Broom	*Genista monspessulana*	High
Fullers Teasel	*Dipsacus sativus*	Medium
Giant Reed	*Arundo donax*	High
Himalayan Blackberry	*Rubus procerus*	High
Summer Mustard	*Hirschfeldia incana*	High
Iceplant or Sea Fig	*Carpobrotus edulis*	Medium
Italian Thistle	*Carduus pycnocephalus*	High
Milk Thistle	*Silybum marianum*	High
Pampas/Jubata Grass	*Cortaderia jubata*	High
Perennial Ryegrass	*Lolium perenne*	Medium
Poison Hemlock	*Conium maculatum*	High
Prickly Wild Lettuce	*Lactuca serriola*	Medium
Rabbit's Foot Grass	*Polypogon monspelensis*	Low
Ripgut Brome	*Bromus diandrus*	Medium
Smilo Gras	*Piptatherum miliaceum*	Medium
Velvet Grass	*Holcus lanatus*	Medium
White Sweet Clover	*Melilotus albus*	Medium
Wild Radish	*Raphanus sativus*	Low
Yellow Dock	*Rumex crispus*	Medium
Yellow Star Thistle	*Centaurea soltitialis*	High

* Invasive plant removal will focus on container stock planting basins and the five-foot wide band of vegetation around each planting basin.

1.3 SUBMITTALS

a) Within 7 days of the date following issuance of the Notice to Proceed, provide the Project Engineer with a copy of the Contractor's or Subcontractor's California State Landscape Contractor's C-27 License.

b) Submit a certificate of compliance stating that the bark mulch conforms to these specifications to the Project Engineer for approval before ordering the material.

c) Additionally, obtain certification from the manufacturer that the bark mulch materials are free of the sudden oak death pathogen and *Phytophthora ramorum*.

1.4 QUALITY ASSURANCE

The Contractor or Subcontractor shall hold a California State Landscape Contractor's C-27 License, and have a minimum of 5 years of experience installing riparian projects.

The Project Botanist or Project Biologist will identify cutting collection sites within the Pajaro River watershed and nearby areas, and will oversee all phases of cutting collection, storage, and handling.

The Project Botanist will inspect the quality of the delivered cuttings and container stock to be used for revegetation.

Importance of Using Local Native Propagation Material. Plant performance will be better if container stock that has originated from locally collected propagules (seeds, cuttings, etc.) is used for revegetation, since the propagules have adapted to local environmental conditions. Wherever practical, seeds and cuttings to propagate plants for revegetation will come from the Pajaro River riparian corridor, and nearby areas. Cuttings from shrub species are typically collected in fall for contract growing, and will need to be collected the fall prior to the fall planting. California blackberry cuttings need to be collected in November one year before planting.

Types of Propagules. Principal factors in selecting types of planting stock are adaptability to the site, cost effectiveness, and if local material is available. The kinds of propagules will include: container stock, short cuttings, plant divisions, and seeds. To the maximum extent possible, propagules will be collected or sourced from the Pajaro River watershed. If propagules are not available from the Pajaro watershed, then the collection range may be expanded to riparian corridors in Santa Cruz County. The Project Biologist or Project Botanist should approve all propagule sources in advance of collection. Most of the native species specified for Hydroseed Mix A will be locally sourced from the Pajaro River watershed.

1.5 EROSION CONTROL HYDROSEEDING

The Hydroseed Contractor will conduct the hydroseeding. The total area of each excavation site, access routes and staging areas will be hydroseeded by October 15 the first fall after construction. Two mixes will be applied using the 2-step process. Mix A is composed of sterile wheat (*Elymus* X *Triticum)*, meadow barley (*Hordeum brachyantherum*), California brome (Bromus carinatus), white yarrow (*Achillea*

millefolium) and Hooker's primrose (*Oenothera elata ssp. hookeri)*. Mix B is 100% sterile wheat.

Sterile wheat, slow release fertilizer (11:11:11), and white yarrow (*Achillea millefolium*) and the components listed below will be provided by the Hydroseed Contractor for both Mix A and Mix B; whereas, the County or its agents will provide the locally sourced native grass seed and Hooker's primrose for Mix A.. A slow release fertilizer such as Floricote (11:11:11) will be applied in the hydroseed mix. The application rate will depend on the results of soil testing, and will be finalized by the Hydroseed Contractor. A range of 250 to 500 lbs. per acre is likely.

Mix A will be applied to the newly constructed 3:1 riverbanks; whereas, Mix B will be applied to the excavated benches. Sterile wheat is economical, and usually costs under $3.00 per pound, performs strongly the first year, and allows the site seed bank to respond in subsequent years.

Conduct Soil Nutrient Analysis

The Hydroseed Contractor will collect soil samples from the excavation sites after construction. Samples will be sent to the Soil Control Laboratory for soil nutrient analysis of nitrogen, potassium and phosphorus. The results will be used to determine the application rate needed for the slow release fertilizer such as Floricote (11:11:11).

Rinsing of Slurry Tank

Prior to applying the mixes, the hydroseed Contractor shall rinse the truck slurry tank with water three times to insure that no seed contamination occurs to the specified seed mixes. The seed mixes listed below will be supplemented with the following ingredients:

Slurry Materials and Seed Mixes

Slurry Materials	**Application Rate (per acre)**
Slow release fertilizer (11:11:11)	250 to 500 lbs
Cellulose fiber mulch	2,000 lbs
Tackifier (Polyacrylamide type)	3 gallons

Table 2. Hydroseed Mixes for Pajaro River Excavation Sites

Hydroseed Mix A (3:1 Banks, total acreage, 11.4 acres) :

Application rate: 52 lbs Mix A per acre

Common Name	Scientific Name	Application Rate
White Yarrow	*Achillea millefolium*	1 lb. per acre
California Brome	*Bromus carinatus*	10 lbs. per acre
Meadow Barley	*Hordeum brachyantherum*	10 lbs. per acre
Sterile Wheat	*Elymus* X *Triticum*	30 lbs. per acre
Hookers Primrose	*Oenothera elata hookeri*	1 lb. per acre

Hydroseed Mix B (level benches, total acreage, 27.7 acres) :

Application rate: 50 lbs Mix B per acre

Common Name	Scientific Name	Application Rate
Sterile Wheat	*Elymus* X *Triticum*	50 lbs per acre

1.6 COLLECTION AND DELIVERY OF PLANTING MATERIAL

Collection of Willow and Black Cottonwood Cuttings (Year 1)

The Revegetation Contractor will collect short cuttings from young trees that have smooth bark, according to the following specifications:

Species	Diameter	Length
Black Cottonwood (*Populus trichocarpa*)	0.75 to 1.5 inches	18 to 24 inches
Red Willow (*Salix laevigata*)	0.75 to 1.5 inches	18 to 24 inches
Arroyo Willow (*Salix lasiolepis*)	0.50 to 1.0 inches	18 to 24 inches
Sandbar willow (*Salix exigua*)	0.50 to 1.0 inches	18 to 24 inches

Select cuttings that are straight, so that the tip to the base does not deviate more than twice the diameter of the cutting. The cuttings should be taken from vigorous stock, free of insects and diseases. Collect cuttings from as many plants as feasible to ensure genetic diversity of the plant material.

Harvest cuttings with sharp pruning shears, lopping shears, small wood saw, or brush cutters. Make cuts with sharp clean tools. Make clean cuts without any additional damage or scaring of parent tree. Do not re-cut harvested cuttings after initial

collection. Remove all side branches and all leaves along the entire length of each cutting to create one single stem.

Delivery and Inspection of Cuttings. The short cuttings shall be transported in buckets of water and planted within 48 hours of harvesting. The cuttings shall be delivered to the project sites by the Contractor. Access to collection sites outside of the work site shall be coordinated with the Project Wildlife Biologist or Project Botanist. Delivery vehicles shall have covered or closed beds to minimize windburn to cuttings during transport. The Contractor shall provide the Project Engineer and Project Botanist with 48-hour advance notice for each partial or complete cutting delivery to the work site.

At the time of delivery to the work site, the Project Engineer or Project Botanist will inspect the cuttings for injury, disease, and insect infestation and ensure that the cuttings are the correct size. Unacceptable cuttings shall be replaced with cuttings of similar size and species before the start of cutting installation, at the Revegetation Contractor's expense. Cuttings not meeting the requirements in this Section shall be immediately removed from the project sites at the Revegetation Contractor's expense and disposed of according to State and local regulations. No additional compensation will be made for any additional expenses incurred by the Contractor as a result of the rejection of cuttings.

Delivery and Inspection of Container Plants. The County will furnish and deliver to the work site all container plant materials required for the project. The Contractor shall provide the Project Engineer or Project Botanist with a minimum of 15 days advance notice when requesting delivery of plant materials to the work site. The Contractor shall coordinate with the County and its agents to ensure that all container plants are delivered in Year 2 (estimated to be 2013 for Construction Phase 1) from December 1st through February 1st. Otherwise, the Contractor shall be required to pay a storage fee to the nursery.

1.7 STORAGE AND PROTECTION

Handling and storage of plants delivered to the site by the County and accepted by the Contractor become the responsibility of the Contractor. All plant materials not installed on the day of arrival at the project site shall be stored and protected. Plant materials shall be maintained in optimal health and protected at all times from animal damage, vandalism, wind, excessive sun, drying out, and any other conditions that would damage or reduce the viability of the plants.

Immediately after removing cuttings from a source plant and bundling, the cuttings shall be maintained cool and moist at all times. Cuttings shall be stored in large, covered containers to conserve moisture. Storage locations shall be subject to the Project Engineer's approval. Cuttings shall be installed within 48 hours of collection.

1.8 MATERIALS

Container Stock

All container plants required for the project will be provided by the County per numbers specified in the planting lists (see Table 3, Master Planting List and Appendix A).

Plant Divisions and Transplants

The Contractor will be responsible for collecting the divisions of wetland species such as sedges and rushes, including tall cyperus and bur reed listed in the planting lists. The number of divisions needed will be coordinated with the Project Botanist/Botanical Monitor and will depend on the number of recruits counted by the Project Botanist/Botanical Monitor. It is likely that the number of divisions needed for a given revegetation area will be fewer than the quantities in the planting lists presented in Appendix A.

Willow and Black Cottonwood Cuttings

The Contractor will be responsible for collecting and transporting the willow and black cottonwood cuttings. The Project Biologist or Project Botanist will oversee the cutting collection, and will select the collection locations.

Mulch

Mulch shall be clean, nitrogen treated shredded bark or wood chip that is free of disease or invasive weeds and seeds. The name of the supplier and a sample shall be submitted to the Project Engineer for approval.

Water

Water shall be obtained from sources to be determined by the Project Engineer. There will be no formal irrigation system. Supplemental water will be applied using a water truck and quick coupler.

