MITIGATED NEGATIVE DECLARATION
Marin County Environmental Review

Pursuant to Section 21000 et. seq. of the Public Resources Code and Marin County Environmental Impact Review Guidelines and Procedures, a Negative Declaration is hereby granted for the following project.

1. Project Name: West Marin Drainage Rehabilitation

2. Location: The Project area encompasses approximately 14 miles of roadway in West Marin County. The Proposed Project includes three distinct road segments: (1) Point Reyes – Petaluma Road between Highway 1 and Platform Bridge Road in Point Reyes Station; (2) Lucas Valley Road west from Milepost (MP) marker 5.29 at Big Rock to the intersection with Nicasio Valley Road in Nicasio; and (3) Nicasio Valley Road from the intersection with Sir Francis Drake Boulevard in San Geronimo Valley to the intersection with Lucas Valley Road.

3. Project Summary: The County is proposing to conduct maintenance activities to rehabilitate existing road pass-through culverts and repair eroded roadside embankments (slip-outs). The proposed project would address culvert deficiencies using a variety of maintenance treatment types specific for each location. Culvert maintenance treatment types may include: extending culvert outfall pipes to avoid flanking or undermining; grouting or lining culvert interiors; paving culvert inverts; replacing damaged sections or failed pipes in-kind; installing larger diameter pipes where culverts are undersized; repairing existing inlet drop structures placing rock riprap at culvert inlets and/or outlets; constructing concrete headwalls; and improving fish passage.

4. Project Sponsor: Marin County Department of Public Works, Engineering Division

5. Finding:

   Based on the attached Initial Study and without a public hearing, it is my judgment that:

   ☐ The project will not have a significant effect on the environment.

   ☒ The significant effects of the project noted in the Initial Study attached have been mitigated by modifications to the project so that the potential adverse effects are reduced to a point where no significant effects would occur.

Rachel Reid

Date: 8/16/2022

Rachel Reid
Environmental Planning Manager

Based on the attached Initial Study, a Mitigated Negative Declaration is granted.

_____ Date: _____

Public Works Director

1. Mitigation Measures:

   ☐ No potential adverse impacts were identified; and therefore, no mitigation measures are required.

   ☐ Please refer to mitigation measures in the attached Initial Study.

   ☒ The potential adverse impacts have been found to be mitigable as noted in the Initial Study attached.

   All of the mitigation measures have been incorporated into the project and are required as conditions of approval.

2. Preparation:

   This Mitigated Negative Declaration was prepared by Betsy Swenerton of the Marin County Department of Public Works. Copies may be reviewed at the address listed below.

   Marin County Department of Public Works
   3501 Civic Center Drive, Room 304
   San Rafael, CA 94903
   (415) 473-6680
   Monday-Friday, 8:00 a.m. to 5:00 p.m.

   An electronic version is also available for review on the County of Marin Environmental Planning website.

COUNTY OF MARIN

West Marin Drainage Rehabilitation Project

California Environmental Quality Act
Initial Study/Mitigated Negative Declaration

July 2022

For additional accessibility assistance with this document, please contact the Marin County Department of Public Works at (415) 473-6680, or through the California Relay Service by dialing 711. This document includes complex figures and tables that may be difficult to interpret using an assistive device such as a screen reader.

County of Marin

West Marin Drainage Rehabilitation Project

California Environmental Quality Act
Initial Study/Mitigated Negative Declaration

Prepared for: **Marin County Department of Public Works**
3501 Civic Center Drive, Room 304
San Rafael, CA 94903

Contact: Betsy Swenerton, Senior Planner

Prepared by: **Horizon Water and Environment, LLC**
266 Grand Avenue, Suite 210
Oakland, CA 94610

Contact: Brian Piontek, Project Manager

July 2022

Horizon Water and Environment. 2022. West Marin Drainage Rehabilitation Project – *Initial Study/Mitigated Negative Declaration.* July. (19.047) Oakland, CA.

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Acronyms and Abbreviations

A	
AB	Assembly Bill
ABAG	Association of Bay Area Governments
Alquist-Priolo Act	Alquist-Priolo Earthquake Fault Zoning Act
AMM	avoidance and minimization measure
amplitude	pressure level or energy content of a sound
B	
B.P.	before present
BAAQMD	Bay Area Air Quality Management District
Basin Plan	water quality control plan
Bay Area	San Francisco Bay Area
C	
CAA	Clean Air Act
CAL FIRE	California Department of Forestry and Fire Protection
Cal/OSHA	California Occupational Safety and Health Administration
CalRecycle	California Department of Resources Recycling and Recovery
Caltrans	California Department of Transportation
CAP	Marin County Unincorporated Area Climate Action Plan 2030
CAP	Clean Air Plan
CARB	California Air Resources Board
CCC	Central California Coast
CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife
CDOC	California Department of Conservation
CDP	census-designated place
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CGS	California giant salamander
CIPP	cured-in-place pipe

CRLF	California red-legged frog
CNDDB	California Natural Diversity Database
CNEL	Community noise equivalent level
CNPS	California Native Plant Society
CO	carbon monoxide
CO_2	Carbon dioxide
CO_2e	carbon dioxide equivalent
Coastal Act	California Coastal Act of 1976
County	Marin County
CRHR	California Register of Historical Resources
CRPR	California Rare Plant Rank
CUPA	Certified Unified Program Agency
CWA	Clean Water Act

D

dB	decibel
dBA	A-weighted decibel
dbh	diameter at breast height
DPM	diesel particulate matter
DPR	California Department of Parks and Recreation
DPS	distinct population segment
DPW	Department of Public Works
DTSC	California Department of Toxic Substances Control

E

EFH	Essential Fish Habitat
EFMA	Federal Emergency Management Agency
EIA	U.S. Energy Information Administration
EIR	environmental impact report
EO	Executive Order
EOC	Emergency Operations Center
EOP	Emergency Operations Plan
ESA	Endangered Species Act
ESCP	erosion and sediment control plan
ESU	evolutionarily significant unit

F

F&G	Fish and Game

Farmland	Prime Farmland, Unique Farmland, or Farmland of Statewide Importance including Farmlands of Local Importance and grazing lands
FESA	federal Endangered Species Act
FHSZ	High Fire Hazard Severity Zones
FHWA	Federal Highway Administration
FIGR	Federated Indians of Graton Rancheria
FLAME	Federal Land Assistance, Management, and Enhancement Act
FRA	Federal Responsibility Area (FRA
frequency	rate of oscillation of sound waves
FTA	Federal Transit Administration
FYLF	foothill yellow-legged frog

G

GHG	greenhouse gas

H

H:V	horizontal to vertical
HCP	Habitat Conservation Plan
HDPE	high-density polyethylene
Historic District	Olema Valley/Lagunitas Loop Ranches Historic District or Olema Valley Dairy Ranches Historic District
Hz	Hertz

I

ICBO	International Conference of Building Officials
in/sec	inches per second
IPaC	USFWS Information for Planning and Consultation
IS/MND	initial study/mitigated negative declaration

L

lb/day	pounds per day
LCP	Marin County Local Coastal Program
Ldn	energy average of the A-weighted sound levels occurring during a 24-hour period
Leq	equivalent steady-state sound level during given measurement period
Lmax	maximum sound level during given measurement period
Lmin	minimum sound level during given measurement period
LOS	level of service

LSAA	Lake and Streambed Alteration Agreement
LUP	Land Use Plan
Lxx	sound level exceeded during x percent of a given measurement period

M

MALT	Marin Agricultural Land Trust
MBTA	Migratory Bird Treaty Act
MCM LHMP	Marin County Multi-Jurisdiction Local Hazard Mitigation Plan
MLD	Most Likely Descendant
MMWD	Marin Municipal Water District
MP	milepost
mph	miles per hour
MT	metric tons
MT CO_2e	metric tons of carbon dioxide equivalents
$MTCO_2e/yr$	metric tons of carbon dioxide equivalents per year

N

NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission
NHPA	National Historic Preservation Act
NHTSA	National Highway Traffic Safety Administration
NMFS	National Marine Fisheries Service
NO_2	nitrogen dioxide
NOAA	National Oceanic and Atmospheric Administration
NOS	northern spotted owl
NO_X	oxides of nitrogen
NPDES	National Pollutant Discharge Elimination System
NPPA	Native Plant Protection Act
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWIC	Northwest Information Center

O

O_3	ozone
OA	Operational Area
OES	Office of Emergency Services
OHP	Office of Historic Preservation
OSHA	Occupational Safety and Health Administration

P

PG&E	Pacific Gas & Electric Company
PM	particulate matter
PM10	particulate matter of aerodynamic radius of 10 micrometers or less
PM2.5	particulate matter of aerodynamic radius of 2.5micrometers or less
Porter-Cologne Act	Porter-Cologne Water Quality Control Act
PPE	personal protective equipment
ppm	parts per million
PPV	peak particle velocity
Pub. Res. Code	Public Resources Code
Proposed Project or Project	West Marin Drainage Rehabilitation Project
PRSCP	Point Reyes Station Community Plan
PVC	polyvinyl chloride

R

Ranch	Black Mountain Ranch
RCP	reinforced concrete pipe
RCRA	Resource Conservation and Recovery Act
ROG	reactive organic gases
RPS	Renewables Portfolio Standard
RSP	rock slope protection
RWQCB	Regional Water Quality Control Board

S

SB	Senate Bill
sf	square feet
SFBAAB	San Francisco Bay Area Air Basin
slip-out	eroded roadside embankment
SMAQMD	Sacramento Metropolitan Air Quality Management District
SO_2	sulfur dioxide
SR	State Route
Superfund Act	Comprehensive Environmental Response, Compensation, and Liability Act
Sustainable Fisheries Act	Magnuson-Stevens Fishery Conservation and Management Act
SWPPP	stormwater pollution prevention plan

SWRCB	State Water Resources Control Board
T	
TAC	toxic air contaminant
TCP	traditional cultural property
TMDL	total maximum daily load
tpy	tons per year
TRC	Tribal Cultural Resources
U	
U.S. 101	U.S. Highway 101
UBC	Uniform Building Code
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
V	
VdB	vibration level measured with respect to root-mean-square vibration velocity in decibels
VMT	vehicle miles traveled
W	
WDR	waste discharge requirement
WPT	western pond turtle
WQO	water quality objective
WRCC	Western Regional Climate Center
Z	
Zero Waste Marin	Marin Hazardous and Solid Waste Management Joint Powers Authority
°F	degrees Fahrenheit
µg/m^3	micrograms per cubic meter

Chapter 1
INTRODUCTION

Marin County (County) Department of Public Works (DPW) has prepared this initial study/mitigated negative declaration (IS/MND) to provide the public, responsible agencies, and trustee agencies with information about the potential environmental effects of the proposed West Marin Drainage Rehabilitation Project (Proposed Project). This document was prepared pursuant to the requirements of the California Environmental Quality Act (CEQA) of 1970 (as amended), the CEQA Guidelines (14 California Code of Regulations [CCR] Section 15000 et seq.), and the Marin County Environmental Impact Review Guidelines (Marin County Community Development Agency 1994).

1.1 Intent and Scope of this Document

This IS/MND has been prepared in accordance with CEQA, under which the Proposed Project is evaluated at a project level (CEQA Guidelines Section 15378). DPW is the lead agency under CEQA and will consider the Proposed Project's environmental impacts when considering whether to approve the Proposed Project. This IS/MND is an informational document to be used in the planning and decision-making process for the Proposed Project and does not recommend approval or denial of the Proposed Project.

An abbreviated IS/MND was prepared for the Proposed Project. Certain resource topics were determined to result in minimal impacts based on the nature and scope of the Proposed Project; the analysis for these topics (indicated below with an asterisk) was abbreviated to include a simple discussion of the rationale for dismissing the potential for environmental impacts. Most of the resource topics describe the environmental setting, including existing conditions and regulatory setting, to help the reader understand the conditions that could be affected by the Proposed Project, and then address the environmental impacts. If appropriate, mitigation measures are identified to reduce the adverse effects of significant impacts. The following resource topics are included in this IS/MND (*Abbreviated IS/MND sections):

- Aesthetics
- Agricultural/Forestry Resources*
- Air Quality
- Biological Resources
- Cultural Resources
- Energy
- Geology, Soils, and Seismicity
- Greenhouse Gas Emissions
- Hazards and Hazardous Materials
- Hydrology and Water Quality

- Land Use and Planning*
- Mineral Resources*
- Noise
- Population and Housing*
- Public Services*
- Recreation*
- Transportation
- Tribal Cultural Resources
- Utilities and Service Systems
- Wildfire

The Proposed Project would incorporate by design avoidance and minimization measures (AMMs) to avoid or reduce potential impacts on the environment. Over the long term, the Proposed Project would benefit overall water quality in the project area.

1.2 Public Involvement Process

Public disclosure and dialogue are priorities under CEQA. CEQA Guidelines Section 15073 and Section 15105(b) require that the lead agency designate a period during the IS/MND process when the public and other agencies can provide comments on the potential impacts of the Proposed Project. Accordingly, the County is circulating this document for a 30-day public and agency review period.

The Draft IS/MND is available for review at the following locations:

- Marin County Department of Public Works Office (3501 Civic Center Drive, Room 304, San Rafael, California 94903)
- Marin County Community Development Agency Office (3501 Civic Center Drive, Room 308, San Rafael, California 94903)
- Point Reyes Station Library (11435 CA-1, Point Reyes Station, California 94956)

The Draft IS/MND will also be available for review on the County's website under the "Current Environmental Review Documents" Panel:

https://www.marincounty.org/depts/cd/divisions/environmental-review

All comments submitted in writing and/or by email should be received and postmarked before 5:00 p.m. on the date identified for closure of the public comment period in the Notice of Intent.

Comments on the Draft IS/MND should be submitted to the following contact:

Betsy Swenerton, Senior Project Manager
Marin County Department of Public Works, Room 304
3501 Civic Center Drive
San Rafael, CA 94903
Email: bswenerton@marincounty.org

1.3 Organization of this Document

This IS/MND contains the following components:

Chapter 1, *Introduction*, provides a brief description of the intent and scope of this IS/MND, the public involvement process under CEQA, and the organization of and terminology used in this IS/MND.

Chapter 2, *Project Description*, describes the Proposed Project, including its purpose and objectives, the project area, construction approach and activities, AMMs, and related permits and approvals.

Chapter 3, *Environmental Checklist*, presents the checklist used to assess the Proposed Project's potential environmental effects, which is based on the model provided in Appendix G of the CEQA Guidelines. This chapter also includes a brief environmental and regulatory setting description for most resource topic and identifies the Proposed Project's anticipated environmental impacts, as well as any mitigation measures that would be required to reduce significant impacts to a less-than-significant level.

Chapter 4, *Report Preparers,* provides a list of individuals with the County and Horizon Water and Environment who were involved in preparing the IS/MND.

Chapter 5, *References*, provides a bibliography of printed references, websites, and personal communications used in preparing this IS/MND.

Appendices

Appendix A, *Air Quality and Greenhouse Gas Emission Calculations*

Appendix B, *Biological Resources Appendix*

Appendix C, *Cultural Resources Assessment Report*

Appendix D, *Noise Calculations*

1.4 Impact Terminology and Use of Language in CEQA

This IS/MND uses the following terminology to describe the environmental effects of the Proposed Project:

- A finding of *no impact* is made when the analysis concludes that the Proposed Project would not affect the particular environmental resource or issue.
- An impact is considered *less than significant* if the analysis concludes that no substantial adverse change in the environment would result and that no mitigation is needed.

- An impact is considered *less than significant with mitigation* if the analysis concludes that no substantial adverse change in the environment would result with the inclusion of the mitigation measures described.
- An impact is considered *significant or potentially significant* if the analysis concludes that a substantial adverse effect on the environment could result.
- *Mitigation* refers to specific measures or activities that would be adopted by the lead agency to avoid, minimize, rectify, reduce, eliminate, or compensate for an otherwise significant impact.
- A *cumulative impact* refers to one that can result when a change in the environment would result from the incremental impacts of a project along with other related past, present, or reasonably foreseeable future projects. Significant cumulative impacts might result from impacts that are individually minor but collectively significant. The cumulative impact analysis in this IS/MND focuses on whether the Proposed Project's incremental contribution to significant cumulative impacts caused by the project in combination with past, present, or probable future projects is cumulatively considerable.
- Because the term "significant" has a specific usage in evaluating the impacts under CEQA, it is used to describe only the significance of impacts and is not used in other contexts within this document. Synonyms such as "substantial" are used when not discussing the significance of an environmental impact.

Chapter 2
PROJECT DESCRIPTION

2.1 Background and Need for the Proposed Project

The Engineering Division of the Marin County (County) Department of Public Works (DPW) is proposing the West Marin Drainage Rehabilitation Project (Proposed Project) to conduct maintenance activities to rehabilitate existing road pass-through culverts and repair eroded roadside embankments (slip-outs) along approximately 14 miles of roadway along Point Reyes – Petaluma Road, Lucas Valley Road, and Nicasio Valley Road. A culvert assessment report was prepared to proactively address declining infrastructure before it failed. Approximately 150 culverts along this 14-mile stretch of roadway were assessed.

The culvert assessment report identified 32 road culverts and 3 slip-outs requiring urgent improvement due to dilapidated conditions that could incur flooding risk, safety issues, and environmental impacts. Addressing these structural deficiencies would also eliminate sediment sources, aligning with the goals and numeric objectives established in the Lagunitas Creek Watershed Sediment Total Maximum Daily Load (TMDL) (San Francisco Bay Water Board 2019). Lagunitas Creek is the largest watershed within Marin County and provides habitat for federally listed species, including coho salmon, steelhead, and California freshwater shrimp. Increased sediment levels throughout the watershed have led to detrimental effects to these species and habitat. Reducing sediment load to Lagunitas Creek tributaries would help restore properly functioning habitat conditions within the watershed.

2.2 Project Purpose and Objectives

Project objectives are as follows:

- Maintain and repair culvert sites within Marin County to address dilapidated conditions and ensure facilities are performing their operational functions.
- Repair and stabilize eroded roadway embankments (slip-outs) and failing culverts in a timely manner to prevent larger-scale slope failures, avoid emergencies, and minimize sedimentation to downstream waterbodies.
- Provide flood protection to County roadways, properties, and residents through maintenance of culverts.

- Avoid and minimize potential impacts to the natural environment when conducting maintenance and rehabilitation activities by incorporating detailed appraisals of habitat, species, and resource conditions.
- Provide cost-effective service and value for citizen taxes and public funding.
- Align with goals and objectives of the Lagunitas Creek TMDL by eliminating sediment sources and preventing catastrophic failure.

2.3 Project Location and Setting

The Project area encompasses approximately 14 miles of roadway in West Marin County. The Proposed Project includes three distinct road segments: (1) Point Reyes – Petaluma Road between Highway 1 and Platform Bridge Road in Point Reyes Station; (2) Lucas Valley Road west from Milepost (MP) marker 5.29 at Big Rock to the intersection with Nicasio Valley Road in Nicasio; and (3) Nicasio Valley Road from the intersection with Sir Francis Drake Boulevard in San Geronimo Valley to the intersection with Lucas Valley Road. The Project area generally includes roadways, culverts, roadside ditches, and roadway embankments. Upstream and downstream segments of the streams are typically located in less developed, more natural watershed systems. Adjacent land uses include rural residential, rangeland, and open space. **Figure 2-1** shows the Proposed Project area and immediate surroundings.

Numerous special-status species may occur in or near the Project area based on site surveys, habitat assessments, and desktop database searches. Seventeen (17) special-status plant species have the potential to occur at Project sites as suitable habitat is present and the sites fall within known species ranges and/or there are recorded database occurrences nearby.

Three (3) special-status fish species have the potential to occur at the Project sites downstream of the Nicasio Reservoir and include Tomales roach (*Lavinia symmetricus ssp.2*), Central California Coast Evolutionary Significant Unit (ESU) coho salmon (*Oncorhynchus kisutch*), and steelhead trout Central California Coast Distinct Population Segment (DPS) (*Oncoryhnchus mykiss*) Coho salmon and steelhead were observed in western Marin County during field surveys conducted in fall 2020 and winter 2021.

Four (4) special-status species of amphibians may be present at Proposed Project sites and include the following: California giant salamander (*Dicamptodon ensatus*) (observed during the field surveys), foothill yellow-legged frog (*Rana boylii*), and California red-legged frog (*Rana draytonii*).). Special-status reptiles with the potential to occur at the Project sites include western pond turtle (*Actinemys marmorata*), which has been recorded in Nicasio Creek upstream of Nicasio Reservoir.

Five (5) special-status bird species may nest in the vicinity of the Project sites and include Northern spotted owls (*Strix occidentalis*), golden eagle (*Aquila chrysaetos*),

white-tailed kite (*Elanus leucurus*), yellow warbler (*Setophaga petechia*), and the olive-sided flycatcher (*Contopus cooperi*). Five (5) special-status mammal species may also occur in the Project vicinity, including pallid bat (*Antrozous pallidus*), Townsend's big-eared bat (*Corynorhinus townsendii*), western red bat (*Lasiurus blossevillii*), San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*), and American badger (*Taxidea taxus*).

Potential impacts on these species are discussed in Section 3.4, "Biological Resources."

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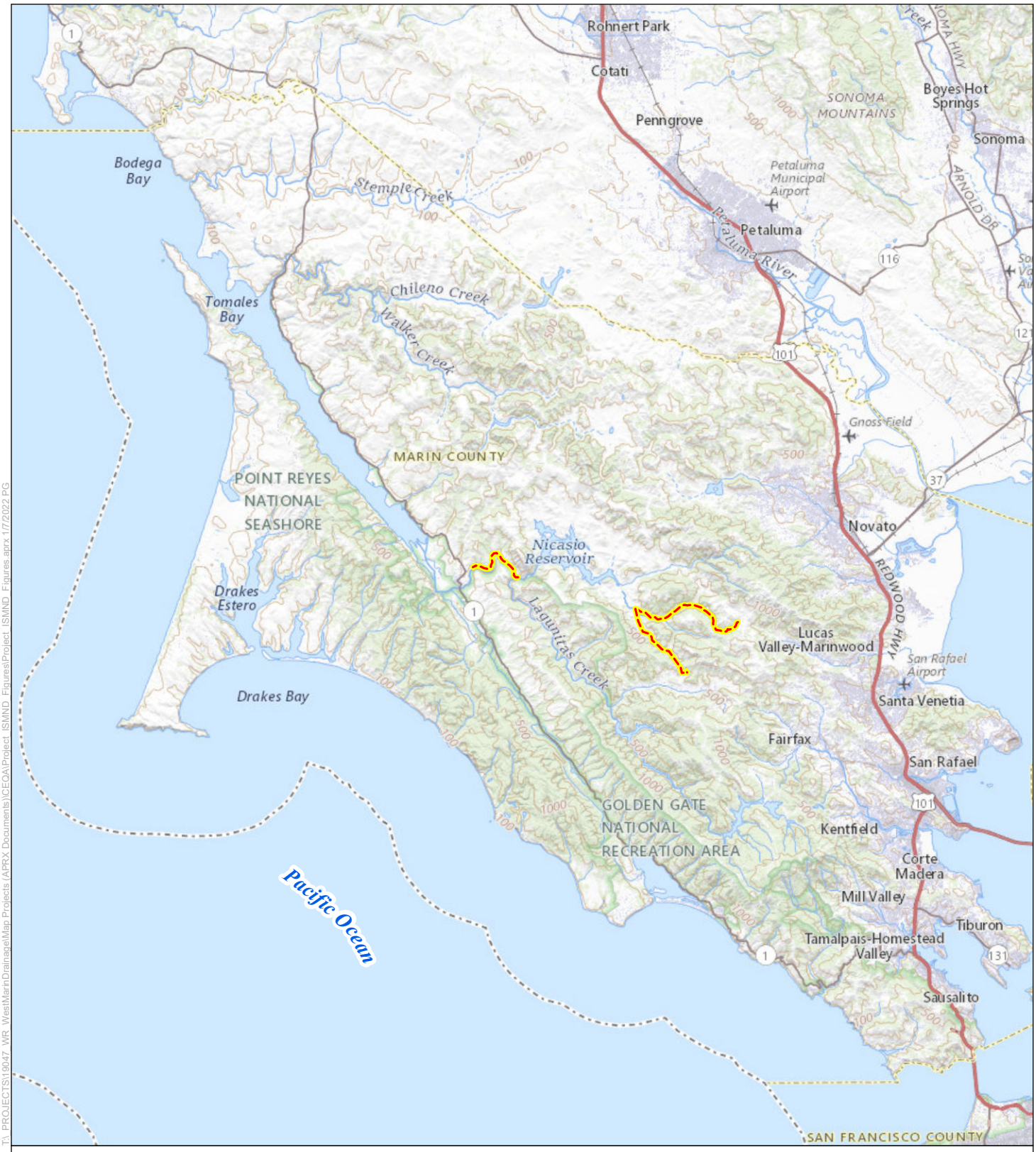

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Figure 1
Project Vicinity

Project Area Road Segments

N

0 5
Miles

Horizon WATER and ENVIRONMENT

West Marin Drainage
Rehabilitation Project
Initial Study/Mitigated Declaration

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Point Reyes Petaluma MP13.67
Point Reyes Petaluma MP13.29
Point Reyes Petaluma MP13.25
Point Reyes Petaluma MP12.33
Point Reyes Petaluma MP11.88
Point Reyes Petaluma MP11.85
Point Reyes Petaluma MP11.76
Point Reyes Petaluma MP11.71
Point Reyes Petaluma MP11.56
Point Reyes Petaluma MP11.47
Point Reyes Petaluma MP11.17

Shoreline Hwy
Tomasini Canyon Rd
Overlook Rd
Winn Ln
McDonald Ln
Cypress Rd
Lois Ln
Lindadale Ln
Coyote Ln
Camino Alto
Pt Reyes Petaluma Rd
Water Tank Rd
Mesa Rd
Knob Hill Rd
Viento Way
Manana Way
A St
6th St
5th St
4th St
3rd St
Mesa Rd
C St
B St
Commodore Webster Dr
Sir Francis Drake Blvd
Kyleswood Pl
Laurel St
Vallejo Ave
Inverness
Pt. Reyes Station
Balboa Ave
Portola Ave
Drakes Summit Rd
Blackberry Way
Silver Hills Rd
Noren Way
Fox Dr
Bear Valley Rd
Limantour Rd
Olema Creek
NICASIO RESERVOIR
Nicasio Valley Rd
Dam Rd
Laurel Canyon Rd
Nicasio Creek
Nicasio
Road to Ranches
Lagunitas Creek
Platform Bridge Rd
Taylor Park Rd

Sources: Esri, USGS, NOAA, Maxar Marin County Open GIS Data, 2021.

N

0 0.25 0.5 1
Miles

Treatment Type
- Culvert Replacement
- Riprap improvements
- Slip Out location

Road Class
- Arterial
- Collector
- Local
- NotCountyMaintained

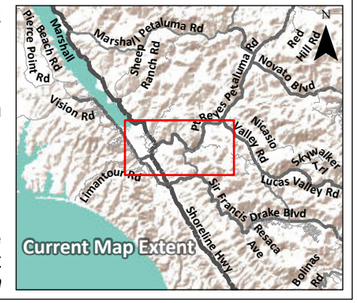
- Community
- Stream/River: Perennial
- Waterbody

Horizon WATER and ENVIRONMENT

Data Source: ESRI 2018; Wood Rogers 2020

Figure 2-2
Project Location

Pt Reyes Station Area



West Marin Drainage Rehabilitation Project
Initial Study/Mitigated Declaration

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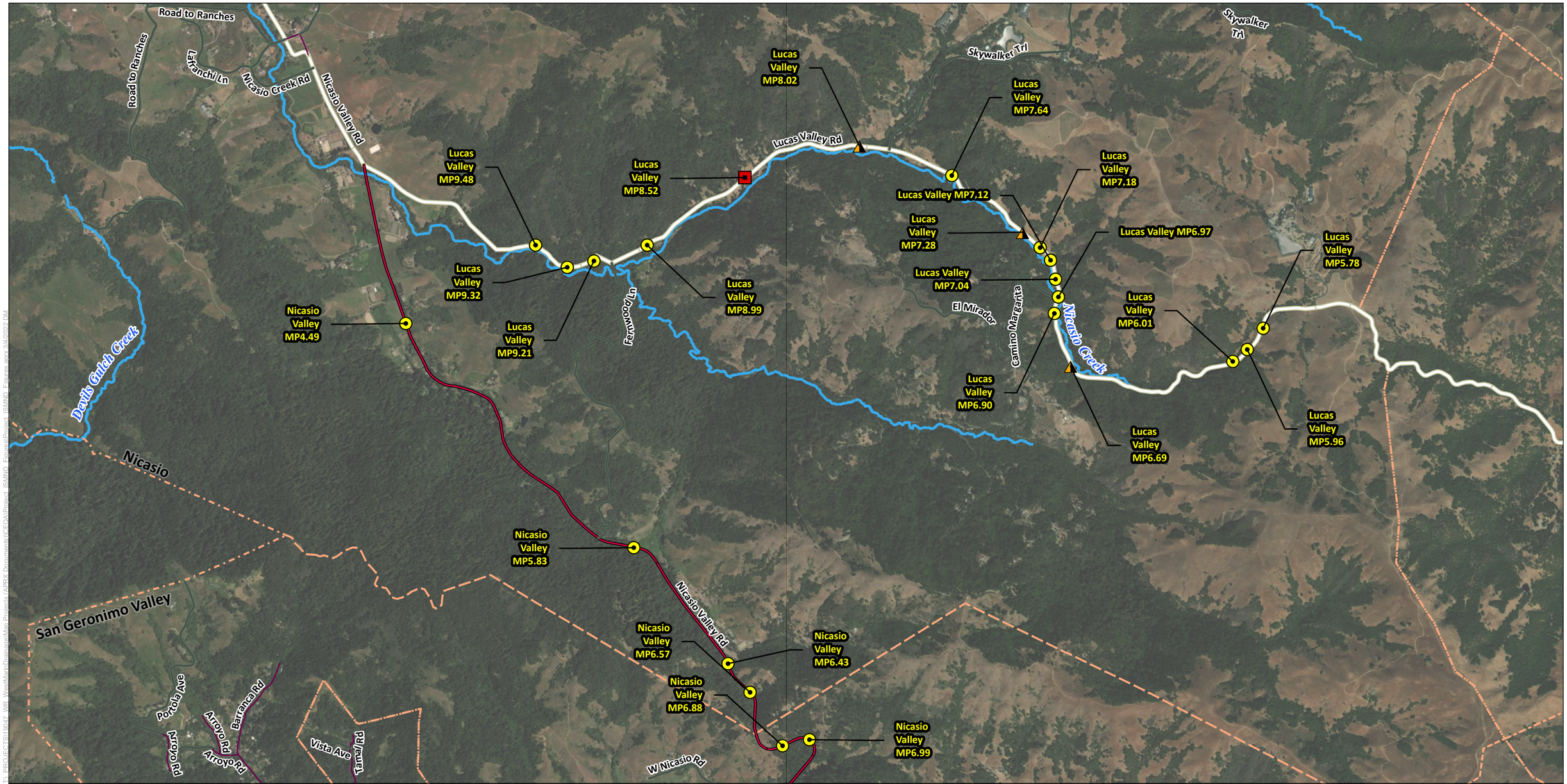


Sources: Esri, USGS, NOAA, Maxar Marin County Open GIS Data, 2021.

N

0 0.25 0.5 1
Miles

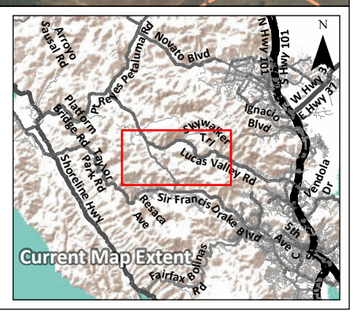
Treatment Type
- Culvert Replacement
- Riprap improvements
- Slip Out location

Road Class
- Arterial
- Collector
- Local
- NotCountyMaintained

- Community
- Stream/River: Perennial

Figure 2-2
Project Location

Nicasio Valley and Lucas Valley Roads Area



West Marin Drainage Rehabilitation Project
Initial Study/Mitigated Declaration

Horizon WATER and ENVIRONMENT

Data Source: ESRI 2018; Wood Rogers 2020

2.4 Project Components

2.4.1 Treatment Types

The Proposed Project would address culvert deficiencies using a variety of maintenance treatment types specific for each location. Culvert maintenance treatment types may include: extending culvert outfall pipes to avoid flanking or undermining; grouting or lining culvert interiors; paving culvert inverts; replacing damaged sections or failed pipes in-kind; installing larger diameter pipes where culverts are undersized; repairing existing inlet drop structures placing rock riprap at culvert inlets and/or outlets; constructing concrete headwalls; and improving fish passage. The Proposed Project would not install culverts in new locations. Proposed Project activities would be confined to the road prism and County right-of-way, to the extent feasible to complete the maintenance activity.

A summary of treatment types according to the culvert deficiencies and corresponding improvement design criteria is provided in **Table 2-1**, followed by a full description of each. Final treatment type(s) would be selected based on channel hydrology and hydraulics, channel, bank, and culvert conditions, and site-specific constraints (e.g., physical topography, substrate material, County right-of-way dimensions, biological resources).

Table 2-1. Improvement Criteria

Deficiencies	Improvement Type	Design Criteria
Culvert Joint Separation	Joint Restraint or Grout	Grout fill reinforced concrete pipe (RCP) separations. Restrain joints via pipe lining according to abrasion level.
Culvert Invert Corrosion or Abrasion	Pipe Lining, Invert Paving,	If pipe is less than or equal to 60-inch diameter, then line pipe according to abrasion level. If pipe is greater than 60-inch diameter, then pave invert.
Localized Culvert Damage	Replacement of Damaged Sections	Replace sections with in-kind pipe material. Line entire pipe according to abrasion level.
Conveyance Capacity for Small Pipe	Culvert Replacement	Size for design storm and design water spread. Minimum 18-inch diameter pipe.
Shallow Culvert Inlet	Headwall	Provide at least one pipe diameter of surcharge above the inlet crown.
Upstream or Downstream Channel	Riprap	Size riprap to resist movement from design flow

Deficiencies	Improvement Type	Design Criteria
Degradation		in channel. Where downstream headcut could threaten culvert, construct grade control to halt migration.
Embankment Erosion	Riprap or Headwall or Bioengineering	Stabilize extent of erosion on embankment to avoid flanking or undermining. If riprap is used, then size to resist movement from design flow.
Outlet Scour	Riprap, Headwall, or Pipe Extension	Stabilize extent of erosion on embankment to avoid flanking or undermining. If riprap is used, then configure to dissipate energy and resist movement from design flow. If pipe extension is used, then extend beyond toe of eroded embankment.
In-Stream Wildlife Barrier	Passage of salmonid fish or other species	Design for salmonid migration at applicable locations. Design for non-fish species migration at applicable locations.

Pipe Extension

Pipe extensions would be added to concrete or metal pipes by placing one or more additional segments at the end of the culvert and sealing the connection with a joint restraint or grouting. Extending the length of a culvert would be done in a manner to reduce outlet scour and improve the stability of the embankment and downstream channel.

Joint Grout

If a joint is allowing fine particle migration, the joint would be re-sealed. Internal grouting, flexible rubber internal joint seals, slip-lining, or lining with cured-in-place pipe (CIPP) would be installed to prevent infiltration. Internal grouting would be specifically designed to stop infiltration at deteriorated, continuously leaking, or open joints. For in pipes large enough for human entry, pressure grouting would be accomplished using manually placed inflatable pipe grout sealing rings or predrilled injection holes and a hand-held probe. Grout will be prevented from leaking outside of the work area and joints will be routinely monitored to ensure grouting is not piping beneath the culvert.

Pipe Lining

Pipe lining is a process used to repair culverts with inverts damaged from corrosion and/or abrasion where site access may be limited or slope constraints are present. There are several methods of pipe lining, such as CIPP lining, slip-lining, fold-and-form lining, and cement mortar lining. CIPP lining may be the simplest and most common

method and may be used on a wide variety of pipe sizes as well as larger culverts. No grouting is required and CIPP lining does not require water quality treatment of water discharge when cured steam is used. In general, pipe lining can serve as a joint seal for culverts with multiple joints with separation and act as a restraint for future separation.

Invert Paving

Invert paving is a repair method used for culverts with inverts damaged from corrosion and/or abrasion. Inverts are commonly paved at sites with high inlet velocities and where large rocks are found to enter the pipe. The process requires first placing a mesh-and-steel structure at the invert of the pipe to provide structural support and then covering this structure with cement. The damaged section of pipe is then removed and replaced with cast-in-place concrete to improve the structural strength of the culvert. This process is more efficient than coating the entire culvert when only the invert has failed. For larger pipes (72 inches in diameter and greater) that have been previously paved and where the paving has failed, the invert paving would be repaired rather than removed and replaced as it is still providing structural support. This treatment method requires a large construction area; in cases where site access is limited, CIPP lining may be the most efficient rehabilitation method (discussed in more detail above).

Joint Restraint

Joint restraining is a method used to repair offset/ separated pipe joints, caused by unbalanced thrust forces in the culvert or embankment slope. The restraint strengthens the pipe connection by stabilizing the segments of the culvert on either end of the restrained joint to prevent further separation of the joints. Retrofitted joint restraints consist of tie rods installed to the interior of the pipe or concrete collar. Joint separation or misalignment can be a result of poor supporting soil or leaking joints.

Drop Structure

A drop structure typically occurs at the inlet or upstream end of a culvert to prevent debris from settling in the culvert and helps to improve culvert conveyance capacity. A drop structure is a junction box with the bottom lower than the connecting culvert to reduce incoming flow velocity and provide storage for debris settlement. Debris accumulates at the bottom of the drop structure instead of settling within the culvert. The Project involves repairing existing inlet drop structures but would not involve the installation of new drop structures.

Headwall

A headwall is a structure (composed of material such as concrete or masonry) installed at the inlet or outlet of a culvert. A headwall serves various purposes; it prevents erosion by providing a hard artificial platform within a high-velocity area; prevents roadway embankment seepage along a culvert by creating a barrier; prevents slope

instability by providing a stable barrier to retain embankment fill; and prevents buoyancy failure by anchoring the culvert.

Headwalls would be installed at sites where riprap protection is not feasible or the required area of riprap protection would be too extensive. Precast headwall structures would be installed over cast-in-place structures whenever possible.

Pipe Replacement

Damaged pipe sections or failed pipes replacement of the damaged or failed pipe. Culvert sizing determinations are based on historical flood records, hydraulic model results, and hydrological conditions. Culverts would be replaced in-kind where the existing pipe diameter adequately conveys stormflows. Larger diameter pipes would be installed where culverts are undersized.

Pipe material would be selected by considering specific physical and hydrological conditions, site constraints, and fire risk. Plastic pipe and pipe with coatings are most susceptible to fire damage. Therefore, RCP culverts would be used where practical. However, some sections of the roadways have been built into the side of hills and may be prone to settlement, and several RCP culverts were observed to have joint separation due to embankment settlement. Because of the potential for RCP pipe joint separation at these locations, failed culverts would be replaced using corrugated polyvinyl chloride (PVC) pipes. Studies have shown that PVC will self-extinguish if the source of fire is eliminated. High-density polyethylene (HDPE) and corrugated metal pipe (CMP) may also be used at select locations. Recommended standard pipe materials and wall thickness for culvert replacement are based on California Department of Transportation (Caltrans) highway design standards and material suitability requirements.

Riprap

Riprap is composed of large, angular and loose rock that may be planted. Geotextile fabric may also be installed outside of the active channel under this treatment type in particularly steep areas. Riprap would be installed along the sides of a degraded channel or roadway embankment as a means of slope protection by providing a stable lining to resist erosion resulting from high-velocity flood water and debris flowing through the channel. Riprap would also be placed at the inlet or outlet of a culvert to reduce the stormwater velocity and the quantity of sediment entering the pipe or the downstream channel, thereby minimizing outlet scour and channel head cuts.

Based on the Federal Highway Administration's (FHWA's) *Bridge Scour and Stream Instability Countermeasures – Experience, Selection, and Design Guidance* (2009), a maximum 1.5 horizontal to 1 vertical side slope (1.5H: 1V) would be provided in riprap slope protection design. For sites where proposed riprap grading is not able to daylight to the natural ground with the maximum side slope, a headwall would be installed.

In-Stream Wildlife Barrier

Fish Passage

Improvements for fish passage are proposed for the culvert on Point Reyes – Petaluma Road MP 12.33 on Black Mountain Creek, a tributary to Lagunitas Creek. The site will be designed to include embedment of the culvert invert, repair/lining of the culvert interior, and preserve existing pools near the culvert inlet and outfall. Channels upstream of the Nicasio Reservoir that flow under Lucas Valley and Nicasio Roads into Nicasio Creek would not benefit from fish passage design because the dam itself creates a barrier to migrating salmonids.

Other Wildlife Passage

Design features to allow passage for terrestrial species would be utilized at Lucas Valley Road MP 8.02 and would be designed in accordance with FHWA's *Wildlife Crossing Structures Handbook* (2011). Design criteria for this crossing would include:

- maintaining a natural substrate (i.e., gravel/sediment overlaying the culvert bottom) (if possible);
- ensuring that the bottom surface of the culvert is flush with the grade and that there are no drop-offs or plunge pools (if possible);
- ensuring that there is no constriction of the channel;
- providing a wide enough design that allows for dry ground or an interior ledge that terrestrial animals can pass through during low flow; and
- ensuring the culvert conveys the 100-year flow (if feasible).

2.4.2 Project Construction

Under the Proposed Project, thirty-two (32) culverts would be repaired and/or replaced. **Table 2-2** describes the treatment types currently proposed for each site.

In addition to roadway culvert maintenance, slope stabilization measures are needed to repair erosional areas and bank failures that threaten County roads. These bank failures or slip-outs frequently occur along stream channels where the channel encroaches on the roadway embankment (e.g., bend scour), and they can threaten the structural integrity of the road and the safety of its users (i.e., cars and bicyclists). The Proposed Project would stabilize a total of three (3) slip-out locations where severe bank erosion is threatening road integrity (refer to Table 2-2). Slip-out repairs would include a combination of rock riprap and engineered fill, rock riprap backfilled with soil and seeded with native plant species, and rock riprap planted with willow stakes.

Table 2-2. Project Sites, Proposed Treatments, and Work Windows

Road	Milepost	Upstream / Downstream Pipe Diameter (in)	Treatment Type	Drainage Type	Within Potential USACE Jurisdiction	Species Avoidance	Anticipated Work Window
Lucas Valley	5.78	15 / –	Inlet pipe extension, junction box, and riprap improvements	Ephemeral Drainage	No	Rare plants (serpentine)	June 1 – October 31
Lucas Valley	5.96	15 / –	Outlet pipe extension replacement and riprap improvements	Ephemeral Drainage	No	NSO	August 1 – October 31
Lucas Valley	6.01	24 / 30	Pipe lining and outlet riprap improvements	Intermittent Drainage	Yes	NSO	August 1 – October 31
Lucas Valley	6.69	18 / –	Slip Out location	Main Channel	Yes	FYLF, CGS, NSO	August 1 – October 31
Lucas Valley	6.9	24 / –	Inlet headwall and riprap improvements	Intermittent Drainage	Yes	FYLF, NSO	August 1 – October 31
Lucas Valley	6.97	36 / 72	Upstream RCP segment only: grout pipe void space, and pipe lining	Main Channel	Yes	FYLF, CGS, NSO	August 1 – October 31
Lucas Valley	7.12	30 / 42	Outlet riprap improvements	Tributary	Yes	FYLF, CGS, NSO	August 1 – October 31

Road	Milepost	Upstream / Downstream Pipe Diameter (in)	Treatment Type	Drainage Type	Within Potential USACE Jurisdiction	Species Avoidance	Anticipated Work Window
Lucas Valley	7.18	15 / –	Outlet riprap improvements	Intermittent Drainage	No	NSO	August 1 – October 31
Lucas Valley	7.28	18 / –	Slip Out location	Main Channel	Yes	NSO	August 1 – October 31
Lucas Valley	7.64	24 / –	Inlet riprap improvements	Intermittent Drainage	Yes	NSO	August 1 – October 31
Lucas Valley	8.02	144 / –	Slip Out location	Main Channel	Yes	FYLF, CGS, NSO	August 1 – October 31
Lucas Valley	8.52	30 / –	New junction box near private property fence, replace 30” diameter pipe under roadway	Intermittent Drainage	No	NSO	August 1 – October 31
Lucas Valley	8.99	21 / 30	Pipe lining and riprap improvements	Intermittent Drainage	Yes	NSO	August 1 – October 31
Lucas Valley	7.04	24 / 24	Upstream RCP segment only: grout pipe void space, and pipe lining	Intermittent Drainage	Yes	CGS, FYLF, NSO	August 1 – October 31

Road	Milepost	Upstream / Downstream Pipe Diameter (in)	Treatment Type	Drainage Type	Within Potential USACE Jurisdiction	Species Avoidance	Anticipated Work Window
Lucas Valley	7.28	18 / –	Repair damaged section of culvert, remove CMP pipe cantilevered end segment and outlet riprap improvements	Ephemeral Drainage	No	NSO	August 1 – October 31
Lucas Valley	9.21	30 / –	Pipe lining, outlet structure concrete repair, outlet riprap improvements	Tributary	Yes	NSO	August 1 – October 31
Lucas Valley	9.32	18 / –	Replace inlet headwall, new junction box near private fence, inlet embankment stabilization, and pipe lining	Intermittent Drainage	Yes	NSO	August 1 – October 31
Lucas Valley	9.48	18 / 24	Replace CMP pipe downstream segment, pipe lining, and outlet riprap improvements	Ephemeral Drainage	No	NSO	August 1 – October 31

Road	Milepost	Upstream / Downstream Pipe Diameter (in)	Treatment Type	Drainage Type	Within Potential USACE Jurisdiction	Species Avoidance	Anticipated Work Window
Nicasio Valley	4.49	21 / –	Outlet pipe end replacement and riprap improvements	Ephemeral Drainage	No	–	June 1 – October 31
Nicasio Valley	5.83	24 / 30	Replace CMP pipe downstream segment, grout RCP pipe joint void space, pipe lining, inlet riprap improvements, outlet riprap improvements	Intermittent Drainage	Yes	NSO	August 1 – October 31
Nicasio Valley	6.43	48 / –	Grout pipe void space, pipe lining, and outlet riprap improvements	Main Channel	Yes	woodrat, NSO	August 1 – October 31
Nicasio Valley	6.57	36 / –	Remove CMP pipe cantilevered end segment, grout RCP pipe joint void space, pipe lining, and outlet riprap improvements	Ephemeral Drainage	No	NSO	August 1 – October 31

Road	Milepost	Upstream / Downstream Pipe Diameter (in)	Treatment Type	Drainage Type	Within Potential USACE Jurisdiction	Species Avoidance	Anticipated Work Window
Nicasio Valley	6.88	30 / 36	Remove CMP pipe cantilevered end segment, lining improvements, inlet riprap improvements, outlet riprap improvements	Ephemeral Drainage	No	NSO	August 1 – October 31
Nicasio Valley	6.99	48 / –	Regrade roadway embankment to stable slope, extend lower24” diameter pipes, rip rap embankment stabilization, and outlet rip rap	Tributary	Yes	NSO	August 1 – October 31
Point Reyes – Petaluma Road	11.17	18 / 21	Inlet headwall, outlet pipe end removal and riprap improvements	Intermittent Drainage	No	–	June 1 – October 31
Point Reyes – Petaluma Road	11.71	18 / –	Outlet riprap improvements	Ephemeral Drainage	No	woodrat	June 1 – October 31

Road	Milepost	Upstream / Downstream Pipe Diameter (in)	Treatment Type	Drainage Type	Within Potential USACE Jurisdiction	Species Avoidance	Anticipated Work Window
Point Reyes – Petaluma Road	11.85	12 / –	Culvert Replacement, inlet headwall and riprap improvements	Intermittent Drainage	No	–	June 1 – October 31
Point Reyes – Petaluma Road	11.88	12 / –	Culvert Replacement, inlet headwall and riprap improvements	Intermittent Drainage	No	–	June 1 – October 31
Point Reyes – Petaluma Road	13.25	18 / –	Outlet riprap improvements	Ephemeral Drainage	No	woodrat	June 1 – October 31
Point Reyes – Petaluma Road	13.29	18 / –	Outlet riprap improvements	Intermittent Drainage	Yes	–	June 15 – October 31
Point Reyes – Petaluma Road	13.67	12 / –	Culvert Replacement, Inlet headwall and riprap improvements	Isolated Drainage	No	–	June 1 – October 31

Road	Milepost	Upstream / Downstream Pipe Diameter (in)	Treatment Type	Drainage Type	Within Potential USACE Jurisdiction	Species Avoidance	Anticipated Work Window
Point Reyes – Petaluma Road	11.47	36 / 36	Replace inlet junction box with new headwall structure, replace CMP pipe downstream segment, grout RCP pipe joint void space, pipe lining, and outlet riprap improvements	Tributary	Yes	CGS, FYLF	June 15 – October 31
Point Reyes – Petaluma Road	11.56	36 / 48	Replace inlet junction box with new headwall structure, replace CMP pipe downstream segment, grout RCP pipe joint void space, pipe lining, inlet riprap improvements, and outlet riprap improvements	Intermittent Drainage	Yes	CGS, FYLF	June 15 – October 31

Road	Milepost	Upstream / Downstream Pipe Diameter (in)	Treatment Type	Drainage Type	Within Potential USACE Jurisdiction	Species Avoidance	Anticipated Work Window
Point Reyes – Petaluma Road	11.76	36 / 48	Replace inlet junction box with new headwall structure, replace CMP pipe downstream segment, grout RCP pipe joint void space, pipe lining, and outlet riprap improvements	Tributary	Yes	–	June 15 – October 31
Point Reyes – Petaluma Road	12.33	84 / –	Fish passage improvements include embedding invert, repairing/lining the culvert interior, and preserving existing pools	Tributary	Yes	CGS, frogs, Fish	June 15 – October 31

Notes: in = inches; NOS= northern spotted owl; FYLF= foothill yellow-legged frog; CGS= California giant salamander; USACE = U.S. Army Corps of Engineers

Construction Equipment and Work Crew

Construction equipment will depend on the type of treatment method and individual project site. The following presents a list of equipment types that would likely be used during Project construction:

- Boom truck/cherry picker
- Baker tanks
- Concrete truck and boom pump
- Concrete saw
- Dump trucks
- Drill
- Excavator (small and medium)
- Flatbed trucks
- Generators and air compressors
- Grader
- Jackhammer
- Loader
- Pickup trucks (small and large)
- Pump
- Roller/Compactor
- Paver

The typical work crew would be between 4 and 10 personnel.

Construction Staging and Access

Construction staging and stockpile areas would be limited to areas within the County's right-of-way, including road shoulders, pull-outs, and closed lanes designated as construction areas. Vegetation within the staging and stockpiling areas would be trimmed and removed as needed and the limits of the work area would be clearly defined for the contractor.

Access to the work sites would be provided via Point Reyes – Petaluma Road, Lucas Valley Road, and Nicasio Valley Road. Project construction activities could result in short-term, temporary lane closures on these roadways.

Channel Dewatering

Culvert maintenance and slip-out repair activities would be conducted during the dry season when drainage ditches and tributaries are dry or channels exhibit minimal to intermittent flow. However, if maintenance is necessary where water is present, dewatering activities such as pumping of pools, the use of cofferdams, or a clean water bypass may be necessary. If cofferdams are used, they would be installed upstream and downstream of the work site and would divert all flow around the work site through a pipe. If a pump is necessary, the pump would operate at the rate of flow that passed through the site naturally. Pipes and pumps would be screened according to National Marine Fisheries Service (NMFS) and California Department of Fish and Wildlife (CDFW) specifications. All temporary dewatering materials would be removed from the

maintenance site upon completion and normal flows would be restored immediately upon completion of work at that location.

2.4.3 Operation and Maintenance

Once constructed, the Proposed Project would not involve any operation-related activities, facilities, or equipment. Maintenance would be consistent with existing practices, consisting of vegetation management, trash and debris removal, and culvert clearing. Maintenance activities would be conducted only when determined to be necessary.

2.4.4 Timing and Implementation

The Proposed Project would be implemented as part of the County's roadway pavement program. The Proposed Project would be constructed in 2023. Prior to the start of work, the relevant regulatory agencies would be notified of planned maintenance activities for the upcoming season in accordance with permit conditions. The County would generally conduct the planned Project activities between June 1 and October 31 or as authorized by regulatory permits and conditions. Project activities would occur on weekdays between the hours of 8:00 a.m. and 5:00 p.m. No nighttime construction activities would occur as part of the Proposed Project.

2.5 Summary of Anticipated Project Impacts

Construction of the Proposed Project would result in both temporary and permanent impacts. Vegetation clearing around culvert inlets/outlets, repositioning existing rock slope protection (RSP), repairing existing inlet paving, excavating the road and shoulder during in-kind culvert replacement, and temporary road/lane closures would result in temporary impacts. Permanent impacts would result from the placement of new rock riprap and concrete associated with headwalls. Out of the approximate construction footprint of 0.92 acre (40,075 square foot [sf]) for all 35 sites, the Proposed Project would result in approximately 0.099 acre (4,310 sf) of permanent impacts associated with the installation of new rock riprap and approximately 0.012 acre (525 sf) of permanent impacts associated with the installation of new concrete for a total of 0.111 acre (4,835 sf) of permanent impacts. However, the permanent impact values given above are a conservative estimate. The actual area of permanent impacts is anticipated to be smaller as the Proposed Project designs are refined to avoid sensitive habitats, protect existing trees, and reduce the amount of fill (i.e., rock riprap and concrete) to the smallest feasible amount that achieves site objectives. In addition, over 400 live willow stakes will be installed at Project sites where suitable growing conditions exist resulting in approximately 0.091 acre (3,954 SF) of new willow riparian habitat. The mitigation approach is described in more detail in Section 2.6.

The Proposed Project would also result in the removal of up to seven (7) trees greater than six (6) inches diameter at breast height (dbh), including five (5) California bay

(*Umbellularia californica*), one (1) California buckeye (*Aesculus californica*), and one (1) coast live oak (*Quercus agrifolia*). However, the actual number of trees to be removed may be less depending on final Project designs and the feasibility to preserve those trees.

2.6 Impact Avoidance and Minimization Measures, Best Management Practices, and Mitigation

The Marin County Development Code, Title 22 (Development Code) implements the policies of the Marin Countywide Plan (Marin County Community Development Agency 2007) within the unincorporated areas of Marin County by regulating land uses and development of structures. The Development Code also strives to conserve and protect the natural resources of the County in accordance with the Marin Countywide Plan (Marin County Community Development Agency 2007). The Development Code includes uniformly applied standards for project construction activities related to dust control, cultural and paleontological resources, roosting bats, nesting birds, and northern spotted owl (*Strix occidentalis caurina*), among others. In order for the Project to meet those standards, Avoidance and Minimization Measures (AMMs) have been incorporated into the design of the Project. AMMs are considered the actions required to meet the standards of the Development Code and. include general maintenance practices, biological resources and habitat protection measures, and cultural resources protection measures that would be implemented during Project construction. The complete list of Project AMMs is provided in **Table 2-4** at the end of this chapter. These AMMs are consistent with the standards included in the Development Code. Proposed Project activities would improve water quality in receiving surface waters by repairing dilapidated culverts and stabilizing eroding banks. By upsizing a currently undersized culvert or improving the design and function of a deficient culvert, the Proposed Project would reduce the potential for catastrophic culvert failures in the future, thereby avoiding large sediment pulses into receiving waterbodies and thus improving water quality. Similarly, by repairing slip-out locations, stabilizing the eroding bank reduces future erosion along the channel bank and sediment load, thus improving water quality in the creek. The Proposed Project aligns with goals and objectives established in the Lagunitas Creek Watershed TMDL along Point Reyes – Petaluma Road, as well as reduces sediment load to Lucas Valley Creek, Nicasio Creek, and Nicasio Reservoir.

In addition to water quality improvements, additional mitigation is proposed to provide on-site habitat enhancement at maintenance work sites to the extent feasible. The goal of on-site mitigation is to restore or enhance the beneficial uses and ecological functions and values at the work site. This would be achieved by incorporating planted RSP and live willow stakes at slip-out repairs and several culvert sites, where feasible, thereby enhancing habitat conditions along the riparian corridor and reducing sediment load to receiving waterbodies. Seeding and riparian planting in the vicinity of the Project sites could provide mitigation for ground-disturbing impacts to riparian habitats. The objective of the willow staking is to enhance the complexity and diversity of the riparian

canopy cover, improve channel shading, and develop multiple vegetative strata along the drainages that are currently devoid of vegetation. Willow staking would enhance habitat for birds, amphibians, and other wildlife using terrestrial riparian areas while providing shading, sources of organic matter and coarse woody debris, and water quality benefits to aquatic species. All trees greater than 6 inches dbh to be removed would be replaced at a ratio of 3:1 in accordance with CDFW protocols.

2.7 Permits and Approvals

The permits and regulatory compliance requirements, along with the responsible or permitting agency, are described for the Proposed Project in **Table 2-3.**

Table 2-3. Applicable Permit and Regulatory Requirements

Federal Agencies

Regulatory Agency	Law/Regulation	Purpose	Permit/ Authorization Type
U.S. Army Corps of Engineers (USACE)	Clean Water Act (CWA) Section 404	Regulates the discharge of dredged or fill material into waters of the United States, including wetlands.	Clean Water Act Section 404, Nationwide Permit 3
U.S. Fish and Wildlife Service (USFWS)	Federal Endangered Species Act (FESA)	USACE must consult with USFWS if threatened or endangered species may be affected by the project.	No-take concurrence letter or FESA Section 7 Biological Opinion
National Marine Fisheries Service (NMFS)	FESA Magnuson-Stevens Fishery Conservation and Management Act	USACE must consult with NMFS if threatened or endangered fish species or Essential Fish Habitat (EFH) may be affected by the project.	No-take concurrence letter or FESA Section 7 Biological Opinion
State Historic Preservation Officer	National Historic Preservation Act Section 106	USACE must consult with State Historic Preservation Officer if historic properties or prehistoric archaeological sites may be affected by the project.	To be conducted in conjunction with USACE Section 404 compliance, if required.

State Agencies

Regulatory Agency	Law/Regulation	Purpose	Permit/ Authorization Type
San Francisco Bay Regional Water Quality Control Board (Region 2)	CWA Section 401	Regulates discharge to waters of the state.	Water Quality Certification
San Francisco Bay Regional Water Quality Control Board (Region 2)	Porter-Cologne Water Quality Control Act—Waste Discharge Requirements (WDR)	Regulates discharges of materials to land and protection of beneficial uses of waters of the State.	WDR
California Department of Fish and Wildlife (CDFW) – Bay Delta Region	Lake and Streambed Alteration Agreement (LSAA)	Provides authorization for modifications to the bed and banks of waterways in CDFW jurisdiction.	LSAA
California Department of Fish and Wildlife (CDFW) – Bay Delta Region	California Endangered Species Act (CESA)	CDFW must be consulted if the project has the potential to result in take of a state-listed species.	Incidental Take Permit, if required
Native American Heritage Commission	Assembly Bill (AB) 52	Requires consultation with California Native American tribes that may be traditionally and culturally affiliated with the Project area	N/A

Notes: CDFW = California Department of Fish and Wildlife; CESA = California Endangered Species Act; CWA = Clean Water Act; EFH = Essential Fish Habitat; FESA = Federal Endangered Species Act; LSAA = Lake and Streambed Alteration Agreement; N/A= not applicable; NMFS = National Marine Fisheries Service; USFWS = U.S. Fish and Wildlife Service; USACE = U.S. Army Corps of Engineers; WDR = Waste Discharge Requirements

Table 2-4. Project Avoidance and Minimization Measures

General

AMM Number	AMM Title	AMM Description	Responsible Party	Timing of Implementation
GEN-1	Work Windows	▪ Ground-disturbing activities in the channel shall occur during the dry season (June 1 through October 31 or as allowed by permits). ▪ The construction work window may be extended provided that there is no measurable precipitation forecasted in the National Weather Service 72-hour forecast and consistent with the terms of regulatory permits and approvals. ▪ No work shall be conducted during or within 24 hours of a rain event (0.5 inches in a 24-hour period).	County DPW or Contractor	During construction
GEN-2	Minimize the Area of Disturbance	▪ Ground disturbance within the channel shall be kept to the minimum footprint necessary to complete project construction.	County DPW or Contractor	During construction
GEN-3	Erosion and Sediment Control	▪ At no time shall silt laden runoff be allowed to leave the project site within a waterway. Silt control structures shall be monitored for effectiveness and shall be repaired or replaced as needed. ▪ Erosion control measures shall be installed according to manufacturer's specifications. Appropriate erosion control measures include, but are not limited to, the following: silt fences, straw bale barriers, erosion control blankets and mats, and soil stabilization measures (e.g., tackified straw with seed, jute blankets, broadcast and hydroseeding). ▪ Erosion control fabrics shall consist of natural fibers that will biodegrade over time and are wildlife friendly. No plastic or other non-porous material	County DPW or Contractor	During construction

AMM Number	AMM Title	AMM Description	Responsible Party	Timing of Implementation
		shall be used as part of a permanent erosion control approach. Plastic sheeting may be used to temporarily protect a slope from runoff. ▪ All temporary construction-related erosion control methods (e.g., silt fences) shall be removed at the completion of construction. ▪ All soils disturbed or exposed during construction activities shall be seeded and stabilized using erosion control measures, such as erosion control fabric or hydromulch. Areas below the Ordinary High Water Mark are exempt from this AMM.		
GEN-4	Fill, Spoils, and Stockpiled Materials	▪ Temporary fill materials, excavated spoils that have not yet been hauled off site, and stockpiled material not moved within 14 days shall be isolated with silt fence, filter fabric, and/or straw bales/fiber rolls. ▪ The Contractor shall designate areas suitable for material storage near construction entrances and at least 10-feet away from drainage courses and creeks. ▪ During wet weather or when rain is forecast within 72 hours, the Contractor shall cover materials that can contaminate rainwater or be transported by runoff to surface waters with a tarp or other waterproof material secured in a manner that would prevent any of the materials from contacting the rainwater.	County DPW or Contractor	During construction
GEN-5	On-site Hazardous Materials Management	▪ An inventory of all hazardous materials used (and/or expected to be used) at the worksite and the end products that are produced (and/or expected to be produced) after their use shall be maintained by the worksite manager.	County DPW or Contractor	During construction

AMM Number	AMM Title	AMM Description	Responsible Party	Timing of Implementation
		▪ As appropriate, containers shall be properly labeled with a "Hazardous Waste" label and hazardous waste shall be properly recycled or disposed of off-site. ▪ Exposure of chemicals to precipitation shall be minimized by storing chemicals in watertight containers or in a storage shed (completely enclosed), with appropriate secondary containment to prevent any spillage or leakage. ▪ Petroleum products, chemicals, cement, fuels, lubricants, and non-storm drainage water or water contaminated with the aforementioned materials shall not contact soil and shall not be allowed to enter surface waters. ▪ All toxic materials, including waste disposal containers, shall be covered when they are not in use, and located as far away as possible from a direct connection to the storm drainage system or surface water. ▪ The storage and disposal of all hazardous materials, such as pesticides, paints, thinners, solvents, and fuels; and all hazardous wastes, such as waste oil and antifreeze; shall comply with all federal, state, and local standards and requirements. ▪ When rain is in the forecast within 72 hours or during wet weather, the Contractor may not apply chemicals in the outside areas. ▪ If hazardous materials are encountered at the project site, the Contractor shall remove and dispose of them according to the Spill Prevention and Response Plan (see GEN-6).		

AMM Number	AMM Title	AMM Description	Responsible Party	Timing of Implementation
GEN-6	Spill Prevention and Response Plan	To minimize the potential adverse effects due to the release of chemicals, fuels, lubricants, and non-storm drainage water into waterways, the County or the Contractor shall develop a Spill Prevention and Response Plan to be implemented by the Contractor and all field personnel. The plan shall contain guidelines for cleanup and disposal of spilled and leaked materials at the project site. The plan shall include, but not be limited to, the following measures: ▪ Contractor's designated field personnel shall be appropriately trained in spill prevention, hazardous material control, and cleanup of accidental spills. ▪ Equipment and materials for cleanup of spills shall be available on site, and spills and leaks shall be cleaned up immediately and disposed of according to the following guidelines: – For small spills on impervious surfaces, absorbent materials shall be used to remove the spill, rather than hosing it down with water. – For small spills on pervious surfaces such as soil, the spill shall be excavated and properly disposed of rather than being buried. ▪ Absorbent materials shall be collected and disposed of properly and promptly. ▪ If the waste is hazardous, the Contractor shall comply with all federal, state, and local hazardous waste requirements. ▪ Spill response kits and a stockpile of spill cleanup materials such as rags or absorbents shall be on hand at all times while hazardous materials are in use	County DPW or Contractor	During construction

AMM Number	AMM Title	AMM Description	Responsible Party	Timing of Implementation
		(e.g., at crew trucks and other logical locations). All field personnel shall be advised of these locations. ▪ The Contractor shall routinely inspect the work site to verify that spill prevention and response measures are properly implemented and maintained.		
GEN-7	Vehicle and Equipment Maintenance/ Cleaning	▪ Servicing of vehicles shall be conducted in designated staging areas or maintenance roads outside the top-of-bank to avoid contamination through accidental drips and spills. The Contractor shall use secondary containment such as a drip pan, to catch leaks or spills any time that vehicle or equipment fluids are dispenses, changed, or poured. ▪ Incoming equipment shall be checked for leaking oil and fluids. No equipment servicing shall take place in	County DPW or Contractor	During construction

AMM Number	AMM Title	AMM Description	Responsible Party	Timing of Implementation
		a water body. If emergency repairs are required, only those repairs necessary to move equipment to a more secure location shall be permissible. Drip pans ▪ All vehicles and equipment shall be kept clean. Excessive build-up of oil and grease shall not be permitted. ▪ Vehicle and equipment washing can occur on site only as needed to prevent the spread of sediment, pathogens, or exotic/invasive species. No runoff from vehicle or equipment washing shall be allowed to enter water bodies without being subjected to adequate filtration (e.g., vegetated buffers, hay wattles or bales, and silt screens). Other proper track-out systems can be used to prevent the spread of sediment from the site. ▪ Refueling shall be done outside of waterways unless equipment stationed in these locations cannot be readily relocated (e.g., pumps and generators). For stationary equipment that must be fueled on-site, secondary containment, such as a drain pan or drop cloth, shall be used to prevent accidental spills of fuels from reaching the soil, surface water, or the storm drain system.		

AMM Number	AMM Title	AMM Description	Responsible Party	Timing of Implementation
GEN-8	Dust Management Controls and Air Quality Protection	The Contractor shall implement the following applicable Bay Area Air Quality Management District's Basic Construction Mitigation Measures to reduce emissions of fugitive dust and equipment exhaust: ▪ All haul trucks transporting soil, sand, or other loose material off-site shall be covered. ▪ All vehicle speeds on unpaved roads shall be limited to 15 mph. ▪ Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure [13 California Code of Regulations Section 2485]). ▪ All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation. ▪ All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited. ▪ All unpaved surfaces (e.g., parking areas, staging areas, soil piles, and graded areas, and unpaved access roads) shall be watered two times a day.	County DPW or Contractor	During construction
GEN-9	Pavement Saw-cutting Operations	The Contractor shall prevent any saw-cutting debris from entering nearby waterways. The Contractor shall use dry cutting techniques and sweep up residue when practicable. If wet methods are used, the Contractor shall vacuum slurry as cutting proceeds or collect all	County DPW or Contractor	During construction

AMM Number	AMM Title	AMM Description	Responsible Party	Timing of Implementation
		wastewater by constructing a sandbag sediment barrier. The bermed area shall be of adequate size to collect all wastewater and solids. The Contractor shall allow collected water to evaporate if the wastewater volume is minimal and if maintaining the ponding area does not interfere with public use of the street area or create a safety hazard. ▪ If approved by the Engineer, the Contractor may direct or pump saw-cutting wastewater to a dirt area and allow to infiltrate. The dirt area shall be adequate to contain all the wastewater. After wastewater has infiltrated, all remaining saw-cutting residue must be removed and disposed of properly. Remaining silt and debris from the ponding or bermed area shall be removed or vacuumed and disposed of properly. ▪ If a suitable dirt area is not available, with the approval of the Engineer, the Contractor shall filter the saw-cutting wastewater through filtering materials and methods meeting Association of Bay Area Governments (ABAG) Standards for Erosion and Sedimentation Control Measures (latest edition) before discharging off-site.		

AMM Number	AMM Title	AMM Description	Responsible Party	Timing of Implementation
GEN-10	Concrete Operations	The Contractor shall prevent the discharge of pollutants from concrete operations by properly disposing of waste, and by implementing the following practices: ▪ Store all materials in waterproof containers or under cover away from drain inlets or drainage areas. ▪ Avoid mixing excess amounts of Portland cement material. ▪ Do not wash out concrete trucks into storm drains, open ditches, streets, streams, etc. Whenever possible, perform washout of concrete trucks off site where discharge is controlled and not permitted to discharge into the storm drain system. For onsite washout, locate washout area at least 50 feet from storm drains, open ditches or other water bodies, preferably in a dirt area. Control runoff from the area by constructing a temporary pit or bermed area large enough for the liquid and solid waste. ▪ Wash out concrete wastes into the temporary pit where the concrete can set, be broken up and then disposed of properly. If the volume of water is greater than what will allow concrete to set, allow the water to infiltrate and/or evaporate, if possible. Remove or vacuum the remaining silt and debris from the pond or beamed area and dispose of it properly. ▪ Dispose of water from washing of exposed aggregate to dirt area. The dirt area shall be adequate to contain all the wastewater and once the wastewater has infiltrated, any remaining residue must be removed. If a suitable dirt area is not available, then the Contractor shall filter the wash water through	County DPW or Contractor	During construction

AMM Number	AMM Title	AMM Description	Responsible Party	Timing of Implementation
		straw bales or other filtering materials meeting ABAG Standards for Erosion and Sediment Control Measures before discharging to the sanitary sewer with approval from the Engineer. ▪ Collect and return sweepings from exposed aggregate concrete to a stockpile or dispose of the waste in trash containers. ▪ Ensure that poured concrete be excluded from the wetted channel for a period of 30 days after it is poured. During that time, the poured concrete shall be kept moist, and runoff from the concrete shall not be allowed to enter the stream. Containment structures shall be installed to control the placement of wet concrete and to prevent it from entering the channel outside of those structures. Commercial sealants may be applied to the poured concrete surface where difficulty in excluding water flow for a long period may occur. If sealant is used, water shall be excluded from the site until the sealant is dry.		
GEN-11	Fire Prevention	All earthmoving and portable equipment with internal combustion engines shall be equipped with spark arrestors.	County DPW or Contractor	During construction

AMM Number	AMM Title	AMM Description	Responsible Party	Timing of Implementation
		During the high fire danger period (April 1–December 1), work crews shall: ▪ Have appropriate fire suppression equipment available at the work site. ▪ Keep flammable materials, including flammable vegetation slash, at least 10 feet away from any equipment that could produce a spark, fire, or flame. ▪ Not use portable tools powered by gasoline-fueled internal combustion engines within 25 feet of any flammable materials unless a round-point shovel or fire extinguisher is within immediate reach of the work crew (no more 25 feet away from the work area).		
GEN-12	Traffic Flow and Safety Measures	▪ Work shall be staged and conducted in a manner that maintains at least one open travel lane of traffic on roadways in the project area. ▪ Construction signs shall be posted at job sites warning the public of construction work and to exercise caution. ▪ Any temporary one-lane closures shall include advance warning signage, a detour route, and flaggers in both directions to direct traffic to safeguard construction workers, provide safe passage for vehicles, and minimize traffic impacts. Work shall also be coordinated with local emergency service providers and local jurisdictions as necessary to ensure that emergency vehicle access and response is not impeded.	County DPW or Contractor	During construction

AMM Number	AMM Title	AMM Description	Responsible Party	Timing of Implementation
		▪ Where work is proposed adjacent to recreational trails, warning signs shall be posted several feet beyond the limits of work. ▪ Fencing, either the orange safety type or chain link shall be installed above project sites. ▪ Access to driveways and private roads shall be maintained. If brief periods of maintenance would temporarily block access, property owners shall be notified prior to maintenance activities.		
GEN-13	Minimize Noise Disturbances to Residential Areas	▪ The County shall implement maintenance practices that minimize disturbances to residential areas surrounding work sites. ▪ With the exception of emergencies, work shall be conducted during normal working hours (7:00 a.m. – 6:00 p.m.). ▪ Construction activities shall not occur on Saturdays, Sundays, or County observed holidays except during emergencies, or with approval by the local jurisdiction and advance notification of surrounding residents. Advanced notification shall be provided 1-week prior to the start of construction to adjacent properties within 180 feet of a project site where heavy equipment shall be used. ▪ Powered equipment (vehicles, heavy equipment, and hand equipment such as chainsaws) shall be equipped with adequate mufflers.	County DPW or Contractor	During construction
GEN-14	Instream Work	▪ Instream work shall be conducted from the top of bank to the maximum extent feasible. ▪ Any work using equipment within the stream channel shall be performed in isolation from a	County DPW or Contractor	During construction

AMM Number	AMM Title	AMM Description	Responsible Party	Timing of Implementation
		flowing stream. If flow is intermittent and does not support fish habitat, excavation may occur within the wetted portion of the channel after installing a sediment boom downstream to allow turbid waters to settle out before being released downstream after sediment removal.		

AMM Number	AMM Title	AMM Description	Responsible Party	Timing of Implementation
GEN-15	Dewatering Measures	When work in flowing streams is unavoidable, streamflow shall be diverted around the work area with use of a temporary dam or bypass according to the measures below and in conjunction with AMM BIO-1: ▪ Prior to dewatering, the best means to bypass flow through the work area shall be determined to minimize disturbance to the channel and avoid direct mortality of fish and other aquatic vertebrates. ▪ Instream cofferdams shall only be built from materials such as clean gravel, or rubber bladders which shall cause little or no siltation or turbidity. No earthen fill shall be used to construct the cofferdam. ▪ Streamflow shall be allowed to gravity flow around or through the work site using temporary bypass pipes or culverts. Bypass pipe diameter shall be sized to accommodate, at a minimum, twice the volume of the summer baseflow. ▪ If a work site is to be temporarily dewatered by pumping, intakes shall be completely screened with wire mesh not larger than 5 millimeters to prevent amphibians from entering the pump system. On Black Mountain Creek, the intake pipe shall be fitted with fish screens meeting California Department of Fish and Wildlife (CDFW) and National Marine Fisheries Service (NMFS) criteria to prevent entrainment or impingement of small fish. ▪ If necessary, discharged water shall pass over some form of energy dissipater to prevent erosion of the downstream channel. Silt bags shall be equipped to the end of discharge hoses and pipes to remove sediment from discharged water.	County DPW or Contractor	Prior to and during construction

AMM Number	AMM Title	AMM Description	Responsible Party	Timing of Implementation
		▪ If used, temporary pump discharge pipes and hoses shall be designed to minimize turbidity and the potential to wash contaminants into the stream. A filtration/settling system shall be included to reduce downstream turbidity (e.g., filter fabric, turbidity curtain, etc.). The selection of an appropriate system is based on the rate of discharge. If feasible, water that is pumped into a pipe should discharge onto the top of bank into a densely vegetated area. ▪ When construction is completed, the flow diversion structure shall be removed as soon as possible but no more than 48-hours after work is completed. When diversion structures are removed, to the extent practicable, the ponded flows shall be directed into the low-flow channel within the work site to minimize downstream water quality impacts.		

Biological Resources

AMM Number	AMM Title	AMM Description	Responsible Party	Timing of Implementation
BIO-1	Relocation of Aquatic Species for Dewatering	As identified above, before a work area is dewatered, fish and other aquatic vertebrates shall be captured and relocated to avoid injury and mortality and minimize disturbance. The following guidelines shall apply: ▪ Before removal and relocation begins, a qualified biologist shall identify the most appropriate release location(s). Release locations should have water temperatures similar to the capture location and offer ample habitat for released aquatic species, and should be selected to minimize the likelihood of reentering the work area or becoming impinged on the exclusion net or screen. ▪ The means of capture shall depend on the nature of the work site, and shall be selected by a qualified biologist who is experienced with capture and handling protocols for fish and aquatic species. Pumping down the pool and then seining or dipnetting shall be the primary method of capture and relocation of aquatic species. Electrofishing shall be used only as a last resort; if electrofishing is necessary, it shall be conducted only as approved by U.S. Fish and Wildlife Service (USFWS), NMFS, and CDFW, and by properly trained personnel following the NMFS Guidelines dated June 2000.	County DPW Biologist	Prior to and during construction

AMM Number	AMM Title	AMM Description	Responsible Party	Timing of Implementation
		▪ To the extent feasible, relocation shall be performed during morning periods. Air and water temperatures shall be measured periodically, and relocation activities shall be suspended if temperatures exceed the limits allowed by NMFS guidelines. ▪ To prevent aquatic species from reentering the work area, the channel shall be blocked by placing fine-meshed nets or screens above and below the work area. To minimize entanglement, mesh diameter shall not exceed 1/8 inch. The bottom edge of the net or screen shall be secured to the channel bed to prevent fish from passing under the screen. Exclusion screening shall be placed in low velocity areas to minimize impingement. Screens shall be checked periodically and cleaned of debris to permit free flow of water. ▪ Handling of aquatic vertebrates shall be minimized. When handling is necessary, personnel shall wet hands or nets before touching them. ▪ Fish shall be held temporarily in cool, shaded water in a large container with a lid. Overcrowding in containers shall be avoided. Aeration shall be provided with a battery-powered external bubbler. Fish shall be protected from jostling and noise, and shall not be removed from the container until the time of release. A thermometer shall be		

AMM Number	AMM Title	AMM Description	Responsible Party	Timing of Implementation
		placed in each holding container and partial water changes shall be conducted as necessary to maintain a stable water temperature. If water temperature reaches or exceeds NMFS limits, fish shall be released and relocation operations shall cease.		
		▪ If fish are abundant, capture shall cease periodically to allow release and minimize the time fish spend in holding containers. ▪ Fish shall not be anesthetized or measured. However, they shall be visually identified to species level, and year classes shall be estimated and recorded. ▪ Reports on fish relocation activities shall be submitted to CDFW and NMFS in a timely fashion. ▪ If mortality during relocation exceeds 5%, relocation shall cease and CDFW and NMFS shall be contacted immediately or as soon as feasible. ▪ When feasible, initial fish relocation efforts shall be performed several days prior to the scheduled start of construction. The fisheries biologist shall perform a survey on the same day before construction begins to verify that no fish have moved back into the work area. ▪ A biological monitor shall check daily for stranded aquatic life in areas that have been dewatered or that contain surface waters.		