Table 3. Master Planting List for the Pajaro River (all excavation sites combined)
Total Area Bench 27.73 acres; Total Area Bank 11.37 acres

Scientific Names	Common Names	Species Codes	Container Type or Cuttings*	Estimated Quantities	Approximate On-Center Spacing** (feet)	Planting Location
Trees:						
Acer negundo	Box Elder	ACNE	treepot	456	12.0 – 15.0	Mid Bank
Alnus rubra or *rhombifolia*	Red or White Alder	ALRU	treepot	51	12.0 – 15.0	Bench
						Lower Bank
Platanus racemosa	California Sycamore	PLRA	treepot	42	12.0 – 15.0	Lower Bank
Populus trichocarpa	Black Cottonwood	POTR	Short cuttings	1145	10.0 – 12.0	Bench
						Lower Bank
Quercus agrifolia	Coast Live Oak	QUAG	treepot, acorn acorns	24	12.0 – 15.0	Upper Bank
Salix spp. (i.e. S. lasiolepis, S. laevigata and lasiandra)	Arroyo, Red, and Yellow Willow	SASp.	short cuttings	4040	4.0 – 5.0	Bench
						Channel Edge
Sambucus nigra	Blue Elderberry	SANI	treepot	90	12.0 – 15.0	Upper Bank
Shrubs:						
Artemisia californica	California Sage	ARCA	1-gallon	528	8.0	Upper Bank
Artemisia douglasiana	Mugwort	ARDO	1-gallon	909	8.0	Mid Bank
Baccharis pilularis	Coyote Brush	BAPI	treepot	420	12.0	Mid Bank
						Upper Bank
Baccharis salicifolia	Mule Fat	BASA	treepot	84	10.0	Bench
Cornus sericea	Creek Dogwood	COSE	treepot	48	10.0 – 12.0	Lower Bank
Frangula californica	Coffeeberry	FRCA	treepot	198	10.0 – 12.0	Mid Bank
						Upper Bank
Rosa californica	Wild Rose	ROCA	1-gallon	474	8.0	Mid Bank
Rubus ursinus	California Blackberry	RUUR	deepot	1827	5.0	Lower Bank
Salix exigua	Sandbar Willow	SAEX	short cutting	130	4.0- 5.0	Bench
						Channel Edge

Scientific Names	Common Names	Species Codes	Container Type or Cuttings*	Estimated Quantities	Approximate On-Center Spacing** (feet)	Planting Location
Perennial Herbs & Grasses:						
Baccharis douglasii	Marsh Baccharis	BADO	1-gallon	264	5.0	Lower Bank
Cyperus eragrostis	Tall Cyperus	CYER	divisions	40	8.0	Bench Channel Edge
Juncus effusus ssp.	Bog Rush*	JUEF	divisions	230	6.0	Channel Edge
Leymus triticoides	Creeping Wild Rye Grass	LETR	1-gallon	489	5.0	Mid Bank
Oenothera elata ssp. *hookeri*	Hooker's Primrose	OEHO	1-gallon	160	4.0	Mid Bank
Bolboschoe-nus fluviatilis	River Tule	BOFL	divisions	136	8.0	Bench
Schoenoplec-tus robustus	Prairie Bulrush	SCRO	divisions	181	8.0	Bench
Schoenoplec-tus californicus	California Tule	SCCA	divisions	435	8.0	Bench Channel Edge
Sparganium eurycarpum	Broad-fruited Burreed	SPEU	divisions	94	8.0	Bench Channel Edge

* Container sizes: treepots @ 4" by 4" by 14" deep; deepots @ 2.5" by 2.5" by 10 " deep.

** Exact spacing and quantities will need to be field fit for each revegetation area, depending on existing vegetation and rate of natural recruitment. Distances are approximate guidelines.

California blackberry will be planted 3 per larger planting basin (3 ft. by 6ft.). Same applies to creeping wild rye grass, and mugwort.

1.9 PLANT INSTALLATION OF CUTTINGS, CONTAINER STOCK & DIVISIONS

The Contractor will install cuttings, container stock and plant divisions as described in this Section. Cuttings will be planted in Year 1, containers and plant divisions in Year 2. The number of plant divisions specified in the planting lists is subject to change, depending on the results of monitoring for plant recruitment. The number to be planted will be confirmed by the Project Botanist. Planting of cuttings, container stock and plant divisions shall occur after rain has moistened the ground to a depth of 8 inches. Expected installation period would be December 1st through February 1st.

Cuttings

The short cuttings shall be installed vertically so that the narrow end is exposed above grade. All cuttings shall be installed with 1/2 of their length below grade. At no time shall fertilizer be used for the cuttings. The cutting hole shall be backfilled with moist, pulverized material meeting the requirements specified above. Backfill material shall be tamped in place to completely encircle the cutting and leave no air pockets.

Cuttings shall be of the species, type, and quantity indicated on the planting plan sheets. Cuttings shall be cut at a right angle at the wide end of the cutting. Cuttings shall be collected from sites identified by the Project Wildlife Biologist or Project Botanist, and stored by the Revegetation Contractor. At the direction of the Project Engineer or Project Botanist, cuttings may be installed below the new bench.

Container Stock & Plant Divisions

Planting material shall be installed at locations shown on the schematic planting plan, matching the quantities listed for each revegetation area (see Appendix A). The Project Engineer or Project Botanist will confirm proper placement and field fitting. The Revegetation Contractor shall field mark all planting locations by plant species, before installation for approval by the Project Engineer or Project Botanist. The Revegetation Contractor shall provide a minimum of 48-hours notice to the Project Engineer in advance of field marking. Planting locations may be modified at the discretion of the Engineer or Project Botanist, if large rocks, tree roots, or other underground obstructions are encountered that interfere with plant installation.

Plant Divisions. Plant divisions are specified in the planting lists for water-loving plants that grow along the water channel, including sedges and rushes. The Revegetation Contractor will collect the divisions along the Pajaro River channel and transplant them within four hours to the bench areas as indicated on the Planting Plan Sheets. Field fitting is expected.

Container Stock. Depending on the planting surface, it is expected that the planting hole excavation may require, but may not be limited to, the use of one of the following methods: hand digging, pry bar, or auger. After the holes have been excavated,

scarify the inside surfaces of the holes to enable root penetration. Container plants shall be removed from the container with the root ball intact. After removing the plants from containers, scarify each side of the root ball to prevent a root-bound condition. Matted roots on the side of the root ball shall be longitudinally sliced 1/8 to 1/4 inch deep at least once per side. Matted roots on the bottom of the root ball shall be sliced to 1/4 inch deep. Insert the root ball into the planting hole without bending or damaging the roots. Plants shall be set plumb and braced in position until backfill material has been placed and tamped solidly around the root ball.

Planting holes shall be backfilled with native topsoil meeting the requirements specified above. The root ball shall be placed so that the top is 1/2 inch above the finish grade of the planting basin after settling.

Sterile straw mulch will be applied onto all bare and seeded areas within the revegetation areas. Straw shall be hand spread to a maximum of two inches after the installation of container stock.

All installed container plants and transplanted plant divisions shall be inspected after installation and watering for settling. If plants have settled, they shall be raised in accordance with this Section.

Planting material shall be installed so that side drainage outlets to the river are not obstructed.

1.10 PLANTING BASINS

In areas where erosion control fabric is not installed, the Revegetation Contractor shall construct circular planting basins with a 4-inch berm around each plant, as shown on the Planting plan sheets. The planting basins shall be constructed using native soil conforming to the backfill specification in this Section. The planting basins shall be 2 to 2.5 feet in diameter for single plantings, and 6 feet by 4 feet for triple plantings for California blackberry, mugwort and creeping wild rye grass. In areas where a 2-foot diameter basin is infeasible, basins shall be a minimum of 1.5 feet. Soil berms shall be compacted by hand.

In areas where erosion control fabric is installed, in each planting location the Contractor shall cut, fold back, and anchor, the erosion control fabric when forming the planting basin.

1.11 MULCH

The Revegetation Contractor shall place bark mulch within the planting basins. Mulch shall be placed to an even depth of 3 inches. At no time shall mulch be placed within 4 inches of the plant stem. Mulch shall be kept out of the crowns of shrubs. Bark mulch shall be installed after March 30th to prevent mulch from being washed away during winter storm flows.

1.12 WATERING

Immediately following installation, the Revegetation Contractor shall thoroughly water all container plants, completely saturating the soil surrounding the plant material. Water shall be trucked to each revegetation area. Plantings shall be hand watered using hoses and quick couplers, or other methods approved by the Project Engineer.

1.13 PLANTING BASIN REPAIR

The planting (watering) basins will be inspected and repaired on a routine basis, so that irrigation water is directed to plant roots and does not contribute to erosion. Most of the repair is anticipated to be on the downslope side of the planting basins.

1.14 PLANT PROTECTION

The Revegetation Contractor will be responsible for plant protection. Due to high rabbit populations along the river, browse protection will be placed around selected species immediately after planting. Protection methods include flexible, plastic tree guards that wrap around the stem/trunk or short metal enclosures made with 1-foot tall hardware cloth anchored to the ground. The following species are recommended for browse protection, so that survival criteria are met: California sycamore, blue elderberry, coast live oak, coffeeberry, creek dogwood, and red or white alder.

1.15 WEED CONTROL

Weed control shall consist of all work and materials needed to maintain the revegetation areas free of weeds and invasive, non-native plant species during the construction period and after plant installation. Maintenance weeding and invasive, non-native plant removal will commence right after hydroseeding the newly constructed benches and riverbanks.

Pre-emergent herbicides are not allowed due to the presence of Species of Concern, including Red-legged Frog and Western Pond Turtle. Herbicide use for weed control or invasive plants will be used as a last resort and shall be approved by the Engineer and Project Biologist prior to application. If herbicide is deemed necessary, spot treatments, basal bark treatments, or cut stump treatments are preferred over broadcast spraying methods. Weeds and invasive, non-native plants within the revegetation areas (previous excavation sites) will be controlled throughout the revegetation areas as a whole. Planting basins will be hand weeded.

A 25-foot wide buffer contiguous with the revegetation areas (levee side) will also be maintained. The buffer will be mowed or trimmed to keep non-native vegetation to a maximum of one-foot tall. The timing of any spring mowing or weed trimming will be

coordinated with the Project Wildlife Biologist, so that ground nesting birds are not disturbed, and to be in compliance with the Migratory Bird Treaty Act. A target list of invasive, non-native plant species to be removed from the revegetation areas and their adjacent 25-foot buffer is provided (see Planting plan sheets). Target invasive, non-native species to be removed include Cape Ivy (*Delaireia odorata*), giant reed (*Arundo donax*), poison hemlock (*Conium maculatum*), yellow star thistle (*Centaurea solstitialis*), milk thistle (*Silybum marianum*) and wild radish (*Raphanus sativus*). Weeds throughout the revegetation areas will be kept to a maximum height of 1.0 foot in spring and summer to minimize reseeding of weedy species. Care will be taken to avoid any native woody species that colonize the gaps between plantings.

1.16 AS-BUILT DRAWINGS

The Contractor shall prepare as-built record drawings to document the numbers planted according to species. Changes and species substitution, if necessary, will be approved by the Project Biologist, and will be documented on planting plan sheets.

The As-Built drawings shall be to scale, include any changes, or substitutions, and be a complete record of the project. The Contractor shall provide the County with two sets of newly printed As-built drawings.

1.17 PAYMENT

Full compensation for furnishing labor, materials, tools, equipment and incidentals, and for doing all of the work involved in installing the revegetation areas, weed control, and supplemental planting of replacement cuttings and container stock shall be considered as included in the contract lump sum price paid for revegetation and no separate payment will be paid.

1.18 PLANT GUARANTEE AND REPLACEMENT

The Contractor will be responsible for supplemental or replacement planting of container stock that has died or has performed poorly. Supplemental planting in Fall 2014 through Winter 2016 is likely, if performance criteria are not met. The amount of supplemental planting needed will be assessed during the summer plant survival counts. Supplemental replacement planting is only required for plantings that are dead or dying.

The Project Botanist will coordinate with the County to decide on the number of plants, the species, and the container size to be used for the replacement planting. Substitute species may be used if the original species planted performs poorly.

1.19 IMPLEMENTATION SCHEDULES

Implementation schedules for the revegetation program for the Establishment Period and the Long-Term are provided in this report, and include the time of year to hydroseed, plant willow and black cotton wood cuttings, install container stock, and maintain and monitor the revegetation areas. The Establishment Period is estimated to occur over a 6-year period, starting with erosion control measures, hydroseeding and invasive, non-native plant removal. For Construction Phase 1, the Establishment Period will start in late Fall 2012. For Construction Phase 2, the Establishment Period is estimated to start in late Fall 2013.