AMM Number	AMM Title	AMM Description	Responsible Party	Timing of Implementation
BIO-2	Protection of Special-Status Amphibian and Reptile Species	▪ At least seven (7) calendar days prior to the onset of project construction, a USFWS- or CDFW-approved biologist(s) shall conduct pre-construction surveys for special status amphibian and reptile species. ▪ If special status species are found at any time during project activities, work at that location shall cease and USFWS and CDFW will be contacted. The County or its Contractors shall prepare a relocation plan for moving special status species from the project area. ▪ Only USFWS- or CDFW-approved biologists shall participate in activities associated with the capture, handling, and monitoring of special status amphibians and reptile species. ▪ Biologists involved with the surveying/handling of the special status amphibians and reptile species shall employ sterilization techniques appropriate to avoid the transmission of chytrid fungus to or from the site. ▪ Biologists shall limit the duration of handling and captivity of rescued species. While in captivity, individuals of these species shall be kept in a cool, moist, aerated environment, such as a bucket containing a damp sponge. Containers used for holding or transporting adults of these species shall not contain any standing water.	County DPW Biologist	Prior to and during construction

AMM Number	AMM Title	AMM Description	Responsible Party	Timing of Implementation
		▪ Biologist(s) and on-site biological monitor(s) shall have the authority to and shall halt any action that might result in effects that exceed the levels anticipated by the USFWS or CDFW during review of the proposed action. If work is stopped, the USFWS or CDFW shall be notified within one (1) working day of the incident by the approved biologist or on-site biological monitor. ▪ To prevent inadvertent entrapment of listed species, all excavated steep-walled holes or trenches should be covered at the end of each workday with plywood or similar materials. If this is not possible, one or more escape ramps constructed of earth fill or wooden planks should be established in the hole. Before such holes or trenches are filled, they shall be thoroughly inspected for animals. ▪ Avoid storage of any pipes measuring four (4) inches or greater in diameter at the site, or seal the ends of any such pipes with tape as they are brought to the site, to prevent any special status species from entering and becoming trapped in pipes.		

AMM Number	AMM Title	AMM Description	Responsible Party	Timing of Implementation
BIO-3	Northern Spotted Owl	Project activities that involve tree removal, excavation, or grading within 500 yards of a known northern spotted owl (NSO) (*Strix occidentalis caurina*) nest site are subject to the requirements described below, unless separate project mitigation measures have been adopted that override these requirements: ▪ Construction activities that may disturb NSO shall be conducted outside the nesting season (February 1 – July 31). ▪ If conducting construction activities outside of NSO nesting season is infeasible and construction or tree removal needs to occur within the nesting season, a USFWS protocol-level survey shall first be conducted by a qualified biologist. If no NSO are detected during survey(s), no further action is required, and construction activities shall occur within 1-week of the survey. ▪ If active NSO nests are observed during the survey(s), a disturbance-free buffer zone of 500 yards shall be established around the nest tree(s) until the young have fledged, as determined by a qualified biologist. ▪ Pre-construction surveys shall be documented and provided to the County by the qualified biologist. If construction fencing is required, photographs of the fencing, directly after installation, shall be submitted to the County.	County DPW Biologist	Prior to and during construction

AMM Number	AMM Title	AMM Description	Responsible Party	Timing of Implementation
BIO-4	Nesting Birds	To the extent feasible, construction activities shall be scheduled to avoid the nesting season (February 1 – August 15). ▪ If it is not possible to schedule project activities outside the nesting bird, pre-construction surveys for nesting birds shall be conducted by a qualified biologist to ensure that no nests shall be disturbed during project implementation. These surveys shall be conducted no more than seven days prior to the initiation of project activities, including tree and vegetation removal. During this survey, the biologist shall inspect all trees and other potential nesting habitats (e.g., shrubs, ruderal grasslands, and structures) in and immediately adjacent to the construction areas for nests. Preconstruction surveys shall be provided to the County by the qualified biologist. ▪ If an active nest is found sufficiently close to work areas to be disturbed by these activities, a non-disturbance buffer zone shall be established around the nest at the biologist's discretion and in accordance with regulatory permits and conditions to ensure that no nests of species protected by the Migratory Bird Treaty Act and California Fish and Game Code shall be disturbed during project implementation. The boundary of each buffer zone shall be marked with	County DPW Biologist	Prior to and during construction

AMM Number	AMM Title	AMM Description	Responsible Party	Timing of Implementation
		orange construction fencing if work shall occur immediately outside the buffer zone. All protective buffer zones shall be maintained until the nest becomes inactive, as determined by a qualified biologist. If construction fencing is required, photographs of the fencing, directly after installation shall be submitted to the County.		
BIO-5	Dusky-footed Woodrat	A qualified biologist shall conduct surveys for San Francisco dusky-footed woodrat nests within the project area within 30 days of the start of project activities. If no nests are found, then no further measures shall be warranted. If nests are found, then the following measures shall be implemented: ▪ A minimum 10-foot non-disturbance buffer shall be maintained between construction activities and each nest. In some situations, a smaller buffer may be allowed if in the opinion of a qualified biologist removing the nest would be a greater impact than that anticipated as a result of project activities. ▪ If a dusky-footed woodrat house(s) cannot be avoided, CDFW shall be notified and information regarding the house location(s) and relocation plan shall be provided. With approval from CDFW, a qualified biologist shall dismantle and relocate the house material. No less than 10 days prior to the beginning of construction a qualified	County DPW Biologist	Prior to and during construction

AMM Number	AMM Title	AMM Description	Responsible Party	Timing of Implementation
		biologist shall deconstruct the house by hand. Materials from the house shall be dispersed into adjacent suitable habitat that is outside of the work area. During the deconstruction process the biologist shall attempt to assess if there are juveniles in the house. If immobile juveniles are observed, the deconstruction process shall be discontinued until a time when the biologist believes the juveniles shall be fully mobile. A 25-foot-wide no-disturbance buffer shall be established around the house until the juveniles are mobile. The house may be dismantled once the biologist has determined that adverse effects on the juveniles would not occur. All disturbances to woodrat houses shall be documented in a construction monitoring report and submitted to CDFW.		

AMM Number	AMM Title	AMM Description	Responsible Party	Timing of Implementation
BIO-6	Bat Colonies	To minimize impacts on bat maternity colonies during the maternity season (March 15 – August 31) or non-reproductive roosting bats during the non-maternity season (September 1 – March 14) a pre-activity survey for roosting bats shall be conducted prior to the onset of ground-disturbing activities. A qualified biologist shall conduct a survey to look for evidence of bat use within suitable habitat. If evidence of use is observed, or if high-quality roost sites are present in areas where evidence of bat use might not be detectable (such as a tree cavity), an evening emergence survey and/or a nocturnal acoustic survey may be necessary to determine if a bat colony is present and to identify the specific location of the bat colony. ▪ If no active maternity colony or non-breeding bat roost is located, project work can continue as planned. ▪ If an active maternity colony or non-breeding roost is located, the project work shall be modified to avoid disturbance of the roosts, if feasible. ▪ If an active maternity colony is located and project work cannot be modified to avoid removal or disturbance of the occupied tree, disturbance shall be scheduled to take place outside the maternity roost season (March 15–August 31), and a non-disturbance buffer zone (determined by a qualified biologist)	County DPW Biologist	Prior to and during construction

AMM Number	AMM Title	AMM Description	Responsible Party	Timing of Implementation
		shall be implemented during the maternity roost season. ▪ If an active non-breeding bat roost is located and project work cannot be modified to avoid removal of the occupied tree, the tree shall be removed using a two-day phased method as follows: Day 1, under supervision of a qualified biologist, tree limbs not containing suitable bat roosting habitat shall be removed using chainsaws only; then, Day 2, the rest of the tree can be removed. The qualified biologist shall submit written confirmation to the County that appropriate measures have been undertaken.		

Cultural Resources

AMM Number	AMM Title	AMM Description	Responsible Party	Timing of Implementation
CUL-1	Cultural Resources and Human Remains	▪ If cultural or paleontological resources are encountered during the project, the contractor shall stop work within 35 feet of a find and protect the find until the County can notify a Professional Archaeologist or other such qualified individual to review the discovery. ▪ Project personnel shall not collect or retain found cultural resources. ▪ The treatment of human remains and of associated or unassociated funerary objects discovered during any soil-disturbing activity within the project area shall comply with applicable State laws. This shall include immediate notification of the Marin County Coroner. ▪ In the event of the coroner's determination that the human remains are Native American, notification of the Native American Heritage Commission (NAHC) is required. The NAHC shall be notified by phone within 24 hours of the discovery and shall be afforded the opportunity to appoint a Most Likely Descendant (MLD) (Public Resources Code Section 5097.98).	County DPW or Contractor	During construction

Notes: ABAG = Association of Bay Area Governments; CDFW = California Department of Fish and Wildlife; CGS= California giant salamander; FYLF= foothill yellow-legged frog; in = inches; MLD = Most Likely Descendant; NAHC = Native American Heritage Commission; NMFS = National Marine Fisheries Service; NOS= northern spotted owl; USACE = U.S. Army Corps of Engineers; USFWS = U.S. Fish and Wildlife Service

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Chapter 3
ENVIRONMENTAL CHECKLIST

This chapter of the Initial Study/Mitigated Negative Declaration (IS/MND) assesses the environmental impacts of the West Marin Drainage Rehabilitation Project (Proposed Project) based on the environmental checklist provided in Appendix G of the California Environmental Quality Act (CEQA) Guidelines. The environmental resources and environmental impacts of the Proposed Project are described in the individual sections (Sections 3.1 through 3.20) below.

Certain resource topics (agricultural resources, land use and planning, mineral resources, population and housing, public services, recreation) were determined to result in no impacts based on the nature and scope of the Proposed Project. The analysis for each of these topics was abbreviated to provide a simple discussion of the rationale for dismissing the potential for environmental impacts.

Each substantive resource section provides a brief overview of regulations and regulatory agencies that address the resource and describes the existing environmental conditions for that resource to help the reader understand the conditions that could be affected by the Proposed Project. Relevant local laws, regulations, and policies are described. In addition, each section includes a discussion of the rationale used to determine the significance level of the Proposed Project's environmental impact for each checklist question. For environmental impacts that have the potential to be significant, mitigation measures are identified that would reduce the severity of the impact to a less-than-significant level.

1.	**Project Title**	West Marin Drainage Rehabilitation Project
2.	**Lead Agency Name and Address**	Marin County Department of Public Works 3501 Civic Center Drive, Room 304 San Rafael, CA 94903
3.	**Contact Person, Phone Number and Email**	Betsy Swenerton; Senior Project Manager (415) 473-6680 bswenerton@marincounty.org
4.	**Project Location and Assessor's Parcel Number (APN)**	Marin County; County roads and rights-of-way
5.	**Property Owner(s)**	Marin County

6. General Plan Designation	Various
7. Zoning	Various
8. Description of Project	The County is proposing to conduct maintenance activities to rehabilitate existing road pass-through culverts and repair eroded roadside embankments (slip-outs) along approximately 14 miles of roadway along Point Reyes – Petaluma Road, Lucas Valley Road, and Nicasio Valley Road in West Marin County. A culvert assessment report prepared as part of the Marin County roadway pavement program identified 32 road culverts and 3 slip-outs requiring urgent improvement. Culvert maintenance treatment types may include extending culvert outfall pipes; grouting or lining culvert interiors; paving culvert inverts; replacing damaged sections or failed pipes in-kind; installing larger diameter pipes where culverts are undersized; repairing existing inlet drop structures; placing rock riprap at culvert inlets and/or outlets; constructing concrete headwalls; and improving fish passage (e.g., embedding the culvert invert, repairing/lining the culvert interior, and adding a series of rock weirs and pools at the culvert outfall). The Proposed Project would not install culverts in new locations. Proposed Project activities would be confined to the road prism and County right-of-way, to the extent feasible to complete the maintenance activity.
9. Surrounding Land Uses and Setting	Open space, roadway infrastructure, agricultural, coastal single family, and recreational commercial
10. Other Public Agencies whose Approval or Input May Be Needed	U.S. Army Corps of Engineers U.S. Fish and Wildlife Service National Marine Fisheries Service State Historic Preservation Officer San Francisco Bay Regional Water Quality Control Board (Region 2) California Department of Fish and Wildlife – Bay-Delta Region
11. Native American Consultation	The Federated Indians of Graton Rancheria (FIGR) responded to the County in an emailed letter dated January 12, 2022 and formally requested consultation on the Project pursuant to Assembly Bill (AB) 52. The County is currently engaging in consultation with FIGR about the Project. The County offered to meet with FIGR on March 8,

2022. The *Cultural Resources Assessment Report* (Appendix C) and the records search were provided to FIGR on March 22, 2022. Please refer to Section 3.18, "Tribal Cultural Resources," for information regarding Native American consultation.

Environmental Factors Potentially Affected

The environmental factors checked below would potentially be affected by the Proposed Project, as indicated by the checklist on the following pages.

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

Determination

The conclusions and recommendations contained herein are professional opinions derived in accordance with current standards of professional practice. They are based on a review of sources of information cited in this document, and the comments received, conversations with knowledgeable individuals; the preparer's personal knowledge of the area; and, where necessary, a visit to the site.

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 by 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 (EIR) 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.

Signature  Date 8/16/2022

Name: Rachel Reid, Environmental Coordinator

3.1 Aesthetics

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
Except as provided in Public Resources Code Section 21099, would the project:				
a. Have a substantial adverse effect on a scenic vista?	☐	☐	☒	☐
b. Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☐	☒
c. In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?	☐	☐	☒	☐
d. Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☐	☒

3.1.1 Regulatory Setting

Federal and State Laws, Regulations, and Policies

There are no federal or state plans, policies, regulations, or laws related to aesthetics or visual resources applicable to the Project.

Regional and Local Laws, Regulations, and Policies

Marin Countywide Plan

The Marin Countywide Plan (Marin County Community Development Agency 2007) is the comprehensive long-range general plan that guides land use and development in the unincorporated areas of Marin County. Goals and policies related to the Proposed

Project and the aesthetics analysis are listed below. Consistency with these goals and policies was considered during evaluation of potential Project impacts.

Goal DES-4: Protection of Scenic Resources. Minimize visual impacts of development and preserve vistas of important natural features.

> **Policy DES-4.1: Preserve Visual Quality.** Protect scenic quality and views of the natural environment — including ridgelines and upland greenbelts, hillsides, water, and trees — from adverse impacts related to development.

3.1.2 Environmental Setting

Regional Setting

The Project area is located in central/western Marin County, which is part of the larger San Francisco Bay Area (Bay Area). The San Francisco Bay region is in the Coast Ranges Physiographic Province, which spans 400 miles in California from Humboldt County to Santa Barbara County. The Bay Area is characterized as having a Mediterranean climate, with coast redwood forest and chaparral and woodlands. The Bay Area is highly developed; however, substantial tracts of open space contribute to the visual character of the region.

Marin County has a unique visual environment with a diversity of landscapes that include views of open space areas, ocean vistas and beaches, San Francisco Bay shoreline, hills and ridgelines, agricultural lands, stands of forests, and other natural features. The northern and western areas of the County are characterized by large areas of undeveloped land and open space. The County has the largest amount of public land in the nine-county Bay Area, and 30 percent of its land base consists of parks and open spaces, while 20 percent is comprised of water areas and watershed lands. In the southern portion of the County, long-distance views are often dominated by Mount Tamalpais, an iconic peak that stands over 2,600 feet above sea level.

Urban development in Marin County is concentrated along the U.S. Highway 101 (U.S. 101) corridor from Novato in the north, and Sausalito/Marin City in the south. Aside from the larger cities of San Rafael and Novato, urban development in the County consists of smaller towns located along the northern and eastern flanks of Mount Tamalpais. While the visual character of the larger cities is influenced by commercial, industrial, and urban/suburban housing developments, these smaller towns have traditionally strived to maintain a compact and “small town” feel that blends with the surrounding natural and agricultural landscapes. Most of these smaller municipalities in Central and Southern Marin have adopted land use controls which encourage residential development near town centers, which lends to walkable neighborhoods for the residents, maintaining a pedestrian-scale community. As noted below, each County municipality or unincorporated community in the Project area has a particular visual character maintained by its own building design requirements, or the County’s

requirements in unincorporated areas. County and local ordinances have also protected nearby ridgeline and scenic vistas.

Project Setting

The Project area is located in unincorporated Marin County. Many of the scenic resources in the Project area consist of designated open space, preserved lands, and parks, primarily associated with Mount Tamalpais. No officially designated State scenic highways are located in the County. Likewise, the County has not designated any roadways in the Project area as scenic. Views from most publicly-accessible viewpoints are limited in the Project area due to dense vegetation along the creeks and roadways. Where there are breaks in the trees, middle-ground views of the surrounding ridgelines and sloping hillsides are available. Most of these views are of open space and agricultural lands and are pastoral in nature.

3.1.3 Discussion of Checklist Responses

a. Adverse effects on scenic vistas – Less than Significant

A scenic vista is generally considered a view of an area that has remarkable scenery or a natural or cultural resource that is indigenous to the area. The Marin Countywide Plan (Marin County Community Development Agency 2007) does not define any scenic vistas within the Project area.

The Nicasio Valley Community Plan (which includes portions of Lucas Valley Road and Nicasio Valley Road [NVCP]) (County of Marin 1997) defines scenic vistas as being generally located at higher elevations along ridgeline ranges and hillsides, or at locations along the Nicasio Valley floor which afford clear views of the valley and adjacent mountains. Views along Lucas Valley Road and Nicasio Valley Road with the Project area are often limited to the immediate foreground and consist of the forest base, creek beds, adjacent houses, and roadside fences. The Point Reyes Station Community Plan (PRSCP) (County of Marin 2001) does not define any scenic vistas along Point Reyes – Petaluma Road.

Project construction activities would primarily be conducted along the roadways and within channels. Due to their location and often the presence of confining vegetation, it is unlikely that construction activities would have a pronounced effect on scenic vistas from these viewpoints. It is possible that some construction sites may be visible from vistas located at higher elevations. However, any disruptions to scenic vistas would be temporary in nature, limited to the area of construction only, and would not result in a substantial adverse effect on scenic vistas. Only the minimum construction necessary would be performed at Project locations. Activities would not result in the construction of any structures or facilities that would block views of surrounding scenic vistas. Therefore, impacts on scenic vistas would be **less than significant.**

b. Damage to scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway – No Impact

No Caltrans-designated scenic highways or County scenic roadways are located in the County. Construction activities would repair dilapidated culverts and stabilize eroding streambanks. Any construction related impacts would be short-term (generally no more than 1 week at a given site) and visual disruptions would be temporary. No substantial or long-term degradation of the scenic resources as viewed by the various viewer groups (e.g., motorists and bicyclists) would occur. Therefore, there would be **no impact** to scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway.

c. Substantially degrade the existing visual character or quality of public views of the site and its surroundings – Less than Significant

Visual character can be defined as the perceived contrast between the existing visual elements of an area and how the area will look after the Project is implemented. This comparison measures how compatible the Project, once implemented, will be with the existing visual environment.

Implementation of the Project would result in temporary, small-scale visual impacts during construction. Construction of the Project includes small modifications to the visual environment including repair/replacement of existing culverts and stabilization of eroded streambanks. These activities would include the temporary staging of construction equipment and construction materials (e.g., excavators, dump trucks, water tenders, carriers, compactors, cement mixers) at the Project sites, disturbed land, and temporary stormwater protection measures such as straw wattles.

Construction activities could temporarily disrupt views at individual Project sites. However, as previously stated these disruptions would be temporary in nature (generally no more than 1 week at a given site) and would be limited to the area of construction only; thus, construction activities would not result in a substantial degradation to the existing visual character or quality of the Project area and surroundings. Upon completion of construction the visual character of each site would be largely the same as existing conditions. Therefore, the Project would have a **less-than-significant** impact on the visual character or quality of the Project area and surroundings.

d. New sources of substantial light or glare – No Impact

Project activities would be conducted during daylight hours only; thus, no nighttime lighting would be required. The Project would not involve the construction of new facilities or modifications to existing facilities that would result in new reflective surfaces or installation of lighting. As such, there would be **no impact**.

3.2 Agriculture and Forestry Resources

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
Would the Project:				
a. 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?	☐	☐	☐	☒
b. Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒
c. Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Pub. Res. Code section 12220(g)), timberland (as defined by Pub. Res. Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	☐	☐	☐	☒
d. Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
e. 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?	☐	☐	☐	☒

3.2.1 Discussion of Checklist Responses

a-e. Convert farmland to non-agriculture use, conflict with zoning for agricultural use or a Williamson Act contract, or result in conflicts with or loss of agricultural or forest lands – No Impact

Farmlands (including Farmlands of Local Importance and grazing lands), Williamson Act Contracts[1], and forest lands are located in close proximity to the proposed culvert maintenance sites and roadside bank slip-out repair areas associated with the Proposed Project (California Department of Conservation (CDOC) 2016, Marin County Community Development Agency 2007. Marin Agricultural Land Trust (MALT) conservation easements are also located near the Proposed Project maintenance sites (Marin County Community Development Agency 2007). However, proposed maintenance activities and roadside bank slip-out repairs would occur entirely within the County right-of-way, including along roads and within stream channels and roadside ditches, where potential impacts to agricultural and forest lands would be minimal or non-existent. Although the existing culverts and stream channels may convey flow to support surrounding agricultural uses, proposed maintenance activities would not interfere with water conveyance in a manner that would affect agricultural uses.

None of the Proposed Project activities would convert or cause changes that would result in the conversion of designated farmland to non-agricultural uses or result in the conversion of forest lands to non-forest lands. Additionally, the Proposed Project would not conflict with an existing Williamson Act contract or MALT conservation easement. Rather, the Proposed Project would provide a long-term benefit to agriculture and forest land in Marin County by reducing flooding and erosion for County roadways, properties, and residents in the project area.

As discussed above, the primary activities proposed under the Proposed Project are maintenance and repair of culverts and repair and stabilization of roadside bank slip-outs. These activities would not alter land use designations, farmland, or timberland classifications at either the local or state level. Furthermore, these activities would not create pressure for future land conversions. **No impact** to farmland, agricultural uses, forest lands, or timberlands would occur with implementation of the Proposed Project.

[1] Williamson Act Contract lands are protected from conversion to non-agricultural uses for the duration of the contract (usually 10 years).

3.3 Air Quality

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
When available, the significance criteria established by the applicable air quality management district or air pollution control district may be relied upon to make the following determinations. Would the project:				
a. Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☒	☐
b. 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?	☐	☐	☒	☐
c. Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☒	☐
d. Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?	☐	☐	☒	☐

3.3.1 Regulatory Setting

The federal Clean Air Act (CAA) is implemented by the U.S. Environmental Protection Agency (USEPA) and sets ambient air limits, known as the National Ambient Air Quality Standards (NAAQS), for six criteria pollutants: carbon monoxide (CO), lead, nitrogen dioxide (NO_2), ground-level ozone (O_3), sulfur dioxide (SO_2), and particulate pollution. Two types of particulate pollution are regulated: particulate matter of aerodynamic radius of 10 micrometers or less (PM10) and particulate matter of aerodynamic radius of 2.5 micrometers or less (PM2.5). Of these six criteria pollutants, particulate matter and ground-level ozone pose the greatest threats to human health.

The California Air Resources Board (CARB) sets standards for criteria pollutants that are more stringent than the NAAQS and also regulates the following additional contaminants: visibility-reducing particles, sulfates, and vinyl chloride.

The project area is located within the San Francisco Bay Area Air Basin (SFBAAB), which includes all or portions of the nine-county Bay Area. The Bay Area Air Quality

Management District (BAAQMD) manages air quality within the SFBAAB for attainment and permitting purposes. **Table 3.3-1** shows the current Bay Area attainment status for the state and federal ambient air quality standards. Ozone and suspended particulate matter (PM10 and PM2.5) are of particular concern in the Bay Area, which is currently designated "nonattainment" for state and national ozone ambient air quality standards, for the state PM10 standards, and for state and national PM2.5 standards. It is "attainment" or "unclassified" with respect to all the other major air pollutants.

Table 3.3-1. Attainment Status of Ambient Air Quality Standards

Contaminant	Averaging Time	Concentration	State Standards Attainment Status[1]	Federal Standards Attainment Status[2]
Ozone	1-hour	0.09 ppm	N	See footnote 3
Ozone	8-hour	0.070 ppm	N	N (Marginal)
Carbon Monoxide	1-hour	20 ppm	A	
Carbon Monoxide	1-hour	35 ppm		A
Carbon Monoxide	8-hour	9.0 ppm	A	A[4]
Nitrogen Dioxide	1-hour	0.18 ppm	A	
		0.100 ppm[6]		U
Nitrogen Dioxide	Annual arithmetic mean	0.030 ppm	A	
Nitrogen Dioxide	Annual arithmetic mean	0.053 ppm		A
Sulfur Dioxide (SO_2)	1-hour	0.25 ppm	A	
Sulfur Dioxide (SO_2)	1-hour	0.075 ppm		A
Sulfur Dioxide (SO_2)	24-hour	0.04 ppm	A	
Sulfur Dioxide (SO_2)	24-hour	0.14 ppm		A
Sulfur Dioxide (SO_2)	Annual arithmetic mean	0.030 ppm		A
Particulate Matter (PM10)	24-hour	50 µg/m^3	N	
Particulate Matter (PM10)	24-hour	150 µg/m^3		U

Contaminant	Averaging Time	Concentration	State Standards Attainment Status[1]	Federal Standards Attainment Status[2]
Particulate Matter (PM10)	Annual arithmetic mean	20 µg/m^3	N	
Fine Particulate Matter (PM2.5)	24-hour	35 µg/m^3		N (Moderate)[7]
Fine Particulate Matter (PM2.5)	Annual arithmetic mean	12 µg/m^3	N	U/A
Sulfates	24-hour	25 µg/m^3	A	
Lead[8]	30-day average	1.5 µg/m^3	A	
Hydrogen Sulfide	1-hour	0.03 ppm	U	
Vinyl Chloride[8] (chloroethene)	24-hour	0.010 ppm	U	
Visibility Reducing Particles	8-hour (10:00 to 18:00 PST)	See footnote 5	U	

A – attainment
N – non-attainment
U – unclassified

ppm – parts per million
PST – pacific standard time
µg/m^3 – micrograms per cubic meter

Notes:

1. California standards for ozone, carbon monoxide, sulfur dioxide (1-hour and 24-hour), nitrogen dioxide, suspended particulate matter – PM10, and visibility-reducing particles are values that are not to be exceeded. The standards for sulfates, lead, hydrogen sulfide, and vinyl chloride are not to be equaled or exceeded. If the standard is for a 1-hour, 8-hour, or 24-hour average (i.e., all standards except for lead and the PM10 annual standard), then some measurements may be excluded. In particular, measurements that are excluded include those that CARB determines would occur less than once per year on average.
2. National standards shown are the "primary standards" designed to protect public health. National air quality standards are set by USEPA at levels determined to be protective of public health with an adequate margin of safety. National standards other than for ozone, particulates, and those based on annual averages are not to be exceeded more than once per year. The 1-hour ozone standard is attained if, during the most recent 3-year period, the average number of days per year with maximum hourly concentrations above the standard is equal to or less than one. The 8-hour ozone standard is attained when the 3-year average of the 4th highest daily concentrations is 0.070 ppm (70 parts per billion) or less. The 24-hour PM_{10} standard is attained when the 3-year average of the 99th percentile of monitored concentrations is less than 150 micrograms per cubic meter (µg/m^3). The 24-hour PM2.5 standard is attained when the 3-year average of 98th percentiles is less than 35 µg/m^3. Except for the national particulate standards, annual standards are met if the annual average falls below the standard at every site. The national annual particulate standard for PM10 is met if the 3-year average falls below the standard at every site. The annual PM2.5 standard is met by spatially averaging annual averages across officially designated clusters of sites and then determining if the 3-year average of these annual averages falls below the standard.
3. The national 1-hour ozone standard was revoked by USEPA on June 15, 2005. On October 1, 2015, the national 8-hour ozone primary and secondary standards were lowered from 0.075 ppm to 0.070 ppm. An area meets the standard if the fourth-highest maximum daily 8-hour ozone concentration per year,

Contaminant	Averaging Time	Concentration	State Standards Attainment Status[1]	Federal Standards Attainment Status[2]

averaged over three years, is equal to or less than 0.070 ppm. This table provides the attainment statuses for the 2015 standard of 0.070 ppm.

4. In April 1998, the Bay Area was redesignated to attainment for the national 8-hour carbon monoxide standard.
5. Statewide Visibility-Reducing Particle Standard (except Lake Tahoe Air Basin): Particles in sufficient amount to produce an extinction coefficient of 0.23 per kilometer when the relative humidity is less than 70 percent. This standard is intended to limit the frequency and severity of visibility impairment due to regional haze and is equivalent to a 10-mile nominal visual range.
6. To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average of nitrogen dioxide at each monitoring station within an area must not exceed 0.100 parts per million (ppm) (effective January 22, 2010).
7. On January 9, 2013, USEPA issued a final rule to determine that the Bay Area attains the 24-hour PM2.5 national standard. Despite this USEPA action, the Bay Area will continue to be designated as "non-attainment" for the national 24-hour PM2.5 standard until such time as the Air District submits a "redesignation request" and a "maintenance plan" to USEPA, and USEPA approves the proposed redesignation.
8. CARB has identified lead and vinyl chloride as toxic air contaminants with no threshold level of exposure below which there are no adverse health effects determined.

Sources: CARB 2021, USEPA 2021, BAAQMD 2021a

The BAAQMD maintains a number of air quality monitoring stations, which continually measure the ambient concentrations of major air pollutants throughout the Bay Area. The closest monitoring station to the Project site is at 6 Castro Street, Forest Knolls, about 1.5 miles to the southwest of the most southern project site on Nicasio Valley Road; however, this monitoring station was recently deployed in 2020 and no data is available at this time. The San Rafael monitoring station located at 534 4th Street in San Rafael is the next closest monitoring station to the Project site, approximately 9 miles southeast of the southern end of the Project site. The data collected show occasional violations of the ozone and PM2.5 particulate standards, as shown in **Table 3.3-2**. Violations of the particulate standards have become more frequent throughout the Bay Area in recent years because of the increasing influence of wildfires in California and the western United States.

Table 3.3-2. Attainment Status of Ambient Air Quality Standards

Air Pollutants	Air Quality Standard	Maximum Concentrations and Number of Days Standards Exceeded		
		2017	2018	2019
Ozone				
Maximum 8-hour concentration (ppm)		63	53	80

Air Pollutants	Air Quality Standard	Maximum Concentrations and Number of Days Standards Exceeded		
		2017	2018	2019
# Days 8-hour California standard exceeded	70 ppb	0	0	1
Nitrogen Dioxide (NO_2				
Maximum 1-hour concentration (ppb)		53	55	50
# of Days national 1-hour standard exceeded	100 ppb	0	0	0
Suspended Inhalable Particulates (PM10)				
Maximum 24-hour concentration (µg/m3)		94	166	33
# Days national 24-hour standard exceeded	150 µg/m3	0	13	0
Suspended Fine Particulates (PM2.5)				
Maximum 24-hour concentration (µg/m3)		74.7	167.6	19.5
# of Days national 24-hour standard exceeded	35 µg/m3	8	13	0

Notes:

As monitored at the BAAQMD station at 534 4th Street in San Rafael.
µg/m 3 = micrograms per cubic meter
ppb = parts per billion.

Source: BAAQMD 2021b.

The BAAQMD has also developed thresholds of significance for criteria air pollutants, which were published in the BAAQMD's *California Environmental Quality Act Air Quality Guidelines* (BAAQMD 2017a). **Table 3.3-3** provides the BAAQMD's recommended significance criteria for analysis of air quality impacts, including cumulative impacts. The term "sensitive receptor" is used by the BAAQMD to refer to facilities or land uses that include members of the population particularly sensitive to the effects of air pollutants, such as children, the elderly, and people with illnesses. The nearest sensitive receptors to the Proposed Project area are rural single-family residences and recreational areas.

Table 3.3-3. BAAQMD CEQA Thresholds of Significance for Criteria Air Pollutants

Criteria Air Pollutants and Precursors (Regional)	Construction-Related Thresholds – Average Daily Emissions (lb./day)	Operational Thresholds – Average Daily Emissions (lb./day)	Operational Thresholds – Maximum Annual Emissions (tpy)
Reactive Organic Gases (ROG)	54	54	10
Nitrogen oxides (NO_X)	54	54	10
Particulate Matter (PM10)	82 (exhaust)	82	15
Particulate Matter (PM2.5)	54 (exhaust)	54	10
PM10/PM2.5 (fugitive dust)	Best Management Practices	None	
Local Carbon Monoxide (CO)	None	9.0 ppm (8-hour average), 20.0 ppm (1-hour average)	
Odors	None	Five confirmed complaints per year averaged over 3 years	

Notes: tpy – tons per year; lb./day – pounds per day; ppm – parts per million

Source: BAAQMD 2017b

The BAAQMD's *Final 2017 Clean Air Plan* (CAP) (BAAQMD 2017b) establishes a goal of protecting air quality and health at the regional and local scale and lists a key priority of reducing emissions of criteria air pollutants and toxic air contaminants from all key sources. The CAP contains numerous control measures to help achieve these goals and priorities.

Marin Countywide Plan

The Marin Countywide Plan (Marin County Community Development Agency 2007) contains policies to reduce air pollution by achieving and maintaining air quality in Marin County that meets or exceeds state and federal standards.

Marin County Development Code

Marin County has the following code to ensure that the construction of new development and the establishment of new and modified uses contribute to the maintenance of a stable and healthy environment, that new development is harmonious in character with existing and future development, and that the use and enjoyment of neighboring properties are protected, as established in the Marin Countywide Plan.

22.20.040.B. Dust Control: The following dust control measures shall apply to projects involving ground disturbance that are subject to environmental review.

1. All unpaved exposed surfaces (e.g., parking areas, staging areas, soil piles, and graded areas, and unpaved access roads) shall be watered two times a day.

2. All haul trucks transporting soil, sand, or other loose material off-site shall be covered.

3. All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.

4. All vehicle speeds on unpaved roads shall be limited to a maximum of 15 miles per hour.

5. All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.

6. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to five minutes (as required by the California Airborne Toxics Control Measure Title 13, Section 2485 of California of Regulations). Clear signage shall be provided for construction workers at all access points.

7. All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified emissions evaluator.

3.3.2 Environmental Setting

Marin County is bounded on the west by the Pacific Ocean, on the east by San Pablo Bay, on the south by the Golden Gate, and on the north by the Petaluma Gap. Most of Marin's population lives in the eastern part of the county in small, sheltered valleys that act like a series of miniature air basins. Although a few mountains reach above 1,500 feet, most of the terrain is 800-1,000 feet high, which usually is not high enough to block the marine layer.

Wind speeds are highest along the west coast of Marin, averaging about 8-10 miles per hour (mph). The prevailing wind directions throughout Marin County are generally from the northwest. In the summer months, areas along the coast are usually subject to onshore movement of cool marine air.

In the winter, proximity to the ocean keeps the coastal regions relatively warm, with temperatures varying little throughout the year. Coastal temperatures are usually in the high 50s (in degrees Fahrenheit [°F]) in the winter and the low 60s in the summer. The warmest months are September and October.

Air pollution potential is highest in eastern Marin County, where most of the population is located in semi-sheltered valleys. In the southeast, the influence of marine air keeps pollution levels low. As development moves farther north, there is greater potential for air pollution to build up because the valleys are more sheltered from the sea breeze. While Marin County does not have many polluting industries, the air quality on its eastern side — especially along the U.S. 101 corridor — may be affected by emissions from motor vehicle use within and through the County (BAAQMD 2017b).

3.3.3 Discussion of Checklist Responses

Project AMMs implemented to minimize and reduce impacts related to air quality are included in **Table 3.3-4** below. Reference to these AMMs occurs throughout this section.

Table 3.3-4. Air Quality AMMs

AMM No.	AMM Title	AMM Description
GEN-7	Vehicle and Equipment Maintenance/ Cleaning	▪ Servicing of vehicles shall be conducted in designated staging areas or maintenance roads outside the top-of-bank to avoid contamination through accidental drips and spills. The Contractor shall use secondary containment such as a drip pan, to catch leaks or spills any time that vehicle or equipment fluids are dispenses, changed, or poured. ▪ Incoming equipment shall be checked for leaking oil and fluids. No equipment servicing shall take place in a water body. If emergency repairs are required, only those repairs necessary to move equipment to a more secure location shall be permissible. Drip pans ▪ All vehicles and equipment shall be kept clean. Excessive build-up of oil and grease shall not be permitted. ▪ Vehicle and equipment washing can occur on site only as needed to prevent the spread of sediment, pathogens, or exotic/invasive species. No runoff from vehicle or equipment washing shall be allowed to enter water bodies without being subjected to adequate filtration (e.g., vegetated buffers, hay wattles or bales, and silt screens). Other proper track-out systems can be used to prevent the spread of sediment from the site. ▪ Refueling shall be done outside of waterways unless equipment stationed in these locations cannot be readily relocated (e.g., pumps and generators). For stationary equipment that must be fueled on-site, secondary containment, such as a drain pan or drop cloth, shall be used to prevent accidental spills of fuels from reaching the soil, surface water, or the storm drain system.

GEN-8	Dust Management Controls and Air Quality Protection	The Contractor shall implement the following applicable Bay Area Air Quality Management District's Basic Construction Mitigation Measures to reduce emissions of fugitive dust and equipment exhaust: ▪ All haul trucks transporting soil, sand, or other loose material off-site shall be covered. ▪ All vehicle speeds on unpaved roads shall be limited to 15 mph. ▪ Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure [13 California Code of Regulations Section 2485]). ▪ All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation. ▪ All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited. ▪ All unpaved surfaces (e.g., parking areas, staging areas, soil piles, and graded areas, and unpaved access roads) shall be watered two times a day.

a, b. Conflict with or obstruct implementation of the applicable air quality plan; or result in a cumulatively considerable net increase of any criteria pollutant for which the project region is a nonattainment area – Less than Significant

As described above, the SFBAAB is in nonattainment of state and federal air quality standards for ozone and PM2.5 and state PM10 standards. The use of vehicles and off-road equipment, such as excavators and graders, as part of the Proposed Project would generate emissions of criteria air pollutants. Fuel combustion involved with vehicle use and operating off-road equipment would release particulate matter (PM2.5 and PM10) and other contaminants associated with motor vehicle operation, including carbon monoxide and ozone precursors (reactive organic gases [ROG] and oxides of nitrogen [NOx]).

Construction activities would take place over 2 years at approximately 35 locations along Point Reyes – Petaluma Road, Lucas Valley Road, and Nicasio Valley Road, with a typical/average round-trip travel distance of about 22 miles. Estimated 2022 and 2023 average daily emissions of criteria air pollutants were modeled using the California Emissions Estimator Model (CalEEMod) 2020.4.0 and are presented in **Table 3.3-5**. Additional information on how emissions were estimated is provided in Appendix A, *Air Quality and Greenhouse Gas Emission Calculations*.

Table 3.3-5**.** Average Daily Emissions Estimates

Year	ROG	NOx	PM10 (Exhaust)	PM2.5 (Exhaust)
2022	0.28	2.38	0.10	0.10
2023	0.32	2.89	0.12	0.11
BAAQMD Threshold	54	54	82	54
Above Threshold?	N	N	N	N

Notes: All emissions estimates are measured in pounds per day.

Source: Data compiled by Horizon in 2022 (refer to Appendix A).

Table 3.3-5 shows that the Proposed Project would generate emissions substantially below BAAQMD significance thresholds for all criteria air pollutants. Implementation of AMM GEN-8 and GEN-7 would further minimize potential air quality impacts by meeting BAAQMD's requirements for basic construction mitigation measures and limiting vehicle idling, and requiring proper maintenance and tuning of equipment, respectively. Complete descriptions of the AMMs are provided above in Table 3.3-4. In addition to the AMMs, the Project would be consistent with the standards included in the Marin County Development Code. BAAQMD's *Final 2017 CAP*, titled *Spare the Air, Cool the Climate*, describes how BAAQMD will reduce emissions of toxic air contaminants (TACs) and continue to make progress toward attaining state and federal air quality standards (BAAQMD 2017a). BAAQMD's proposed AMMs include controlling particulate matter [PM] emissions from paving operations, fugitive dust, track-out during construction, and bulk material handling and transport. The Proposed Project would not conflict with or impair implementation of applicable air quality plans established by BAAQMD or Marin County because the Proposed Project would not generate growth or conflict with the applicable policies from the BAAQMD air quality plan (BAAQMD 2017b).

Following construction, annual maintenance needs and activities at individual Project sites would be similar to, or less than, they were prior to construction and would be much lower than construction-related emissions. Therefore, operation and maintenance of the Proposed Project would not conflict with applicable BAAQMD or County policies.

The BAAQMD significance thresholds represent the level of emissions below which a project would not contribute substantially to a cumulative impact. Therefore, the Proposed Project would not make a considerable contribution to cumulative impacts related to air quality. (Also refer to Section 3.21(b).)

As a result, the Proposed Project would not violate any air quality standards, obstruct implementation of applicable plans, or contribute substantially to a cumulative impact. This impact would be considered **less than significant**.

c. Expose sensitive receptors to substantial pollutant concentrations – Less than Significant

During Proposed Project construction activities for the Proposed Project, diesel particulate matter (DPM) and gasoline fuel combustion emissions that are classified as TACs would be emitted from construction equipment. These impacts would be most severe adjacent to the construction area and would decrease rapidly with increasing distance. Concentrations of mobile-source DPM emissions are typically reduced by 70 percent at a distance of approximately 500 feet (CARB 2005). Few sensitive receptors are located near the Proposed Project, with the closest receptors being residences approximately 100 feet away on Lucas Valley Road. Proposed Project construction activities near any specific sensitive receptor would be temporary, lasting approximately 2-4 days. As described above, the Proposed Project would not generate emissions of criteria air pollutants in excess of BAAQMD significance thresholds and would comply with BAAQMD measures, as specified in AMM GEN-8. In addition, construction equipment is subject to CARB regulations regarding construction equipment fleets. Therefore, sensitive receptors would not be exposed to substantial pollutant concentrations. This impact would be considered **less than significant**.

d. Result in other emissions affecting a substantial number of people – Less than Significant

Excavation, paving activities, and diesel fuel–powered construction equipment can generate objectionable odors. Excavated material from culverts and washouts may contain high levels of organic material or reduced sulfur, which can generate odors when exposed to air. The BAAQMD indicates that odor impacts could result from siting a new odor source near existing sensitive receptors. As the Proposed Project's activities would be small in scale and would take place in a rural roadside setting, the number of people exposed to odor from any excavation activities would be small and the duration of exposure would be temporary and short. Therefore, the Proposed Project would not generate substantial annoyances from odors to sensitive receptors. This impact would be considered **less than significant**.

3.4 Biological Resources

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
Would the Project:				
a. 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 CDFW or USFWS?	☐	☒	☐	☐
b. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the CDFW or USFWS?	☐	☐	☒	☐
c. Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☒	☐
d. Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☐	☒	☐
e. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☒	☐
f. Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state HCP?	☐	☐	☐	☒

3.4.1 Regulatory Setting

Federal Laws, Regulations, and Policies

Endangered Species Act of 1973

The Endangered Species Act (ESA) (16 U.S. Code [USC] Section 1531 et seq.; 50 Code of Federal Regulations [CFR] Parts 17 and 222) provides for conservation of species that are endangered or threatened throughout all or a significant portion of their range, as well as the protection of habitats on which they depend.

Magnuson-Stevens Fishery Conservation and Management Act

The amended Magnuson-Stevens Fishery Conservation and Management Act of 1996, also known as the Sustainable Fisheries Act, provides for the conservation and management of all fish resources within the exclusive economic zone of the U.S. It requires that all federal agencies consult with the National Marine Fisheries Service (NMFS) on activities or proposed activities authorized, funded, or undertaken by that agency that may adversely affect Essential Fish Habitat (EFH) of commercially managed marine and anadromous fish species.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) (16 USC Sections 703–712; 50 CFR Subchapter B) makes it unlawful to pursue, hunt, take, capture, kill, or possess any migratory birds, or part, nests, or eggs of such migratory birds, that are listed in wildlife protection treaties between the U.S. and Canada, Mexico, Japan, and Russia. The MBTA applies to almost all avian species that are native to California. It requires that all federal agencies consult with the U.S. Fish and Wildlife Service (USFWS) on activities or proposed activities authorized, funded, or undertaken by that agency that may adversely affect migratory birds.

Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act prohibits the taking or possession of and commerce in bald and golden eagles, with limited exceptions (16 USC Section 668). Under the Bald and Golden Eagle Protection Act, it is a violation to "take, possess, sell, purchase, barter, offer to sell, transport, export or import, at any time or in any manner, any bald eagle commonly known as the American eagle, or golden eagle, alive or dead, or any part, nest or egg thereof…".

Clean Water Act (Sections 401 and 404)

The Clean Water Act (CWA) (33 USC Section 1251) establishes the basic structure for regulating discharges of pollutants (including dredged or fill material) into waters of the U.S., including wetlands, and for regulating quality standards for surface waters. The

CWA provides guidance for the restoration and maintenance of the chemical, physical, and biological integrity of the nation's waters.

CWA Section 404 prohibits the discharge of dredged or fill material into waters of the U.S., including wetlands, without a permit from the U.S. Army Corps of Engineers (USACE). The CWA Section 401 requires that an applicant for a federal license or permit that allows activities with the potential to result in a discharge to waters of the U.S., including wetlands, obtain a CWA Section 401 Water Quality Certification.

State Laws, Regulations, and Programs

California Fish and Game Code

The California Fish and Game (F&G) Code includes various statutes that protect biological resources, including the requirements for a notification of lake or streambed alteration, Native Plant Protection Act of 1977 (NPPA), the California Endangered Species Act (CESA), and multiple species-specific protection regulations. F&G Code sections applicable to the Proposed Project include:

Section 1600 et seq. (Lake and Streambed Alteration) establishes the Lake and Streambed Alteration Program to provide for protection and conservation of fish and wildlife resources with respect to 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.

Sections 1900-1913 (California Native Plant Protection Act) requires all State agencies to use their authority to carry out programs to conserve endangered and rare native plants.

Sections 2050-2098 (California Endangered Species Act) declares that it is the policy of the State that State agencies should not approve projects that would jeopardize the continued existence of a species listed under CESA as endangered or threatened or result in the destruction or adverse modification of habitat essential to the continued existence of those species.

Section 2080 prohibits the take of any species that is state-listed as endangered or threatened, or designated as a candidate for such listing.

Sections 3511, 4700, 5050, and 5515 (Fully Protected Species) has designated 37 fully protected species and prohibited the take or possession of these species at any time.

Sections 3503, 3503.5, and 3513 (Nesting Bird Protections) states that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by code.

Porter-Cologne Water Quality Control Act

The 1969 Porter-Cologne Water Quality Control Act (known as the Porter-Cologne Act) dovetails with the CWA. The Porter-Cologne Act to protect the quality of water in the State from degradation. The act established the State Water Resources Control Board (SWRCB) and divided the state into nine regions, each overseen by its own Regional Water Quality Control Board (RWQCB).

Regional and Local Regulations, Plans, and Policies

Marin County Municipal Code

The Native Tree Protection and Preservation code, Section 22.27.030, Chapter 22.27, requires that a Tree Removal Permit be obtained prior to removing any protected and/or heritage tree within the county. The definition of a protected and heritage tree varies by species and is defined in Marin County Code Section 22 Article VIII (Definitions).

Marin Countywide Plan

Goals and policies in the Marin Countywide Plan (Marin County Community Development Agency 2007) that are relevant to the Proposed Project and biological resources are listed below. Consistency with these goals and policies was considered during evaluation of potential Project impacts.

Goal BIO-1: Enhanced Native Habitat and Biodiversity. Effectively manage and enhance native habitat, maintain viable native plant and animal populations, and provide for improved biodiversity throughout the County.

Policy BIO-1.1: Protect Wetlands, Habitat for Special-Status Species, Sensitive Natural Communities, and Important Wildlife Nursery Areas and Movement Corridors.

Policy BIO-1.3: Protect Woodlands, Forests, and Tree Resources.

Policy BIO-1.6: Control Spread of Invasive Exotic Plants.

Goal BIO-2: Protection of Sensitive Biological Resources. Require identification of sensitive biological resources and commitment to adequate protection and mitigation, and monitor development trends and resource preservation efforts.

Policy BIO-2.1: Include Resource Preservation in Environmental Review.

Policy BIO-2.3: Preserve Ecotones.

Policy BIO-2.4: Protect Wildlife Nursery Areas and Movement Corridors.

Policy BIO-2.5: Restrict Disturbance in Sensitive Habitat During Nesting Season.

Policy BIO-2.8: Coordinate with Trustee Agencies.

Goal BIO-3: Wetland Conservation. Require all feasible measures to avoid and minimize potential adverse impacts on existing wetlands and to encourage programs for restoration and enhancement of degraded wetlands.

Policy BIO-3.1: Protect Wetlands.

Goal BIO-4: Riparian Conservation. Protect and, where possible, restore the natural structure and function of riparian systems.

Policy BIO-4.4: Promote Natural Stream Channel Function.

Policy BIO-4.5: Restore and Stabilize Stream Channels.

Policy BIO-4.6: Control Exotic Vegetation.

Policy BIO-4.7: Protect Riparian Vegetation.

Policy BIO-4.16: Regulate Channel and Flow Alteration.

Policy BIO-4.19: Maintain Channel Stability.

Policy BIO-4.20: Minimize Runoff.

Goal WR-1: Healthy Watersheds. Achieve and maintain proper ecological functioning of watersheds, including sediment transport, groundwater recharge and filtration, biological processes, and natural flood mitigation, while ensuring high-quality water.

Policy WR-1.2: Restore and Enhance Watersheds.

Goal WR-2: Clean Water. Ensure that surface and groundwater supplies are sufficiently unpolluted to support local natural communities, the health of the human population, and the viability of agriculture and other commercial uses.

Policy WR-2.3: Avoid Erosion and Sedimentation.

Marin County Development Code

Marin County has the following code to ensure that the construction of new development and the establishment of new and modified uses contribute to the maintenance of a stable and healthy environment and minimize impacts to biological resources, that new development is harmonious in character with existing and future development, and that the use and enjoyment of neighboring properties are protected, as established in the Marin Countywide Plan.

22.20.040.E: Roosting Bat Protection Measures. For the purposes of protecting roosting bats, outdoor construction activity that involves tree removal in an area where a biological assessment has identified a high probability of roosting bats on site are subject to the requirements enumerated below before and during site preparation and construction activities, unless separate project mitigation measures have been adopted that override these requirements. These standards apply only to tree removal that takes place during the nesting seasons of March 1 and April 15 or between September 1 and October 15.

1. Trees identified as containing suitable roost habitat shall be removed using a two-step process if they are removed during the nesting season. Trees removed during the nesting season shall be felled the first day and left overnight before the felled trees are removed the following day or later.

2. A qualified biologist shall be responsible for overseeing the removal of trees that provide suitable bat habitat and will submit written confirmation to the County verifying that these measures have been undertaken.

22.20.040.F: Nesting Bird Protection Measures (excluding Northern Spotted Owl). For the purposes of protecting nesting birds, outdoor construction activity that involves tree removal, grading, or other site disturbances in an area where a biological assessment has identified a high probability of the presence of nesting birds are subject to the requirements enumerated below before and during site preparation and construction activities, unless separate project mitigation measures have been adopted that override these requirements.

1. Construction activities that may disturb birds shall be conducted outside the nesting season, which generally occurs between February 1 and August 15.

2. If commencing construction activities between August 16 and January 31 is infeasible and ground disturbance or tree removal needs to occur within the nesting season, a pre-construction nesting bird survey of the property shall be conducted by a qualified biologist. If no nesting birds are observed by the biologist, no further action is required, and construction activities shall occur within one week of the survey.

3. If active bird nests are observed during the pre-construction survey, a disturbance-free buffer zone shall be established around the nest tree(s) until the young have fledged, as determined by a qualified biologist.

4. To delineate the buffer zone around a nesting tree, orange construction fencing shall be placed at the specified radius from the base of the tree within which no machinery or workers shall intrude. After the fencing is in place, there will be no restrictions on grading or construction activities outside the

prescribed buffer zones, but County staff during routine site inspections may verify that fencing remains in place.

5. Pre-construction surveys will be documented and provided to the County by the qualified biologist. If construction fencing is required, photographs of the fencing, directly after installation, will be submitted to the County.

22.20.040.G: Northern Spotted Owl. For the purposes of protecting Northern Spotted Owls (*Strix occidentalis caurina*), outdoor construction activity that involves tree removal, grading, or other site disturbances in an area where a biological assessment has identified a spotted owl nest within 500 yards of a project are subject to the requirements enumerated below before and during site preparation and construction activities, unless separate project mitigation measures have been adopted that override these requirements.

1. Construction activities that may disturb Northern Spotted Owls shall be conducted outside the nesting season, which occurs between February 1 and July 9.

2. If conducting construction activities between July 10 and January 31 is infeasible and construction or tree removal needs to occur within the nesting season, a pre-construction survey shall first be conducted by a qualified biologist. If no Northern Spotted Owls are observed by the biologist, no further action is required, and construction activities shall occur within one week of the survey.

3. If active bird nests are observed during the pre-construction survey, a disturbance-free buffer zone of 500 yards shall be established around the nest tree(s) until the young have fledged, as determined by a qualified biologist.

4. To delineate the buffer zone around a nesting tree, orange construction fencing shall be placed at the specified radius from the base of the tree within which no machinery or workers shall intrude.

5. . Pre-construction surveys will be documented and provided to the County by the qualified biologist. If construction fencing is required, photographs of the fencing, directly after installation, will be submitted to the County.

3.4.2 Environmental Setting

This section describes landcover present within the Project area. Vegetation in the Project area was assessed during field surveys and vegetation categories were typified according to the Manual of California Vegetation (Sawyer et al. 2009).

Aquatic and Wetland Habitats

Aquatic habitat includes areas that are permanently or persistently inundated. Aquatic habitats that occur in the Project area are described below.

Riverine

Riverine habitat in the Project area is located in Nicasio Creek, Black Mountain Creek (a tributary to Lagunitas Creek) and other unnamed tributaries to Lagunitas Creek, Nicasio Creek, and Lucas Valley Creek. These features area generally characterized as having intermittent to perennial flow and a coarse matrix of gravel/cobble beds and fine sediments with earthen banks. Other riverine features within the Project area include minor intermittent or ephemeral drainages.

Terrestrial Habitats

Terrestrial habitats include upland areas, including forest/woodland, shrubland, grassland, and barren areas. Developed areas are also classified as terrestrial habitat. Terrestrial habitats in the Project area are described below.

Redwood Forest

Redwood forest habitats are largely restricted to areas of coastal influence with relatively stable temperatures and summer coastal fog. The tree composition includes redwood (*Sequoia sempervirens*) as the dominant/co-dominant species with California Bay (*Umbellularia californica*), Douglas fir (*Pseudotsuga menziesii*), and red alder (*Alnus rubra*). Redwood forest is present along Lucas Valley Road and Nicasio Valley Road.

Coast Oak Woodland

Coastal oak woodland is a variable habitat that consists of a canopy dominated by coast live oak (*Quercus agrifolia*). Other tree species, such as California Bay, walnut (*Juglans californica*), and arroyo willow (*Salix lasiolepis*) may present. Coast oak woodland occurs in the Project area along all three roads.

Arroyo Willow Thickets

Arroyo willow thickets communities include arroyo willow as the dominant or co-dominant shrub or tree in the canopy with other willow species (*Salix* spp.) and American dogwood (*Cornus sericea*) (Sawyer et al. 2009). This community is present in riparian areas along creeks and larger drainages.

California Annual Grassland

California annual grassland is present along some slopes in the Project area. Dominant species include slender oat (*Avena barbata*), wild oat (*A. fatua*), ripgut brome (*Bromus diandrus*), and soft brome (*B. hordeaceus*).

Ruderal

Ruderal land cover is characterized by non-native forbs and grasses in areas with frequent disturbance, typically along the edges of roadways or developed/landscaped areas.

Developed/Landscaped Areas

Developed/landscaped land cover is found throughout the Project area. This land cover includes roads, structures, paved surfaces, landscaped vegetation, and other anthropogenic features. Vegetation in these areas, if present at all, is usually sparse, dominated by opportunistic weedy herbaceous species or, in the landscaped areas, typically ornamental horticultural species.

Sensitive Natural Communities in the Project Area

Portions of the Project area contain sensitive natural communities as identified by California Department of Fish and Wildlife (CDFW) (CDFW 2021). Redwood forest and arroyo willow thickets are considered sensitive natural communities. Riparian areas along streams are also considered sensitive natural communities. As described in Section 3.4.1, "Regulatory Setting," wetlands and waters are protected by both federal and state regulations.

Critical Habitat

USFWS and NMFS have designed critical habitat for some species listed under the federal ESA. Critical habitat is a specific geographic area that contains features essential to the conservation of a listed species and that may require special management and protection. The USFWS Critical Habitat Mapper (USFWS 2022b) and NMFS critical habitat shapefiles (NMFS 2022) were consulted to determine the presence of designated Critical Habitat within the Project area (**Figure 3.4-4**). Several Project sites are located near, but not within designated critical habitat for Central California Coast (CCC) coho salmon evolutionarily significant unit (ESU) (*Oncorhynchus kisutch*) and CCC steelhead distinct population segment (DPS) (*Oncorhynchus mykiss*).

Special-Status Species

For the purposes of this IS/MND, special-status species are defined as:

- Species that are listed as threatened or endangered under the federal ESA (50 CFR 17.12 for listed plants, 50 CFR 17.11 for listed animals);
- Species that are candidates for possible future listing as threatened or endangered under ESA (76 FR 66370);

- Species that are listed or proposed for listing by the State of California as threatened or endangered under the CESA (14 California Code of Regulations [CCR] 670.5);
- Plants listed as rare under the California Native Plant Society (CNPS) (F&G Code Section 1900 et seq.);
- California Rare Plant Rank (CRPR) List 1, 2, 3, and 4 species;
- Species considered a locally significant species, that is, a species that is not rare from a statewide perspective but is rare or uncommon in a local context such as within a county or region (CEQA Guidelines Section 15125(c)) or is so designated in local or regional plans, policies, or ordinances. Examples include a species at the outer limits of its known range or a species occurring on an uncommon soil type; or
- Animals fully protected in California (F&G Code Sections 3511 [birds], 4700 [mammals], and 5050 [reptiles and amphibians]).

3.4.3 Discussion of Checklist Responses

Project AMMs implemented to minimize and reduce impacts related to biological resources are included in **Table 3.4-1** below. Reference to these AMMs occurs throughout this section.

Table 3.4-1. Biological Resources AMMs

AMM No.	AMM Title	AMM Description
GEN-1	Work Windows	▪ Ground-disturbing activities in the channel shall occur during the dry season (June 1 through October 31 or as allowed by permits). ▪ The construction work window may be extended provided that there is no measurable precipitation forecasted in the National Weather Service 72-hour forecast and consistent with the terms of regulatory permits and approvals. ▪ No work shall be conducted during or within 24 hours of a rain event (0.5 inches in a 24-hour period).
GEN-2	Minimize the Area of Disturbance	▪ Ground disturbance within the channel shall be kept to the minimum footprint necessary to complete project construction.

GEN-3	Erosion and Sediment Control	▪ At no time shall silt laden runoff be allowed to leave the project site within a waterway. Silt control structures shall be monitored for effectiveness and shall be repaired or replaced as needed. ▪ Erosion control measures shall be installed according to manufacturer's specifications. Appropriate erosion control measures include, but are not limited to, the following: silt fences, straw bale barriers, erosion control blankets and mats, and soil stabilization measures (e.g., tackified straw with seed, jute blankets, broadcast and hydroseeding). ▪ Erosion control fabrics shall consist of natural fibers that will biodegrade over time and are wildlife friendly. No plastic or other non-porous material shall be used as part of a permanent erosion control approach. Plastic sheeting may be used to temporarily protect a slope from runoff. ▪ All temporary construction-related erosion control methods (e.g., silt fences) shall be removed at the completion of construction. ▪ All soils disturbed or exposed during construction activities shall be seeded and stabilized using erosion control measures, such as erosion control fabric or hydromulch. Areas below the Ordinary High Water Mark are exempt from this AMM.
GEN-4	Fill, Spoils, and Stockpiled Materials	▪ Temporary fill materials, excavated spoils that have not yet been hauled off site, and stockpiled material not moved within 14 days shall be isolated with silt fence, filter fabric, and/or straw bales/fiber rolls. ▪ The Contractor shall designate areas suitable for material storage near construction entrances and at least 10-feet away from drainage courses and creeks. ▪ During wet weather or when rain is forecast within 72 hours, the Contractor shall cover materials that can contaminate rainwater or be transported by runoff to surface waters with a tarp or other waterproof material secured in a manner that would prevent any of the materials from contacting the rainwater.
GEN-5	On-site Hazardous Materials Management	▪ An inventory of all hazardous materials used (and/or expected to be used) at the worksite and the end products that are produced (and/or expected to be produced) after their use shall be maintained by the worksite manager. ▪ As appropriate, containers shall be properly labeled with a "Hazardous Waste" label and hazardous waste shall be properly recycled or disposed of off-site. ▪ Exposure of chemicals to precipitation shall be minimized by storing chemicals in watertight containers or in a storage shed (completely enclosed), with appropriate secondary containment to prevent any spillage or leakage. ▪ Petroleum products, chemicals, cement, fuels, lubricants, and non-storm drainage water or water contaminated with the

		aforementioned materials shall not contact soil and shall not be allowed to enter surface waters. ▪ All toxic materials, including waste disposal containers, shall be covered when they are not in use, and located as far away as possible from a direct connection to the storm drainage system or surface water. ▪ The storage and disposal of all hazardous materials, such as pesticides, paints, thinners, solvents, and fuels; and all hazardous wastes, such as waste oil and antifreeze; shall comply with all federal, state, and local standards and requirements. ▪ When rain is in the forecast within 72 hours or during wet weather, the Contractor may not apply chemicals in the outside areas. ▪ If hazardous materials are encountered at the project site, the Contractor shall remove and dispose of them according to the Spill Prevention and Response Plan (see GEN-6).
GEN-6	Spill Prevention and Response Plan	To minimize the potential adverse effects due to the release of chemicals, fuels, lubricants, and non-storm drainage water into waterways, the County or the Contractor shall develop a Spill Prevention and Response Plan to be implemented by the Contractor and all field personnel. The plan shall contain guidelines for cleanup and disposal of spilled and leaked materials at the project site. The plan shall include, but not be limited to, the following measures: ▪ Contractor's designated field personnel shall be appropriately trained in spill prevention, hazardous material control, and cleanup of accidental spills. ▪ Equipment and materials for cleanup of spills shall be available on site, and spills and leaks shall be cleaned up immediately and disposed of according to the following guidelines: – For small spills on impervious surfaces, absorbent materials shall be used to remove the spill, rather than hosing it down with water. – For small spills on pervious surfaces such as soil, the spill shall be excavated and properly disposed of rather than being buried. ▪ Absorbent materials shall be collected and disposed of properly and promptly. ▪ If the waste is hazardous, the Contractor shall comply with all federal, state, and local hazardous waste requirements. ▪ Spill response kits and a stockpile of spill cleanup materials such as rags or absorbents shall be on hand at all times while hazardous materials are in use (e.g., at crew trucks and other logical locations). All field personnel shall be advised of these locations. ▪ The Contractor shall routinely inspect the work site to verify that spill prevention and response measures are properly implemented and maintained.

GEN-9	Pavement Saw-cutting Operations	The Contractor shall prevent any saw-cutting debris from entering nearby waterways. The Contractor shall use dry cutting techniques and sweep up residue when practicable. If wet methods are used, the Contractor shall vacuum slurry as cutting proceeds or collect all wastewater by constructing a sandbag sediment barrier. The bermed area shall be of adequate size to collect all wastewater and solids. The Contractor shall allow collected water to evaporate if the wastewater volume is minimal and if maintaining the ponding area does not interfere with public use of the street area or create a safety hazard. ▪ If approved by the Engineer, the Contractor may direct or pump saw-cutting wastewater to a dirt area and allow to infiltrate. The dirt area shall be adequate to contain all the wastewater. After wastewater has infiltrated, all remaining saw-cutting residue must be removed and disposed of properly. Remaining silt and debris from the ponding or bermed area shall be removed or vacuumed and disposed of properly. ▪ If a suitable dirt area is not available, with the approval of the Engineer, the Contractor shall filter the saw-cutting wastewater through filtering materials and methods meeting Association of Bay Area Governments (ABAG) Standards for Erosion and Sedimentation Control Measures (latest edition) before discharging off-site.
GEN-10	Concrete Operations	The Contractor shall prevent the discharge of pollutants from concrete operations by properly disposing of waste, and by implementing the following practices: ▪ Store all materials in waterproof containers or under cover away from drain inlets or drainage areas. ▪ Avoid mixing excess amounts of Portland cement material. ▪ Do not wash out concrete trucks into storm drains, open ditches, streets, streams, etc. Whenever possible, perform washout of concrete trucks off site where discharge is controlled and not permitted to discharge into the storm drain system. For onsite washout, locate washout area at least 50 feet from storm drains, open ditches or other water bodies, preferably in a dirt area. Control runoff from the area by constructing a temporary pit or bermed area large enough for the liquid and solid waste. ▪ Wash out concrete wastes into the temporary pit where the concrete can set, be broken up and then disposed of properly. If the volume of water is greater than what will allow concrete to set, allow the water to infiltrate and/or evaporate, if possible. Remove or vacuum the remaining silt and debris from the pond or beamed area and dispose of it properly. ▪ Dispose of water from washing of exposed aggregate to dirt area. The dirt area shall be adequate to contain all the wastewater and once the wastewater has infiltrated, any remaining residue must be removed. If a suitable dirt area is not available, then the Contractor shall filter the wash water through straw bales or other filtering

		materials meeting ABAG Standards for Erosion and Sediment Control Measures before discharging to the sanitary sewer with approval from the Engineer. ▪ Collect and return sweepings from exposed aggregate concrete to a stockpile or dispose of the waste in trash containers. ▪ Ensure that poured concrete be excluded from the wetted channel for a period of 30 days after it is poured. During that time, the poured concrete shall be kept moist, and runoff from the concrete shall not be allowed to enter the stream. Containment structures shall be installed to control the placement of wet concrete and to prevent it from entering the channel outside of those structures. Commercial sealants may be applied to the poured concrete surface where difficulty in excluding water flow for a long period may occur. If sealant is used, water shall be excluded from the site until the sealant is dry.
GEN-14	Instream Work	▪ Instream work shall be conducted from the top of bank to the maximum extent feasible. ▪ Any work using equipment within the stream channel shall be performed in isolation from a flowing stream. If flow is intermittent and does not support fish habitat, excavation may occur within the wetted portion of the channel after installing a sediment boom downstream to allow turbid waters to settle out before being released downstream after sediment removal.
GEN-15	Dewatering Measures	When work in flowing streams is unavoidable, streamflow shall be diverted around the work area with use of a temporary dam or bypass according to the measures below and in conjunction with AMM BIO-1: ▪ Prior to dewatering, the best means to bypass flow through the work area shall be determined to minimize disturbance to the channel and avoid direct mortality of fish and other aquatic vertebrates. ▪ Instream cofferdams shall only be built from materials such as clean gravel, or rubber bladders which shall cause little or no siltation or turbidity. No earthen fill shall be used to construct the cofferdam. ▪ Streamflow shall be allowed to gravity flow around or through the work site using temporary bypass pipes or culverts. Bypass pipe diameter shall be sized to accommodate, at a minimum, twice the volume of the summer baseflow. ▪ If a work site is to be temporarily dewatered by pumping, intakes shall be completely screened with wire mesh not larger than 5 millimeters to prevent amphibians from entering the pump system. On Black Mountain Creek, the intake pipe shall be fitted with fish screens meeting California Department of Fish and Wildlife (CDFW) and National Marine Fisheries Service (NMFS) criteria to prevent entrainment or impingement of small fish. ▪ If necessary, discharged water shall pass over some form of energy dissipater to prevent erosion of the downstream channel. Silt bags

		shall be equipped to the end of discharge hoses and pipes to remove sediment from discharged water. ▪ If used, temporary pump discharge pipes and hoses shall be designed to minimize turbidity and the potential to wash contaminants into the stream. A filtration/settling system shall be included to reduce downstream turbidity (e.g., filter fabric, turbidity curtain, etc.). The selection of an appropriate system is based on the rate of discharge. If feasible, water that is pumped into a pipe should discharge onto the top of bank into a densely vegetated area. ▪ When construction is completed, the flow diversion structure shall be removed as soon as possible but no more than 48-hours after work is completed. When diversion structures are removed, to the extent practicable, the ponded flows shall be directed into the low-flow channel within the work site to minimize downstream water quality impacts.
BIO-1	Relocation of Aquatic Species for Dewatering	As identified above, before a work area is dewatered, fish and other aquatic vertebrates shall be captured and relocated to avoid injury and mortality and minimize disturbance. The following guidelines shall apply: ▪ Before removal and relocation begins, a qualified biologist shall identify the most appropriate release location(s). Release locations should have water temperatures similar to the capture location and offer ample habitat for released aquatic species, and should be selected to minimize the likelihood of reentering the work area or becoming impinged on the exclusion net or screen. ▪ The means of capture shall depend on the nature of the work site, and shall be selected by a qualified biologist who is experienced with capture and handling protocols for fish and aquatic species. Pumping down the pool and then seining or dipnetting shall be the primary method of capture and relocation of aquatic species. Electrofishing shall be used only as a last resort; if electrofishing is necessary, it shall be conducted only as approved by U.S. Fish and Wildlife Service (USFWS), NMFS, and CDFW, and by properly trained personnel following the NMFS Guidelines dated June 2000. ▪ To the extent feasible, relocation shall be performed during morning periods. Air and water temperatures shall be measured periodically, and relocation activities shall be suspended if temperatures exceed the limits allowed by NMFS guidelines. ▪ To prevent aquatic species from reentering the work area, the channel shall be blocked by placing fine-meshed nets or screens above and below the work area. To minimize entanglement, mesh diameter shall not exceed 1/8 inch. The bottom edge of the net or screen shall be secured to the channel bed to prevent fish from passing under the screen. Exclusion screening shall be placed in low velocity areas to minimize impingement. Screens shall be checked periodically and cleaned of debris to permit free flow of water.

		▪ Handling of aquatic vertebrates shall be minimized. When handling is necessary, personnel shall wet hands or nets before touching them. ▪ Fish shall be held temporarily in cool, shaded water in a large container with a lid. Overcrowding in containers shall be avoided. Aeration shall be provided with a battery-powered external bubbler. Fish shall be protected from jostling and noise, and shall not be removed from the container until the time of release. A thermometer shall be placed in each holding container and partial water changes shall be conducted as necessary to maintain a stable water temperature. If water temperature reaches or exceeds NMFS limits, fish shall be released and relocation operations shall cease. If fish are abundant, capture shall cease periodically to allow release and minimize the time fish spend in holding containers. ▪ Fish shall not be anesthetized or measured. However, they shall be visually identified to species level, and year classes shall be estimated and recorded. ▪ Reports on fish relocation activities shall be submitted to CDFW and NMFS in a timely fashion. ▪ If mortality during relocation exceeds 5%, relocation shall cease and CDFW and NMFS shall be contacted immediately or as soon as feasible. ▪ When feasible, initial fish relocation efforts shall be performed several days prior to the scheduled start of construction. The fisheries biologist shall perform a survey on the same day before construction begins to verify that no fish have moved back into the work area. ▪ A biological monitor shall check daily for stranded aquatic life in areas that have been dewatered or that contain surface waters.
BIO-2	Protection of Special-Status Amphibian and Reptile Species	▪ At least seven (7) calendar days prior to the onset of project construction, a USFWS- or CDFW-approved biologist(s) shall conduct pre-construction surveys for special status amphibian and reptile species. ▪ If special status species are found at any time during project activities, work at that location shall cease and USFWS and CDFW will be contacted. The County or its Contractors shall prepare a relocation plan for moving special status species from the project area. ▪ Only USFWS- or CDFW-approved biologists shall participate in activities associated with the capture, handling, and monitoring of special status amphibians and reptile species. Biologists involved with the surveying/handling of the special status amphibians and reptile species shall employ sterilization techniques appropriate to avoid the transmission of chytrid fungus to or from the site.

BIO-3	Northern Spotted Owl	Project activities that involve tree removal, excavation, or grading within 500 yards of a known northern spotted owl (NSO) (*Strix occidentalis caurina*) nest site are subject to the requirements described below, unless separate project mitigation measures have been adopted that override these requirements: ▪ Construction activities that may disturb NSO shall be conducted outside the nesting season (February 1 – July 31). ▪ If conducting construction activities outside of NSO nesting season is infeasible and construction or tree removal needs to occur within the nesting season, a USFWS protocol-level survey shall first be conducted by a qualified biologist. If no NSO are detected during survey(s), no further action is required, and construction activities shall occur within 1-week of the survey. ▪ If active NSO nests are observed during the survey(s), a disturbance-free buffer zone of 500 yards shall be established around the nest tree(s) until the young have fledged, as determined by a qualified biologist. ▪ Pre-construction surveys shall be documented and provided to the County by the qualified biologist. If construction fencing is required, photographs of the fencing, directly after installation, shall be submitted to the County.
BIO-4	Nesting Birds	To the extent feasible, construction activities shall be scheduled to avoid the nesting season (February 1 – August 15). ▪ If it is not possible to schedule project activities outside the nesting bird, pre-construction surveys for nesting birds shall be conducted by a qualified biologist to ensure that no nests shall be disturbed during project implementation. These surveys shall be conducted no more than seven days prior to the initiation of project activities, including tree and vegetation removal. During this survey, the biologist shall inspect all trees and other potential nesting habitats (e.g., shrubs, ruderal grasslands, and structures) in and immediately adjacent to the construction areas for nests. Preconstruction surveys shall be provided to the County by the qualified biologist. ▪ If an active nest is found sufficiently close to work areas to be disturbed by these activities, a non-disturbance buffer zone shall be established around the nest at the biologist's discretion and in accordance with regulatory permits and conditions to ensure that no nests of species protected by the Migratory Bird Treaty Act and California Fish and Game Code shall be disturbed during project implementation. The boundary of each buffer zone shall be marked with orange construction fencing if work shall occur immediately outside the buffer zone. All protective buffer zones shall be maintained until the nest becomes inactive, as determined by a qualified biologist. If construction fencing is required, photographs of the fencing, directly after installation shall be submitted to the County.

BIO-5	Dusky-footed Woodrat	▪ A qualified biologist shall conduct surveys for San Francisco dusky-footed woodrat nests within the project area within 30 days of the start of project activities. If no nests are found, then no further measures shall be warranted. If nests are found, then the following measures shall be implemented: ▪ A minimum 10-foot non-disturbance buffer shall be maintained between construction activities and each nest. In some situations, a smaller buffer may be allowed if in the opinion of a qualified biologist removing the nest would be a greater impact than that anticipated as a result of project activities. ▪ If a dusky-footed woodrat house(s) cannot be avoided, CDFW shall be notified and information regarding the house location(s) and relocation plan shall be provided. With approval from CDFW, a qualified biologist shall dismantle and relocate the house material. No less than 10 days prior to the beginning of construction a qualified biologist shall deconstruct the house by hand. Materials from the house shall be dispersed into adjacent suitable habitat that is outside of the work area. During the deconstruction process the biologist shall attempt to assess if there are juveniles in the house. If immobile juveniles are observed, the deconstruction process shall be discontinued until a time when the biologist believes the juveniles shall be fully mobile. A 25-foot-wide no-disturbance buffer shall be established around the house until the juveniles are mobile. The house may be dismantled once the biologist has determined that adverse effects on the juveniles would not occur. All disturbances to woodrat houses shall be documented in a construction monitoring report and submitted to CDFW.

BIO-6	Bat Colonies	To minimize impacts on bat maternity colonies during the maternity season (March 15 – August 31) or non-reproductive roosting bats during the non-maternity season (September 1 – March 14) a pre-activity survey for roosting bats shall be conducted prior to the onset of ground-disturbing activities. A qualified biologist shall conduct a survey to look for evidence of bat use within suitable habitat. If evidence of use is observed, or if high-quality roost sites are present in areas where evidence of bat use might not be detectable (such as a tree cavity), an evening emergence survey and/or a nocturnal acoustic survey may be necessary to determine if a bat colony is present and to identify the specific location of the bat colony. ▪ If no active maternity colony or non-breeding bat roost is located, project work can continue as planned. ▪ If an active maternity colony or non-breeding roost is located, the project work shall be modified to avoid disturbance of the roosts, if feasible. ▪ If an active maternity colony is located and project work cannot be modified to avoid removal or disturbance of the occupied tree, disturbance shall be scheduled to take place outside the maternity roost season (March 15–August 31), and a non-disturbance buffer zone (determined by a qualified biologist) shall be implemented during the maternity roost season. ▪ If an active non-breeding bat roost is located and project work cannot be modified to avoid removal of the occupied tree, the tree shall be removed using a two-day phased method as follows: Day 1, under supervision of a qualified biologist, tree limbs not containing suitable bat roosting habitat shall be removed using chainsaws only; then, Day 2, the rest of the tree can be removed. The qualified biologist shall submit written confirmation to the County that appropriate measures have been undertaken.

a. Substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species – Less than Significant with Mitigation

The evaluation of potential impacts of the Proposed Project on biological resources is based on information gathered during reconnaissance surveys of Proposed Project sites as well as a review of relevant background information. Relevant background information includes data from the following sources:

- CDFW California Natural Diversity Database (CNDDB) query of the U.S. Geological Survey (USGS) 7.5-minute quadrangles containing and surrounding the Proposed Project (Point Reyes NE, Petaluma, Petaluma River, Inverness, San Geronimo, San Rafael, Novato, Double Point, and Bolinas) (Appendix B);

- USFWS Information for Planning and Consultation (IPaC) List of Federally Endangered and Threatened Species that may Occur in the Proposed Project, and/or may be Affected by the Proposed Project (USFWS 2022; Appendix B);

- CNPS's Inventory of Rare and Endangered Plants of California queries for the USGS 7.5-minute quadrangles containing and surrounding the Proposed Project (CNPS 2022; provided in Appendix B); and

- National Oceanic and Atmospheric Administration (NOAA) NMFS West Coast Region California Species List (Appendix B).

The potential for special-status species to occur in areas affected by Proposed Project activities was evaluated according to the following criteria:

- **None:** the Proposed Project is outside of species' range, record is possibly or presumed extirpated, or lacks suitable habitat capable of supporting the species.

- **Not Expected:** marginal to poor quality habitat is present in the Proposed Project or isolated from the nearest extant occurrence record(s), and/or the species is not known to occur in the area.

- **Possible:** suitable habitat is present in the Proposed Project that could support the species as it is within the species range and/or near an occurrence record.

- **Present:** the species was either observed directly or its presence was confirmed by field investigations or previous studies in the Proposed Project.

Appendix B, Tables B-1 and B-2 list the special-status plant, fish, and wildlife species with potential to occur in the vicinity of the Proposed Project sites, and **Figures 3.4-1** through **3.4-3** show the CNDDB occurrences of special-status plants and animals within a 2-mile radius of the Proposed Project, and northern spotted owl occurrences. **Figure 3.4-4** shows Critical Habitats in the Project area.

Impacts to Special-status Plant Species

Ground-disturbing activities have the potential to destroy or otherwise harm special-status plant species if they are present in work areas. Appendix B lists special-status plant species known to occur in the vicinity of the Proposed Project. None of these special-status plant species were observed within Project sites; however, 19 species are considered to have a "possible" potential to occur in areas affected by Proposed Project activities. Some species that are restricted to growing on serpentine substrates only have a potential to occur at site Lucas Valley Milepost (MP) 5.78.