Construction Schedule

The dates listed in the revegetation implementation schedules (Tables 4 and 5) are subject to change, and assume bench excavation for all of the excavation sites will be completed over a two-year period, starting in summer 2012 and ending in summer 2013. Two excavation sites, 1R and 2R are anticipated to be constructed in Phase 1. The remaining nine excavation sites 3R, 4R, 5R, 5.5R, 6R, 7R, 8R, 2L and 4L will be constructed in Phase 2. The timing and completion of both phases are subject to change, and will depend on project logistics, primarily the availability of receiver sites for the excavated soil materials and trucking access.

Table 4a. Construction Phase 1

Establishment Period
Revegetation Implementation Schedule *

	Year 1 (2012)				Year 2 (2013)				Year 3 (2014)				Year 4 (2015)				Year 5 (2016)				Year 6 (2017)			
TASK	**W**	**S**	**S**	**F**	**W**	**S**	**S**	**F**	**W**	**S**	**S**	**F**	**W**	**S**	**S**	**F**	**W**	**S**	**S**	**F**	**W**	**S**	**S**	**F**
Erosion Control			•				•																	
Hydroseed				•																				
Install Willow and Cottonwood Cuttings				•	•																			
Install Container Stock								•	•															
Maintenance**				•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Culling & Thinning											•				•				•				•	
Biological Monitoring				•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Prepare Year-end Report					•				•				•				•				•			
Remedial Planting												•	•			•	•							

* Dates listed in the schedule are subject to change, and assume bank construction for all of the excavation sites will be completed over a two-year period. Excavation sites 1R and 2R are anticipated be constructed in summer 2012.

** Provides for five years of maintenance and monitoring commencing after hydroseeding. Maintenance includes watering, weeding, invasive, non-native plant removal, culling, weed trimming and mowing.

Table 4b. Construction Phase 1

Long-Term
Revegetation Implementation Schedule*

	Year 7 (2018)				Year 8 (2019)				Year 9 (2020)				Year 10 (2021)				Year 11 (2022)			
TASK	**W**	**S**	**S**	**F**	**W**	**S**	**S**	**F**	**W**	**S**	**S**	**F**	**W**	**S**	**S**	**F**	**W**	**S**	**S**	**F**
Exotics Control		•	•			•	•			•	•			•	•					
Mowing & Weed-trimming**		•	•			•	•			•	•			•	•					
Culling & Thinning			•				•				•				•					
Biological Monitoring	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•				
Prepare Year-end Report					•				•				•							
Prepare Final Report																	•			

* Dates listed in the schedule are subject to change, and assume bank construction for all of the excavation sites will be completed over a two-year period, Year 1 (2012) and Year 2 (2013). Excavation sites 1R and 2R are anticipated to be constructed in summer 2012.

** Provides for four years of long-term maintenance and monitoring. Maintenance will also include tree culling and thinning as needed to lower roughness and plant competition.

Table 5a. Construction Phase 2

Establishment Period
Revegetation Implementation Schedule *

	Year 1 (2013)				Year 2 (2014)				Year 3 (2015)				Year 4 (2016)				Year 5 (2017)				Year 6 (2018)			
TASK	**W**	**S**	**S**	**F**	**W**	**S**	**S**	**F**	**W**	**S**	**S**	**F**	**W**	**S**	**S**	**F**	**W**	**S**	**S**	**F**	**W**	**S**	**S**	**F**
Erosion Control			•				•																	
Hydroseed				•																				
Install Willow and Cottonwood Cuttings				•	•																			
Install Container Stock								•	•															
Maintenance**				•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Culling & Thinning											•				•				•				•	
Biological Monitoring				•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Prepare Year-end Report					•				•				•				•				•			
Supplemental Planting												•	•			•	•			•	•			

* Dates listed in the schedule are subject to change, and assume bank construction for the second phase will be completed in fall 2013. Excavation sites 3R, 4R, 5R, 5.5R, 6R, 7R, 8R, 2L and 4L are anticipated to be constructed in the second phase.

** Provides for five years of maintenance and monitoring commencing after hydroseeding. Maintenance includes weeding, invasive, non-native plant removal, watering, culling, weed trimming and mowing.

Table 5b. Construction Phase 2

Long-Term
Revegetation Implementation Schedule*

	Year 7 (2019)				Year 8 (2020)				Year 9 (2021)				Year 10 (2022)				Year 11 (2023)			
TASK	**W**	**S**	**S**	**F**	**W**	**S**	**S**	**F**	**W**	**S**	**S**	**F**	**W**	**S**	**S**	**F**	**W**	**S**	**S**	**F**
Exotics Control		•	•			•	•			•	•			•	•					
Mowing & Weed-trimming**		•	•			•	•			•	•			•	•					
Culling & Thinning			•				•				•				•					
Biological Monitoring	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•				
Prepare Year-end Report					•				•				•							
Prepare Final Report																	•			

* Dates listed in the schedule are subject to change, and assume bank construction for all of the excavation sites will be completed over a two-year period, Year 1 (2012) and Year 2 (2013). Excavation sites 3R, 4R, 5R, 5.5R, 6R, 7R, 8R, 2L and 4L are anticipated to be constructed in the second phase.

** Provides for four years of long-term maintenance and monitoring. Maintenance will also include tree culling and thinning as needed to lower roughness and plant competition.

CHAPTER 2.0 MAINTENANCE ACTIVITIES

2.1 DESCRIPTION

Maintenance of the revegetation areas and their 25-foot wide buffers (on the levee side) will start after installing erosion control measures and the initial hydroseeding. Maintenance activities will include controlling invasive, non-native species, weeding, supplemental truck watering, mowing, weed trimming, remedial planting, debris removal, and thinning and pruning the installed trees and shrubs. Each of the 11 revegetation areas (bank excavation sites) plus a 25-foot wide buffer on the levee side of the revegetation area will be maintained and mowed and/or weed-trimmed to control invasive, invasive non-native species.

The majority of the work described in this section will be performed by the Contractor under separate contract. The County's maintenance staff will assist with mowing the buffers, once in spring and once in late summer (see Mowing Section).

2.2 SUBMITTALS

a) Within 7 days of the date of the Notice to Proceed, provide the Engineer with a copy of the Contractor's or Subcontractor's California State Landscape Contractor's License.

b) Submit a schedule specifying maintenance visits, and listing authorized workers and vehicles.

c) Submit a certificate of compliance stating that the bark mulch conforms to these specifications to the Project Engineer for approval before ordering the material.

d) Additionally, obtain certification from the manufacturer that the bark mulch materials are free of the sudden oak death pathogen and *Phytophthora ramorum*.

Throughout the maintenance period, the Contractor shall record all weed control, replanting, and other maintenance activities performed monthly using a form similar to the example included in Appendix B. The Contractor shall submit the completed forms to the Project Engineer within 10 days following the end of each month.

The Contractor shall provide the Project Engineer with an adjusted watering schedule if the application rates and frequency vary from what is described in this section.

2.3 MAINTENANCE SCHEDULE

Maintenance of the revegetation areas and their 25-foot buffers will start after installing erosion control measures and the initial hydroseeding. The mitigation plantings will be maintained regularly during the 5-year plant establishment period. The plant establishment period and associated site maintenance will be extended if significant plant replacement is required due plant mortality.

2.4 QUALITY ASSURANCE

The Contractor or Subcontractor shall hold a California State Landscape Contractor's License and have a minimum of 5 years revegetation maintenance experience in riparian habitat.

The Project Biologist or Project Botanist will identify replacement cutting collection sites, if necessary, within the Pajaro River riparian corridor and adjacent sloughs for the Contractor prior to cutting collection.

The Engineer will oversee all phases of cutting collection, storage, and handling.

Personnel performing weed control shall be trained to identify native plant species installed as part of the contract.

Due to the presence of the rare Red-legged Frog and the Western Pond Turtle, herbicides are not to be used in the revegetation areas, buffers or flood plains along the river corridor.

All tree thinning and pruning shall be overseen by the Project Botanist.

Before final acceptance of the project and filing of a Notice of Completion for the project, the Contractor shall post a performance bond covering against defects of the plantings for one year after final acceptance of the project by the County.

2.5 PAYMENT

Full compensation for furnishing labor, materials, tools, equipment and incidentals, and for doing all of the work involved in maintaining the revegetation areas, weed control, and supplemental planting of replacement cuttings and container stock shall be considered as included in the contract lump sum price paid for revegetation maintenance.

2.6 MAINTENANCE TASKS

Plant Maintenance

Maintenance Frequency. The Contractor shall check each planting location a minimum of once every week during the irrigation season (March to October) and a minimum of once every month during the non-irrigation season (November to February) for the duration of the maintenance period. During the watering season, the Contractor shall examine plant condition, weed growth, planting basin stability, and assess soil moisture around each plant to ensure that the plants are receiving sufficient water. During the non-irrigation season, the Contractor shall also remove any flood debris that may be covering plants. The Contractor shall record all maintenance activities and observations in monthly Maintenance Log (see Appendix B Maintenance and Monitoring Forms).

Supplemental Watering. The Contractor will provide supplemental watering during the 5-year plant establishment period. The plants will be watered using a water truck. Two gallons of water per plant is estimated and will be verified by the Project Biological Monitor. Due to the high vandalism potential along the Pajaro River and a resident homeless population, a formal irrigation system with irrigation bubblers is not deemed feasible due to potential theft and incidental breakage. In Year 1, the container stock plantings will be watered approximately three times per month, from April through October, to keep the soils within the root zone moist. The watering schedule in Year 2 will be reduced (approximately two times per month). In Year 3, little irrigation (one time per month) will be required. The watering schedule described above is a guideline, and may be adjusted after monitoring revegetation performance.

Repair of Planting Basins: The planting (watering) basins will be inspected and repaired on a routine basis, so that water is directed to plant roots and does not contribute to erosion. Most of the repair is anticipated to be on the downslope side of the planting basins.

Mulching. The Contractor shall replace bark mulch within the planting basins to maintain the depth and coverage specified in plant installation.

Pruning. The Contractor shall selectively prune, on an as-needed basis under the direction of the Project Botanist, to remove dead and broken branches and to correct structural defects. The Contractor shall prune plantings according to their natural growth characteristics leaving trees well shaped and balanced. All pruning debris shall be disposed of offsite by the Contractor according to local and state regulations.

Culling or Thinning. Tree thinning or culling will be conducted under the direction of the Project Botanist. The Contractor shall be responsible for culling of new plants should plant densities exceed success criteria specified in the Monitoring and Reporting Section of this report. Culling shall be performed to reduce competition between plantings. The Contractor shall cut the trunk or main stem of the plant in the root tissue below grade. Trees with severe storm damage or very poor form may also be culled

out. Culling operations may be required periodically during the maintenance period at the direction of the Project Botanist. All culling debris shall be disposed of offsite by the Contractor according to local and state regulations.

Plant Replacement. The Contractor will be responsible for supplemental or replacement planting of container stock that has died or has performed poorly. Supplemental planting in Fall 2014 through Winter 2017 is expected. The amount of supplemental planting needed will be assessed during the summer monitoring and survival counts conducted by the Project Botanist. Supplemental replacement planting is only required for plantings that are dead or dying, and plant survival criteria have not been met. Losses or damages to plantings due to herbivory, disease, pests, vandalism, or high storm flows shall also require replacement, if the site exceeds allowable mortality rate.

The Contractor shall not be responsible for replacement or repair costs associated with vandalism, flooding, or other acts of nature (e.g., damage by wildlife).

Plant Survival Criteria for Container Stock

First Fall after Planting: The target survival rate for all plants in a revegetation area is 100%. If monitoring results determine that percent survival is less than 100%, all of the dead and dying plantings shall be replaced by the Revegetation Contractor.