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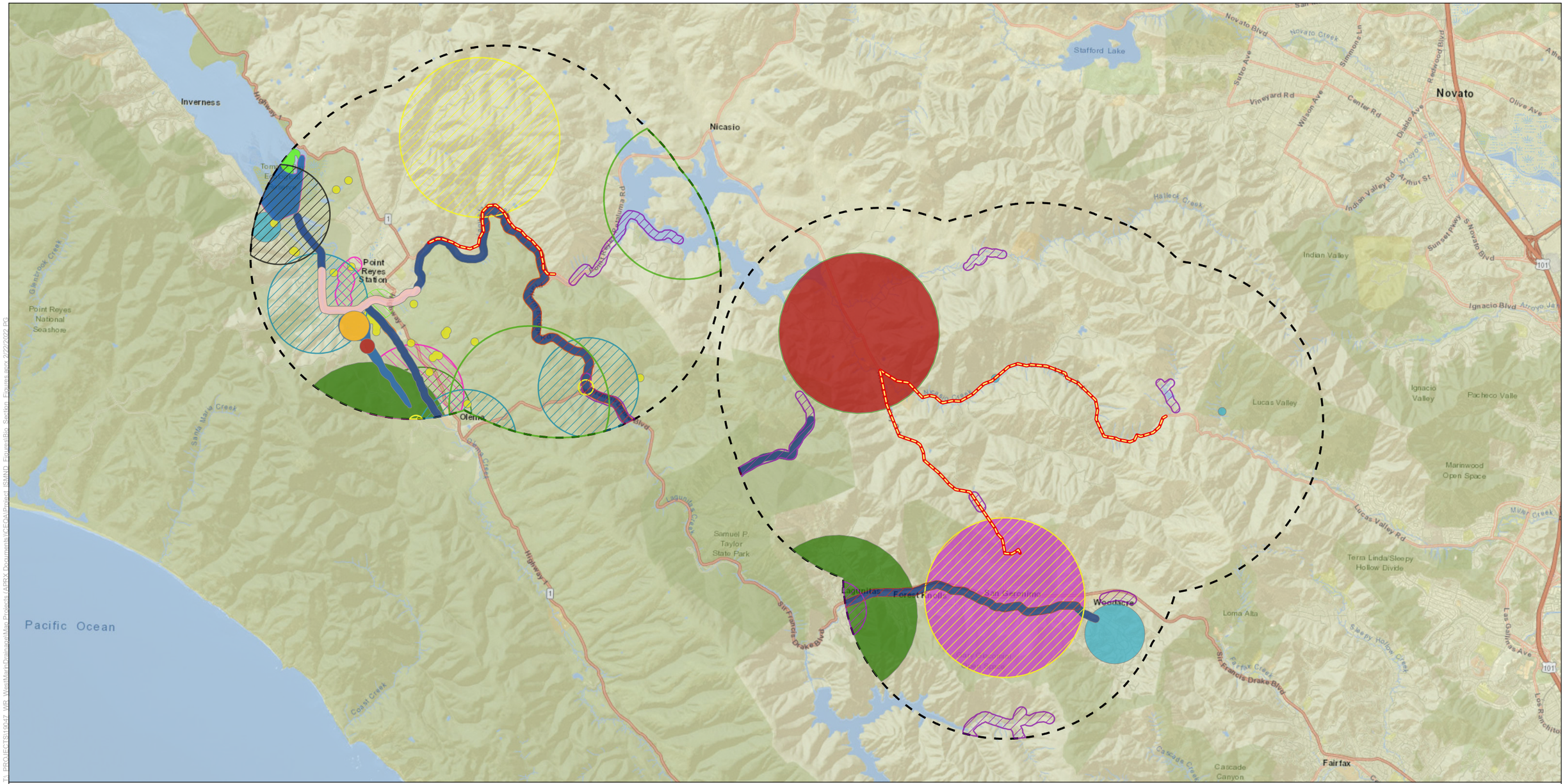

California Natural Diversity Database - Wildlife Occurrences

Source: CDFW 2022. January update.
Occurrences documented between 1892 and 2018.

Horizon WATER and ENVIRONMENT

Figure 3.4-1
Special-status Wildlife Species within the Vicinity of the Project sites

West Marin Drainage Maintenance Project
Initial Study/Mitigated Negative Declaration

Data Source: ESRI 2018, Wood Rogers 2020, CNDDB, January 2022

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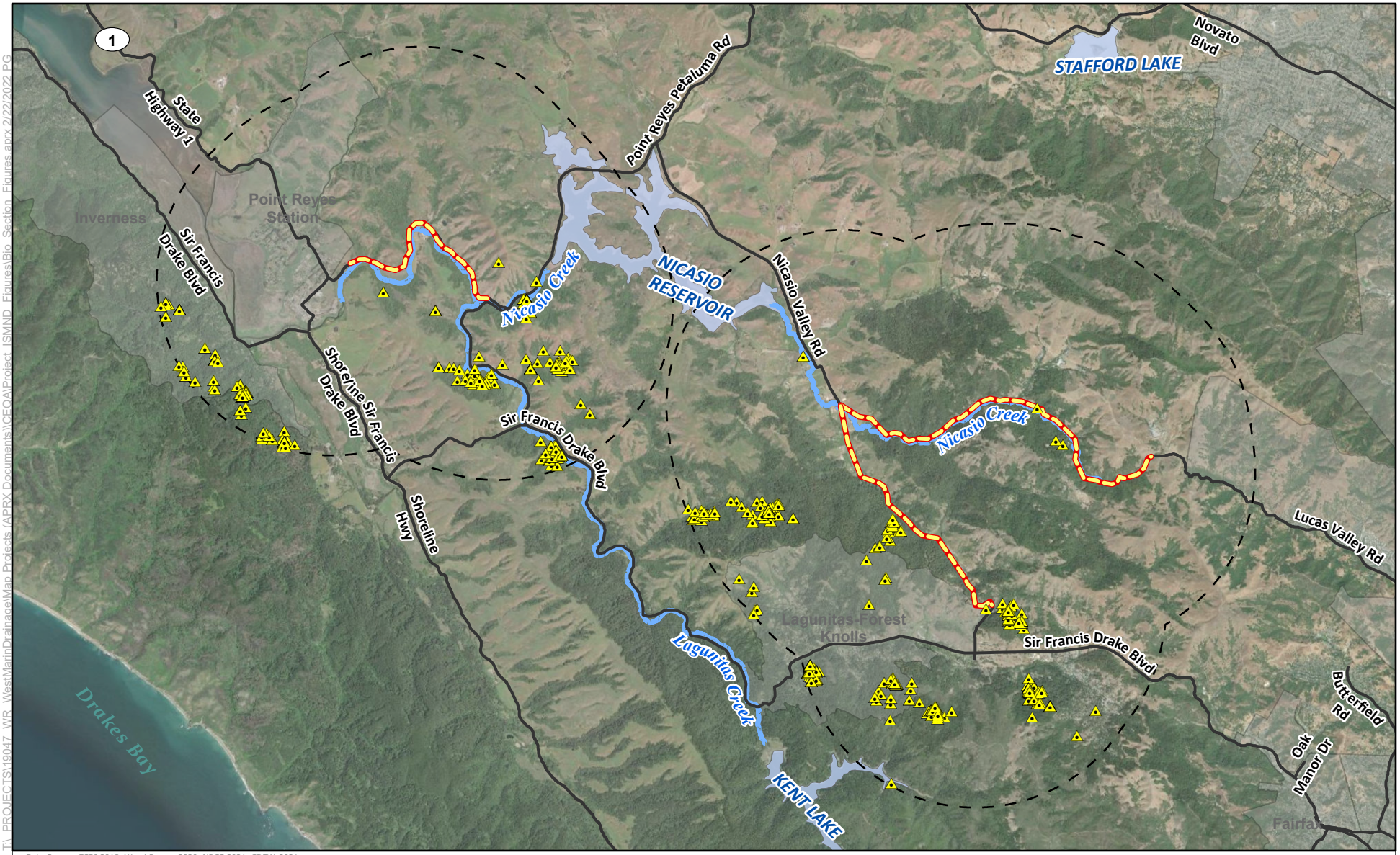

Data Source: ESRI 2018, Wood Rogers 2020, NRCS 2021, CDFW, 2021

N

0 1 2
Miles

Project Road Extent

2-mile buffer

Northern Spotted Owl Observations

Source: CDFW 2022. January update.
Occurrences documented between 1919 and 2019.

Major Road

Stream/River: Perennial

Lake or Enclosed Waterbody

Communities

Figure 3.4-2
Northern Spotted Owl Observations within the Vicinity of the Project sites

West Marin Drainage Maintenance Project
Initial Study/Mitigated Negative Declaration

Horizon WATER and ENVIRONMENT

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Project Road Extents
2-mile Buffer

N

0 1
Miles

California Natural Diversity Database - Plant Occurrences

- Bolander's water-hemlock
- Humboldt Bay owl's-clover
- Koch's cord moss
- Lyngbye's sedge
- Marin County navarretia
- Marin checker lily
- Marin checkerbloom
- Marin knotweed
- Marin manzanita
- Marin western flax
- Mt. Tamalpais bristly jewelflower
- Mt. Tamalpais manzanita
- Mt. Tamalpais thistle
- Napa false indigo
- Nicasio ceanothus
- North Coast semaphore grass
- Point Reyes checkerbloom
- Point Reyes horkelia
- Point Reyes salty bird's-beak
- Sanford's arrowhead
- Sonoma alopecurus
- Tamalpais jewelflower
- Tamalpais lessingia
- Tamalpais oak
- Tiburon buckwheat
- Tiburon paintbrush
- bent-flowered fiddleneck
- bluff wallflower
- coastal marsh milk-vetch
- coastal triquetrella
- congested-headed hayfield tarplant
- fragrant fritillary
- perennial goldfields
- seaside bittercress
- swamp harebell
- two-fork clover
- water star-grass
- western leatherwood
- woolly-headed gilia

Source: CDFW 2022. January update.
Occurrences documented between 1886 and 2020.

Horizon WATER and ENVIRONMENT

Data Source: ESRI 2018, Wood Rogers 2020, NRCS 2021, CNDDB January, 2022

Figure 3.4-3
Special Status Plants in the Vicinity of the Project Sites

West Marin Drainage Maintenance Project
Initial Study/ Mitigated Negative Declaration

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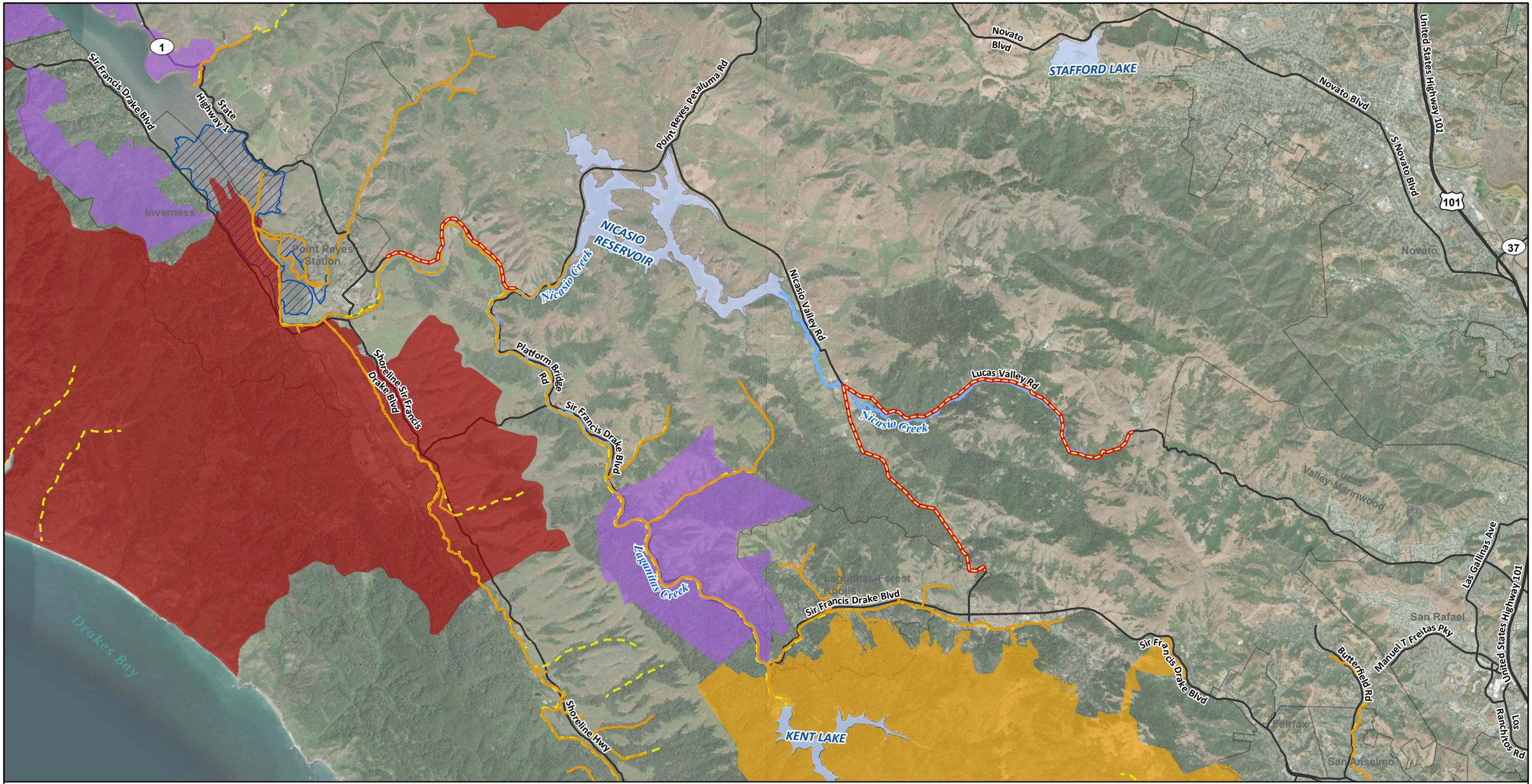

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Data Source: ESRI 2018, Wood Rogers 2020, NRCS 2021, CDFW, 2021

N

0 1 2
Miles

Horizon WATER and ENVIRONMENT

- Project Road Extent
- Steelhead - CCC DPS
- Coho Salmon - CCC ESU
- Tidewater Goby
- Marbled Murrelet
- Northern Spotted Owl
- California Red-legged Frog

Source: USFWS 2022b

- Lake or Enclosed Waterbody
- Stream/River: Perennial
- Major Road
- Communities

Figure 3.4-4
Critical Habitat within the Vicinity of the Project sites

West Marin Drainage Rehabilitation Project
Initial Study/Mitigated Negative Declaration

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It is the County's intent to avoid impacts to special-status plant species, to the greatest extent feasible. Standard operating procedures for Proposed Project activities include implementing AMM GEN-2: Minimize the Area of Disturbance and AMM GEN-4: Staging and Stockpiling of Materials listed above in **Table 3.4-1**. Implementation of AMMs GEN-2 and GEN-4 would reduce the potential for impacts to special-status plant species by minimizing the area of disturbance. However, impacts could still occur if special-status plants are present in the Proposed Project sites. Implementation of **Mitigation Measure BIO-1: Avoid Special-status Plant Species** would reduce the potential for impacts to special-status plants through surveys by a qualified biologist, avoidance of these species if present, and implementation of minimization measures if they cannot be avoided.

Mitigation Measure BIO-1: Avoid and Minimize Impacts to Special-Status Plant Species

A. A qualified botanist will conduct surveys of Project sites identified as suitable habitat for special status plant species prior to commencement of work.

B. Surveys will be conducted during the appropriate time of the year to adequately identify plants.

C. The qualified botanist will ensure avoidance and minimize impacts by implementing one or more of the following, as appropriate, per the botanist's recommendation:

   I. Flag or otherwise delineate in the field the special status plant populations and/or sensitive natural community to be protected;

   II. Allow adequate buffers around plants; the location of the buffer zone will be marked in the field with stakes and/or flagging in such a way that exclusion zones are visible to project personnel without excessive disturbance of the sensitive habitat or population itself (e.g., from installation of fencing).

   III. Time construction or other activities during dormant and/or non-critical life cycle period.

D. If special-status plant species are present and the Proposed Project cannot avoid impacts to the species, then a qualified botanist will determine the ecologically appropriate minimization measures for the species. Minimization measures may include transplanting, seed collection, or both, depending on the physiology of the species.

E. The County will not conduct Proposed Project activities that would result in the reduction of a plant species range or compromise the viability of a local population.

By implementing Mitigation Measure BIO-1, along with the other AMMs listed above, the Proposed Project is not likely to result in a substantial adverse effect on any special-status plant species or their habitat. Therefore, this impact would be **less than significant with mitigation**.

Impacts to Special-status Invertebrate Species

No special-status invertebrates have the potential to occur within the Proposed Project. California freshwater shrimp (*Syncaris pacifica*) is known to occur in Lagunitas Creek, which is connected to Black Mountain Creek during high flows. However, Black Mountain Creek is inhabitable for California freshwater shrimp during periods of low flow due to the intermittent surface flow, shallow water depth, and physical barriers that prohibit movement upstream to the Project area at Black Mountain Creek, Point Reyes – Petaluma Road MP 12.33. During periods of high flow, water depth and hydrological surface connectivity increases but episodic high winter pulse flows and significant streamflow velocity likely prevent upstream movement and/or sustained occupation of this species in Black Mountain Creek. Implementation of the Proposed Project would reduce sedimentation into Lagunitas Creek, and would thus improve habitat for California freshwater shrimp. Therefore, this impact would be **less than significant**.

Impacts to Special-status Fish Species

Appendix B lists the special-status fish species known to occur in the vicinity of the Project area and **Figure 3.4-5** identifies essential fish habitat near the Project area. Of the eight species returned from the database searches, five have no potential to be impacted by Project activities because they were locally extirpated, the maintenance sites lacked suitable habitat for those species, or there are no known natal rivers for that species in or upstream of the maintenance sites.

Special-status fish may occur in the Lagunitas Creek Watershed downstream of Nicasio Reservoir. The culvert at Point Reyes – Petaluma Road MP 12.33 conveys Black Mountain Creek, an intermittent tributary to Lagunitas Creek. While Black Mountain Creek remains dry much of the year, a spring fed seep approximately 400 linear feet upstream of MP 12.33 maintains a perennial segmented reach directly upstream and downstream of Point Reyes – Petaluma Road. Flow from this seep fills scour pools at the Point Reyes – Petaluma Road MP 12.33 culvert inlet and outlet, and a third, smaller pool approximately 60 feet farther downstream of the culvert. In the absence of storm events that can provide continuous flow along the entire stream, these pools are disconnected and isolated most of the year. However, although limited in size, these pools provide suitable habitat for fish. Farther upstream, beyond 400 feet of the culvert, and approximately 150 feet downstream of the culvert, conditions are drier and do not support pools, except for the periods as described above when storm events create continuous flow along Black Mountain Creek.

The Central California Coast ESU coho salmon and Steelhead trout – Central California Coast Distinct Population Segment (DPS) were observed in these pools during field assessments. Tomales roach (*Lavina symmetricus ssp. 2*) were not directly observed but may also be present in Black Mountain Creek. Since salmonids of differing life stages (i.e., spawning and juvenile) were observed in the downstream scour pool at Point Reyes – Petaluma Road MP 12.33 and suitable spawning substrate is present at this location, impacts to individual fish or loss of the instream habitat would be considered a significant impact to special-status fish species and their habitat. Impacts to special-status fish at the Point Reyes – Petaluma Road MP 12.33 site could occur from dewatering, Project-related erosion or sedimentation, change in bed substrate, or accidental leaks or spills of hazardous materials. Proposed Project activities at Point Reyes – Petaluma Road at MP 12.33 could require relocation of special-status fish individuals, if present at the time of construction.

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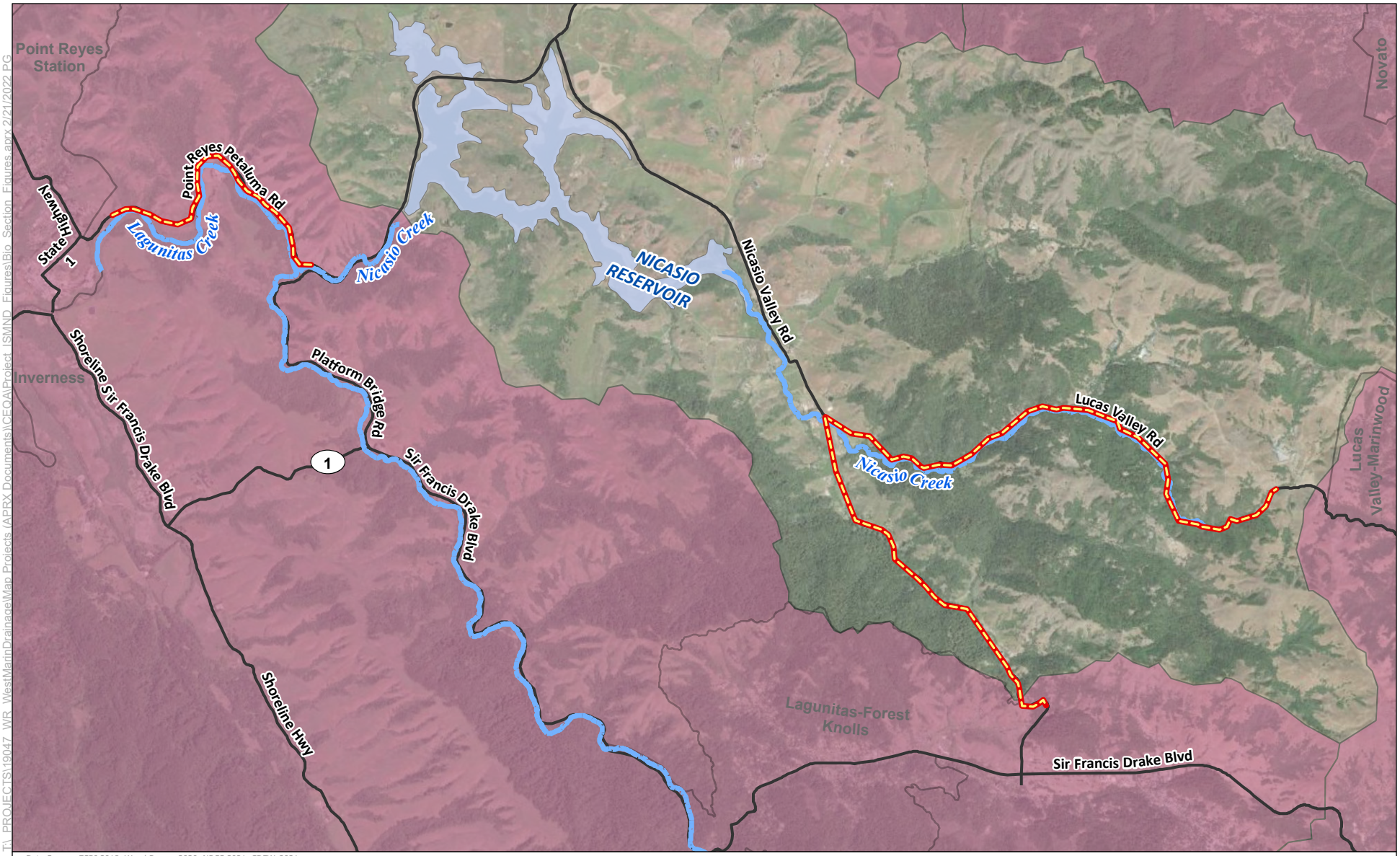

Figure 3.4-5
Essential Fish Habitat within the Vicinity of the Project sites

West Marin Drainage
Rehabilitation Project
Initial Study/Mitigated Negative Declaration

Horizon WATER and ENVIRONMENT

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Special-status fish would not occur at other maintenance sites along Point Reyes – Petaluma Road (MPs 13.67, 13.29, 13.25, 12.33, 11.88, 11.85, 11.76, 11.71, 11.56, 11.47, and 11.17) as these locations do provide sufficient or sustained surface waters to support these species. However, these maintenance locations drain to Lagunitas Creek during storm events and periods of high flow. Exposure to leaked hazardous materials or suspended sediments could potentially affect species downstream in Lagunitas Creek.

Work proposed at the Point Reyes – Petaluma Road MP 12.33 location includes repairing the failing culvert and stabilizing the culvert outfall area. The Proposed Project would embed the culvert invert and repair/line the culvert interior. Rock would be embedded in the culvert bottom to increase roughness inside the pipe and improve fish mobility through the culvert. Additionally, the end of the culvert outfall would be beveled to reduce the vertical distance from the scour pool water surface to the culvert interior, thus allowing for easier fish entrance into culvert. The Proposed Project would maintain the downstream pool size, depth, and substrate material to the furthest extent feasible. Dissipating the streamflow energy out of the culvert, reducing the vertical distance from the pool to the culvert, and repairing the culvert interior would improve upstream mobility for fish at this location and maintain or improve habitat conditions for coho salmon and steelhead in the Project area.

It is the County's intent to avoid and minimize impacts to special-status fish species, to the greatest extent feasible. Standard operating procedures for the Proposed Project include implementing AMM GEN-15: *Dewatering Measures* and AMM BIO-1: *Relocation of Aquatic Species for Dewatering*. These measures would require diversion of streamflow around the work area when work in flowing streams is unavoidable, screening of pump intakes, and capture and relocation of fish and other aquatic vertebrates to avoid injury and mortality and minimize disturbance. AMM GEN-1 restricts instream activities from June 1 through October 31 (or as otherwise allowed by regulatory permits) thereby avoiding peak migration periods for anadromous salmonids.

The following AMMs would further minimize potential impacts to special-status fish species and their habitats:

- AMM GEN-1: Work Windows
- AMM GEN-2: Minimize the Area of Disturbance
- AMM GEN-3: Erosion and Sediment Control
- AMM GEN-4: Fill, Spoils, and Stockpiled Materials
- AMM GEN-5: On-site Hazardous Materials Management
- AMM GEN-6: Spill Prevention and Response Plan

- AMM GEN-9: Pavement Saw-cutting Operations
- AMM GEN-10: Concrete Operations
- AMM GEN-14: Instream Work

Complete descriptions of these AMMs are provided in Table 3.4-1 above. Implementing these measures would avoid and minimize impacts to special-status fish species and their habitat.

Repair of slip-outs and culverts would reduce sedimentation into streams in the Project area. These measures are likely to result in beneficial effects to special-status fish species and their habitat. By implementing Project AMMs, the Proposed Project is not likely to result in a substantial adverse effect on any special-status fish species or their habitat. Therefore, this impact would be **less than significant**.

Impacts to Special-status Amphibian and Reptile Species

Appendix B lists the special-status amphibian and reptile species with the potential to occur in the vicinity of the Project area. Special-status amphibians with the potential to occur in the Proposed Project include the California red-legged frog (CRLF) (*Rana draytonii*), foothill yellow-legged frog (FYLF) (*R. boylii*), and California giant salamander (CGS) (*Dicamptodon ensatus*) (observed at Project sites during field surveys). Special-status reptiles with the potential to occur include western pond turtle (WPT) (*Actinemys marmorata*), which has been recorded in Nicasio Creek upstream of Nicasio Reservoir (CDFW 2022).

FYLFs are not known to utilize underground habitat to the same extent as CRLFs or CGSs, so these species are less susceptible to Project impacts due to the seasonal timing of work conducted during the dry months (per AMM GEN-1). Most Project impacts would be temporary (e.g., temporary reduction in habitat quality or indirect disturbance of individuals from culvert replacement or slip-out repair); however, maintenance activities may result in the injury or mortality of individuals due to worker foot traffic and equipment use. Substrate vibrations or dewatering may cause individuals to move out of refugia, exposing them to a greater risk of predation or desiccation; such vibrations may also interfere with predator detection, causing a decrease in time spent foraging. In addition, CRLFs and CGSs may be crushed in their burrows or trapped and suffocated by the passage of heavy equipment.

Project activities could indirectly impact individuals or reduce the habitat quality by removing breeding substrate or escape cover in areas where Project activities occur, and increasing creek turbidity and downstream sedimentation as a result of ground disturbing activities. Localized habitat degradation may occur if petrochemicals, hydraulic fluids, and solvents are spilled or leaked from maintenance vehicles or equipment.

As part of the planning phase for the Proposed Project, biologists conducted habitat assessments and evaluated the potential for special-status wildlife to occur at each maintenance site in the Project area. Sites with ostensibly suitable habitat for special-status amphibians are shown in Chapter 2, Table 2-2. Marginally suitable habitat for WPT is present at Lucas Valley MP 6.69 and 6.97, however, the Project area generally lacks suitable habitat for WPT, and this species is not expected to occur within the Project area. Results of the habitat assessments and species evaluations were considered and incorporated into the Proposed Project design to avoid and minimize impacts to species.

Furthermore, standard operating procedures for Proposed Project activities include implementing AMM BIO-1: *Relocation of Aquatic Species for Dewatering* and AMM BIO-2: *Protection of Special-Status Amphibian and Reptile Species*. These measures include a pre-construction survey for special-status amphibian and reptile species, stopping work if a special-status amphibian or reptile is detected and contacting USFWS and CDFW, developing relocation plans, relocation of special status species from the Project area, and screening of pump intakes.

The following AMMs would further minimize potential impacts to special-status amphibian and reptile species and their habitats:

- AMM GEN-1: Work Windows
- AMM GEN-2: Minimize the Area of Disturbance
- AMM GEN-3: Erosion and Sediment Control
- AMM GEN-4: Fill, Spoils, and Stockpiled Materials
- AMM GEN-5: On-site Hazardous Materials Management
- AMM GEN-6: Spill Prevention and Response Plan
- AMM GEN-9: Pavement Saw-cutting Operations
- AMM GEN-10: Concrete Operations
- AMM GEN-14: Instream Work

Complete descriptions of these AMMs are provided in Table 3.4-1, above.

Implementation of Project AMMs would ensure that impacts to special-status amphibian and reptile species, where present, and their habitat are avoided and minimized by establishing standard operating procedures, such as surveying ahead of work and developing relocation plans. Individual species may be encountered during

construction activities, which may temporarily disturb distribution patterns or require relocation away from construction activities; however, this level of disturbance would not be considered a significant impact. Therefore, this impact would be **less than significant.** No mitigation is required.

Impacts to Special-status Bird Species

Appendix B lists the special-status bird species known to occur in the vicinity of the Project area. Northern spotted owl (NSO) (*Strix accidentalis caurina*) is known to occur in the Proposed Project vicinity. Proposed Project sites Lucas Valley MP 5.96, 6.01, 6.69, 6.90, 6.97, 7.04, 7.12, 7.18, 7.28, 7.64, 8.02, 8.99, 9.21, 9.32, 9.48, and 10.23 and Nicasio Valley MP 5.83, 6.43, 6.57, 6.88, 6.99 have the potential to support NSO. Other special-status bird species considered to have the potential to occur in the Project area include the olive sided flycatcher (*Contopus cooperi*), yellow warbler (*Setophaga petechia*), white-tailed kite (*Elanus leucurus*), and golden eagle (*Aquila chrysaetos*). Other bird species that are protected by the MBTA and F&G Code Sections 3503 and 3503.5 could nest in the vicinity of any of the Proposed Project sites.

Proposed Project activities such as tree removal or the use of heavy machinery in the vicinity of active nests have the potential to disturb nesting special-status bird species and nests protected by the MBTA and F&G Code. This may cause nesting failure or reduced fitness, which could result in a significant impact.

It is the County's intent to avoid and minimize impacts to special-status bird species. Standard operating procedures for Proposed Project activities include implementing AMM BIO-3: *Northern Spotted Owl* and AMM BIO-4: *Nesting Birds*. AMM BIO-3 includes measures that apply to Proposed Project activities that involve tree removal, excavation, or grading within 500 yards of a previously recorded NSO nest site. Steps to avoid impacts to NSO include working outside of the nesting season (February 1 – July 31) for construction activities in potential NSO habitat area. If the nesting season cannot be avoided, protocol-level surveys and establishment of avoidance buffers around active NSO nests would be required. AMM BIO-4 states that construction activities should be avoided during the general bird nesting season (February August 31). If Project activities during the nesting season cannot be avoided, pre-construction nest surveys would be required. If nesting birds are found, a non-disturbance buffer will be established around the nest and maintained until the young have fledged. AMM GEN-13 minimizes construction-related noise. A complete description of these AMMs is provided in Table 3.4-1, above. In addition to the AMMs, the Project would be consistent with the standards included in the Marin County Development Code.

By implementing these Project AMMs, impacts to special-status bird species, their habitat, and other nesting bird species would be avoided or sufficiently minimized such that adverse impacts are not likely to occur. Therefore, this impact would be **less than significant.** No mitigation is required.

Impacts to Special-status Mammal Species

Special-status mammals that may be present include three bat species, dusky-footed woodrat (*Neotoma fuscipes annectens*), and American badger (*Taxidea taxus*). The bat species which may be present are pallid bat (*Antrozous pallidus*), Townsend's big eared bat (*Corynorhinus townsendii*), and western red bat (*Laiurus blossevillii*). Several non-special-status but CEQA-relevant bat species (hereafter referred to as "CEQA-relevant bats") have potential to occur in the Project area, including myotis bats (*Myotis* spp.) and big brown bat (*Ephesicus fiscus*).

Project activities occur in areas immediately adjacent to roadways that are not anticipated to support American badger dens. If foraging American badgers were present in the vicinity of Project activities, they would be able to disperse out of the Project area as this is a highly mobile species. Therefore, no impacts to American badger would occur.

Dusky-footed woodrat are present within the Project area and were observed near PRP MP 11.71 and 13.25 and NVR MP 6.43. This species builds large stick nests, typically in woodlands. Clearing or ground-disturbing work could result in the destruction of dusky-footed woodrat nests and mortality of woodrats if they were present inside the nest.

Special-status bat and CEQA-relevant bats may roost in trees or potentially culverts. Tree removal and culvert replacement could impact special-status bats or large colonial roosts of CEQA-relevant bat species through the loss of roosting habitat or direct mortality of bats. Removal of an active roost or large colonial roost of CEQA-relevant bats could be a significant impact. The bat maternity season (March 15–July 31) is an especially sensitive period, as young may be unable to fly (i.e., non-volant) during this period. Culvert interiors and trees to be removed were inspected for presence of colonial bat roosts (e.g., individual bats, urine staining, guano, and oil staining). No colonial bat roosts were detected during site field assessments. However, suitable bat roost substrate was observed and the potential for future inhabitation exists.

It is the County's intent to avoid or minimize impacts to special-status mammal species and CEQA-relevant bat species. The Proposed Project standard operating procedures includes AMM BIO-5: *Dusky-footed Woodrat* and AMM BIO-6: *Bat Colonies*. AMM BIO-5 would require pre-construction surveys for dusky-footed woodrat nests, implementation of non-disturbance buffers if present, and creation and implementation of a relocation plan if the nests cannot be avoided. Implementation of AMM BIO-6 would require pre-construction surveys for roosting bats, roost avoidance, and if roosts cannot be avoided, removal of roost habitat outside of sensitive periods for bats. Several other AMMs would also provide protection for other mammal species. These measures include:

- AMM GEN-2: Minimize the Area of Disturbance
- AMM GEN-4: Fill, Spoils, and Stockpiled Materials

A complete description of these AMMs is included in Table 3.4-1, above. In addition to AMMs, the Project would be consistent with the standards included in the Marin County Development Code.

By implementing these AMMs, impacts to mammal species and their habitat would be avoided or sufficiently minimized such that significant adverse impacts are not likely to occur. Therefore, this impact would be **less than significant.** No mitigation is required.

b. Substantial adverse effect on any riparian habitat or other sensitive natural community – Less than Significant

The Proposed Project involves maintenance and repair of existing stormwater culverts, many of which are constructed with concrete headwalls, inlet drop structures, paved areas, and/or rock slope protection (RSP). Proposed Project treatments are largely in-kind or analogous and would not significantly alter or reduce the extent or quality of a sensitive natural community. Riparian vegetation that is removed by Proposed Project activities is expected to regenerate naturally. However, some Proposed Project activities occur in sensitive natural communities including riverine and riparian habitat. Impacts to Waters of the U.S. are discussed in item (c), below.

Temporary impacts to sensitive natural communities are likely to occur through tree removal, vegetation clearing around culvert inlets/outlets, and slip-out repair. Up to seven (7) trees with a diameter at breast height (dbh) greater than 6 inches will be removed, including 7 native species, and 0 non-native species. The removal of riparian trees without replacement would be considered a permanent and potentially significant impact. However, the Proposed Project would install a total of approximately 215 live willow stakes at the slip-out repair sites and multiple culvert sites at a replacement ratio of 3:1.

The Proposed Project contains several AMMs designed to avoid and minimize disturbance to sensitive natural communities including:

- AMM GEN-1: Work Windows
- AMM GEN-2: Minimize the Area of Disturbance
- AMM GEN-3: Erosion and Sediment Control
- AMM GEN-4: Fill, Spoils, and Stockpiled Materials
- AMM GEN-5: On-site Hazardous Materials Management

- AMM GEN-6: Spill Prevention and Response Plan

A complete description of these AMMs is included in Table 3.4-1, above.

Implementing these measures would avoid and minimize impacts to riparian habitats and sensitive natural communities. With implementation of Project AMMs, impacts to sensitive natural communities including riparian habitat would be **less than significant**.

c. Substantial adverse effects on state or federally protected wetlands – Less than Significant

No wetlands are present within the Project area. However, construction-activities would occur within waters of the U.S. Proposed Project activities including repositioning existing RSP, repairing existing inlet paving, and excavating the road and shoulder during in-kind culvert replacement would result in temporary impacts to jurisdictional waters. Permanent impacts to waters of the U.S. would occur from the placement of new RSP and concrete associated with headwalls, as well as repair of slip-outs. Across the 35 sites, the Proposed Project would result in approximately 0.099 acre (4,310 square feet [sf]) of permanent impacts associated with the installation of new RSP and approximately 0.012 acre (525 sf) of permanent impacts associated with the installation of new concrete for a total of 0.111 acre (4,835 sf) of permanent impacts. However, only a portion of these permanent impacts would be located below ordinary high water and thus be located within waters of the U.S. Additionally, planted RSP and willow staking would enhance habitat conditions where installed as existing ecological conditions at many sites is void of vegetation or otherwise degraded due to recent erosion or existing RSP.

Proposed Project activities would improve water quality in receiving surface waters by repairing dilapidated culverts and stabilizing eroding banks. By upsizing a currently undersized culvert or improving the design and function of a deficient culvert, the Proposed Project would reduce the potential for catastrophic culvert failures in the future, thereby avoiding large sediment pulses into receiving waterbodies and thus improving water quality. Similarly, by repairing slip-out locations, stabilizing the eroding bank reduces existing erosion along the channel bank and sediment load, thus improving water quality in the creek. The Proposed Project aligns with goals and objectives established in the Lagunitas Creek Watershed total maximum daily load (TMDL) along Point Reyes – Petaluma Road, as well as reduces sediment load to Lucas Valley Creek, Nicasio Creek, and Nicasio Reservoir. Slip-out repairs and several culvert sites would also incorporate planted RSP and live willow stakes enhancing habitat conditions along the riparian corridor and those locations.

The Proposed Project the following AMMs designed to protect and minimize disturbance to waters of the U.S.:

- AMM GEN-1: Work Windows
- AMM GEN-2: Minimize the Area of Disturbance
- AMM GEN-3: Erosion and Sediment Control
- AMM GEN-4: Fill, Spoils, and Stockpiled Materials
- AMM GEN-5: On-site Hazardous Materials Management
- AMM GEN-6: Spill Prevention and Response Plan

A complete description of these AMMs is included in Table 3.4-1, above.

These standard operating procedures would avoid and minimize Project impacts to waters of the U.S. by:

- Conducting culvert maintenance activities between June 1 and October 31 when surface water levels are low or absent.
- Installing silt fencing, silt curtain, or other sediment capture device(s) downstream of the work area to reduce and limit turbidity effects of culvert maintenance and bank repair activities.
- Dewatering and isolating work sites from flowing waterways.
- Conducting work from the top-of-bank to the extent feasible.
- Applying seeding or erosion fabric on exposed areas after completing culvert maintenance activities at a given site.

As no wetlands are present within the Proposed Project work areas, no impacts to wetlands would occur. Temporary and permanent impacts to waters of the U.S. would occur. Implementation of AMMs would avoid and minimize impacts to waters. Long-term, the Proposed Project would have a beneficial impact to water quality. Therefore, this impact would be **less than significant**.

d. Substantial interference with wildlife movement, established wildlife corridors, or the use of native wildlife nursery sites – Less than Significant

The Proposed Project would not result in any permanent barriers to wildlife movement. Work in riparian areas may temporarily alter dispersal corridors for native wildlife but affected areas would be temporary, minor in scale, and only occur at focused locations per AMM GEN-2: *Minimize the Area of Disturbance*.

Standard operating procedures for the Proposed Project include implementing several AMMs that would avoid or minimize impacts to the movement of native fish and wildlife species. These measures include:

- AMM GEN-1: Work Windows
- AMM GEN-2: Minimize the Area of Disturbance
- AMM BIO-1: Relocation of Aquatic Species for Dewatering
- AMM BIO-2: Protection of Special-Status Amphibian and Reptile Species
- AMM BIO-3: Northern Spotted Owl
- AMM BIO-4: Nesting Birds
- AMM BIO-5: Dusky-footed Woodrat
- AMM BIO-6: Bat Colonies

A complete description of these AMMs is included in Table 3.4-1, above.

By implementing these AMMs, impacts to wildlife movement and migration would be avoided or sufficiently minimized such that significant adverse impacts are not likely to occur. Individual Project activities are generally temporary and small-scale (typically less than 0.01 acre of disturbance) and do not result in the creation of permanent barriers or obstructions to wildlife movement. Design for fish passage would be utilized at Point Reyes – Petaluma Road MP 12.33, where feasible, and salmonid upstream passage would remain similar or improve following work at this site. Also, work would occur outside of the salmonid migratory period and would thus not impact the migratory path. This fish passage design will result in a net improvement to aquatic species corridors and movement. Channels upstream of large reservoirs, such as the Nicasio Reservoir would not benefit from fish passage design since the dam itself creates a barrier to migrating salmonids and prevents salmonids from reaching upstream locations. Potential impacts to bat roosts, dusky footed woodrat nests, and nesting birds are discussed in (a), above. This impact would be **less than significant.**

e. Conflict with local policies or ordinances protecting biological resources – Less than Significant

The Proposed Project considers the polices and goals of the Marin Countywide Plan. No wetlands would be affected and the Project would be beneficial to biological resources overall by reducing watershed sediment load. There are no conflicts with local policies or ordinances protecting biological resources. None of the eighteen (18) trees to be removed are considered “heritage” trees or “protected” under the Marin County Native

Tree Protection and Preservation ordinance. Therefore, the impact would be **less than significant**.

f. Conflict with the provisions of an adopted HCP, Natural Community Conservation Plan, or other approved local, regional, or state HCP – No Impact

The only Habitat Conservation Plan (HCP) in Marin County is the Pacific Gas and Electric Company (PG&E) Operations and Maintenance HCP, which covers impacts to 18 wildlife and 13 plant species over nine counties across the SF Bay area; Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Sonoma, and Solano Counties. The Proposed Project is not a covered activity under the HCP and Project activities would not conflict with the provisions of this HCP. The Proposed Project does not fall under the jurisdiction of any other approved local, regional, or state habitat conservation plans. Therefore, there would be **no impact**.

3.5 Cultural Resources

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
Would the project:				
a. Cause a substantial adverse change in the significance of a historical resource pursuant to Section 15064.5?	☐	☐	☒	☐
b. Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?	☐	☐	☒	☐
c. Disturb any human remains, including those interred outside of dedicated cemeteries?	☐	☐	☒	☐

3.5.1 Regulatory Setting

Federal Laws, Regulations, and Policies

No federal regulations related to cultural resources are applicable to the Proposed Project.

State Laws, Regulations, and Policies

CEQA and State CEQA Guidelines

The Proposed Project must comply with CEQA (Public Resource Code [Pub. Res. Code] Section 21000 et seq.) and the CEQA Guidelines (14 CCR Chapter 3), which determine, in part, whether a project would have a significant effect on a unique archaeological resource (according to Pub. Res. Code 21083.2) or a historical resource (according to Public Resource Code Section 21084.1).

CEQA Guidelines Section 15064.5 notes that "a project with an effect that may cause a substantial adverse change in the significance of a historical resource is a project that may have a significant effect on the environment." Lead agencies are required to identify potentially feasible measures or alternatives to avoid or mitigate significant adverse changes in the significance of a historical resource before such projects are approved. According to the CEQA Guidelines, historical resources are:

- Listed in, or determined to be eligible for listing in, the California Register of Historical Resources (Pub. Res. Code Section 5024.1[e]);

- Included in a local register of historical resources (Pub. Res. Code Section 5020.1[k]) or identified as significant in a historical resource survey meeting the requirements of Public Resource Code Section 5024.1(g); or

- Determined by a lead state agency to be historically significant.

CEQA Guidelines Section 15064.5 also applies to unique archaeological resources as defined in Public Resource Code Section 21084.1.

California Register of Historical Resources

Public Resource Code Section 5024.1 establishes the California Register of Historical Resources (CRHR). This register lists all California properties considered to be significant historical resources. The CRHR includes all properties listed, or determined to be eligible for listing, in the National Register of Historic Places (NRHP), including properties evaluated under Section 106 of the National Historic Preservation Act (NHPA). The criteria for listing are similar to those of the NRHP. Criteria for listing in the CRHR include resources that:

(1) Are associated with the events that have made a significant contribution to the broad patterns of California's history and cultural heritage;

(2) Are associated with the lives of persons important in our past;

(3) Embody the distinctive characteristics of a type, period, region, or method of construction, or represent the work of an important creative individual, or possess high artistic values; or

(4) Have yielded, or may be likely to yield, important information in prehistory or history.

The regulations set forth the criteria for eligibility as well as guidelines for assessing historical integrity and resources that have special considerations.

Regional and Local Regulations

Marin Countywide Plan

Cultural resources are addressed in Section 4.13, "Historic and Archaeological Resources," under the Socioeconomics Element of the Marin Countywide Plan (Marin County Community Development Agency 2007). Goals and policies related to the Proposed Project and the cultural resources analysis are listed below. Consistency with these goals and policies was considered during evaluation of potential Project impacts.

Goal HAR-1. Historical Resource Protection. Identify and protect archaeological and historical resources as major contributors to quality of life and community vitality in Marin.

Policy HAR-1.1: Preserve Historical and Archaeological Resources. Identify archaeological and historical resource sites.

Policy HAR-1.3: Avoid Impacts to Historical and Archaeological Resources. Ensure that human activity avoids damaging cultural resources, where feasible.

Marin County Development Code

Marin County has the following code to ensure that the construction of new development and the establishment of new and modified uses contribute to the maintenance of a stable and healthy environment, that new development is harmonious in character with existing and future development, and that the use and enjoyment of neighboring properties are protected, as established in the Marin Countywide Plan.

22.20.040.D: Archaeological and Historic Resources. In the event that archaeological or historic resources are discovered during any construction, construction activities shall cease, and the Agency shall be notified so that the extent and location of discovered materials may be recorded by a qualified archaeologist, and disposition of artifacts may occur in compliance with State and Federal law. The disturbance of an Indian midden may require the issuance of an Excavation Permit by the Department of Public Works, in compliance with Chapter 5.32 (Excavating Indian Middens) of the County Code.

3.5.2 Environmental Setting

Native American Pre-Contact Era

The Native American pre-contact (or prehistoric) era reflects information known about the indigenous population from the time the region was first populated with humans until the arrival of the first Europeans, who visited and recorded their journeys through the written record. The pre-contact record is derived from more than a century of archaeological research and, while much has been gleaned from these studies, large gaps in the data record remain. The following prehistoric culture sequence, derived from Milliken et al. (2010), briefly outlines the prehistory of the San Francisco Bay region.

The Early Holocene (Lower Archaic; 8000 to 3500 B.C.) is considered a time when populations continued to be very mobile as they practiced a foraging subsistence pattern around the region. Artifacts that characterize this period include the milling slab and hand stone to process seeds, as well as large wide-stemmed and leaf-shaped projectile points.

The Early Period (Middle Archaic; 3500 to 500 B.C.) is marked by the appearance of cut shell beads in the archaeological record, as well as the presence of the mortar and pestle for processing acorns. House floors with postholes indicate substantial living structures, which suggests a move toward establishing a more sedentary lifestyle and an increasing population.

During the Middle Period – which includes the Lower Middle Period (Initial Upper Archaic; 500 B.C. to A.D. 430) and Upper Middle Period (Late Upper Archaic; A.D. 430 to 1050) – geographic mobility may have continued, although groups began to establish longer-term base camps in localities from which a more diverse range of resources could be exploited. Milling tools, obsidian and chert concave-base projectile points, and the occurrence of sites in a wider range of environments suggest that the economic base was more diverse. By the Upper Middle Period, numerous small villages were developing. Around A.D. 430 a "dramatic cultural disruption" occurred, as evidenced by the sudden collapse of the Olivella saucer bead trade network.

The Initial Late Period (Lower Emergent; A.D. 1050 to 1550) reflects a social complexity that had developed toward lifeways of large, central villages with resident political leaders and specialized activity sites. Artifacts associated with the period include the bow and arrow, small corner-notched projectile points, and a diversity of beads and ornaments.

The Terminal Late Period (Upper Emergent; A.D. 1550 to circa 1750) generally represents the indigenous cultures that were encountered by the Spanish when they first arrived in the San Francisco Bay area.

Ethnography

The Project area lies within the traditional territory of the Coast Miwok people. Miwok is a Penutian language with three groups within California: the Lake Miwok, located south of Clear Lake; the Eastern Miwok, located in the Sierra Nevada foothills; and the Coast Miwok, located on the North Bay and adjacent to the coast. The Coast Miwok, in turn, have been divided into two major dialect groups: the western or Bodega, and the southern or Marin (Kelly 1978).

The Project area lies more specifically within the territory of the Olema/Nicasio group, who occupied the region from near the southern end of Tomales Bay south to include most of present-day Kent Reservoir, along with Lagunitas and Nicasio Creeks and the modern-day communities of Point Reyes Station, Nicasio, Olema, Lagunitas, San Geronimo, and Woodacre. Along the coast, the Olema/Nicasio group appears to have held lands from just south of the Estero de Limantour south to about Wildcat Lake (Milliken 2009).

The Coast Miwok lived in an area with diverse terrain and varied food resources that they relied on for subsistence. Their intimate attachment to the land was fostered by a

deep knowledge of their surroundings and the animals and plants that inhabited the landscape, such that their material surroundings and the spiritual world were inseparable (Goerke 2009). Seasonal subsistence practices followed a spiritual and ceremonial calendar. As described by Goerke (2009:22), some ceremonies were conducted on a community level and held in "the round house, in a smaller women's dance house, in a brush-enclosed clearing, or in the sweathouses of smaller rancherias. These activities helped to maintain a proper balance between the people and the world of animals and spirits. Other ceremonies were personal, such as the rituals of hunters, or even conducted while eating.

Some animal foods such as deer, shellfish, rockfish, and crab were available year-round (Goerke 2009; Kelly 1978). However, in general, subsistence practices followed an annual cycle, and animals such as salmon and water fowl were obtained seasonally. The primary botanical staple, acorns, were harvested in the fall and stored for later use. Many other seasonal plants, such as seeds, nuts, and berries were similarly gathered during times of abundance and stored for later use. The Coast Miwok were careful to leave a portion of the plants for regeneration to ensure a future crop (Goerke 2009).

Conical grass-covered dwellings with slightly excavated central hearths were the most common type of housing. Each such dwelling accommodated from six to ten nuclear or extended family members. During most of the year, the Coast Miwok appear to have resided in small camps close to resource gathering sites. As winter approached, they would return inland to their winter village, which was commonly located next to a stream and an acorn supply. This village usually consisted of a maximum of ten houses and contained more substantial structures such as a large earthen oven, dance house, and one or possibly two sweathouses (Kelly 1978).

Coast Miwok groups lived in a number of small communities comprised of intermarried families. These groups were often led by a nonhereditary male headman, called a *hoipu,* and two female authority figures known as *maien.* The *hoipu* acted as an advisor and coordinator, settling internal disputes and organizing labor for communal ceremonies and hunts. The *maien* also held important leadership roles, organizing and overseeing activities and festivals such as the Acorn Dance, *sünwele* dance, and certain aspects of the Bird Cult (Kelly 1978). It is likely that they also played a larger role than recorded in the ethnographies, as some informants indicated that the *maien* was a "woman chief" and had some superiority over the *hoipu* (Goerke 2009:27). Local groups interacted with neighboring groups through trade, feasts, seasonal ceremonial dances, and marriage.

The material culture of the Coast Miwok reflects a balance between what was locally available and what could be obtained through trade. As common to most California groups, basketry was a well-developed art among the Coast Miwok and baskets were used for utilitarian, decorative, and ceremonial functions. Ground stone milling equipment was essential for processing the multitude of plant and seed resources utilized by the Coast Miwok. Obsidian, obtained through trade, was a preferred source

for arrow-sized projectile points and butchering knives, while green chalcedony was preferred for general utility knives (Kelly 1978). Animal bone was used to make various implements. Olivella and abalone shell were most often used to make beads and pendants, while clamshell was used to make disk-shaped beads that would be used as currency throughout Central California in later times.

The Coast Miwok were visited by Sir Francis Drake in 1579 and Sebastian Rodriquez Cermeño in 1595. Exploration of the Petaluma River again brought Europeans into Coast Miwok territory in 1775; however, extended encounters with European settlers did not occur until the following year with the establishment of the Presidio of San Francisco and Mission San Francisco de Asís (Kyle et al. 2002). In 1817, Mission San Raphael Arcángel was established in Marin County and the conscription of local Native Americans as a labor source began shortly thereafter. By the 1820s, a large percentage of Coast Miwok were associated with the missions.

As described below under *History*, in addition to the establishment of the mission and development of the surrounding lands to grow food to support the missions, Marin County was later occupied by Mexican citizenry who were allotted land grants, and then by farmers, ranchers, and loggers who provided supplies for an increasingly urban population in San Francisco, as well as the argonauts who joined the frenzy for gold during the Gold Rush. All of these activities further displaced Miwok and other Native American groups who were not within the missions or working on the ranchos. They also degraded the landscape such that the small Miwok populations who strove to continue traditional subsistence practices found it increasingly more difficult, if not impossible to survive. Simultaneously, the indigenous population suffered tremendous loss due to introduced diseases, abuse, and open genocide.

By the late 1800s, the Miwok living in Marin County were landless and primarily worked seasonally on farms throughout the region. The Bureau of Indian Affairs purchased 15.45 acres in 1920 for displaced Coast Miwok and Southern Pomo people living in the vicinity of Marshall, Bodega, Tomales, and Sebastopol. Located in Graton, southern Sonoma County, this became the Graton Rancheria. The land was steep, with little water, and not suited for permanent residency. It was, however, used seasonally for the resources it could provide (Goerke 2009).

In the 1950s, the federal government terminated its relationship with many of the rancherias in California, including Graton. This resulted in the dissolution of rancheria lands, with the exception of one family who was able to hold on to their 1-acre parcel. The Coast Miwok and Pomo descendants of Graton began their effort for federal recognition in the 1990s, and they were re-granted federal status in 2000, becoming the Federated Indians of Graton Rancheria. A gathering was held in Coast Miwok ancestral territory at Point Reyes National Seashore in 2001 to celebrater their reclaimed status (Goerke 2009). FIGR purchased 254 acres near Rohnert Park, Sonoma County, in 2005 to establish a reservation. The land was taken into trust by the federal government in

2010. This created the opportunity for the tribe to establish the Graton Resort and Casino, which opened in 2013. Revenues from the casino have allowed the tribe to become self-sufficient, and has also allowed for the development of cultural and language programs to preserve traditional ways (FIGR 2022).

History

The historic period of California began with Spanish exploration of the Pacific Coast, namely a brief visit by Juan Cabrillo in 1542. During the following two centuries, the Spanish, English, and Russians explored the California coast. Sir Francis Drake, who visited the Marin Headlands in 1579 is the most well-known explorer associated with Marin County (Kyle et al. 2002).

Although the exact location of Drake's landing has yet to be confirmed, it has been established that Sebastian Cermeño visited the area now known as Drake's Bay in 1595. The Marin County area was not occupied by the Spanish until 1817, however, when Mission San Rafael Arcángel was founded (Kyle et al. 2002). Originally an outpost hospital for Mission Dolores in San Francisco, Mission San Rafael Arcángel became a full mission in 1822 and was the penultimate mission to be established in Alta California. When the Republic of Mexico claimed its independence from Spain in 1822 and Alta California came under the rule of Mexico, Mission San Rafael Arcángel was the first of the missions to be secularized (California Missions Foundation 2022).

Also, during this time, as many as 500 large land claims or grants were established in California, some of which were under the control of individual citizens. Many of these land grants became known as *ranchos* (Kyle et al. 2002). Grants in the Project area included Rancho Nicasio (Point Reyes – Petaluma Road) and Rancho San Pedro Santa Margarita y Las Gallinas (Lucas Valley and Ignacio Valley Roads).

The location of Rancho Nicasio was once a sheep ranch for Mission San Raphael (Milliken 2009:53). Governor Figueroa awarded Rancho Nicasio to Teodosio Quilajuequi, a Coast Miwok Indian from Mission San Raphael, and his tribe in 1835. Covering 80,000 acres, it was the largest land grant associated with Marin County, and provided a home to a native population of about 500 (FIGR 2022). The history of the rancho is convoluted; by a decade later, Governor Micheltorena apparently revoked the grant and gave all but 4,000 acres of the property to Pablo de la Guerra and Juan Bautista Cooper (FIGR 2022; Kyle et al. 2002). A short while later, the rancho was further subdivided among Henry Helleck, Daniel Funk, William Renolds, James Black, and B. R. Buckelew. James Black received approximately 9,500 acres of land along the Point Reyes – Petaluma Road in 1847 or 1848 (Salisbury 2016). A portion of this ranch continues to exist as Black Mountain Ranch in the vicinity of the Project area. Rancho San Pedro, Santa Margarita y Las Gallinas was comprised of 21,678 acres and located directly east of and adjacent to Rancho Nicasio. It was granted to Timothy Murphy in 1844.

By the late 1820s and 1830s, American explorers and fur trappers were entering California and Oregon by traveling overland from the east, and by the early 1840s groups of settlers were making the trip. The opportunity to obtain land in Alta California attracted young men from the east who were eager to take advantage of the opportunity to establish themselves in business enterprises. Gold was discovered in 1848 in the American River east-northeast of Sutter's Fort, leading to the Gold Rush of 1849 and the Euroamerican settlement of the western Sierra Nevada foothill region.

The city of San Francisco grew from its inception as a Spanish mission and presidio, becoming an important port that received immigrants and goods during the Mexican period. With the advent of the Gold Rush, the size and importance of the city exploded as thousands of gold miners passed through the port to make their way to the Mother Lode. Some of the new arrivals, however, stayed in San Francisco to establish businesses to support the miners. With the expanding need to provide food staples to the growing urban population, as well as providing for miners in the Sierra Nevada foothills, would-be farmers and ranchers looked north to Marin County for additional farmland. All of these activities further displaced Miwok and other Native American groups from their lands and the indigenous population suffered tremendous loss due to introduced diseases, abuse, and open genocide.

The ranchos of the Mexican era were generally self-sufficient, largely by relying on the labor of the local Coast Miwok; they raised cattle, sheep, and horses for trade and grew their own vegetables and grains, as well as establishing small orchards in some instances. Logging also developed as nearby settlements grew (HRA 2008). During the early American period, settlers moved into western Marin County and expanded this tradition. The area was also used for harvesting lumber for the San Francisco building boom. Dairy cows were imported in the early 1850s and the industry developed rapidly, particularly on the Point Reyes Peninsula.

With the increasing population and the need to transport goods to far-away markets, new roads were developed, and in the early 1870s, plans formed for a narrow-gauge railroad from San Rafael to Tomales Bay. The North Pacific Coast Railroad began operations in 1874/75, with termini in San Rafael and Sausalito connecting to ferry lines into San Francisco and the new town of Point Reyes Station. The railroad eventually followed Tomales Bay north to Cazadero in Sonoma County. The line was abandoned in the 1930s (HRA 2008; PacificNG.org. 2022), but remnants are still visible adjacent to the Point Reyes – Petaluma Road.

The Project area has remained rural to modern times, supported by the many dairy ranches that persist, along with tourism at nearby Point Reyes National Seashore National Park, which was established in 1962.

Cultural Resources Studies

Archival Search

A record search of the Project area was conducted by the Northwest Information Center (NWIC) of the California Historical Resources Information System at Sonoma State University in Rohnert Park, California, in December 2020 (NWIC File No. 20-0967). The record search area included the entire length of the roadways within the Project area and a ¼-mile buffer on either side of the road. The purpose of the record search was to identify any previously conducted cultural resources studies that included the Project area, as well as previously recorded cultural resources at or near the locations of the individual Project sites.

The record search determined that the portions of Point Reyes – Petaluma Road, Lucas Valley Road, and Nicasio Valley Road that form the Project area had previously been included in 32 studies; another 33 studies had been conducted within the ¼-mile buffer area. Nearly all of the studies were along Point Reyes – Petaluma Road. More information about these studies is included in Appendix C, *Cultural Resources Assessment Report*, of this IS/MND.

Four previously recorded cultural resources were identified by the record search (**Table 3.5-1**). The record search also provided information about previously identified historical resources and unique archaeological resources that have been recorded within the Proposed Project boundaries. One such resource, the Black Mountain Ranch (P-57-003018), represents a large area that overlaps several individual Project sites. This resource is discussed in more detail below.

Table 3.5-1. NWIC Records Search Results – Previously Recorded Resources

P Number Trinomial	Resource Type	Resource Name (Date Constructed)	Within Project Site or Buffer	Resource Eligibility Status
P-21-000418 CA-MRN-000464	Pre-contact milling feature and petroglyphs	Manuel's Hill	Buffer	Not evaluated
P-57-002919	Historic District	Olema Valley/ Lagunitas Loop Ranches Historic District (Olema Valley Dairy Ranches Historic District)	Buffer	Listed in the NRHP
P-57-003017	Commercial	Rich Redi-Mix Concrete Plant	Buffer	Recommended not eligible

		(1958)		
P-57-003018	Historic Ranch	Black Mountain Ranch	Project site	Recommended eligible

Notes: NRHP = National Register of Historic Places; NWIC = Northwest Information Center

Source: Information provided by NWIC (File No. 20-0967)

Resource P-21-000418 is located well away from the edge of Lucas Valley Road, on a hill above a cut slope. The site has not been evaluated for eligibility listing in the NRHP/CRHR. None of the individual Project sites are located in the immediate vicinity of this resource.

The Olema Valley/Lagunitas Loop Ranches Historic District (Historic District) (also known as the Olema Valley Dairy Ranches Historic District; P-57-002919) is immediately south of portions of Point Reyes – Petaluma Road that contain Project sites. The Historic District, which was listed in the NRHP in 2018, covers 14,127 acres in Olema Valley and comprises 19 contiguous ranches that date to 1856. The Historic District extends from Point Reyes Station south to the junction of State Route (SR) 1 and Olema-Bolinas Road. The historic property lies almost entirely east of SR 1; the portion of Point Reyes – Petaluma Road that is within the Project area lies just north of the Historic District's northern boundary. The Built Environment Resources Directory for Marin County (Office of Historic Preservation [OHP] 2022) indicates that the Historic District has been assigned the California Historical Resource Status Code of 2S2: "Individually determined eligible for the NRHP by consensus through the Section 106 process; listed in the CRHR."

The Rich Redi-Mix Concrete Plant, P-57-003017, is located directly adjacent the south edge of Point Reyes – Petaluma Road, at the base of Black Mountain, and 0.35 mile west of the junction with Platform Bridge Road. Project sites are located near the resource, but not within the boundaries of the property.

Resource P-57-003018, Black Mountain Ranch (Ranch), overlaps with a portion of Point Reyes – Petaluma Road within the Project area where individual Project sites are located. The Ranch is largely north of Point Reyes – Petaluma Road, but also extends south of the road and in some areas overlaps with the northernmost limits of the Olema Valley/Lagunitas Loop Ranches Historic District. The Ranch was originally part of the Nicasio Land Grant and has been operating as a cattle ranch since 1848 when James Black acquired 9,500 acres of the larger rancho. Today the ranch covers 1,200 acres. The Ranch is considered eligible for the NRHP under Criterion A as a medium-sized family-owned ranch that operated during a significant period of rural development in Marin County; under Criterion B for its association with James Black and the Gallagher family, two of the first nonnative peoples to settle in the area; and under Criterion C for its example of local rural vernacular architecture, especially the barn and cabin within the resource boundaries. The Ranch "also appears to contribute to the significance and

integrity of the neighboring Olema Valley/ Lagunitas Loop Ranches Historic District" (Salisbury 2016).

Historic USGS maps were also examined to look for resources that are no longer extant that might have been located in close proximity to the Project sites.

Geoarchaeological Review

As a result of the dynamic nature of California's landscape, archaeological sites deposited over the last circa (ca.) 13,500 years (roughly the time that humans are known to have lived in California) have been subject to numerous geomorphic processes that have either buried, destroyed, or left these sites intact on the surface. These geomorphic processes can include alluvial fan deposition due to changing climate, fluctuating river courses and related floodplain deposition. In general, most Pleistocene-age or older landforms have little potential for harboring buried archaeological resources, as they developed prior to human migration into North America (ca. 13,000 years before the present [B.P.]). However, Pleistocene surfaces buried below younger Holocene deposits do have a potential for containing archaeological deposits. Holocene alluvial deposits may contain buried soils (paleosols) that represent periods of landform stability before renewed deposition. The identification of paleosols within Holocene-age landforms is of particular interest because they represent formerly stable surfaces that have a potential for preserving archaeological deposits.

Given the above criteria, it is possible to forecast the burial sensitivity by looking at the intersection of existing geomorphic, stratigraphic, and soils spatial variables, as well as any behavioral variables that may forecast human occupation. Therefore, a review of the Project sites and the geomorphic conditions that underlie these locations was conducted using geologic mapping of the Bay Area prepared by Witter et al. (2006) and the geoarchaeological overview of the Bay Area, including Marin County, conducted by Meyer and Rosenthal (2007).

The entire Project area and much of the surrounding lands are comprised of Pre-Holocene (>11,800 years), undifferentiated substrates. In addition, due to the steep terrain indicative of the Project sites along these corridors, the potential for buried deposits is considered low due to the lack of depositional landforms in these areas and the low probability of long-term human settlement in these types of settings. Therefore, the potential for substantial buried or surface archaeological sites within the Project area is considered low.

Native American Communication

An email request was made to the NAHC on August 30, 2021, to review its files for the presence of recorded sacred sites in the Project area. The NAHC responded on October 11, 2021 stating that the records search identified significant resources in the Project vicinity. The NAHC also provided a list of tribes and tribal contacts with a traditional and

cultural affiliation with the Project area for notification pursuant to Pub. Res. Code Section 21080.3.1 (AB 52). Coordination with tribes is described in Section 3.18, "Tribal Cultural Resources."

Archaeological Survey and Results

A pedestrian archaeological survey was conducted of the individual project locations on December 30, 2021. The ground surface visibility generally was poor given the proximity of the culverts to road cuts and substantial vegetation cover throughout the area. Most of the locations were in areas of steep slopes; culvert locations that were located in valleys or exhibited gradual slopes were surveyed with transects of less than 20-meters. All other areas were subject to a cursory survey (>20-meters). No archaeological resources were identified during the field survey.

Built Environment Resources

No built environment resources were identified at the Project sites, other than the culvert structures themselves. As described in Chapter 2, Project Description, the culverts to be replaced or repaired include numerous features, such as concrete or masonry inlets or head walls, metal pipe, and riprap. Culverts are minor, ubiquitous infrastructure elements that do not warrant recordation or NRHP/CRHR evaluation, unless they contribute to the significance of larger historic properties such as districts or cultural landscape (California Department of Transportation [Caltrans] 2022). Therefore, these culvert structures were not recorded as part of the cultural resources study.

3.5.3 Discussion of Checklist Responses

Project Avoidance and Minimization Measures (AMMs) implemented to minimize and reduce impacts related to cultural resources are included in **Table 3.5-2** below. Reference to these AMMs occurs throughout this section.

Table 3.5-2. Cultural Resources AMMs

AMM No.	AMM Title	AMM Description
CUL-1	Cultural Resources and Human Remains	▪ If cultural or paleontological resources are encountered during the project, the contractor shall stop work within 35 feet of a find and protect the find until the County can notify a Professional Archaeologist or other such qualified individual to review the discovery. ▪ Project personnel shall not collect or retain found cultural resources. ▪ The treatment of human remains and of associated or unassociated funerary objects discovered during any soil-disturbing activity within the project area shall comply with

		applicable State laws. This shall include immediate notification of the Marin County Coroner. ▪ In the event of the coroner's determination that the human remains are Native American, notification of the Native American Heritage Commission (NAHC) is required. The NAHC shall be notified by phone within 24 hours of the discovery and shall be afforded the opportunity to appoint a Most Likely Descendant (MLD) (Public Resources Code Section 5097.98).

a. Adverse change in the significance of a historical resource – Less than Significant

One historical resource, resource P-57-003018 (Black Mountain Ranch) overlaps with the portion of Point Reyes – Petaluma Road that is located within the Project area; therefore, the repair/replacement of 10 culverts along this roadway segment would occur within the boundaries of the Ranch. The Ranch has been recommended eligible for listing in the NRHP and, is assumed eligible for the NRHP and CRHR for the purposes of this IS/MND. The Ranch was considered eligible as a family-owned ranch that contributed to the early rural development of Marin County, its association with the Black and Gallagher families who were early Euro-American settlers in the area, and the rural vernacular architecture of the extant barn and cabin on the property. It is also relevant as a continuation of the National Register-listed Olema Valley/ Lagunitas Loop Ranches Historic District that lies immediately south of the Ranch.

The Ranch was not evaluated in detail; therefore, the California Department of Parks and Recreation (DPR) does not list all the contributing elements of the property. However, roads are considered contributing elements to the adjacent Historic District and, by association, it is reasonable that Point Reyes – Petaluma Road would similarly contribute to the Ranch's historic character. However, the replacement of culverts and repair of eroding slip-outs along the road is considered a routine maintenance activity that would help maintain the integrity of the road as a transportation route without changing the overall alignment of the road through the Ranch. Therefore, this impact would be **less than significant**.

Historical resources that are archaeological in nature may be accidentally discovered during Project construction; archaeological resources are discussed further in Section 3.5.3(b) below.

b. Adverse change in the significance of an archaeological resource – Less than Significant

No archaeological resources, as defined in Section 15064.5 of the CEQA Guidelines, have been identified within the Project area. However, even though a vast majority of the Project locations are in terrain that is not generally sensitive for archaeological sites (i.e., steep topography), cultural remains may be buried with no surface manifestation, and discovered during Project construction. Native American pre-contact materials most likely to be discovered would include obsidian and chert flaked stone tools (e.g., projectile points, knives, and choppers), tool-making debris, or milling equipment such as mortars and pestles. Historic-era archaeological remains would likely consist of ranching or agriculturally related items such as pieces of wire or fencing, or perhaps equipment parts. Roadsides, especially downslopes have been ubiquitously used as locations to dump refuse from the onset of the historic period and such deposits, consisting of tin cans and fragments of glass bottles, as well as other household items, would be anticipated.

If archaeological remains are accidentally discovered that are determined eligible for listing in the CRHR/NRHP, and Proposed Project activities would affect them in a way that would render them ineligible for such listing, a significant impact would result. Implementation of AMM CUL-1 would require that work stop, should any archaeological remains be discovered during construction and would reduce impacts related to currently unknown archaeological resources to a **less-than-significant** level.

c. Disturbance of any human remains, including those interred outside of formal cemeteries – Less than Significant

No evidence of human remains was observed at any of the Project sites. Although the locations have been previously disturbed by installation of the culverts, and most of the locations are in areas of steep terrain, there is the possibility that human remains could be discovered during excavation activities. However, the possibility is extremely low. Should any such remains be discovered during construction, AMM-CUL-1 shall be followed. A complete description of AMM CUL-1 is included in Table 3.5-2, above. In addition to AMM CUL-1, the Project would comply with the standards included in the Marin County Development Code. Adherence to the procedures and provisions of AMM CUL-1 would reduce potential impacts on human remains to a **less-than-significant** level.

3.6 Energy

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
Would the project:				
a. Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?	☐	☐	☒	☐
b. Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	☐	☐	☒	☐

3.6.1 Regulatory Setting

This section describes the federal, state, and local regulations related to energy resources. Section 3.8, "Greenhouse Gas Emissions," contains additional discussions of greenhouse gas- (GHG-) related regulations that may also be relevant to energy resources.

At the federal level, the USEPA and the National Highway Traffic Safety Administration (NHTSA) have developed regulations to improve the efficiency of cars, and light-, medium-, and heavy-duty vehicles. These regulations are discussed in greater detail in Section 3.8.

Energy resource-related regulations, policies, and plans at the state level, require the regular analysis of energy data and developing recommendations to reduce statewide energy use, and setting requirements on the use of renewable energy sources. Senate Bill (SB) 1389, passed in 2002, requires the California Energy Commission (CEC) to prepare an *Integrated Energy Policy Report* for the governor and legislature every 2 years (CEC 2021a). The report analyzes data and provides policy recommendations on trends and issues concerning electricity and natural gas, transportation, energy efficiency, renewable energy, and public interest energy research (CEC 2021a). The *Draft 2021 Integrated Energy Policy Report* discusses the energy-related impacts of the COVID-19 pandemic, extreme summer weather, and drought conditions. The report also includes policy recommendations for building decarbonization, industrial and agricultural decarbonization, and improving reliability by addressing the vulnerability of California's energy infrastructure to extreme events related to climate change, including fire and drought (CEC 2021b).

In addition, since 2002, California has established a Renewables Portfolio Standard (RPS) program, through multiple senate bills (SB 1078, SB 107, SB X1-2, SB 350, SB 100) and executive orders (S-14-08, B-55-18), that requires increasingly higher targets of electricity retail sales be served by eligible renewable resources. The established eligible renewable source targets include 20 percent of electricity retail sales by 2010, 33 percent of electricity retail sales by 2020, 50 percent by 2030, and 100 percent zero-carbon electricity for the state and statewide carbon neutrality by 2045 (CEC 2017, CEC 2019).

Section 3.8, "Greenhouse Gas Emissions," provides additional details on California's *2017 Climate Change Scoping Plan*, which details the state's strategy for achieving the state's GHG targets, including energy-related goals and policies. It contains measures and actions that may pertain to the Proposed Project relating to vehicle efficiency and transitioning to alternatively powered vehicles (CARB 2017).

The BAAQMD 2017 Clean Air Plan, lays the groundwork for a long-term effort to reduce Bay Area GHG emissions 40 percent below 1990 levels by 2030 and 80 percent below 1990 levels by 2050. The plan contains multiple key priorities related to energy including reducing demand for fossil fuels and decarbonizing the energy system; and contains transportation control measures aimed at reducing emissions from vehicles and equipment (BAAQMD 2017).

The Marin Countywide Plan has a guiding principle to "Reduce greenhouse gas emissions that contribute to global warming" and multiple goals and policies aimed at decreasing energy use and increasing renewable resource use (Marin County Community Development Agency 2007). The Marin County *Unincorporated Area Climate Action Plan 2030* (CAP) quantifies GHG emissions in unincorporated Marin County and outlines a path towards reducing GHG emissions through 2030. The CAP includes strategies relating to low carbon transportation, including encouraging the adoption of zero emission vehicles and equipment and the use of low carbon fuels (Marin County 2020).

3.6.2 Environmental Setting

Energy Resources and Consumption

California has extensive energy resources, including an abundant supply of crude oil, high production of conventional hydroelectric power, and leads the nation in electricity generation from renewable resources (solar, geothermal, and biomass resources) (U.S. Energy Information Administration (EIA) 2021). California has the second highest total energy consumption in the U.S. but the fourth lowest energy consumption rates per capita due to its mild climate and energy efficiency programs (EIA 2021). A comparison of California's energy consuming end-use sectors indicates that the transportation sector is the greatest energy consumer, by approximately two times compared to the other end-use sectors (Industrial, Commercial, and Residential, which are listed in order

of greatest to least consumption) (EIA 2021). California is the largest consumer of motor gasoline and jet fuel in the U.S. (EIA 2021).

Due to the rural character of unincorporated areas of Marin, energy consumed is small compared to other portions of the Bay Area and in statewide terms. As described in Section 3.8, "Greenhouse Gas Emissions," the CAP contains a GHG emissions inventory stating that Community GHG emissions totaled 493,985 metric tons in 2005 and 380,318 metric tons in 2018, falling 23 percent, or 113,367 metric tons carbon dioxide equivalent (CO_2e) (Marin County 2020). The largest sources of emissions, a rough indicator of energy consumption, were from transportation, agriculture, and building energy use. The largest decline in emissions from 2005-2018 occurred in the built environment sector due to a reduction in electricity consumption and a shift in sources of electricity generation. The County estimates that in 2018, passenger and commercial vehicle miles traveled (VMT) totaled approximately 288.9 million and 13.3 million miles, respectively.

3.6.3 Discussion of Checklist Responses

Project Avoidance and Minimization Measures (AMMs) implemented to minimize and reduce impacts related to energy are included in **Table 3.6-1** below. Reference to these AMMs occurs throughout this section.

Table 3.6-1. Energy AMMs

AMM No.	AMM Title	AMM Description
GEN-7	Vehicle and Equipment Maintenance/ Cleaning	▪ Servicing of vehicles shall be conducted in designated staging areas or maintenance roads outside the top-of-bank to avoid contamination through accidental drips and spills. The Contractor shall use secondary containment such as a drip pan, to catch leaks or spills any time that vehicle or equipment fluids are dispenses, changed, or poured. ▪ Incoming equipment shall be checked for leaking oil and fluids. No equipment servicing shall take place in a water body. If emergency repairs are required, only those repairs necessary to move equipment to a more secure location shall be permissible. Drip pans ▪ All vehicles and equipment shall be kept clean. Excessive build-up of oil and grease shall not be permitted. ▪ Vehicle and equipment washing can occur on site only as needed to prevent the spread of sediment, pathogens, or exotic/invasive species. No runoff from vehicle or equipment washing shall be allowed to enter water bodies without being subjected to adequate filtration (e.g., vegetated buffers, hay wattles or bales, and silt screens). Other proper track-out systems can be used to prevent the spread of sediment from the site. ▪ Refueling shall be done outside of waterways unless equipment stationed in these locations cannot be readily relocated (e.g., pumps and generators). For stationary equipment that must be fueled on-site,

		secondary containment, such as a drain pan or drop cloth, shall be used to prevent accidental spills of fuels from reaching the soil, surface water, or the storm drain system.
GEN-8	Dust Management Controls and Air Quality Protection	The Contractor shall implement the following applicable Bay Area Air Quality Management District's Basic Construction Mitigation Measures to reduce emissions of fugitive dust and equipment exhaust: ▪ All haul trucks transporting soil, sand, or other loose material off-site shall be covered. ▪ All vehicle speeds on unpaved roads shall be limited to 15 mph. ▪ Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure [13 California Code of Regulations Section 2485]). ▪ All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation. ▪ All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited. ▪ All unpaved surfaces (e.g., parking areas, staging areas, soil piles, and graded areas, and unpaved access roads) shall be watered two times a day.

a, b. Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources or Conflict with or obstruct a state or local plan for renewable energy or energy efficiency – Less than Significant

The Proposed Project would require the consumption of energy (fossil fuels) for construction equipment, worker vehicles, and truck trips. The Proposed Project would not involve any activities that would require electricity-based energy use. The consumption of energy for the Project's equipment and vehicles would be minimized by ensuring construction equipment is properly tuned and maintained and by minimizing vehicle idling (AMM GEN-8). **Table 3.6-2** shows the estimated total fuel use from construction equipment, worker vehicles, and truck trips. The calculations used to develop these estimates are presented in Appendix A.

Table 3.6-2. Project Fossil Fuel Use

Source Type	Gasoline Fuel Use (gallons)	Diesel Fuel Use (gallons)
Construction On-Road Vehicles	345	11
Construction Off-Road Equipment		4,307
Total for Construction	345	4,317

The Proposed Project's energy consumption is necessary for flood protection and protection of habitat, water quality, and transportation infrastructure. These activities would not cause wasteful, inefficient, and unnecessary consumption of energy or cause a substantial increase in energy demand and the need for additional energy resources. Although no mitigation measures are necessary to reduce this impact to a less-than-significant level, implementation of AMM GEN-8 and AMM GEN-7 would reduce the Proposed Project's effect by requiring minimization of idling times and requiring that all equipment be maintained and tuned properly. As a result, the Proposed Project would not result in wasteful, inefficient, or unnecessary consumption of energy. A complete description of the Project AMMs is included in Table 3.6-1, above.

In addition, the County's activities would not conflict with any of the goals, policies, or implementation actions identified in the applicable plans, such as the *Draft 2021 Integrated Energy Policy Report,* Marin County's Countywide Plan, Marin County's *Unincorporated Area Climate Action Plan 2030*, and BAAQMD's 2017 Clean Air Plan*,* because the Proposed Project would not create any future energy demands and would be completed as efficiently as possible. Thus, the Proposed Project would not conflict with any plans relating to renewable energy or energy efficiency. Therefore, this impact would be considered **less than significant**.

3.7 Geology, Soils, and Seismicity

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
Would the Project:				
a. Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☐	☒
ii. Strong seismic ground shaking?	☐	☐	☒	☐
iii Seismic-related ground failure, including liquefaction?	☐	☐	☒	☐
iv. Landslides?	☐	☐	☒	☐
b. Result in substantial soil erosion or the loss of topsoil?	☐	☐	☒	☐
c. 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?	☐	☐	☒	☐
d. Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?	☐	☐	☒	☐
e. Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	☐	☐	☐	☒

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
f. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☐	☒	☐

3.7.1 Regulatory Setting

Federal Laws, Regulations, and Policies

Uniform Building Code

The 1997 Uniform Building Code (UBC) was developed by the International Conference of Building Officials (ICBO) and is used in most states, including California, and local jurisdictions to set basic standards for acceptable design of structures and facilities. The UBC provides information on criteria for seismic design, construction, and load-bearing capacity associated with various buildings and other structures and features. Additionally, the UBC identifies design and construction requirements to address and mitigate potential geologic hazards. New construction generally must meet the requirements of the most recent version of the UBC.

State Laws, Regulations, and Policies

Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Earthquake Fault Zoning Act (Alquist-Priolo Act) (Pub. Res. Code Section 2621 *et seq*.) was passed to reduce the risk to life and property from surface faulting in California. The Alquist-Priolo Act prohibits construction of most types of structures intended for human occupancy directly on or across the surface traces of active faults and strictly regulates construction in the corridors along active faults (earthquake fault zones). It also defines criteria for identifying active faults, giving legal weight to terms such as "active," and establishes a process for reviewing building proposals in and adjacent to earthquake fault zones. Under the Alquist-Priolo Act, faults are zoned and construction along or across them is strictly regulated if they are "sufficiently active" and "well defined." Before a project can be permitted, cities and counties must require a geologic investigation to demonstrate that proposed buildings would not be constructed across active faults.

Seismic Hazards Mapping Act

The Seismic Hazards Mapping Act of 1990 (Pub. Res. Code Sections 2690–2699.6) establishes statewide minimum public safety standards for mitigation of earthquake

hazards. While the Alquist-Priolo Act addresses surface fault rupture, the Seismic Hazards Mapping Act addresses other earthquake-related hazards, such as strong ground shaking, liquefaction, and seismically induced landslides. Its provisions are similar in concept to those of the Alquist-Priolo Act: The State of California is charged with identifying and mapping areas at risk of strong ground shaking, liquefaction, landslides, and other corollary hazards, and cities and counties are required to regulate development within mapped seismic hazard zones. In addition, the act addresses expansive soils, settlement, and slope stability. Under the Seismic Hazards Mapping Act, cities and counties may withhold the development permits for a site within a seismic hazard zone until appropriate site-specific geologic and/or geotechnical investigations have been carried out and measures to reduce potential damage have been incorporated into the development plans.

California Coastal Commission

The California Coastal Commission was established by voter initiative in 1972 (Proposition 20) and later made permanent by the Legislature through adoption of the California Coastal Act of 1976 (Coastal Act). The Coastal Act includes specific policies that address shoreline access, development and land use, aesthetics, water quality, and protection and enhancement of terrestrial and marine habitat and natural resources. Under the Coastal Management Program, the California Coastal Commission manages development along the California coast, excluding San Francisco Bay. The Coastal Act broadly defines development activities to include construction of buildings, divisions of land, and activities that change the intensity of use of land or public access to coastal waters.

The California Coastal Commission plans and regulates the development and use of land and water in the coastal zone. The coastal zone extends three nautical miles offshore and varies in width from several hundred feet in highly urbanized areas to up to five miles in certain rural areas. A portion of the Project area (western portion of Point Reyes – Petaluma Road) is within the coastal zone (California Coastal Commission 2021). In Marin County, the Coastal Act is implemented through the Marin County Local Coastal Program (see discussion under “Local Laws, Regulations, and Policies” below).

California Building Standards Code

Title 24 of the California Building Standards Codes (specifically Title 24CCR, Part 2) specifies standards for geologic and seismic hazards other than surface faulting. These codes are administered and updated by the California Building Standards Commission. This code specifies criteria for open excavation, seismic design, and load-bearing capacity directly related to construction in California. The seismic building requirements under the California Building Standards Codes are more stringent than those of the federal UBC.

California Public Resources Code

Pub. Res. Code Section 5097.5 states that "no person shall knowingly and willfully excavate upon, or remove, destroy, injure or deface any historic or prehistoric ruins, burial grounds, archaeological or vertebrate paleontological site, including fossilized footprints, inscriptions made by human agency, or any other archaeological, paleontological or historical feature, situated on public lands, except with the express permission of the public agency having jurisdiction over such lands. Violation of this section is a misdemeanor." As used in this section, "public lands" means lands owned by, or under the jurisdiction of, the state, or any city, county, district, authority, or public corporation, or any agency thereof.

Local Laws, Regulations, and Policies

Marin Countywide Plan

The Marin Countywide Plan (Marin County Community Development Agency 2007) is a comprehensive long-range general plan that guides land use and development in the unincorporated areas of Marin County. Goals and policies related to the Proposed Project and the geology and soils analysis are listed below. Consistency with these goals and policies was considered during evaluation of potential Project impacts.

Goal EH-2: Safety from Seismic and Geologic Hazards. Protect people and property from risks associated with seismic activity and geologic conditions.

> **Policy EH-2.1: Avoid Hazard Areas.** Require development to avoid or minimize potential hazards from earthquakes and unstable ground conditions.
>
> **Policy EH-2.2: Comply with the Alquist-Priolo Act.** Continue to implement and enforce the Alquist-Priolo Earthquake Fault Zoning Act.

Marin County Local Coastal Program

The Marin County Local Coastal Program (LCP) is intended to carry out the coastal resource protection policies of the Coastal Act (see discussion under "State Laws, Regulations, and Policies" above). The LCP includes a Land Use Plan (LUP), the Development Code, policy maps and zoning maps for the coastal zone, and supporting appendices. The primary tool for implementing the LCP is the "coastal permit" (County of Marin 2018). Most types of development activities require that a coastal permit be issued by Marin County. Policies in the LUP related to geology and environmental

hazards[2] generally require establishing setbacks from sea bluffs, meeting seismic safety standards of the Alquist-Priolo Act, and the avoidance of developing residential structures on parcels subject to geologic hazards (County of Marin 2004).

Marin County Development Code

Marin County has the following code to ensure that the construction of new development and the establishment of new and modified uses contribute to the maintenance of a stable and healthy environment, that new development is harmonious in character with existing and future development, and that the use and enjoyment of neighboring properties are protected, as established in the Marin Countywide Plan.

> **22.20.040.D: Paleontological Resources.** In the event that paleontological resources are discovered during any construction, construction activities shall cease, and the Agency shall be notified so that the extent and location of discovered materials may be recorded by a qualified archaeologist, and disposition of artifacts may occur in compliance with State and Federal law.

3.7.2 Environmental Setting

Geology

Geologic units underlying the Project area generally belong to the Franciscan Complex (USGS 2000). The Franciscan Complex includes Cretaceous and Jurassic-aged sandstone with smaller amounts of shale, chert, limestone, and conglomerate (USGS 2021). Specific units underlying the segment of Point Reyes – Petaluma Road between Point Reyes Station and Nicasio Reservoir include Kfs – Sandstone and shale (Cretaceous), Fsr – Melange, and Jfg – Greenstone (Jurassic) (USGS 2000). There are also surficial deposits of Quaternary-aged alluvium (Qal) along this segment of the Project area.

With respect to the eastern Project Road segments (i.e., Nicasio Valley Road and Lucas Valley Road), underlying units in these areas primarily include Fsr – Melange, KJfm – Metamorphic rocks (Cretaceous and Jurassic), KJfch – Chert (Cretaceous and Jurassic), and surficial deposits of Quaternary-aged alluvium (Qal) (USGS 2000).

[2] On July 13, 2021, the County of Marin Board of Supervisors voted to activate the certified LCP Amendments. All portions of Marin's LCP Amendments were approved by the Board of Supervisors and certified by the California Coastal Commission with the exception of chapters related to environmental hazards, which remain the subject of on-going work and public input. As a result, these sections of the original versions of the LCP, certified by the California Coastal Commission in 1980 (Unit I) and in 1981 (Unit II), still apply to environmental hazards (County of Marin 2018).

Soils

A variety of soil types underlie the Project area. **Table 3.7-1** shows the soil types mapped by the Natural Resources Conservation Service (NRCS) within 50 feet of the individual Project sites.

Table 3.7-1. Soil Types in the Project Area

Map Unit Symbol	Map Unit Name	Map Unit Details
101	Ballard gravelly, loam	2 to 9 percent slopes
105	Blucher-Cole complex	2 to 5 percent slopes
114	Cortina gravelly sandy loam	0 to 6 percent slopes, cool, MLRA 15
120	Dipsea-Barnabe very gravelly loams	50 to 75 percent slopes
124	Felton variant-Soulajule complex	15 to 30 percent slopes
126	Felton variant-Soulajule complex	50 to 75 percent slopes
127	Fluvents	channeled
128	Gilroy-Typic Argixerolls-Bonnydoon	30 to 50 percent slopes
141	Los Osos-Bonnydoon complex	15 to 30 percent slopes
142	Los Osos-Bonnydoon complex	30 to 50 percent slopes
149	Olompali loam	9 to 15 percent slopes
157	Pits	quarries
178	Tocaloma-McMullin complex	15 to 30 percent slopes
180	Tocaloma-McMullin complex	50 to 75 slopes
185	Tocaloma-Saurin association	extremely steep

Notes: The table shows soil types mapped within 50 feet of the project activity footprints.

Source: NRCS 2021

Seismicity

Faults

The Proposed Project sites (in particular those in the western portion of the Project area along Point Reyes – Petaluma Road) are within a seismically active area. The San Andreas Fault Zone roughly follows the alignment of SR 1 in this area and passes through the unincorporated communities of Point Reyes Station and Inverness (Marin County Community Development Agency 2007). The San Andreas Fault Zone has ruptured in the historic period (i.e., 200 years to today) and is a designated Alquist-Priolo Fault Zone. While the San Andreas Fault Zone passes relatively close (within 1

mile) to the western-most Project activity sites, this fault zone does not cross any of the proposed maintenance sites. Several other pre-Quaternary (4.5 billion to 1,600,000 years ago) faults occur in the Project area (Marin County Community Development Agency 2007).

Ground Shaking

Given the proximity of the San Andreas Fault Zone, the entire Project area could experience significant ground shaking if a rupture along that fault zone were to occur. The western Project sites along Point Reyes – Petaluma Road appear to be located on or adjacent to soils designated as Soil Type D, for which significant (350 m/sec > Vs > 200 m/sec) amplification of shaking is generally expected (Marin County Community Development Agency 2007). The soils underlying the eastern portion of the Project area (i.e., sites along Nicasio Valley Road and Lucas Valley Road) are all either Soil Type C, for which the shaking amplification would likely not be as significant (750 m/sec > Vs > 350 m/sec) as for Soil Types D and E, or Soil Types A and B, which do not contribute greatly (Vs > 1500 m/sec and 1500 m/sec > Vs > 750 m/sec, respectively) to shaking amplification (Marin County Community Development Agency 2007).

Liquefaction and Differential Settlement

Portions of the Project area are mapped as being susceptible to liquefaction[3]. The eastern portion of the Project area is designated as very low or moderate in terms of liquefaction susceptibility (Marin County Community Development Agency 2007); however, the western Project sites along Point Reyes – Petaluma Road are located on or adjacent to land designated as very high susceptibility to liquefaction (Marin County Community Development Agency 2007).

Landslide, Slope Failure, and Lateral Spreading

Many of the Project sites are located on steep slopes that may be susceptible to landslides. The CDOC mapped the relative likelihood of deep-seated landslides in California based on regional estimates of rock strength and steepness of slopes (CDOC 2011). This analysis showed that much of Marin County, including the Project area, is in the higher classes of landslide susceptibility (CDOC 2011). The CDOC analysis did not consider landslide triggering events, such as rainstorms or earthquake shaking, nor did it address susceptibility to shallow landslides such as debris flows.

[3] Liquefaction is the temporary transformation of saturated and very low cohesion or cohesionless soils into a viscous liquid as a result of ground shaking.

Paleontological Resources

Paleontological resources are the fossil remains of prehistoric flora and fauna, or traces of evidence of the existence of prehistoric flora and fauna. These include fossil remains, as well as fossil localities and rock or soil formations that have produced fossil material. In California, paleontological resources are generally observed in sedimentary and metasedimentary deposits.

3.7.3 Discussion of Checklist Responses

Project Avoidance and Minimization Measures (AMMs) implemented to minimize and reduce impacts related to geology, soils, and seismicity are included in **Table 3.7-2** below. Reference to these AMMs occurs throughout this section.

Table 3.7-2. Geology, Soils, and Seismicity AMMs

AMM No.	AMM Title	AMM Description
GEN-2	Minimize the Area of Disturbance	▪ Ground disturbance within the channel shall be kept to the minimum footprint necessary to complete project construction.
GEN-3	Erosion and Sediment Control	▪ At no time shall silt laden runoff be allowed to leave the project site within a waterway. Silt control structures shall be monitored for effectiveness and shall be repaired or replaced as needed. ▪ Erosion control measures shall be installed according to manufacturer's specifications. Appropriate erosion control measures include, but are not limited to, the following: silt fences, straw bale barriers, erosion control blankets and mats, and soil stabilization measures (e.g., tackified straw with seed, jute blankets, broadcast and hydroseeding). ▪ Erosion control fabrics shall consist of natural fibers that will biodegrade over time and are wildlife friendly. No plastic or other non-porous material shall be used as part of a permanent erosion control approach. Plastic sheeting may be used to temporarily protect a slope from runoff. ▪ All temporary construction-related erosion control methods (e.g., silt fences) shall be removed at the completion of construction. ▪ All soils disturbed or exposed during construction activities shall be seeded and stabilized using erosion control measures, such as erosion control

		fabric or hydromulch. Areas below the Ordinary High Water Mark are exempt from this AMM.
CUL-1	Cultural Resources and Human Remains	▪ If cultural or paleontological resources are encountered during the project, the contractor shall stop work within 35 feet of a find and protect the find until the County can notify a Professional Archaeologist or other such qualified individual to review the discovery. ▪ Project personnel shall not collect or retain found cultural resources. ▪ The treatment of human remains and of associated or unassociated funerary objects discovered during any soil-disturbing activity within the project area shall comply with applicable State laws. This shall include immediate notification of the Marin County Coroner. ▪ In the event of the coroner's determination that the human remains are Native American, notification of the Native American Heritage Commission (NAHC) is required. The NAHC shall be notified by phone within 24 hours of the discovery and shall be afforded the opportunity to appoint a Most Likely Descendant (MLD) (Public Resources Code Section 5097.98).

a. Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:

i. Seismic-related rupture of a known earthquake fault – No Impact

Although the Proposed Project sites (in particular the western sites along Point Reyes – Petaluma Road) are located in relatively close proximity to the San Andreas Fault Zone, none of the sites cross this active fault. Other faults in closer proximity to the Project sites are all pre-Quaternary and thus, are not considered active. Project construction activities would be limited to culvert repair/replacement, bank slip-out repair, and related activities that would have no potential to generate an earthquake. Likewise, implementation of the Proposed Project would not create or establish any new structures or land uses that would exacerbate a seismic-related rupture of a known earthquake fault, such as to expose people or structures to substantial adverse effects. As a result, **no impact** would occur.

ii. Strong seismic ground shaking – Less than Significant

As stated in above in Section 3.7.3(a)(ii), the Proposed Project sites (in particular the western sites along Point Reyes – Petaluma Road) are located in relatively close proximity to the San Andreas Fault Zone, which travels through the unincorporated community of Point Reyes Station in a southeast to northwest direction (Marin County Community Development Agency 2007). Therefore, these sites along Point Reyes – Petaluma Road could experience strong ground shaking associated with seismic activity along this fault zone. Given the short duration of construction activities (generally no more than one week at a site), it is unlikely that such ground shaking would occur during the construction period. Strong seismic ground shaking could potentially damage culverts and/or cause slope failure along the Project road segments. Implementation of the Proposed Project would improve the resilience of these existing drainage structures and features to ground shaking by improving dilapidated culvert conditions and stabilizing eroding streambanks.

The Proposed Project would not include activities that could cause or exacerbate seismic ground shaking. Additionally, the Proposed Project would not create or establish new structures or land uses that could be susceptible to strong seismic ground shaking, such as to expose people or structures to substantial adverse effects. As a result, this impact would be **less than significant**.

iii. Seismic-related ground failure, including liquefaction – Less than Significant

Portions of the Project area (in particular the western sites along Point Reyes – Petaluma Road) are mapped in an area identified as being highly susceptible to liquefaction or adjacent to highly susceptible areas (see Map 2-11 in the Marin Countywide Plan [Marin County Community Development Agency 2007]). As such, if seismic activity were to occur in this area during or following Project construction, it could result in liquefaction or ground failure. This could compromise the culverts and roadways themselves, potentially affecting motorists using the roadway and adjacent private property owners.

As discussed above, the Proposed Project would not involve activities that could induce or cause seismic-related ground failure. Likewise, the Proposed Project would not create or establish new structures or land uses that could exacerbate effects to structures or people in the event of a seismic-related ground failure. Rather, the Proposed Project would repair or replace existing culverts and stabilize existing bank slip-outs along the roadway, thereby increasing the integrity/resilience of these facilities with respect to geologic movements or other stressors. As a result, this impact would be **less than significant**.

iv. Landslides – Less than Significant

Similar to the discussions above, the Project area may be susceptible to landslides; however, the Proposed Project would not cause or contribute to landslides and would not exacerbate the effects of landslides in the area if they were to occur. CDOC mapping indicates that the Project area, along with much of Marin County, is susceptible to deep-seated landslides, as determined based on regional estimates of rock strength and steepness of slopes (CDOC 2011). Additionally, many of the Project sites are located along steep slopes that could be subject to more surface-level (i.e., not deep-seated) slope failure.

If such landslides/slope failures were to occur, this could adversely affect the Project culverts/features, roadways, and streambanks. Due to the short duration of construction activities at any given site (i.e., generally no more than 1 week at a site), it would be unlikely for a landslide or slope failure to occur during the construction period that could impact workers on-site. In addition, Project construction activities would occur during the dry season to avoid stream flows as well as precipitation and saturated soils that can increase the potential for slope failures. The Proposed Project would not include any new structures that could potentially expose people to hazards associated with landslides or otherwise exacerbate the effects of landslides that may occur in the Project area. As a result, this impact would be **less than significant.**

b. Substantial soil erosion or the loss of topsoil – Less than Significant

Proposed Project construction would include ground-disturbing activities that would loosen soils making them more susceptible to erosion by water or wind forces. For example, culvert pipe replacement would require excavation and removal of the existing pipe, as well as earthwork for installation of the replacement pipe. Likewise, movement of tracked or large-tired, heavy construction equipment on unpaved surfaces at the Project sites and staging areas may loosen soils, thereby increasing their susceptibility to erosion.

Implementation of AMMs GEN-2 and GEN-3 would reduce the potential for impacts related to soil erosion and loss of topsoil by minimizing the area of disturbance and implementing erosion control and sediment measures during construction. A complete description of the AMMs is included in Table 3.7-2, above. Following construction, implementation of the Proposed Project would reduce the potential for erosion relative to existing conditions by stabilizing eroding banks (e.g., with rock slope protection and planted vegetation) and improving dilapidated culvert conditions (e.g., installing properly sized culverts or repairing damaged culverts). Stabilized streambanks would be less likely to erode during storm events, thereby reducing potential for loss of topsoil. Additionally, properly sized culverts would be less likely to back up during large storms,

potentially contributing to erosion and sedimentation. As a result, this impact would be **less than significant.**

c. Location on a geologic unit or soil that is unstable or that would become unstable as a result of the Proposed Project and potentially result in an on-site or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse – Less than Significant

As discussed in Section 3.7.2, the geologic units underlying the Project area are primarily of the Franciscan Complex, which consist of sedimentary and meta-sedimentary rocks from the Cretaceous and Jurassic periods. Additionally, there are surficial deposits of Quaternary-aged alluvium that appear to be primarily associated with the stream channels in the Project area (i.e., Lagunitas Creek and Nicasio Creek). These geologic units would not be expected to be unstable, although the alluvium may become unstable and would be susceptible to liquefaction (see discussion under Section 3.7.3(a)(iii) above for a further discussion of potential liquefaction effects).

As discussed above, the Proposed Project would not include activities that would cause or induce substantial geologic or soil instability. Additionally, the Proposed Project would not include the construction of any new structures or facilities, and rather would be limited to replacement or improvement of existing facilities. Thus, the Proposed Project would not exacerbate a scenario where geologic units or soil could become unstable by placing people or structures in the affected area. Implementation of the Proposed Project would result in a long-term benefit to the facilities and roadways in Marin County through the improvement of dilapidated culvert conditions and stabilization of eroding banks. Therefore, this impact would be **less than significant.**

d. Location on expansive soil, creating substantial direct or indirect risks to life or property – Less than Significant

The Proposed Project would not include any habitable structures and would be limited to repair/replacement of existing facilities (i.e., culverts and roadway embankments). Expansive soils are soils that exhibit substantial shrink-swell characteristics, such that they change in volume due to changes in moisture content. Expansive soil is a particular clay soil that usually contains a dominant proportion of montmorillonite minerals (She et al. 2020). Many of the soils in the Project area are loams that may overlie clay or gravel.

While it is possible that expansive soils could be present in the Project area, the Proposed Project only involves the repair or replacement of existing facilities and would not include the construction of any new habitable structures or facilities; thus, the Proposed Project would not create any new substantial risks associated with expansive soils. Therefore, this impact would be **less than significant**.

e. Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems in areas where sewers are not available for the disposal of wastewater – No Impact

The Proposed Project would not include or involve the use of septic tanks or alternative wastewater disposal systems. Therefore, **no impact** related to septic tanks or alternative wastewater disposal systems would occur associated with the Proposed Project.

f. Destruction of a unique paleontological resource or site or unique geological feature – Less than Significant

The Franciscan Complex sedimentary rocks underlying the Project area could bear fossils. However, given that the Proposed Project activities would be limited to repair/replacement of existing culverts and roadway embankments and excavation depths for construction activities would generally be within 3 feet below the ground surface or shallower, construction activities would primarily affect previously disturbed soils and fills (e.g., those associated with the original roadway construction). Thus, Project construction would likely not penetrate or affect underlying rock structures where paleontological resources would be most likely to occur. In the unlikely event that paleontological resources are found on site, implementation of AMM CUL-1 would minimize any potential impacts by stopping work and adhering to standard conditions. A complete description of this AMM is included in Table 3.7-2, above. In addition to the AMM, the Project would be consistent with the standards included in the Marin County Development Code.

Project operation and maintenance activities would be consistent with existing practices and would not involve substantial ground disturbance; thus, there would be no potential to impact paleontological resources during operation. No unique geological features are known to occur on or near the Proposed Project sites. Therefore, no impact would occur to such features during construction or operation. Overall, this impact would be **less than significant.**

3.8 Greenhouse Gas Emissions

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
Would the Project:				
a. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☒	☐
b. Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☒	☐

3.8.1 Regulatory Setting

This section describes the federal, state, and local regulations related to GHG emissions and climate change. At the federal level, the USEPA has developed regulations to reduce GHG emissions from motor vehicles and has developed permitting requirements for large stationary emitters of GHGs. At the federal level, the USEPA has developed regulations to reduce GHG emissions from motor vehicles and has developed permitting requirements for large stationary emitters of GHGs. On April 1, 2010, USEPA and the NHTSA established a program to reduce GHG emissions and improve fuel economy standards for new model year 2012-2016 cars and light trucks. On August 9, 2011, USEPA and the NHTSA announced standards to reduce GHG emissions and improve fuel efficiency for heavy-duty trucks and buses. In August 2016, USEPA and the NHTSA jointly finalized Phase 2 Heavy-Duty National Program standards to reduce GHG emissions and improve fuel efficiency of medium- and heavy-duty vehicles for model year 2018 and beyond (USEPA 2021, NHTSA 2021). However, some of these standards have been stayed by a court order and USEPA has proposed repealing certain Phase 2 emissions standards (Center for Climate and Energy Solutions 2021). In August 2021, President Biden's Executive Order 14037, Strengthening American Leadership in Clean Cars and Trucks, directed EPA to begin work on establishing new emissions standards for heavy-duty vehicles for model years 2027 through 2030 or later. The order called for USEPA to finalize this rulemaking by December 2022 (Center for Climate and Energy Solutions 2021).

In recent years, California has enacted a number of policies and plans to address GHG emissions, energy, and climate change. In 2006, the California State Legislature enacted AB 32, the Global Warming Solutions Act, which set the overall goals for reducing California's GHG emissions to 1990 levels by 2020. SB 32 codified an overall goal for reducing California's GHG emissions to 40 percent below 1990 levels by 2030. Executive

Orders (EOs) S-3-05 and B-16-2012 further extend this goal to 80 percent below 1990 levels by 2050. CARB has completed rulemaking to implement several GHG emission reduction regulations and continues to investigate the feasibility of implementing additional GHG emission reduction regulations. These include the low carbon fuel standard, which reduces GHG emissions associated with fuel usage, and the RPS, which requires electricity suppliers to increase the amount of electricity generated from renewable sources to certain thresholds by various deadlines. In 2018, SB 100 updated the RPS to require 50 percent renewable resources by the end of 2026, 60 percent by the end of 2030, and 100 percent renewable energy and zero carbon resources by 2045. EO B-55–18 signed by Gov. Brown set a goal of statewide carbon neutrality by 2045 and net negative emissions thereafter. Governor Newsom signed EO-N-79-20 which directs CARB to develop regulations to mandate that 100 percent of in-state cars and trucks are zero-emission by 2035 and all medium- and heavy-duty trucks shall be 100 percent zero emission by 2045 where feasible.

The First Update to the AB 32 Scoping Plan (approved in 2014) defined climate change priorities for the next 5 years from its adoption and set the groundwork for reaching the state's long-term GHG emissions reduction goals, including aligning those goals with other state policy priorities for water, waste, natural resources, clean energy, transportation, and land use.

A subsequent 2017 Scoping Plan Update was released to reflect the updated emissions reductions targets (CARB 2017). The Scoping Plan Update developed statewide inventory projection data for 2030, as well as identified reduction strategies capable of securing emissions reductions that allow for achievement of the EO's new interim goal (CARB 2017). Emission reduction strategies in the 2017 Scoping Plan Update include continuation of the Cap-and-Trade Program through 2030, and incorporates a Mobile Source Strategy that includes strategies targeted to increase Zero Emission Vehicle fleet penetration and a more stringent target for the Low Carbon Fuel Standard by 2030. The Second Update also incorporates approaches to cutting short-lived climate pollutants under the Short-Lived Climate Pollutant Reduction Strategy (a planning document that was adopted by CARB in March 2017).

CARB has implemented a mandatory reporting regulation for GHG emissions for several industries. The Proposed Project is not a mandatory industry and will likely be below the reporting threshold.

The BAAQMD 2017 Clean Air Plan lays the groundwork for a long-term effort to reduce Bay Area GHG emissions 40 percent below 1990 levels by 2030 and 80 percent below 1990 levels by 2050. The plan contains multiple transportation measures designed to decrease emissions of GHGs and other pollutants (BAAQMD 2017a).

The BAAQMD does not have a construction-related GHG threshold, but does have an operational GHG threshold of 1,100 metric tons of carbon dioxide equivalents per year

($MTCO_2e$/yr) (BAAQMD 2017b). This "bright-line threshold" of 1,100 metric tons (MT) CO_2e was set for the 2020 goal established in AB 32; however, it is insufficient in ensuring that projects are complying with the current, more ambitious emission reduction targets. At the time of publication, the BAAQMD has not provided an updated analysis regarding the applicability of this bright-line threshold to the 2030 and 2050 goals of SB 32. The County has chosen not to rely on the old, outdated bright line threshold, but instead focus on whether the Project complies with a Qualified GHG Reduction Strategy. The Marin County Unincorporated Area Climate Action Plan 2030 (CAP) quantifies GHG emissions in unincorporated Marin County and outlines a path towards reducing GHG emissions through 2030. Marin County's CAP is a Qualified GHG Reduction Strategy, and is consistent and exceeds the State's goals to reduce GHG emissions by 40 percent below 1990 levels by 2030 and by 80 percent below 1990 levels by 2050. Specifically, the County establishes the goals of reducing GHG emissions 40 percent below 1990 levels by 2030, and, through a combination of emission reductions and carbon sequestration, reducing net carbon emissions to 60 percent below 2005 levels by 2030 (a goal initially established by Drawdown: Marin), and to zero by 2045. The CAP includes strategies relating to low carbon transportation, including encouraging the adoption of zero emission vehicles and equipment and the use of low carbon fuels (Marin County 2020). Based on this threshold, the Project would result in a significant impact if it did not reduce GHG emissions occurring before 2030 by 40 percent, and after 2030 by 80 percent. Consistent with the BAAQMD's 2017 thresholds, if the Project has a significant impact on GHG emissions, the County also considers its contribution to a cumulative impact to be cumulatively considerable.

The Marin Countywide Plan has a guiding principle to "Reduce greenhouse gas emissions that contribute to global warming" and multiple goals and policies aimed at reducing local contributions to global climate change by both reducing GHG emissions and fostering the absorption of GHGs (Marin County Community Development Agency 2007).

3.8.2 Environmental Setting

Anthropogenic emissions of GHGs are widely accepted in the scientific community as contributing to global climate change. Temperature rises associated with climate change are expected to negatively impact plant and animal species, cause ocean acidification and sea level rise, affect water supplies, impact agriculture, and harm public health. California has contributed to GHG emissions and was estimated in 2018 by the California Energy Commission to be responsible for approximately 1 percent of the world's total GHG emissions (CEC 2018). California's total GHG emissions were estimated as 418.2 million metric tons of CO_2e in 2019 by CARB in its Greenhouse Gas Inventory Data (CARB 2021).

Due to the rural character of unincorporated areas of Marin, the amount of GHGs emitted is small compared to other portions of the Bay Area and in statewide terms. The

2030 CAP contains a GHG emissions inventory stating that Community GHG emissions totaled 493,985 metric tons in 2005 and 380,318 metric tons in 2018, falling 23%, or 113,367 metric tons CO_2e (Marin County 2020). The largest sources of emissions were from transportation, agriculture, and building energy use. The largest decline in emissions from 2005-2018 occurred in the built environment sector due to a reduction in electricity consumption and a shift in sources of electricity generation. The County estimated that in 2018, off-road construction equipment emissions and total emissions from vehicles were 2,875 MT CO_2e and 117,767 MT CO_2e respectively. Although the 2030 CAP identifies state regulatory actions and local strategies to reduce emissions from small off-road equipment, the 2030 CAP does not contain any actions or strategies related to large scale construction equipment.

3.8.3 Discussion of Checklist Responses

Project Avoidance and Minimization Measures (AMMs) implemented to minimize and reduce impacts related to GHG emissions are included in **Table 3.8-2** below. Reference to these AMMs occurs throughout this section.

Table 3.8-1. GHG AMMs

AMM No.	AMM Title	AMM Description
GEN-7	Vehicle and Equipment Maintenance/ Cleaning	▪ Servicing of vehicles shall be conducted in designated staging areas or maintenance roads outside the top-of-bank to avoid contamination through accidental drips and spills. The Contractor shall use secondary containment such as a drip pan, to catch leaks or spills any time that vehicle or equipment fluids are dispenses, changed, or poured. ▪ Incoming equipment shall be checked for leaking oil and fluids. No equipment servicing shall take place in a water body. If emergency repairs are required, only those repairs necessary to move equipment to a more secure location shall be permissible. Drip pans ▪ All vehicles and equipment shall be kept clean. Excessive build-up of oil and grease shall not be permitted. ▪ Vehicle and equipment washing can occur on site only as needed to prevent the spread of sediment, pathogens, or exotic/invasive species. No runoff from vehicle or equipment washing shall be allowed to enter water bodies without being subjected to adequate filtration (e.g., vegetated buffers, hay wattles or bales, and silt screens). Other proper track-out systems can be used to prevent the spread of sediment from the site. ▪ Refueling shall be done outside of waterways unless equipment stationed in these locations cannot be readily relocated (e.g., pumps and generators). For stationary equipment that must be fueled on-site, secondary containment, such as a drain pan or drop cloth, shall be used to prevent accidental spills of fuels from reaching the soil, surface water, or the storm drain system.

GEN-8	Dust Management Controls and Air Quality Protection	The Contractor shall implement the following applicable Bay Area Air Quality Management District's Basic Construction Mitigation Measures to reduce emissions of fugitive dust and equipment exhaust: ▪ All haul trucks transporting soil, sand, or other loose material off-site shall be covered. ▪ All vehicle speeds on unpaved roads shall be limited to 15 mph. ▪ Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure [13 California Code of Regulations Section 2485]). ▪ All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation. ▪ All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited. ▪ All unpaved surfaces (e.g., parking areas, staging areas, soil piles, and graded areas, and unpaved access roads) shall be watered two times a day.

a, b. Generate a net increase in greenhouse gas emissions which may have a significant impact on the environment, or Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases – Less than Significant

Use of vehicles and off-road equipment, such as graders and excavators, would generate emissions of GHGs. As discussed in Section 3.3, "Air Quality," work would occur over two years at approximately 35 locations along Point Reyes – Petaluma Road, Lucas Valley Road, and Nicasio Valley Road, with a typical/average round trip distance of about 22 miles.

Estimated annual GHG emissions for 2022 and 2023 are 30 and 14 tons per year during construction, respectively. For additional information on how emissions were estimated refer to Appendix A. These emissions represent less than 10 percent of the annual off-road equipment emissions in unincorporated Marin County and thus would not be a considerable source that would make a large contribution to the existing levels of GHG emissions from construction equipment. Additionally, implementation of AMMs GEN-7 and GEN-8 would limit GHG emissions by requiring proper maintenance and tuning of equipment and limiting vehicle idling. A complete description of these AMMs is included in Table 3.8-2. In addition, once construction of the Project is complete, no new GHG emissions would be generated. Thus by 2023, the Proposed Project would not generate

any GHG emissions, thereby exceeding the State's and 2030 CAP's GHG reduction targets. Therefore, the Proposed Project would not generate GHG emissions with the potential to significantly affect the environment or conflict with any plans, including the State GHG reduction goals of AB 32and the goals and policies of the Marin County 2030 CAP. This impact is considered **less than significant**.

3.9 Hazards and Hazardous Materials

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
Would the Project:				
a. Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☒	☐
b. 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?	☐	☐	☒	☐
c. Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☒	☐
d. 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, create a significant hazard to the public or the environment?	☐	☐	☐	☒
e. Be 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 and result in a safety hazard or excessive noise for people residing or working in the project area?	☐	☐	☐	☒
f. Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☒	☐
g. Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?	☐	☐	☒	☐

3.9.1 Regulatory Setting

Federal Laws, Regulations, and Policies

Comprehensive Environmental Response, Compensation, and Liability Act

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, also called the Superfund Act) (42 USC Section 9601 et seq.) is intended to protect the public and the environment from the effects of past hazardous waste disposal activities and new hazardous material spills. Under CERCLA, USEPA has the authority to identify the parties responsible for hazardous materials releases and to ensure their cooperation in site remediation. CERCLA also provides federal funding (through the "Superfund") for the remediation of hazardous materials contamination. The Superfund Amendments and Reauthorization Act of 1986 (Public Law 99-499) amends some provisions of CERCLA and provides for a Community Right-to-Know program.

Resource Conservation and Recovery Act

The Resource Conservation and Recovery Act (RCRA) (42 USC Section 6901 *et seq.*) was enacted in 1976 as an amendment to the Solid Waste Disposal Act to address the nationwide generation of municipal and industrial solid waste. RCRA gives USEPA the authority to control the generation, transportation, treatment, storage, and disposal of hazardous waste, including underground storage tanks storing hazardous substances. RCRA also establishes a framework for the management of nonhazardous wastes. RCRA addresses only active and future facilities; it does not address abandoned or historical sites, which are covered by CERCLA (as described above).

Occupational Safety and Health Administration Regulations

The Occupational Safety and Health Act of 1970 created the Occupational Safety and Health Administration (OSHA) to ensure safe and healthful conditions for workers by setting and enforcing standards and by providing training, outreach, education, and assistance. To fulfill this purpose, OSHA develops and enforces mandatory job safety and health standards.

These standards, codified in 29 Code of CFR Part 1910, address issues that range in scope from walking and working surfaces, to exit routes and emergency planning, to hazardous materials and personal protective equipment (PPE). They include exposure limits for a wide range of specific hazardous materials, as well as requirements that employers provide PPE (i.e., protective equipment for eyes, face, or extremities; protective clothing, and respiratory devices) to their employees wherever it is necessary (i.e., when required by the label instructions) (29 CFR Section 1910.132).

State Laws, Regulations, and Policies

California state regulations, which are equal to or more stringent than federal regulations, require those handling hazardous wastes to plan for and manage such

wastes to handle, store, and dispose of them properly, to reduce risks to human health and the environment.

Hazardous Waste Control Act

The Hazardous Waste Control Act of 1972 created the Hazardous Waste Management Program, which is similar to, but more stringent than, the federal program under RCRA. The Hazardous Waste Control Act is implemented by regulations contained in Title 26 of the CCR. These regulations list more than 800 materials that may be hazardous and establish criteria for their identification, packaging, and disposal. Under the Hazardous Waste Control Act and 26 CCR, hazardous waste generators must complete a manifest that accompanies the waste from the generator to the transporter to the ultimate disposal location. Copies of the manifest must be filed with the California Department of Toxic Substances Control (DTSC).

Emergency Services Act

Under the Emergency Services Act, the State of California developed a plan to coordinate emergency services provided by federal, state, and local agencies. Rapid response to incidents involving hazardous materials or hazardous waste is an important part of the plan, which is administered by the California Office of Emergency Services. This office coordinates the responses of other agencies, including USEPA, the California Highway Patrol, the nine RWQCBs, the various air quality management districts, and County disaster response offices.

California Occupational Safety and Health Administration Standards

Title 8 of the California Occupational Safety and Health Administration (Cal/OSHA) regulations specifies that workers who may be exposed to contaminated soils, vapors that could be inhaled, or groundwater containing hazardous levels of constituents are subject to monitoring and personal safety equipment requirements that specifically address airborne contaminants. The primary intent of the Title 8 requirements is to protect worker health.

California Department of Forestry and Fire Protection Wildland Fire Management

The Office of the State Fire Marshal and California Department of Forestry and Fire Protection (CAL FIRE) administer State policies regarding wildland fire safety. Construction contractors must comply with the following requirements in the California Pub. Res. Code during construction activities at any sites with forest-, brush-, or grass-covered land:

- Earthmoving and portable equipment with internal combustion engines must be equipped with a spark arrestor to reduce the potential for igniting a wildland fire (Pub. Res. Code Section 4442).

- Appropriate fire-suppression equipment must be maintained from April 1 to December 1, the highest-danger period for fires (Pub. Res. Code Section 4428).
- On days when a burning permit is required, flammable materials must be removed to a distance of 10 feet from any equipment that could produce a spark, fire, or flame, and the construction contractor must maintain the appropriate fire-suppression equipment (Pub. Res. Code Section 4427).
- On days when a burning permit is required, portable tools powered by gasoline-fueled internal combustion engines must not be used within 25 feet of any flammable materials (Pub. Res. Code Section 4431).

Regional and Local Laws, Regulations, and Policies

Marin Countywide Plan

The Marin Countywide Plan (Marin County Community Development Agency 2007) is the comprehensive long-range general plan that guides land use and development in the unincorporated areas of Marin County. Goals and policies related to the Proposed Project and the hazards and hazardous materials analysis are listed below. Consistency with these goals and policies was considered during evaluation of potential Project impacts.

Goal EH-1: Hazard Awareness. Raise public awareness and responses about potential environmental hazards.

> **Policy EH-1.3: Identify Evacuation Routes.** Provide the public with information identifying accessible evacuation routes for fire, geologic, and other hazards.

Goal EH-4: Safety from Fires. Protect people and property from hazards associated with wildland and structural fires.

Goal PS-4: Decreased Exposure to Hazardous Materials. Reduce the risks to human and environmental health from hazardous materials.

> **Policy PS-4.1: Regulate and Reduce Hazardous Material Use.** Control the use and storage of hazardous materials to minimize their presence in, and potential dangers to, the community and environment.

Marin County Multi-Jurisdiction Local Hazard Mitigation Plan

The Marin County Multi-Jurisdiction Local Hazard Mitigation Plan (MCM LHMP) (County of Marin 2018) was developed to assess risks posed by natural hazards and to develop a mitigation strategy for reducing the County's risks. Common mitigation actions identified in the MCM LHMP potentially applicable to the Proposed Project and the hazards and hazardous materials analysis include:

FIR-1: Develop a plan for appropriate access and evacuation in hillside wildland-urban interface areas, for example creation of no parking areas, signage, and early warning and evacuation.

Marin Operational Area Emergency Operations Plan

The Marin Operational Area (OA) Emergency Operations Plan (EOP) (Marin County Sheriff's Office of Emergency Services [OES] 2014) addresses the planned response to extraordinary emergency situations associated with large-scale disasters affecting Marin County. Specifically, the EOP does the following:

- Establishes the emergency management organization required to mitigate any significant emergency or disaster affecting the Marin OA; and
- Establishes the overall operational concepts associated with Marin County's Emergency Operations Center (EOC) activities and the recovery process.

The EOP identifies how the Marin County emergency operational system fits into the overall California and National risk-based, all-hazard emergency response and recovery operations plan (Marin County Sheriff's OES 2014). The EOP incorporates annexes for specific disaster response issues, such as post-disaster housing, spontaneous volunteers, tsunami, medical/health, bioterrorism, oil spill, extreme temperature, mass fatality, and mass care and shelter.

Unified Program

The Unified Program is a consolidation of multiple environmental and emergency management programs, allowing for local oversight and enforcement by a Certified Unified Program Agency (CUPA). The Unified Program consolidates the following programs (California Environmental Protection Agency 2021):

- Aboveground Petroleum Storage Act Program
- Area Plans for Hazardous Materials Emergencies
- California Accidental Release Prevention Program
- Hazardous Materials Release Response Plans and Inventories (Business Plans)
- Hazardous Material Management Plan and Hazardous Materials Inventory Statements
- Hazardous Waste Generator and Onsite Hazardous Waste Treatment (tiered permitting) Programs
- Underground Storage Tank Program

Of these programs, likely only the hazardous waste generator program may apply to the Proposed Project during construction. The Marin County CUPA administers the Unified Program in the Project area.

3.9.2 Environmental Setting

Schools

The nearest schools to the Proposed Project include West Marin Elementary, which is located in Point Reyes Station, roughly 0.2 mile from the western-most Project site on Point Reyes – Petaluma Road. Nicasio Elementary School is located roughly 1.1 miles northwest of the intersection of Nicasio Valley Road and Lucas Valley Road. Lagunitas Elementary is located roughly 0.75 mile west-southwest of the nearest Project site along Nicasio Valley Road.

Existing Hazards and Hazardous Materials Sites

No open hazardous materials cleanup sites are located on or within any of the Proposed Project sites (DTSC 2021; SWRCB 2021). The nearest such hazardous materials site is located along Lucas Valley Road approximately 1.2 miles from the eastern-most Project site. This site is identified as the Lucas Valley Road Spill (T1000013241) and the potential contaminants of concern are diesel and gasoline (SWRCB 2021). The site is still open as of August 2019 (SWRCB 2021).

Airports

No airports are located within 2 miles of the Proposed Project. The nearest airport is the San Rafael Airport, which is roughly 5.5 miles east-southeast of the Project sites. The Petaluma Municipal Airport and Sonoma Valley Airport are both over 10 miles northeast of the Project sites.

Emergency Response and Evacuation

The County of Marin provides wildfire evacuation zone maps for wildland-urban interface areas in the County. These include the Point Reyes and Lagunitas areas, located near the western and southeastern termini of the Project area, respectively. In the Point Reyes area, Point Reyes – Petaluma Road is identified as a primary evacuation route (County of Marin 2017a). In the Lagunitas area, Sir Francis Drake Boulevard is identified as a primary evacuation route, as are several fire roads north of the populated areas, one of which connects with Nicasio Valley Road (County of Marin 2017b). In general, apart from these two areas, the majority of the lengths of the Proposed Project road segments are sparsely populated and rural in nature.

Wildfire Hazards

Portions of the Proposed Project road segments pass through areas designated as Moderate and High Fire Hazard Severity Zones (FHSZ). The area immediately north of Point Reyes – Petaluma Road between Point Reyes Station and Nicasio Reservoir is a Moderate FHSZ (CAL FIRE 2007). The area south of Point Reyes – Petaluma Road is a Federal Responsibility Area (FRA) and is thus not mapped for fire hazard severity by CAL FIRE (CAL FIRE 2007). Portions of Lucas Valley Road and Nicasio Valley Road pass through Moderate and High FHSZs. No part of the Project area is designated as a Very High FHSZ.

In general, CAL FIRE's FHSZ maps are developed using a science-based and field-tested model that assigns a hazard score based on the factors that influence fire likelihood and fire behavior (CAL FIRE 2021). Many factors are considered such as fire history, existing and potential fuel (natural vegetation), predicted flame length, blowing embers, terrain, and typical fire weather for the area (CAL FIRE 2021).

3.9.3 Discussion of Checklist Responses

Project Avoidance and Minimization Measures (AMMs) implemented to minimize and reduce impacts related to hazards and hazardous materials are included in **Table 3.9-1** below. Reference to these AMMs occurs throughout this section.

Table 3.9-1. Hazards and Hazardous Materials AMMs

AMM No.	AMM Title	AMM Description
GEN-4	Fill, Spoils, and Stockpiled Materials	▪ Temporary fill materials, excavated spoils that have not yet been hauled off site, and stockpiled material not moved within 14 days shall be isolated with silt fence, filter fabric, and/or straw bales/fiber rolls. ▪ The Contractor shall designate areas suitable for material storage near construction entrances and at least 10-feet away from drainage courses and creeks. ▪ During wet weather or when rain is forecast within 72 hours, the Contractor shall cover materials that can contaminate rainwater or be transported by runoff to surface waters with a tarp or other waterproof material secured in a manner that would prevent any of the materials from contacting the rainwater.
GEN-5	On-site Hazardous Materials Management	▪ An inventory of all hazardous materials used (and/or expected to be used) at the worksite and the end products that are produced (and/or expected to be produced) after their use shall be maintained by the worksite manager.

		▪ As appropriate, containers shall be properly labeled with a "Hazardous Waste" label and hazardous waste shall be properly recycled or disposed of off-site. ▪ Exposure of chemicals to precipitation shall be minimized by storing chemicals in watertight containers or in a storage shed (completely enclosed), with appropriate secondary containment to prevent any spillage or leakage. ▪ Petroleum products, chemicals, cement, fuels, lubricants, and non-storm drainage water or water contaminated with the aforementioned materials shall not contact soil and shall not be allowed to enter surface waters. ▪ All toxic materials, including waste disposal containers, shall be covered when they are not in use, and located as far away as possible from a direct connection to the storm drainage system or surface water. ▪ The storage and disposal of all hazardous materials, such as pesticides, paints, thinners, solvents, and fuels; and all hazardous wastes, such as waste oil and antifreeze; shall comply with all federal, state, and local standards and requirements. ▪ When rain is in the forecast within 72 hours or during wet weather, the Contractor may not apply chemicals in the outside areas. ▪ If hazardous materials are encountered at the project site, the Contractor shall remove and dispose of them according to the Spill Prevention and Response Plan (see GEN-6).
GEN-6	Spill Prevention and Response Plan	To minimize the potential adverse effects due to the release of chemicals, fuels, lubricants, and non-storm drainage water into waterways, the County or the Contractor shall develop a Spill Prevention and Response Plan to be implemented by the Contractor and all field personnel. The plan shall contain guidelines for cleanup and disposal of spilled and leaked materials at the project site. The plan shall include, but not be limited to, the following measures: ▪ Contractor's designated field personnel shall be appropriately trained in spill prevention, hazardous material control, and cleanup of accidental spills. ▪ Equipment and materials for cleanup of spills shall be available on site, and spills and leaks shall be cleaned up immediately and disposed of according to the following guidelines:

		– For small spills on impervious surfaces, absorbent materials shall be used to remove the spill, rather than hosing it down with water. – For small spills on pervious surfaces such as soil, the spill shall be excavated and properly disposed of rather than being buried. ▪ Absorbent materials shall be collected and disposed of properly and promptly. ▪ If the waste is hazardous, the Contractor shall comply with all federal, state, and local hazardous waste requirements. ▪ Spill response kits and a stockpile of spill cleanup materials such as rags or absorbents shall be on hand at all times while hazardous materials are in use (e.g., at crew trucks and other logical locations). All field personnel shall be advised of these locations. ▪ The Contractor shall routinely inspect the work site to verify that spill prevention and response measures are properly implemented and maintained.
GEN-7	Vehicle and Equipment Maintenance/ Cleaning	▪ Servicing of vehicles shall be conducted in designated staging areas or maintenance roads outside the top-of-bank to avoid contamination through accidental drips and spills. The Contractor shall use secondary containment such as a drip pan, to catch leaks or spills any time that vehicle or equipment fluids are dispenses, changed, or poured. ▪ Incoming equipment shall be checked for leaking oil and fluids. No equipment servicing shall take place in a water body. If emergency repairs are required, only those repairs necessary to move equipment to a more secure location shall be permissible. Drip pans ▪ All vehicles and equipment shall be kept clean. Excessive build-up of oil and grease shall not be permitted. ▪ Vehicle and equipment washing can occur on site only as needed to prevent the spread of sediment, pathogens, or exotic/invasive species. No runoff from vehicle or equipment washing shall be allowed to enter water bodies without being subjected to adequate filtration (e.g., vegetated buffers, hay wattles or bales, and silt screens). Other proper track-out systems can be used to prevent the spread of sediment from the site. ▪ Refueling shall be done outside of waterways unless equipment stationed in these locations cannot be readily relocated (e.g., pumps and generators). For

		stationary equipment that must be fueled on-site, secondary containment, such as a drain pan or drop cloth, shall be used to prevent accidental spills of fuels from reaching the soil, surface water, or the storm drain system.
GEN-11	Fire Prevention	All earthmoving and portable equipment with internal combustion engines shall be equipped with spark arrestors. During the high fire danger period (April 1–December 1), work crews shall: ▪ Have appropriate fire suppression equipment available at the work site. ▪ Keep flammable materials, including flammable vegetation slash, at least 10 feet away from any equipment that could produce a spark, fire, or flame. ▪ Not use portable tools powered by gasoline-fueled internal combustion engines within 25 feet of any flammable materials unless a round-point shovel or fire extinguisher is within immediate reach of the work crew (no more 25 feet away from the work area).
GEN-12	Traffic Flow and Safety Measures	▪ Work shall be staged and conducted in a manner that maintains at least one open travel lane of traffic on roadways in the project area. ▪ Construction signs shall be posted at job sites warning the public of construction work and to exercise caution. ▪ Any temporary one-lane closures shall include advance warning signage, a detour route, and flaggers in both directions to direct traffic to safeguard construction workers, provide safe passage for vehicles, and minimize traffic impacts. Work shall also be coordinated with local emergency service providers and local jurisdictions as necessary to ensure that emergency vehicle access and response is not impeded. ▪ Where work is proposed adjacent to recreational trails, warning signs shall be posted several feet beyond the limits of work. ▪ Fencing, either the orange safety type or chain link shall be installed above project sites. ▪ Access to driveways and private roads shall be maintained. If brief periods of maintenance would temporarily block access, property owners shall be notified prior to maintenance activities.

a. Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials – Less than Significant

During construction, Proposed Project activities would involve the use of hazardous materials and could create a significant hazard to the public or the environment if proper precautions are not taken. As described in Chapter 2, *Project Description,* repair/replacement of existing culverts and other activities (e.g., slip-out repairs) would involve use of a variety of mechanical equipment. This equipment would contain hazardous materials, such as fuel, oil, lubricant, etc., which may need to be routinely handled and/or transported by construction workers. Additionally, the equipment used during the Project activities may generate waste that is hazardous in nature (e.g., used oil) requiring disposal.

Compliance with OSHA and Cal/OSHA regulations would limit the potential for harmful exposures of hazardous materials to construction workers. These regulations would require that the County provide workers, whenever necessary, with PPE to protect them from unsafe exposure. Given the sparsely populated nature of the Project area, there would be limited potential for routine use of hazardous materials at the individual Project sites to expose the public and workers to significant hazards. Additionally, compliance with the RCRA, the Hazardous Waste Control Act, and the Unified Program would reduce the potential for any hazards to be released to the public or the environment during disposal of hazardous materials used during Project construction activities.

Given that activities during Project operation would be minimal and consistent with existing conditions (i.e., infrequent vegetation management, trash and debris removal, and culvert cleaning), there would be no potential for these activities to create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials. Overall, for both construction and operation, this impact would be **less than significant**.

b. 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 – Less than Significant

As described under Section3.9.3(a) above, construction activities for the Proposed Project would involve the use of mechanical equipment that would contain hazardous materials, such as fuel, oil, and lubricants. This equipment, and the hazardous materials required for its operation, may need to be stored at staging areas. Additionally, during the course of the construction activities, equipment would need to be refueled and may need to be serviced on-site using hazardous materials (e.g., oil). These activities would provide opportunities for spills or other upset or accident conditions to occur, which could create a significant hazard to the public or the environment.

Several AMMs would serve to minimize potential for upset or accident conditions resulting in a release of hazardous materials, such as AMMs GEN-4, GEN-5, GEN-6, and GEN-7, which require the contractor to cover materials during a rain event, properly manage on-site hazardous materials, implement a spill prevention and response plan if necessary, and ensure vehicles are properly maintained. A complete description of these AMMs is included in Table 3.9-1, above. Implementation of these AMMs, including compliance with applicable federal, state, and local regulations regarding hazardous materials and hazardous wastes, would substantially reduce potential for spills or other upset or accident conditions involving hazardous materials to occur.

Operation and maintenance of the Project facilities would be consistent with existing practices, consisting of infrequent vegetation management, trash and debris removal, and culvert clearing. These activities would involve no, or very minimal, use of hazardous materials that could be released through upset or accident conditions.

Overall, during construction and operation, this impact would be **less than significant**.

c. Emit hazardous emissions or involve handling hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school – Less than Significant

As described in Section 3.9.2, West Marin Elementary is located approximately 0.2-mile from the westernmost Project site along Point Reyes – Petaluma Road. Construction at this location would involve the use of mechanical and diesel-powered equipment. This would result in emissions of DPM, which is potentially harmful to human health, as described further in Section 3.3, "Air Quality." Construction activities at this location also may involve handling of hazardous materials and wastes (see discussion above under Sections 3.9.3(a) and (b).

Given the limited scale of the construction activities and temporary nature of the associated emissions (lasting for the duration of construction at any one given site, approximately 2 weeks), any hazardous emissions associated with the Proposed Project would not result in significant impacts. The types of equipment and materials (and associated emissions) to be used during Project construction activities would be similar in nature to any road repair/construction project, which may frequently occur in proximity to schools. During operation, the Proposed Project would not result in substantial hazardous emissions in proximity to schools. As a result, this impact would be **less than significant**.

d. Located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, create a significant hazard to the public or the environment – No Impact

Hazardous materials sites compiled pursuant to Government Code Section 65962.5 are identified in DTSC's EnviroStor database. As described in Section 3.9.2, none of the Project sites would be located on or near any hazardous materials sites identified in EnviroStor or the SWRCB's GeoTracker database. Therefore, **no impact** would occur.

e. Located within an airport land use plan area or, where such a plan has not been adopted, be within 2 miles of a private airport or public airport and result in a safety hazard or excessive noise for people residing or working in the study area – No Impact

None of the Project sites are located within an airport land use plan area or within 2 miles of a private or public airport. Therefore, **no impact** would occur.

f. Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan – Less than Significant

As described in Section 3.9.2 above, Point Reyes – Petaluma Road and fire roads that connect with Nicasio Valley Road are designated as the primary evacuation routes by the County within the Project area. During a disaster or other emergency, the emergency response would be led by the Marin County Sheriff's OES in accordance with the Marin OA EOP. The response measures may vary depending on the nature and location of the event, but could involve evacuation of the populated areas and movement of emergency vehicles along roadways within this area.

Project construction activities would involve culvert repair/replacement and slip-out repair activities within or adjacent to roadways, including identified evacuation routes such as Point Reyes – Petaluma Road and Nicasio Valley Road. These activities may require temporary one-lane closures and involve the operation of heavy equipment in the roadway that could obstruct or hinder public and emergency vehicle travel, particularly if proper measures are not taken. If an emergency were to occur during the construction period, evacuation and/or emergency response procedures could be disrupted due to the Project construction activities affecting the roadway.

Implementation of AMM GEN-12 would reduce potential impacts on traffic flow and on evacuation and emergency response procedures by providing warning and detour signs and flaggers to safely guide travelers during construction as well as by ensuring that local emergency providers are notified in advance of temporary lane closures. A complete description of this AMM is included in Table 3.9-1, above.

Following construction, the Proposed Project would not create any obstructions or conditions that could adversely affect emergency response or evacuation. Rather, repair of road slip-outs would improve the integrity of the roadway and prevent potential future failures. Operation and maintenance of the Proposed Project facilities would be consistent with existing practices and would have no potential to substantially affect emergency response or evacuation efforts. Overall, this impact would be **less than significant.**

g. Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires – Less than Significant

As described in Section 3.9.2, portions of the Project area are located in Moderate and High FHSZs. Construction of the Proposed Project (i.e., culvert repair/replacement, slip-out repair, etc.) would involve the use of internal combustion-engine equipment, which could potentially provide a spark for ignition of a wildfire. Additionally, the Project sites are located in rural vegetated areas along and adjacent to roadways where there may be combustible fuel present for a wildfire.

Although the majority of the Project sites are located in rural and sparsely populated areas, if Project construction activities were to spark a wildfire, this could result in wide-reaching adverse effects. Similarly, if the fire could not be contained, it could threaten people and structures in the surrounding area, as well as larger towns and cities in Marin County.

Compliance with applicable sections of the Pub. Res. Code (see discussion in Section 3.9.1) would reduce the potential for equipment used during Project construction to ignite a fire. For example, because the Project sites would include forest-, brush-, or grass-covered land, Project construction activities would be subject to Public Resource Code requirements including (1) equipping earthmoving and portable equipment with internal combustion engines with spark arrestors (section 4442); (2) maintaining appropriate fire-suppression equipment from April 1 to December 1 (section 4428); (3) on days when a burning permit is required, removing flammable materials to a distance of 10 feet from any equipment that could produce a spark, fire, or flame (section 4427); and (4) on days when a burning permit is required, not using portable tools powered by gasoline-fueled internal combustion engines within 25 feet of any flammable materials (section 4431). In addition, implementation of AMM GEN-11 would further reduce the potential for a wildfire at an active work site by ensuring that appropriate fire suppression equipment is available and that flammable materials are kept away from equipment that can produce a spark. A complete description of this AMM is included in Table 3.9-1, above. With implementation of these measures, the risk of wildfire ignition would be greatly reduced.

The Proposed Project would not include any residential or habitable structures, and would be limited to repair and maintenance of existing facilities. As such, it would not

place any people or structures in areas subject to wildfire risk. During operation, maintenance activities associated with the Proposed Project facilities would be consistent with existing practices and thus would not increase wildfire risk relative to baseline conditions. Overall, this impact would be **less than significant.**

3.10 Hydrology and Water Quality

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
Would the Proposed Project:				
a. Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?	☐	☐	☒	☐
b. Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?	☐	☐	☒	☐
c. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:				
i. result in substantial erosion or siltation on- or off-site;	☐	☐	☒	☐
ii. substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;	☐	☐	☒	☐
iii. create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or	☐	☐	☒	☐
iv. impede or redirect flood flows?	☐	☐	☒	☐
d. In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?	☐	☐	☒	☐

e. Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	☐	☐	☒	☐

3.10.1 Regulatory Setting

Federal Laws, Regulations, and Policies

Clean Water Act and Associated Programs

The Federal Water Pollution Control Act of 1972, also known as the Clean Water Act (CWA), is the primary federal law that protects the quality of the nation's surface waters, including lakes, rivers, and coastal wetlands. The objective of the CWA is "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." States, territories, and authorized Tribes establish water quality standards that describe the desired condition of a waterbody or the level of protection, which are then approved by the USEPA; these standards form a legal basis for controlling pollution that enters the waters of the U.S. Water quality standards consist of the designated beneficial uses of the waterbody, criteria to protect those designated uses, antidegradation requirements to protect existing uses and high-quality waters, and general policies regarding implementation.

USEPA is responsible for implementing the CWA, although some sections are implemented by other federal agencies under USEPA's oversight, such as Section 404 dealing with discharge of dredged and fill material into waters of the U.S. (which is implemented by the USACE). USEPA also has the option to delegate implementation of certain programs to a state agency. In California, the State Water Resources Control Board (SWRCB) and its nine regional water quality control boards (RWQCBs) administer various sections of the CWA.

Section 401

CWA Section 401 requires an evaluation of water quality when a proposed activity requiring a federal license or permit could result in a discharge to waters of the U.S. In California, USEPA has delegated the authority to issue water quality certifications to SWRCB and the RWQCBs. Each RWQCB is responsible for implementing Section 401 in compliance with the CWA and that region's water quality control plan (also known as a Basin Plan). Applicants seeking a federal license or permit to conduct activities that might result in a discharge to waters of the U.S. must also obtain a Section 401 water quality certification to ensure that any such discharge would comply with the applicable provisions of the CWA.

Section 404

CWA Section 404 regulates the discharge of dredged and fill materials into waters of the U.S., which include all navigable waters, their tributaries, and some isolated waters, as well as some wetlands adjacent to the aforementioned waters (33 CFR Section 328.3). Areas typically not considered to be jurisdictional waters include non-tidal drainage and irrigation ditches excavated on dry land, artificially irrigated areas, artificial lakes or ponds used for irrigation or stock watering, small artificial waterbodies such as swimming pools, and water-filled depressions (33 CFR Part 328). Areas meeting the regulatory definition of waters of the U.S. are subject to the jurisdiction of USACE under the provisions of CWA Section 404. Construction activities involving placement of fill into jurisdictional waters of the U.S. are regulated by USACE through permit requirements. No USACE permit is effective in the absence of state water quality certification pursuant to Section 401 of the CWA.

Section 402

Section 402 of the CWA establishes the National Pollutant Discharge Elimination System (NPDES). Under Section 402, a permit is required for point-source discharges of pollutants into navigable waters of the U.S. (other than dredge or fill material, which are addressed under Section 404). In California, the NPDES permit program is administered by the SWRCB and the RWQCBs. Permits contain specific water-quality-based limits and establish pollutant monitoring and reporting requirements. Discharge limits in NPDES permits may be based on water quality objectives designed to protect designated beneficial uses of surface waters, such as recreation or supporting aquatic life.

Section 303

Section 303 of the federal CWA (as well as the State-level Porter-Cologne Act, discussed further below) requires that states adopt water quality standards. In addition, under CWA Section 303(d), states are required to identify a list of "impaired waterbodies" (i.e., those not meeting established water quality standards), identify the pollutants causing the impairment, establish priority rankings for waters on the list, and develop a schedule for preparation of control plans to improve water quality. USEPA then approves or modifies the state's recommended list of impaired waterbodies. States must update their Section 303(d) list every 2 years. Waterbodies on the list are defined to have no further assimilative capacity for the identified pollutant, and the Section 303(d) list identifies priorities for development of pollution control plans for each listed waterbody and pollutant.

The pollution control plans mandated by the CWA Section 303(d) list are called TMDLs. The TMDL is a "pollution budget," designed to restore the health of a polluted waterbody and provide protection for designated beneficial uses. The TMDL also contains the target reductions needed to meet water quality standards and allocates those reductions among the pollutant sources in the watershed (i.e., point sources, nonpoint sources, and natural sources) (40 CFR Section 130.2). A TMDL is unique to a

specific waterbody and its surrounding pollutant sources and is not applicable to other waterbodies. The current effective USEPA-approved Section 303(d) list for waterbodies in California is the 2018 list, which received final approval by USEPA on June 9, 2021. Section 3.10.2 identifies the waterbodies in the Project vicinity that are included on the 303(d) list.

State Laws, Regulations, and Policies

Porter-Cologne Water Quality Control Act

Effective in January 1970, the Porter-Cologne Act (California Water Code Division 7) created water quality regulation on the state level, establishing the SWRCB, and dividing California into nine regions, each overseen by an RWQCB. The act established regulatory authority over waters of the state, defined as "any surface water or groundwater, including saline waters, within the boundaries of the state." More specifically, the SWRCB and RWQCBs have jurisdiction over any surface water or groundwater to which a beneficial use may be assigned. Following enactment of the federal CWA in 1972, the Porter-Cologne Act assigned responsibility for implementing CWA Sections 303, 401, and 402 to the SWRCB and RWQCBs.

The Porter-Cologne Act requires the RWQCBs to adopt water quality control plans (Basin Plans) for the protection of surface water and groundwater quality. The act also authorizes the RWQCBs to issue waste discharge requirements (WDRs) for discharges of waste to waters of the state, including NPDES permits. Any activity, discharge, or proposed activity or discharge from a property or business that could affect California's surface water, coastal waters, or groundwater will (in most cases) be subject to a WDR.

San Francisco Bay Basin Water Quality Control Plan

The Proposed Project is located in the San Francisco Bay Region (Region 2), which is overseen by the San Francisco Bay Region RWQCB (San Francisco Bay Water Board). The San Francisco Bay Water Quality Control Plan (San Francisco Bay Water Board 2019) identifies beneficial uses for surface waters and groundwater within the San Francisco Bay Region, and establishes narrative and numerical water quality objectives (WQOs) to achieve the beneficial uses for those waters. Beneficial uses represent the services and qualities of a waterbody (i.e., the reasons that the waterbody is considered valuable). WQOs reflect the standards necessary to protect and support those beneficial uses. **Table 3.10-1** lists designated beneficial uses for surface waterbodies in the vicinity of the Proposed Project.

Table 3.10-1. Beneficial Uses for Surface Waters in the Vicinity of the Proposed Project

Waterbody	AGR	MUN	FRESH	GWR	IND	PROC	COMM	SHELL	COLD	EST	MAR	MIGR	RARE	SPWN	WARM	WILD	REC-1	REC-2	NAV
Lagunitas Creek	E	E	E						E			E	E	E	E	E	E	E	
Nicasio Creek		E	E						E			E		E	E	E	E	E	
Nicasio Reservoir		E	E				E		P					E	E	E	E*	E	
San Geronimo Creek									E			E	E	E	E	E	E	E	

Notes: AGR = Agricultural Supply; MUN = Municipal and Domestic Supply; FRESH = Freshwater Replenishment; GWR = Groundwater Recharge; IND = Industrial Service Supply; PROC = Industrial Process Supply; COMM = Commercial and Sport Fishing; SHELL = Shellfish Harvesting; COLD = Cold Freshwater Habitat; EST = Estuarine Habitat; MAR = Marine Habitat; MIGR = Fish Migration; RARE = Preservation of Rare and Endangered Species; SPWN = Fish Spawning; WARM = Warm Freshwater Habitat; WILD = Wildlife Habitat; REC-1 = Water Contact Recreation; REC-2 = Noncontact Water Recreation; NAV = Navigation

E = Existing beneficial use; E* = Water quality objectives apply; water contact recreation is prohibited or limited to protect public health

Source: San Francisco Bay Water Board 2019

General Permit for Construction Activities

Most construction projects that disturb 1 acre or more of land are required to obtain coverage under the SWRCB's NPDES *General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities* (Order 2009-0009-DWQ, as amended by 2010-0014-DWQ and 2012-0006-DWQ – "Construction General Permit"). The Construction General Permit requires the applicant to file a notice of intent to discharge stormwater and prepare and implement a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP must include a site map and a description of the proposed construction activities; demonstrate compliance with relevant local ordinances and regulations; and present a list of AMMs that will be implemented to prevent soil erosion and protect against discharge of sediment and other construction-related pollutants to surface waters. Enrollees in the Construction General Permit are further required to conduct monitoring and reporting to ensure that AMMs are implemented correctly and are effective in controlling the discharge of construction-related pollutants.

Total Maximum Daily Load for Fine Sediment in the Lagunitas Creek Watershed

In 2014, the San Francisco Bay Water Board adopted Resolution No. R2-2014-0027, amending the Water Quality Control Plan for the San Francisco Bay Region. The amendment established a TMDL for sediment in Lagunitas Creek, and an implementation plan to achieve the TMDL and related habitat enhancement goals. The objective of the TMDL is to reduce fine sediment (primarily sand) deposition in Lagunitas

Creek and its tributaries, as needed to support recovery of coho salmon and steelhead runs. The TMDL allocates discharges of sediment to natural erosion processes, non-point sources generated by human actions (e.g., roads, grazing, and accelerated bed and bank erosion along Lagunitas Creek and the alluvial reaches of its tributaries), and minor point sources including construction activities and stormwater runoff.

Local Laws, Regulations, and Policies

Marin Countywide Plan

The Marin Countywide Plan (Marin County Community Development Agency 2007) is the comprehensive long-range general plan that guides land use and development in the unincorporated areas of Marin County. Goals and policies in the Marin Countywide Plan related to the Proposed Project and the hydrology and water quality analysis are listed below. Consistency with these goals and policies was considered during evaluation of potential Project impacts.

Goal WR-1: Healthy Watersheds. Achieve and maintain proper ecological functioning of watersheds, including sediment transport, groundwater recharge and filtration, biological processes, and natural flood mitigation, while ensuring high-quality water.

> **Policy WR-1.1: Protect Watersheds and Aquifer Recharge.** Give high priority to the protection of watersheds, aquifer-recharge areas, and natural drainage systems in any consideration of land use.
>
> **Policy WR-1.2: Restore and Enhance Watersheds.** Support watershed restoration efforts, coordinate County watershed activities with efforts by other groups, and simplify permit acquisition for watershed restoration and enhancement projects.

Goal WR-2: Clean Water. Ensure that surface and groundwater supplies are sufficiently unpolluted to support local natural communities, the health of the human population, and the viability of agriculture and other commercial uses.

> **Policy WR-2.3: Avoid Erosion and Sedimentation.** Minimize soil erosion and discharge of sediments into surface runoff, drainage systems, and water bodies. Continue to require grading plans that address avoidance of soil erosion and on-site sediment retention. Require developments to include on-site facilities for the retention of sediments, and, if necessary, require continued monitoring and maintenance of these facilities upon project completion.

Marin County Code, Chapter 23.18 – Stormwater Runoff Pollution Prevention

Chapter 23.18 of the Marin County Code includes requirements related to stormwater runoff pollution prevention. Under Section 23.18.093, any person performing construction activities in the County shall implement appropriate AMMs to prevent the discharge of construction wastes, including soil or sediment, or contaminants from

construction materials, tools, and equipment from entering a county storm drain, watercourse, bay or ocean. As described in Section 23.18.093(A):

> Construction-phase BMPs include erosion and sediment controls and pollution prevention practices. Erosion control BMPs may include, but are not limited to, scheduling and timing of grading (soil disturbing) activities, timely revegetation of graded areas, the use of hydroseed and hydraulic mulches, and installation of erosion control blankets. Sediment control may include properly sized detention basins, dams, or filters to reduce entry of suspended sediment into the storm drain system and watercourses, and installation of construction entrances to prevent tracking of sediment onto adjacent streets. Pollution prevention practices may include designated washout areas or facilities, control of trash and recycled materials, covering of materials stored on-site, and proper location of and maintenance of temporary sanitary facilities. The combination of BMPs used, and their execution in the field, must be customized to the site using up-to-date standards and practices. The agency will provide references to current guidance manuals and BMP information on request.

Under Section 23.18.093(C), an erosion and sediment control plan (ESCP) is required for any project subject to a grading permit or for any project subject to a building permit or other permit issued by the County that the agency determines has the potential for significant erosion and/or significant non-stormwater discharges of sediment and/or construction site waste.

3.10.2 Environmental Setting

Topography and Climate

The topography of Marin County is highly varied, with elevations ranging from sea level to 2,572 feet above sea level at the peak of Mount Tamalpais. Topographic features in the Proposed Project vicinity include Black Mountain (1,280 feet above sea level), Bolinas Ridge (roughly at elevations of 500 to 600 feet in the area of the Project sites), and Shroyer Mountain (1,458 feet above sea level), among others. Generally, the roadway segments where the Project sites are located follow creek alignments (i.e., Nicasio Creek), which tend to be at valley bottom locations in lower elevations than the surrounding hills and mountains.

The Project area exhibits a Mediterranean climate with mild, wet winters and warm, dry summers. Regional climatic conditions are moderated by a cooler, moist marine layer from the Pacific Ocean. Due to the influence of the ocean, the climate can change rapidly as one moves inland. Average annual precipitation for Point Reyes Light Station (roughly 12.5 miles west of the western-most Project site) is approximately 17 inches (Western Regional Climate Center [WRCC] 2021a), whereas for Kentfield (roughly 7.5 miles southeast from the southeastern-most Project site) the average annual precipitation is approximately 47 inches (WRCC 2021b). Average temperatures at Point

Reyes Light Station range from a low of 45.1°F in January to a high of 61.0°F in September and October (WRCC 2021a). Average temperatures at Kentfield range from a low of 38.6°F in January to a high of 83.5°F in July (WRCC 2021b).

Surface Water Hydrology and Quality

Creeks in the vicinity of the Project area drain to Tomales Bay. The main creeks are Lagunitas Creek, Nicasio Creek, and San Geronimo Creek, as shown on Figure 3.10-1. Nicasio and San Geronimo Creeks are tributaries to Lagunitas Creek. The western Project sites are located along Point Reyes – Petaluma Road, which generally follows Lagunitas Creek and Nicasio Creek. Nicasio Creek is impounded roughly 0.85-mile upstream (i.e., east-northeast) of the e Project sites along Point Reyes – Petaluma Road, creating Nicasio Reservoir. The eastern Project sites along Nicasio Valley Road and Lucas Valley Road are upstream of Nicasio Reservoir.

Some of the Project culverts convey road runoff/stormwater that collects on the inboard side of the road across/underneath the road. Other Project culverts allow passage of more defined drainage features from the upstream to downstream side of the roadway.

Several of the surface waterbodies in the vicinity of the Proposed Project sites are listed in the CWA Section 303(d) list to indicate they are impaired for a certain constituent (State Water Resources Control Board 2020), as shown in **Table 3.10-2**.

Table 3.10-2. Clean Water Act Section 303(d) Impaired Waters in the Project Vicinity

Water Body	Pollutant	TMDL Requirement Status	Sources	Expected TMDL Completion Date / Date USEPA Approved*
Lagunitas Creek	Nutrients	5A	Unknown	2022
Lagunitas Creek	Sedimentation / Siltation	5B	Unknown	2016
Lagunitas Creek	Pathogens	5B	Unknown	2007
Nicasio Reservoir	Mercury	5A	Unknown	2013
Tomales Bay	Sedimentation / Siltation	5A	Unknown	2013
Tomales Bay	Nutrients	5A	Unknown	2029
Tomales Bay	Mercury	5B	Unknown	2012
Tomales Bay	Pathogens	5B	Unknown	2007

Notes: 5A= TMDL still required; 5 B= approved TMDL being addressed by USEPA.

* Dates relate to the TMDL requirement status, so a date for 5A= TMDL scheduled completion date and

5B= Date USEPA approved TMDL.

Source: State Water Resources Control Board 2022.

Stormwater

As noted above, a number of the Project culverts convey runoff from the roadways across/underneath the road. Roadside ditches may be present in some locations to convey stormwater generated from the paved road surface. Otherwise, the Proposed Project sites are located in a rural and sparsely inhabited area that is not served by a municipal storm sewer system.

Groundwater

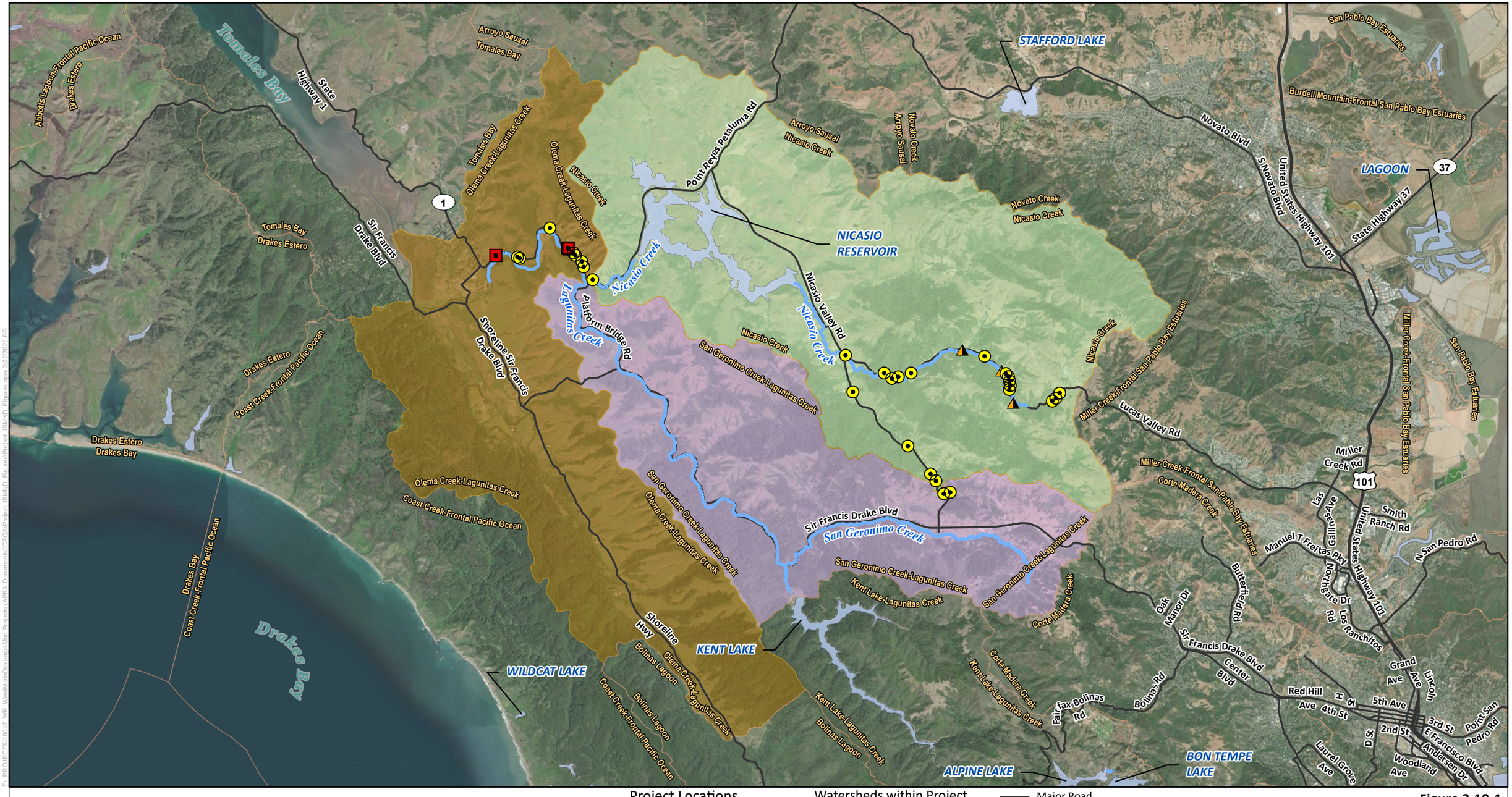
No mapped groundwater basins are present in the Project area (San Francisco Bay Water Board 2019).