Second Fall after Planting: The target survival rate for all plants in a revegetation area is 90%. If monitoring results determine that the percent survival is less than 90%, the minimum number of plants required to achieve the 90% survival criterion shall be replaced by the Revegetation Contractor.

Third Fall after Planting: The target survival rate for all plants in a revegetation area is 80%. If percent survival is less than 80%, the minimum number of plants required to achieve the 80% survival criterion shall be replaced by the Revegetation Contractor.

The biological monitor will coordinate with the County to decide on the number of plants, the species, and the container size to be used for the replacement planting. Credit for natural recruitment will also be factored into determining the number of replacement plantings. Substitute species may be used if the original species planted performs poorly. The Contractor will record the number and location of the remedial or supplemental plantings on the As-built drawings. All dead plants shall be disposed of offsite by the Contractor according to local and state regulations.

Cutting Replacement

Replacement cuttings shall be the same species and size as those being replaced, unless otherwise directed by the Project Botanist. Cuttings will be replaced if monitoring results determine that cutting survival is less than 70% of that planted. If percent survival is less than 70%, the minimum number of plants required to achieve the 70% survival criterion shall be replaced by the Contractor.

The Contractor shall collect the replacement cuttings as specified. The Contractor shall not be responsible for replacement cutting costs unless it is determined by the Project Engineer that plant mortality was the result of Contractor negligence, in which case the Contractor shall be financially responsible for replacement cuttings.

2.7 WEED CONTROL

Weeds within the revegetation areas (previous excavation sites) will be controlled around each plant and throughout the revegetation areas as a whole as part of the weed trimming and mowing program. A target list of invasive, non-native plant species to be removed from the planting basins and around the plantings is provided (Table 1). The watering basin around each installed tree and shrub will be hand weeded; whereas the areas around the basins may be maintained by weed trimming, and the upper banks and a 25-foot wide buffer on the levee side of the revegetation areas may be mowed and mulched with wood chips to keep weed levels down. Weeds throughout the revegetation areas will be kept to a maximum height of 1.0 foot in spring and summer to minimize reseeding of weedy species. Care will be taken to avoid any native woody species that colonize the gaps between plantings.

Criteria. The Revegetation Contractor shall control weeds in all planting areas (as indicated on the drawings) throughout the work site during the maintenance period in accordance with these specifications and all local regulations. Maintenance activities shall include weed control within the planting basins, as well as herbaceous vegetation clearing, exotic tree removal, resprout eradication, and noxious weed control (as specified in this Section) throughout the planting areas. Weed control criteria shall consist of the following:

Maintaining all planting basins and an area 5 feet in diameter around each plant, free of weeds during the duration of the maintenance period. Weeds that grow within 5 feet of each planting, including in the planting basin and on the berms, shall be removed before the weeds reach 6 inches in height, or cover 30% of the planting basin or equivalent area. Weeds shall be removed before they produce viable seed.

Controlling herbaceous vegetation in the revegetation areas outside of the area specified above, but within the planting areas (as indicated on the drawings). Herbaceous vegetation shall be removed in these areas before vegetation exceeds 1.0 foot in height.

Noxious Weed Control. The Contractor shall eradicate existing noxious weeds and invasive, non-native plants within the planting areas. Prior to the start of any eradication activities, the Contractor shall stake or flag the control locations in the field for approval by the Project Botanist.

Control Methods. Weed control shall include hand-pulling, mechanical removal, and herbicide application as described below. The methods used shall be dependent on the location of weeds and the time of year that weed control operations occur. Installed plants and native plant volunteers shall not be damaged by weed control operations. Hydroseeded grasses occurring within the planting basins and on the basin berms shall be treated as weeds.

Hand-pulling: All weed control within the planting basins or within 24 inches of any seedling shall be performed by hand-pulling or using hand tools. Weed removal shall not cause disruption to the root system or the above-ground structure of the plants or planting basins. Contractor shall remove, within planting basins, only those plants that were not installed as part of the contract.

Mechanical control: Weed control within the planting areas, outside of the planting basins, shall be conducted using mechanical methods (e.g., mower, weed trimmer). Weeds shall be cut at, or below ground level, to maintain weeds at a maximum height of 6 inches. At no time shall mechanical methods be used to control weeds within the planting basins.

Herbicide application: As a last resort, control of some weeds may require herbicide application. Work shall be conducted only after receiving approval from the Project Wildlife Biologist. Herbicide application shall be limited to cutting and painting stumps, or foliar or spot spray using backpack or ATV-mounted sprayers. Herbicide will be applied according to manufacturer's specifications by licensed applicators in a manner that minimizes drip and drift into the stream channel. Herbicides shall only be used in the planting areas to control noxious weeds. At no time shall herbicides be used to control weeds within the planting basins.

Disposal of Removed Invasive, Non-native Plant Material

In general, the removed material of most of the vines and species with underground stems (e.g., Bermuda grass, periwinkle, Himalayan blackberry, bindweed, Kikuyu grass, and Cape ivy) will need to be removed off-site, and taken to the green waste at a sanitary landfill. Such species can reproduce from stem fragments, so they should not be dragged over soil surfaces, but bagged or contained as close as possible to the area from where they were removed. Invasive, non-natives with mature seed such as French broom, thistle species, bristly ox-tongue, yellow dock, and acacias should also be taken to the landfill. If not in seed, larger acacias may be cut and used as firewood.

Follow-up Monitoring and Control of Invasive, Non-Native Species

Since it is very difficult to remove all of an infestation of invasive, non-native species at once, it is important to conduct follow-up monitoring by re-visiting the site several months after exotic plant removal. Any resprouts should be removed. Species such as periwinkle, Cape ivy, Kikuyu grass, and bindweed that have underground stems/ runners are especially likely to resprout. French broom also tends to persist in areas due the fact that its seed stays viable in the soil "seed bank" for over 40 years. Due to the heavy infestations along the Pajaro River, invasive, non-native species removal is likely to be an on-going part of maintaining the riparian corridor. Note that many of the invasive species have propagules that are transported in the river water from infested areas further up in the watershed.

The revegetation areas will be surveyed for problematic invasive, non-native vegetation as part of site monitoring as described in the Monitoring and Reporting Section of this report. Surveys for invasive non-native vegetation should be concentrated during the winter and spring months. The performance criteria listed recommend a maximum of 10% relative vegetative cover of invasive, non-native plant species.

Mowing and Weed Trimming

Mowing and/or weed trimming of the revegetation areas and their 25-foot wide buffers will start the first spring after bench excavation, and will continue throughout the 5-year establishment period. The majority of the work described in this section will be performed by the Contractor. The County's maintenance staff will assist with mowing the buffers, once in April and once in late September. At the end of Year 5, the Project Biologist will determine how much more mowing or weed trimming will be needed for the next five years, and make recommendations for a long-term mowing program for the project site. Any spring mowing or weed trimming will be done under the direction of the Project Wildlife Biologist to ensure that ground nesting birds and Western Pond Turtles are not disturbed.

Depending on weather patterns, it is estimated that the ground vegetation will need to be cut at 3 to 4 week intervals during the growing season, so that the herb layer does not exceed 1.0 foot in height. This will lower weed seed production and competition with the plantings for soil moisture. In Year 1, mowing may be used on the top half of the new 3:1 banks with care taken not to damage erosion control measures such as coir rolls and erosion control blankets. After installing the container stock in Year 2, the revegetation areas will have the vegetation cut using weed trimmers, which allow more selective and careful cutting. This will help to lower damage to plantings or other native plants that have naturally recruited at the site.

Migratory Birds: All weed control areas may be suitable nesting habitat for migratory birds. Weed control operations shall occur throughout the year in the planting areas and must be accomplished before weeds become suitable habitat for migratory birds (greater than 6 inches in height). The Contractor shall contact the Project Biologist if

vegetation taller than 6 inches requires removal. Work shall be conducted only after receiving approval from the Project Wildlife Biologist.

2.8 FLOOD DAMAGE AND REPAIR

In the event that channel flows cause damage within the revegetation areas, the Revegetation Contractor will be responsible for removing debris from within and between the planting basins. Basins and plant protection measures shall be repaired. If entire planting basins are destroyed or larger sections of the revegetation areas are damaged, the Project Engineer and Project Botanist may decide to not replant the areas, if they deem the areas are prone to continued damage. If portions of the revegetation areas are deleted, the deletions shall be mapped on to the As-Built for the initial plant installation, and a copy sent to the Botanical Monitor.

2.9 DEBRIS REMOVAL

The Contractor shall maintain the work site in a natural-looking condition throughout the maintenance period. Site clean-up shall occur on a daily basis for days which the Contractor has personnel onsite. All garbage, vegetative debris, excess plant material, discarded materials, and extraneous equipment shall be removed and stored or disposed of offsite in accordance with State and local regulations.

Woody debris shall not be removed from the work site unless it is a threat to public safety, promotes erosion, or may damage plantings, irrigation system components, or instream structures. The Contractor shall inform the Project Engineer if large pieces of woody debris or felled trees have moved into the revegetation areas and have damaged, or have the potential to damage, the irrigation system, plantings, and instream. The County will be responsible for removing large woody debris or felled trees from the work area if required.

2.10 MAINTENANCE ACCESS

Each revegetation area should have chipped trails or roads every several hundred feet to allow for maintenance access for weeding, mowing and truck watering. Typically, invasive, non-native plants in the Pajaro riparian corridor can reach an average height of 8 feet by late May, and many have already set weed seed, if left uncontrolled. Maintenance access is needed to help locate the revegetation areas that are found at various intervals along the water channel.

2.11 REPORTING AND INSPECTIONS

Monthly Maintenance Log. Throughout the maintenance period, the Contractor shall keep records of maintenance activities including, but not limited to, watering schedule

and amount applied, weed control, erosion blanket/coir log repair, and replacement planting. The Contractor shall compile a record of all maintenance activities performed on a monthly maintenance log (see Appendix B Maintenance and Monitoring Forms). The Contractor shall submit a completed copy of the form to the Project Engineer within 10 days following the end of each month.

Inspections. Progress inspections and stage acceptance of the Contractor's maintenance activities will be conducted by the Project Botanist according to this Section. The Project Engineer may conduct interim inspections and bring deficiencies to the Contractor's attention at any time.

Orientation Meeting. At the beginning of the maintenance period, the Contractor shall participate in an initial orientation meeting with the Project Engineer and the County to discuss site maintenance, weed control, plant maintenance, and other maintenance activities.

Progress Inspections. The Project Botanist and the Contractor will conduct a joint inspection of the revegetation areas monthly during the irrigation season (March to October) and bimonthly during the non-irrigation season (November to February) for the duration of the maintenance period to review Contractor's work.

Final Acceptance Inspections. At the end of the maintenance period, the Project Engineer and the Contractor will inspect the work site to evaluate the acceptability of the maintenance activities. The Contractor shall provide the Project Engineer with a minimum 5-working day advance notification for the final acceptance inspection. If necessary, the Project Engineer will develop a punch list (as described below) of items to be completed by the Contractor before final acceptance. Punch list requirements shall be completed by the Contractor within 15 working days of receipt of the punch list. The Contractor shall rework, repair, and/or replant any areas determined to be unacceptable by the Project Engineer. Contractor shall be responsible for any resulting extension of the contract period and shall do so at no additional cost to the County. The unacceptable areas will be re-inspected and approved by the Project Engineer. Final acceptance of completion of the project will be granted by the Project Engineer upon satisfactory completion of the punch list items.

Punch List. Following each inspection (as described above), the Project Biologist will provide the Contractor with a punch list of items to be completed. The Contractor will have 10 working days to correct any problems identified during progress inspections. The Contractor shall rework, repair, and/or replant any areas determined to be unacceptable by the Project Engineer.