Floodplains and Tsunamis

Several of the Project sites appear to be within the Federal Emergency Management Agency (FEMA) Flood Hazard Zone A (FEMA 2021), which is an area subject to inundation by the 1-percent-annual-chance flood event or 100-year flood (FEMA 2020). Generally, the flood hazard zones associated with Nicasio Creek and Lagunitas Creek do not extend to the adjacent roadway where the Project sites are generally located (FEMA 2021).

All of the Project sites west of Nicasio Reservoir along Point Reyes – Petaluma Road would be within the dam inundation zone for failure of the dam associated with Nicasio Reservoir (Marin County Community Development Agency 2007).

None of the Project sites are within a mapped tsunami inundation zone (California Emergency Management Agency et al. 2009).



Project Locations

Treatment Type

- Culvert Replacement
- Slip Out location
- Riprap improvements

Watersheds within Project Locations

- Nicasio Creek
- Olema Creek-Lagunitas Creek
- San Geronimo Creek-Lagunitas Creek
- Adjacent Watersheds

- Major Road
- Lake or Enclosed Waterbody
- Stream/River: Perennial

N

0 5
Miles

Source: County of Marin Watersheds (HUC12). http://www.marinmap.org/Geocortex/Essentials/MMREST/REST/sites/Planner_Profile/map/mapservices/9/layers/20

Figure 3.10-1
Watersheds and Surface Waterbodies

West Marin Drainage Rehabilitation Project
Initial Study/Mitigated Declaration

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3.10.3 Discussion of Checklist Responses

Project Avoidance and Minimization Measures (AMMs) implemented to minimize and reduce impacts related to hydrology and water quality are included in **Table 3.10-3** below. Reference to these AMMs occurs throughout this section.

Table 3.10-3. Hydrology and Water Quality AMMs

AMM No.	AMM Title	AMM Description
GEN-3	Erosion and Sediment Control	▪ At no time shall silt laden runoff be allowed to leave the project site within a waterway. Silt control structures shall be monitored for effectiveness and shall be repaired or replaced as needed. ▪ Erosion control measures shall be installed according to manufacturer's specifications. Appropriate erosion control measures include, but are not limited to, the following: silt fences, straw bale barriers, erosion control blankets and mats, and soil stabilization measures (e.g., tackified straw with seed, jute blankets, broadcast and hydroseeding). ▪ Erosion control fabrics shall consist of natural fibers that will biodegrade over time and are wildlife friendly. No plastic or other non-porous material shall be used as part of a permanent erosion control approach. Plastic sheeting may be used to temporarily protect a slope from runoff. ▪ All temporary construction-related erosion control methods (e.g., silt fences) shall be removed at the completion of construction. ▪ All soils disturbed or exposed during construction activities shall be seeded and stabilized using erosion control measures, such as erosion control fabric or hydromulch. Areas below the Ordinary High Water Mark are exempt from this AMM.
GEN-4	Fill, Spoils, and Stockpiled Materials	▪ Temporary fill materials, excavated spoils that have not yet been hauled off site, and stockpiled material not moved within 14 days shall be isolated with silt fence, filter fabric, and/or straw bales/fiber rolls. ▪ The Contractor shall designate areas suitable for material storage near construction entrances and at least 10-feet away from drainage courses and creeks. ▪ During wet weather or when rain is forecast within 72 hours, the Contractor shall cover materials that can contaminate rainwater or be transported by runoff to surface waters with a tarp or other waterproof

		material secured in a manner that would prevent any of the materials from contacting the rainwater.
GEN-5	On-site Hazardous Materials Management	▪ An inventory of all hazardous materials used (and/or expected to be used) at the worksite and the end products that are produced (and/or expected to be produced) after their use shall be maintained by the worksite manager. ▪ As appropriate, containers shall be properly labeled with a "Hazardous Waste" label and hazardous waste shall be properly recycled or disposed of off-site. ▪ Exposure of chemicals to precipitation shall be minimized by storing chemicals in watertight containers or in a storage shed (completely enclosed), with appropriate secondary containment to prevent any spillage or leakage. ▪ Petroleum products, chemicals, cement, fuels, lubricants, and non-storm drainage water or water contaminated with the aforementioned materials shall not contact soil and shall not be allowed to enter surface waters. ▪ All toxic materials, including waste disposal containers, shall be covered when they are not in use, and located as far away as possible from a direct connection to the storm drainage system or surface water. ▪ The storage and disposal of all hazardous materials, such as pesticides, paints, thinners, solvents, and fuels; and all hazardous wastes, such as waste oil and antifreeze; shall comply with all federal, state, and local standards and requirements. ▪ When rain is in the forecast within 72 hours or during wet weather, the Contractor may not apply chemicals in the outside areas. ▪ If hazardous materials are encountered at the project site, the Contractor shall remove and dispose of them according to the Spill Prevention and Response Plan (see GEN-6).
GEN-6	Spill Prevention and Response Plan	To minimize the potential adverse effects due to the release of chemicals, fuels, lubricants, and non-storm drainage water into waterways, the County or the Contractor shall develop a Spill Prevention and Response Plan to be implemented by the Contractor and all field personnel. The plan shall contain guidelines for cleanup and disposal of spilled and leaked materials at the project site. The plan shall include, but not be limited to, the following measures:

		▪ Contractor's designated field personnel shall be appropriately trained in spill prevention, hazardous material control, and cleanup of accidental spills. ▪ Equipment and materials for cleanup of spills shall be available on site, and spills and leaks shall be cleaned up immediately and disposed of according to the following guidelines: – For small spills on impervious surfaces, absorbent materials shall be used to remove the spill, rather than hosing it down with water. – For small spills on pervious surfaces such as soil, the spill shall be excavated and properly disposed of rather than being buried. ▪ Absorbent materials shall be collected and disposed of properly and promptly. ▪ If the waste is hazardous, the Contractor shall comply with all federal, state, and local hazardous waste requirements. ▪ Spill response kits and a stockpile of spill cleanup materials such as rags or absorbents shall be on hand at all times while hazardous materials are in use (e.g., at crew trucks and other logical locations). All field personnel shall be advised of these locations. ▪ The Contractor shall routinely inspect the work site to verify that spill prevention and response measures are properly implemented and maintained.
GEN-7	Vehicle and Equipment Maintenance/ Cleaning	▪ Servicing of vehicles shall be conducted in designated staging areas or maintenance roads outside the top-of-bank to avoid contamination through accidental drips and spills. The Contractor shall use secondary containment such as a drip pan, to catch leaks or spills any time that vehicle or equipment fluids are dispenses, changed, or poured. ▪ Incoming equipment shall be checked for leaking oil and fluids. No equipment servicing shall take place in a water body. If emergency repairs are required, only those repairs necessary to move equipment to a more secure location shall be permissible. Drip pans ▪ All vehicles and equipment shall be kept clean. Excessive build-up of oil and grease shall not be permitted. ▪ Vehicle and equipment washing can occur on site only as needed to prevent the spread of sediment, pathogens, or exotic/invasive species. No runoff from vehicle or equipment washing shall be allowed to enter water bodies without being subjected to

		adequate filtration (e.g., vegetated buffers, hay wattles or bales, and silt screens). Other proper track-out systems can be used to prevent the spread of sediment from the site. ▪ Refueling shall be done outside of waterways unless equipment stationed in these locations cannot be readily relocated (e.g., pumps and generators). For stationary equipment that must be fueled on-site, secondary containment, such as a drain pan or drop cloth, shall be used to prevent accidental spills of fuels from reaching the soil, surface water, or the storm drain system.
GEN-9	Pavement Saw-cutting Operations	The Contractor shall prevent any saw-cutting debris from entering nearby waterways. The Contractor shall use dry cutting techniques and sweep up residue when practicable. If wet methods are used, the Contractor shall vacuum slurry as cutting proceeds or collect all wastewater by constructing a sandbag sediment barrier. The bermed area shall be of adequate size to collect all wastewater and solids. The Contractor shall allow collected water to evaporate if the wastewater volume is minimal and if maintaining the ponding area does not interfere with public use of the street area or create a safety hazard. ▪ If approved by the Engineer, the Contractor may direct or pump saw-cutting wastewater to a dirt area and allow to infiltrate. The dirt area shall be adequate to contain all the wastewater. After wastewater has infiltrated, all remaining saw-cutting residue must be removed and disposed of properly. Remaining silt and debris from the ponding or bermed area shall be removed or vacuumed and disposed of properly. ▪ If a suitable dirt area is not available, with the approval of the Engineer, the Contractor shall filter the saw-cutting wastewater through filtering materials and methods meeting Association of Bay Area Governments (ABAG) Standards for Erosion and Sedimentation Control Measures (latest edition) before discharging off-site.
GEN-10	Concrete Operations	The Contractor shall prevent the discharge of pollutants from concrete operations by properly disposing of waste, and by implementing the following practices: ▪ Store all materials in waterproof containers or under cover away from drain inlets or drainage areas. ▪ Avoid mixing excess amounts of Portland cement material.

		▪ Do not wash out concrete trucks into storm drains, open ditches, streets, streams, etc. Whenever possible, perform washout of concrete trucks off site where discharge is controlled and not permitted to discharge into the storm drain system. For onsite washout, locate washout area at least 50 feet from storm drains, open ditches or other water bodies, preferably in a dirt area. Control runoff from the area by constructing a temporary pit or bermed area large enough for the liquid and solid waste. ▪ Wash out concrete wastes into the temporary pit where the concrete can set, be broken up and then disposed of properly. If the volume of water is greater than what will allow concrete to set, allow the water to infiltrate and/or evaporate, if possible. Remove or vacuum the remaining silt and debris from the pond or beamed area and dispose of it properly. ▪ Dispose of water from washing of exposed aggregate to dirt area. The dirt area shall be adequate to contain all the wastewater and once the wastewater has infiltrated, any remaining residue must be removed. If a suitable dirt area is not available, then the Contractor shall filter the wash water through straw bales or other filtering materials meeting ABAG Standards for Erosion and Sediment Control Measures before discharging to the sanitary sewer with approval from the Engineer. ▪ Collect and return sweepings from exposed aggregate concrete to a stockpile or dispose of the waste in trash containers. ▪ Ensure that poured concrete be excluded from the wetted channel for a period of 30 days after it is poured. During that time, the poured concrete shall be kept moist, and runoff from the concrete shall not be allowed to enter the stream. Containment structures shall be installed to control the placement of wet concrete and to prevent it from entering the channel outside of those structures. Commercial sealants may be applied to the poured concrete surface where difficulty in excluding water flow for a long period may occur. If sealant is used, water shall be excluded from the site until the sealant is dry.
GEN-14	Instream Work	▪ Instream work shall be conducted from the top of bank to the maximum extent feasible. ▪ Any work using equipment within the stream channel shall be performed in isolation from a flowing stream. If flow is intermittent and does not support fish

		habitat, excavation may occur within the wetted portion of the channel after installing a sediment boom downstream to allow turbid waters to settle out before being released downstream after sediment removal.
GEN-15	Dewatering Measures	When work in flowing streams is unavoidable, streamflow shall be diverted around the work area with use of a temporary dam or bypass according to the measures below and in conjunction with AMM BIO-1: ▪ Prior to dewatering, the best means to bypass flow through the work area shall be determined to minimize disturbance to the channel and avoid direct mortality of fish and other aquatic vertebrates. ▪ Instream cofferdams shall only be built from materials such as clean gravel, or rubber bladders which shall cause little or no siltation or turbidity. No earthen fill shall be used to construct the cofferdam. ▪ Streamflow shall be allowed to gravity flow around or through the work site using temporary bypass pipes or culverts. Bypass pipe diameter shall be sized to accommodate, at a minimum, twice the volume of the summer baseflow. ▪ If a work site is to be temporarily dewatered by pumping, intakes shall be completely screened with wire mesh not larger than 5 millimeters to prevent amphibians from entering the pump system. On Black Mountain Creek, the intake pipe shall be fitted with fish screens meeting California Department of Fish and Wildlife (CDFW) and National Marine Fisheries Service (NMFS) criteria to prevent entrainment or impingement of small fish. ▪ If necessary, discharged water shall pass over some form of energy dissipater to prevent erosion of the downstream channel. Silt bags shall be equipped to the end of discharge hoses and pipes to remove sediment from discharged water. ▪ If used, temporary pump discharge pipes and hoses shall be designed to minimize turbidity and the potential to wash contaminants into the stream. A filtration/settling system shall be included to reduce downstream turbidity (e.g., filter fabric, turbidity curtain, etc.). The selection of an appropriate system is based on the rate of discharge. If feasible, water that is pumped into a pipe should discharge onto the top of bank into a densely vegetated area.

		▪ When construction is completed, the flow diversion structure shall be removed as soon as possible but no more than 48-hours after work is completed. When diversion structures are removed, to the extent practicable, the ponded flows shall be directed into the low-flow channel within the work site to minimize downstream water quality impacts.

a. Violate any water quality standards, waste discharge requirements or otherwise substantially degrade water quality – Less than Significant

Construction

Proposed Project construction would include ground-disturbing activities (e.g., excavation/removal of existing culverts, operation of heavy equipment on unpaved surfaces, etc.) that would loosen soils, thereby increasing their susceptibility to erosion by water or wind forces. Project construction also would require removal and clearing of vegetation in work areas to allow for equipment access and a designated clean work area, as well as at staging and stockpile areas. Since vegetation plays an important role in stabilizing soils, such vegetation removal/clearing would increase the susceptibility of these areas to erosion.

Heavy equipment used during Project construction (see Section 2.4.2 in Chapter 2, *Project Description*) would contain hazardous materials, such as fuel, oil, lubricants, etc. If these materials were to leak, spill, or otherwise be released into the environment, they could be discharged to surface waterbodies, thereby adversely affecting beneficial uses. Alternatively, the released materials could infiltrate into the soil and groundwater and thus adversely affect groundwater quality. Additionally, certain types of construction equipment/processes would involve constituents and/or generate wastes that could adversely affect water quality. Pavement cutting for replacement of culvert pipes would require use of a concrete saw, which may utilize a wet slurry that can pollute surface waters if discharged off-site. Concrete work (e.g., installation of headwalls) may create potential for water quality degradation through improper washout of concrete trucks and/or through allowing surface waters to contact uncured concrete.

Equipment would be operated from the top of bank whenever feasible. However, since the Project sites involve repair at culverts and along eroded roadway embankments within stream/drainage channels, some work activities may require work within the stream channel. Operation of equipment within the stream channel would heighten the potential for pollution of surface waters via erosion/sedimentation and release of hazardous materials, particularly if preventative measures are not taken. This could

result in violation of water quality standards or waste discharge requirements, which would be a significant impact.

As described in Chapter 2, *Project Description,* Project construction activities would be conducted during the dry season when drainage ditches and tributaries are dry or channels exhibit minimal to intermittent flow. However, if construction activities are necessary where water is present, dewatering activities including pumping of pools, the use of cofferdams, or a clean water bypass may be necessary. If necessary, dewatering activities would be conducted in a manner that would minimize impacts to water quality. Implementation of the following AMMs would minimize impacts to water quality.

- AMM GEN-4: Fill Spoils, and Stockpiled Materials
- AMM GEN-5: On-Site Hazardous Materials Management
- AMM GEN-6: Spill Prevention and Response Plan
- AMM GEN-7: Vehicle and Equipment Maintenance/ Cleaning
- AMM GEN-9: Pavement Saw-cutting Operations
- AMM GEN-10: Concrete Operations
- AMM GEN-14: Instream Work
- AMM GEN-15: Dewatering Measures

A complete description of these AMMs is included in Table 3.10-3, above.

Implementation of the AMMs listed above would reduce the potential for adverse impacts to water quality during construction activities (i.e., repair/replacement of culverts, road slip-out repair). Implementation of these measures would reduce the potential for pollution of surface waters via erosion/sedimentation, leaks or spills of hazardous materials, and improper discharge of construction wastes to a level that is less than significant. Likewise, with implementation of the measures, the potential for pollution of groundwater quality would be less than significant. Overall, construction of the Proposed Project would result in a **less-than-significant** impact.

Operation

Once constructed, the Proposed Project would not have any operation-related activities, facilities, or equipment, and maintenance would be consistent with existing practices. Therefore, there would be no potential to substantially adversely affect water quality during Project operation and maintenance. By repairing or replacing existing deficient

and dilapidated culverts and repairing existing road slip-outs, the Proposed Project would beneficially affect water quality over the long-term relative to existing conditions. Under current conditions, erosion and sedimentation is occurring at many of the Project site locations due to culvert and bank deficiencies. Sedimentation may adversely affect water quality conditions in Nicasio Creek, Lagunitas Creek, and other downstream waterbodies in the area. Thus, by correcting the problems with the existing culverts (e.g., repairing or replacing failed or damaged pipes, stabilizing slopes, repairing existing inlet drop structures, upsizing culverts where needed) and repairing eroding streambanks, the Proposed Project would improve the operation of the culverts and repair the streambanks to reduce the potential for erosion and sedimentation occurring in the future. Overall, this impact would be **less than significant.**

b. Substantially decrease groundwater supplies or interfere substantially with groundwater recharge, such that the project may impede sustainable groundwater management of the basin – Less than Significant

Project construction may require relatively small amounts of water for dust control, cleaning of equipment and vehicles, mixing concrete, drinking water for construction workers, and other related purposes. It is possible that some of this water could be sourced from groundwater (e.g., municipal sources that obtain some amount of water from groundwater); however, given the limited scale of the Proposed Project construction activities, this would have no potential to substantially decrease groundwater supplies. Likewise, some excavations for Project construction could encounter groundwater, which may need to be dewatered and discharged off-site. Due to the small amount of groundwater likely to be encountered (the excavations would not generally extend deeper than 3 feet below ground surface or be large in area), this would not substantially affect groundwater supplies.

Once constructed/repaired, the Proposed Project facilities would not require or use any water, including groundwater. Additionally, the Proposed Project would not create any substantial new areas of impervious surface that could interfere with groundwater recharge. The Project culverts would continue to allow water to pass through or underneath the roadway, where it may percolate through the streambed to groundwater below. As such, the Proposed Project would have no potential to impede sustainable groundwater management. Therefore, this impact would be **less than significant**.

c. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:

i. Result in substantial erosion or siltation on- or off-site – Less than Significant

As described in Section 3.10.3(a) above, Proposed Project construction activities would have the potential to result in erosion and sedimentation/siltation. The use of heavy equipment and ground-disturbing activities required for repair or replacement of culverts and repair of slip-outs would loosen soils, thereby increasing their susceptibility to erosive forces. Project construction activities would also temporarily alter the existing drainage patterns of the sites through vegetation removal at work and staging areas and through ground-disturbance/excavation required for repair or replacement of some culverts and slip-out repair sites. Additionally, it is possible that channel dewatering may be required if there is water in the channels at the time of construction.

These Project activities would create the potential for erosion and siltation to occur on- or off-site, which could adversely affect water quality. Implementation of the AMMs described in Section 3.10.3(a) would reduce potential for such adverse effects. In particular, installation of silt fencing, silt curtain, or other sediment capture devices downstream of the channel work areas would help to limit off-site movement of sediments or silts that could be dislodged from the culvert maintenance and slip-out repair activities. Additionally, implementation of AMM GEN-3, which would require implementation of sedimentation and erosion control measures, would help to prevent adverse water quality effects from occurring. A complete description of AMM GEN-3 is included in Table 3.10-3, above. With implementation of these measures, the potential for impacts during construction would be less than significant.

Following construction, exposed earthen channel banks would be stabilized by applying seeding or erosion fabric. This would limit the potential for erosion and siltation post-construction. In general, the Proposed Project would reduce potential for erosion and siltation over the long term by repairing/stabilizing banks that are eroding and unstable under existing conditions and by improving dilapidated culvert conditions. Operation and maintenance of the Project sites would be consistent with existing practices and thus, would not result in substantial erosion or siltation on- or off-site. Therefore, impacts during the operation phase would be less than significant.

Overall, for the reasons listed above, this impact would be **less than significant.**

ii. Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite – Less than Significant

As described above, the Proposed Project would not create any substantial new areas of impervious surface which could substantially increase the rate of amount of surface runoff. Any impervious surface associated with new headwalls would be *de minimis*. The culvert and slip-out sites are located in rural, sparsely inhabited areas of Marin County, which are not served by a municipal stormwater system. The repairs and replacement of existing culverts would improve drainage at the site locations and reduce the potential for localized flooding by ensuring culverts are properly sized, repairing existing inlet drop structures where needed. As such, this impact would be **less than significant.**

iii. Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff – Less than Significant

See the discussion under Section 3.10.3(c)(ii) above. The Proposed Project sites are located in a rural area of Marin County that is not served by a municipal stormwater drainage system. Additionally, the Proposed Project would not create or establish any substantial new areas of impervious surface. Several of the Proposed Project culverts serve to convey stormwater drainage from the road surfaces, and implementation of the Proposed Project would improve the performance of these facilities. During construction, there may be the potential for Project construction activities to provide additional sources of polluted runoff to nearby waterbodies (e.g., spills of hazardous materials from construction equipment and subsequent precipitation events). However, implementation of AMMs GEN-3, GEN-4, GEN-5, GEN-6, GEN-7, GEN-9, and GEN-10 in particular, would minimize potential for such adverse effects to occur and would reduce the potential effects to a level that is **less than significant**.

iv. Impede or redirect flood flows – Less than Significant

The Proposed Project would not create or establish substantial new above-ground structures that could impede or redirect flood flows. Rather, the Proposed Project would be limited to repair/replacement of existing facilities. In some cases, culverts may be upsized and new headwalls may be installed; however, these new or enlarged facilities would better convey flows, improving dilapidated conditions and would not substantially change the profile of the sites with respect to impeding or redirecting flood flows. Construction activities would take place during the dry season; thus, the potential for flooding to occur on the construction site(s) and for construction equipment and materials to impede or redirect the flows would not be substantial. Therefore, this impact would be **less than significant.**

d. In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation – Less than Significant

As described in Section 3.10.2, several of the Project sites are located within the FEMA 100-year flood hazard zone and a majority of the sites are located along roadways that are adjacent to creeks (i.e., Nicasio Creek) that could potentially flood during large storms. During construction, equipment containing hazardous materials would be used on-site and such equipment and hazardous materials may be stored at staging areas that could potentially be subject to inundation by flood. If floodwaters were to inundate the Project sites and/or staging areas, this could potentially result in a release of pollutants. However, given that Project construction would take place during the dry season, the probability of such an event occurring would be extremely low. Additionally, implementation of AMMs GEN-5 and GEN-6 would ensure that hazardous materials are stored securely and away from surface waters, limiting the potential for release during a flood. A complete description of these AMMs is included in Table 3.01-3, above. Once constructed, the Proposed Project sites/facilities would not store or contain any pollutants that could potentially be released during an inundation event.

All of the Project sites west of Nicasio Reservoir are within the inundation area for failure of the dam. Inundation due to dam failure could result in a release of hazardous materials and other materials (e.g., wet slurry, concrete washout water) present at the Project sites. However, given the low probability of a failure occurring during the construction period and the temporary nature of Project activities at any one location, the probability of inundation at the Project sites due to dam failure is extremely low.

None of the Project sites are located within a mapped tsunami hazard zone. Several Project sites are located downstream of Nicasio Reservoir which may experience seiches. Any hazardous materials (e.g., wet slurry, fuel, oil) stored at the Project sites could be released during a substantial, sudden inundation event such as a seiche. However, given the low probability of such events in any given year and the temporary nature of the Project activities, the probability of this event occurring is extremely low.

Overall, this impact would be **less than significant.**

e. Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan – Less than Significant

With implementation of the measures described in Section 3.10.3(a) above, the Proposed Project would not result in substantial pollutant discharges during construction. Thus, construction activities would not substantially adversely affect beneficial uses, as identified in the San Francisco Bay Basin Plan (see Table 3.10-1). Over the long term, the Proposed Project would improve the performance of existing culverts and repair unstable, eroding roadway embankments, thereby reducing potential sediment discharges to nearby surface waters. By reducing sediment load to

downstream creeks, the Proposed Project would further the goals of the Lagunitas Creek Watershed Sediment TMDL, which was adopted as an amendment to the Basin Plan. No mapped groundwater basins are located in the immediate Project area and no adopted sustainable groundwater management plans are applicable to the Proposed Project. Therefore, the Proposed Project would not conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan. This impact would be **less than significant.**

3.11 Land Use and Planning

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
Would the Project:				
a. Physically divide an established community?	☐	☐	☒	☐
b. Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☒

3.11.1 Discussion of Checklist Responses

Project Avoidance and Minimization Measures (AMMs) implemented to minimize and reduce impacts related to land use and planning are included in **Table 3.11-1** below. Reference to these AMMs occurs throughout this section.

Table 3.11-1. Land Use AMMs

AMM No.	AMM Title	AMM Description
GEN-12	Traffic Flow and Safety Measures	▪ Work shall be staged and conducted in a manner that maintains at least one open travel lane of traffic on roadways in the project area. ▪ Construction signs shall be posted at job sites warning the public of construction work and to exercise caution. ▪ Any temporary one-lane closures shall include advance warning signage, a detour route, and flaggers in both directions to direct traffic to safeguard construction workers, provide safe passage for vehicles, and minimize traffic impacts. Work shall also be coordinated with local emergency service providers and local jurisdictions as necessary to ensure that emergency vehicle access and response is not impeded. ▪ Where work is proposed adjacent to recreational trails, warning signs shall be posted several feet beyond the limits of work.

		▪ Fencing, either the orange safety type or chain link shall be installed above project sites. ▪ Access to driveways and private roads shall be maintained. If brief periods of maintenance would temporarily block access, property owners shall be notified prior to maintenance activities.

a. Divide an established community – Less than Significant

The Proposed Project would be limited to maintenance activities along 3 existing roadway segments in Marin County. The Proposed Project would not permanently affect access to surrounding land uses or create any new permanent, physical barriers between developed communities. Maintenance activities and repairs would be temporary in duration lasting approximately six months. As described in Section 3.17, "Transportation," maintenance activities could encroach into the roadways, which could temporarily disrupt traffic flow and also result in temporary road/lane closures. Implementation of AMM GEN-12, described above in Table 3.11-1,would ensure that appropriate measures are implemented to minimize traffic flow disruptions, and thereby minimize disruptions to existing communities. Additionally, once culvert maintenance activities and roadside bank slip-out repairs are completed at a given location, access disruptions to existing communities related to those activities would cease.

Because proposed maintenance activities and repairs would be short-term and implementation of AMM GEN-12 would minimize temporary disruptions to nearby communities, this impact would be **less than significant.**

b. Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect – No Impact

The Proposed Project will extend through lands designated as agricultural, coastal agricultural, coastal single family, open space, and recreational commercial. The Project will also traverse through greenbelt lands, which include lands designated as MALT Conservation Easements, Federal and State Parks, ridge and upland greenbelt, stream conservation areas, wetlands, and Marin County Open Space District lands.

The proposed culvert maintenance activities and roadside bank slip-out repairs would not result in new development, as no new permanent habitable structures would be created, nor would land be altered from its present use. Proposed Project activities would occur within the County right-of-way along and within existing roads and also within roadside ditches and stream channels.

Although temporary and permanent impacts may occur associated with Proposed Project activities, Project activities would support the guiding principles and are consistent with the goals and policies of the Marin Countywide Plan (Marin County Community Development Agency 2007) through environmental protection, which would include improvements to flood and erosion protection and water quality, enhancements to native habitats, and protection of sensitive biological resources. Section 3.4, "Biological Resources," and Section 3.10, "Hydrology and Water Quality," further discuss the Project's proposed improvements to environmental resources as well as mitigation and AMMs that will be implemented to avoid, minimize, or mitigate any environmental impacts. Over the long term, implementation of the Proposed Project would protect existing land uses by maintaining channel conveyance capacity and provide enhanced riparian habitat through willow staking in the Project area.

Overall, implementation of the Proposed Project would support existing land use plans and would not result in incompatibilities with existing and adjacent land uses. **No impact** would occur related to this topic.

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3.12 Mineral Resources

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
Would the Project:				
a. 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?	☐	☐	☐	☒
b. 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?	☐	☐	☐	☒

3.12.1 Discussion of Checklist Responses

a, b. 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; or 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 – No Impact

The Proposed Project is not located within a known significant mineral resource area of the County, according to Map 3-5 (Location of Mineral Resource Preservation Sites) in the *Mineral Resources* chapter of the Marin Countywide Plan (Marin County Community Development Agency 2007). Nicasio Quarry, a Marin County Permitted Mineral Resource Site, is located approximately 1 mile north of where Proposed Project activities would occur along Lucas Valley Road and Nicasio Valley Road (Marin County Community Development Agency 2007). The Nicasio Quarry is also listed on the CDOC's Office of Mine Reclamation's website under Mine ID 91-21-0005 as a stone quarry (CDOC 2016). However, Proposed Project activities would occur entirely within the County right-of-way and would not involve any activities or acquire land that could directly affect the availability of a mineral resource or the operation of the Nicasio Quarry. Therefore, the Proposed Project would not result in the loss of availability of a known mineral resource that would be of value to the region nor would it result in the loss of a locally-important mineral resource recovery site. As a result, **no impact** to mineral resources would occur with implementation of the Proposed Project.

3.13 Noise

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
Would the Project result in:				
a. Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☒	☐
b. Generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☒	☐
c. For a project located within the vicinity of a private airstrip or an airport land use plan area, or, where such a plan has not been adopted, within 2 miles of a public airport or public-use airport, would the project expose people residing or working in the project site to excessive noise levels?	☐	☐	☐	☒

3.13.1 Overview of Noise and Vibration Concepts and Terminology

Noise

In the CEQA context, noise can be defined as unwanted sound. Sound is characterized by various parameters, including the rate of oscillation of sound waves (frequency), the speed of propagation, and the pressure level or energy content (amplitude). In particular, the sound pressure level is the most common descriptor used to characterize the loudness of an ambient sound level, or sound intensity. The decibel (dB) scale is used to quantify sound intensity. Because sound pressure can vary enormously within the range of human hearing, a logarithmic scale is used to keep sound intensity numbers at a convenient and manageable level. The human ear is not equally sensitive to all frequencies in the spectrum, so noise measurements are weighted more heavily for frequencies to which humans are sensitive, creating the A-weighted decibel (dBA) scale.

Different types of measurements are used to characterize the time-varying nature of sound. Below are brief definitions of these measurements and other terminology used in this chapter.

Decibel (dB) is a measure of sound on a logarithmic scale that indicates the squared ratio of sound pressure amplitude to a reference sound pressure amplitude. The reference pressure is 20 micro-pascals.

A-weighted decibel (dBA) is an overall frequency-weighted sound level in decibels that approximates the frequency response of the human ear.

Maximum sound level (Lmax) is the maximum sound level measured during a given measurement period.

Minimum sound level (Lmin) is the minimum sound level measured during a given measurement period.

Equivalent sound level (Leq) is the equivalent steady-state sound level that, in a given period, would contain the same acoustical energy as a time-varying sound level during that same period.

Percentile-exceeded sound level (Lxx) is the sound level exceeded during *x* percent of a given measurement period. For example, L_{10} is the sound level exceeded 10 percent of the measurement period.

Day-night sound level (Ldn) is the energy average of the A-weighted sound levels occurring during a 24-hour period, with 10 dB added to the A-weighted sound levels during the period from 10:00 p.m. to 7:00 a.m. (typical sleeping hours). This weighting adjustment reflects the elevated sensitivity of individuals to ambient sound during nighttime hours.

Community noise equivalent level (CNEL) is the energy average of the A-weighted sound levels during a 24-hour period, with 5 dB added to the A-weighted sound levels between 7:00 p.m. and 10:00 p.m. and 10 dB added to the A-weighted sound levels between 10:00 p.m. and 7:00 a.m.

In general, human sound perception is such that a change in sound level of 3 dB is barely noticeable, a change of 5 dB is clearly noticeable, and a change of 10 dB is perceived as doubling or halving the sound level. **Table 3.13-1** presents approximate noise levels for common noise sources, measured adjacent to the source.

Table 3.13-1**.** Examples of Common Noise Levels

Common Outdoor Activities	Noise Level (dBA)
Jet flyover at 1,000 feet	110
Gas lawnmower at 3 feet	100
Diesel truck at 50 feet traveling 50 miles per hour	90

Common Outdoor Activities	Noise Level (dBA)
Noisy urban area, daytime	80
Gas lawnmower at 100 feet, commercial area	70
Heavy traffic at 300 feet	60
Quiet urban area, daytime	50
Quiet urban area, nighttime	40
Quiet suburban area, nighttime	30
Quiet rural area, nighttime	20

Source: Caltrans 2013

Vibration

Ground-borne vibration propagates from the source through the ground to adjacent buildings by surface waves. Vibration may be composed of a single pulse, a series of pulses, or a continuous oscillatory motion. The frequency of a vibrating object describes how rapidly it is oscillating, measured in Hertz (Hz). Most environmental vibrations consist of a composite, or "spectrum," of many frequencies. The normal frequency range of most ground-borne vibrations that can be felt generally starts from a low frequency of less than 1 Hz to a high of about 200 Hz. Vibration information for this analysis has been described in terms of the peak particle velocity (PPV), measured in inches per second, or of the vibration level measured with respect to root-mean-square vibration velocity in decibels (VdB), with a reference quantity of 1 micro-inch per second.

Vibration energy dissipates as it travels through the ground, causing the vibration amplitude to decrease with distance away from the source. High-frequency vibrations reduce much more rapidly than do those characterized by low frequencies, so that in a far-field zone distant from a source, the vibrations with lower frequency amplitudes tend to dominate. Soil properties also affect the propagation of vibration. When ground-borne vibration interacts with a building, a ground-to-foundation coupling loss usually results but the vibration also can be amplified by the structural resonances of the walls and floors. Vibration in buildings is typically perceived as rattling of windows, shaking of loose items, or the motion of building surfaces. In some cases, the vibration of building surfaces also can be radiated as sound and heard as a low-frequency rumbling noise, known as ground-borne noise.

Ground-borne vibration is generally limited to areas within a few hundred feet of certain types of industrial operations and construction/demolition activities, such as pile driving. Road vehicles rarely create enough ground-borne vibration amplitude to be perceptible to humans unless the receiver is in immediate proximity to the source or the road surface is poorly maintained and has potholes or bumps. Human sensitivity to

vibration varies by frequency and by receiver. Generally, people are more sensitive to low-frequency vibration. Human annoyance also is related to the number and duration of events; the more events or the greater the duration, the more annoying it becomes.

3.13.2 Regulatory Setting

Federal Laws, Regulations, and Policies

No federal laws, regulations, or policies for construction-related noise and vibration apply to the Proposed Project. However, the Federal Transit Administration (FTA) *Transit Noise and Vibration Impact Assessment Manual* states that for evaluating daytime construction noise impacts in outdoor areas, a noise threshold of 90 dBA L_{eq} should be used for residential areas (FTA 2018).

For construction vibration impacts, the FTA guidelines use an annoyance threshold of 80 VdB for infrequent events (fewer than 30 vibration events per day) and a damage threshold of 0.12 inches per second (in/sec) PPV for buildings extremely susceptible to vibration damage (FTA 2018). The groundborne vibration annoyance level is 65 VdB for buildings where vibration would interfere with interior operations, 72 VdB for residences, and 75 VdB for institutional land uses with primarily daytime uses.

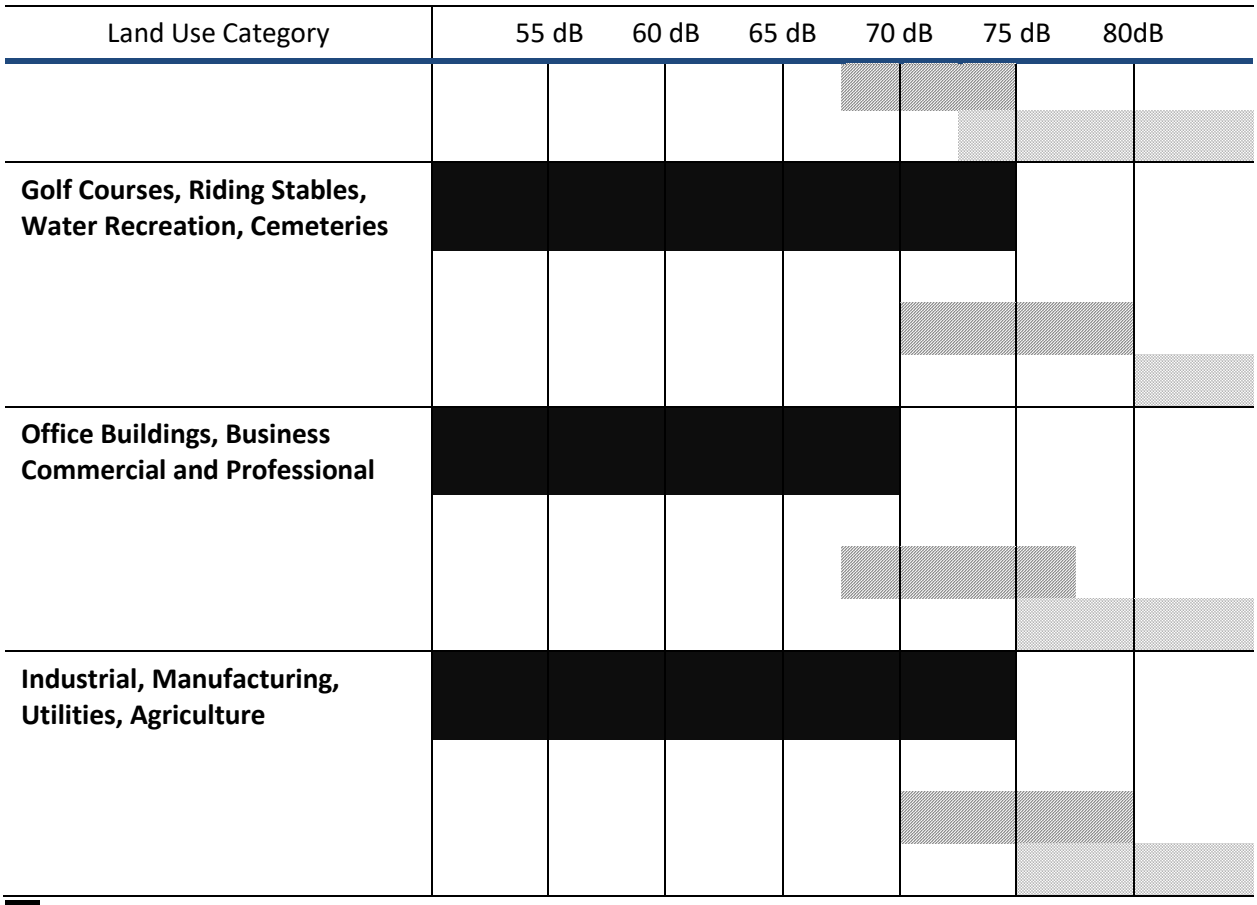
State Laws, Regulations, and Policies

California requires each local government entity to implement a noise element as part of its general plan. California Administrative Code, Title 4, presents guidelines for evaluating the compatibility of various land uses as a function of community noise exposure. The state land use compatibility guidelines are listed in **Table 3.13-2**.

For the protection of fragile, historic, and residential structures, Caltrans recommends a more conservative threshold of 0.2 in/sec PPV for normal residential buildings and 0.08 in/sec PPV for old or historically significant structures (Caltrans 2020).

Table 3.13-2. State Land Use Compatibility Standards for Community Noise Exposure

Land Use Category	55 dB	60 dB	65 dB	70 dB	75 dB	80dB
Residential – Low Density Single Family, Duplex, Mobile Homes						
Residential – Multi-Family						
Transient Lodging – Motels, Hotels						
Schools, Libraries, Churches, Hospitals, Nursing Homes						
Auditoriums, Concert Halls, Amphitheaters						
Sports Arenas, Outdoor Spectator Sports						
Playgrounds, Neighborhood Parks						



■	Normally Acceptable:	Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.
■	Conditionally Acceptable:	New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features are included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.
▨	Normally Unacceptable:	New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.
▨	Clearly Unacceptable:	New construction or development generally should not be undertaken.

Note: Community Noise Exposure is measured as Ldn or CNEL (in dB).

Source: California Governor's Office of Planning and Research 2017

Local Laws, Regulations, and Policies

The Marin County Municipal Code, Title 6 contains the following noise-related regulations that may apply to the Proposed Project:

Section 6.70.030 – Enumerated Noises

(5) Construction Activities and Related Noise.

a. Hours for construction activities and other work undertaken in connection with building, plumbing, electrical, and other permits issued by the community development agency shall be limited to the following:

    i. Monday through Friday: seven a.m. to six p.m.

    ii. Saturday: 9 am to 5 pm

    iii. Prohibited on Sundays and Holidays (New Year's Day, President's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, and Christmas Day.)

b. Loud noise-generating construction-related equipment (e.g., backhoes, generators, jackhammers) can be maintained, operated, or serviced at a construction site for permits administered by the community development agency from eight a.m. to five p.m. Monday through Friday only.

c. Special exceptions to these limitations may occur for:

    i. Emergency work as defined in Section 22.130.030 of this code provided written notice is given to the community development director within forty-eight hours of commencing work;

    ii. Construction projects of city, county, state, other public agency, or other public utility;

    iii. When written permission of the community development director has been obtained, for showing of sufficient cause;

    iv. Minor jobs (e.g., painting, hand sanding, sweeping) with minimal/no noise impacts on surrounding properties;

    v. Modifications required by the review authority as a discretionary permit condition of approval.

The Marin Countywide Plan (Marin County Community Development Agency 2007) contains goal and policies related to the Proposed Project and the noise analysis that

are listed below. Consistency with these goals and policies was considered during evaluation of potential Project impacts.

Goal NO-1. Protection from Excessive Noise. Ensure that new land uses, transportation activities, and construction do not create noise levels that impair human health or quality of life.

Policy NO-1.3 Regulate Noise Generating Activities. Require measures to minimize noise exposure to neighboring properties, open space, and wildlife habitat from construction-related activities, yard maintenance equipment, and other noise sources, such as amplified music.

3.13.3 Environmental Setting

Vehicle traffic is the primary source of noise in Marin County and is loudest along major roadways. Other significant local noise sources include aircraft, trains, mining activity, and construction (Marin County Community Development Agency 2007). The Proposed Project is located along roads in rural unincorporated areas of Marin County, within the 60 Ldn noise contour. Vehicular traffic along these roads is the primary source of noise in the Project area. Long-term noise measurements taken in 2005 at two sites near the Project area, at Sir Francis Drake Blvd. near Woodacre and Hwy 1 South of Point Reyes Station, measured Ldn of 73 and 62 respectively (Marin County Community Development Agency 2007).

Sensitive receptors in the vicinity of the Proposed Project consist primarily of rural residences. There are multiple residences on Lucas Valley Road located approximately 100 feet from a project site. The distance from the closest project locations to the nearest residences on Point Reyes – Petaluma Road and Nicasio Valley Road are 270 and 305 feet, respectively. Point Reyes Station Inn is located approximately 1,600 feet west of a project site. Some Project sites are located adjacent to Roy's Redwood Preserve and French Ranch Preserve and close to portions of Golden Gate National Recreation Area. The nearest schools, churches, and other sensitive receptor types are located more than half a mile from any Project site. The nearest airports, San Rafael Airport and Gnoss Field, are located 6 miles east and 7.4 miles northeast respectively of the nearest project site. The US Coast Guard Pacific Strike Team has a helipad 6.5 miles east of the Project area.

3.13.4 Discussion of Checklist Reponses

a. Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies – Less than Significant

The Proposed Project would generate noises associated with construction activities (e.g., grading and excavation activities) that would temporarily increase noise levels and would cease once construction is complete. Following construction, operation and maintenance-related noise sources would return to baseline levels.

The nearest sensitive receptors are located along Lucas Valley Road approximately 100 feet from the closest project site. At this distance, the construction equipment noise level from the noisiest sites is anticipated to be 86.5 dBA based on the two loudest pieces of equipment (concrete saw and jackhammer). The 90 dBA noise threshold would occur at 67 feet from one of these Project Work areas. At sites where concrete saws and jackhammers would not be used, the 90 dBA threshold would occur at a distance of 40 feet. Detailed noise calculations are shown in Appendix D.

Project activities would occur on weekdays between the hours of 8:00 a.m. and 5:00 p.m. and work on weekends or outside of the that time is prohibited unless approved by the Project Engineer. These construction hours are allowed by the Marin County Municipal Code Section 06.70.030. Work at individual sites would be temporary (generally 2-4 days for culvert repair/replacement and between 10-20 days for slip-out repairs) and infrequent with sites spread out over a large area, thus limiting the amount of noise generated near individual sensitive receptors. Additionally, the Proposed Project is a Marin County Public Works project and is exempt from the limitations listed in the municipal code. Nevertheless, because the Proposed Project would be in compliance with the Marin County Municipal Code and no sensitive receptors would be exposed to noise in excess of the threshold, this impact would be **less than significant**.

b. Generation of excessive groundborne vibration or groundborne noise levels – Less than Significant

Vibration thresholds for buildings occur at a PPV of 0.12 in/sec for buildings extremely susceptible to vibration damage; the human annoyance threshold is at 80 VdB. Vibration and ground-borne noise levels were estimated following methods described in the FTA Noise and Vibration Impact Assessment (FTA 2018) to determine the PPV that would potentially impact buildings and the VdB for annoyance, since there are no applicable County vibration-related thresholds or recommended methodology. It was assumed that the equipment would have similar vibration sound levels as a vibratory roller (at Project sites requiring paving) or loaded trucks (which would impact areas along hauling routes). **Table 3.13-3** below shows relevant parameters for the construction equipment

used for the Proposed Project and distance to sensitive receptors to be below vibration thresholds.

Table 3.13-3. Construction Equipment and Vibration Distance

Equipment	PPV at 25 ft	Distance to PPV of 0.12 in/sec	Noise Vibration Level at 25 ft	Distance to Noise Vibration of 80 VdB
Vibratory Roller	**0.21 in/sec**	**36.3 feet**	**94 VdB**	**73 feet**
Loaded Truck	**0.076 in/sec**	**18.4 feet**	**86 VdB**	**40 feet**

Source: Calculations are provided in Appendix D.

Table 3.13-3 shows that the vibration noise is below the human annoyance level of 80 VdB at 73 feet from the Project area and that the building damage threshold is at 36 feet. There are no sensitive receptors or sensitive buildings within these threshold distances. Therefore, since the vibration is below the annoyance level and there are no buildings within the damage threshold, this impact would be **less than significant**.

c. For a project located within the vicinity of a private airstrip or an airport land use plan area, or, within 2 miles of a public airport or public-use airport, would the project expose people residing or working in the project site to excessive noise levels – No Impact

The Proposed Project is not located within an airport land use plan area or within 2 miles of a public airport or private airport or airstrip. The nearest airports are San Rafael Airport and Gnoss Field which are both over 5 miles away from the closest section of the Project area. There would be **no impact** related to airport noise exposure.

3.14 Population and Housing

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
Would the Project:				
a. Induce substantial unplanned 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)?	☐	☐	☐	☒
b. Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

3.14.1 Discussion of Checklist Responses

a. Induce unplanned population growth – No Impact

The Proposed Project would be limited to maintenance of existing facilities and would not result in the construction of new roads, culverts, or other facilities that would Proposed Project indirectly induce substantial population growth. In addition, the Proposed Project would not involve changes to existing land uses that would result in new development or infrastructure. Therefore, the Proposed Project would not directly or indirectly induce population growth in the Project area. As a result, **no impact** related to inducing population growth would occur with implementation of the Proposed Project.

b. Displace a substantial number of existing people or housing – No Impact

As described above, the Proposed Project would not involve the construction or development of additional infrastructure. Although residences are located near the Project area, no residents or housing would be displaced by the Proposed Project, either temporarily or permanently. In addition, no construction of replacement housing would occur as part of the Proposed Project. As a result, **no impact** related to housing would occur with implementation of the Proposed Project.

3.15 Public Services

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
Would the Project:				
a. Would the project 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:				
i. Fire protection?	☐	☐	☒	☐
ii. Police protection?	☐	☐	☒	☐
iii. Schools?	☐	☐	☐	☒
iv. Parks?	☐	☐	☐	☒
v. Other public facilities?	☐	☐	☐	☒

3.15.1 Discussion of Checklist Responses

Project Avoidance and Minimization Measures (AMMs) implemented to minimize and reduce impacts related to public services are included in **Table 3.15-1** below. Reference to these AMMs occurs throughout this section.

Table 3.15-1. Public Services AMMs

AMM No.	AMM Title	AMM Description
GEN-5	On-site Hazardous Materials Management	▪ An inventory of all hazardous materials used (and/or expected to be used) at the worksite and the end products that are produced (and/or expected to be produced) after their use shall be maintained by the worksite manager.

		▪ As appropriate, containers shall be properly labeled with a "Hazardous Waste" label and hazardous waste shall be properly recycled or disposed of off-site. ▪ Exposure of chemicals to precipitation shall be minimized by storing chemicals in watertight containers or in a storage shed (completely enclosed), with appropriate secondary containment to prevent any spillage or leakage. ▪ Petroleum products, chemicals, cement, fuels, lubricants, and non-storm drainage water or water contaminated with the aforementioned materials shall not contact soil and shall not be allowed to enter surface waters. ▪ All toxic materials, including waste disposal containers, shall be covered when they are not in use, and located as far away as possible from a direct connection to the storm drainage system or surface water. ▪ The storage and disposal of all hazardous materials, such as pesticides, paints, thinners, solvents, and fuels; and all hazardous wastes, such as waste oil and antifreeze; shall comply with all federal, state, and local standards and requirements. ▪ When rain is in the forecast within 72 hours or during wet weather, the Contractor may not apply chemicals in the outside areas. ▪ If hazardous materials are encountered at the project site, the Contractor shall remove and dispose of them according to the Spill Prevention and Response Plan (see GEN-6).
GEN-6	Spill Prevention and Response Plan	To minimize the potential adverse effects due to the release of chemicals, fuels, lubricants, and non-storm drainage water into waterways, the County or the Contractor shall develop a Spill Prevention and Response Plan to be implemented by the Contractor and all field personnel. The plan shall contain guidelines for cleanup and disposal of spilled and leaked materials at the project site. The plan shall include, but not be limited to, the following measures: ▪ Contractor's designated field personnel shall be appropriately trained in spill prevention, hazardous material control, and cleanup of accidental spills. ▪ Equipment and materials for cleanup of spills shall be available on site, and spills and leaks shall be cleaned up immediately and disposed of according to the following guidelines:

		– For small spills on impervious surfaces, absorbent materials shall be used to remove the spill, rather than hosing it down with water. – For small spills on pervious surfaces such as soil, the spill shall be excavated and properly disposed of rather than being buried. ▪ Absorbent materials shall be collected and disposed of properly and promptly. ▪ If the waste is hazardous, the Contractor shall comply with all federal, state, and local hazardous waste requirements. ▪ Spill response kits and a stockpile of spill cleanup materials such as rags or absorbents shall be on hand at all times while hazardous materials are in use (e.g., at crew trucks and other logical locations). All field personnel shall be advised of these locations. ▪ The Contractor shall routinely inspect the work site to verify that spill prevention and response measures are properly implemented and maintained.
GEN-7	Vehicle and Equipment Maintenance/ Cleaning	▪ Servicing of vehicles shall be conducted in designated staging areas or maintenance roads outside the top-of-bank to avoid contamination through accidental drips and spills. The Contractor shall use secondary containment such as a drip pan, to catch leaks or spills any time that vehicle or equipment fluids are dispenses, changed, or poured. ▪ Incoming equipment shall be checked for leaking oil and fluids. No equipment servicing shall take place in a water body. If emergency repairs are required, only those repairs necessary to move equipment to a more secure location shall be permissible. Drip pans ▪ All vehicles and equipment shall be kept clean. Excessive build-up of oil and grease shall not be permitted. ▪ Vehicle and equipment washing can occur on site only as needed to prevent the spread of sediment, pathogens, or exotic/invasive species. No runoff from vehicle or equipment washing shall be allowed to enter water bodies without being subjected to adequate filtration (e.g., vegetated buffers, hay wattles or bales, and silt screens). Other proper track-out systems can be used to prevent the spread of sediment from the site. ▪ Refueling shall be done outside of waterways unless equipment stationed in these locations cannot be readily relocated (e.g., pumps and generators). For

		stationary equipment that must be fueled on-site, secondary containment, such as a drain pan or drop cloth, shall be used to prevent accidental spills of fuels from reaching the soil, surface water, or the storm drain system.
GEN-11	Fire Prevention	All earthmoving and portable equipment with internal combustion engines shall be equipped with spark arrestors. During the high fire danger period (April 1–December 1), work crews shall: ▪ Have appropriate fire suppression equipment available at the work site. ▪ Keep flammable materials, including flammable vegetation slash, at least 10 feet away from any equipment that could produce a spark, fire, or flame. ▪ Not use portable tools powered by gasoline-fueled internal combustion engines within 25 feet of any flammable materials unless a round-point shovel or fire extinguisher is within immediate reach of the work crew (no more 25 feet away from the work area).
GEN-12	Traffic Flow and Safety Measures	▪ Work shall be staged and conducted in a manner that maintains at least one open travel lane of traffic on roadways in the project area. ▪ Construction signs shall be posted at job sites warning the public of construction work and to exercise caution. ▪ Any temporary one-lane closures shall include advance warning signage, a detour route, and flaggers in both directions to direct traffic to safeguard construction workers, provide safe passage for vehicles, and minimize traffic impacts. Work shall also be coordinated with local emergency service providers and local jurisdictions as necessary to ensure that emergency vehicle access and response is not impeded. ▪ Where work is proposed adjacent to recreational trails, warning signs shall be posted several feet beyond the limits of work. ▪ Fencing, either the orange safety type or chain link shall be installed above project sites. ▪ Access to driveways and private roads shall be maintained. If brief periods of maintenance would temporarily block access, property owners shall be notified prior to maintenance activities.

a. Result in adverse physical impacts associated with the provision of new or physically altered governmental facilities or a need for new or physically altered governmental facilities

i. Fire protection – Less than Significant

As described in Section 3.14, "Population and Housing," the Proposed Project would not induce population growth and therefore would not require construction of new or altered fire protection facilities in order to maintain acceptable response times. However, some of the Proposed Project activities (i.e., culvert repair/replacement, slip-out repair activities) would involve the use of internal combustion-powered equipment, in addition to the use and storage of flammable and/or hazardous materials, such as fuel, which could temporarily increase fire risk or provide an ignition source. Additionally, the Project sites would extend into vegetated areas adjacent to roadways where there could be a risk of wildfire in areas with a high fuel load. If Proposed Project activities were to cause a fire, it could require a response from the County of Marin Fire Department (i.e., the Point Reyes Fire Station or the Woodacre Fire Station), thereby diverting their resources from other calls for service (County of Marin 2022). Furthermore, Project activities that would occur underneath or adjacent to roadways, as well as slip-out repairs along roadways, may cause temporary lane closures and involve operation of heavy equipment within the roadway. Without adequate traffic control, temporary lane closures or detours associated with Proposed Project activities could affect the mobility of fire apparatus and vehicles and thereby adversely affect fire protection service in the vicinity of the Project work sites.

As discussed in Section 3.9, "Hazards and Hazardous Materials," and Section 3.20, "Wildfire," compliance with applicable sections of the Public Resource Code (see discussion in Section 3.9.1) would reduce potential for any equipment used during Project construction to ignite a fire. Additionally, the following AMMs described in Table 3.15-1, above include measures that would reduce the potential risk of fires.

- AMM GEN-5: Hazardous/Waste Management
- AMM GEN-6: Spill Prevention and Control
- AMM GEN-7: Vehicle and Equipment Maintenance/Cleaning
- AMM GEN-11: Fire Protection

In addition, implementation of AMM GEN-12 would help maintain traffic flow by requiring signage and flaggers to be present during Project activities as well as would ensure that emergency response providers are notified of any closures in advance. With implementation of the Public Resource Code and the AMMs listed above,

impacts to fire protection services would be minimal during Project activities. Therefore, this impact would be l**ess than significant**.

ii. Police protection – Less than Significant

The Proposed Project would not increase population in the Project area (see related discussion in Section 3.14, "Population and Housing") such as to increase demand for police protection services or require/result in the need to construct new or altered police protection facilities. However, as discussed above, temporary lane closures or detours associated with Proposed Project activities could affect response times of police services. Implementation of AMM GEN-12 would help minimize disruptions to existing roadways by requiring signage and flaggers to be present during Project construction activities as well as ensure that emergency response providers are notified in advance of any closures. A complete description of this AMM is included in Table 3.15-1, above. Within implementation of AMM GEN-12, impacts to police protection services would be **less than significant**.

iii, iv, v. Schools, parks, and other facilities – No Impact

Proposed Project activities would occur within the County roadways and right-of-way, with some activities occurring within the stream channels and roadside ditches. As discussed in Section 3.14, the Proposed Project would not induce population growth such that the provision and construction of new or altered schools, parks or other public facilities would be necessary to meet appropriate performance objectives. As such, **no impact** related to construction of new or altered schools, parks or other public facilities would occur.

3.16 Recreation

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
Would the Project:				
a. 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?	☐	☐	☒	☐
b. Include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☐	☒

3.16.1 Discussion of Checklist Responses

a. Increase use of existing parks or recreational facilities – Less than Significant

As described in Section 3.14, "Population and Housing," the Proposed Project would not induce population growth in Marin County.

Trails and Marin County Open Space District Preserve lands (i.e., Roy's Redwoods Preserve, Maurice Thorner Preserve, and French Ranch Preserve) are located adjacent to the southern portion of the Project area on the east and west sides of Nicasio Valley Road (Marin County 2021). Moon Hill Trail is located adjacent to and just west of Nicasio Valley Road near MP 6.88 within the French Ranch Preserve. Roy's Redwoods Loop Trail, located adjacent to and just east of Nicasio Valley Road near MP 7.1 within Roy's Redwoods Preserve, generally parallels Nicasio Valley Road heading south before veering east away from the project area. Thorner Ridge Trail crosses Nicasio Valley Road at MP 7.49 just south of the Project area via an existing pedestrian bridge and connects Roy's Redwood Preserve to the Maurice Thorner Preserve.

Trail access near Nicasio Valley MP 6.88 and Nicasio Valley MP 6.99 may be temporarily disrupted during maintenance activities adjacent to Nicasio Valley Road (see Figure 2-2, "Project Location"). However, proposed improvements would be short in duration (generally between 2-4 days for culvert repair/replacement and between 10-20 days for slip-out repair). Additionally, given that Marin County has approximately 639 miles of public trails, and numerous parks and open space areas, it is unlikely that any temporary effects caused by the Proposed Project would substantially increase the use of existing

parks or other recreational facilities such that physical deterioration of these facilities would occur (Marin County Community Development Agency 2007). As a result, this impact would be **less than significant**.

b. Creation of new or altered recreational facilities – No Impact

The Proposed Project would not include any recreational facilities or require the construction or expansion of recreational facilities. Rather, the Proposed Project construction activities would be limited to culvert maintenance and bank slip-out repairs. Therefore, **no impact** related to the creation of new or altered recreational facilities would occur with implementation of the Proposed Project.

3.17 Transportation

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
Would the Project:				
a. Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?	☐	☐	☒	☐
b. Would the project conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?	☐	☐	☒	☐
c. Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☒	☐
d. Result in inadequate emergency access?	☐	☐	☒	☐

3.17.1 Terminology

Following are definitions of key traffic and transportation terms used in this section, based on materials published by the Transportation Research Board (Transportation Research Board 2000).

Level of service (LOS) – A qualitative measure describing operational conditions within a traffic stream, based on service measures such as speed and travel time, freedom to maneuver, traffic interruptions, comfort, and convenience. Roadway LOS is defined according to methodologies presented in the Highway Capacity Manual (Transportation Research Board 2000). Using the Highway Capacity Manual procedures, the quality of traffic operation is graded as one of six LOS designations: A, B, C, D, E, or F. LOS A and B represent the best traffic operations, LOS C and D represent intermediate operations, and LOS E and F represent high levels of congestion and unstable traffic flow.

Delay – The additional travel time experienced by a vehicle or traveler that results from inability to travel at optimal speed, and stops due to congestion or traffic control.

Freeway – A multilane divided highway with a minimum of two lanes in each direction and full access control, with no interruption in traffic flow. Freeways are used exclusively by vehicular traffic.

Highway – A roadway with two or more lanes that is not completely access-controlled, and may have at-grade crossings and/or occasional traffic signals. Multilane highways may be divided. Two-lane highways are typically undivided. Highways may accommodate bicycle traffic.

Local access roadway, local roadway – A roadway designed with the primary function of providing access to an adjacent site or development; a roadway that connects local points but does not accommodate through traffic

3.17.2 Regulatory Setting

Federal Laws, Regulations, and Policies

There are no federal regulations pertaining to transportation impacts that are applicable to the Project.

State, Regional, and Local Regulations

Transportation analysis in California is guided by policies and standards set at the state level by the California Department of Transportation and at the regional and local level by jurisdictional agencies such as the Marin County congestion management agency (Transportation Authority of Marin) and the Towns of Fairfax and San Anselmo. Local jurisdictions regulate speed limits and other driving standards on local roadways. The California Department of Transportation and local jurisdictions generally assess the impacts of long-term (not short-term) traffic conditions. The goal of state and local plans and policies related to transportation is to prepare for future growth and the vehicular, transit, pedestrian, and bicycle travel demand associated with that growth. However, given that the Project elements would generate construction-related vehicle traffic, the goals and policies presented below are considered to have relevance to this analysis.

Marin Countywide Plan

The Marin Countywide Plan (Marin County Community Development Agency 2007) is a comprehensive long-range general plan that guides land use and development in the unincorporated areas of Marin County. Goals and policies in the Marin Countywide Plan are relevant to the Proposed Project and the transportation analysis. Consistency with these goals and policies was considered during evaluation of potential Project impacts.

Goal TR-1. Safe and Efficient Movement of People and Goods. Provide a range of transportation options that meet the needs of residents, businesses, and travelers.

> **Policy TR-1.2: Maintain Service Standards.** Establish level of service standards for vehicles on streets and highways and performance standards for transit, bicycles, pedestrians, and other modes of transportation.

3.17.3 Environmental Setting

The Project area is served by a roadway network of freeways (e.g., U.S. 101 and California SR 1), arterials (e.g., Sir Francis Drake Boulevard), and local streets (e.g., Point Reyes – Petaluma Road).

Regional Roadways

U.S. 101 is Marin County's primary roadway; it varies between two and five lanes in both directions and forms a north-south corridor along the County's eastern edge, where development is most dense between the cities of Mill Valley and Novato. U.S. 101 is highly-congested, particularly during commute hours, because it is the primary surface link connecting with the City of San Francisco, which draws large numbers of workers each day. The highway also intersects with other important highways, such as Interstate 580, which provide important inter-county and inter-regional links. U.S. 101 is also vital in connecting communities within the County for everyday activities such as shopping, school, and recreation. U.S. 101 has an average daily traffic volume of approximately 172,000 vehicles south of the Sir Francis Drake Boulevard interchange, and about 196,000 vehicles north of the Mission Avenue interchange (Caltrans 2017).

SR 1 serves as a north-south corridor along the County's western edge. SR 1 has an average daily traffic volume of approximately 5,600 vehicles south of the Point Reyes – Petaluma Road intersection, and about 2,000 vehicles north of the intersection (Caltrans 2016).

Sir Francis Drake Boulevard is an important arterial roadway of varying width (number of lanes) that runs primarily east-west, linking U.S. 101 to SR 1 in West Marin. Much of the road is a four-lane rural highway, but widens to six lanes approaching the City of Larkspur Landing east of U.S. 101 and narrows to two lanes as it extends west beyond the Town of Fairfax. Sir Francis Drake Boulevard is the primary east-west corridor in the County, and is designated a Principal Arterial in the Marin County Congestion Management Program between U.S. 101 and SR 1. The daily traffic volume on Sir Francis Drake Boulevard varies, ranging from approximately 17,000 vehicles on the two-lane section in the Towns of Fairfax and San Anselmo to about 36,000 vehicles on the four-lane section in the census-designated place (CDP) of Kentfield (Environmental Science Associates 2018).

Local Roadways

The Project area encompasses three distinct local road segments totaling approximately 14 miles of roadway in West Marin County: (1) Point Reyes – Petaluma Road between SR 1 and Platform Bridge Road in Point Reyes Station; (2) Lucas Valley Road from MP 5.29 at Big Rock west to the intersection with Nicasio Valley Road in Nicasio; and (3) Nicasio Valley Road from the intersection with Sir Francis Drake Boulevard in San Geronimo Valley to the intersection with Lucas Valley Road.

Existing Bicycle and Pedestrian Facilities

The Marin County Transit District provides regional transit service in western Marin County. No existing or proposed transit facilities are located along the roadways within the Project area. West Marin Stagecoach Route 68, which travels on Sir Francis Drake Boulevard between San Rafael and Inverness provides the only transit option in Point Reyes Station. The closest transit stop to the Project area is located south of the Project sites along Nicasio Valley Road at the intersection of Nicasio Valley Road and Sir Francis Drake Boulevard.

Point Reyes – Petaluma Road, Nicasio Valley Road and Lucas Valley Road are classified as having Class II bike lanes (Marin County Community Development Agency 2018) and limited pedestrian facilities; however, pedestrian facilities (i.e., sidewalks) are only located in built-up areas and are not within the Project area

3.17.4 Discussion of Checklist Responses

Project Avoidance and Minimization Measures (AMMs) implemented to minimize and reduce impacts related to transportation are included in **Table 3.17-1** below. Reference to these AMMs occurs throughout this section.

Table 3.17-1. Transportation AMMs

AMM No.	AMM Title	AMM Description
GEN-12	Traffic Flow and Safety Measures	▪ Work shall be staged and conducted in a manner that maintains at least one open travel lane of traffic on roadways in the project area. ▪ Construction signs shall be posted at job sites warning the public of construction work and to exercise caution. ▪ Any temporary one-lane closures shall include advance warning signage, a detour route, and flaggers in both directions to direct traffic to safeguard construction workers, provide safe passage for vehicles, and minimize traffic impacts. Work shall also be coordinated with local emergency service providers and local jurisdictions as necessary to ensure that emergency vehicle access and response is not impeded. ▪ Where work is proposed adjacent to recreational trails, warning signs shall be posted several feet beyond the limits of work. ▪ Fencing, either the orange safety type or chain link shall be installed above project sites.

		▪ Access to driveways and private roads shall be maintained. If brief periods of maintenance would temporarily block access, property owners shall be notified prior to maintenance activities.

a. Conflict with applicable circulation plans, ordinances, or policies and applicable congestion management programs – Less than Significant

The Project's effect on traffic in the Project area would be limited to short-term effects in any given location associated with construction vehicles and haul trips. Construction-related traffic would consist primarily of commutes to and from worksites by construction workers and periodic delivery and removal of materials during the construction period. The number of construction workers and vehicles would vary by project, planned activity, and material needs.

The manner by which Project activities are likely to affect traffic volumes and LOS in the Project area are discussed below.

Temporary Lane Closures

Some Project activities, including culvert replacement work and roadway slip-outs, may physically encroach into the traveled roadway, resulting in temporary one- lane closures. New culverts would be installed in segments and slip-outs would be repaired in a manner to maintain one open travel lane to traffic during construction. Generally, temporary lane closures would last 2-3 days for culvert work but may last up to 10-20 days for larger slip-out repairs. Full closures of the roadway would not be required.

Temporary one-lane closures could lead to traffic delays, temporary reductions in roadway LOS, or create traffic hazards. As described in AMM GEN-12 if temporary lane closures or traffic delays are required, adequate warning and detour signs and flaggers would be provided to safely guide travelers during construction activities. A complete description of this AMM is included in Table 3.17-1, above. In addition, advance notice of temporary closures would be provided to local jurisdictions and emergency service providers. As such, with implementation of AMM GEN-12, the effects of temporary lane closures on traffic operations would be less than significant.

Construction Worker Trip Generation

Construction workers would need to access the work sites, which would add vehicle traffic to area roadways. The County estimates that a total of approximately 547 trips would be made annually by both County personnel and contractors to conduct Project-related work in the Project area (Appendix A). The majority of work would be conducted over approximately 100 workdays, generally between June 1 and October 31, over two years. Even if all trips were condensed over this peak work period, the maximum

number of trips in the Project area (approximately 5.5 trips per day) would not have a noticeable effect on LOS on regional and local access routes. However, work would not be conducted continually at one site; rather maintenance activities would be conducted temporarily at each site throughout the Project area.

Typically, construction workers meet at the County yard and use any number of the three County-owned trucks to drive to the work sites. The County also employs contractors, each of which arrives separately using a single truck or tractor. Even if each of the three County trucks and up to four contractor vehicles were used, the number of additional vehicle trips generated by maintenance at any given location, compared to baseline conditions, would be quite nominal. On average, the maximum duration of any Project activity is approximately 1 day. Thus, the maximum number of additional trips likely to result from maintenance (i.e., 7 round trips per day) is considered unlikely to result in a noticeable change in traffic flow or intersection LOS in any particular location.

Both regionally and locally, the temporary added volume of traffic generated on Project area roadways would be negligible relative to roadway capacity and existing traffic volumes. Impacts would be less than significant.

Equipment Deliveries

Hand tools and other smaller equipment types would arrive in construction trucks used by personnel to access the site. However, heavy equipment needed for certain Project activities would need to be delivered to the work site on trailers and/or flatbed trucks. Slower travel speeds, large size and turning radii typically associated with this kind of traffic could temporarily reduce roadway capacity and result in minor increases in congestion and delay for vehicles.

While the specific impact of heavy equipment traffic on roadways would depend on the number of travel lanes on the roadways, existing traffic volumes on these roadways, terrain, and other factors, the use of specialized heavy equipment such as excavators and backhoes would be minimal. Even if heavy equipment was used for every site and it took 20 days per site, the estimated 40 trips to and from work sites would have a negligible effect on Project area traffic. Consequently, this impact would be less than significant.

Truck Disposal Trips

Dump trucks would be used to haul excavated materials for reuse or disposal elsewhere, or may haul fill materials to be used for slip-out repair activities. Minimal, if any, excess material is expected to be generated that would require off-site disposal, and the amount of material to be hauled to the site would be similarly small. Additionally, minimal volumes of removed vegetation may require hauling or disposal. Vegetation is typically chipped and left on site as mulch or taken to County facilities for composting.

However, the addition of these trips would not cause substantial degradation of LOS or delay for motorists in the Project area.

Conflict with Alternative Transportation Policies

The Proposed Project would not result in permanent effects on public transit, bicycle, or pedestrian traffic. As previously described, the majority of Project activities would occur within County rights-of-way where public access is not permitted. However, Project activities occurring within public streets could temporarily disrupt bicycle access. No pedestrian facilities or transit stops are located within the Project area.

Where temporary one- lane closures are required, implementation of AMM GEN-12 would ensure that Class II bike lanes along Project roadways are maintained to the extent practicable. If temporary lane closures are required, implementation of AMM GEN-12 would minimize impacts to bicycle traffic through the posting of advance warning signs in the vicinity of affected areas to alert bicycle traffic of revised routes and hazards during construction. A complete description of this AMM is included in Table 3.17-1, above. In addition, warning signage and flaggers would be on-site during construction to safely guide bicyclists around construction activities. Further, one-lane closures would be temporary, mostly lasting for 2-3 days associated with culvert repair/replacement but may last up to 10-20 days associated with slip-our repairs. With implementation of AMM GEN-12, the Project's temporary impact regarding conflicts with alternative transportation policies would be less than significant.

Summary

In summary, with the implementation of AMM GEN-12 impacts on traffic from temporary one-lane closures, maintenance worker trips, heavy equipment delivery, and truck trips associated with the Proposed Project would be **less than significant**. Therefore, the Project would not conflict with applicable circulation plans, ordinances, or policies and applicable congestion management program

b. Conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b) – Less than Significant

In accordance with SB 743, the new CEQA Guidelines Section 15064.3, subdivision (b) was adopted in December 2018 by the California Natural Resources Agency. These revisions to the CEQA Guidelines criteria for determining the significance of transportation impacts are primarily focused on projects within transit priority areas and shifts the focus from driver delay to a reduction of greenhouse gas emissions, creation of multimodal networks, and promotion of a mix of land uses. VMT is a measure of the total number of miles driven to or from a development and is sometimes expressed as an average per trip or per person.

The County has not yet adopted VMT screening criteria and thresholds and, therefore, the statewide guidance as documented in the Technical Advisory on Evaluating Transportation Impacts in CEQA (Technical Guidelines) would apply to the Project. According to the Technical Guidelines, absent substantial evidence indicating that a project would generate a potentially significant level of VMT or inconsistency with a Sustainable Communities Strategy or general plan, projects that generate fewer than 110 trips per day generally may be assumed to cause a less-than-significant transportation impact.

Taking the information discussed above into account, the Project would not conflict with or be inconsistent with CEQA Guidelines Section 15064.3(b) during construction. Construction-generated trips would be temporary and would result in fewer than 5.5 trips per day during the peak construction traffic period. Furthermore, no changes to existing operation and maintenance activities are anticipated. For these reasons, VMT generated by the Project would be **less than significant**.

c. Increased hazards resulting from geometric design features – Less than Significant

Project activities could result in the temporary closing or narrowing of roadway lanes in the vicinity of the Project sites. Temporary reductions in available travel lanes could subject vehicles using the affected roadways to increased hazards, congestion, and delays. In addition, temporary lane closures could also create traffic hazards affecting vehicle, transit, bicycle, and pedestrian traffic in the area. The temporary one-lane closure could increase the potential for traffic hazards during the construction period. The increase in safety hazards results from several factors, including the increased potential for conflicts between construction vehicles, conflicts between the movement of traffic and Project activities, and confusion of drivers and bicyclists due to temporary alterations in otherwise familiar roadway conditions.

Implementation of AMM GEN-12 requires that temporary one-lane closures are coordinated with the appropriate jurisdictions and that the County install adequate warning signage in the vicinity of the work sites. A complete description of this AMM is included in Table 3.17-1, above. Implementation of AMM GEN-12 would ensure proper planning of traffic management during Project activities, and would provide adequate public awareness of temporarily altered road conditions and potential hazards.

The Project would not introduce any new intersections or adjusted roadway geometry that would have the potential to introduce a hazardous driving condition. Additionally, as noted in Section 3.17.4(a) above, the Project would not introduce a substantial number of large construction or delivery vehicles to area roadways during the construction phase.

Flooding of these culvert sites in the County could spill over onto the adjacent roadways, resulting in potential lane closures and significant hazards to drivers and other roadway users. However, maintaining and repairing culvert sites within the County would address dilapidated conditions and ensure that facilities are performing their operational functions, thereby reducing potential flooding risks. In addition, the Project would stabilize eroded roadway embankments (slip-outs) and prevent larger-scale slope failures, improving roadway safety in the immediate area. Besides the direct benefit at these locations, the reduction of flood threats and roadway failure would benefit transportation in the overall Project area.

The Project does not propose any changes that would permanently reconfigure or alter roadways. Overall, the Project would reduce hazards in the Project area. Therefore, the Proposed Project would not result in a permanent adverse impact on roadway safety conditions. With implementation of AMM GEN-12 the Project's temporary and long-term impact on traffic safety hazards would be **less than significant**.

d. Inadequate emergency access – Less than Significant

As described above and in Section 3.15, "Public Services," road closures, detours, and Project-related traffic could delay or obstruct traffic in the Project area, including the movement of emergency vehicles. However, as detailed in AMM GEN-12, the County would maintain traffic flow on public roadways to the maximum extent practicable. In the event that temporary one-lane closures are necessary, affected jurisdictional agencies (including police and fire departments) would receive advanced notification of Project schedules for all activities that could affect emergency access. A complete description of this AMM is included in Table 3.17-1, above.

The Project does not propose any structures that would permanently block or constrain roadways, and would therefore would not result in a permanent impact on emergency access. Thus, with implementation of AMM GEN-12, the Project's impact on emergency access would be **less than significant**.

3.18 Tribal Cultural Resources

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
Would the Proposed Project:				
a. Cause a substantial adverse change in the significance of a tribal cultural resource, defined in Pub. Res. Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:				
i. Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Pub. Res. Code section 5020.1(k)	☐	☐	☒	☐
ii. A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Pub. Res. Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	☐	☐	☒	☐

3.18.1 Regulatory Setting

Federal Laws, Regulations, and Policies

No federal regulations are applicable to tribal cultural resources in relation to the Proposed Project. However, similar resources, called traditional cultural properties (TCPs), fall under the purview of Section 106 of the NHPA, as referenced in Section 3.5, "Cultural Resources." TCPs are locations of cultural value that are historic properties. A place of cultural value is eligible as a TCP "because of its association with cultural

practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community" (Parker and King 1990). A TCP must be a tangible property, meaning that it must be a place with a referenced location, and it must have been continually a part of the community's cultural practices and beliefs for the past 50 years or more. Unlike TCRs, TCPs can be associated with communities other than Native American tribes, although the resources are usually associated with tribes. By definition, TCPs are historic properties; that is, they meet the eligibility criteria as a historic property for listing in the National Register of Historic Places. Therefore, as historic properties, TCPs must be treated according to the implementing regulations found under Title 36 CFR Section 800, as amended in 2001.

State Laws, Regulations, and Policies

CEQA and State CEQA Guidelines

AB 52, which was approved in September 2014 and went into effect on January 1, 2015, requires that state lead agencies consult with any California Native American tribe that is traditionally and culturally affiliated with the geographic area of a Proposed Project, if requested by the tribe. The bill, chaptered in Pub. Res. Code Section 21084.2, also specifies that a project with an effect that may cause a substantial adverse change in the significance of a TCR is a project that may have a significant effect on the environment.

Defined in Pub. Res. Code Section 21074(a), TCRs are:

(1) Sites, features, places, cultural landscapes, sacred places and objects with cultural value to a California Native American tribe that are either of the following:

(A) Included or determined to be eligible for inclusion in the California Register of Historical Resources; or

(B) Included in a local register of historical resources as defined in subdivision (k) of Section 5020.1.

(2) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Section 5024.1. In applying the criteria set forth in subdivision (c) of Section 5024.1 for the purposes of this paragraph, the lead agency shall consider the significance of the resource to a California Native American tribe.

TCRs are further defined under Pub. Res. Code Section 21074 as follows:

(b) A cultural landscape that meets the criteria of subdivision (a) is a TCR to the extent that the landscape is geographically defined in terms of the size and scope of the landscape; and

(c) A historical resource described in Section 21084.1, a unique archaeological resource as defined in subdivision (g) of Section 21083.2, or a "nonunique archaeological resource" as defined in subdivision (h) of Section 21083.2 may also be a tribal cultural resource if it conforms with the criteria of subdivision (a).