2.12 AS-BUILT DRAWINGS

Throughout the maintenance period the Contractor shall update the as-built drawings and keep written notes documenting replacement plantings, erosion control product

replacement and/or maintenance. The drawings shall also identify plants as original plants or, if required, during the maintenance period, replacement plants. A summary table describing the number and species of plants requiring replacement shall also be updated as part of the drawings. The drawings shall be updated monthly as a redlined set of construction drawings and kept on the work site available for viewing by the Project Engineer during work hours.

Within 30 days of final acceptance of the project, and prior to final payment, the Contractor shall provide final as-built drawings to the County of Santa Cruz..

2.13 MAINTENANCE ACTIVITIES YEARS 7 THROUGH 10

Maintenance in Years 7 through 10 will be conducted by the County of Santa Cruz Public Works Department maintenance staff. The amount of maintenance needed in Years 7 through 10 will be less compared to previous years. If there has been no replacement planting in Years 5 and 6, no more watering will be required. Maintenance may also include site repair and debris removal due to flood damage.

Culling and Thinning

In theory, most culling and thinning needed for plant performance will have already been done in Years 3, 4 and 5. Culling in Years 7 through 10 may be needed if the results of hydraulic analysis show that roughness should be reduced in the area.

Mowing and Weed-trimming

Mowing of the 25-foot wide buffers on the levee side of the revegetation areas and weed-trimming around the trees and shrubs planted on the 3:1 slopes will be reduced. The vegetation will be cut three times in spring and once in fall, so that herb layer does not exceed two feet in height. The spring mowing and weed trimming should be done under the direction of the Project Wildlife Biologist, so that impacts to ground nesting birds and sensitive wildlife species are minimized.

Removal of Invasive, Non-native Species

The Project Botanist will inform maintenance staff if there are locations within the revegetation areas that support high priority invasive, non-native species that need to be removed, especially Cape Ivy climbing up trees and patches of arundo (giant reed) and yellow star thistle.

CHAPTER 3.0 MONITORING AND REPORTING

The following overview describes the monitoring procedures and performance criteria that will be used to evaluate revegetation performance. Monitoring will document the success of the revegetation efforts, and will be conducted by the Project Botanist. Vegetation monitoring will include plant survival counts, vegetation sampling using belt transects, reconnaissance surveys, photodocumentation, and notes on erosion or site disturbance problems.

The results of the monitoring will be presented in the annual monitoring reports. Each year revegetation success will be assessed and remedial methods suggested and implemented. Adaptive management will be implemented, as needed to promote revegetation success and to improve habitat value of the riparian corridor.

Potential remedial actions include additional erosion control measures, seeding or container stock planting, or increased exotics removal.

3.1 MONITORING METHODS YEAR 1 THROUGH YEAR 7

Reconnaissance Surveys

The Project Botanist will survey the Revegetation Areas and their 25-foot buffers monthly during spring and summer, and every other month during fall and winter months in Years 1 through 6. The reconnaisance surveys will start the spring after bank excavation. The revegetation areas will be surveyed for invading invasive non-native plant species and weeds. The proportion of native vegetation versus non-native vegetation will be determined. The purpose of the reconnaissance surveys will be to assess how the revegetation and control of invasive non-native plants is proceeding, and to identify problems or potential problems that may exist (see monitoring form in Appendix B).

During these surveys, the monitor will look for plant damage, pests and diseases, and will make recommendations to correct any significant problems or potential problems. Plants are most vulnerable to many types of distrubances during the early part of the establishment period, so monitoring must be relatively intense during these early years. These visits will also be used to document the need to change or adjust revegetation plan activities (i.e., altering the maintenance schedule, adding extra weed control visits, increasing or reducing the frequency or amount of watering, etc.).

Monitoring of Natural Recruitment of Native Plant Species

The revegetation areas and their 25-foot buffers will be monitored in spring and summer in Years 1 through 4 to see which native plant species re-establish naturally. The Project Botanist shall conduct the monitoring of natural recruitment.

Notes recorded on naturally recruiting native species will guide the active revegetation of the excavation sites. The proposed planting lists in this Plan (see Appendix A) are therefore subject to refinement according to the monitoring results. It is expected that willow species and water-loving plants such as rushes, tules and sedges will establish naturally along the excavated benches. Such recruitment will be quantified, and credit given, so that fewer short cuttings and plant divisions will need to be planted. A 1:1 ratio will apply. For example, if one California tule volunteers on the bench, then one less division of California tule will need to be planted. Such changes will be noted on the As-built drawings

Vegetation Sampling (Belt Transects)

The Project Botanist will conduct vegetation sampling in Years 3, 4, 5 and 6. The belt transects will be 10 feet wide (along the riverbank) with the long side (varies approximately 15 feet) perpendicular to the river such that the long side spans the length of the newly excavated bench and 3:1 bank . The Project Botanist will establish the transect locations the first spring after the initial planting of container stock. Belt transects will be established in each of the 11 revegetation areas such that a minimum of 1.0% of the new bench and 3:1 bank areas are sampled. Some of the belt transect locations will coincide with the location of cross sections established by Northwest Hydraulic Consultants to study hydraulic impacts and roughness. The number and location of belt transects will be determined the first spring after the initial planting of container stock. The locations of the transects will be mapped on an aerial map provided by the County of Santa Cruz, and the belt transect corners will be marked in the field. In subsequent monitoring years, these same location will be re-monitored. For each belt transect, the percent vegetative cover according to species should be determined through visual estimation. In addition, the percent bare ground, percent mulch/organic litter, and percent artificial bank stabilization (i.e., rip rap, cement, etc.) should be recorded. If open water is detected, its percentage will also be recorded.

The data collected from the transects will provide information on native vegetative cover, cover of invasive non-native species, and the average height of the woody species planted to see if the revegetation areas are on track with meeting the performance criteria presented in this chapter (see monitoring form in Appendix B).

Detailed Monitoring of Plant Survival, Vigor, and Growth

The Project Botanist will conduct survival and vigor assessments in Years 3, 4, 5 and 6. In addition to the reconnaissance surveys and vegetation sampling, one additional monitoring visit will be made in summer for four years following the installation of container stock. The summer monitoring will verify plant vigor, plant survival, and whether the performance criteria are being met. The number of living and number of dead plantings will be recorded according to species in each revegetation area. The height of planted trees and shrubs from container stock will be measured to the nearest

third of a foot. The width/spread of the trees and shrub plantings will be visually estimated (see monitoring form in Appendix B).

Each tree and shrub container stock planting within a restoration area will also be evaluated for vigor by using the following vigor rating system.

Vigor Rating System

0 = Dead
1 = Poor, greater than 75% of plant affected by cumulative symptoms
2 = Fair, 25 to 75% of plant affected by cumulative symptoms
3 = Good, less than 25% of plant affected by cumulative symptoms
4 = Excellent, less the 5% of plant affected by cumulative symptoms

Factors evaluated to determine the vigor ratings include presence of pests and diseases, mechanical damage, bud development, new growth, foliage color, herbivore and drought stress.

Photodocumentation

During the spring monitoring, the Project Botanist will take photographs to document the condition of each revegetation area. Photographs will be taken from the same vantage point (photostation) and in the same direction every year. Belt transects that coincide with the crossection locations used for hydraulic analysis will also be photographed. Selected photographs will be included in the annual reports. The locations of the photostations shall be mapped onto a current aerial photograph the year of the initial planting to facilitate repeat photographs fron the same position in subsequent years.

3.2 PERFORMANCE CRITERIA YEAR 1 THROUGH YEAR 6

Attributes to be monitored include: natural recruitment, plant survival, plant vigor, vegetative cover, soil erosion, and the proportion of invasive, non-native plant species. The specific performance criteria follow:

Plant Survival Criteria for Container Stock

First Fall after Planting: The target survival rate for all plants in a revegetation area is 100%. If monitoring results determine that percent survival is less than 100%, all of the dead and dying plantings shall be replaced by the Revegetation Contractor.

Second Fall after Planting: The target survival rate for all plants in a revegetation area is 90%. If monitoring results determine that the percent survival is less than 90%, the minimum number of plants required to achieve the 90% survival criterion shall be replaced by the Revegetation Contractor.

Third Fall after Planting: The target survival rate for all plants in a revegetation area is 80%. If percent survival is less than 80%, the minimum number of plants required to achieve the 80% survival criterion shall be replaced by the Revegetation Contractor.

Plant Survival of Willow Cuttings, Cottonwood Cuttings and Plant Divisions

Seventy percent (70%) survival of willow and black cottonwood short cuttings, and 70% survival of transplanted divisions of wetland species such as bulrush, tall cyperus and bur reed during Years 1 through 3 of the establishment period.

Plant Vigor

The majority of the tree and shrub plantings should have fair to good vigor.

Vegetative Cover of Invasive, Non-native Plant Species

Maximum of 5% vegetative cover within the revegetation areas of high priority/perennial, invasive, non-native plants, including Cape ivy, giant reed, jubata/pampas grass, French broom, yellow star thistle, and poison hemlock. For additional high priority invasive plants for removal, see Table 1.

Trend of Increasing Woody Cover of Native Species Year 2 through Year 6

Minimum annual increase of 4% for average native tree cover (all species combined) and minimum annual increase of 4% for average native shrub cover (all species ccombined).

Bare Ground. Maximum of 10% bare ground.

3.3 MONITORING METHODS YEARS 7 THROUGH 10

Monitoring methods will be reduced in scope during Years 7 through 10. Reconnaissance surveys of the revegetation areas will be reduced to four surveys during spring and summer. Plant survival counts and vigor assessments will no longer be conducted. Photodocumentation and vegetation sampling will continue.

Vegetation Sampling

Vegetation sampling using belt transects will be conducted in Year 8 and Year 10 as described above, since the transects provide data on vegetative cover, proportion of native versus non-native vegetation and average height of trees and shrubs. This information is needed to document trends in vegetative cover, and also provides data for hydraulic analysis of channel roughness. The monitoring results collected from the belt transects will be summarized in the annual monitoring reports to determine whether the revegetation areas are still meeting the established performance standards.

Photodocumentation

As described for Years 1 through 6, spring photographs will be taken to document the conditions of each revegetation area. Photographs will be taken from the same vantage point (photostation) and in the same direction every year. Belt transects that coincide with the crossection locations used for hydraulic analysis will also be photographed. Selected photographs will be included in the annual reports.

3.4 PERFORMANCE CRITERIA YEAR 7 THROUGH YEAR 10

The final success criteria for vegetative cover will be applied separately to each of the 11 riparian revegetation areas. Percent cover is positively correlated with aboveground plant biomass and wildlife use and will be used as the primary indicator of successful establishment of riparian habitat. The final success criteria for average percent cover shall be met by 10 years following the hydroseeding in Year 1.

Percent Woody Cover

Average percent cover of native woody species in the revegetation areas is expected to be relatively low during the first three years following plant installation, but should increase quickly thereafter. The table below provides target performance criteria for percent cover for Year 7 through Year 10 of the maintenance and monitoring period.

Year 10 Criteria. For areas interplanted with trees and shrubs, average percent cover by Year 10 shall be 40% by native trees and 20% by native shrubs. If tree cover exceeds the final goal, the final success criteria for shrub cover may be reduced by a corresponding amount.

Performance Criteria for Tree and Shrub Cover Years 8 through Year 10

Monitoring Year	Average Percent Cover of Native Trees	Average Percent Cover of Native Shrubs
Year 8	30%	15%
Year 9	35%	18%
Year 10	40%	20%

Tree Height

Tree height is a useful measure of the vigor and value of riparian habitat. The table below provides goals for tree height for selected species in Year 5 and Year 10.

Performance Criteria for Tree Heights

Species	Year 5 Average Height (feet)	Year 10 Average Height (feet)
Arroyo Willow	6	12
Box Elder	5	10
Coast Live Oak	5	10
Blue Elderberry	6	12
Red Willow	6	12
Red or White Alder	6	12

3.5 REPORT PREPARATION

Annual Reports

During the ten-year maintenance and monitoring period, annual monitoring reports will be prepared in January that document the results of the reconnaissance surveys, summer monitoring, maintenance and revegetation activities. The annual report for the restoration program should document the findings of the year's monitoring, highlight problems and successes, date of monitoring, who performed the monitoring, yearly photographs, and other appropriate information. The reports will recommend remedial actions to be undertaken if the revegetation is not meeting the above period performance criteria. Reports shall be submitted to the USFWS, CORPS, County of Santa Cruz, RWQCB and CDFG.

Final Report

A Final Report will be prepared in January of Year 11 that presents the last revegetation area monitoring results. The Final Report will make recommendations for the future management of the revegetation areas and address any adaptive management needs. The report will be submitted to the USFWS, CORPS, County of Santa Cruz, RWQCB and CDFG.

3.6 ADAPTIVE MANAGEMENT

The proposed revegetation project has provisions for adaptive management. Adaptive management provides for flexible management practices that may be modified according to monitoring results and site performance. Some flexibility is necessary in response to changes in site conditions such as flood damage , drought, etc. As the proposed revegetation activities are implemented and monitored for success, refinements to the

revegetation and maintenance methods are expected. The monitoring results for natural recruitment will have a key part in the adaptive management of the revegetation areas.

Natural Recruitment

Monitoring for native species that naturally recruit or establish in a revegetation area may be taken into account when determining the number of plants to install. Natural recruitment on the newly excavated benches and riverbanks is expected, especially willows and water-loving plants along the channel edge. As part of the monitoring surveys, the number of recruits will be evaluated, and credit given at a 1:1 ratio. For example, if sedges, rushes, and bulrushes come in naturally, then the number of divisions proposed for planting of these species may be reduced by one per one recruit. Similarly, if some of the willow cuttings die, naturally recruiting willows may provide credit, so that less replanting is necessary.

Field Fitting

There is also some flexibility in selecting the locations for planting. The planting lists for each revegetation area provide bank or channel locations for each species that are meant to guide the installation. Field fitting with the assistance of the Biological Monitors is encouraged, so that the plants are installed in the best locations for successful establishment.

Weather and Rainfall

Weather patterns and rainfall will also need to be considered, and the amount of supplemental watering adjusted accordingly.

Flood Damage

Sections of some revegetation areas may need to be abandoned if there is significant flood damage. Any reduction in the size/area of a revegetation area will be agreed upon and documented b the Project engineer, Revegetation Contractor, and Biological Monitor.

Maintenance and Monitoring Period

If there has been a lot of remedial planting, especially native tree species, and/or Performance Criteria have not been met, the length of the maintenance and monitoring may be extended one to two years.

REFERENCES AND LITERATURE CITED

California Native Plant Society (CNPS), CNPS Electronic Inventory data request for U.S. Geological Survey 7.5-minute topographic quadrangles: Soquel, Watsonville West, Watsonville East, Moss Landing, and Prunedale, information accessed July 15, 2011.

California Native Plant Society. September 1996. Policy on Invasive Non-native Plants in California, Sacramento, California.

CH_2M Hill. 1997. Phase II Report: Pajaro River Management & Restoration Plan. Prepared in partnership with Northwest Hydraulic Consultants, Inc. and Greening Associates. Prepared for Santa Cruz County Flood Control and Water Conservation District, Zone 7.

County of Santa Cruz. October 1994. County of Santa Cruz General Plan and Local Coastal Plan – 1990 –2005 Environmental Quality Element, Santa Cruz, California.

Hoag, J.C. 1993b. How to Plant Willows and Cottonwoods for Riparian Rehabilitation. USDA Natural Resources Conservation Service, Idaho Plant Materials Technical Note #23, Boise, ID.

Hoag, J.C., G.L.. Young, and J.L. Gibbs. 1991. Planting Techniques for Vegetating Riparian Areas from the Aberdeen Plant Materials Center Paper presented at the 45th Annual Meeting of the Society of Range Management, Spokane, WA.

Fuller, T.C. and G.D. Barbe. 1985. The Bradley Method of Eliminating Exotic Plants from Natural Reserves. *Fremontia*, July 1985.

Guinon, M. 1992. Promoting Gene Conservation through Seed and Plant Procurement. *In:* Proceedings, Western Forest Nursery Association, held September 1992, Fallen Leaf Lake, CA.

The Jepson Manual of Vascular Plants of California 2nd Edition, in Press 2011. University of California Press, Berkeley, CA.

Kittleson, G. 2006. Final Preliminary Biotic Impact and Mitigation Assessment –Proposed Pajaro River Levee Bench Sediment Excavation Project.

Kittleson, G. and V. Haley. 2004. Riparian Habitat Acreage Impacted by Pajaro River Vegetation Thinning Activities, Santa Cruz County Department of Public Works.

Northwest Hydraulic Consultants, Inc. 2011a. Pajaro River Bench Excavation Project 65% Revised Basis of Design Memorandum. Prepared for Santa Cruz County Flood Control and Water Conservation District, Zone 7.

Northwest Hydraulic Consultants, Inc. 2011b. Pajaro River Bench Excavation Project 75% Basis of Design Memorandum. Prepared for Santa Cruz County Flood Control and Water Conservation District, Zone 7.

Salix Applied Earthcare. 1999. Biotechnical Erosion Control for Slopes and Streambanks Manual. John McCullah. Workshop April 8, 1999, Zayante Fire Department, Felton, CA..

Shields, F.D. and D.H. Gray. 1993. Effects of Woody Vegetation on the Structural Intergrity of Sandy Levees. Water Resources Bulletin 28(5): 917-931.

Singer, S.W. 1992. Groundcover – A Planting Guide for Erosion Control and Site Improvement on the Central Coast (San Francisco to Big Sur). Santa Cruz County Resource Conservation District, Aptos, CA.

Thomas, John Hunter. 1961. Flora of the Santa Cruz Mountains of California. A Manual of the Vascular Plants. Stanford University Press, Stanford, CA.

Table 1R. Planting List for Excavation Site 1R (2.58 acres)
Pajaro River Revegetation Areas

Scientific Names	Common Names	Species Codes	Container Type or Cuttings*	Estimated Quantities	Approximate On-Center Spacing** (feet)	Planting Location
Trees:						
Acer negundo	Box Elder	ACNE	treepot	66	12.0 – 15.0	Mid Bank
Populus trichocarpa	Black Cottonwood	POTR	short cuttings	25	10.0 – 12.0	Bench Channel Edge
Salix spp. (i.e. S. lasiolepis, S. laevigata and lasiandra)	Arroyo, Red , and Yellow Willow	SASp.	short cuttings	110	8.0 – 10.0	Bench Channel Edge
Shrubs:						
Artemisia californica	California Sage	ARCA	1-gallon	30	8.0	Upper Bank
Artemisia douglasiana	Mugwort	ARDO	1-gallon	21	8.0	Mid Bank
Baccharis pilularis	Coyote Brush	BAPI	treepot	36	12.0	Mid Bank Upper Bank
Frangula californica	Coffeeberry	FRCA	treepot	21	10.0 – 12.0	Mid Bank Upper Bank
Rosa californica	Wild Rose	ROCA	1-gallon	36	8.0	Mid Bank
Rubus ursinus	California Blackberry	RUUR	deepot	150	5.0	Lower Bank
Perennial Herbs & Grasses:						
Leymus triticoides	Creeping Wild Rye	LETR	1-gallon	15	5.0	Mid Bank
Schoenoplectus californicus	California Tule	SCCA	divisions	36	8.0	Bench Channel Edge

* Container sizes: treepots @ 4” by 4” by 14” deep; deepots @ 2.5” by 2.5” by 10 “ deep.

** Exact spacing and quantities will need to be field fit for each revegetation area, depending on existing vegetation and rate of natural recruitment. Distances are approximate guidelines.

California blackberry will be planted 3 per larger planting basin (3 ft. by 6ft.). Same applies to creeping wild rye grass and mugwort.

Notes:

Length of waterline at cut – 1,496 feet

Number of large trees removed – 0; Number of large tree protection zones – 0

Table 2R. Planting List for Excavation Site 2R (4.42 acres)
Pajaro River Revegetation Areas

Scientific Names	Common Names	Species Codes	Container Type or Cuttings*	Estimated Quantities	Approximate On-Center Spacing** (feet)	Planting Location
Trees:						
Acer negundo	Box Elder	ACNE	treepot	90	12.0 – 15.0	Mid Bank
Populus trichocarpa	Black Cottonwood	POTR	short cuttings	75	10.0 – 12.0	Bench Channel Edge
Salix spp. (i.e. S. lasiolepis, S. laevigata and lasiandra)	Arroyo, Red , and Yellow Willow	SASp.	short cuttings	200	8.0 – 10.0	Bench Channel Edge
Shrubs:						
Artemisia californica	California Sage	ARCA	1-gallon	54	8.0	Upper Bank
Artemisia douglasiana	Mugwort	ARDO	1-gallon	30	8.0	Mid Bank
Baccharis pilularis	Coyote Brush	BAPI	treepot	54	12.0	Mid Bank Upper Bank
Frangula californica	Coffeeberry	FRCA	treepot	36	10.0 – 12.0	Mid Bank Upper Bank
Rosa californica	Wild Rose	ROCA	1-gallon	54	8.0	Mid Bank
Rubus ursinus	California Blackberry	RUUR	deepot	165	5.0	Lower Bank
Perennial Herbs & Grasses:						
Baccharis douglasii	Marsh Baccharis	BADO	1-gallon	24	5.0	Lower Bank
Leymus triticoides	Creeping Wild Rye	LETR	1-gallon	27	5.0	Mid Bank
Schoenoplectus californicus	California Tule	SCCA	divisions	60	8.0	Bench Channel Edge

* Container sizes: treepots @ 4” by 4” by 14” deep; deepots @ 2.5” by 2.5” by 10 “ deep.

** Exact spacing and quantities will need to be field fit for each revegetation area, depending on existing vegetation and rate of natural recruitment. Distances are approximate guidelines.

California blackberry will be planted 3 per larger planting basin (3 ft. by 6ft.). Same applies to creeping wild rye grass, and mugwort.

Notes:
Length of waterline at cut – 2,424 feet
Number of large trees removed – 2 willow and 5 cottonwood; Number of large tree protection zones – 1

Table 2L. Planting List and Hydroseed Quantities for Excavation Site 2L (1.43 acres)
Pajaro River Revegetation Areas

Scientific Names	Common Names	Species Codes	Container Type or Cuttings*	Estimated Quantities	Approximate On-Center Spacing** (feet)	Planting Location
Trees:						
Acer negundo	Box Elder	ACNE	treepot	24	12.0 – 15.0	Mid Bank
Alnus rubra or *rhombifolia*	Red or White Alder	ALRU	treepot	6	12.0 – 15.0	Bench Lower Bank
Populus trichocarpa	Black Cottonwood	POTR	short cuttings	38	10.0 – 12.0	Bench Lower Bank
Salix spp. (i.e. S. lasiolepis, S. laevigata and lasiandra)	Arroyo, Red , and Yellow Willow	SASp.	short cuttings	60	8.0 – 10.0	Bench Channel Edge
Sambucus nigra	Blue Elderberry	SANI	treepot	9	12.0 – 15.0	Upper Bank
Shrubs:						
Artemisia californica	California Sage	ARCA	1-gallon	20	5.0	Upper Bank
Artemisia douglasiana	Mugwort	ARDO	1-gallon	20	8.0	Mid Bank
Baccharis pilularis	Coyote Brush	BAPI	treepot	12	12.0	Mid Bank Upper Bank
Frangula californica	Coffeeberry	FRCA	treepot	12	10.0	Mid Bank Upper Bank
Rosa californica	Wild Rose	ROCA	1-gallon	12	5.0	Mid Bank
Rubus ursinus	California Blackberry	RUUR	treepot	150	5.0	Lower Bank
Perennial Herbs & Grasses:						
Baccharis douglasii	Marsh Baccharis	BADO	1-gallon	20	5.0	Lower Bank
Juncus effusus ssp.	Bog Rush*	JUEF	1-gallon	12	6.0	Channel Edge
Leymus triticoides	Creeping Wild Rye Grass	LETR	1-gallon	30	5.0	Mid Bank
Oenothera elata ssp. *hookeri*	Hooker's Primrose	OEHO	1-gallon	16	4.0	Mid Bank

Scientific Names	Common Names	Species Codes	Container Type or Cuttings*	Estimated Quantities	Approximate On-Center Spacing** (feet)	Planting Location
Schoenoplectus californicus	California Tule	SCCA	divisions	12	8.0	Bench Channel Edge
Sparganium eurycarpum	Broad-fruited Burreed	SPEU	divisions	12	8.0	Bench Channel Edge

* Container sizes: treepots @ 4" by 4" by 14" deep; deepots @ 2.5" by 2.5" by 10 " deep.