Mitigation measures for TCRs must be developed in consultation with the affected California Native American tribe pursuant to newly chaptered Section 21080.3.2, or according to Section 21084.3. Section 21084.3 identifies mitigation measures than include avoidance and preservation of TCRs and treating TCRs with culturally appropriate dignity, taking into account the tribal cultural values and meaning of the resource.

3.18.2 Environmental Setting

As discussed in Section 3.5, "Cultural Resources," the Project area is in the traditional and ancestral homelands of the Coast Miwok. An email request was made to the NAHC on August 30, 2021, to review its files for the presence of recorded sacred sites on the Project site. The NAHC responded on October 11, 2021, stating that a search of their files identified significant resources in the vicinity of the Project area. Specifics about these resources were not provided by the NAHC, and they suggested that the Federated Indians of Graton Rancheria (FIGR) be contacted for additional information. The NAHC also provided a list of tribes with a traditional and cultural affiliation with the Project area.

Project notification letters, as required under Pub. Res. Code Section 21080.3.1 (AB 52), were sent to three tribes via email on January 6, 2022. **Table 3.18-1** lists all those contacted and summarizes the results of the consultation.

The FIGR responded in an emailed letter dated January 12, 2022. The tribe formally requested consultation on the Project pursuant to AB 52. The County is currently engaging in consultation with the FIGR about the Project. The County offered to meet with the FIGR on March 8, 2022. The Cultural Resources Assessment Report (Appendix C) and the records search data from the Northwest Information Center (see Section 3.5, Cultural Resources) were provided to the FIGR on March 22, 2022, per their request.

The County met with the FIGR representatives via a teleconference call on June 22, 2022 to present details about the Proposed Project, and to discuss tribal cultural resources and potential mitigation measures. The FIGR expressed concerns over the process by which the County conducted the AB 52 outreach to tribes, and the lack of involvement afforded to the FIGR to participate in the cultural resources studies. The FIGR also noted the potential for burials within the Project study area, as well as the potential for botanical and viewshed tribal cultural resources. The County agreed to accompany FIGR members on a field review of the Project locations. Prior to conducting the field survey, the County will provide the FIGR with a list of the Project sites and a description of the actions that will take place at each location (i.e., pipe lining, or riprap, etc.) to help the

FIGR determine which locations they want to examine. Once the field review has taken place, the County will collaborate with the FIGR to develop appropriate mitigation measures (e.g., construction monitoring).

Table 3.18-1. Native American Consultation under AB 52

Organization/Tribe	Name of Contact	Letter Date	Tribal Response	Comments
Coast Miwok Tribal Council of Marin	Jason Deschler, Tribal Preservation Officer	January 6, 2022	No response, to date.	Consultation closed.
Federated Indians of Graton Rancheria	Buffy McQuillen, Tribal Heritage Preservation Officer	January 6, 2022	January 12, 2022	Tribe requested consultation, and a teleconference call was held on June 22, 2022. A field review will be scheduled for later this summer, after which time, mitigation measures will be developed. Consultation remains ongoing.
Ione Band of Miwok Indians	Sara D. Setshwaelo, Cultural Committee Chairwoman	January 6, 2022	No response, to date.	Consultation closed.

3.18.3 Discussion of Checklist Responses

Project Avoidance and Minimization Measures (AMMs) implemented to minimize and reduce impacts related to tribal cultural resources are included in **Table 3.18-2** below. Reference to these AMMs occurs throughout this section.

Table 3.18-2. Tribal Cultural Resources AMMs

AMM No.	AMM Title	AMM Description

CUL-1	Cultural Resources and Human Remains	▪ If cultural or paleontological resources are encountered during the project, the contractor shall stop work within 35 feet of a find and protect the find until the County can notify a Professional Archaeologist or other such qualified individual to review the discovery. ▪ Project personnel shall not collect or retain found cultural resources. ▪ The treatment of human remains and of associated or unassociated funerary objects discovered during any soil-disturbing activity within the project area shall comply with applicable State laws. This shall include immediate notification of the Marin County Coroner. ▪ In the event of the coroner's determination that the human remains are Native American, notification of the Native American Heritage Commission (NAHC) is required. The NAHC shall be notified by phone within 24 hours of the discovery and shall be afforded the opportunity to appoint a Most Likely Descendant (MLD) (Public Resources Code Section 5097.98).

a. Cause a substantial adverse change in the significance of a tribal cultural resource, defined in Pub. Res. Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:

i. Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Pub. Res. Code section 5020.1(k).

ii. A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Pub. Res. Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.

No tribal cultural resources, as defined under Pub. Res. Code section 21074, have been identified in the Project area, to date. As a result, there would be no impact to known tribal cultural resources. However, construction activities have the potential to uncover

significant resources, such as human remains, that would be considered tribal cultural resources. Should any such resources be discovered during construction, AMM-CUL-1 shall be followed. A complete description of this AMM is included in Table 3.18-1, above. Adherence to the procedures and provisions of AMM CUL-1 would reduce potential impacts to tribal cultural resources to a **less-than-significant** level.

The County shall, furthermore, continue consultations with the FIGR pursuant to AB 52 until such consultation is concluded by consensus between the County and the tribe. If the FIGR reveals that the Project has the potential to disturb tribal cultural resources, the County will work to avoid such disturbances to the level of a **less-than-significant** impact.

3.19 Utilities and Service Systems

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
Would the Project:				
a. Require or result in the relocation or construction of new or expanded water, or wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?	☐	☐	☐	☒
b. Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?	☐	☐	☒	☐
c. Result in a 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?	☐	☐	☒	☐
d. Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?	☐	☐	☒	☐
e. Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?	☐	☐	☒	☐

3.19.1 Regulatory Setting

Federal Laws, Regulations, and Policies

No federal laws, regulations, or polices related to utilities are applicable to the Proposed Project.

State Laws, Regulations, and Policies

California Integrated Waste Management Act

The California Integrated Waste Management Act of 1989 (Pub. Res. Code, Division 30) requires all California cities and counties to reduce, reuse, recycle, and compost solid waste generated in the state to the maximum extent feasible. The State, acting through the California Integrated Waste Management Board (now California Department of Resources Recycling and Recovery [CalRecycle]) determines compliance with this mandate based on jurisdiction's per-capita disposal rates.

In October 2011, Assembly Bill (AB) 341 was adopted by the California legislature which amended the California Integrated Waste Management Act by directing CalRecycle to adopt a state policy to achieve a goal of 75 percent recycling, composting or source reduction of solid waste by 2020. AB 341 focused largely on commercial waste generators because this sector was identified as the most in need of improved waste management. AB 341 is a legislative declaration of policy and does not alter the 50 percent diversion mandate (CalRecycle 2021).

Local Laws, Regulations, and Policies

Marin Countywide Plan

The Marin Countywide Plan (Marin County Community Development Agency 2007) is the comprehensive long-range general plan that guides land use and development in the unincorporated areas of Marin County. Goals and policies in the Marin Countywide Plan related to the Proposed Project and the utilities analysis are listed below. Consistency with these goals and policies was considered during evaluation of potential Project impacts.

Goal PFS-4: Efficient Processing and Reduced Landfill Disposal of Solid Waste. Minimize, treat, and safely process solid waste materials in a manner that protects natural resources from pollution while planning for the eventual reuse or recycling of discarded material to achieve zero waste.

> **Policy PFS-4.1: Reduce the Solid Waste Stream.** Promote the highest and best use of discarded materials through redesign, reuse, composting, and shared producer responsibility. Emphasize a closed-loop system of production and consumption.
>
> **Policy PFS-4.3: Plan for Waste Transformation or Disposal.** Plan for the transformation or elimination of waste materials that cannot be reduced, recycled, or composted.

Marin Hazardous and Solid Waste Management Joint Powers Authority

The Marin Hazardous and Solid Waste Management Joint Powers Authority, referred to as Zero Waste Marin, ensures Marin County's compliance with state recycling mandates and provides residents and businesses with information on household hazardous waste collection, recycling, composting, and waste disposal (Zero Waste Marin 2015a). Zero Waste Marin was formed in 1996 by the County of Marin and its incorporated cities and towns (i.e., Belvedere, Corte Madera, Fairfax, Larkspur, Mill Valley, Novato, Ross, San Anselmo, San Rafael, Sausalito, and Tiburon) to ensure the County's compliance with the waste diversion disposal goals mandated by California's Integrated Waste Management Act. Zero Waste Marin worked in partnership with County agencies, private waste haulers, and facility operators to develop and implement the Integrated Waste Management Plan to comply with state mandates (Zero Waste Marin 2015b).

3.19.2 Environmental Setting

Water Supply

The Marin Municipal Water District (MMWD) provides drinking water to 189,900 customers over 147 square miles of urban area in Marin County (MMWD 2021a). The MMWD facilities include seven reservoirs, three water-treatment plants, and various storage tanks, pumps, and distribution mains (MMWD 2020). Three-fourths of MMWD's supply comes from the local watershed and is stored in reservoirs, while the remaining water comes via pipeline from the Russian River in Sonoma County (Marin County Community Development Agency 2007). The MMWD estimated that the operational yield of their reservoirs is approximately 20,000 acre-feet per year (MMWD 2021b). Several of the culvert work sites along Point Reyes- Petaluma Road are located within the jurisdiction of NMWD. In addition, several MMWD water lines are located within the Project area beneath Point Reyes – Petaluma Road.

Wastewater

The Project corridors are located within rural Marin County. These areas are located outside of any sanitation district and residences rely upon individual septic systems for on-site sanitary services.

Stormwater

Some of the Project culverts convey road runoff/stormwater that collects on the inboard side of the road across/underneath the road. Other Project culverts allow passage of more defined drainage features from the upstream to downstream side of the roadway. Otherwise, the Proposed Project sites are located in a rural and sparsely inhabited area that is not served by a municipal stormwater system.

Solid Waste

Residential and commercial solid waste disposal services in the Project area are provided by Marin Sanitary Service who serves more than 30,000 residential and commercial accounts in Marin County (Marin Sanitary Service 2022). Redwood Landfill and the Recycling Center in Novato serves as the regional waste disposal center for the North Bay, including for residential and commercial wastes generated in the vicinity of and within the Project area. The Redwood Landfill, operated by Waste Management, is located in northern Marin County and is projected to close in 2039. The current permitted capacity of the landfill is 19.1 million cubic yards with a permitted daily disposal rate of 2,310 tons (Waste Management 2022).

Electricity and Natural Gas

California has extensive energy resources, including an abundant supply of crude oil, high production of conventional hydroelectric power, and leads the nation in electricity generation from renewable resources (solar, geothermal, and biomass resources) (EIA 2021). California has the second highest total energy consumption in the U.S. but the fourth lowest energy consumption rates per capita due to its mild climate and energy efficiency programs (EIA 2021). PG&E provides electricity and natural gas service for the entire Marin County. PG&E obtains its energy supplies from natural gas fields and power plants in northern California as well as from energy purchased outside its service area, which is delivered through transmission lines and pipelines. No power plants are located in Marin County. Marin Clean Energy procures renewable sources of electricity and partners with PG&E to deliver electricity with the County. The PG&E utility system in the Project area consists of overhead utility lines along the roadways. No underground natural gas lines are located within the Project area.

Communications

Existing communication services (including cable, telephone, and internet services) in the Project area are provided by Comcast and AT&T. Overhead communication lines are located along the roadways.

3.19.3 Discussion of Checklist Responses

Project Avoidance and Minimization Measures (AMMs) implemented to minimize and reduce impacts related to utilities and service systems are included in **Table 3.19-1** below. Reference to these AMMs occurs throughout this section.

Table 3.19-1. Utilities and Service Systems AMMs

AMM No.	AMM Title	AMM Description
GEN-7	Vehicle and Equipment	▪ Servicing of vehicles shall be conducted in designated staging areas or maintenance roads

	Maintenance/ Cleaning	outside the top-of-bank to avoid contamination through accidental drips and spills. The Contractor shall use secondary containment such as a drip pan, to catch leaks or spills any time that vehicle or equipment fluids are dispenses, changed, or poured. ▪ Incoming equipment shall be checked for leaking oil and fluids. No equipment servicing shall take place in a water body. If emergency repairs are required, only those repairs necessary to move equipment to a more secure location shall be permissible. Drip pans ▪ All vehicles and equipment shall be kept clean. Excessive build-up of oil and grease shall not be permitted. ▪ Vehicle and equipment washing can occur on site only as needed to prevent the spread of sediment, pathogens, or exotic/invasive species. No runoff from vehicle or equipment washing shall be allowed to enter water bodies without being subjected to adequate filtration (e.g., vegetated buffers, hay wattles or bales, and silt screens). Other proper track-out systems can be used to prevent the spread of sediment from the site. ▪ Refueling shall be done outside of waterways unless equipment stationed in these locations cannot be readily relocated (e.g., pumps and generators). For stationary equipment that must be fueled on-site, secondary containment, such as a drain pan or drop cloth, shall be used to prevent accidental spills of fuels from reaching the soil, surface water, or the storm drain system.
GEN-8	Dust Management Controls and Air Quality Protection	The Contractor shall implement the following applicable Bay Area Air Quality Management District's Basic Construction Mitigation Measures to reduce emissions of fugitive dust and equipment exhaust: ▪ All haul trucks transporting soil, sand, or other loose material off-site shall be covered. ▪ All vehicle speeds on unpaved roads shall be limited to 15 mph. ▪ Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure [13 California Code of Regulations Section 2485]).

		▪ All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation. ▪ All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited. ▪ All unpaved surfaces (e.g., parking areas, staging areas, soil piles, and graded areas, and unpaved access roads) shall be watered two times a day.

a. Require the relocation or construction of new or expanded water, wastewater treatment, or stormwater drainage, electric power, natural gas, or telecommunications facilities or expansion of existing facilities, the construction or relocation of which could cause significant environmental effects – No Impact

The Proposed Project would not require or result in the construction or relocation of new or expanded water or wastewater treatment, electric power, natural gas, or telecommunication facilities. The Proposed Project involves in-kind repair or replacement of culvert facilities; thus, the County would not substantially modify or construct or expand existing stormwater drainage facilities. Under the Project, only minimal new areas of impervious surface would be installed at slip-out repair sites and culvert repair/replacement sites (i.e., construction of headwalls). The goal of the Proposed Project is to maintain flood conveyance and hydraulic capacity of facilities and stabilized eroding streambanks to prevent erosion and water quality impacts to downstream waterbodies. As such, **no impact** would occur.

b. Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years – Less than Significant

Potential activities that may require minimal amounts of water include vehicle cleaning and sediment/soil watering related to dust control activities. As described in AMM GEN-7, on-site vehicle cleaning may occur, but only as needed to prevent the spread of sediment, pathogens, or exotic/invasive species. In addition, as detailed in AMM GEN-8, active construction areas would be watered following required dust control measures set by the BAAQMD. A complete description of these AMMs is included in Table 3.19-1. Water would likely be supplied by a water truck at the work sites, as necessary. The

amount of water to be used is anticipated to be very small. In addition, contractors will know and comply with all mandatory water conservation requirements and drought water waste prohibitions as applicable to this project and as required by law. Furthermore, the Proposed Project would not require the construction of any long-term water distribution or supply facilities. Thus, this impact would be **less than significant**.

c. Result in a 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 – Less than Significant

The Proposed Project does not include any uses, features, or facilities that would generate wastewater or require connection to the municipal wastewater collection and treatment system. Furthermore, the Proposed Project would not increase or alter the distribution of the local population in the Project area such that the need or demand for wastewater treatment would be altered (see also Section 3.14, "Population and Housing"). A nominal amount of wastewater would be generated by construction workers using portable restrooms on-site, which would be off-hauled by the County or its contractor for disposal. This limited amount of wastewater would not substantially contribute to an exceedance of capacity at local wastewater treatment facilities in Marin County. As such, this impact would be **less than significant**.

d. Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals – Less than Significant

The Proposed Project activities would generate up to 20 cubic yards of materials needing export. For the purpose of this analysis, it was assumed that all of the materials requiring export (20 cubic yards) would require disposal and would not be able to be reused. Under that assumption, the operating solid waste disposal facility that would receive these materials would be the Redwood Landfill and Recycling Center. The remaining capacity of this facility is 6,641,000 cubic yards (Waste Management 2022). Thus, there is adequate permitted remaining capacity at this facility for the volume and type of solid waste that would be generated by the Project. Therefore, the Proposed Project would not substantially contribute to an exceedance of capacity at County landfills and impacts would be **less than significant**.

e. Comply with federal, state, and local management and reduction statutes and regulations related to solid waste – Less than Significant

As described above under Section 3.19.3(d), material generated by the Proposed Project would be disposed of at the Redwood Landfill and Recycling Center. This facility, is permitted to dispose of all types of waste generated by Project construction. As

discussed in Section 3.19.1, the California Integrated Waste Management Act of 1989 requires municipalities to divert at least 50 percent of all solid waste generated by the year 2000 and establishes the goal of diverting at least 75 percent of generated waste (based on per capita disposal rates) by 2020. Given the minimal amount of material requiring disposal from the Project (i.e., approximately 20 cubic yards), the Project would have a negligeable impact on Marin County meeting the California Integrated Waste Management Act and Zero Waste Marin goals. Therefore, the Proposed Project would not conflict with any federal, state, or local regulations related to solid waste. As such, this impact would be **less than significant**.

3.20 Wildfire

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:				
a. Substantially impair an adopted emergency response plan or emergency evacuation plan?	☐	☐	☒	☐
b. Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?	☐	☐	☒	☐
c. Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?	☐	☐	☒	☐
d. Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?	☐	☐	☒	☐

3.20.1 Regulatory Setting

Federal Laws, Regulations, and Policies

The National Strategy

Pursuant to the 2009 Federal Land Assistance, Management, and Enhancement Act (FLAME Act), the U.S. Department of Agriculture and U.S. Department of the Interior undertook a process to develop a national cohesive wildland fire management strategy to comprehensively address wildland fire management across all lands in the U.S. The National Strategy recognizes and accepts fire as a natural process necessary for the maintenance of many ecosystems and strives to reduce conflicts between fire-prone

landscapes and people (U.S. Department of Agriculture and U.S. Department of the Interior 2014). Specifically, the National Strategy identifies the following primary goals:

Restore and maintain landscapes: Landscapes across all jurisdictions are resilient to fire-related disturbances in accordance with management objectives.

Fire adapted communities: Human populations and infrastructure can withstand a wildfire without loss of life and property.

Wildfire response: All jurisdictions participate in making and implementing safe, effective, efficient risk-based wildfire management decisions.

State Laws, Regulations, and Policies

Emergency Services Act

Under the Emergency Services Act, the State of California developed a plan to coordinate emergency services provided by federal, state, and local agencies. Rapid response to incidents involving hazardous materials or hazardous waste is an important part of the plan, which is administered by the California Office of Emergency Services. This office coordinates the responses of other agencies, including USEPA, the California Highway Patrol, the nine RWQCBs, the various air quality management districts, and County disaster response offices.

California Department of Forestry and Fire Protection Wildland Fire Management

The Office of the State Fire Marshal and CAL FIRE administer State policies regarding wildland fire safety. Construction contractors must comply with the following requirements in the Pub. Res. Code during construction activities at any sites with forest-, brush-, or grass-covered land:

- Earthmoving and portable equipment with internal combustion engines must be equipped with a spark arrestor to reduce the potential for igniting a wildland fire (Pub. Res. Code Section 4442).

- Appropriate fire-suppression equipment must be maintained from April 1 to December 1, the highest-danger period for fires (Pub. Res. Code Section 4428).

- On days when a burning permit is required, flammable materials must be removed to a distance of 10 feet from any equipment that could produce a spark, fire, or flame, and the construction contractor must maintain the appropriate fire-suppression equipment (Pub. Res. Code Section 4427).

- On days when a burning permit is required, portable tools powered by gasoline-fueled internal combustion engines must not be used within 25 feet of any flammable materials (Pub. Res. Code Section 4431).

Regional and Local Laws, Regulations, and Policies

Marin Countywide Plan

The Marin Countywide Plan (Marin County Community Development Agency 2007) is the comprehensive long-range general plan that guides land use and development in the unincorporated areas of Marin County. Goals and policies related to the Proposed Project and the wildfire analysis are listed below. Consistency with these goals and policies was considered during evaluation of potential Project impacts.

Goal EH-1: Hazard Awareness. Raise public awareness and responses about potential environmental hazards.

> **Policy EH-1.3: Identify Evacuation Routes.** Provide the public with information identifying accessible evacuation routes for fire, geologic, and other hazards.

Goal EH-4: Safety from Fires. Protect people and property from hazards associated with wildland and structural fires.

Marin County Multi-Jurisdiction Local Hazard Mitigation Plan

The MCM LHMP (County of Marin 2018) was developed to assess risks posed by natural hazards and to develop a mitigation strategy for reducing the County's risks. Common mitigation actions identified in the MCM LHMP potentially applicable to the Proposed Project and the wildfire analysis include the following:

> **FIR-1:** Develop a plan for appropriate access and evacuation in hillside wildland-urban interface areas, for example creation of no parking areas, signage, and early warning and evacuation.

Marin Operational Area Emergency Operations Plan

The Marin OA EOP (Marin County Sheriff's OES 2014) addresses the planned response to extraordinary emergency situations associated with large-scale disasters affecting Marin County. Specifically, the EOP does the following:

- Establishes the emergency management organization required to mitigate any significant emergency or disaster affecting the Marin OA; and
- Establishes the overall operational concepts associated with Marin County's EOC activities and the recovery process.

The EOP identifies how the Marin County emergency operational system fits into the overall California and National risk-based, all-hazard emergency response and recovery operations plan (Marin County Sheriff's OES 2014). The EOP incorporates annexes for specific disaster response issues, such as post-disaster housing, spontaneous volunteers,

tsunami, medical/health, bioterrorism, oil spill, extreme temperature, mass fatality, and mass care and shelter.

3.20.2 Environmental Setting

Wildfire Hazards

Portions of the Proposed Project road segments pass through areas designated as Moderate and High FHSZ. The area immediately north of Point Reyes – Petaluma Road between Point Reyes Station and Nicasio Reservoir is within a Moderate FHSZ (CAL FIRE 2007). The area south of Point Reyes – Petaluma Road is within a Federal Responsibility Area (FRA) and is not mapped for fire hazard severity by CAL FIRE (CAL FIRE 2007). Portions of Lucas Valley Road and Nicasio Valley Road pass through Moderate and High FHSZs. No part of the Project area is designated as a Very High FHSZ.

In general, CAL FIRE's FHSZ maps are developed using a science-based and field-tested model that assigns a hazard score based on the factors that influence fire likelihood and fire behavior (CAL FIRE 2021). Many factors are considered such as fire history, existing and potential fuel (natural vegetation), predicted flame length, blowing embers, terrain, and typical fire weather for the area (CAL FIRE 2021).

Emergency Response and Evacuation

The County of Marin provides wildfire evacuation zone maps for wildland-urban interface areas in the County. These include the Point Reyes and Lagunitas areas, located near the western and southeastern termini of the Project area, respectively. In the Point Reyes area, Point Reyes – Petaluma Road is identified as a primary evacuation route (County of Marin 2017a). In the Lagunitas area, Sir Francis Drake Boulevard is identified as a primary evacuation route, as are several fire roads north of the populated areas, one of which connects with Nicasio Valley Road (County of Marin 2017b). In general, apart from these two areas, the majority of the lengths of the Proposed Project road segments are sparsely populated and rural in nature.

3.20.3 Discussion of Checklist Responses

Project Avoidance and Minimization Measures (AMMs) implemented to minimize and reduce impacts related to wildfires are included in **Table 3.20-1** below. Reference to these AMMs occurs throughout this section.

Table 3.20-1. Wildfire AMMs

AMM No.	AMM Title	AMM Description
GEN-11	Fire Prevention	All earthmoving and portable equipment with internal combustion engines shall be equipped with spark arrestors.

		During the high fire danger period (April 1–December 1), work crews shall: ▪ Have appropriate fire suppression equipment available at the work site. ▪ Keep flammable materials, including flammable vegetation slash, at least 10 feet away from any equipment that could produce a spark, fire, or flame. ▪ Not use portable tools powered by gasoline-fueled internal combustion engines within 25 feet of any flammable materials unless a round-point shovel or fire extinguisher is within immediate reach of the work crew (no more 25 feet away from the work area).
GEN-11	Fire Prevention	All earthmoving and portable equipment with internal combustion engines shall be equipped with spark arrestors. During the high fire danger period (April 1–December 1), work crews shall: ▪ Have appropriate fire suppression equipment available at the work site. ▪ Keep flammable materials, including flammable vegetation slash, at least 10 feet away from any equipment that could produce a spark, fire, or flame. ▪ Not use portable tools powered by gasoline-fueled internal combustion engines within 25 feet of any flammable materials unless a round-point shovel or fire extinguisher is within immediate reach of the work crew (no more 25 feet away from the work area).
GEN-12	Traffic Flow and Safety Measures	▪ Work shall be staged and conducted in a manner that maintains at least one open travel lane of traffic on roadways in the project area. ▪ Construction signs shall be posted at job sites warning the public of construction work and to exercise caution. ▪ Any temporary one-lane closures shall include advance warning signage, a detour route, and flaggers in both directions to direct traffic to safeguard construction workers, provide safe passage for vehicles, and minimize traffic impacts. Work shall also be coordinated with local emergency service providers and local jurisdictions as necessary to ensure that

		emergency vehicle access and response is not impeded. ▪ Where work is proposed adjacent to recreational trails, warning signs shall be posted several feet beyond the limits of work. ▪ Fencing, either the orange safety type or chain link shall be installed above project sites. ▪ Access to driveways and private roads shall be maintained. If brief periods of maintenance would temporarily block access, property owners shall be notified prior to maintenance activities.

a. Substantially impair an adopted emergency response plan or emergency evacuation plan – Less than Significant

As described in Section 3.20.2 above, Point Reyes – Petaluma Road and fire roads that connect with Nicasio Valley Road are designated as primary evacuation routes by the County. During a disaster or emergency, the emergency response would be led by the Marin County Sheriff's OES in accordance with the Marin OA EOP. The response measures may vary depending on the nature and location of the event, but could involve evacuation of the populated areas and movement of emergency vehicles along roadways within this area.

Project construction activities would involve culvert replacement/repair and slip-out repair activities within or adjacent to roadways, including identified evacuation routes such as Point Reyes – Petaluma Road and Nicasio Valley Road. These activities may require temporary lane closures and involve the operation of heavy equipment in the roadway that could obstruct or hinder public and emergency vehicle travel, particularly if proper measures are not taken. If an emergency were to occur during the construction period, evacuation and/or emergency response procedures could be disrupted due to the Project construction activities affecting the roadway.

Implementation of AMM GEN-12 would reduce potential impacts on traffic flow and on evacuation and emergency response procedures by providing warning and detour signs and flaggers to safely guide travelers during construction as well as by ensuring that local emergency providers are notified in advance of any temporary lane closures Project sites. A complete description of this AMM is included in Table 3.20-1, above. Implementation of AMM GEN-12 would reduce impacts during construction to a level that is less than significant.

Following construction, the Proposed Project would not create any obstructions or conditions that could adversely affect emergency response or evacuation. Rather, repair of road slip-outs would improve the integrity of the roadway by stabilizing eroding

stream banks that threaten the roadway, thus preventing road failures from occurring in the future. Operation and maintenance of the Proposed Project features would be consistent with existing practices and would have no potential to substantially affect emergency response or evacuation efforts. Overall, with the implementation of AMM GEN-12 this impact would be **less than significant.**

b. Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire – Less than Significant

As described in Section 3.20.2 above, portions of the Proposed Project area are located in Moderate and High FHSZs. Construction of the Proposed Project (i.e., culvert repair/replacement, slip-out repair activities) would involve use of internal combustion-engine equipment, which could potentially provide a spark for ignition of a wildfire. Additionally, the Project sites are located in rural vegetated areas along and adjacent to roadways where there may be combustible fuel present for a wildfire.

Proposed Project activities would not involve the placement of people or habitable structures in areas without adequate fire protection. Additionally, proposed Project activities would not result in the creation of new wildland areas which could increase fire dangers. Although the Project sites are located in rural and sparsely populated areas, some private residences are in close proximity to the Project sites and could be at risk if Proposed Project construction activities sparked a wildfire. Similarly, if the fire could not be contained, it could threaten people and structures in the larger surrounding area, including neighboring towns and cities in Marin County.

Compliance with applicable sections of the Pub. Res. Code (see discussion in Section 3.20.1) would reduce the potential for equipment used during Proposed Project construction to ignite a fire. For example, because the Project sites would include forest-, brush-, or grass-covered land, Project construction activities would be subject to Public Resource Code requirements including (1) equipping earthmoving and portable equipment with internal combustion engines with spark arrestors (section 4442); (2) maintaining appropriate fire-suppression equipment from April 1 to December 1 (section 4428); (3) on days when a burning permit is required, removing flammable materials to a distance of 10 feet from any equipment that could produce a spark, fire, or flame (section 4427); and (4) on days when a burning permit is required, not using portable tools powered by gasoline-fueled internal combustion engines within 25 feet of any flammable materials (section 4431). In addition, implementation of AMM GEN-11 would further reduce the potential for a wildfire at an active work site by ensuring that appropriate fire suppression equipment is available and that flammable materials are kept away from equipment that can produce a spark. A complete description of this AMM is included in Table 3.9-1, above. With implementation of these measures, the risk of wildfire ignition would be greatly reduced and the potential for impacts during construction would be **less than significant.**

c. Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment – Less than Significant

Construction activities such as excavation and slip-out repair activities may require temporary site access for staging of equipment and vehicles; however, access and staging would occur on existing roads and turnouts adjacent to the Project sites. As such, Project activities would not require the installation of new roads. The Project involves the maintenance of existing culverts and repair of slip-outs along the existing Project corridor to prevent erosion-related impacts on water quality and potential road failure. Thus, the Proposed Project would not require the installation or maintenance of other infrastructure that could exacerbate fire risks including fuel breaks, emergency water sources, power lines, or other utilities. Implementation of AMM GEN-11 would ensure that equipment used during construction activities is equipped with spark arrestors and that all equipment and vehicles are checked for leaking oil and fluids. By complying with this AMM, Project activities would not exacerbate fire risks or result in ongoing impacts to the environment. Therefore, with implementation of the AMM, this impact would be **less than significant**.

d. Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes – Less than Significant

The Proposed Project would not include any residential or habitable structures, and would be limited to repair and maintenance of existing facilities. As such, it would not place any people or structures in areas subject to downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes. The Project would provide a net benefit to downstream waterbodies and uses by stabilizing eroding banks, improving dilapidated culvert conditions, and preventing potential road failure. During operation, maintenance activities associated with the Proposed Project facilities would be consistent with existing practices and thus would not increase post-fire risk relative to the baseline conditions. Overall, this impact would be **less than significant.**

3.21 Mandatory Findings of Significance

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
a. Does the project have the potential to substantially 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 plan or animal community, substantially 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?	☐	☒	☐	☐
b. 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)?	☐	☐	☐	☐
c. Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☒	☐	☐

3.21.1 Discussion of Checklist Responses

a. Effects on environmental quality, fish or wildlife, and historic resources

As discussed throughout this IS/MND, significant but mitigatable impacts were identified for biological resources. With implementation of AMMs identified in Table 2-4 of Chapter 2, *Project Description* and Mitigation Measures BIO-1, the Proposed Project would not have the potential to substantially reduce the habitat of 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. Therefore, this impact would be **less than significant with mitigation**.

b. Cumulative impacts

A cumulative impact refers to the combined effect of "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts" (CEQA Guidelines Section 15355). As defined by the State of California, cumulative impacts reflect "the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time" (CEQA Guidelines Section 15355[b]).

The following cumulative analysis evaluates the potential cumulative impacts from the Proposed Project in combination with other related past, present, and probable future projects in the area, shown in **Table 3.21-1**.

Table 3.21-1. Summary of Cumulative Projects in Marin County

Project Name	Description	Planned or Expected Date
Northern Regional Road Rehabilitation Project	Paving project in Lucas Valley neighborhood	Completed January 2022
2021 Digout Project	Localized pavement repairs on Nicasio Valley Road ahead of 2021 sealant project	Completed August 2021
2021 Sealant Project – Phase 2	Road sealant project on Nicasio Valley Road and portions of Point Reyes – Petaluma Road	Planned for Spring/Summer 2022
Central Region Road Rehabilitation Project	Paving on Lucas Valley Road between MP 5.30 to MP 10.30	Completed in January 2019
Lucas Valley Road MP 9.6 Project – Phases 1& 2	Installation of a retaining wall on Lucas Valley Road	Phase 1 completed in 2018, Phase 2 planned for late Summer 2022
Nicasio Valley Road and Point Reyes – Petaluma Road Turn Pocket Project	Widening Point Reyes – Petaluma Road roadway to allow for a left turn lane onto Nicasio Valley Road	Planned for 2024
HSIP Guardrail Replacement Project	Guardrail replacement on Point Reyes – Petaluma Road	Completed in 2021
Nicasio Valley Road Bridge	Bridge Replacement at Nicasio Valley Road	Planned for 2026

Project Name	Description	Planned or Expected Date
Replacement Project		

Impacts Avoided

The Proposed Project would have no significant impact on the following resources and would therefore not contribute to potential cumulative impacts on these resources:

- Agriculture and Forestry Resources
- Land Use and Planning
- Mineral Resources
- Population and Housing
- Public Services
- Recreation

Cumulative Impacts

Aesthetics

Proposed Project activities would occur solely within County right-of-way along roadways and within channels. Temporary visual impacts would occur from the presence of personnel, equipment, staging, earthwork, and other Project-related activities; however, these activities would be temporary and localized and would not result in significant visual impacts. Over the long term, visual conditions of County facilities would generally improve as a result of implementation of the Proposed Project (e.g., repairing dilapidated culverts and eroded roadway embankments). Similarly, impacts related to aesthetics from the other County projects would be site specific and temporary. For these reasons, no cumulatively significant impact related to aesthetics would result, and the Proposed Project would not make a considerable contribution to such an impact.

Air Quality

Refer to the discussion in Section 3.3(b). Because the SFBAAB is in nonattainment for ozone, PM10, and PM2.5, the combined effect of the cumulative projects would result in a significant cumulative impact on air quality. However, the Proposed Project's individual emissions are substantially below the established BAAQMD thresholds for criteria air pollutants; therefore, the Proposed Project would not make a considerable contribution to the significant cumulative impact.

Biological Resources

The Proposed Project would likely occur in similar habitats to some of the other roadway and maintenance projects identified in Table 3.21-1. Thus, the Proposed Project could result in similar special-status species and habitat impacts, including impacts to drainages, other waterbodies, and riparian habitat, as the other cumulative projects. Like the Proposed Project, other cumulative projects would need to comply with local, State, and federal laws and regulations protecting special-status species and sensitive habitats. The potential exists for a significant cumulative impact.

Although the majority of the Proposed Project's impacts on biological resources would be temporary, impacts to special-status species and habitat as a result of the proposed activities could occur. Implementation of AMMs and Mitigation Measure BIO-1 would reduce the Proposed Project's impacts to less than significant. In addition, the Project would incorporate planted RSP and live willow stakes at the slip-out repair sites and culvert sites to enhance habitat conditions along the riparian corridor. Therefore, given that (1) many of the other cumulative projects identified in Table 3.21-1 involve similar minor roadway and maintenance work at County facilities, (2) impacts of the Proposed Project would be effectively avoided/minimized and mitigated, and (3) the Proposed Project would improve habitat conditions and water quality in the Project area, the Project would not make a considerable contribution to a significant cumulative impact on biological resources.

Cultural Resources and Tribal Cultural Resources

Many of the other cumulative projects identified in Table 3.21-1 may involve some amount of ground disturbance (although within previously disturbed areas), and thus may have the potential to uncovered buried archaeological resources, some of which could be TCRs. If proper protocols are not followed, this could result in adverse effects on cultural resources and TCRs. However, similar to the Proposed Project, none of the cumulative projects would be anticipated to affect known built environment resources or substantially change a place or landscape. Given implementation of federal, state, and local regulations, as well as Project-specific AMMs, no significant cumulative effect on cultural resources and TCRs would result. In addition, with implementation of Project-specific AMMs, the Project would not make a considerable contribution to a significant cumulative impact on cultural resources or TCRs.

Energy

Most of the other cumulative projects identified in Table 3.21-1 would involve operation of construction equipment and use of energy in the form of fossil fuels. However, similar to the Proposed Project, the energy use associated with these other projects would be temporary. None of the projects would include construction of housing, buildings, or commercial or industrial uses that could create a substantial long-term demand for energy. Therefore, no significant cumulative impact on energy would result. In addition, given the fact that the Proposed Project's energy use would be relatively minor and

similar to existing conditions, the Project would not make a considerable contribution to a significant cumulative impact related to energy.

Geology, Soils, and Seismicity

Maintenance and roadway projects in general pose minimal risk with respect to geology, soils, and seismicity, as these projects would not place any new structures or people in locations that are potentially susceptible to geologic hazards. While the other cumulative projects shown in Table 3.21-1 may involve earthmoving activities, none of these projects would be expected to result in substantial loss of topsoil. Therefore, no significant cumulative impact on geology, soils, or seismicity would result. In addition, implementation of the Project would improve the resilience of existing drainage structures and features to geologic hazards, thus improving public safety, and implementation of AMMs would prevent or minimize Project-related effects on soils (e.g., erosion) or paleontological resources. Thus, with the implementation of AMMs, the Project would not make a considerable contribution to a significant cumulative impact related to geology, soils, and seismicity.

Greenhouse Gas Emissions

GHGs are cumulative in nature and the cumulative impact from GHG production at a global scale is significant. The Proposed Project would generate GHG emissions during Project activities; however, these activities would be limited in nature and duration, and be required to comply with state and local regulations. Similar to the Proposed Project, the other projects identified in Table 3.21-1 would also generate GHG emissions; however, these would be temporary and would be required to comply with state and local regulations. For these reasons, no cumulatively significant impact related to GHGs would result, and the Project would not make a considerable contribution to such an impact.

Hazards and Hazardous Materials

Similar to the Proposed Project, other maintenance and roadway projects would be required to comply with standard federal, state, and local requirements to minimize impacts related to hazardous materials. The other cumulative projects listed in Table 3.21-1 would be expected to use hazardous materials during construction and operation of construction equipment and repair of roadways. Thus, the potential exists for a significant cumulative impact. As described in Section 3.9, Project activities would be of short duration in any one location and generally would be confined to small areas. Compliance with federal and state regulations and implementation of AMMs would ensure that maintenance workers and the public are protected from exposure of hazardous materials during Project activities. Given the above, the Project would not make a considerable contribution to a significant cumulative impact related to hazards and hazardous materials.

Hydrology and Water Quality

Similar to the Proposed Project, several of the other cumulative projects identified in Table 3.21-1 would benefit hydrology and water quality over the long term by replacing/repairing damaged culverts from large storms. Although short-term impacts to water quality could occur, the Proposed Project and other cumulative projects would implement AMMs to minimize potential impacts on hydrology and water quality such as erosion and sediment control practices. Similar to the other cumulative projects, the Proposed Project would not include any substantial areas of new impervious surface that would generate additional runoff and create potential for generation of polluted stormwater. Given the long-term benefits of the Proposed Project and other cumulative projects, no cumulatively significant impact related to hydrology and water quality would result. In addition, with implementation of AMMs, the Project would not make a considerable contribution to a significant cumulative impact related to hydrology and water quality.

Noise

Similar to the Proposed Project, the other cumulative projects identified in Table 3.21-1 would generate construction noise similar to or greater than the Project. Noise generated during construction activities would be temporary and of short duration at any given location and infrequent with sites spread out over a large area, thus limiting the amount of noise generated near sensitive receptors. Although the Proposed Project is exempt from the limitations listed in the County's Municipal Code, all Project work would occur during normal weekday hours. Further once work is complete at a given site, the Proposed Project would not permanently increase noise levels above the existing condition. For these reasons, no cumulatively significant impact related to noise would result, and the Proposed Project would not make a considerable contribution to such an impact.

Transportation

During Project activities, the Proposed Project would contribute some vehicle traffic to local roadways (e.g., vehicle trips to work sites, equipment deliveries, and truck disposal trips); however, the vehicle traffic and VMT from the Proposed Project would be similar to existing conditions and would not have a noticeable effect on regional and local access routes. Work would also not be conducted continually at one site, rather, Project activities would be conducted temporarily at each site throughout the Project area. Some Project activities may physically encroach into the traveled roadway, resulting in temporary one-lane closures, which could lead to traffic delays or create traffic hazards. Implementation of AMMs would require adequate warning and detour signs and flaggers to safely guide travelers during construction activities and reduce potential safety hazards. In general, traffic conditions in Marin County are variable and congestion-related cumulative impacts would be relatively localized. Many of the other cumulative projects listed in Table 3.21-1 would generate a similar number of worker and haul truck trips as the Proposed Project and would not be expected to create

substantial long-term vehicle trips or VMT. For these reasons, no cumulatively significant impact related to transportation would result, and the Proposed Project would not make a considerable contribution to such an impact.

Utilities and Service Systems

The Proposed Project would not directly nor indirectly induce growth in the Project area and therefore, would not increase the cumulative demand for utilities and service systems. Given that the other cumulative projects identified in Table 3.21-1 would not include any housing or similar land uses that would require permanent water, wastewater, electricity, or other utilities services, these projects also would not increase cumulative demand for utilities and service systems and no cumulatively significant impact related to utilities and service systems would result. Any temporary need for water or wastewater service during construction or maintenance activities for the Proposed Project and other cumulative projects would be limited and would have no potential to substantially contribute to an exceedance in capacity or need for additional entitlements or sources. Similar to the Proposed Project, the contractor will know and comply with all mandatory water conservation requirements and drought water waste prohibitions as applicable and as required by law. Therefore, the Project would not make a considerable contribution to a significant cumulative impact to utilities and service systems.

Wildfire

As discussed under Section 3.20, although portions of the Project area are located in moderate and high fire hazard severity zones, compliance with applicable requirements and implementation of AMMs during construction activities would minimize the risk of accidental ignition of a wildfire. Similar to the Proposed Project, other cumulative projects listed in Table 3.21-1 would be required to implement fire safety measures during construction activities, such that these projects would not substantially exacerbate wildfire risks. Thus, no cumulatively significant impact related to wildfire would result. Over the long term, these projects would not establish land uses that could increase overall wildfire risk or place new people or structures in areas susceptible to wildfire. Therefore, the Project would not make a considerable contribution to a significant cumulative impact to wildlife.

Summary

Based on the cumulative impacts analysis provided above, and with the implementation of AMMs and mitigation measures included herein, the Proposed Project would not result in any significant cumulative environmental impacts. This impact would be l**ess than significant with mitigation**.

c. Effects on human beings

Based on the analysis provided in the above resource sections, the Proposed Project would result in less-than-significant impacts for the following resources topics: aesthetics; air quality; cultural resources; energy; geology, soils, and seismicity; greenhouse gas emissions; hazards and hazardous materials; hydrology and water quality; noise; transportation; utilities and service systems; and wildfire with implementation of AMMs identified in Chapter 2, *Project Description*. Mitigation measures pertaining to biological resources would reduce Project-related impacts to a less than significant level. As such, implementation of the already identified mitigation measure and AMMs would ensure that the effects on human beings would be **less than significant with mitigation**.

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Chapter 4
REPORT PREPARERS

The following individuals assisted in preparing and/or reviewing the Initial Study.

County of Marin

3501 Civic Center Drive, Room 304
San Rafael, CA 94903

Betsy Swenerton	Senior Project Manager, Department of Public Works
Kallie Kull	Senior Planner, Department of Public Works
Rachel Reid	Environmental Planning Manager
Tammy Taylor	Senior Planner, Community Development Agency
Chelsea Hall	Environmental Planning & Housing Aide

Horizon Water and Environment, LLC

266 Grand Avenue, Suite 210
Oakland, CA 94610

Ken Schwarz	Principal
Brian Piontek	Project Manager, Senior Consultant
Bridget Lillis	Associate Consultant
Robin Hunter	Associate Consultant
Janis Offerman	Senior Consultant
Johnnie Chamberlin	Associate Consultant
Patrick Donaldson	Associate Consultant
Carley Dutra	Associate Consultant
Debra Lilly	Senior Consultant

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Chapter 5
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Section 3.21, Mandatory Findings of Significance

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APPENDICES

Appendix A

Air Quality and Greenhouse Gas Emission Calculations

West Marin Drainage Rehabilitation Project - Marin County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

West Marin Drainage Rehabilitation Project

Marin County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Asphalt Surfaces	7.10	1000sqft	0.16	7,100.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	69
Climate Zone	5			**Operational Year**	2024
Utility Company	MCE				
CO2 Intensity (lb/MWhr)	187.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Based on Project Description

Construction Phase - Based on Project Description and Basis of Design

Off-road Equipment - Based on Project Description

Off-road Equipment - Based on Project Description

Off-road Equipment - Based on Project Description

Off-road Equipment - Based on Project Description

Off-road Equipment - Based on Project Description

Off-road Equipment - Based on project description

Off-road Equipment - Based on Project Description

Grading - Based on Project Description

Trips and VMT -

West Marin Drainage Rehabilitation Project - Marin County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	2.00	21.00
tblConstructionPhase	NumDays	2.00	60.00
tblConstructionPhase	NumDays	2.00	12.00
tblConstructionPhase	NumDays	2.00	12.00
tblConstructionPhase	NumDays	2.00	8.00
tblConstructionPhase	NumDays	2.00	24.00
tblConstructionPhase	NumDays	2.00	16.00
tblConstructionPhase	PhaseEndDate	10/4/2022	5/25/2023
tblConstructionPhase	PhaseEndDate	9/20/2022	9/13/2022
tblConstructionPhase	PhaseEndDate	4/28/2022	5/2/2022
tblConstructionPhase	PhaseEndDate	5/3/2022	6/21/2022
tblConstructionPhase	PhaseEndDate	9/27/2022	4/26/2023
tblConstructionPhase	PhaseEndDate	4/29/2022	6/3/2022
tblConstructionPhase	PhaseStartDate	9/28/2022	4/27/2023
tblConstructionPhase	PhaseStartDate	5/4/2022	6/22/2022
tblConstructionPhase	PhaseStartDate	4/30/2022	6/6/2022
tblConstructionPhase	PhaseStartDate	9/21/2022	4/17/2023
tblConstructionPhase	PhaseStartDate	4/29/2022	5/3/2022
tblGrading	AcresOfGrading	4.50	0.03
tblGrading	AcresOfGrading	0.00	0.03
tblGrading	AcresOfGrading	0.00	0.03
tblGrading	AcresOfGrading	6.00	0.03
tblGrading	AcresOfGrading	0.00	0.03
tblGrading	MaterialExported	0.00	2.00
tblGrading	MaterialExported	0.00	1.00
tblGrading	MaterialExported	0.00	2.00
tblGrading	MaterialExported	0.00	2.00

West Marin Drainage Rehabilitation Project - Marin County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblGrading	MaterialExported	0.00	1.00
tblGrading	MaterialImported	0.00	3.00
tblGrading	MaterialImported	0.00	2.00
tblGrading	MaterialImported	0.00	1.00
tblGrading	MaterialImported	0.00	10.00
tblGrading	MaterialImported	0.00	3.00
tblGrading	MaterialImported	0.00	2.00
tblGrading	MaterialImported	0.00	1.00
tblOffRoadEquipment	HorsePower	84.00	20.00
tblOffRoadEquipment	HorsePower	84.00	20.00
tblOffRoadEquipment	HorsePower	84.00	20.00
tblOffRoadEquipment	HorsePower	84.00	20.00
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tblOffRoadEquipment	HorsePower	84.00	20.00
tblOffRoadEquipment	HorsePower	84.00	20.00
tblOffRoadEquipment	HorsePower	247.00	0.00
tblOffRoadEquipment	HorsePower	247.00	0.00
tblOffRoadEquipment	LoadFactor	0.40	0.40
tblOffRoadEquipment	LoadFactor	0.40	0.40
tblOffRoadEquipment	OffRoadEquipmentType	Air Compressors	Excavators
tblOffRoadEquipment	OffRoadEquipmentType	Concrete/Industrial Saws	Cement and Mortar Mixers
tblOffRoadEquipment	OffRoadEquipmentType	Cranes	Excavators
tblOffRoadEquipment	OffRoadEquipmentType	Forklifts	Skid Steer Loaders
tblOffRoadEquipment	OffRoadEquipmentType	Graders	Excavators
tblOffRoadEquipment	OffRoadEquipmentType	Rubber Tired Dozers	Excavators
tblOffRoadEquipment	OffRoadEquipmentType	Tractors/Loaders/Backhoes	Skid Steer Loaders
tblOffRoadEquipment	OffRoadEquipmentType	Tractors/Loaders/Backhoes	Generator Sets
tblOffRoadEquipment	OffRoadEquipmentType	Graders	Generator Sets
tblOffRoadEquipment	OffRoadEquipmentType	Graders	Generator Sets

tblOffRoadEquipment	OffRoadEquipmentType	Graders	Skid Steer Loaders
tblOffRoadEquipment	OffRoadEquipmentType	Graders	Generator Sets
tblOffRoadEquipment	OffRoadEquipmentType	Rubber Tired Dozers	Skid Steer Loaders
tblOffRoadEquipment	OffRoadEquipmentType	Rubber Tired Dozers	Excavators
tblOffRoadEquipment	OffRoadEquipmentType	Rubber Tired Dozers	Generator Sets
tblOffRoadEquipment	OffRoadEquipmentType	Tractors/Loaders/Backhoes	Pavers
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tblOffRoadEquipment	OffRoadEquipmentType		Generator Sets
tblOffRoadEquipment	OffRoadEquipmentType		Concrete/Industrial Saws
tblOffRoadEquipment	OffRoadEquipmentType		Skid Steer Loaders
tblOffRoadEquipment	OffRoadEquipmentType		Generator Sets
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tblOffRoadEquipment	OffRoadEquipmentType		Rubber Tired Dozers
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tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
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tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	UsageHours	6.00	0.00
tblOffRoadEquipment	UsageHours	7.00	0.00
tblOffRoadEquipment	UsageHours	7.00	0.00
tblOffRoadEquipment	UsageHours	7.00	0.00
tblOffRoadEquipment	UsageHours	6.00	0.00
tblOffRoadEquipment	UsageHours	6.00	0.00

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblOffRoadEquipment	UsageHours	6.00	0.00
tblOffRoadEquipment	UsageHours	6.00	0.00
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural

2.0 Emissions Summary

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2022	0.0151	0.1287	0.1899	3.4000e-004	3.6700e-003	5.6100e-003	9.2700e-003	9.7000e-004	5.2000e-003	6.1700e-003	0.0000	29.7482	29.7482	8.3800e-003	1.0000e-004	29.9882
2023	7.3100e-003	0.0650	0.0791	1.6000e-004	1.8100e-003	2.6000e-003	4.4000e-003	4.8000e-004	2.4200e-003	2.8900e-003	0.0000	13.9672	13.9672	3.8300e-003	4.0000e-005	14.0762
Maximum	**0.0151**	**0.1287**	**0.1899**	**3.4000e-004**	**3.6700e-003**	**5.6100e-003**	**9.2700e-003**	**9.7000e-004**	**5.2000e-003**	**6.1700e-003**	**0.0000**	**29.7482**	**29.7482**	**8.3800e-003**	**1.0000e-004**	**29.9882**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2022	0.0151	0.1287	0.1899	3.4000e-004	3.6700e-003	5.6100e-003	9.2700e-003	9.7000e-004	5.2000e-003	6.1700e-003	0.0000	29.7482	29.7482	8.3800e-003	1.0000e-004	29.9881
2023	7.3100e-003	0.0650	0.0791	1.6000e-004	1.8100e-003	2.6000e-003	4.4000e-003	4.8000e-004	2.4200e-003	2.8900e-003	0.0000	13.9672	13.9672	3.8300e-003	4.0000e-005	14.0762
Maximum	**0.0151**	**0.1287**	**0.1899**	**3.4000e-004**	**3.6700e-003**	**5.6100e-003**	**9.2700e-003**	**9.7000e-004**	**5.2000e-003**	**6.1700e-003**	**0.0000**	**29.7482**	**29.7482**	**8.3800e-003**	**1.0000e-004**	**29.9881**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**4-15-2022**	**7-14-2022**	0.0875	0.0875
2	**7-15-2022**	**10-14-2022**	0.0532	0.0532
5	**4-15-2023**	**7-14-2023**	0.0708	0.0708
		Highest	0.0875	0.0875

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	6.1000e-004	0.0000	7.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.3000e-004	1.3000e-004	0.0000	0.0000	1.4000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**6.1000e-004**	**0.0000**	**7.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**1.3000e-004**	**1.3000e-004**	**0.0000**	**0.0000**	**1.4000e-004**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	6.1000e-004	0.0000	7.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.3000e-004	1.3000e-004	0.0000	0.0000	1.4000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**6.1000e-004**	**0.0000**	**7.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**1.3000e-004**	**1.3000e-004**	**0.0000**	**0.0000**	**1.4000e-004**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Phase 1 - Culvert Large	Grading	6/6/2022	6/21/2022	5	12	
2	Phase 1 - Culvert Medium	Grading	5/3/2022	6/3/2022	5	24	
3	Phase 1 - Culvert Small	Grading	4/15/2022	5/2/2022	5	12	

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

4	Phase 1 - Slip-outs	Grading	6/22/2022	9/13/2022	5	60	
5	Phase 2 - Culvert Large	Grading	5/26/2023	6/16/2023	5	16	
6	Phase 2 - Culvert Medium	Grading	4/27/2023	5/25/2023	5	21	
7	Phase 2 - Culvert Small	Grading	4/17/2023	4/26/2023	5	8	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0.03

Acres of Paving: 0.16

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Phase 2 - Culvert Medium	Excavators	1	6.00	158	0.38
Phase 2 - Culvert Small	Cement and Mortar Mixers	1	8.00	9	0.56
Phase 1 - Culvert Small	Cement and Mortar Mixers	1	8.00	9	0.56
Phase 1 - Slip-outs	Excavators	1	8.00	158	0.38
Phase 1 - Slip-outs	Skid Steer Loaders	1	2.00	65	0.37
Phase 1 - Culvert Large	Graders	1	6.00	187	0.41
Phase 1 - Culvert Medium	Excavators	1	6.00	158	0.38
Phase 2 - Culvert Small	Pavers	0	0.00	130	0.42
Phase 2 - Culvert Small	Rollers	0	0.00	80	0.38
Phase 1 - Culvert Small	Rubber Tired Dozers	0	0.00	247	0.40
Phase 1 - Culvert Large	Excavators	1	6.00	158	0.38
Phase 1 - Slip-outs	Tractors/Loaders/Backhoes	0	0.00	97	0.37
Phase 1 - Culvert Small	Tractors/Loaders/Backhoes	0	0.00	97	0.37
Phase 1 - Culvert Large	Skid Steer Loaders	1	2.00	65	0.37
Phase 2 - Culvert Small	Tractors/Loaders/Backhoes	0	0.00	97	0.37
Phase 1 - Culvert Medium	Generator Sets	1	1.00	20	0.74

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Phase 1 - Culvert Small	Generator Sets	1	1.00	20	0.74
Phase 1 - Slip-outs	Generator Sets	1	1.00	20	0.74
Phase 2 - Culvert Large	Graders	1	6.00	187	0.41
Phase 2 - Culvert Medium	Skid Steer Loaders	1	2.00	65	0.37
Phase 2 - Culvert Small	Generator Sets	1	1.00	20	0.74
Phase 1 - Culvert Medium	Skid Steer Loaders	1	2.00	65	0.37
Phase 1 - Slip-outs	Rubber Tired Dozers	0	0.00	247	0.40
Phase 2 - Culvert Large	Excavators	1	6.00	158	0.38
Phase 2 - Culvert Medium	Generator Sets	1	1.00	20	0.74
Phase 2 - Culvert Small	Rubber Tired Dozers	0	0.00	247	0.40
Phase 2 - Culvert Large	Pavers	1	2.00	130	0.42
Phase 2 - Culvert Medium	Tractors/Loaders/Backhoes	0	7.00	97	0.37
Phase 1 - Culvert Large	Pavers	1	2.00	130	0.42
Phase 1 - Culvert Large	Generator Sets	1	1.00	20	0.74
Phase 1 - Culvert Large	Concrete/Industrial Saws	1	1.00	81	0.73
Phase 2 - Culvert Large	Skid Steer Loaders	1	2.00	65	0.37
Phase 2 - Culvert Large	Generator Sets	1	1.00	20	0.74
Phase 2 - Culvert Large	Concrete/Industrial Saws	1	1.00	81	0.73
Phase 1 - Culvert Medium	Rubber Tired Dozers	0	0.00	0	0.40
Phase 2 - Culvert Medium	Rubber Tired Dozers	0	0.00	0	0.40

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Phase 1 - Culvert Small	2	5.00	0.00	0.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Phase 1 - Culvert Medium	3	8.00	0.00	0.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Phase 1 - Culvert Large	6	15.00	0.00	1.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Phase 1 - Slip-outs	3	8.00	0.00	2.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Phase 2 - Culvert Small	2	5.00	0.00	0.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Phase 2 - Culvert Medium	3	8.00	0.00	0.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Phase 2 - Culvert Large	6	15.00	0.00	1.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Phase 1 - Culvert Large - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.6000e-003	0.0392	0.0320	7.0000e-005		1.4900e-003	1.4900e-003		1.3800e-003	1.3800e-003	0.0000	6.0555	6.0555	1.8300e-003	0.0000	6.1012
Total	**3.6000e-003**	**0.0392**	**0.0320**	**7.0000e-005**	**2.0000e-005**	**1.4900e-003**	**1.5100e-003**	**0.0000**	**1.3800e-003**	**1.3800e-003**	**0.0000**	**6.0555**	**6.0555**	**1.8300e-003**	**0.0000**	**6.1012**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.2 Phase 1 - Culvert Large - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	9.0000e-005	2.0000e-005	0.0000	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0329	0.0329	0.0000	1.0000e-005	0.0346
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.7000e-004	1.9000e-004	2.1000e-003	1.0000e-005	7.1000e-004	0.0000	7.1000e-004	1.9000e-004	0.0000	1.9000e-004	0.0000	0.5747	0.5747	2.0000e-005	2.0000e-005	0.5803
Total	**2.7000e-004**	**2.8000e-004**	**2.1200e-003**	**1.0000e-005**	**7.2000e-004**	**0.0000**	**7.2000e-004**	**1.9000e-004**	**0.0000**	**1.9000e-004**	**0.0000**	**0.6077**	**0.6077**	**2.0000e-005**	**3.0000e-005**	**0.6148**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.6000e-003	0.0392	0.0320	7.0000e-005		1.4900e-003	1.4900e-003		1.3800e-003	1.3800e-003	0.0000	6.0555	6.0555	1.8300e-003	0.0000	6.1012
Total	**3.6000e-003**	**0.0392**	**0.0320**	**7.0000e-005**	**2.0000e-005**	**1.4900e-003**	**1.5100e-003**	**0.0000**	**1.3800e-003**	**1.3800e-003**	**0.0000**	**6.0555**	**6.0555**	**1.8300e-003**	**0.0000**	**6.1012**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.2 Phase 1 - Culvert Large - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	9.0000e-005	2.0000e-005	0.0000	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0329	0.0329	0.0000	1.0000e-005	0.0346
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.7000e-004	1.9000e-004	2.1000e-003	1.0000e-005	7.1000e-004	0.0000	7.1000e-004	1.9000e-004	0.0000	1.9000e-004	0.0000	0.5747	0.5747	2.0000e-005	2.0000e-005	0.5803
Total	**2.7000e-004**	**2.8000e-004**	**2.1200e-003**	**1.0000e-005**	**7.2000e-004**	**0.0000**	**7.2000e-004**	**1.9000e-004**	**0.0000**	**1.9000e-004**	**0.0000**	**0.6077**	**0.6077**	**2.0000e-005**	**3.0000e-005**	**0.6148**

3.3 Phase 1 - Culvert Medium - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.3100e-003	0.0205	0.0344	6.0000e-005		9.5000e-004	9.5000e-004		8.8000e-004	8.8000e-004	0.0000	4.8297	4.8297	1.5200e-003	0.0000	4.8677
Total	**2.3100e-003**	**0.0205**	**0.0344**	**6.0000e-005**	**2.0000e-005**	**9.5000e-004**	**9.7000e-004**	**0.0000**	**8.8000e-004**	**8.8000e-004**	**0.0000**	**4.8297**	**4.8297**	**1.5200e-003**	**0.0000**	**4.8677**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.3 Phase 1 - Culvert Medium - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.9000e-004	2.0000e-004	2.2400e-003	1.0000e-005	7.6000e-004	0.0000	7.6000e-004	2.0000e-004	0.0000	2.1000e-004	0.0000	0.6131	0.6131	2.0000e-005	2.0000e-005	0.6189
Total	**2.9000e-004**	**2.0000e-004**	**2.2400e-003**	**1.0000e-005**	**7.6000e-004**	**0.0000**	**7.6000e-004**	**2.0000e-004**	**0.0000**	**2.1000e-004**	**0.0000**	**0.6131**	**0.6131**	**2.0000e-005**	**2.0000e-005**	**0.6189**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.3100e-003	0.0205	0.0344	6.0000e-005		9.5000e-004	9.5000e-004		8.8000e-004	8.8000e-004	0.0000	4.8297	4.8297	1.5200e-003	0.0000	4.8677
Total	**2.3100e-003**	**0.0205**	**0.0344**	**6.0000e-005**	**2.0000e-005**	**9.5000e-004**	**9.7000e-004**	**0.0000**	**8.8000e-004**	**8.8000e-004**	**0.0000**	**4.8297**	**4.8297**	**1.5200e-003**	**0.0000**	**4.8677**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.3 Phase 1 - Culvert Medium - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.9000e-004	2.0000e-004	2.2400e-003	1.0000e-005	7.6000e-004	0.0000	7.6000e-004	2.0000e-004	0.0000	2.1000e-004	0.0000	0.6131	0.6131	2.0000e-005	2.0000e-005	0.6189
Total	**2.9000e-004**	**2.0000e-004**	**2.2400e-003**	**1.0000e-005**	**7.6000e-004**	**0.0000**	**7.6000e-004**	**2.0000e-004**	**0.0000**	**2.1000e-004**	**0.0000**	**0.6131**	**0.6131**	**2.0000e-005**	**2.0000e-005**	**0.6189**

3.4 Phase 1 - Culvert Small - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.9000e-004	3.0800e-003	2.3300e-003	1.0000e-005		1.2000e-004	1.2000e-004		1.2000e-004	1.2000e-004	0.0000	0.3759	0.3759	4.0000e-005	0.0000	0.3769
Total	**4.9000e-004**	**3.0800e-003**	**2.3300e-003**	**1.0000e-005**	**0.0000**	**1.2000e-004**	**1.2000e-004**	**0.0000**	**1.2000e-004**	**1.2000e-004**	**0.0000**	**0.3759**	**0.3759**	**4.0000e-005**	**0.0000**	**0.3769**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.4 Phase 1 - Culvert Small - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	9.0000e-005	6.0000e-005	7.0000e-004	0.0000	2.4000e-004	0.0000	2.4000e-004	6.0000e-005	0.0000	6.0000e-005	0.0000	0.1916	0.1916	1.0000e-005	1.0000e-005	0.1934
Total	**9.0000e-005**	**6.0000e-005**	**7.0000e-004**	**0.0000**	**2.4000e-004**	**0.0000**	**2.4000e-004**	**6.0000e-005**	**0.0000**	**6.0000e-005**	**0.0000**	**0.1916**	**0.1916**	**1.0000e-005**	**1.0000e-005**	**0.1934**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.9000e-004	3.0800e-003	2.3300e-003	1.0000e-005		1.2000e-004	1.2000e-004		1.2000e-004	1.2000e-004	0.0000	0.3759	0.3759	4.0000e-005	0.0000	0.3769
Total	**4.9000e-004**	**3.0800e-003**	**2.3300e-003**	**1.0000e-005**	**0.0000**	**1.2000e-004**	**1.2000e-004**	**0.0000**	**1.2000e-004**	**1.2000e-004**	**0.0000**	**0.3759**	**0.3759**	**4.0000e-005**	**0.0000**	**0.3769**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.4 Phase 1 - Culvert Small - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	9.0000e-005	6.0000e-005	7.0000e-004	0.0000	2.4000e-004	0.0000	2.4000e-004	6.0000e-005	0.0000	6.0000e-005	0.0000	0.1916	0.1916	1.0000e-005	1.0000e-005	0.1934
Total	**9.0000e-005**	**6.0000e-005**	**7.0000e-004**	**0.0000**	**2.4000e-004**	**0.0000**	**2.4000e-004**	**6.0000e-005**	**0.0000**	**6.0000e-005**	**0.0000**	**0.1916**	**0.1916**	**1.0000e-005**	**1.0000e-005**	**0.1934**

3.5 Phase 1 - Slip-outs - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	7.2900e-003	0.0647	0.1104	1.8000e-004		3.0200e-003	3.0200e-003		2.7900e-003	2.7900e-003	0.0000	15.4763	15.4763	4.9000e-003	0.0000	15.5987
Total	**7.2900e-003**	**0.0647**	**0.1104**	**1.8000e-004**	**2.0000e-005**	**3.0200e-003**	**3.0400e-003**	**0.0000**	**2.7900e-003**	**2.7900e-003**	**0.0000**	**15.4763**	**15.4763**	**4.9000e-003**	**0.0000**	**15.5987**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 Phase 1 - Slip-outs - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	1.9000e-004	5.0000e-005	0.0000	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	1.0000e-005	0.0000	0.0659	0.0659	0.0000	1.0000e-005	0.0691
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.2000e-004	5.0000e-004	5.6000e-003	2.0000e-005	1.8900e-003	1.0000e-005	1.9000e-003	5.0000e-004	1.0000e-005	5.1000e-004	0.0000	1.5326	1.5326	5.0000e-005	5.0000e-005	1.5474
Total	**7.2000e-004**	**6.9000e-004**	**5.6500e-003**	**2.0000e-005**	**1.9100e-003**	**1.0000e-005**	**1.9200e-003**	**5.0000e-004**	**1.0000e-005**	**5.2000e-004**	**0.0000**	**1.5985**	**1.5985**	**5.0000e-005**	**6.0000e-005**	**1.6165**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	7.2900e-003	0.0647	0.1104	1.8000e-004		3.0200e-003	3.0200e-003		2.7900e-003	2.7900e-003	0.0000	15.4763	15.4763	4.9000e-003	0.0000	15.5987
Total	**7.2900e-003**	**0.0647**	**0.1104**	**1.8000e-004**	**2.0000e-005**	**3.0200e-003**	**3.0400e-003**	**0.0000**	**2.7900e-003**	**2.7900e-003**	**0.0000**	**15.4763**	**15.4763**	**4.9000e-003**	**0.0000**	**15.5987**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 Phase 1 - Slip-outs - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	1.9000e-004	5.0000e-005	0.0000	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	1.0000e-005	0.0000	0.0659	0.0659	0.0000	1.0000e-005	0.0691
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.2000e-004	5.0000e-004	5.6000e-003	2.0000e-005	1.8900e-003	1.0000e-005	1.9000e-003	5.0000e-004	1.0000e-005	5.1000e-004	0.0000	1.5326	1.5326	5.0000e-005	5.0000e-005	1.5474
Total	**7.2000e-004**	**6.9000e-004**	**5.6500e-003**	**2.0000e-005**	**1.9100e-003**	**1.0000e-005**	**1.9200e-003**	**5.0000e-004**	**1.0000e-005**	**5.2000e-004**	**0.0000**	**1.5985**	**1.5985**	**5.0000e-005**	**6.0000e-005**	**1.6165**

3.6 Phase 2 - Culvert Large - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.4600e-003	0.0465	0.0425	9.0000e-005		1.7700e-003	1.7700e-003		1.6400e-003	1.6400e-003	0.0000	8.0723	8.0723	2.4300e-003	0.0000	8.1332
Total	**4.4600e-003**	**0.0465**	**0.0425**	**9.0000e-005**	**2.0000e-005**	**1.7700e-003**	**1.7900e-003**	**0.0000**	**1.6400e-003**	**1.6400e-003**	**0.0000**	**8.0723**	**8.0723**	**2.4300e-003**	**0.0000**	**8.1332**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 Phase 2 - Culvert Large - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	8.0000e-005	2.0000e-005	0.0000	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0314	0.0314	0.0000	1.0000e-005	0.0330
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.3000e-004	2.2000e-004	2.5900e-003	1.0000e-005	9.5000e-004	1.0000e-005	9.5000e-004	2.5000e-004	0.0000	2.6000e-004	0.0000	0.7425	0.7425	2.0000e-005	2.0000e-005	0.7493
Total	**3.3000e-004**	**3.0000e-004**	**2.6100e-003**	**1.0000e-005**	**9.6000e-004**	**1.0000e-005**	**9.6000e-004**	**2.5000e-004**	**0.0000**	**2.6000e-004**	**0.0000**	**0.7739**	**0.7739**	**2.0000e-005**	**3.0000e-005**	**0.7823**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.4600e-003	0.0465	0.0425	9.0000e-005		1.7700e-003	1.7700e-003		1.6400e-003	1.6400e-003	0.0000	8.0723	8.0723	2.4300e-003	0.0000	8.1332
Total	**4.4600e-003**	**0.0465**	**0.0425**	**9.0000e-005**	**2.0000e-005**	**1.7700e-003**	**1.7900e-003**	**0.0000**	**1.6400e-003**	**1.6400e-003**	**0.0000**	**8.0723**	**8.0723**	**2.4300e-003**	**0.0000**	**8.1332**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 Phase 2 - Culvert Large - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	8.0000e-005	2.0000e-005	0.0000	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0314	0.0314	0.0000	1.0000e-005	0.0330
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.3000e-004	2.2000e-004	2.5900e-003	1.0000e-005	9.5000e-004	1.0000e-005	9.5000e-004	2.5000e-004	0.0000	2.6000e-004	0.0000	0.7425	0.7425	2.0000e-005	2.0000e-005	0.7493
Total	**3.3000e-004**	**3.0000e-004**	**2.6100e-003**	**1.0000e-005**	**9.6000e-004**	**1.0000e-005**	**9.6000e-004**	**2.5000e-004**	**0.0000**	**2.6000e-004**	**0.0000**	**0.7739**	**0.7739**	**2.0000e-005**	**3.0000e-005**	**0.7823**

3.7 Phase 2 - Culvert Medium - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.9000e-003	0.0160	0.0301	5.0000e-005		7.4000e-004	7.4000e-004		6.8000e-004	6.8000e-004	0.0000	4.2269	4.2269	1.3300e-003	0.0000	4.2601
Total	**1.9000e-003**	**0.0160**	**0.0301**	**5.0000e-005**	**2.0000e-005**	**7.4000e-004**	**7.6000e-004**	**0.0000**	**6.8000e-004**	**6.8000e-004**	**0.0000**	**4.2269**	**4.2269**	**1.3300e-003**	**0.0000**	**4.2601**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.7 Phase 2 - Culvert Medium - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.3000e-004	1.5000e-004	1.8100e-003	1.0000e-005	6.6000e-004	0.0000	6.7000e-004	1.8000e-004	0.0000	1.8000e-004	0.0000	0.5198	0.5198	2.0000e-005	1.0000e-005	0.5245
Total	**2.3000e-004**	**1.5000e-004**	**1.8100e-003**	**1.0000e-005**	**6.6000e-004**	**0.0000**	**6.7000e-004**	**1.8000e-004**	**0.0000**	**1.8000e-004**	**0.0000**	**0.5198**	**0.5198**	**2.0000e-005**	**1.0000e-005**	**0.5245**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.9000e-003	0.0160	0.0301	5.0000e-005		7.4000e-004	7.4000e-004		6.8000e-004	6.8000e-004	0.0000	4.2269	4.2269	1.3300e-003	0.0000	4.2601
Total	**1.9000e-003**	**0.0160**	**0.0301**	**5.0000e-005**	**2.0000e-005**	**7.4000e-004**	**7.6000e-004**	**0.0000**	**6.8000e-004**	**6.8000e-004**	**0.0000**	**4.2269**	**4.2269**	**1.3300e-003**	**0.0000**	**4.2601**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.7 Phase 2 - Culvert Medium - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.3000e-004	1.5000e-004	1.8100e-003	1.0000e-005	6.6000e-004	0.0000	6.7000e-004	1.8000e-004	0.0000	1.8000e-004	0.0000	0.5198	0.5198	2.0000e-005	1.0000e-005	0.5245
Total	**2.3000e-004**	**1.5000e-004**	**1.8100e-003**	**1.0000e-005**	**6.6000e-004**	**0.0000**	**6.7000e-004**	**1.8000e-004**	**0.0000**	**1.8000e-004**	**0.0000**	**0.5198**	**0.5198**	**2.0000e-005**	**1.0000e-005**	**0.5245**

3.8 Phase 2 - Culvert Small - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.3000e-004	2.0500e-003	1.5500e-003	0.0000		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005	0.0000	0.2506	0.2506	3.0000e-005	0.0000	0.2513
Total	**3.3000e-004**	**2.0500e-003**	**1.5500e-003**	**0.0000**	**0.0000**	**8.0000e-005**	**8.0000e-005**	**0.0000**	**8.0000e-005**	**8.0000e-005**	**0.0000**	**0.2506**	**0.2506**	**3.0000e-005**	**0.0000**	**0.2513**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.8 Phase 2 - Culvert Small - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	6.0000e-005	4.0000e-005	4.3000e-004	0.0000	1.6000e-004	0.0000	1.6000e-004	4.0000e-005	0.0000	4.0000e-005	0.0000	0.1238	0.1238	0.0000	0.0000	0.1249
Total	**6.0000e-005**	**4.0000e-005**	**4.3000e-004**	**0.0000**	**1.6000e-004**	**0.0000**	**1.6000e-004**	**4.0000e-005**	**0.0000**	**4.0000e-005**	**0.0000**	**0.1238**	**0.1238**	**0.0000**	**0.0000**	**0.1249**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.3000e-004	2.0500e-003	1.5500e-003	0.0000		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005	0.0000	0.2506	0.2506	3.0000e-005	0.0000	0.2513
Total	**3.3000e-004**	**2.0500e-003**	**1.5500e-003**	**0.0000**	**0.0000**	**8.0000e-005**	**8.0000e-005**	**0.0000**	**8.0000e-005**	**8.0000e-005**	**0.0000**	**0.2506**	**0.2506**	**3.0000e-005**	**0.0000**	**0.2513**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.8 Phase 2 - Culvert Small - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	6.0000e-005	4.0000e-005	4.3000e-004	0.0000	1.6000e-004	0.0000	1.6000e-004	4.0000e-005	0.0000	4.0000e-005	0.0000	0.1238	0.1238	0.0000	0.0000	0.1249
Total	**6.0000e-005**	**4.0000e-005**	**4.3000e-004**	**0.0000**	**1.6000e-004**	**0.0000**	**1.6000e-004**	**4.0000e-005**	**0.0000**	**4.0000e-005**	**0.0000**	**0.1238**	**0.1238**	**0.0000**	**0.0000**	**0.1249**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Other Asphalt Surfaces	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Other Asphalt Surfaces	14.70	6.60	6.60	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Other Asphalt Surfaces	0.540731	0.061602	0.202834	0.122898	0.023958	0.005433	0.006645	0.003685	0.000662	0.000406	0.027616	0.000722	0.002809

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	6.1000e-004	0.0000	7.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.3000e-004	1.3000e-004	0.0000	0.0000	1.4000e-004
Unmitigated	6.1000e-004	0.0000	7.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.3000e-004	1.3000e-004	0.0000	0.0000	1.4000e-004

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	1.5000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	4.6000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.0000e-005	0.0000	7.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.3000e-004	1.3000e-004	0.0000	0.0000	1.4000e-004
Total	**6.2000e-004**	**0.0000**	**7.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**1.3000e-004**	**1.3000e-004**	**0.0000**	**0.0000**	**1.4000e-004**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	1.5000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	4.6000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.0000e-005	0.0000	7.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.3000e-004	1.3000e-004	0.0000	0.0000	1.4000e-004
Total	**6.2000e-004**	**0.0000**	**7.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**1.3000e-004**	**1.3000e-004**	**0.0000**	**0.0000**	**1.4000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Other Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Other Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

West Marin Drainage Rehabilitation Project - Marin County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

West Marin Drainage Rehabilitation Project

Marin County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Asphalt Surfaces	7.10	1000sqft	0.16	7,100.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	69
Climate Zone	5			**Operational Year**	2024
Utility Company	MCE				
CO2 Intensity (lb/MWhr)	187.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Based on Project Description

Construction Phase - Based on Project Description and Basis of Design

Off-road Equipment - Based on Project Description

Off-road Equipment - Based on Project Description

Off-road Equipment - Based on Project Description

Off-road Equipment - Based on Project Description

Off-road Equipment - Based on Project Description

Off-road Equipment - Based on project description

Off-road Equipment - Based on Project Description

Grading - Based on Project Description

Trips and VMT -

West Marin Drainage Rehabilitation Project - Marin County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	2.00	21.00
tblConstructionPhase	NumDays	2.00	60.00
tblConstructionPhase	NumDays	2.00	12.00
tblConstructionPhase	NumDays	2.00	12.00
tblConstructionPhase	NumDays	2.00	8.00
tblConstructionPhase	NumDays	2.00	24.00
tblConstructionPhase	NumDays	2.00	16.00
tblConstructionPhase	PhaseEndDate	10/4/2022	5/25/2023
tblConstructionPhase	PhaseEndDate	9/20/2022	9/13/2022
tblConstructionPhase	PhaseEndDate	4/28/2022	5/2/2022
tblConstructionPhase	PhaseEndDate	5/3/2022	6/21/2022
tblConstructionPhase	PhaseEndDate	9/27/2022	4/26/2023
tblConstructionPhase	PhaseEndDate	4/29/2022	6/3/2022
tblConstructionPhase	PhaseStartDate	9/28/2022	4/27/2023
tblConstructionPhase	PhaseStartDate	5/4/2022	6/22/2022
tblConstructionPhase	PhaseStartDate	4/30/2022	6/6/2022
tblConstructionPhase	PhaseStartDate	9/21/2022	4/17/2023
tblConstructionPhase	PhaseStartDate	4/29/2022	5/3/2022
tblGrading	AcresOfGrading	4.50	0.03
tblGrading	AcresOfGrading	0.00	0.03
tblGrading	AcresOfGrading	0.00	0.03
tblGrading	AcresOfGrading	6.00	0.03
tblGrading	AcresOfGrading	0.00	0.03
tblGrading	MaterialExported	0.00	2.00
tblGrading	MaterialExported	0.00	1.00
tblGrading	MaterialExported	0.00	2.00
tblGrading	MaterialExported	0.00	2.00