** Exact spacing and quantities will need to be field fit for each revegetation area, depending on existing vegetation and rate of natural recruitment. Distances are approximate guidelines.

California blackberry will be planted 3 per larger planting basin (3 ft. by 6 ft.). Same applies to creeping wild rye grass, and mugwort.

Notes:
Length of waterline – 965 feet
Number of large trees removed – 5 cottonwoods; Number of large tree protection zones – 0
Number of rootwad planting areas - ?? (see planting detail)
Number of side drainage planting areas -0

Table 3R. Planting List for Excavation Site 3R (2.06 acres)
Pajaro River Revegetation Areas

Scientific Names	Common Names	Species Codes	Container Type or Cuttings*	Estimated Quantities	Approximate On-Center Spacing** (feet)	Planting Location
Trees:						
Acer negundo	Box Elder	ACNE	treepot	30	12.0 – 15.0	Mid Bank
Populus trichocarpa	Black Cottonwood	POTR	short cuttings	30	10.0 – 12.0	Bench Channel Edge
Salix spp. (i.e. S. lasiolepis, S. laevigata and lasiandra)	Arroyo, Red , and Yellow Willow	SASp.	short cuttings	150	8.0 – 10.0	Bench Channel Edge
Shrubs:						
Artemisia californica	California Sage	ARCA	1-gallon	36	8.0	Upper Bank
Artemisia douglasiana	Mugwort	ARDO	1-gallon	18	8.0	Mid Bank
Baccharis pilularis	Coyote Brush	BAPI	treepot	30	12.0	Mid Bank Upper Bank
Frangula californica	Coffeeberry	FRCA	treepot	12	10.0 – 12.0	Mid Bank Upper Bank
Rosa californica	Wild Rose	ROCA	1-gallon	24	8.0	Mid Bank
Rubus ursinus	California Blackberry	RUUR	deepot	75	5.0	Lower Bank
Perennial Herbs & Grasses:						
Baccharis douglasii	Marsh Baccharis	BADO	1-gallon	18	5.0	Lower Bank
Schoenoplectus californicus	California Tule	SCCA	divisions	60	8.0	Bench Channel Edge

* Container sizes: treepots @ 4” by 4” by 14” deep; deepots @ 2.5” by 2.5” by 10 “ deep.

** Exact spacing and quantities will need to be field fit for each revegetation area, depending on existing vegetation and rate of natural recruitment. Distances are approximate guidelines.

California blackberry will be planted 3 per larger planting basin (3 ft. by 6 ft.). Same applies to creeping wild rye grass, and mugwort.

Notes:
Length of waterline at cut – 1,147 feet
Near downtown, vandalism potential.
Number of large trees removed – 1 cottonwood; Number of large tree protection zones – 0

Table 4R . Planting List for Excavation Site 4R (6.24 acres)
Pajaro River Revegetation Areas

Scientific Names	Common Names	Species Codes	Container Type or Cuttings*	Estimated Quantities	Approximate On-Center Spacing** (feet)	Planting Location
Trees:						
Acer negundo	Box Elder	ACNE	treepot	48	12.0 – 15.0	Mid Bank
Populus trichocarpa	Black Cottonwood	POTR	short cuttings	50	10.0 – 12.0	Bench Channel Edge
Salix spp. (i.e. S. lasiolepis, S. laevigata and lasiandra)	Arroyo, Red , and Yellow Willow	SASp.	short cuttings	275	8.0 – 10.0	Bench Channel Edge
Shrubs:						
Artemisia californica	California Sage	ARCA	1-gallon	84	8.0	Upper Bank
Artemisia douglasiana	Mugwort	ARDO	1-gallon	36	8.0	Mid Bank
Baccharis pilularis	Coyote Brush	BAPI	treepot	54	12.0	Mid Bank Upper Bank
Frangula californica	Coffeeberry	FRCA	treepot	27	10.0 – 12.0	Mid Bank Upper Bank
Rosa californica	Wild Rose	ROCA	1-gallon	66	8.0	Mid Bank
Rubus ursinus	California Blackberry	RUUR	deepot	288	5.0	Lower Bank
Perennial Herbs & Grasses:						
Baccharis douglasii	Marsh Baccharis	BADO	1-gallon	33	5.0	Lower Bank
Bolboschoenus fluviatilis	River Tule	BOFL	divisions	30	8.0	Bench
Leymus triticoides	Creeping Wild Rye	LETR	1-gallon	48	5.0	Mid Bank
Schoenoplectus robustus	Prairie Bulrush	SCRO	divisions	30	8.0	Bench
Schoenoplectus californicus	California Tule	SCCA	divisions	30	8.0	Bench Channel Edge

* Container sizes: treepots @ 4” by 4” by 14” deep; deepots @ 2.5” by 2.5” by 10 “ deep.

** Exact spacing and quantities will need to be field fit for each revegetation area, depending on existing vegetation and rate of natural recruitment. Distances are approximate guidelines.

California blackberry will be planted 3 per larger planting basin (3 ft. by 6 ft.). Same applies to creeping wild rye grass, and mugwort.

Notes:
Length of waterline at cut – 2,221 feet
Near downtown, vandalism potential. Just Downstream from confluence with Salsipuedes Creek.
Number of large trees removed – 0 ; Number of large tree protection zones – 0

Table 4L. Planting List for Excavation Site 4L (1.82 acres)
Pajaro River Revegetation Areas

Scientific Names	Common Names	Species Codes	Container Type or Cuttings*	Estimated Quantities	Approximate On-Center Spacing** (feet)	Planting Location
Trees:						
Acer negundo	Box Elder	ACNE	treepot	24	12.0 – 15.0	Mid Bank
Alnus rubra or *rhombifolia*	Red or White Alder	ALRU	treepot	10	12.0 – 15.0	Bench Lower Bank
Platanus racemosa	California Sycamore	PLRA	treepot	9	12.0 – 15.0	Lower Bank
Populus trichocarpa	Black Cottonwood	POTR	short cuttings	60	10.0 – 12.0	Bench Channel Edge
Salix spp. (i.e. S. lasiolepis, S. laevigata and lasiandra)	Arroyo, Red , and Yellow Willow	SASp.	short cuttings	175	8.0 – 10.0	Bench Channel Edge
Sambucus nigra	Blue Elderberry	SANI	treepot	12	12.0 – 15.0	Upper Bank
Shrubs:						
Artemisia californica	California Sage	ARCA	1-gallon	30	5.0	Upper Bank
Artemisia douglasiana	Mugwort	ARDO	1-gallon	30	8.0	Mid Bank
Baccharis pilularis	Coyote Brush	BAPI	treepot	24	12.0	Mid Bank Upper Bank
Baccharis salicifolia	Mule Fat	BASA	treepot	12	8.0	Bench
Frangula californica	Coffeeberry	FRCA	treepot	24	10.0	Mid Bank Upper Bank
Rosa californica	Wild Rose	ROCA	1-gallon	24	5.0	Mid Bank
Rubus ursinus	California Blackberry	RUUR	deepot	120	5.0	Lower Bank
Salix exigua	Sandbar Willow	SAEX	short cuttings	20	8.0 – 10.0	Bench Channel Edge

Scientific Names	Common Names	Species Codes	Container Type or Cuttings*	Estimated Quantities	Approximate On-Center Spacing** (feet)	Planting Location
Perennial Herbs & Grasses:						
Baccharis douglasii	Marsh Baccharis	BADO	1-gallon	24	5.0	Lower Bank
Juncus effusus ssp.	Bog Rush*	JUEF	1-gallon	50	6.0	Channel Edge
Leymus triticoides	Creeping Wild Rye Grass	LETR	1-gallon	24	5.0	Mid Bank
Bolboschoenus fluviatilis	River Tule	BOFL	divisions	24	8.0	Bench
Schoenoplectus robustus	Prairie Bulrush	SCRO	divisions	24	8.0	Bench
Schoenoplectus californicus	California Tule	SCCA	divisions	30	8.0	Bench Channel Edge

* Container sizes: treepots @ 4" by 4" by 14" deep; deepots @ 2.5" by 2.5" by 10 " deep.

** Exact spacing and quantities will need to be field fit for each revegetation area, depending on existing vegetation and rate of natural recruitment. Distances are approximate guidelines.

California blackberry will be planted 3 per larger planting basin (3 ft. by 6 ft.). Same applies to creeping wild rye grass, and mugwort.

Notes:
Length of waterline at cut – 951 feet
Number of large trees removed – 3 cottonwood and 1 willow ; Number of large tree protection zones – 0

Table 5R. Planting List for Excavation Site 5R (4.84 acres)
Pajaro River Revegetation Areas

Scientific Names	Common Names	Species Codes	Container Type or Cuttings*	Estimated Quantities	Approximate On-Center Spacing** (feet)	Planting Location
Trees:						
Acer negundo	Box Elder	ACNE	treepot	60	12.0 – 15.0	Mid Bank
Populus trichocarpa	Black Cottonwood	POTR	short cuttings	100	10.0 – 12.0	Bench Channel Edge
Salix spp. (i.e. S. lasiolepis, S. laevigata and lasiandra)	Arroyo, Red , and Yellow Willow	SASp.	short cuttings	250	8.0 – 10.0	Bench Channel Edge
Shrubs:						
Artemisia californica	California Sage	ARCA	1-gallon	78	8.0	Upper Bank
Artemisia douglasiana	Mugwort	ARDO	1-gallon	27	8.0	Mid Bank
Baccharis pilularis	Coyote Brush	BAPI	treepot	60	12.0	Mid Bank Upper Bank
Frangula californica	Coffeeberry	FRCA	treepot	36	10.0 – 12.0	Mid Bank Upper Bank
Rosa californica	Wild Rose	ROCA	1-gallon	72	8.0	Mid Bank
Rubus ursinus	California Blackberry	RUUR	deepot	348	5.0	Lower Bank
Perennial Herbs & Grasses:						
Baccharis douglasii	Marsh Baccharis	BADO	1-gallon	39	5.0	Lower Bank
Bolboschoenus fluviatilis	River Tule	BOFL	divisions	30	8.0	Bench
Leymus triticoides	Creeping Wild Rye	LETR	1-gallon	36	5.0	Mid Bank
Schoenoplectus robustus	Prairie Bulrush	SCRO	divisions	30	8.0	Bench
Schoenoplectus californicus	California Tule	SCCA	divisions	60	8.0	Bench Channel Edge

* Container sizes: treepots @ 4” by 4” by 14” deep; deepots @ 2.5” by 2.5” by 10 “ deep.

** Exact spacing and quantities will need to be field fit for each revegetation area, depending on existing vegetation and rate of natural recruitment. Distances are approximate guidelines.