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblGrading	MaterialExported	0.00	1.00
tblGrading	MaterialImported	0.00	3.00
tblGrading	MaterialImported	0.00	2.00
tblGrading	MaterialImported	0.00	1.00
tblGrading	MaterialImported	0.00	10.00
tblGrading	MaterialImported	0.00	3.00
tblGrading	MaterialImported	0.00	2.00
tblGrading	MaterialImported	0.00	1.00
tblOffRoadEquipment	HorsePower	84.00	20.00
tblOffRoadEquipment	HorsePower	84.00	20.00
tblOffRoadEquipment	HorsePower	84.00	20.00
tblOffRoadEquipment	HorsePower	84.00	20.00
tblOffRoadEquipment	HorsePower	84.00	20.00
tblOffRoadEquipment	HorsePower	84.00	20.00
tblOffRoadEquipment	HorsePower	84.00	20.00
tblOffRoadEquipment	HorsePower	247.00	0.00
tblOffRoadEquipment	HorsePower	247.00	0.00
tblOffRoadEquipment	LoadFactor	0.40	0.40
tblOffRoadEquipment	LoadFactor	0.40	0.40
tblOffRoadEquipment	OffRoadEquipmentType	Air Compressors	Excavators
tblOffRoadEquipment	OffRoadEquipmentType	Concrete/Industrial Saws	Cement and Mortar Mixers
tblOffRoadEquipment	OffRoadEquipmentType	Cranes	Excavators
tblOffRoadEquipment	OffRoadEquipmentType	Forklifts	Skid Steer Loaders
tblOffRoadEquipment	OffRoadEquipmentType	Graders	Excavators
tblOffRoadEquipment	OffRoadEquipmentType	Rubber Tired Dozers	Excavators
tblOffRoadEquipment	OffRoadEquipmentType	Tractors/Loaders/Backhoes	Skid Steer Loaders
tblOffRoadEquipment	OffRoadEquipmentType	Tractors/Loaders/Backhoes	Generator Sets
tblOffRoadEquipment	OffRoadEquipmentType	Graders	Generator Sets
tblOffRoadEquipment	OffRoadEquipmentType	Graders	Generator Sets

tblOffRoadEquipment	OffRoadEquipmentType	Graders	Skid Steer Loaders
tblOffRoadEquipment	OffRoadEquipmentType	Graders	Generator Sets
tblOffRoadEquipment	OffRoadEquipmentType	Rubber Tired Dozers	Skid Steer Loaders
tblOffRoadEquipment	OffRoadEquipmentType	Rubber Tired Dozers	Excavators
tblOffRoadEquipment	OffRoadEquipmentType	Rubber Tired Dozers	Generator Sets
tblOffRoadEquipment	OffRoadEquipmentType	Tractors/Loaders/Backhoes	Pavers
tblOffRoadEquipment	OffRoadEquipmentType		Pavers
tblOffRoadEquipment	OffRoadEquipmentType		Generator Sets
tblOffRoadEquipment	OffRoadEquipmentType		Concrete/Industrial Saws
tblOffRoadEquipment	OffRoadEquipmentType		Skid Steer Loaders
tblOffRoadEquipment	OffRoadEquipmentType		Generator Sets
tblOffRoadEquipment	OffRoadEquipmentType		Concrete/Industrial Saws
tblOffRoadEquipment	OffRoadEquipmentType		Rubber Tired Dozers
tblOffRoadEquipment	OffRoadEquipmentType		Rubber Tired Dozers
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	UsageHours	6.00	0.00
tblOffRoadEquipment	UsageHours	7.00	0.00
tblOffRoadEquipment	UsageHours	7.00	0.00
tblOffRoadEquipment	UsageHours	7.00	0.00
tblOffRoadEquipment	UsageHours	6.00	0.00
tblOffRoadEquipment	UsageHours	6.00	0.00

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblOffRoadEquipment	UsageHours	6.00	0.00
tblOffRoadEquipment	UsageHours	6.00	0.00
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural

2.0 Emissions Summary

West Marin Drainage Rehabilitation Project - Marin County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2022	0.6472	6.5709	5.7169	0.0127	0.1274	0.2491	0.3765	0.0334	0.2312	0.2645	0.0000	1,231.2660	1,231.2660	0.3395	3.8300e-003	1,240.8941
2023	0.6018	5.8393	5.6644	0.0127	0.1263	0.2220	0.3484	0.0332	0.2060	0.2392	0.0000	1,225.7877	1,225.7877	0.3386	3.3500e-003	1,235.2491
Maximum	**0.6472**	**6.5709**	**5.7169**	**0.0127**	**0.1274**	**0.2491**	**0.3765**	**0.0334**	**0.2312**	**0.2645**	**0.0000**	**1,231.2660**	**1,231.2660**	**0.3395**	**3.8300e-003**	**1,240.8941**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2022	0.6472	6.5709	5.7169	0.0127	0.1274	0.2491	0.3765	0.0334	0.2312	0.2645	0.0000	1,231.2660	1,231.2660	0.3395	3.8300e-003	1,240.8941
2023	0.6018	5.8393	5.6644	0.0127	0.1263	0.2220	0.3484	0.0332	0.2060	0.2392	0.0000	1,225.7877	1,225.7877	0.3386	3.3500e-003	1,235.2491
Maximum	**0.6472**	**6.5709**	**5.7169**	**0.0127**	**0.1274**	**0.2491**	**0.3765**	**0.0334**	**0.2312**	**0.2645**	**0.0000**	**1,231.2660**	**1,231.2660**	**0.3395**	**3.8300e-003**	**1,240.8941**

West Marin Drainage Rehabilitation Project - Marin County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

West Marin Drainage Rehabilitation Project - Marin County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	3.3900e-003	1.0000e-005	7.2000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.5500e-003	1.5500e-003	0.0000		1.6600e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total	**3.3900e-003**	**1.0000e-005**	**7.2000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**1.5500e-003**	**1.5500e-003**	**0.0000**	**0.0000**	**1.6600e-003**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	3.3900e-003	1.0000e-005	7.2000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.5500e-003	1.5500e-003	0.0000		1.6600e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total	**3.3900e-003**	**1.0000e-005**	**7.2000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**1.5500e-003**	**1.5500e-003**	**0.0000**	**0.0000**	**1.6600e-003**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Phase 1 - Culvert Large	Grading	6/6/2022	6/21/2022	5	12	
2	Phase 1 - Culvert Medium	Grading	5/3/2022	6/3/2022	5	24	
3	Phase 1 - Culvert Small	Grading	4/15/2022	5/2/2022	5	12	
4	Phase 1 - Slip-outs	Grading	6/22/2022	9/13/2022	5	60	
5	Phase 2 - Culvert Large	Grading	5/26/2023	6/16/2023	5	16	
6	Phase 2 - Culvert Medium	Grading	4/27/2023	5/25/2023	5	21	
7	Phase 2 - Culvert Small	Grading	4/17/2023	4/26/2023	5	8	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0.03

Acres of Paving: 0.16

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Phase 2 - Culvert Medium	Excavators	1	6.00	158	0.38
Phase 2 - Culvert Small	Cement and Mortar Mixers	1	8.00	9	0.56
Phase 1 - Culvert Small	Cement and Mortar Mixers	1	8.00	9	0.56
Phase 1 - Slip-outs	Excavators	1	8.00	158	0.38

West Marin Drainage Rehabilitation Project - Marin County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Phase 1 - Slip-outs	Skid Steer Loaders	1	2.00	65	0.37
Phase 1 - Culvert Large	Graders	1	6.00	187	0.41
Phase 1 - Culvert Medium	Excavators	1	6.00	158	0.38
Phase 2 - Culvert Small	Pavers	0	0.00	130	0.42
Phase 2 - Culvert Small	Rollers	0	0.00	80	0.38
Phase 1 - Culvert Small	Rubber Tired Dozers	0	0.00	247	0.40
Phase 1 - Culvert Large	Excavators	1	6.00	158	0.38
Phase 1 - Slip-outs	Tractors/Loaders/Backhoes	0	0.00	97	0.37
Phase 1 - Culvert Small	Tractors/Loaders/Backhoes	0	0.00	97	0.37
Phase 1 - Culvert Large	Skid Steer Loaders	1	2.00	65	0.37
Phase 2 - Culvert Small	Tractors/Loaders/Backhoes	0	0.00	97	0.37
Phase 1 - Culvert Medium	Generator Sets	1	1.00	20	0.74
Phase 1 - Culvert Small	Generator Sets	1	1.00	20	0.74
Phase 1 - Slip-outs	Generator Sets	1	1.00	20	0.74
Phase 2 - Culvert Large	Graders	1	6.00	187	0.41
Phase 2 - Culvert Medium	Skid Steer Loaders	1	2.00	65	0.37
Phase 2 - Culvert Small	Generator Sets	1	1.00	20	0.74
Phase 1 - Culvert Medium	Skid Steer Loaders	1	2.00	65	0.37
Phase 1 - Slip-outs	Rubber Tired Dozers	0	0.00	247	0.40
Phase 2 - Culvert Large	Excavators	1	6.00	158	0.38
Phase 2 - Culvert Medium	Generator Sets	1	1.00	20	0.74
Phase 2 - Culvert Small	Rubber Tired Dozers	0	0.00	247	0.40
Phase 2 - Culvert Large	Pavers	1	2.00	130	0.42
Phase 2 - Culvert Medium	Tractors/Loaders/Backhoes	0	7.00	97	0.37
Phase 1 - Culvert Large	Pavers	1	2.00	130	0.42
Phase 1 - Culvert Large	Generator Sets	1	1.00	20	0.74
Phase 1 - Culvert Large	Concrete/Industrial Saws	1	1.00	81	0.73
Phase 2 - Culvert Large	Skid Steer Loaders	1	2.00	65	0.37
Phase 2 - Culvert Large	Generator Sets	1	1.00	20	0.74

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Phase 2 - Culvert Large	Concrete/Industrial Saws	1	1.00	81	0.73
Phase 1 - Culvert Medium	Rubber Tired Dozers	0	0.00	0	0.40
Phase 2 - Culvert Medium	Rubber Tired Dozers	0	0.00	0	0.40

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Phase 1 - Culvert Small	2	5.00	0.00	0.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Phase 1 - Culvert Medium	3	8.00	0.00	0.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Phase 1 - Culvert Large	6	15.00	0.00	1.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Phase 1 - Slip-outs	3	8.00	0.00	2.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Phase 2 - Culvert Small	2	5.00	0.00	0.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Phase 2 - Culvert Medium	3	8.00	0.00	0.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Phase 2 - Culvert Large	6	15.00	0.00	1.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

West Marin Drainage Rehabilitation Project - Marin County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.2 Phase 1 - Culvert Large - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.7000e-003	0.0000	2.7000e-003	2.9000e-004	0.0000	2.9000e-004			0.0000			0.0000
Off-Road	0.5999	6.5288	5.3377	0.0115		0.2483	0.2483		0.2304	0.2304		1,112.5087	1,112.5087	0.3360		1,120.9074
Total	**0.5999**	**6.5288**	**5.3377**	**0.0115**	**2.7000e-003**	**0.2483**	**0.2510**	**2.9000e-004**	**0.2304**	**0.2307**		**1,112.5087**	**1,112.5087**	**0.3360**		**1,120.9074**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	3.9000e-004	0.0150	3.9100e-003	5.0000e-005	1.4600e-003	1.3000e-004	1.5800e-003	4.0000e-004	1.2000e-004	5.2000e-004		6.0520	6.0520	3.9000e-004	9.6000e-004	6.3489
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0468	0.0272	0.3753	1.1100e-003	0.1232	6.6000e-004	0.1239	0.0327	6.1000e-004	0.0333		112.7053	112.7053	3.1300e-003	2.8700e-003	113.6378
Total	**0.0472**	**0.0421**	**0.3792**	**1.1600e-003**	**0.1247**	**7.9000e-004**	**0.1255**	**0.0331**	**7.3000e-004**	**0.0338**		**118.7573**	**118.7573**	**3.5200e-003**	**3.8300e-003**	**119.9867**

West Marin Drainage Rehabilitation Project - Marin County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.2 Phase 1 - Culvert Large - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.7000e-003	0.0000	2.7000e-003	2.9000e-004	0.0000	2.9000e-004			0.0000			0.0000
Off-Road	0.5999	6.5288	5.3377	0.0115		0.2483	0.2483		0.2304	0.2304	0.0000	1,112.5087	1,112.5087	0.3360		1,120.9074
Total	**0.5999**	**6.5288**	**5.3377**	**0.0115**	**2.7000e-003**	**0.2483**	**0.2510**	**2.9000e-004**	**0.2304**	**0.2307**	**0.0000**	**1,112.5087**	**1,112.5087**	**0.3360**		**1,120.9074**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	3.9000e-004	0.0150	3.9100e-003	5.0000e-005	1.4600e-003	1.3000e-004	1.5800e-003	4.0000e-004	1.2000e-004	5.2000e-004		6.0520	6.0520	3.9000e-004	9.6000e-004	6.3489
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0468	0.0272	0.3753	1.1100e-003	0.1232	6.6000e-004	0.1239	0.0327	6.1000e-004	0.0333		112.7053	112.7053	3.1300e-003	2.8700e-003	113.6378
Total	**0.0472**	**0.0421**	**0.3792**	**1.1600e-003**	**0.1247**	**7.9000e-004**	**0.1255**	**0.0331**	**7.3000e-004**	**0.0338**		**118.7573**	**118.7573**	**3.5200e-003**	**3.8300e-003**	**119.9867**

West Marin Drainage Rehabilitation Project - Marin County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.3 Phase 1 - Culvert Medium - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.3400e-003	0.0000	1.3400e-003	1.5000e-004	0.0000	1.5000e-004			0.0000			0.0000
Off-Road	0.1923	1.7107	2.8673	4.6200e-003		0.0792	0.0792		0.0734	0.0734		443.6520	443.6520	0.1395		447.1406
Total	**0.1923**	**1.7107**	**2.8673**	**4.6200e-003**	**1.3400e-003**	**0.0792**	**0.0805**	**1.5000e-004**	**0.0734**	**0.0735**		**443.6520**	**443.6520**	**0.1395**		**447.1406**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0250	0.0145	0.2001	5.9000e-004	0.0657	3.5000e-004	0.0661	0.0174	3.2000e-004	0.0178		60.1095	60.1095	1.6700e-003	1.5300e-003	60.6068
Total	**0.0250**	**0.0145**	**0.2001**	**5.9000e-004**	**0.0657**	**3.5000e-004**	**0.0661**	**0.0174**	**3.2000e-004**	**0.0178**		**60.1095**	**60.1095**	**1.6700e-003**	**1.5300e-003**	**60.6068**

West Marin Drainage Rehabilitation Project - Marin County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.3 Phase 1 - Culvert Medium - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.3400e-003	0.0000	1.3400e-003	1.5000e-004	0.0000	1.5000e-004			0.0000			0.0000
Off-Road	0.1923	1.7107	2.8673	4.6200e-003		0.0792	0.0792		0.0734	0.0734	0.0000	443.6520	443.6520	0.1395		447.1406
Total	**0.1923**	**1.7107**	**2.8673**	**4.6200e-003**	**1.3400e-003**	**0.0792**	**0.0805**	**1.5000e-004**	**0.0734**	**0.0735**	**0.0000**	**443.6520**	**443.6520**	**0.1395**		**447.1406**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0250	0.0145	0.2001	5.9000e-004	0.0657	3.5000e-004	0.0661	0.0174	3.2000e-004	0.0178		60.1095	60.1095	1.6700e-003	1.5300e-003	60.6068
Total	**0.0250**	**0.0145**	**0.2001**	**5.9000e-004**	**0.0657**	**3.5000e-004**	**0.0661**	**0.0174**	**3.2000e-004**	**0.0178**		**60.1095**	**60.1095**	**1.6700e-003**	**1.5300e-003**	**60.6068**

West Marin Drainage Rehabilitation Project - Marin County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.4 Phase 1 - Culvert Small - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.0818	0.5140	0.3876	9.4000e-004		0.0205	0.0205		0.0205	0.0205		69.0590	69.0590	7.3000e-003		69.2415
Total	**0.0818**	**0.5140**	**0.3876**	**9.4000e-004**	**1.0000e-005**	**0.0205**	**0.0205**	**0.0000**	**0.0205**	**0.0205**		**69.0590**	**69.0590**	**7.3000e-003**		**69.2415**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0156	9.0600e-003	0.1251	3.7000e-004	0.0411	2.2000e-004	0.0413	0.0109	2.0000e-004	0.0111		37.5684	37.5684	1.0400e-003	9.6000e-004	37.8793
Total	**0.0156**	**9.0600e-003**	**0.1251**	**3.7000e-004**	**0.0411**	**2.2000e-004**	**0.0413**	**0.0109**	**2.0000e-004**	**0.0111**		**37.5684**	**37.5684**	**1.0400e-003**	**9.6000e-004**	**37.8793**

West Marin Drainage Rehabilitation Project - Marin County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.4 Phase 1 - Culvert Small - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.0818	0.5140	0.3876	9.4000e-004		0.0205	0.0205		0.0205	0.0205	0.0000	69.0590	69.0590	7.3000e-003		69.2415
Total	**0.0818**	**0.5140**	**0.3876**	**9.4000e-004**	**1.0000e-005**	**0.0205**	**0.0205**	**0.0000**	**0.0205**	**0.0205**	**0.0000**	**69.0590**	**69.0590**	**7.3000e-003**		**69.2415**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0156	9.0600e-003	0.1251	3.7000e-004	0.0411	2.2000e-004	0.0413	0.0109	2.0000e-004	0.0111		37.5684	37.5684	1.0400e-003	9.6000e-004	37.8793
Total	**0.0156**	**9.0600e-003**	**0.1251**	**3.7000e-004**	**0.0411**	**2.2000e-004**	**0.0413**	**0.0109**	**2.0000e-004**	**0.0111**		**37.5684**	**37.5684**	**1.0400e-003**	**9.6000e-004**	**37.8793**

West Marin Drainage Rehabilitation Project - Marin County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 Phase 1 - Slip-outs - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					5.5000e-004	0.0000	5.5000e-004	6.0000e-005	0.0000	6.0000e-005			0.0000			0.0000
Off-Road	0.2429	2.1550	3.6811	5.9100e-003		0.1007	0.1007		0.0931	0.0931		568.6558	568.6558	0.1800		573.1551
Total	**0.2429**	**2.1550**	**3.6811**	**5.9100e-003**	**5.5000e-004**	**0.1007**	**0.1012**	**6.0000e-005**	**0.0931**	**0.0932**		**568.6558**	**568.6558**	**0.1800**		**573.1551**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.6000e-004	5.9900e-003	1.5600e-003	2.0000e-005	5.8000e-004	5.0000e-005	6.3000e-004	1.6000e-004	5.0000e-005	2.1000e-004		2.4208	2.4208	1.5000e-004	3.9000e-004	2.5396
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0250	0.0145	0.2001	5.9000e-004	0.0657	3.5000e-004	0.0661	0.0174	3.2000e-004	0.0178		60.1095	60.1095	1.6700e-003	1.5300e-003	60.6068
Total	**0.0251**	**0.0205**	**0.2017**	**6.1000e-004**	**0.0663**	**4.0000e-004**	**0.0667**	**0.0176**	**3.7000e-004**	**0.0180**		**62.5303**	**62.5303**	**1.8200e-003**	**1.9200e-003**	**63.1464**

West Marin Drainage Rehabilitation Project - Marin County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 Phase 1 - Slip-outs - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					5.5000e-004	0.0000	5.5000e-004	6.0000e-005	0.0000	6.0000e-005			0.0000			0.0000
Off-Road	0.2429	2.1550	3.6811	5.9100e-003		0.1007	0.1007		0.0931	0.0931	0.0000	568.6558	568.6558	0.1800		573.1551
Total	**0.2429**	**2.1550**	**3.6811**	**5.9100e-003**	**5.5000e-004**	**0.1007**	**0.1012**	**6.0000e-005**	**0.0931**	**0.0932**	**0.0000**	**568.6558**	**568.6558**	**0.1800**		**573.1551**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.6000e-004	5.9900e-003	1.5600e-003	2.0000e-005	5.8000e-004	5.0000e-005	6.3000e-004	1.6000e-004	5.0000e-005	2.1000e-004		2.4208	2.4208	1.5000e-004	3.9000e-004	2.5396
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0250	0.0145	0.2001	5.9000e-004	0.0657	3.5000e-004	0.0661	0.0174	3.2000e-004	0.0178		60.1095	60.1095	1.6700e-003	1.5300e-003	60.6068
Total	**0.0251**	**0.0205**	**0.2017**	**6.1000e-004**	**0.0663**	**4.0000e-004**	**0.0667**	**0.0176**	**3.7000e-004**	**0.0180**		**62.5303**	**62.5303**	**1.8200e-003**	**1.9200e-003**	**63.1464**

West Marin Drainage Rehabilitation Project - Marin County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 Phase 2 - Culvert Large - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.0200e-003	0.0000	2.0200e-003	2.2000e-004	0.0000	2.2000e-004			0.0000			0.0000
Off-Road	0.5579	5.8062	5.3156	0.0115		0.2214	0.2214		0.2054	0.2054		1,112.2724	1,112.2724	0.3355		1,120.6594
Total	**0.5579**	**5.8062**	**5.3156**	**0.0115**	**2.0200e-003**	**0.2214**	**0.2234**	**2.2000e-004**	**0.2054**	**0.2056**		**1,112.2724**	**1,112.2724**	**0.3355**		**1,120.6594**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.4000e-004	9.0200e-003	2.6400e-003	4.0000e-005	1.0900e-003	7.0000e-005	1.1600e-003	3.0000e-004	6.0000e-005	3.6000e-004		4.3258	4.3258	2.8000e-004	6.9000e-004	4.5383
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0437	0.0241	0.3462	1.0800e-003	0.1232	6.3000e-004	0.1239	0.0327	5.8000e-004	0.0333		109.1896	109.1896	2.8300e-003	2.6600e-003	110.0514
Total	**0.0439**	**0.0331**	**0.3488**	**1.1200e-003**	**0.1243**	**7.0000e-004**	**0.1250**	**0.0330**	**6.4000e-004**	**0.0336**		**113.5153**	**113.5153**	**3.1100e-003**	**3.3500e-003**	**114.5897**

West Marin Drainage Rehabilitation Project - Marin County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 Phase 2 - Culvert Large - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.0200e-003	0.0000	2.0200e-003	2.2000e-004	0.0000	2.2000e-004			0.0000			0.0000
Off-Road	0.5579	5.8062	5.3156	0.0115		0.2214	0.2214		0.2054	0.2054	0.0000	1,112.2724	1,112.2724	0.3355		1,120.6594
Total	**0.5579**	**5.8062**	**5.3156**	**0.0115**	**2.0200e-003**	**0.2214**	**0.2234**	**2.2000e-004**	**0.2054**	**0.2056**	**0.0000**	**1,112.2724**	**1,112.2724**	**0.3355**		**1,120.6594**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.4000e-004	9.0200e-003	2.6400e-003	4.0000e-005	1.0900e-003	7.0000e-005	1.1600e-003	3.0000e-004	6.0000e-005	3.6000e-004		4.3258	4.3258	2.8000e-004	6.9000e-004	4.5383
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0437	0.0241	0.3462	1.0800e-003	0.1232	6.3000e-004	0.1239	0.0327	5.8000e-004	0.0333		109.1896	109.1896	2.8300e-003	2.6600e-003	110.0514
Total	**0.0439**	**0.0331**	**0.3488**	**1.1200e-003**	**0.1243**	**7.0000e-004**	**0.1250**	**0.0330**	**6.4000e-004**	**0.0336**		**113.5153**	**113.5153**	**3.1100e-003**	**3.3500e-003**	**114.5897**

West Marin Drainage Rehabilitation Project - Marin County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.7 Phase 2 - Culvert Medium - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.5300e-003	0.0000	1.5300e-003	1.7000e-004	0.0000	1.7000e-004			0.0000			0.0000
Off-Road	0.1807	1.5227	2.8682	4.6200e-003		0.0701	0.0701		0.0650	0.0650		443.7435	443.7435	0.1396		447.2328
Total	**0.1807**	**1.5227**	**2.8682**	**4.6200e-003**	**1.5300e-003**	**0.0701**	**0.0716**	**1.7000e-004**	**0.0650**	**0.0651**		**443.7435**	**443.7435**	**0.1396**		**447.2328**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0233	0.0128	0.1846	5.8000e-004	0.0657	3.3000e-004	0.0661	0.0174	3.1000e-004	0.0177		58.2344	58.2344	1.5100e-003	1.4200e-003	58.6941
Total	**0.0233**	**0.0128**	**0.1846**	**5.8000e-004**	**0.0657**	**3.3000e-004**	**0.0661**	**0.0174**	**3.1000e-004**	**0.0177**		**58.2344**	**58.2344**	**1.5100e-003**	**1.4200e-003**	**58.6941**

West Marin Drainage Rehabilitation Project - Marin County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.7 Phase 2 - Culvert Medium - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.5300e-003	0.0000	1.5300e-003	1.7000e-004	0.0000	1.7000e-004			0.0000			0.0000
Off-Road	0.1807	1.5227	2.8682	4.6200e-003		0.0701	0.0701		0.0650	0.0650	0.0000	443.7435	443.7435	0.1396		447.2328
Total	**0.1807**	**1.5227**	**2.8682**	**4.6200e-003**	**1.5300e-003**	**0.0701**	**0.0716**	**1.7000e-004**	**0.0650**	**0.0651**	**0.0000**	**443.7435**	**443.7435**	**0.1396**		**447.2328**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0233	0.0128	0.1846	5.8000e-004	0.0657	3.3000e-004	0.0661	0.0174	3.1000e-004	0.0177		58.2344	58.2344	1.5100e-003	1.4200e-003	58.6941
Total	**0.0233**	**0.0128**	**0.1846**	**5.8000e-004**	**0.0657**	**3.3000e-004**	**0.0661**	**0.0174**	**3.1000e-004**	**0.0177**		**58.2344**	**58.2344**	**1.5100e-003**	**1.4200e-003**	**58.6941**

West Marin Drainage Rehabilitation Project - Marin County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.8 Phase 2 - Culvert Small - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.0816	0.5133	0.3869	9.4000e-004		0.0203	0.0203		0.0203	0.0203		69.0590	69.0590	7.3000e-003		69.2415
Total	**0.0816**	**0.5133**	**0.3869**	**9.4000e-004**	**1.0000e-005**	**0.0203**	**0.0203**	**0.0000**	**0.0203**	**0.0203**		**69.0590**	**69.0590**	**7.3000e-003**		**69.2415**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0146	8.0300e-003	0.1154	3.6000e-004	0.0411	2.1000e-004	0.0413	0.0109	1.9000e-004	0.0111		36.3965	36.3965	9.4000e-004	8.9000e-004	36.6838
Total	**0.0146**	**8.0300e-003**	**0.1154**	**3.6000e-004**	**0.0411**	**2.1000e-004**	**0.0413**	**0.0109**	**1.9000e-004**	**0.0111**		**36.3965**	**36.3965**	**9.4000e-004**	**8.9000e-004**	**36.6838**

West Marin Drainage Rehabilitation Project - Marin County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.8 Phase 2 - Culvert Small - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.0816	0.5133	0.3869	9.4000e-004		0.0203	0.0203		0.0203	0.0203	0.0000	69.0590	69.0590	7.3000e-003		69.2415
Total	**0.0816**	**0.5133**	**0.3869**	**9.4000e-004**	**1.0000e-005**	**0.0203**	**0.0203**	**0.0000**	**0.0203**	**0.0203**	**0.0000**	**69.0590**	**69.0590**	**7.3000e-003**		**69.2415**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0146	8.0300e-003	0.1154	3.6000e-004	0.0411	2.1000e-004	0.0413	0.0109	1.9000e-004	0.0111		36.3965	36.3965	9.4000e-004	8.9000e-004	36.6838
Total	**0.0146**	**8.0300e-003**	**0.1154**	**3.6000e-004**	**0.0411**	**2.1000e-004**	**0.0413**	**0.0109**	**1.9000e-004**	**0.0111**		**36.3965**	**36.3965**	**9.4000e-004**	**8.9000e-004**	**36.6838**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Other Asphalt Surfaces	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Other Asphalt Surfaces	14.70	6.60	6.60	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Other Asphalt Surfaces	0.540731	0.061602	0.202834	0.122898	0.023958	0.005433	0.006645	0.003685	0.000662	0.000406	0.027616	0.000722	0.002809

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	3.3900e-003	1.0000e-005	7.2000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.5500e-003	1.5500e-003	0.0000		1.6600e-003
Unmitigated	3.3900e-003	1.0000e-005	7.2000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.5500e-003	1.5500e-003	0.0000		1.6600e-003

West Marin Drainage Rehabilitation Project - Marin County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	8.1000e-004					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	2.5100e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	7.0000e-005	1.0000e-005	7.2000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.5500e-003	1.5500e-003	0.0000		1.6600e-003
Total	**3.3900e-003**	**1.0000e-005**	**7.2000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**1.5500e-003**	**1.5500e-003**	**0.0000**		**1.6600e-003**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	8.1000e-004					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	2.5100e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	7.0000e-005	1.0000e-005	7.2000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.5500e-003	1.5500e-003	0.0000		1.6600e-003
Total	**3.3900e-003**	**1.0000e-005**	**7.2000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**1.5500e-003**	**1.5500e-003**	**0.0000**		**1.6600e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

West Marin Drainage Rehabilitation Project - Marin County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

West Marin Drainage Rehabilitation Project

Marin County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Asphalt Surfaces	7.10	1000sqft	0.16	7,100.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	69
Climate Zone	5			**Operational Year**	2024
Utility Company	MCE				
CO2 Intensity (lb/MWhr)	187.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Based on Project Description

Construction Phase - Based on Project Description and Basis of Design

Off-road Equipment - Based on Project Description

Off-road Equipment - Based on Project Description

Off-road Equipment - Based on Project Description

Off-road Equipment - Based on Project Description

Off-road Equipment - Based on Project Description

Off-road Equipment - Based on project description

Off-road Equipment - Based on Project Description

Grading - Based on Project Description

Trips and VMT -

West Marin Drainage Rehabilitation Project - Marin County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	2.00	21.00
tblConstructionPhase	NumDays	2.00	60.00
tblConstructionPhase	NumDays	2.00	12.00
tblConstructionPhase	NumDays	2.00	12.00
tblConstructionPhase	NumDays	2.00	8.00
tblConstructionPhase	NumDays	2.00	24.00
tblConstructionPhase	NumDays	2.00	16.00
tblConstructionPhase	PhaseEndDate	10/4/2022	5/25/2023
tblConstructionPhase	PhaseEndDate	9/20/2022	9/13/2022
tblConstructionPhase	PhaseEndDate	4/28/2022	5/2/2022
tblConstructionPhase	PhaseEndDate	5/3/2022	6/21/2022
tblConstructionPhase	PhaseEndDate	9/27/2022	4/26/2023
tblConstructionPhase	PhaseEndDate	4/29/2022	6/3/2022
tblConstructionPhase	PhaseStartDate	9/28/2022	4/27/2023
tblConstructionPhase	PhaseStartDate	5/4/2022	6/22/2022
tblConstructionPhase	PhaseStartDate	4/30/2022	6/6/2022
tblConstructionPhase	PhaseStartDate	9/21/2022	4/17/2023
tblConstructionPhase	PhaseStartDate	4/29/2022	5/3/2022
tblGrading	AcresOfGrading	4.50	0.03
tblGrading	AcresOfGrading	0.00	0.03
tblGrading	AcresOfGrading	0.00	0.03
tblGrading	AcresOfGrading	6.00	0.03
tblGrading	AcresOfGrading	0.00	0.03
tblGrading	MaterialExported	0.00	2.00
tblGrading	MaterialExported	0.00	1.00
tblGrading	MaterialExported	0.00	2.00
tblGrading	MaterialExported	0.00	2.00

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblGrading	MaterialExported	0.00	1.00
tblGrading	MaterialImported	0.00	3.00
tblGrading	MaterialImported	0.00	2.00
tblGrading	MaterialImported	0.00	1.00
tblGrading	MaterialImported	0.00	10.00
tblGrading	MaterialImported	0.00	3.00
tblGrading	MaterialImported	0.00	2.00
tblGrading	MaterialImported	0.00	1.00
tblOffRoadEquipment	HorsePower	84.00	20.00
tblOffRoadEquipment	HorsePower	84.00	20.00
tblOffRoadEquipment	HorsePower	84.00	20.00
tblOffRoadEquipment	HorsePower	84.00	20.00
tblOffRoadEquipment	HorsePower	84.00	20.00
tblOffRoadEquipment	HorsePower	84.00	20.00
tblOffRoadEquipment	HorsePower	84.00	20.00
tblOffRoadEquipment	HorsePower	247.00	0.00
tblOffRoadEquipment	HorsePower	247.00	0.00
tblOffRoadEquipment	LoadFactor	0.40	0.40
tblOffRoadEquipment	LoadFactor	0.40	0.40
tblOffRoadEquipment	OffRoadEquipmentType	Air Compressors	Excavators
tblOffRoadEquipment	OffRoadEquipmentType	Concrete/Industrial Saws	Cement and Mortar Mixers
tblOffRoadEquipment	OffRoadEquipmentType	Cranes	Excavators
tblOffRoadEquipment	OffRoadEquipmentType	Forklifts	Skid Steer Loaders
tblOffRoadEquipment	OffRoadEquipmentType	Graders	Excavators
tblOffRoadEquipment	OffRoadEquipmentType	Rubber Tired Dozers	Excavators
tblOffRoadEquipment	OffRoadEquipmentType	Tractors/Loaders/Backhoes	Skid Steer Loaders
tblOffRoadEquipment	OffRoadEquipmentType	Tractors/Loaders/Backhoes	Generator Sets
tblOffRoadEquipment	OffRoadEquipmentType	Graders	Generator Sets
tblOffRoadEquipment	OffRoadEquipmentType	Graders	Generator Sets

tblOffRoadEquipment	OffRoadEquipmentType	Graders	Skid Steer Loaders
tblOffRoadEquipment	OffRoadEquipmentType	Graders	Generator Sets
tblOffRoadEquipment	OffRoadEquipmentType	Rubber Tired Dozers	Skid Steer Loaders
tblOffRoadEquipment	OffRoadEquipmentType	Rubber Tired Dozers	Excavators
tblOffRoadEquipment	OffRoadEquipmentType	Rubber Tired Dozers	Generator Sets
tblOffRoadEquipment	OffRoadEquipmentType	Tractors/Loaders/Backhoes	Pavers
tblOffRoadEquipment	OffRoadEquipmentType		Pavers
tblOffRoadEquipment	OffRoadEquipmentType		Generator Sets
tblOffRoadEquipment	OffRoadEquipmentType		Concrete/Industrial Saws
tblOffRoadEquipment	OffRoadEquipmentType		Skid Steer Loaders
tblOffRoadEquipment	OffRoadEquipmentType		Generator Sets
tblOffRoadEquipment	OffRoadEquipmentType		Concrete/Industrial Saws
tblOffRoadEquipment	OffRoadEquipmentType		Rubber Tired Dozers
tblOffRoadEquipment	OffRoadEquipmentType		Rubber Tired Dozers
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	UsageHours	6.00	0.00
tblOffRoadEquipment	UsageHours	7.00	0.00
tblOffRoadEquipment	UsageHours	7.00	0.00
tblOffRoadEquipment	UsageHours	7.00	0.00
tblOffRoadEquipment	UsageHours	6.00	0.00
tblOffRoadEquipment	UsageHours	6.00	0.00

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblOffRoadEquipment	UsageHours	6.00	0.00
tblOffRoadEquipment	UsageHours	6.00	0.00
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural

2.0 Emissions Summary

West Marin Drainage Rehabilitation Project - Marin County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2022	0.6490	6.5781	5.7028	0.0126	0.1274	0.2491	0.3765	0.0334	0.2312	0.2645	0.0000	1,223.7123	1,223.7123	0.3399	4.2500e-003	1,233.4777
2023	0.6037	5.8455	5.6529	0.0126	0.1263	0.2220	0.3484	0.0332	0.2060	0.2392	0.0000	1,218.4901	1,218.4901	0.3390	3.7400e-003	1,228.0784
Maximum	**0.6490**	**6.5781**	**5.7028**	**0.0126**	**0.1274**	**0.2491**	**0.3765**	**0.0334**	**0.2312**	**0.2645**	**0.0000**	**1,223.7123**	**1,223.7123**	**0.3399**	**4.2500e-003**	**1,233.4777**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2022	0.6490	6.5781	5.7028	0.0126	0.1274	0.2491	0.3765	0.0334	0.2312	0.2645	0.0000	1,223.7123	1,223.7123	0.3399	4.2500e-003	1,233.4777
2023	0.6037	5.8455	5.6529	0.0126	0.1263	0.2220	0.3484	0.0332	0.2060	0.2392	0.0000	1,218.4901	1,218.4901	0.3390	3.7400e-003	1,228.0784
Maximum	**0.6490**	**6.5781**	**5.7028**	**0.0126**	**0.1274**	**0.2491**	**0.3765**	**0.0334**	**0.2312**	**0.2645**	**0.0000**	**1,223.7123**	**1,223.7123**	**0.3399**	**4.2500e-003**	**1,233.4777**

West Marin Drainage Rehabilitation Project - Marin County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

West Marin Drainage Rehabilitation Project - Marin County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	3.3900e-003	1.0000e-005	7.2000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.5500e-003	1.5500e-003	0.0000		1.6600e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total	**3.3900e-003**	**1.0000e-005**	**7.2000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**1.5500e-003**	**1.5500e-003**	**0.0000**	**0.0000**	**1.6600e-003**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	3.3900e-003	1.0000e-005	7.2000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.5500e-003	1.5500e-003	0.0000		1.6600e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total	**3.3900e-003**	**1.0000e-005**	**7.2000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**1.5500e-003**	**1.5500e-003**	**0.0000**	**0.0000**	**1.6600e-003**

West Marin Drainage Rehabilitation Project - Marin County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Phase 1 - Culvert Large	Grading	6/6/2022	6/21/2022	5	12	
2	Phase 1 - Culvert Medium	Grading	5/3/2022	6/3/2022	5	24	
3	Phase 1 - Culvert Small	Grading	4/15/2022	5/2/2022	5	12	
4	Phase 1 - Slip-outs	Grading	6/22/2022	9/13/2022	5	60	
5	Phase 2 - Culvert Large	Grading	5/26/2023	6/16/2023	5	16	
6	Phase 2 - Culvert Medium	Grading	4/27/2023	5/25/2023	5	21	
7	Phase 2 - Culvert Small	Grading	4/17/2023	4/26/2023	5	8	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0.03

Acres of Paving: 0.16

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Phase 2 - Culvert Medium	Excavators	1	6.00	158	0.38
Phase 2 - Culvert Small	Cement and Mortar Mixers	1	8.00	9	0.56
Phase 1 - Culvert Small	Cement and Mortar Mixers	1	8.00	9	0.56
Phase 1 - Slip-outs	Excavators	1	8.00	158	0.38

West Marin Drainage Rehabilitation Project - Marin County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Phase 1 - Slip-outs	Skid Steer Loaders	1	2.00	65	0.37
Phase 1 - Culvert Large	Graders	1	6.00	187	0.41
Phase 1 - Culvert Medium	Excavators	1	6.00	158	0.38
Phase 2 - Culvert Small	Pavers	0	0.00	130	0.42
Phase 2 - Culvert Small	Rollers	0	0.00	80	0.38
Phase 1 - Culvert Small	Rubber Tired Dozers	0	0.00	247	0.40
Phase 1 - Culvert Large	Excavators	1	6.00	158	0.38
Phase 1 - Slip-outs	Tractors/Loaders/Backhoes	0	0.00	97	0.37
Phase 1 - Culvert Small	Tractors/Loaders/Backhoes	0	0.00	97	0.37
Phase 1 - Culvert Large	Skid Steer Loaders	1	2.00	65	0.37
Phase 2 - Culvert Small	Tractors/Loaders/Backhoes	0	0.00	97	0.37
Phase 1 - Culvert Medium	Generator Sets	1	1.00	20	0.74
Phase 1 - Culvert Small	Generator Sets	1	1.00	20	0.74
Phase 1 - Slip-outs	Generator Sets	1	1.00	20	0.74
Phase 2 - Culvert Large	Graders	1	6.00	187	0.41
Phase 2 - Culvert Medium	Skid Steer Loaders	1	2.00	65	0.37
Phase 2 - Culvert Small	Generator Sets	1	1.00	20	0.74
Phase 1 - Culvert Medium	Skid Steer Loaders	1	2.00	65	0.37
Phase 1 - Slip-outs	Rubber Tired Dozers	0	0.00	247	0.40
Phase 2 - Culvert Large	Excavators	1	6.00	158	0.38
Phase 2 - Culvert Medium	Generator Sets	1	1.00	20	0.74
Phase 2 - Culvert Small	Rubber Tired Dozers	0	0.00	247	0.40
Phase 2 - Culvert Large	Pavers	1	2.00	130	0.42
Phase 2 - Culvert Medium	Tractors/Loaders/Backhoes	0	7.00	97	0.37
Phase 1 - Culvert Large	Pavers	1	2.00	130	0.42
Phase 1 - Culvert Large	Generator Sets	1	1.00	20	0.74
Phase 1 - Culvert Large	Concrete/Industrial Saws	1	1.00	81	0.73
Phase 2 - Culvert Large	Skid Steer Loaders	1	2.00	65	0.37
Phase 2 - Culvert Large	Generator Sets	1	1.00	20	0.74

West Marin Drainage Rehabilitation Project - Marin County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Phase 2 - Culvert Large	Concrete/Industrial Saws	1	1.00	81	0.73
Phase 1 - Culvert Medium	Rubber Tired Dozers	0	0.00	0	0.40
Phase 2 - Culvert Medium	Rubber Tired Dozers	0	0.00	0	0.40

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Phase 1 - Culvert Small	2	5.00	0.00	0.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Phase 1 - Culvert Medium	3	8.00	0.00	0.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Phase 1 - Culvert Large	6	15.00	0.00	1.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Phase 1 - Slip-outs	3	8.00	0.00	2.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Phase 2 - Culvert Small	2	5.00	0.00	0.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Phase 2 - Culvert Medium	3	8.00	0.00	0.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Phase 2 - Culvert Large	6	15.00	0.00	1.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

West Marin Drainage Rehabilitation Project - Marin County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.2 Phase 1 - Culvert Large - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.7000e-003	0.0000	2.7000e-003	2.9000e-004	0.0000	2.9000e-004			0.0000			0.0000
Off-Road	0.5999	6.5288	5.3377	0.0115		0.2483	0.2483		0.2304	0.2304		1,112.5087	1,112.5087	0.3360		1,120.9074
Total	**0.5999**	**6.5288**	**5.3377**	**0.0115**	**2.7000e-003**	**0.2483**	**0.2510**	**2.9000e-004**	**0.2304**	**0.2307**		**1,112.5087**	**1,112.5087**	**0.3360**		**1,120.9074**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	3.9000e-004	0.0158	3.9400e-003	5.0000e-005	1.4600e-003	1.3000e-004	1.5800e-003	4.0000e-004	1.2000e-004	5.2000e-004		6.0528	6.0528	3.8000e-004	9.6000e-004	6.3498
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0487	0.0335	0.3612	1.0400e-003	0.1232	6.6000e-004	0.1239	0.0327	6.1000e-004	0.0333		105.1508	105.1508	3.5200e-003	3.2900e-003	106.2205
Total	**0.0490**	**0.0493**	**0.3652**	**1.0900e-003**	**0.1247**	**7.9000e-004**	**0.1255**	**0.0331**	**7.3000e-004**	**0.0338**		**111.2035**	**111.2035**	**3.9000e-003**	**4.2500e-003**	**112.5703**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.2 Phase 1 - Culvert Large - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.7000e-003	0.0000	2.7000e-003	2.9000e-004	0.0000	2.9000e-004			0.0000			0.0000
Off-Road	0.5999	6.5288	5.3377	0.0115		0.2483	0.2483		0.2304	0.2304	0.0000	1,112.5087	1,112.5087	0.3360		1,120.9074
Total	**0.5999**	**6.5288**	**5.3377**	**0.0115**	**2.7000e-003**	**0.2483**	**0.2510**	**2.9000e-004**	**0.2304**	**0.2307**	**0.0000**	**1,112.5087**	**1,112.5087**	**0.3360**		**1,120.9074**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	3.9000e-004	0.0158	3.9400e-003	5.0000e-005	1.4600e-003	1.3000e-004	1.5800e-003	4.0000e-004	1.2000e-004	5.2000e-004		6.0528	6.0528	3.8000e-004	9.6000e-004	6.3498
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0487	0.0335	0.3612	1.0400e-003	0.1232	6.6000e-004	0.1239	0.0327	6.1000e-004	0.0333		105.1508	105.1508	3.5200e-003	3.2900e-003	106.2205
Total	**0.0490**	**0.0493**	**0.3652**	**1.0900e-003**	**0.1247**	**7.9000e-004**	**0.1255**	**0.0331**	**7.3000e-004**	**0.0338**		**111.2035**	**111.2035**	**3.9000e-003**	**4.2500e-003**	**112.5703**

West Marin Drainage Rehabilitation Project - Marin County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.3 Phase 1 - Culvert Medium - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.3400e-003	0.0000	1.3400e-003	1.5000e-004	0.0000	1.5000e-004			0.0000			0.0000
Off-Road	0.1923	1.7107	2.8673	4.6200e-003		0.0792	0.0792		0.0734	0.0734		443.6520	443.6520	0.1395		447.1406
Total	**0.1923**	**1.7107**	**2.8673**	**4.6200e-003**	**1.3400e-003**	**0.0792**	**0.0805**	**1.5000e-004**	**0.0734**	**0.0735**		**443.6520**	**443.6520**	**0.1395**		**447.1406**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0260	0.0179	0.1927	5.5000e-004	0.0657	3.5000e-004	0.0661	0.0174	3.2000e-004	0.0178		56.0804	56.0804	1.8800e-003	1.7600e-003	56.6509
Total	**0.0260**	**0.0179**	**0.1927**	**5.5000e-004**	**0.0657**	**3.5000e-004**	**0.0661**	**0.0174**	**3.2000e-004**	**0.0178**		**56.0804**	**56.0804**	**1.8800e-003**	**1.7600e-003**	**56.6509**

West Marin Drainage Rehabilitation Project - Marin County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.3 Phase 1 - Culvert Medium - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.3400e-003	0.0000	1.3400e-003	1.5000e-004	0.0000	1.5000e-004			0.0000			0.0000
Off-Road	0.1923	1.7107	2.8673	4.6200e-003		0.0792	0.0792		0.0734	0.0734	0.0000	443.6520	443.6520	0.1395		447.1406
Total	**0.1923**	**1.7107**	**2.8673**	**4.6200e-003**	**1.3400e-003**	**0.0792**	**0.0805**	**1.5000e-004**	**0.0734**	**0.0735**	**0.0000**	**443.6520**	**443.6520**	**0.1395**		**447.1406**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0260	0.0179	0.1927	5.5000e-004	0.0657	3.5000e-004	0.0661	0.0174	3.2000e-004	0.0178		56.0804	56.0804	1.8800e-003	1.7600e-003	56.6509
Total	**0.0260**	**0.0179**	**0.1927**	**5.5000e-004**	**0.0657**	**3.5000e-004**	**0.0661**	**0.0174**	**3.2000e-004**	**0.0178**		**56.0804**	**56.0804**	**1.8800e-003**	**1.7600e-003**	**56.6509**

West Marin Drainage Rehabilitation Project - Marin County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.4 Phase 1 - Culvert Small - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.0818	0.5140	0.3876	9.4000e-004		0.0205	0.0205		0.0205	0.0205		69.0590	69.0590	7.3000e-003		69.2415
Total	**0.0818**	**0.5140**	**0.3876**	**9.4000e-004**	**1.0000e-005**	**0.0205**	**0.0205**	**0.0000**	**0.0205**	**0.0205**		**69.0590**	**69.0590**	**7.3000e-003**		**69.2415**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0162	0.0112	0.1204	3.5000e-004	0.0411	2.2000e-004	0.0413	0.0109	2.0000e-004	0.0111		35.0503	35.0503	1.1700e-003	1.1000e-003	35.4068
Total	**0.0162**	**0.0112**	**0.1204**	**3.5000e-004**	**0.0411**	**2.2000e-004**	**0.0413**	**0.0109**	**2.0000e-004**	**0.0111**		**35.0503**	**35.0503**	**1.1700e-003**	**1.1000e-003**	**35.4068**

West Marin Drainage Rehabilitation Project - Marin County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.4 Phase 1 - Culvert Small - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.0818	0.5140	0.3876	9.4000e-004		0.0205	0.0205		0.0205	0.0205	0.0000	69.0590	69.0590	7.3000e-003		69.2415
Total	**0.0818**	**0.5140**	**0.3876**	**9.4000e-004**	**1.0000e-005**	**0.0205**	**0.0205**	**0.0000**	**0.0205**	**0.0205**	**0.0000**	**69.0590**	**69.0590**	**7.3000e-003**		**69.2415**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0162	0.0112	0.1204	3.5000e-004	0.0411	2.2000e-004	0.0413	0.0109	2.0000e-004	0.0111		35.0503	35.0503	1.1700e-003	1.1000e-003	35.4068
Total	**0.0162**	**0.0112**	**0.1204**	**3.5000e-004**	**0.0411**	**2.2000e-004**	**0.0413**	**0.0109**	**2.0000e-004**	**0.0111**		**35.0503**	**35.0503**	**1.1700e-003**	**1.1000e-003**	**35.4068**

West Marin Drainage Rehabilitation Project - Marin County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 Phase 1 - Slip-outs - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					5.5000e-004	0.0000	5.5000e-004	6.0000e-005	0.0000	6.0000e-005			0.0000			0.0000
Off-Road	0.2429	2.1550	3.6811	5.9100e-003		0.1007	0.1007		0.0931	0.0931		568.6558	568.6558	0.1800		573.1551
Total	**0.2429**	**2.1550**	**3.6811**	**5.9100e-003**	**5.5000e-004**	**0.1007**	**0.1012**	**6.0000e-005**	**0.0931**	**0.0932**		**568.6558**	**568.6558**	**0.1800**		**573.1551**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.5000e-004	6.3200e-003	1.5800e-003	2.0000e-005	5.8000e-004	5.0000e-005	6.3000e-004	1.6000e-004	5.0000e-005	2.1000e-004		2.4211	2.4211	1.5000e-004	3.9000e-004	2.5399
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0260	0.0179	0.1927	5.5000e-004	0.0657	3.5000e-004	0.0661	0.0174	3.2000e-004	0.0178		56.0804	56.0804	1.8800e-003	1.7600e-003	56.6509
Total	**0.0261**	**0.0242**	**0.1942**	**5.7000e-004**	**0.0663**	**4.0000e-004**	**0.0667**	**0.0176**	**3.7000e-004**	**0.0180**		**58.5015**	**58.5015**	**2.0300e-003**	**2.1500e-003**	**59.1908**

West Marin Drainage Rehabilitation Project - Marin County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 Phase 1 - Slip-outs - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					5.5000e-004	0.0000	5.5000e-004	6.0000e-005	0.0000	6.0000e-005			0.0000			0.0000
Off-Road	0.2429	2.1550	3.6811	5.9100e-003		0.1007	0.1007		0.0931	0.0931	0.0000	568.6558	568.6558	0.1800		573.1551
Total	**0.2429**	**2.1550**	**3.6811**	**5.9100e-003**	**5.5000e-004**	**0.1007**	**0.1012**	**6.0000e-005**	**0.0931**	**0.0932**	**0.0000**	**568.6558**	**568.6558**	**0.1800**		**573.1551**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.5000e-004	6.3200e-003	1.5800e-003	2.0000e-005	5.8000e-004	5.0000e-005	6.3000e-004	1.6000e-004	5.0000e-005	2.1000e-004		2.4211	2.4211	1.5000e-004	3.9000e-004	2.5399
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0260	0.0179	0.1927	5.5000e-004	0.0657	3.5000e-004	0.0661	0.0174	3.2000e-004	0.0178		56.0804	56.0804	1.8800e-003	1.7600e-003	56.6509
Total	**0.0261**	**0.0242**	**0.1942**	**5.7000e-004**	**0.0663**	**4.0000e-004**	**0.0667**	**0.0176**	**3.7000e-004**	**0.0180**		**58.5015**	**58.5015**	**2.0300e-003**	**2.1500e-003**	**59.1908**

West Marin Drainage Rehabilitation Project - Marin County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 Phase 2 - Culvert Large - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.0200e-003	0.0000	2.0200e-003	2.2000e-004	0.0000	2.2000e-004			0.0000			0.0000
Off-Road	0.5579	5.8062	5.3156	0.0115		0.2214	0.2214		0.2054	0.2054		1,112.2724	1,112.2724	0.3355		1,120.6594
Total	**0.5579**	**5.8062**	**5.3156**	**0.0115**	**2.0200e-003**	**0.2214**	**0.2234**	**2.2000e-004**	**0.2054**	**0.2056**		**1,112.2724**	**1,112.2724**	**0.3355**		**1,120.6594**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.4000e-004	9.5400e-003	2.6500e-003	4.0000e-005	1.0900e-003	7.0000e-005	1.1600e-003	3.0000e-004	7.0000e-005	3.6000e-004		4.3287	4.3287	2.8000e-004	6.9000e-004	4.5413
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0456	0.0297	0.3346	1.0100e-003	0.1232	6.3000e-004	0.1239	0.0327	5.8000e-004	0.0333		101.8890	101.8890	3.1900e-003	3.0500e-003	102.8776
Total	**0.0457**	**0.0392**	**0.3372**	**1.0500e-003**	**0.1243**	**7.0000e-004**	**0.1250**	**0.0330**	**6.5000e-004**	**0.0336**		**106.2177**	**106.2177**	**3.4700e-003**	**3.7400e-003**	**107.4190**

West Marin Drainage Rehabilitation Project - Marin County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 Phase 2 - Culvert Large - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.0200e-003	0.0000	2.0200e-003	2.2000e-004	0.0000	2.2000e-004			0.0000			0.0000
Off-Road	0.5579	5.8062	5.3156	0.0115		0.2214	0.2214		0.2054	0.2054	0.0000	1,112.2724	1,112.2724	0.3355		1,120.6594
Total	**0.5579**	**5.8062**	**5.3156**	**0.0115**	**2.0200e-003**	**0.2214**	**0.2234**	**2.2000e-004**	**0.2054**	**0.2056**	**0.0000**	**1,112.2724**	**1,112.2724**	**0.3355**		**1,120.6594**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.4000e-004	9.5400e-003	2.6500e-003	4.0000e-005	1.0900e-003	7.0000e-005	1.1600e-003	3.0000e-004	7.0000e-005	3.6000e-004		4.3287	4.3287	2.8000e-004	6.9000e-004	4.5413
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0456	0.0297	0.3346	1.0100e-003	0.1232	6.3000e-004	0.1239	0.0327	5.8000e-004	0.0333		101.8890	101.8890	3.1900e-003	3.0500e-003	102.8776
Total	**0.0457**	**0.0392**	**0.3372**	**1.0500e-003**	**0.1243**	**7.0000e-004**	**0.1250**	**0.0330**	**6.5000e-004**	**0.0336**		**106.2177**	**106.2177**	**3.4700e-003**	**3.7400e-003**	**107.4190**

West Marin Drainage Rehabilitation Project - Marin County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.7 Phase 2 - Culvert Medium - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.5300e-003	0.0000	1.5300e-003	1.7000e-004	0.0000	1.7000e-004			0.0000			0.0000
Off-Road	0.1807	1.5227	2.8682	4.6200e-003		0.0701	0.0701		0.0650	0.0650		443.7435	443.7435	0.1396		447.2328
Total	**0.1807**	**1.5227**	**2.8682**	**4.6200e-003**	**1.5300e-003**	**0.0701**	**0.0716**	**1.7000e-004**	**0.0650**	**0.0651**		**443.7435**	**443.7435**	**0.1396**		**447.2328**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0243	0.0158	0.1785	5.4000e-004	0.0657	3.3000e-004	0.0661	0.0174	3.1000e-004	0.0177		54.3408	54.3408	1.7000e-003	1.6300e-003	54.8681
Total	**0.0243**	**0.0158**	**0.1785**	**5.4000e-004**	**0.0657**	**3.3000e-004**	**0.0661**	**0.0174**	**3.1000e-004**	**0.0177**		**54.3408**	**54.3408**	**1.7000e-003**	**1.6300e-003**	**54.8681**

West Marin Drainage Rehabilitation Project - Marin County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.7 Phase 2 - Culvert Medium - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.5300e-003	0.0000	1.5300e-003	1.7000e-004	0.0000	1.7000e-004			0.0000			0.0000
Off-Road	0.1807	1.5227	2.8682	4.6200e-003		0.0701	0.0701		0.0650	0.0650	0.0000	443.7435	443.7435	0.1396		447.2328
Total	**0.1807**	**1.5227**	**2.8682**	**4.6200e-003**	**1.5300e-003**	**0.0701**	**0.0716**	**1.7000e-004**	**0.0650**	**0.0651**	**0.0000**	**443.7435**	**443.7435**	**0.1396**		**447.2328**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0243	0.0158	0.1785	5.4000e-004	0.0657	3.3000e-004	0.0661	0.0174	3.1000e-004	0.0177		54.3408	54.3408	1.7000e-003	1.6300e-003	54.8681
Total	**0.0243**	**0.0158**	**0.1785**	**5.4000e-004**	**0.0657**	**3.3000e-004**	**0.0661**	**0.0174**	**3.1000e-004**	**0.0177**		**54.3408**	**54.3408**	**1.7000e-003**	**1.6300e-003**	**54.8681**

West Marin Drainage Rehabilitation Project - Marin County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.8 Phase 2 - Culvert Small - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.0816	0.5133	0.3869	9.4000e-004		0.0203	0.0203		0.0203	0.0203		69.0590	69.0590	7.3000e-003		69.2415
Total	**0.0816**	**0.5133**	**0.3869**	**9.4000e-004**	**1.0000e-005**	**0.0203**	**0.0203**	**0.0000**	**0.0203**	**0.0203**		**69.0590**	**69.0590**	**7.3000e-003**		**69.2415**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0152	9.9000e-003	0.1115	3.4000e-004	0.0411	2.1000e-004	0.0413	0.0109	1.9000e-004	0.0111		33.9630	33.9630	1.0600e-003	1.0200e-003	34.2926
Total	**0.0152**	**9.9000e-003**	**0.1115**	**3.4000e-004**	**0.0411**	**2.1000e-004**	**0.0413**	**0.0109**	**1.9000e-004**	**0.0111**		**33.9630**	**33.9630**	**1.0600e-003**	**1.0200e-003**	**34.2926**

West Marin Drainage Rehabilitation Project - Marin County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.8 Phase 2 - Culvert Small - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.0816	0.5133	0.3869	9.4000e-004		0.0203	0.0203		0.0203	0.0203	0.0000	69.0590	69.0590	7.3000e-003		69.2415
Total	**0.0816**	**0.5133**	**0.3869**	**9.4000e-004**	**1.0000e-005**	**0.0203**	**0.0203**	**0.0000**	**0.0203**	**0.0203**	**0.0000**	**69.0590**	**69.0590**	**7.3000e-003**		**69.2415**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0152	9.9000e-003	0.1115	3.4000e-004	0.0411	2.1000e-004	0.0413	0.0109	1.9000e-004	0.0111		33.9630	33.9630	1.0600e-003	1.0200e-003	34.2926
Total	**0.0152**	**9.9000e-003**	**0.1115**	**3.4000e-004**	**0.0411**	**2.1000e-004**	**0.0413**	**0.0109**	**1.9000e-004**	**0.0111**		**33.9630**	**33.9630**	**1.0600e-003**	**1.0200e-003**	**34.2926**

West Marin Drainage Rehabilitation Project - Marin County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Other Asphalt Surfaces	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Other Asphalt Surfaces	14.70	6.60	6.60	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Other Asphalt Surfaces	0.540731	0.061602	0.202834	0.122898	0.023958	0.005433	0.006645	0.003685	0.000662	0.000406	0.027616	0.000722	0.002809

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

West Marin Drainage Rehabilitation Project - Marin County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	3.3900e-003	1.0000e-005	7.2000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.5500e-003	1.5500e-003	0.0000		1.6600e-003
Unmitigated	3.3900e-003	1.0000e-005	7.2000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.5500e-003	1.5500e-003	0.0000		1.6600e-003

West Marin Drainage Rehabilitation Project - Marin County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	8.1000e-004					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	2.5100e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	7.0000e-005	1.0000e-005	7.2000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.5500e-003	1.5500e-003	0.0000		1.6600e-003
Total	**3.3900e-003**	**1.0000e-005**	**7.2000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**1.5500e-003**	**1.5500e-003**	**0.0000**		**1.6600e-003**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	8.1000e-004					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	2.5100e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	7.0000e-005	1.0000e-005	7.2000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.5500e-003	1.5500e-003	0.0000		1.6600e-003
Total	**3.3900e-003**	**1.0000e-005**	**7.2000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**1.5500e-003**	**1.5500e-003**	**0.0000**		**1.6600e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Appendix B

Biological Resources Appendix

Appendix B-1. Special-Status Plant Species

Sci. Name Common Name	Listing Status (Federal/State /CRPR)*	Range	Habitat	Potential to Occur at Project sites and Rationale
Abronia umbellata var. *breviflora* pink sand-verbena	-/-/1B.1	Coastal areas of Marin County north into Oregon.	Coastal dunes and coastal strand. Foredunes and interdunes with sparse cover. *A. umbellata* var. *breviflora* is usually the plant closest to the ocean. 0-75 meters (m) elevation.	**None.** Suitable habitat is absent from the Project sites.
Agrostis blasdalei Blasdale's bent grass	-/-/1B.2	Coastal areas of Monterey County north into Mendocino County.	Coastal dunes, coastal bluff scrub, coastal prairie. Sandy or gravelly soil close to rocks; often in nutrient-poor soil with sparse vegetation. 5-365 m.	**None.** Suitable habitat is absent from the Project sites.
Allium peninsulare var. *franciscanum* Franciscan onion	-/-/1B.2	Mendocino, Napa, San Mateo, Santa Clara, and Sonoma counties.	Cismontane woodland, valley and foothill grassland. Clay soils; often on serpentine; sometimes on volcanics. Dry hillsides. 5-320 m.	**Not expected.** Not known from Marin County.
Alopecurus aequalis var. *sonomensis* Sonoma alopecurus	FE/-/1B.1	Limited to Sonoma and Marin counties. Marin occurrences limited to the Point Reyes peninsula.	Freshwater marshes and swamps, riparian scrub. Wet areas, marshes, and riparian banks, with other wetland species. All populations occur in moist soils in permanent freshwater marshes and swamps or riparian scrub. 3-360 m.	**Not expected.** Marin County occurrences are limited to the Point Reyes peninsula, outside of the Project area.
Amorpha californica var. *napensis* Napa false indigo	-/-/1B.2	Lake, Marin, Napa, and Sonoma counties.	Openings in forest or woodland or in chaparral. 30-735 m	**Possible.** Suitable habitat is present in the Project area.
Amsinckia lunaris bent-flowered fiddleneck	-/-/1B.2	Alameda, Colusa, Contra Costa, Lake, Marin, Napa, San Francisco, San Mateo, Santa Clara, Santa Cruz, Sonoma, Sutter, and Yolo counties.	Cismontane woodland, valley and foothill grassland, coastal bluff scrub. 3-795 m.	**Possible.** Suitable habitat is present in the Project area.
Arabis blepharophylla coast rockcress	-/-/4.3	Contra Costa, Marin, Monterey, San Francisco, San Mateo, and Sonoma counties.	Broadleafed upland forest, coastal prairie, coastal scrub, coastal bluff scrub. Rocky sites. 3-1100 m.	**Not expected.** Marginally **s**uitable habitat is present in the Project area.

Sci. Name Common Name	Listing Status (Federal/State /CRPR)*	Range	Habitat	Potential to Occur at Project sites and Rationale
Arctostaphylos montana ssp. *montana* Mt. Tamalpais manzanita	-/-/1B.3	Marin County, generally in the vicinity of Mount Tamalpais.	Chaparral, valley and foothill grassland. Serpentine slopes in chaparral and grassland. 150-680 m.	**Not expected.** No manzanita species were observed at Project sites.
Arctostaphylos virgata Marin manzanita	-/-/1B.2	Marin County.	Broadleafed upland forest, closed-cone coniferous forest, chaparral, north coast coniferous forest. On sandstone or granitic 1-800 m.	**Not expected.** No manzanita species were observed at Project sites.
Aspidotis carlotta-halliae Carlotta Hall's lace fern	-/-/4.2	Alameda, Butte, Marin, Monterey, San Benito, San Luis Obispo, and Santa Clara counties. Marin County distribution is limited to Mount Tamalpais and the Tiburon peninsula.	Chaparral, cismontane woodland. Generally serpentine slopes, crevices, or outcrops. 100-1400 m.	**Not expected.** Marin County occurrences are limited to Mount Tamalpais and the Tiburon peninsula, outside of the Project area.
Astragalus breweri Brewer's milk-vetch	-/-/4.2	Colusa, Lake, Marin, Mendocino, Napa, and Sonoma counties. Marin County distribution is limited to Mount Tamalpais.	Chaparral, cismontane woodland, meadows and seeps, valley and foothill grassland. Grassy flats, meadows moist in spring, and open slopes in chaparral. Commonly on or near volcanics or serpentine. 90-730 m.	**Not expected.** Marin county occurrences are limited to Mount Tamalpais, outside of the Project area.
Astragalus pycnostachyus var. *pycnostachyus* coastal marsh milk-vetch	-/-/1B.2	Humboldt, Marin, San Luis Obispo, and San Mateo counties.	Coastal dunes,marshes and swamps, coastal scrub. Mesic sites in dunes or along streams or coastal salt marshes. 0-155 m.	**None.** Suitable habitat is absent from the Project sites.
Astragalus tener var. *tener* alkali milk-vetch	-/-/1B.2	Known from records in Alameda, Contra Costa, Kern, Merced, Monterey, Marin, Napa, San Benito, Santa Clara, San Diego, San Francisco, San Joaquin, San Mateo, Solano, Sonoma, Stanislaus, and Yolo counties.	Alkali playa, valley and foothill grassland, vernal pools. Low ground, alkali flats, and flooded lands; in annual grassland or in playas or vernal pools. 1-170 meters amsl. Blooms March-June.	**None.** Suitable habitat is absent from the Project sites.

Sci. Name Common Name	Listing Status (Federal/State /CRPR)*	Range	Habitat	Potential to Occur at Project sites and Rationale
Calamagrostis crassiglumis Thurber's reed grass	-/-/2B.1	Known from the western U.S. and Canada. Distribution in California includes Del Norte, Humboldt, Marin, Mendocino, and Sonoma counties.	Coastal scrub, marshes and swamps. Usually in marshy swales surrounded by grassland or coastal scrub. 5-50 m. Blooms May-August.	**Not expected.** Marginally **s**uitable habitat is present in the Project area.
Calamagrostis ophitidis serpentine reed grass	-/-/4.3	Lake, Marin, Mendocino, Napa, and Sonoma counties.	Chaparral, lower montane coniferous forest, meadows and seeps, valley and foothill grassland. Serpentine, rocky sites. 90-1065 m	**Possible.** Suitable habitat is present in the Project area. The only site with potential for this species is LV 5.78.
Calochortus umbellatus Oakland star tulip	-/-/4.2	Alameda, Contra Costa, Marin, San Mateo, and Santa Clara counties.	Chaparral, lower montane coniferous forest, broadleafed upland forest, valley and foothill grassland, cismontane woodland. Often on serpentine. 100-700 m.	**Possible.** Suitable habitat is present in the Project area.
Calochortus uniflorus pink star-tulip	-/-/4.2	Colusa, Lake, Marin, Monterey, Napa, San Mateo, Santa Cruz, and Sonoma counties. Also known from Oregon.	Coastal scrub, coastal prairie, north coast coniferous forest, meadows and seeps. Seasonally moist meadows, sometimes within coastal scrub, or forested habitats. Usually at low elevations on the coast. 10-1070 m.	**Not expected.** Marginally **s**uitable habitat is present in the Project area.
Calystegia collina ssp. oxyphylla Mt. Saint Helena morning-glory	-/-/4.2	Colusa, Lake, Marin, Mendocino, Napa, San Benito, and Sonoma counties.	Chaparral, lower montane coniferous forest, valley and foothill grassland. On serpentine barrens, slopes, and hillsides. 280-1010 m.	**Possible.** Suitable habitat is present in the Project area. The only site with potential for this species is LV 5.78.
Campanula californica swamp harebell	-/-/1B.2	Marin, Mendocino, and Sonoma counties.	Bogs and fens, closed-cone coniferous forest, coastal prairie, meadows and seeps, freshwater marsh, north coast coniferous forest. Bogs and marshes in a variety of habitats; uncommon where it occurs. 1-520 m.	**Not expected.** Marin county occurrences are limited to the Point Reyes peninsula, outside of the Project area.
Cardamine angulata seaside bittercress	-/-/2B.1	Marin County north to Alaska.	North coast coniferous forest, lower montane coniferous forest. Wet areas, streambanks. 5-515 m.	**Not expected.** Marginally **s**uitable habitat is present in the Project area.
Carex lyngbyei Lyngbye's sedge	-/-/2B.2	Coastal areas. Marin County north to Alaska.	Marshes and swamps (brackish or freshwater). 0-200 m.	**None.** Suitable habitat is absent from the Project sites.

Sci. Name Common Name	Listing Status (Federal/State /CRPR)*	Range	Habitat	Potential to Occur at Project sites and Rationale
Castilleja affinis var. *neglecta* Tiburon paintbrush	FE/ST/1B.2	Marin, Napa, and Santa Clara counties.	Valley and foothill grassland. Rocky serpentine sites. 120-400 m.	**Possible.** Suitable habitat is present in the Project area. The only site with potential for this species is LV 5.78.
Castilleja ambigua var. *humboldtiensis* Humboldt Bay owl's-clover	-/-/1B.2	Humboldt, Marin, and Mendocino counties.	Marshes and swamps. In coastal saltmarsh with *Spartina, Distichlis, Salicornia, Jaumea*. 0-20 m.	**None.** Suitable habitat is absent from the Project sites.
Ceanothus decornutus Nicasio ceanothus	-/-/1B.2	Endemic to Marin County.	Chaparral. Maritime chaparral; serpentinite, rocky, sometimes clay. 235-290 m.	**None.** Suitable habitat is absent from the Project sites.
Ceanothus gloriosus var. *porrectus* Mt. Vision ceanothus	-/-/1B.3	Limited to the Point Reyes peninsula.	Closed-cone coniferous forest, coastal prairie, coastal scrub, valley and foothill grassland. Low shrub in a variety of habitats on Pt. Reyes; sandy soils. 10-335 m.	**Not expected.** Marin County occurrences are limited to the Point Reyes peninsula, outside of the Project area.
Ceanothus masonii Mason's ceanothus	-/SR/1B.2	Endemic to Marin County.	Chaparral. Serpentine ridges or slopes in chaparral or transition zone. 180-460 m.	**None.** Suitable habitat is absent from the Project sites.
Chloropyron maritimum ssp. *palustre* Point Reyes salty bird's-beak	-/-/1B.2	Alameda, Humboldt, Marin, San Francisco, San Mateo, Santa Clara, and Sonoma counties.	Coastal salt marsh. Usually in coastal salt marsh with Salicornia*, Distichlis, Jaumea, Spartina*, etc. 0-115 m.	**None.** Suitable habitat is absent from the Project sites.
Chloropyron molle ssp. *molle* soft salty bird's-beak	FE/SR/1B.2	Contra Costa, Marin, Napa, Sacramento, Solano, and Sonoma counties.	Coastal salt marsh. In coastal salt marsh with *Distichlis, Salicornia, Frankenia*, etc. 0-5 m.	**None.** Suitable habitat is absent from the Project sites.

Sci. Name Common Name	Listing Status (Federal/State /CRPR)*	Range	Habitat	Potential to Occur at Project sites and Rationale
Chorizanthe cuspidata var. *cuspidata* San Francisco Bay Cirsium hydrophilum var. vaseyispineflower	-/-/1B.2	Alameda, Marin, San Francisco, San Mateo, and Sonoma counties.	Coastal bluff scrub, coastal dunes, coastal prairie, coastal scrub. Closely related to *C. pungens*. Sandy soil on terraces and slopes. 2-550 m.	**None.** Suitable habitat is absent from the Project sites.
Chorizanthe valida Sonoma spineflower	FE/SE/1B.1	Marin and Sonoma counties. Experimental reintroductions- though extinct for 77 years.	Coastal prairie. Sandy soil. 5-50 m.	**None.** Suitable habitat is absent from the Project sites.
Cicuta maculata var. *bolanderi* Bolander's water-hemlock	-/-/2B.1	Known from Arizona, California, New Mexico, and Washington. In California, found in Contra Costa, Marin, Sacramento, Santa Barbara, and Solano counties.	Marshes and swamps. In fresh or brackish water. 0-20 m.	**Not expected.** Marin County occurrences are limited to the Point Reyes peninsula, outside of the Project area.
Cirsium andrewsii Franciscan thistle	-/-/1B.2	Contra Costa, Marin, San Francisco, San Mateo, and Sonoma counties.	Coastal bluff scrub, broadleafed upland forest, coastal scrub, coastal prairie. Sometimes serpentine seeps. 0-295 m.	**Not expected.** Marginally **s**uitable habitat is present in the Project area.
Cirsium hydrophilum var. *vaseyi* Mt. Tamalpais thistle	-/-/1B.2	Marin and San Francisco counties.	Broadleafed upland forest, chaparral, meadows and seeps. Serpentine seeps and streams in chaparral and woodland. 180-610 m.	**Possible.** Suitable habitat is present in the Project area. The only site with potential for this species is LV 5.78.
Collinsia corymbosa round-headed Chinese-houses	-/-/1B.2	Humboldt, Marin, Mendocino, San Francisco, San Mateo, and Santa Clara counties.	Coastal dunes. 0-30 m.	**None.** Suitable habitat is absent from the Project sites.
Delphinium bakeri Baker's larkspur	FE/SE/1B.1	Historically present in Sonoma County, currently only known from Marin County. This species is known only from one extant historical population along Marshall-Petaluma Road and three introduced populations nearby.	Broadleafed upland forest, coastal scrub, valley and foothill grassland. Only site occurs on NW-facing slope, on decomposed shale. Historically known from grassy areas along fencelines too. 105-205 m.	**Not expected.** The Project sites are not within the known range of this species.

Sci. Name Common Name	Listing Status (Federal/State /CRPR)*	Range	Habitat	Potential to Occur at Project sites and Rationale
Delphinium luteum golden larkspur	FE/SR/1B.1	Marin and Sonoma counties.	Chaparral, coastal prairie, coastal scrub. North-facing rocky slopes. 5-100 m.	**None.** Suitable habitat is absent from the Project sites.
Dirca occidentalis western leatherwood	-/-/1B.2	Alameda, Contra Costa, Marin, San Mateo, Santa Clara, and Sonoma counties.	Broadleafed upland forest, chaparral, closed-cone coniferous forest, cismontane woodland, north coast coniferous forest, riparian forest, riparian woodland. On brushy slopes, mesic sites; mostly in mixed evergreen & foothill woodland communities. 20-640 m.	**Possible.** Suitable habitat is present in the Project area.
Entosthodon kochii Koch's cord moss	-/-/1B.3	Marin, Mariposa, Mendocino, San Luis Obispo counties. Previously collected from Lucas Valley Road 2-3 miles east of Nicasio.	Cismontane woodland. Moss growing on soil on river banks. 185-365 m.	**Possible.** Suitable habitat is present in the Project area.
Eriogonum luteolum var. caninum Tiburon buckwheat	-/-/1B.2	Marin and Alameda counties.	Chaparral, valley and foothill grassland, cismontane woodland, coastal prairie. Serpentine soils; sandy to gravelly sites. 60-640 m.	**Possible.** Suitable habitat is present in the Project area. The only site with potential for this species is LV 5.78.
Erysimum concinnum bluff wallflower	-/-/1B.2	Del Norte, Humboldt, Marin, Mendocino, and Sonoma counties.	Coastal dunes, coastal bluff scrub, coastal prairie. More or less a coastal generalist within coastal habitat types. 3-60 m.	**None.** Suitable habitat is absent from the Project sites.
Fissidens pauperculus minute pocket moss	-/-/1B.2	Known from California and Oregon. In California found in Alameda, Butte, Del Norte, Humboldt, Marin, Mendocino, San Mateo, Santa Cruz, Sonoma, and Yuba counties.	North coast coniferous forest. Moss growing on damp soil along the coast. In dry streambeds and on stream banks. 30-1025 m.	**Possible.** Suitable habitat is present in the Project area.
Fritillaria lanceolata var. *tristulis* Marin checker lily	-/-/1B.1	Only occurs in Marin County.	Coastal bluff scrub, coastal scrub, coastal prairie. Occurrences reported from canyons and riparian areas as well as rock outcrops; often on serpentine. 5-305 m.	**Not expected.** Marginally **s**uitable habitat is present in the Project area.
Fritillaria liliacea fragrant fritillary	-/-/1B.2	Alameda, Contra Costa, Marin, Monterey, San Benito, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma counties.	Coastal scrub, valley and foothill grassland, coastal prairie, cismontane woodland. Often on serpentine; various soils reported though usually on clay, in grassland. 3-385 m.	**Possible.** Suitable habitat is present in the Project area.

Sci. Name Common Name	Listing Status (Federal/State /CRPR)*	Range	Habitat	Potential to Occur at Project sites and Rationale
Gilia capitata ssp. *chamissonis* blue coast gilia	-/-/1B.1	Marin, San Francisco and Sonoma counties.	Coastal dunes, coastal scrub. 3-200 m.	**None.** Suitable habitat is absent from the Project sites.
Gilia capitata ssp. *tomentosa* Bluehead gilia	-/-/1B.1	Marin and Sonoma counties.	Coastal bluff scrub, valley and foothill grassland, riparian woodland. Rocky outcrops, sometimes serpentine. 6-290 m.	**Possible.** Suitable habitat is present in the Project area.
Gilia millefoliata dark-eyed gilia	-/-/1B.2	Alameda, Contra Costa, Del Norte, Humboldt, Marin, Mendocino, San Francisco, San Mateo, and Sonoma counties. Also present in some counties in Oregon.	Coastal dunes. 1-60 m.	**None.** Suitable habitat is absent from the Project sites.
Helianthella castanea Diablo helianthella	-/-/1B.2	Alameda, Contra Costa, San Mateo, and Solano counties. Historically known from Marin and San Francisco counties, but these occurrences are considered extirpated.	Broadleafed upland forest, chaparral, cismontane woodland, coastal scrub, riparian woodland, valley and foothill grassland. Usually in chaparral/oak woodland interface in rocky, azonal soils. Often in partial shade. 45-1070 m.	**Not expected.** Current known range of the species does not include Marin County.
Hemizonia congesta ssp. *congesta* congested-headed hayfield tarplant	-/-/1B.2	Lake, Marin, Mendocino, San Francisco, San Mateo, and Sonoma counties.	Valley and foothill grassland. Grassy valleys and hills, often in fallow fields; sometimes along roadsides. 5-520 m.	**Possible.** Suitable habitat is present in the Project area.
Hesperolinon congestum Marin western flax	FT/ST/1B.1	Marin, San Francisco, and San Mateo counties.	Chaparral, valley and foothill grassland. In serpentine barrens and in serpentine grassland and chaparral. 60-400 m.	**Possible.** Suitable habitat is present in the Project area. The only site with potential for this species is LV 5.78.
Heteranthera dubia water star-grass	-/-/2B.2	Widely distributed throughout North America. Present in California in Butte, Colusa, Marin, Modoc, San Francisco, San Mateo, Shasta, and Sutter counties.	Marshes and swamps. Alkaline, still or slow-moving water. Requires a pH of 7 or higher, usually in slightly eutrophic waters. 15-1510 m.	**None.** Suitable habitat is absent from the Project sites.