California blackberry will be planted 3 per larger planting basin (3 ft. by 6 ft.). Same applies to creeping wild rye grass, and mugwort.

Notes:
Length of waterline at cut – 2,831 feet
Number of large trees removed – 7 cottonwood and 3 willow; Number of large tree protection zones – 2

* Container sizes: treepots @ 4” by 4” by 14” deep; deepots @ 2.5” by 2.5” by 10 “ deep.

** Exact spacing and quantities will need to be field fit for each revegetation area, depending on existing vegetation and rate of natural recruitment. Distances are approximate guidelines.

California blackberry will be planted 3 per larger planting basin (3 ft. by 6 ft.). Same applies to creeping wild rye grass, and mugwort.

Notes:

Length of waterline at cut – 605 feet
Number of large trees removed – 7 cottonwood and 3 willow; Number of large tree protection zones – 2

Table 6R. Planting List for Excavation Site 6R (9.46 acres)
Pajaro River Revegetation Areas

Scientific Names	Common Names	Species Codes	Container Type or Cuttings*	Estimated Quantities	Approximate On-Center Spacing** (feet)	Planting Location
Trees:						
Acer negundo	Box Elder	ACNE	treepot	48	12.0 – 15.0	Mid Bank
Alnus rubra or *rhombifolia*	Red or White Alder	ALRU	treepot	24	12.0 – 15.0	Bench Lower Bank
Platanus racemosa	California Sycamore	PLRA	treepot	22	12.0 – 15.0	Lower Bank
Populus trichocarpa	Black Cottonwood	POTR	short cuttings	75	10.0 – 12.0	Bench Channel Edge
Salix spp. (i.e. S. lasiolepis, S. laevigata and lasiandra)	Arroyo, Red , and Yellow Willow	SASp.	short cuttings	475	8.0 – 10.0	Bench Channel Edge
Sambucus nigra	Blue Elderberry	SANI	treepot	30	12.0 – 15.0	Upper Bank
Shrubs:						
Artemisia californica	California Sage	ARCA	1-gallon	78	5.0	Upper Bank
Artemisia douglasiana	Mugwort	ARDO	1-gallon	87	8.0	Mid Bank
Baccharis pilularis	Coyote Brush	BAPI	treepot	72	12.0	Mid Bank Upper Bank
Baccharis salicifolia	Mule Fat	BASA	treepot	51	8.0	Bench
Cornus sericea	Creek Dogwood	COSE	treepot	24	10.0 – 12.0	Lower Bank
Frangula californica	Coffeeberry	FRCA	treepot	33	10.0	Mid Bank Upper Bank
Rosa californica	Wild Rose	ROCA	1-gallon	83	5.0	Mid Bank
Rubus ursinus	California Blackberry	RUUR	deepot	260	5.0	Lower Bank
Salix exigua	Sandbar Willow	SAEX	short cuttings	60	8.0 – 10.0	Bench Channel Edge

Scientific Names	Common Names	Species Codes	Container Type or Cuttings*	Estimated Quantities	Approximate On-Center Spacing** (feet)	Planting Location
Perennial Herbs & Grasses:						
Baccharis douglasii	Marsh Baccharis	BADO	1-gallon	57	5.0	Lower Bank
Juncus effusus ssp.	Bog Rush*	JUEF	1-gallon	100	6.0	Channel Edge
Leymus triticoides	Creeping Wild Rye Grass	LETR	1-gallon	75	5.0	Mid Bank
Oenothera elata ssp. *hookeri*	Hooker's Primrose	OEHO	1-gallon	72	4.0	Mid Bank
Schoenoplectus robustus	Prairie Bulrush	SCRO	divisions	50	8.0	Bench
Schoenoplectus californicus	California Tule	SCCA	divisions	100	8.0	Bench Channel Edge
Sparganium eurycarpum	Broad-fruited Burreed	SPEU	divisions	50	8.0	Bench Channel Edge

* Container sizes: treepots @ 4" by 4" by 14" deep; deepots @ 2.5" by 2.5" by 10 " deep.

** Exact spacing and quantities will need to be field fit for each revegetation area, depending on existing vegetation and rate of natural recruitment. Distances are approximate guidelines.

California blackberry will be planted 3 per larger planting basin (3 ft. by 6 ft.). Same applies to creeping wild rye grass, and mugwort.

Notes:
Length of waterline at cut – 4,502 feet
Number of large trees removed – 2 cottonwood and 1 box elder; Number of large tree protection zones – 0

Table 7R. Planting List for Excavation Site 7R (1.09 acres)
Pajaro River Revegetation Areas

Scientific Names	Common Names	Species Codes	Container Type or Cuttings*	Estimated Quantities	Approximate On-Center Spacing** (feet)	Planting Location
Trees:						
Acer negundo	Box Elder	ACNE	treepot	12	12.0 – 15.0	Mid Bank
Populus trichocarpa	Black Cottonwood	POTR	short cuttings	20	10.0 – 12.0	Bench Channel Edge
Quercus agrifolia	Coast Live Oak	QUAG	Treepot, acorn acorns	3	12.0 – 15.0	Upper Bank
Salix spp. (i.e. S. lasiolepis, S. laevigata and lasiandra)	Arroyo, Red , and Yellow Willow	SASp.	short cuttings	60	8.0 – 10.0	Bench Channel Edge
Sambucus nigra	Blue Elderberry	SANI	treepot	6	12.0 – 15.0	Upper Bank
Shrubs:						
Artemisia californica	California Sage	ARCA	1-gallon	18	5.0	Upper Bank
Artemisia douglasiana	Mugwort	ARDO	1-gallon	18		Mid Bank
Baccharis pilularis	Coyote Brush	BAPI	treepot	12	12.0	Mid Bank Upper Bank
Baccharis salicifolia	Mule Fat	BASA	treepot	6	8.0	Bench
Cornus sericea	Creek Dogwood	COSE	treepot	9	10.0 – 12.0	Lower Bank
Frangula californica	Coffeeberry	FRCA	treepot	15	10.0	Mid Bank Upper Bank
Rosa californica	Wild Rose	ROCA	1-gallon	18	5.0	Mid Bank
Rubus ursinus	California Blackberry	RUUR	deepot	96	5.0	Lower Bank
Salix exigua	Sandbar Willow	SAEX	short cuttings	15	8.0 – 10.0	Bench Channel Edge

Scientific Names	Common Names	Species Codes	Container Type or Cuttings*	Estimated Quantities	Approximate On-Center Spacing** (feet)	Planting Location
Perennial Herbs & Grasses:						
Cyperus eragrostis	Tall Cyperus	CYER	divisions	20	8.0	Bench Channel Edge
Juncus effusus ssp.	Bog Rush*	JUEF	1-gallon	20	6.0	Channel Edge
Leymus triticoides	Creeping Wild Rye Grass	LETR	1-gallon	12	5.0	Mid Bank
Oenothera elata ssp. *hookeri*	Hooker's Primrose	OEHO	1-gallon	20	4.0	Mid Bank
Bolboschoenus fluviatilis	River Tule	BOFL	divisions	12	8.0	Bench
Schoenoplectus robustus	Prairie Bulrush	SCRO	divisions	12	8.0	Bench
Schoenoplectus californicus	California Tule	SCCA	divisions	12	8.0	Bench Channel Edge
Sparganium eurycarpum	Broad-fruited Burreed	SPEU	divisions	12	8.0	Bench Channel Edge

* Container sizes: treepots @ 4" by 4" by 14" deep; deepots @ 2.5" by 2.5" by 10 " deep.

** Exact spacing and quantities will need to be field fit for each revegetation area, depending on existing vegetation and rate of natural recruitment. Distances are approximate guidelines.

California blackberry will be planted 3 per larger planting basin (3 ft. by 6 ft.). Same applies to creeping wild rye grass, and mugwort.

Notes:
Length of waterline at cut – 699 feet
Number of large trees removed – 0; Number of large tree protection zones – 0

Table 8R. Planting List for Excavation Site 8R (4.29 acres)
Pajaro River Revegetation Areas

Scientific Names	Common Names	Species Codes	Container Type or Cuttings*	Estimated Quantities	Approximate On-Center Spacing** (feet)	Planting Location
Trees:						
Acer negundo	Box Elder	ACNE	treepot	48	12.0 – 15.0	Mid Bank
Alnus rubra or *rhombifolia*	Red or White Alder	ALRU	treepot	12	12.0 – 15.0	Bench Lower Bank
Platanus racemosa	California Sycamore	PLRA	treepot	10	12.0 – 15.0	Lower Bank
Populus trichocarpa	Black Cottonwood	POTR	short cuttings	100	10.0 – 12.0	Bench Channel Edge
Quercus agrifolia	Coast Live Oak	QUAG	Treepot, acorn	21	12.0 – 15.0	Upper Bank
Salix spp. (i.e. S. lasiolepis, S. laevigata and lasiandra)	Arroyo, Red , and Yellow Willow	SASp.	short cuttings	250	8.0 – 10.0	Bench Channel Edge
Sambucus nigra	Blue Elderberry	SANI	treepot	21	12.0 – 15.0	Upper Bank
Shrubs:						
Artemisia californica	California Sage	ARCA	1-gallon	66	8.0	Upper Bank
Artemisia douglasiana	Mugwort	ARDO	1-gallon	54	8.0	Mid Bank
Baccharis pilularis	Coyote Brush	BAPI	treepot	42	12.0	Mid Bank Upper Bank
Baccharis salicifolia	Mule Fat	BASA	treepot	15	8.0	Bench
Cornus sericea	Creek Dogwood	COSE	treepot	15	10.0 – 12.0	Lower Bank
Frangula californica	Coffeeberry	FRCA	treepot	30	10.0	Mid Bank Upper Bank
Rosa californica	Wild Rose	ROCA	1-gallon	60	5.0	Mid Bank
Rubus ursinus	California Blackberry	RUUR	deepot	180	5.0	Lower Bank
Salix exigua	Sandbar Willow	SAEX	short cuttings	35	8.0 – 10.0	Bench Edge Channel Edge

Scientific Names	Common Names	Species Codes	Container Type or Cuttings*	Estimated Quantities	Approximate On-Center Spacing** (feet)	Planting Location
Perennial Herbs & Grasses:						
Baccharis douglasii	Marsh Baccharis	BADO	1-gallon	42	5.0	Lower Bank
Cyperus eragrostis	Tall Cyperus	CYER	divisions	20	8.0	Bench Channel Edge
Juncus effusus ssp.	Bog Rush*	JUEF	1-gallon	60	6.0	Channel Edge
Leymus triticoides	Creeping Wild Rye Grass	LETR	1-gallon	105	5.0	Mid Bank
Oenothera elata ssp. *hookeri*	Hooker's Primrose	OEHO	1-gallon	52	4.0	Mid Bank
Bolboschoenus fluviatilis	River Tule	BOFL	divisions	20	8.0	Bench
Schoenoplectus robustus	Prairie Bulrush	SCRO	divisions	20	8.0	Bench
Schoenoplectus californicus	California Tule	SCCA	divisions	20	8.0	Bench Channel Edge
Sparganium eurycarpum	Broad-fruited Burreed	SPEU	divisions	20	8.0	Bench Channel Edge

* Container sizes: treepots @ 4" by 4" by 14" deep; deepots @ 2.5" by 2.5" by 10 " deep.

** Exact spacing and quantities will need to be field fit for each revegetation area, depending on existing vegetation and rate of natural recruitment. Distances are approximate guidelines.

California blackberry will be planted 3 per larger planting basin (3 ft. by 6 ft.). Same applies to creeping wild rye grass, and mugwort.

Notes:
Length of waterline at cut – 2,706 feet
Number of large trees removed – 1 willow and 3 cottonwood; Number of large tree protection zones – 1