Sci. Name Common Name	Listing Status (Federal/State /CRPR)*	Range	Habitat	Potential to Occur at Project sites and Rationale
Holocarpha macradenia Santa Cruz tarplant	FT/SE/1B.1	Current range is limited to Contra Costa, Monterey, and Santa Cruz counties. Historically known from Alameda, and Marin counties.	Coastal prairie, coastal scrub, valley and foothill grassland. Light, sandy soil or sandy clay; often with nonnatives. 10-275 m.	**Not expected.** Current known range of the species does not include Marin County.
Horkelia marinensis Point Reyes horkelia	-/-/1B.2	Marin, Mendocino, Monterey, San Mateo, Santa Cruz, and Sonoma counties.	Coastal dunes, coastal prairie, coastal scrub. Sandy flats and dunes near coast; in grassland or scrub plant communities. 2-775 m.	**None.** Suitable habitat is absent from the Project sites.
Horkelia tenuiloba thin-lobed horkelia	-/-/1B.2	Marin, Mendocino, and Sonoma counties. Marin County occurrences are limited to Mount Tamalpais.	Broadleafed upland forest, chaparral, valley and foothill grassland. Sandy soils; mesic openings. 45-640 m.	**Not expected.** Marin County occurrences are limited to Mount Tamalpais, outside of the Project area.
Hypogymnia schizidiata island tube lichen	-/-/1B.3	Occurs in Baja California, Mexico, as well as the state of California. Occurs in Marin, Mendocino, San Mateo, and Santa Barbara counties in California.	Chaparral, closed-cone coniferous forest. On bark and wood of hardwoods and conifers. 255-545 m.	**None.** Suitable habitat is absent from the Project sites.
Kopsiopsis hookeri small groundcone	-/-/2B.3	Marin County north to British Colombia.	North coast coniferous forest. Open woods, shrubby places, generally on *Gaultheria shallon*. 120-1435 m.	**Not expected.** Marginally **s**uitable habitat is present in the Project area.
Lasthenia californica ssp. macrantha perennial goldfields	-/-/1B.2	Del Norte, Humboldt, Marin, Mendocino, San Luis Obispo, San Mateo, Santa Cruz, and Sonoma counties.	Coastal bluff scrub, coastal dunes, coastal scrub. 5-185 m.	**None.** Suitable habitat is absent from the Project sites.
Lasthenia conjugens Contra Costa goldfields	FE/-/1B.1	Alameda, Contra Costa, Marin, Monterey, Napa, Solano, and Sonoma counties. Historically known from Mendocino, Santa Barbara, and Santa Clara counties.	Valley and foothill grassland, vernal pools, alkaline playas, cismontane woodland. Vernal pools, swales, low depressions, in open grassy areas. 1-450 m.	**None.** Suitable habitat is absent from the Project sites.
Lessingia micradenia var. *micradenia* Tamalpais lessingia	-/-/1B.2	Limited to the area around Mount Tamalpais.	Chaparral, valley and foothill grassland. Usually on serpentine, in serpentine grassland or serpentine chaparral. Often on roadsides. 60-305 m.	**Not expected.** Marginally **s**uitable habitat is present in the Project area.

Sci. Name Common Name	Listing Status (Federal/State /CRPR)*	Range	Habitat	Potential to Occur at Project sites and Rationale
Lilaeopsis masonii Mason's lilaeopsis	-/SR/1B.1	Alameda, Contra Costa, Marin, Napa, Sacramento, San Joaquin, Solano, and Yolo counties.	Marshes and swamps, riparian scrub. Tidal zones, in muddy or silty soil formed through river deposition or river bank erosion. In brackish or freshwater. 0-10 m.	**None.** Suitable habitat is absent from the Project sites.
Lilium maritimum coast lily	-/-/1B.1	Marin, Mendocino, and Sonoma counties. In Marin, limited to the Point Reyes peninsula.	Closed-cone coniferous forest, coastal prairie, coastal scrub, broadleafed upland forest, north coast coniferous forest, marshes and swamps. Historically in sandy soil, often on raised hummocks or bogs; today mostly in roadside ditches. 4-490 m.	**Not expected.** Marin County occurrences are limited to the Point Reyes peninsula, outside of the Project area.
Lilium pardalinum ssp. pitkinense Pitkin Marsh lily	FE/SE/1B.1	Sonoma County.	Cismontane woodland, meadows and seeps, marshes and swamps. Saturated, sandy soils with grasses and shrubs. 45-65 m.	**Not expected.** Known range of the species does not include Marin County.
Microseris paludosa marsh microseris	-/-/1B.2	Marin, Mendocino, Monterey, San Luis Obispo, Santa Cruz, Solano, and Sonoma counties. Historically known from San Francisco and San Mateo counties.	Closed-cone coniferous forest, cismontane woodland, coastal scrub, valley and foothill grassland. 3-610 m.	**Possible.** Suitable habitat is present in the Project area.
Mielichhoferia elongata elongate copper moss	-/-/4.3	Greenland, Canada, United States. Alaska, California, Colorado, Maine, Michigan, Montana, New York, Oregon, and Tennessee.	Cismontane woodland. Moss growing on very acidic, metamorphic rock or substrate; usually in higher portions in fens. Often on substrates naturally enriched with heavy metals (e.g. copper) such as mine tailings. 5-1085 m.	**Not expected.** Marginally **s**uitable habitat is present in the Project area.
Navarretia leucocephala ssp. *bakeri* Baker's navarretia	-/-/1B.1	Colusa, Glenn, Humboldt, Lake, Lassen, Marin, Mendocino, Napa, Solano, Sonoma, Sutter, Tehama, and Yolo counties.	Cismontane woodland, meadows and seeps, vernal pools, valley and foothill grassland, lower montane coniferous forest. Vernal pools and swales; adobe or alkaline soils. 3-1680 m.	**None.** Suitable habitat is absent from the Project sites.
Navarretia rosulata Marin County navarretia	-/-/1B.2	Marin and Napa counties.	Closed-cone coniferous forest, chaparral. Dry, open rocky places; can occur on serpentine. 185-640 m.	**None.** Suitable habitat is absent from the Project sites.

Sci. Name Common Name	Listing Status (Federal/State /CRPR)*	Range	Habitat	Potential to Occur at Project sites and Rationale
Pentachaeta bellidiflora white-rayed pentachaeta	FE/SE/1B.1	San Mateo County. Historically known from Marin and Santa Cruz counties.	Valley and foothill grassland, cismontane woodland. Open dry rocky slopes and grassy areas, often on soils derived from serpentine bedrock. 35-610 m.	**Not expected.** Current known range of the species does not include Marin County.
Phacelia insularis var. *continentis* North Coast phacelia	-/-/1B.2	Marin and Mendocino counties.	Coastal bluff scrub, coastal dunes. Open maritime bluffs, sandy soil, sometimes rocky habitats. 0-155 m.	**None.** Suitable habitat is absent from the Project sites.
Plagiobothrys glaber hairless popcornflower	-/-/1A	Alameda, Marin, San Benito, and Santa Clara counties.	Meadows and seeps, marshes and swamps. Coastal salt marshes and alkaline meadows. 5-125 m.	**None.** Suitable habitat is absent from the Project sites.
Plagiobothrys mollis var. *vestitus* Petaluma popcornflower	-/-/1A	Known only from the type collection (in 1880) near Petaluma.	Valley and foothill grassland, marshes and swamps. Wet sites in grassland, possibly coastal marsh margins. 10-50 m.	**Not expected.** This species is thought to be extirpated.
Pleuropogon hooverianus North Coast semaphore grass	-/ST/1B.1	Humboldt, Marin, Mendocino, and Sonoma counties.	Broadleafed upland forest, meadows and seeps, north coast coniferous forest. Wet grassy, usually shady areas, sometimes freshwater marsh; associated with forest environments. 45-1160 m.	**Possible.** Suitable habitat is present in the Project area.
Polygonum marinense Marin knotweed	-/-/3.1	Alameda, Contra Costa, Marin, Napa, San Francisco, Solano, and Sonoma counties.	Marshes and swamps. Coastal salt marshes and brackish marshes. 0-10 m.	**None.** Suitable habitat is absent from the Project sites.
Quercus parvula var. *tamalpaisensis* Tamalpais oak	-/-/1B.3	Limited to Mount Tamalpais.	Lower montane coniferous forest, cismontane woodland. 200-640 m.	**Not expected.** This species is limited to Mount Tamalpais, outside of the Project area.

Sci. Name Common Name	Listing Status (Federal/State /CRPR)*	Range	Habitat	Potential to Occur at Project sites and Rationale
Sagittaria sanfordii Sanford's arrowhead	-/-/1B.2	Butte, Del Norte, El Dorado, Fresno, Madera, Marin, Mariposa, Merced, Napa, Sacramento, San Bernardino, San Joaquin, Shasta, Solano, Sutter, Tehama, Tulare, and Yuba counties.	Marshes and swamps. In standing or slow-moving freshwater ponds, marshes, and ditches. 0-605 m.	**Not expected.** Marginally **s**uitable habitat is present in the Project area.
Sidalcea calycosa ssp. *rhizomata* Point Reyes checkerbloom	-/-/1B.2	Marin, Mendocino, and Sonoma counties.	Marshes and swamps. Freshwater marshes near the coast. 5-95 m.	**None.** Suitable habitat is absent from the Project sites.
Sidalcea hickmanii ssp. *viridis* Marin checkerbloom	-/-/1B.1	Marin County.	Chaparral. Serpentine or volcanic soils; sometimes appears after burns. 1-425 m.	**None.** Suitable habitat is absent from the Project sites.
Stebbinsoseris decipiens Santa Cruz microseris	-/-/1B.2	Marin, Monterey, San Francisco, San Mateo, and Santa Cruz counties.	Broadleafed upland forest, closed-cone coniferous forest, chaparral, coastal prairie, coastal scrub, valley and foothill grassland. Open areas in loose or disturbed soil, usually derived from sandstone, shale or serpentine, on seaward slopes. 90-750 m.	**Not expected.** Marginally **s**uitable habitat is present in the Project area.
Streptanthus anomalus Mount Burdell jewelflower	-/-/1B.1	Currently known only from Mount Burdell, near Novato.	Cismontane woodland. Grassy openings, serpentinite. 50-150 m.	**Not expected.** Current known range of the species does not include the Project area.
Streptanthus batrachopus Tamalpais jewelflower	-/-/1B.3	Marin County, in the vicinity of Mount Tamalpais.	Closed-cone coniferous forest, chaparral. Talus serpentine outcrops. 335-670 m.	**None.** Suitable habitat is absent from the Project sites.

Sci. Name Common Name	Listing Status (Federal/State /CRPR)*	Range	Habitat	Potential to Occur at Project sites and Rationale
Streptanthus glandulosus ssp. *pulchellus* Mt. Tamalpais bristly jewelflower	-/-/1B.2	Marin County, in the vicinity of Mount Tamalpais.	Chaparral, valley and foothill grassland. Serpentine slopes. 125-670 m.	**Possible.** Suitable habitat is present in the Project area. The only site with potential for this species is LV 5.78.
Trifolium amoenum two-fork clover	FE/-/1B.1	Marin, San Mateo, and Sonoma counties. Historically known from Napa and Solano counties.	Valley and foothill grassland, coastal bluff scrub. Sometimes on serpentine soil, open sunny sites, swales. Most recently cited on roadside and eroding cliff face. 5-310 m.	**Not expected.** Marginally **s**uitable habitat is present in the Project area.
Trifolium polyodon Pacific Grove clover	-/SR/1B.1	Marin, Monterey, Santa Cruz, and Sonoma counties.	Closed-cone coniferous forest, meadows and seeps, coastal prairie, valley and foothill grassland. Along small springs and seeps in grassy openings. 5-260 m.	**Not expected.** Marginally **s**uitable habitat is present in the Project area.
Triphysaria floribunda San Francisco owl's-clover	-/-/1B.2	Marin, San Francisco, and San Mateo counties.	Coastal prairie, coastal scrub, valley and foothill grassland. On serpentine and non-serpentine substrate (such as at Pt. Reyes). 1-150 m.	**Possible.** Suitable habitat is present in the Project area.
Triquetrella californica coastal triquetrella	-/-/1B.2	Known from California and Oregon. California range includes Contra Costa, Del Norte, Marin, Mendocino, San Diego, San Francisco, San Mateo, and Sonoma counties.	Coastal bluff scrub, coastal scrub. Grows within 30m from the coast in coastal scrub, grasslands and in open gravels on roadsides, hillsides, rocky slopes, and fields. On gravel or thin soil over outcrops. 20-1175 m.	**None.** Suitable habitat is absent from the Project sites.

"Potential to Occur" Categories Definitions

Possible = record is known from within 2 miles of the Project sites or was observed in the vicinity, and suitable habitat is present in or near the Project site.

Not expected = record known from within 2 miles of the Project site but only marginal habitat exists in the vicinity, but the occurrence is outside of the surrounding area.

None = Project site is outside of species' range, record is possibly or presumed extirpated, or no marginal habitat present.

Status Legend

State
SR = State rare
SE = State endangered
ST = State threatened ***Other:***
CNDDB= California Natural Diversity Database

CRPR (California Rare Plant Rank)
1A = Plants Presumed Extirpated in California and Either Rare or Extinct Elsewhere
1B = Plants Rare, Threatened, or Endangered in California and Elsewhere
2A = Plants Presumed Extirpated in California, But More Common Elsewhere
2B = Plants Rare, Threatened, or Endangered in California, But More Common Elsewhere

Appendix D-2. Special-Status Fish Species

Sci. Name Common Name	Listing Status (Federal/State)*	Range	Habitat	Potential to Occur at Project sites and Rationale
Acipenser medirostris Southern Green sturgeon DPS	FT/-/-	They can be found from Alaska to Mexico but are most commonly encountered north of Point Conception, California. The southern DPS spawns in the Sacramento, Feather, and Yuba Rivers.	Anadromous species. Return to natal rivers to spawn every 3-5 years.	**None.** Sturgeon spawn in natal rivers, and there is no known population of sturgeon utilizing any of the creeks in the Project sites. There is not suitable habitat present in the Project sites.
Eucyclogobius newberryi tidewater goby	FE/-/-	Brackish water habitats along the California coast from Agua Hedionda Lagoon (San Diego County) north to the mouth of the Smith River (Del Norte County).	Found in shallow lagoons and lower stream reaches, they need fairly still but not stagnant water and high oxygen levels.	**None.** Locally extirpated. Last CNDDB occurrence was in 1953**.**
Hypomesus transpacificus Delta smelt	FT/SE/-	San Francisco Bay to Sacramento-San Joaquin Delta.	Freshwater streams to tidally influenced sloughs and channels.	**None.** There is not suitable habitat present in the Project sites.
Lavinia symmetricus ssp. 2 Tomales roach	-/-/SSC	Marin County – restricted to Lagunitas and Walker Creeks and associated tributaries to Tomales Bay.	Tomales Roach is a subspecies of the California roach. They are generally found in small, warm intermittent streams, and dense populations are frequently found in isolated pools. They are habitat generalists, also being found in cold, well-aerated clear “trout” streams.	**Possible.** Subspecies of the California Roach**.** This sub species is understudied, but thought to be locally abundant in tributaries of the Tomales Bay. More likely to occur at Project sites west of the Nicasio Reservoir, as the Seeger dam would have the fragmented population.

Sci. Name Common Name	Listing Status (Federal/State)*	Range	Habitat	Potential to Occur at Project sites and Rationale
Oncorhynchus kisutch pop. 4 coho salmon – Central California Coast ESU	FE/SE/-	This evolutionarily significant unit, or ESU, includes naturally spawned coho salmon originating from rivers south of Punta Gorda, California to and including Aptos Creek, as well as such coho salmon originating from tributaries to San Francisco Bay.	California Coho Salmon typically inhabit small coastal streams, as well as larger rivers. Coho Salmon in northern California coastal streams are typically associated with low gradient reaches of tributary streams, which provide suitable spawning areas and good juvenile rearing habitat. Generally, Coho Salmon spawn in smaller streams than do Chinook Salmon.	**Present.** This species was observed in Black Mountain Creek (Pt. Reyes – Petaluma Road MP 12.33) during field assessments.
Oncorhynchus mykiss pop. 8 steelhead – Central California Coast DPS	FT/-/-	This distinct population segment, or DPS, includes naturally spawned anadromous steelhead originating below natural and manmade impassable barriers from the Russian River to and including Aptos Creek, and all tributaries of San Francisco and San Pablo Bays to the Sacramento and San Joaquin Rivers.	Spawning occurs in places where the streambed is composed of gravelly substrate, usually in riffles or pool tails. Within a stream resident rainbows and freshwater phase steelhead have in-stream habitat preferences generally determined by size. Generally, the smallest fish are mostly found in riffles, medium sized fish in runs, and larger fish predominantly in pools.	**Present.** This species was observed in Black Mountain Creek (Pt. Reyes – Petaluma Road MP 12.33) during field assessments.
Pogonichthys macrolepidotus Sacramento splittail	-/-/SSC	Endemic to the lakes and rivers of the Central Valley, but now confined to the Delta, Suisun Bay and associated marshes.	Slow moving river sections, dead end sloughs. Requires flooded vegetation for spawning and foraging for young.	**None.** There is not suitable habitat present in the Project sites.

Sci. Name Common Name	Listing Status (Federal/State)*	Range	Habitat	Potential to Occur at Project sites and Rationale
Spirinchus thaleichthys longfin Smelt	FC/ST/-	Bays, estuaries, and nearshore environments from Lake Earl to the San Francisco Bay. Includes Suisun Bay and Marsh, San Pablo Bay, San Francisco Bay, Gulf of the Farallones, and Humboldt Bay. Eastward range limited to upstream of Rio Vista on Sacramento River, Cache Slough and Medford Island on San Joaquin River.	Mid-water to near-bottom of water column in freshwater to saltwater bays, estuaries, and nearshore environments below 22°C	**None**. There is not suitable habitat present in the Project sites.

Federal Designations:

FE = Federal endangered

FT = Federal threatened

FC = Federal candidate

State Designations:

SE = State endangered

ST = State threatened

SCE = State candidate endangered

SR = State rare

SSC = Species of Special Concern (CDFW Designation)

FP = Fully Protected (CDFW Designation)

WL = Watch List (CDFW Designation)

"Potential to Occur" Categories Definitions

Present = Species was seen during surveys at the Project Area.

Possible = record is known from within 2 miles of the Project site or was observed in or near the vicinity, and suitable habitat is present in the Project site.

Not expected = record known from within 2 miles of the Project site and only marginal habitat exists in the vicinity, but the occurrence is outside of the surrounding area.

None = Project site is outside of species' range, record is possibly or presumed extirpated, or no marginal habitat present.

Appendix D-3. Special-Status Wildlife Species

Sci. Name Common Name	Listing Status (Federal/State)*	Range	Habitat	Potential to Occur at Project sites and Rationale
Invertebrates				
Bombus occidentalis western bumble bee	-/SCE	Northern California in high meadows or coastal environments.	Meadows and grasslands with abundant floral resources. Nests primarily underground in animal cavities. Most commonly associated with plants from the genera *Cirsium, Erigonum, Solidago,* "Aster", *Ceanothus, Centaurea,* and *Penstemon.*	**Not Expected.** Suitable meadow and grassland habitat with abundant floral resources is absent at the Project sites. No CNDDB occurrence records are known from the study area.
Callophrys mossii bayensis San Bruno elfin butterfly	FE/-	In the vicinity of San Bruno Mountain, San Mateo County.	Coastal, mountainous areas with grassy ground cover. Colonies are located on steep, north-facing slopes within the fog belt. Larval host plant is *Sedum spathulifolium*.	**None.** Project Area is outside of the known range of this species. No CNDDB occurrence records are known within 2-miles of the Project Area.
Danaus plexippus pop. 1 monarch butterfly – California overwintering population	FC/-	The range extent is based on the coastal winter range, which runs along about 1,000 kilometers along the California coast, historically from northern Mendocino County south to northern Baja California, Mexico (Lane 1993, Leong et al. 2004, Jepsen and Black 2015). Based on the overwintering range, the California Natural Diversity Database estimated the historic area of occupancy as 242 4-sq km grid cells. The current area of occupancy is likely to be much lower, following a 99.9% decline in overwintering populations from the	Dense Eucalyptus, Monterey pine, and live oak groves along Coastal California that provide shelter from prevailing winds.	**Not expected** as an overwintering site. Known overwintering population sites are located in or near Bolinas, separated by a mountain range. No known CNDDB occurrences in Project vicinity. No known milkweed occurrences in project vicinity to support foraging during breeding months.

Sci. Name Common Name	Listing Status (Federal/State)*	Range	Habitat	Potential to Occur at Project sites and Rationale
		1980s to 2020 (Xerces Society, 2020)N. On the 2019 Thanksgiving count, monarchs were recorded at only 121 separate sites, some of which may occur within the same grid cell.		
Haliotis cracherodii Black Abalone	FE/-/-	Black abalone range from about Point Arena, California, to Bahia Tortugas and Isla Guadalupe, Mexico. They are rarely found north of San Francisco and south of Punta Eugenia.	Black abalone live on rocky substrates in intertidal and shallow subtidal reefs (to about 18 feet deep) along the coast.	**None**. Black Abalone is a strictly coastal species.
Syncaris pacifica California freshwater shrimp	FE/SE/-	Endemic to Marin, Napa, and Sonoma counties.	Found in low elevation, low gradient streams where riparian cover is moderate to heavy. Shallow pools away from main streamflow. Winter: undercut banks w/ exposed roots. Summer: leafy branches touching water.	**Not Expected.** Present in Lagunitas creek, which is connected to Black Mountain creek at high water flow. However, the California freshwater shrimp is not mobile enough to make it up to the project sites at high water flow.
Speyeria zerene myrtleae Myrtle's silverspot butterfly	FE/-	Restricted to the foggy, coastal dunes/hills of the Point Reyes peninsula; extirpated from coastal San Mateo County.	Larval foodplant thought to be Viola adunca .	**None.** Project Area is outside of the known range of this species (too far inland- past coastal dunes).
Amphibians and reptiles				
Ambystoma californiense California tiger salamander	FT/ST, WL	Central Valley, including Sierra Nevada foothills, up to approximately 1,000 feet amsl, and from Sonoma County south to Santa Barbara County along coast.	Need underground refuges, especially ground squirrel burrows & vernal pools or other seasonal water sources for breeding.	**None.** Project location has no vernal pools and is not in the known range of the species. No CNDDB occurrences in Project vicinity.
Dicamptodon ensatus California giant salamander	-/SSC	Endemic to California, found in two, possibly three isolated regions, from Mendocino County near Point Arena east into the coast rages into	Typically found in moist forests and riparian zones in or near clear, cold streams or seeps. Found under logs	**Present.** This species was observed at the Project site during field surveys.

Sci. Name Common Name	Listing Status (Federal/State)*	Range	Habitat	Potential to Occur at Project sites and Rationale
		Lake and Glenn counties, south to Sonoma and Marin counties, continuing south of the San Francisco Bay from San Mateo County to southern Santa Cruz county. Does not occur east of the San Francisco Bay.	and debris, and occasionally in trees and shrubs near water. Breeds in clear, cold rivers, creeks, and ponds.	
Rana boylii Foothill yellow-legged frog	-/SSC, (some clades are ST or SE, but not the north coast clade)	Coast and coastal mountain ranges from Oregon border south to Ventura County, Sierra Nevada foothills south to Tulare County. Disjunct populations in eastern Los Angeles County and northern Sutter County.	Lowlands & foothills in or near permanent sources of deep water with dense, shrubby or emergent riparian vegetation. Partly-shaded, shallow streams and riffles with a rocky substrate.	**Possible.** Suitable habitat (freshwater streams) is present within Project sites.
Rana draytonii California red-legged frog	FT/SSC	Coast and coastal mountain ranges from Mendocino County to San Diego County, and in the Sierra Nevada Mountains from Butte County south to Stanislaus County.	Streams, freshwater pools, and ponds with emergent vegetation.	**Possible.** Suitable habitat present within Project sites.
Taricha rivularis red-bellied newt	-/SSC	Coastal Drainages form Humboldt County South to Sonoma County, inland to Lake County. Isolated Population of uncertain origin in Santa Clara county.	Lives in terrestrial habitats, juveniles generally underground and adults active at surface in moist environments. Will migrate over 1 km to breed, typically in streams with moderate flow and clean, rocky substrate.	**Possible.** Suitable habitat is present and within known range of species. No CNDDB occurrences within 2-miles of Project Area.
Actinemys (=*Emys*) *marmorata* western pond turtle	-/SSC	Oregon border of Del Norte and Siskiyou Counties south along coast to San Francisco Bay, inland through Sacrament Valley, and on the western slope of the Sierra Nevada Mountains.	Found in ponds, marshes, rivers, streams & irrigation ditches, usually with aquatic vegetation. Needs basking sites.	**Possible.** Suitable habitat present within Project sites.

Sci. Name Common Name	Listing Status (Federal/State)*	Range	Habitat	Potential to Occur at Project sites and Rationale
Chelonia mydas green sea turtle	FT/-/-	In the eastern North Pacific, green turtles have been sighted as far north as southern Alaska, but most commonly occur from southern California to northwestern Mexico.	Marine. Completely herbivorous; needs adequate supply of seagrasses and algae.	**None.** This is a marine species.
Dermochelys coriacea Leatherback sea turtle	FE/-/-	The Central Coast of California, including Monterey Bay, is one stop in the seasonal migration of Leatherbacks in the Pacific as they travel across the ocean from the western Pacific to Hawaii and/or Indonesia to feed.	Marine. Feeds mostly on jellyfish. Thoroughly aquatic and the most widely-distributed sea turtle in the world.	**None.** This is a marine species.
Lepidochelys olivacea Olive Ridley sea turtle	FE/-/-	The olive ridley is mainly a pelagic sea turtle, observed by trans-Pacific ships over 2,400 miles from shore, but they are also known to inhabit coastal areas. Olive ridleys are globally distributed in the tropical regions of the Atlantic, Pacific, and Indian oceans.	Marine. Omnivorous- feeds on algae, lobster, crabs, tunicates, and mollusks.	**None.** This is a marine species.
Birds				
Athene cunicularia burrowing owl	-/SSC	Lowlands throughout California, including the Central Valley, northeastern plateau, southeastern deserts, and coastal areas; rare along south coast.	Yearlong resident of open, dry grassland and desert habitats, as well as in grass, forb and open shrub stages of pinyon-juniper and ponderosa pine habitats. Open, dry annual or perennial grasslands, deserts & scrublands characterized by low-growing vegetation. Subterranean nester, dependent upon burrowing mammals, most notably, the California ground	**None.** Area is too mountainous and heavily forested to support burrowing owls.

Sci. Name Common Name	Listing Status (Federal/State)*	Range	Habitat	Potential to Occur at Project sites and Rationale
			squirrel (*Spermophilus beecheyi*).	
Aquila chrysaetos golden eagle	-/FP	Golden eagles are found throughout North America, but are more common in western North America. Most golden eagles in California are resident (e.g. they stay in the state yearlong), but some migrate into California for winter.	Resident golden eagels may move downslope for the winter, or upslope after breeding season. Golden eagles inhabit a variety of habitats including forests, canyons, shrub lands, grasslands, and oak woodlands	**Possible.** There are 9 ebird observations from 1986- 2018 in the vicinity of the Project sites. Golden eagles can utilize a wide variety of habitats, and there is suitable habitat (including adequate trees for nesting) in the vicinity of the Project area.
Brachyramphus marmoratus marbled murrelet	FT/SE	From Eureka to Oregon border and from Half Moon Bay to Santa Cruz.	Feeds near-shore in shallow waters and nearby inland habitats; nests inland along coast. Nests in old-growth redwood-dominated forests, up to six miles inland, often in Douglas-fir.	**None.** Project Sites are between 5-12 miles inland with a coastal mountain range in between the ocean and the project sites. No known CNDDB occurrences within Project vicinity. No suitable old conifer forest habitat within project vicinity.
Buteo swainsoni Swainson's hawk	-/ST	Lower Sacramento and San Joaquin valleys, Klamath Basin, and Butte Valley. Recent breeding in Santa Clara County and expected elsewhere in greater San Francisco Bay Area.	Breeds in grasslands with scattered trees, juniper-sage flats, riparian areas, savannahs, and agricultural or ranch lands with groves or lines of trees. Requires adjacent suitable foraging areas such as grasslands, or alfalfa or grain fields supporting rodent populations.	**None.** Not enough adjacent grasslands to support Swainson's hawk nesting. However, could be possible for the species to be present as a temporary migrant or forager.
Charadrius nivosus nivosus western snowy plover	FT/SSC	The Pacific coast population of the western snowy plover breeds primarily on coastal beaches from southern Washington to southern Baja California, Mexico.	Sandy beaches, salt pond levees & shores of large alkali lakes. Needs sandy, gravelly or friable soils for nesting.	**None.** Project Area does not have suitable habitat to support western snowy plover nesting (i.e. sandy beach or alkali lakes). There are no CNDDB occurrences within 2-miles of the project area.
Contopus cooperi	-/SSC	The Olive-sided Flycatcher breeds from Alaska across central and	Can occupy plantings of conifers and eucalyptus.	**Possible.** Marin county is within the breeding range of this species. There have been abundant

Sci. Name Common Name	Listing Status (Federal/State)*	Range	Habitat	Potential to Occur at Project sites and Rationale
Olive-sided flycatcher		southern Canada south into the United States to Baja California Norte, as well as throughout many areas in the eastern and central United States. The species is most abundant in California, Oregon, Washington, British Columbia, and the Yukon Territory. Occurs in California in Humboldt, Marin, Sonoma, Napa, Contra Costa, Alameda, San Francisco, San Mateo, Santa Clara, Santa Cruz, Monterey, San Luis Obispo, Los Angeles, Orange, and San Diego counties, and the Glass Mountain region of Mono County.	Prefer edges, openings, and clearings in otherwise dense forests. Prefer fragmented forests.	ebird observations of this species in the vicinity of the Project sites as recently as 2021**.**
Coturnicops noveboracensis yellow rail	-/SSC	In California, winters in marshes along San Francisco Bay and breeds in Siskiyou and Modoc counties.	Shallow brackish and freshwater marshes, wet meadows, and occasionally rice fields.	**None.** Project Area does not have suitable habitat to support yellow rail nesting (i.e. marshes). There are no CNDDB occurrences within 2-miles of the project area.
Cypseloides niger black swift	-/SSC	Breeds widely but locally throughout western North America, from southeastern Alaska to southern California, as far east as central Colorado, throughout Mexico to Costa Rica, and on some Caribbean islands. Despite this extensive range, less than 100 nesting locations have been documented, so the world population is comparatively small. Occurs in California as a summer resident and migrant from mid-April to mid-October. Nest sites are occupied from mid-May (Santa Cruz coast) to mid-September (Sierra), but most nesting occurs during June	Nest behind waterfalls in the Sierra Nevada, and formerly at Big Basin State Park, and in sea caves along coastal bluffs in San Mateo County and Santa Cruz County. Forages aerially for insects.	**None.** Project Area does not have suitable habitat to support black swift nesting (i.e. waterfalls or sea caves). There are no CNDDB occurrences within 2-miles of the project area.

Sci. Name Common Name	Listing Status (Federal/State)*	Range	Habitat	Potential to Occur at Project sites and Rationale
		through August (Legg 1956, Gaines 1992, Marin 1999, Lowther and Collins 2002).		
Elanus leucurus white-tailed kite	-/FP	Lowlands west of the Sierra Nevada Mountains from Sacramento Valley south to western San Diego County (including coastal foothills and valleys).	Nests in rolling foothills/valley margins with scattered oaks and river bottomlands or marshes next to deciduous woodland. Open grasslands, meadows, or marshes for foraging close to isolated, dense-topped trees for nesting and perching.	**Possible.** Suitable habitat is present.
Geothlypis trichas sinuosa saltmarsh common yellowthroat	-/SSC	Coastal areas in Marin County and the San Mateo Peninsula, and areas along San Pablo Bay and the southern portion of San Francisco Bay.	Resident of fresh and salt water marsh and swamps throughout San Francisco Bay. Requires thick, continuous cover down to water surface for foraging, and tall grasses, bulrush patches, and/or willows for nesting.	**None.** Project Area does not have suitable habitat to support saltmarsh common yellowthroat nesting (i.e. marsh or swamps). However, there is CNDDB occurrences within 2-miles of the project area in marsh area nearby the Project Area. Therefore, it may be present as a temporary migrant or forager.
Haliaeetus leucocephalus Bald Eagle	-/SE, FP	Can occur within much of North America, including Alaska, Canada, the lower 48 states, and northwest Mexico.	Bald eagles in winter may be found throughout most of California at lakes, reservoirs, rivers, and some rangelands and coastal wetlands. California's breeding habitats are mainly in mountain and foothill forests and woodlands near reservoirs, lakes, and rivers. Most breeding territories are in northern California, but the eagles also nest in scattered locations in the central and	**Not expected.** There are no CNDDB occurrences, and no known nesting territories in Marin county (CDFW, 2016b). There are two ebird observations near the Project sites from 2018, so they could be present as temporary migrants or foragers.

Sci. Name Common Name	Listing Status (Federal/State)*	Range	Habitat	Potential to Occur at Project sites and Rationale
			southern Sierra Nevada mountains and foothills, in several locations from the central coast range to inland southern California, and on Santa Catalina Island.	
Laterallus jamaicensis coturniculus California black rail	-/ST, FP	Year-round resident in the Lower Colorado River and greater San Francisco Bay Area.	Inhabits freshwater marshes, wetland meadows, and the shallow margins of saltwater marshes bordering larger bays. Needs water depths of about 1 inch that do not fluctuate during the year & dense vegetation for nesting habitat.	**None.** Project Area does not have suitable habitat to support California black rail (i.e. wetland meadows or marshes). There are no CNDDB occurrences within 2-miles of the project area.
Melospiza melodia samuelis San Pablo song sparrow	-/SSC	Stanislaus, eastern Contra Costa, eastern Alameda, San Joaquin, Sacramento, eastern Solano, Yolo, eastern Colusa, Sutter, western Yuba, and western Placer counties.	Emergent freshwater marshes, riparian willow thickets, riparian forests, and vegetated irrigation. Inhabits cattails (*Typha* spp.), bulrush (*Schoenoplectus* spp.) and other sedges; also known to frequent tangles bordering sloughs.	**None.** The Project Area is not within the range of this species. There are no CNDDB occurrences within 2-miles of the project area.
Rallus obsoletus obsoletus Ridgway's rail	FE/SE, FP	In California, year-round in San Francisco Bay, Southern California coast (from Ventura County south), the Salton Sea, and the lower Colorado River and tributaries.	Saltwater and brackish marshes traversed by tidal sloughs in the vicinity of San Francisco Bay. Associated with abundant growths of pickleweed, but feeds away from cover on invertebrates from mud-bottomed sloughs.	**None.** Project Area does not have suitable habitat to support Ridgeway's Rail nesting (i.e. salt-water/brackish marshes). There are no CNDDB occurrences within 2-miles of the project area.

Sci. Name Common Name	Listing Status (Federal/State)*	Range	Habitat	Potential to Occur at Project sites and Rationale
Riparia riparia bank swallow	-/ST	Migrates throughout all of California. Year-round resident on the San Mateo Peninsula, Sacramento River, and northern Sierra Nevada to plains east of the Cascades.	Colonial nester; nests primarily in riparian and other lowland habitats west of the desert. Requires vertical banks/cliffs with fine-textured/sandy soils near streams, rivers, lakes, or ocean to dig nesting hole.	**None**. Suitable habitat (vertical sandy river banks) is absent from the Project sites and no CNDDB occurrence records are known from within 2 miles of the Project sites.
Setophaga petechia yellow warbler	-/SSC	Breeds along California coast (except Santa Cruz to San Mateo Peninsula), Cascades, plains east of the Cascades, and Coast Range and Sierra Nevada foothills surrounding the Sacramento Valley. Migrant throughout the rest of California.	Riparian plant associations in close proximity to water. Also nests in montane shrub clusters in open conifer forests in Cascades and Sierra Nevada. Frequently found nesting and foraging in willow shrubs and thickets, and in other riparian plants including cottonwoods, sycamores, ash, and alders.	**Possible.** Suitable is present at Project sites.
Sternula antillarum browni California least tern	FE/SE	Nests along the coast from San Francisco Bay south to northern Baja California.	Colonial breeder on bare or sparsely vegetated, flat substrates: sand beaches, alkali flats, landfills, or paved areas. Forages in open water, marine habitat.	**None.** Suitable habitat (i.e. sandy beaches, alkali flats, or land fills) is absent from the Project sites and no CNDDB occurrence records are known from within 2 miles of the Project sites.
Strix occidentalis caurina northern spotted owl	FT/	The historical range has shrunk dramatically since the 1980's. Critical Habitat has been designated for northern spotted owls in California from the Oregon/California border to most of Marin County.	Inhabit old-growth forests or mixed stands of old-growth and mature trees including Douglas-fir, redwood forests, mixed evergreen and hardwood, ponderosa pine, white fir, and grand fir. Occasionally	**Present.** Species observed at Project site during surveys. Suitable habitat available (i.e. stands of mature trees).

Sci. Name Common Name	Listing Status (Federal/State)*	Range	Habitat	Potential to Occur at Project sites and Rationale
			found in younger forests with patches of big trees.	
Mammals				
Antrozous pallidus pallid bat	-/SSC, WBWG: High Priority	Widespread throughout California.	Deserts, grasslands, shrublands, woodlands & forests. Most common in open, dry habitats with rocky areas for roosting. Roosts must protect bats from high temperatures. Very sensitive to disturbance of roosting sites.	**Possible.** Trees at Project sites provide suitable roosting habitat.
Aplodontia rufa phaea Point Reyes mountain beaver	-/SSC	Endemic to western Marin County, almost entirely within Point Reyes National Seashore.	Coastal area of Point Reyes in areas of springs or seepages. North-facing slopes of hills and gullies in areas overgrown with sword ferns and thimbleberries.	**None.** Project Area is outside of the range of the Point Reyes Mountain Beaver. There are no CNDDB occurrence records are known from within 2 miles of the Project sites.
Arctocephalus townsendi Guadalupe fur seal	FT/-/-	Guadalupe fur seals are not common along the West Coast of the United States, but immature animals commonly strand on beaches as far north as Washington State. Over the last several years, a few pups have been born on San Miguel Island in the Channel Islands off southern California.	Guadalupe fur seals are generally solitary, are thought to be non-social animals when at sea. They primarily feed at night on coastal and pelagic squid, and small pelagic fish	**None.** This is a marine species.
Balaenoptera borealis Sei whale	FE/-/-	Sei whales are widely distributed, and occur in subtropical, temperate, and subpolar waters around the world.	Sei whales are usually observed alone or in small groups of two to five animals. They can dive 5 to 20 minutes to feed on plankton (including copepods and krill), small	**None.** This is a marine (mostly pelagic) species.

Sci. Name Common Name	Listing Status (Federal/State)*	Range	Habitat	Potential to Occur at Project sites and Rationale
			schooling fish, and cephalopods (including squid) by both gulping and skimming. They prefer temperate waters in the mid-latitudes, typically in deep waters far from the coastline.	
Balaenoptera musculus Blue whale	FE/-/-	Migratory routes are not well known. Along the West Coast of the United States, eastern North Pacific blue whales are believed to spend winters off of Mexico and Central America. They likely feed during summer off the U.S. West Coast and, to a lesser extent, in the Gulf of Alaska and central North Pacific waters.	They feed almost exclusively on krill, straining huge volumes of ocean water through their baleen plates (which hang from the roof of the mouth and work like a sieve). Some of the biggest individuals may eat up to 6 tons of krill a day. They are distributed in all seas in the world, and little is known about their life history.	**None.** This is a marine species.
Balaenoptera physalus Fin whale	FE/-/-	Fin whales are typically found in deep, offshore waters of all major oceans, primarily in temperate to polar latitudes. They are less common in the tropics.	Most migrate from the Arctic and Antarctic feeding areas in the summer to tropical breeding and calving areas in the winter. The location of winter breeding grounds is not known. Fin whales travel in the open seas, away from the coast, so they are difficult to track	**None.** This is a pelagic species.
Corynorhinus townsendii Townsend's big-eared bat	-/SSC, WBWG: High Priority	Coastal regions from Del Norte County south to Santa Barbara County.	Found throughout California in a wide variety of habitats, including woodlands, forests, chaparral, scrubs, and grasslands. Most	**Possible.** Trees at Project sites provide suitable roosting habitat.

Sci. Name Common Name	Listing Status (Federal/State)*	Range	Habitat	Potential to Occur at Project sites and Rationale
			common in mesic sites. Roosts on open surfaces in caves, abandoned mines, and buildings. Also uses bridges, rock crevices and hollow trees as roost sites. Roosting sites are limiting. This species is extremely sensitive to human disturbance.	
Eubalaena japonica North Pacific right whale	FE/-/-	The population is very small, likely in the low 100s. Contemporary sightings of right whales have mostly occurred in the central North Pacific and Bering Sea. Migration patterns of the North Pacific right whale are unknown, although it is thought the whales spend the summer in far northern feeding grounds and migrate south to warmer waters, such as southern California, during the winter.	Most known right whale nursery areas are in shallow, coastal waters. They are baleen whales straining water for copepods and zooplankton, and utilize most of the Pacific ocean.	**None.** This is a marine species.
Lasiurus blossevillii western red bat	-/SSC	Year-round range spans the Central Valley, Sierra Nevada foothills, Coast Range, and coast except for Humboldt and Del Norte counties.	Cismontane woodland, lower montane coniferous forest, riparian forest and woodlands. Roosts primarily in trees, 2-40 feet above ground, from sea level up through mixed conifer forests. Prefers habitat edges and mosaics with trees that are protected from above and open below with open areas for foraging.	**Possible.** The Project provides suitable habitat.

Sci. Name Common Name	Listing Status (Federal/State)*	Range	Habitat	Potential to Occur at Project sites and Rationale
Neotoma fuscipes annectens San Francisco dusky-footed woodrat	-/SSC	This species can be found throughout the San Francisco Bay area.	Forest habitats of moderate canopy and moderate to dense understory. May prefer chaparral and redwood habitats. Constructs nests of shredded grass, leaves, and other material. May be limited by availability of nest-building materials.	**Possible.** Trees at Project sites provide suitable roosting habitat.
Megaptera novaeangliae Humpback whale	FE/-/-	Humpback whales live in all oceans around the world. They travel great distances every year and have one of the longest migrations of any mammal on the planet. Some populations swim 5,000 miles from tropical breeding grounds to colder, more productive feeding grounds. At least four humpback whale populations occur in the North Pacific.	Humpback whales feed on shrimp-like crustaceans (krill) and small fish, straining huge volumes of ocean water through their baleen plates, which act like a sieve.	**None.** This is a marine species.
Orcinus orca Southern Resident Killer Whale	FE/-/-	Southern Resident killer whales spend several months of the summer and fall each year in Washington State's Puget Sound. Southern Resident killer whales are the only endangered population of killer whales in the United States, ranging from central California to southeast Alaska.	The population is composed of three families numbering around 70 individual whales. They utilize both offshore and coastal waters. The diet of killer whales is primarily determined by the culture (i.e., learned hunting tactics) of each ecotype. For example, one ecotype of killer whales in the U.S. Pacific Northwest exclusively eats fish, mainly salmon, and another ecotype in the same area	**None.** This is a marine species.

Sci. Name Common Name	Listing Status (Federal/State)*	Range	Habitat	Potential to Occur at Project sites and Rationale
			primarily eats marine mammals and squid.	
Physeter macrocephalus Sperm whale	FE-/-/	Inhabit all of the world's oceans, with poorly understood migrations. Females and their young tend to stay in tropical waters, while males migrate all the way to the poles.	Spend most of their time in deep water, hunting squid, sharks, skates, and deep ocean fish. They can dive to 10,000 ft for over 60 minutes.	**None.** This is a marine species.
Reithrodontomys raviventris salt-marsh harvest mouse	FE/SE, FP	San Francisco Bay Estuary and Suisun Marsh.	Saline emergent wetlands of San Francisco Bay and its tributaries.	**None.** Suitable habitat is absent from Project Area (i.e. no emergent wetlands). No CNDDB occurrence records are known from within 2 miles of the Project sites.
Taxidea taxus American badger	-/SSC	Majority of northern, western, and central United States south to Baja California.	Most abundant in drier open stages of most shrub, forest, and herbaceous habitats, with friable soils. Needs sufficient food, friable soils and open, uncultivated ground. Preys on burrowing rodents. Digs burrows.	**Possible.** Suitable habitat is present.

Federal Designations:

FE = Federal endangered

FT = Federal threatened

FC = Federal candidate

BCC = Bird of Conservation Concern (USFWS designation)

State Designations:

SE = State endangered

ST = State threatened

SCE = State candidate endangered

WBWG (Western Bat Working Group) Priority
(available: http://wbwg.org/matrices/species-matrix/)

High = species "considered the highest priority for funding, planning, and conservation actions. Information about status and threats to most species could result in effective conservation actions being implemented should a commitment to management exist. Species is imperiled or are at high risk of imperilment."

Moderate = species warrants "evaluation, more research, and conservation actions of both the specie and possible threats. The lack of meaningful information is a major obstacle in adequately assessing species' status and should be considered a threat."

Sci. Name Common Name	Listing Status (Federal/State)*	Range	Habitat	Potential to Occur at Project sites and Rationale
SR = State rare SSC = Species of Special Concern (CDFW Designation) FP = Fully Protected (CDFW Designation) WL = Watch List (CDFW Designation)			**Low** = indicates "that most of the existing data support stable populations of the species, and that the potential for major changes in status in the near future is considered unlikely.	

"Potential to Occur" Categories Definitions

Present = Species was seen during surveys at the Project Area.

Possible = record is known from within 2 miles of the Project site or was observed in or near the vicinity, and suitable habitat is present in the Project site.

Not expected = record known from within 2 miles of the Project site and only marginal habitat exists in the vicinity, but the occurrence is outside of the surrounding area.

None = Project site is outside of species' range, record is possibly or presumed extirpated, or no marginal habitat present.

Selected Elements by Scientific Name

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Quad IS (Point Reyes NE (3812227) OR Petaluma (3812226) OR Petaluma River (3812225) OR Inverness (3812217) OR San Geronimo (3812216) OR San Rafael (3712285) OR Novato (3812215) OR Double Point (3712287) OR Bolinas (3712286))

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Abronia umbellata var. breviflora pink sand-verbena	PDNYC010N4	None	None	G4G5T2	S2	1B.1
Adela oplerella Opler's longhorn moth	IILEE0G040	None	None	G2	S2	
Agrostis blasdalei Blasdale's bent grass	PMPOA04060	None	None	G2	S2	1B.2
Allium peninsulare var. franciscanum Franciscan onion	PMLIL021R1	None	None	G5T2	S2	1B.2
Alopecurus aequalis var. sonomensis Sonoma alopecurus	PMPOA07012	Endangered	None	G5T1	S1	1B.1
Ambystoma californiense pop. 3 California tiger salamander - Sonoma County DPS	AAAAA01183	Endangered	Threatened	G2G3	S2	WL
Amorpha californica var. napensis Napa false indigo	PDFAB08012	None	None	G4T2	S2	1B.2
Amsinckia lunaris bent-flowered fiddleneck	PDBOR01070	None	None	G3	S3	1B.2
Antrozous pallidus pallid bat	AMACC10010	None	None	G4	S3	SSC
Aplodontia rufa phaea Point Reyes mountain beaver	AMAFA01012	None	None	G5T2	S2	SSC
Arctostaphylos montana ssp. montana Mt. Tamalpais manzanita	PDERI040J5	None	None	G3T3	S3	1B.3
Arctostaphylos virgata Marin manzanita	PDERI041K0	None	None	G2	S2	1B.2
Ardea alba great egret	ABNGA04040	None	None	G5	S4	
Ardea herodias great blue heron	ABNGA04010	None	None	G5	S4	
Astragalus pycnostachyus var. pycnostachyus coastal marsh milk-vetch	PDFAB0F7B2	None	None	G2T2	S2	1B.2
Astragalus tener var. tener alkali milk-vetch	PDFAB0F8R1	None	None	G2T1	S1	1B.2
Athene cunicularia burrowing owl	ABNSB10010	None	None	G4	S3	SSC
Bombus caliginosus obscure bumble bee	IIHYM24380	None	None	G4?	S1S2	

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Bombus occidentalis western bumble bee	IIHYM24250	None	None	G2G3	S1	
Buteo swainsoni Swainson's hawk	ABNKC19070	None	Threatened	G5	S3	
Caecidotea tomalensis Tomales isopod	ICMAL01220	None	None	G2	S2S3	
Calamagrostis crassiglumis Thurber's reed grass	PMPOA17070	None	None	G3Q	S2	2B.1
Calicina diminua Marin blind harvestman	ILARAU8040	None	None	G1	S1	
Callophrys mossii marinensis Marin elfin butterfly	IILEPE2207	None	None	G4T1	S1	
Campanula californica swamp harebell	PDCAM02060	None	None	G3	S3	1B.2
Cardamine angulata seaside bittercress	PDBRA0K010	None	None	G4G5	S3	2B.1
Carex lyngbyei Lyngbye's sedge	PMCYP037Y0	None	None	G5	S3	2B.2
Castilleja affinis var. neglecta Tiburon paintbrush	PDSCR0D013	Endangered	Threatened	G4G5T1T2	S1S2	1B.2
Castilleja ambigua var. humboldtiensis Humboldt Bay owl's-clover	PDSCR0D402	None	None	G4T2	S2	1B.2
Ceanothus decornutus Nicasio ceanothus	PDRHA04440	None	None	G1	S1	1B.2
Ceanothus gloriosus var. porrectus Mt. Vision ceanothus	PDRHA040F7	None	None	G4T2	S2	1B.3
Ceanothus masonii Mason's ceanothus	PDRHA04200	None	Rare	G1	S1	1B.2
Charadrius nivosus nivosus western snowy plover	ABNNB03031	Threatened	None	G3T3	S2	SSC
Chloropyron maritimum ssp. palustre Point Reyes salty bird's-beak	PDSCR0J0C3	None	None	G4?T2	S2	1B.2
Chloropyron molle ssp. molle soft salty bird's-beak	PDSCR0J0D2	Endangered	Rare	G2T1	S1	1B.2
Chorizanthe cuspidata var. cuspidata San Francisco Bay spineflower	PDPGN04081	None	None	G2T1	S1	1B.2
Chorizanthe valida Sonoma spineflower	PDPGN040V0	Endangered	Endangered	G1	S1	1B.1
Cicindela hirticollis gravida sandy beach tiger beetle	IICOL02101	None	None	G5T2	S2	
Cicuta maculata var. bolanderi Bolander's water-hemlock	PDAPI0M051	None	None	G5T4T5	S2?	2B.1

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Cirsium andrewsii Franciscan thistle	PDAST2E050	None	None	G3	S3	1B.2
Cirsium hydrophilum var. vaseyi Mt. Tamalpais thistle	PDAST2E1G2	None	None	G2T1	S1	1B.2
Coastal Brackish Marsh Coastal Brackish Marsh	CTT52200CA	None	None	G2	S2.1	
Coastal Terrace Prairie Coastal Terrace Prairie	CTT41100CA	None	None	G2	S2.1	
Collinsia corymbosa round-headed Chinese-houses	PDSCR0H060	None	None	G1	S1	1B.2
Corynorhinus townsendii Townsend's big-eared bat	AMACC08010	None	None	G4	S2	SSC
Coturnicops noveboracensis yellow rail	ABNME01010	None	None	G4	S1S2	SSC
Cypseloides niger black swift	ABNUA01010	None	None	G4	S2	SSC
Danaus plexippus pop. 1 monarch - California overwintering population	IILEPP2012	Candidate	None	G4T2T3	S2S3	
Delphinium bakeri Baker's larkspur	PDRAN0B050	Endangered	Endangered	G1	S1	1B.1
Delphinium luteum golden larkspur	PDRAN0B0Z0	Endangered	Rare	G1	S1	1B.1
Dicamptodon ensatus California giant salamander	AAAAH01020	None	None	G3	S2S3	SSC
Dirca occidentalis western leatherwood	PDTHY03010	None	None	G2	S2	1B.2
Egretta thula snowy egret	ABNGA06030	None	None	G5	S4	
Elanus leucurus white-tailed kite	ABNKC06010	None	None	G5	S3S4	FP
Emys marmorata western pond turtle	ARAAD02030	None	None	G3G4	S3	SSC
Entosthodon kochii Koch's cord moss	NBMUS2P050	None	None	G1	S1	1B.3
Erethizon dorsatum North American porcupine	AMAFJ01010	None	None	G5	S3	
Eriogonum luteolum var. caninum Tiburon buckwheat	PDPGN083S1	None	None	G5T2	S2	1B.2
Erysimum concinnum bluff wallflower	PDBRA160E3	None	None	G3	S2	1B.2
Eucyclogobius newberryi tidewater goby	AFCQN04010	Endangered	None	G3	S3	

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Fissidens pauperculus minute pocket moss	NBMUS2W0U0	None	None	G3?	S2	1B.2
Fritillaria lanceolata var. tristulis Marin checker lily	PMLIL0V0P1	None	None	G5T2	S2	1B.1
Fritillaria liliacea fragrant fritillary	PMLIL0V0C0	None	None	G2	S2	1B.2
Geothlypis trichas sinuosa saltmarsh common yellowthroat	ABPBX1201A	None	None	G5T3	S3	SSC
Gilia capitata ssp. chamissonis blue coast gilia	PDPLM040B3	None	None	G5T2	S2	1B.1
Gilia capitata ssp. tomentosa woolly-headed gilia	PDPLM040B9	None	None	G5T2	S2	1B.1
Gilia millefoliata dark-eyed gilia	PDPLM04130	None	None	G2	S2	1B.2
Helianthella castanea Diablo helianthella	PDAST4M020	None	None	G2	S2	1B.2
Hemizonia congesta ssp. congesta congested-headed hayfield tarplant	PDAST4R065	None	None	G5T2	S2	1B.2
Hesperoleucus venustus subditus southern coastal roach	AFCJB19032	None	None	GNRTNR	S2	SSC
Hesperolinon congestum Marin western flax	PDLIN01060	Threatened	Threatened	G1	S1	1B.1
Heteranthera dubia water star-grass	PMPON03010	None	None	G5	S2	2B.2
Holocarpha macradenia Santa Cruz tarplant	PDAST4X020	Threatened	Endangered	G1	S1	1B.1
Horkelia marinensis Point Reyes horkelia	PDROS0W0B0	None	None	G2	S2	1B.2
Horkelia tenuiloba thin-lobed horkelia	PDROS0W0E0	None	None	G2	S2	1B.2
Hydrochara rickseckeri Ricksecker's water scavenger beetle	IICOL5V010	None	None	G2?	S2?	
Hypogymnia schizidiata island tube lichen	NLT0032640	None	None	G2G3	S2	1B.3
Ischnura gemina San Francisco forktail damselfly	IIODO72010	None	None	G2	S2	
Kopsiopsis hookeri small groundcone	PDORO01010	None	None	G4?	S1S2	2B.3
Lasionycteris noctivagans silver-haired bat	AMACC02010	None	None	G3G4	S3S4	
Lasiurus blossevillii western red bat	AMACC05060	None	None	G4	S3	SSC

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Lasiurus cinereus hoary bat	AMACC05030	None	None	G3G4	S4	
Lasthenia californica ssp. macrantha perennial goldfields	PDAST5L0C5	None	None	G3T2	S2	1B.2
Lasthenia conjugens Contra Costa goldfields	PDAST5L040	Endangered	None	G1	S1	1B.1
Laterallus jamaicensis coturniculus California black rail	ABNME03041	None	Threatened	G3G4T1	S1	FP
Lessingia micradenia var. micradenia Tamalpais lessingia	PDAST5S063	None	None	G2T2	S2	1B.2
Lichnanthe ursina bumblebee scarab beetle	IICOL67020	None	None	G2	S2	
Lilaeopsis masonii Mason's lilaeopsis	PDAPI19030	None	Rare	G2	S2	1B.1
Lilium maritimum coast lily	PMLIL1A0C0	None	None	G2	S2	1B.1
Lilium pardalinum ssp. pitkinense Pitkin Marsh lily	PMLIL1A0H3	Endangered	Endangered	G5T1	S1	1B.1
Linderiella occidentalis California linderiella	ICBRA06010	None	None	G2G3	S2S3	
Melospiza melodia samuelis San Pablo song sparrow	ABPBXA301W	None	None	G5T2	S2	SSC
Microseris paludosa marsh microseris	PDAST6E0D0	None	None	G2	S2	1B.2
Mielichhoferia elongata elongate copper moss	NBMUS4Q022	None	None	G5	S3S4	4.3
Navarretia leucocephala ssp. bakeri Baker's navarretia	PDPLM0C0E1	None	None	G4T2	S2	1B.1
Navarretia rosulata Marin County navarretia	PDPLM0C0Z0	None	None	G2	S2	1B.2
Northern Coastal Salt Marsh Northern Coastal Salt Marsh	CTT52110CA	None	None	G3	S3.2	
Northern Maritime Chaparral Northern Maritime Chaparral	CTT37C10CA	None	None	G1	S1.2	
Northern Vernal Pool Northern Vernal Pool	CTT44100CA	None	None	G2	S2.1	
Oncorhynchus kisutch pop. 4 coho salmon - central California coast ESU	AFCHA02034	Endangered	Endangered	G5T2T3Q	S2	
Oncorhynchus mykiss irideus pop. 8 steelhead - central California coast DPS	AFCHA0209G	Threatened	None	G5T2T3Q	S2S3	
Pandion haliaetus osprey	ABNKC01010	None	None	G5	S4	WL

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Pentachaeta bellidiflora white-rayed pentachaeta	PDAST6X030	Endangered	Endangered	G1	S1	1B.1
Phacelia insularis var. continentis North Coast phacelia	PDHYD0C2B1	None	None	G2T2	S2	1B.2
Plagiobothrys glaber hairless popcornflower	PDBOR0V0B0	None	None	GX	SX	1A
Plagiobothrys mollis var. vestitus Petaluma popcornflower	PDBOR0V0Q2	None	None	G4?TX	SX	1A
Pleuropogon hooverianus North Coast semaphore grass	PMPOA4Y070	None	Threatened	G2	S2	1B.1
Pogonichthys macrolepidotus Sacramento splittail	AFCJB34020	None	None	GNR	S3	SSC
Polygonum marinense Marin knotweed	PDPGN0L1C0	None	None	G2Q	S2	3.1
Pomatiopsis binneyi robust walker	IMGASJ9010	None	None	G1	S1	
Pomatiopsis californica Pacific walker	IMGASJ9020	None	None	G1	S1	
Quercus parvula var. tamalpaisensis Tamalpais oak	PDFAG051Q3	None	None	G4T2	S2	1B.3
Rallus obsoletus obsoletus California Ridgway's rail	ABNME05011	Endangered	Endangered	G3T1	S1	FP
Rana boylii foothill yellow-legged frog	AAABH01050	None	Endangered	G3	S3	SSC
Rana draytonii California red-legged frog	AAABH01022	Threatened	None	G2G3	S2S3	SSC
Reithrodontomys raviventris salt-marsh harvest mouse	AMAFF02040	Endangered	Endangered	G1G2	S1S2	FP
Riparia riparia bank swallow	ABPAU08010	None	Threatened	G5	S2	
Sagittaria sanfordii Sanford's arrowhead	PMALI040Q0	None	None	G3	S3	1B.2
Serpentine Bunchgrass Serpentine Bunchgrass	CTT42130CA	None	None	G2	S2.2	
Setophaga petechia yellow warbler	ABPBX03010	None	None	G5	S3S4	SSC
Sidalcea calycosa ssp. rhizomata Point Reyes checkerbloom	PDMAL11012	None	None	G5T2	S2	1B.2
Sidalcea hickmanii ssp. viridis Marin checkerbloom	PDMAL110A4	None	None	G3TH	SH	1B.1
Spirinchus thaleichthys longfin smelt	AFCHB03010	Candidate	Threatened	G5	S1	

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Stebbinsoseris decipiens Santa Cruz microseris	PDAST6E050	None	None	G2	S2	1B.2
Streptanthus anomalus Mount Burdell jewelflower	PDBRA2G520	None	None	G1	S1	1B.1
Streptanthus batrachopus Tamalpais jewelflower	PDBRA2G050	None	None	G2	S2	1B.3
Streptanthus glandulosus ssp. pulchellus Mt. Tamalpais bristly jewelflower	PDBRA2G0J2	None	None	G4T2	S2	1B.2
Stygobromus hyporheicus Hypoheic amphipod	ICMAL05D80	None	None	G1	S1	
Syncaris pacifica California freshwater shrimp	ICMAL27010	Endangered	Endangered	G2	S2	
Talanites ubicki Ubick's gnaphosid spider	ILARA98030	None	None	G1	S1	
Taricha rivularis red-bellied newt	AAAAF02020	None	None	G2	S2	SSC
Taxidea taxus American badger	AMAJF04010	None	None	G5	S3	SSC
Trachusa gummifera San Francisco Bay Area leaf-cutter bee	IIHYM80010	None	None	G1	S1	
Trifolium amoenum two-fork clover	PDFAB40040	Endangered	None	G1	S1	1B.1
Trifolium polyodon Pacific Grove clover	PDFAB402H0	None	Rare	G1	S1	1B.1
Triphysaria floribunda San Francisco owl's-clover	PDSCR2T010	None	None	G2?	S2?	1B.2
Triquetrella californica coastal triquetrella	NBMUS7S010	None	None	G2	S2	1B.2
Tryonia imitator mimic tryonia (=California brackishwater snail)	IMGASJ7040	None	None	G2	S2	
Vespericola marinensis Marin hesperian	IMGASA4140	None	None	G2	S2	

Record Count: 139

CNPS California Native Plant Society

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Plant List

106 matches found. *Click on scientific name for details*

Search Criteria

Found in Quads 3812227, 3812226, 3812225, 3812217, 3812216, 3812215, 3712287 3712286 and 3712285;

Modify Search Criteria | Export to Excel | Modify Columns | Modify Sort | Display Photos

Scientific Name	Common Name	Family	Lifeform	Blooming Period	CA Rare Plant Rank	State Rank	Global Rank
Abronia umbellata var. breviflora	pink sand-verbena	Nyctaginaceae	perennial herb	Jun-Oct	1B.1	S2	G4G5T2
Agrostis blasdalei	Blasdale's bent grass	Poaceae	perennial rhizomatous herb	May-Jul	1B.2	S2	G2
Allium peninsulare var. franciscanum	Franciscan onion	Alliaceae	perennial bulbiferous herb	(Apr)May-Jun	1B.2	S2	G5T2
Alopecurus aequalis var. sonomensis	Sonoma alopecurus	Poaceae	perennial herb	May-Jul	1B.1	S1	G5T1
Amorpha californica var. napensis	Napa false indigo	Fabaceae	perennial deciduous shrub	Apr-Jul	1B.2	S2	G4T2
Amsinckia lunaris	bent-flowered fiddleneck	Boraginaceae	annual herb	Mar-Jun	1B.2	S3	G3
Arabis blepharophylla	coast rockcress	Brassicaceae	perennial herb	Feb-May	4.3	S4	G4
Arctostaphylos montana ssp. montana	Mt. Tamalpais manzanita	Ericaceae	perennial evergreen shrub	Feb-Apr	1B.3	S3	G3T3
Arctostaphylos virgata	Marin manzanita	Ericaceae	perennial evergreen shrub	Jan-Mar	1B.2	S2	G2
Aspidotis carlotta-halliae	Carlotta Hall's lace fern	Pteridaceae	perennial rhizomatous herb	Jan-Dec	4.2	S3	G3
Astragalus breweri	Brewer's milk-vetch	Fabaceae	annual herb	Apr-Jun	4.2	S3	G3
Astragalus pycnostachyus var. pycnostachyus	coastal marsh milk-vetch	Fabaceae	perennial herb	(Apr)Jun-Oct	1B.2	S2	G2T2
Astragalus tener var. tener	alkali milk-vetch	Fabaceae	annual herb	Mar-Jun	1B.2	S1	G2T1
Calamagrostis crassiglumis	Thurber's reed grass	Poaceae	perennial rhizomatous herb	May-Aug	2B.1	S2	G3Q
Calamagrostis ophitidis	serpentine reed grass	Poaceae	perennial herb	Apr-Jul	4.3	S3	G3

Calandrinia breweri	Brewer's calandrinia	Montiaceae	annual herb	(Jan)Mar-Jun	4.2	S4	G4
Calochortus umbellatus	Oakland star-tulip	Liliaceae	perennial bulbiferous herb	Mar-May	4.2	S3?	G3?
Campanula californica	swamp harebell	Campanulaceae	perennial rhizomatous herb	Jun-Oct	1B.2	S3	G3
Cardamine angulata	seaside bittercress	Brassicaceae	perennial herb	(Jan)Mar-Jul	2B.2	S3	G4G5
Carex lyngbyei	Lyngbye's sedge	Cyperaceae	perennial rhizomatous herb	Apr-Aug	2B.2	S3	G5
Castilleja affinis var. neglecta	Tiburon paintbrush	Orobanchaceae	perennial herb (hemiparasitic)	Apr-Jun	1B.2	S1S2	G4G5T1T2
Castilleja ambigua var. ambigua	johnny-nip	Orobanchaceae	annual herb (hemiparasitic)	Mar-Aug	4.2	S3S4	G4T4
Castilleja ambigua var. humboldtiensis	Humboldt Bay owl's-clover	Orobanchaceae	annual herb (hemiparasitic)	Apr-Aug	1B.2	S2	G4T2
Ceanothus decornutus	Nicasio ceanothus	Rhamnaceae	perennial shrub	Mar-May	1B.2	S1	G1
Ceanothus gloriosus var. exaltatus	glory brush	Rhamnaceae	perennial evergreen shrub	Mar-Jun(Aug)	4.3	S4	G4T4
Ceanothus gloriosus var. gloriosus	Point Reyes ceanothus	Rhamnaceae	perennial evergreen shrub	Mar-May	4.3	S4	G4T4
Ceanothus gloriosus var. porrectus	Mt. Vision ceanothus	Rhamnaceae	perennial evergreen shrub	Feb-May	1B.3	S2	G4T2
Ceanothus masonii	Mason's ceanothus	Rhamnaceae	perennial evergreen shrub	Mar-Apr	1B.2	S1	G1
Ceanothus pinetorum	Kern ceanothus	Rhamnaceae	perennial evergreen shrub	May-Jul	4.3	S3	G3
Ceanothus rigidus	Monterey ceanothus	Rhamnaceae	perennial evergreen shrub	Feb-Apr(Jun)	4.2	S4	G4
Chloropyron maritimum ssp. palustre	Point Reyes bird's-beak	Orobanchaceae	annual herb (hemiparasitic)	Jun-Oct	1B.2	S2	G4?T2
Chloropyron molle ssp. molle	soft bird's-beak	Orobanchaceae	annual herb (hemiparasitic)	Jun-Nov	1B.2	S1	G2T1
Chorizanthe cuspidata var. cuspidata	San Francisco Bay spineflower	Polygonaceae	annual herb	Apr-Jul(Aug)	1B.2	S1	G2T1
Chorizanthe valida	Sonoma spineflower	Polygonaceae	annual herb	Jun-Aug	1B.1	S1	G1
Cicuta maculata var. bolanderi	Bolander's water-hemlock	Apiaceae	perennial herb	Jul-Sep	2B.1	S2?	G5T4T5
Cirsium andrewsii	Franciscan thistle	Asteraceae	perennial herb	Mar-Jul	1B.2	S3	G3
Cirsium hydrophilum var. vaseyi	Mt. Tamalpais thistle	Asteraceae	perennial herb	May-Aug	1B.2	S1	G2T1
Cistanthe maritima	seaside cistanthe	Montiaceae	annual herb	(Feb)Mar-Jun(Aug)	4.2	S3	G3G4
Collinsia corymbosa	round-headed Chinese-houses	Plantaginaceae	annual herb	Apr-Jun	1B.2	S1	G1
Cypripedium californicum	California lady's-slipper	Orchidaceae	perennial rhizomatous herb	Apr-Aug(Sep)	4.2	S4	G4
Delphinium bakeri	Baker's larkspur	Ranunculaceae	perennial herb	Mar-May	1B.1	S1	G1
Delphinium luteum	golden larkspur	Ranunculaceae	perennial herb	Mar-May	1B.1	S1	G1

Dirca occidentalis	western leatherwood	Thymelaeaceae	perennial deciduous shrub	Jan-Mar(Apr)	1B.2	S2	G2
Eleocharis parvula	small spikerush	Cyperaceae	perennial herb	(Apr)Jun-Aug(Sep)	4.3	S3	G5
Elymus californicus	California bottle-brush grass	Poaceae	perennial herb	May-Aug(Nov)	4.3	S4	G4
Entosthodon kochii	Koch's cord moss	Funariaceae	moss		1B.3	S1	G1
Erigeron biolettii	streamside daisy	Asteraceae	perennial herb	Jun-Oct	3	S3?	G3?
Eriogonum luteolum var. caninum	Tiburon buckwheat	Polygonaceae	annual herb	May-Sep	1B.2	S2	G5T2
Erysimum concinnum	bluff wallflower	Brassicaceae	annual / perennial herb	Feb-Jul	1B.2	S2	G3
Erysimum franciscanum	San Francisco wallflower	Brassicaceae	perennial herb	Mar-Jun	4.2	S3	G3
Fissidens pauperculus	minute pocket moss	Fissidentaceae	moss		1B.2	S2	G3?
Fritillaria lanceolata var. tristulis	Marin checker lily	Liliaceae	perennial bulbiferous herb	Feb-May	1B.1	S2	G5T2
Fritillaria liliacea	fragrant fritillary	Liliaceae	perennial bulbiferous herb	Feb-Apr	1B.2	S2	G2
Gilia capitata ssp. chamissonis	blue coast gilia	Polemoniaceae	annual herb	Apr-Jul	1B.1	S2	G5T2
Gilia capitata ssp. tomentosa	woolly-headed gilia	Polemoniaceae	annual herb	May-Jul	1B.1	S1	G5T1
Gilia millefoliata	dark-eyed gilia	Polemoniaceae	annual herb	Apr-Jul	1B.2	S2	G2
Grindelia hirsutula var. maritima	San Francisco gumplant	Asteraceae	perennial herb	Jun-Sep	3.2	S1	G5T1Q
Helianthella castanea	Diablo helianthella	Asteraceae	perennial herb	Mar-Jun	1B.2	S2	G2
Hemizonia congesta ssp. congesta	congested-headed hayfield tarplant	Asteraceae	annual herb	Apr-Nov	1B.2	S2	G5T2
Hesperevax sparsiflora var. brevifolia	short-leaved evax	Asteraceae	annual herb	Mar-Jun	1B.2	S2	G4T3
Hesperolinon congestum	Marin western flax	Linaceae	annual herb	Apr-Jul	1B.1	S1	G1
Heteranthera dubia	water star-grass	Pontederiaceae	perennial herb (aquatic)	Jul-Oct	2B.2	S2	G5
Holocarpha macradenia	Santa Cruz tarplant	Asteraceae	annual herb	Jun-Oct	1B.1	S1	G1
Horkelia marinensis	Point Reyes horkelia	Rosaceae	perennial herb	May-Sep	1B.2	S2	G2
Horkelia tenuiloba	thin-lobed horkelia	Rosaceae	perennial herb	May-Jul(Aug)	1B.2	S2	G2
Hosackia gracilis	harlequin lotus	Fabaceae	perennial rhizomatous herb	Mar-Jul	4.2	S3	G3G4
Hypogymnia schizidiata	island rock lichen	Parmeliaceae	foliose lichen (null)		1B.3	S1	G2
Kopsiopsis hookeri	small groundcone	Orobanchaceae	perennial rhizomatous herb (parasitic)	Apr-Aug	2B.3	S1S2	G4?
Lasthenia californica ssp. macrantha	perennial goldfields	Asteraceae	perennial herb	Jan-Nov	1B.2	S2	G3T2
Lasthenia conjugens	Contra Costa goldfields	Asteraceae	annual herb	Mar-Jun	1B.1	S1	G1
Layia carnosa	beach layia	Asteraceae	annual herb	Mar-Jul	1B.1	S2	G2

Leptosiphon acicularis	bristly leptosiphon	Polemoniaceae	annual herb	Apr-Jul	4.2	S4?	G4?
Leptosiphon croceus	coast yellow leptosiphon	Polemoniaceae	annual herb	Apr-Jun	1B.1	S1	G1
Leptosiphon grandiflorus	large-flowered leptosiphon	Polemoniaceae	annual herb	Apr-Aug	4.2	S3S4	G3G4
Lessingia hololeuca	woolly-headed lessingia	Asteraceae	annual herb	Jun-Oct	3	S2S3	G3?
Lessingia micradenia var. micradenia	Tamalpais lessingia	Asteraceae	annual herb	(Jun)Jul-Oct	1B.2	S2	G2T2
Lilaeopsis masonii	Mason's lilaeopsis	Apiaceae	perennial rhizomatous herb	Apr-Nov	1B.1	S2	G2
Lilium maritimum	coast lily	Liliaceae	perennial bulbiferous herb	May-Aug	1B.1	S2	G2
Lilium pardalinum ssp. pitkinense	Pitkin Marsh lily	Liliaceae	perennial bulbiferous herb	Jun-Jul	1B.1	S1	G5T1
Micropus amphibolus	Mt. Diablo cottonweed	Asteraceae	annual herb	Mar-May	3.2	S3S4	G3G4
Microseris paludosa	marsh microseris	Asteraceae	perennial herb	Apr-Jun(Jul)	1B.2	S2	G2
Mielichhoferia elongata	elongate copper moss	Mielichhoferiaceae	moss		4.3	S4	G5
Monardella sinuata ssp. nigrescens	northern curly-leaved monardella	Lamiaceae	annual herb	(Apr)May-Jul(Aug-Sep)	1B.2	S2	G3T2
Navarretia leucocephala ssp. bakeri	Baker's navarretia	Polemoniaceae	annual herb	Apr-Jul	1B.1	S2	G4T2
Navarretia rosulata	Marin County navarretia	Polemoniaceae	annual herb	May-Jul	1B.2	S2	G2
Pentachaeta bellidiflora	white-rayed pentachaeta	Asteraceae	annual herb	Mar-May	1B.1	S1	G1
Perideridia gairdneri ssp. gairdneri	Gairdner's yampah	Apiaceae	perennial herb	Jun-Oct	4.2	S3S4	G5T3T4
Phacelia insularis var. continentis	North Coast phacelia	Hydrophyllaceae	annual herb	Mar-May	1B.2	S2	G2T2
Plagiobothrys glaber	hairless popcornflower	Boraginaceae	annual herb	Mar-May	1A	SH	GH
Plagiobothrys mollis var. vestitus	Petaluma popcornflower	Boraginaceae	perennial herb	Jun-Jul	1A	SX	G4?TX
Pleuropogon hooverianus	North Coast semaphore grass	Poaceae	perennial rhizomatous herb	Apr-Jun	1B.1	S2	G2
Pleuropogon refractus	nodding semaphore grass	Poaceae	perennial rhizomatous herb	(Mar)Apr-Aug	4.2	S4	G4
Polygonum marinense	Marin knotweed	Polygonaceae	annual herb	(Apr)May-Aug(Oct)	3.1	S2	G2Q
Quercus parvula var. tamalpaisensis	Tamalpais oak	Fagaceae	perennial evergreen shrub	Mar-Apr	1B.3	S2	G4T2
Ranunculus lobbii	Lobb's aquatic buttercup	Ranunculaceae	annual herb (aquatic)	Feb-May	4.2	S3	G4
Ribes victoris	Victor's gooseberry	Grossulariaceae	perennial deciduous shrub	Mar-Apr	4.3	S3S4	G3G4
Sagittaria sanfordii	Sanford's arrowhead	Alismataceae	perennial rhizomatous herb (emergent)	May-Oct(Nov)	1B.2	S3	G3

Sidalcea calycosa ssp. rhizomata	Point Reyes checkerbloom	Malvaceae	perennial rhizomatous herb	Apr-Sep	1B.2	S2	G5T2
Sidalcea hickmanii ssp. viridis	Marin checkerbloom	Malvaceae	perennial herb	May-Jun	1B.1	SH	G3TH
Stebbinsoseris decipiens	Santa Cruz microseris	Asteraceae	annual herb	Apr-May	1B.2	S2	G2
Streptanthus batrachopus	Tamalpais jewelflower	Brassicaceae	annual herb	Apr-Jul	1B.3	S2	G2
Streptanthus glandulosus ssp. pulchellus	Mt. Tamalpais bristly jewelflower	Brassicaceae	annual herb	May-Jul(Aug)	1B.2	S2	G4T2
Trifolium amoenum	two-fork clover	Fabaceae	annual herb	Apr-Jun	1B.1	S1	G1
Trifolium polyodon	Pacific Grove clover	Fabaceae	annual herb	Apr-Jun(Jul)	1B.1	S1	G1
Triphysaria floribunda	San Francisco owl's-clover	Orobanchaceae	annual herb	Apr-Jun	1B.2	S2?	G2?
Triquetrella californica	coastal triquetrella	Pottiaceae	moss		1B.2	S2	G2

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Quad Name **Point Reyes NE**
Quad Number **38122-B7**

ESA Anadromous Fish

SONCC Coho ESU (T) -
CCC Coho ESU (E) - **X**
CC Chinook Salmon ESU (T) -
CVSR Chinook Salmon ESU (T) -
SRWR Chinook Salmon ESU (E) -
NC Steelhead DPS (T) -
CCC Steelhead DPS (T) - **X**
SCCC Steelhead DPS (T) -
SC Steelhead DPS (E) -
CCV Steelhead DPS (T) -
Eulachon (T) -
sDPS Green Sturgeon (T) -

ESA Anadromous Fish Critical Habitat

SONCC Coho Critical Habitat -
CCC Coho Critical Habitat - **X**
CC Chinook Salmon Critical Habitat -
CVSR Chinook Salmon Critical Habitat -
SRWR Chinook Salmon Critical Habitat -
NC Steelhead Critical Habitat -
CCC Steelhead Critical Habitat - **X**
SCCC Steelhead Critical Habitat -
SC Steelhead Critical Habitat -
CCV Steelhead Critical Habitat -
Eulachon Critical Habitat -
sDPS Green Sturgeon Critical Habitat -

ESA Marine Invertebrates

Range Black Abalone (E) - **X**
Range White Abalone (E) -

ESA Marine Invertebrates Critical Habitat

Black Abalone Critical Habitat -

ESA Sea Turtles

East Pacific Green Sea Turtle (T) - X
Olive Ridley Sea Turtle (T/E) -
Leatherback Sea Turtle (E) -
North Pacific Loggerhead Sea Turtle (E) -

ESA Whales

Blue Whale (E) -
Fin Whale (E) -
Humpback Whale (E) -
Southern Resident Killer Whale (E) -
North Pacific Right Whale (E) -
Sei Whale (E) -
Sperm Whale (E) -

ESA Pinnipeds

Guadalupe Fur Seal (T) -
Steller Sea Lion Critical Habitat -

Essential Fish Habitat

Coho EFH - X
Chinook Salmon EFH - X
Groundfish EFH - X
Coastal Pelagics EFH - X
Highly Migratory Species EFH -

MMPA Species (See list at left)

ESA and MMPA Cetaceans/Pinnipeds

See list at left and consult the NMFS Long Beach office 562-980-4000

MMPA Cetaceans -
MMPA Pinnipeds - **X**

Quad Name **Petaluma**
Quad Number **38122-B6**

ESA Anadromous Fish

SONCC Coho ESU (T) -
CCC Coho ESU (E) - **X**
CC Chinook Salmon ESU (T) -
CVSR Chinook Salmon ESU (T) -
SRWR Chinook Salmon ESU (E) -
NC Steelhead DPS (T) -
CCC Steelhead DPS (T) - **X**
SCCC Steelhead DPS (T) -
SC Steelhead DPS (E) -
CCV Steelhead DPS (T) -
Eulachon (T) -
sDPS Green Sturgeon (T) - **X**

ESA Anadromous Fish Critical Habitat

SONCC Coho Critical Habitat -
CCC Coho Critical Habitat - **X**
CC Chinook Salmon Critical Habitat -
CVSR Chinook Salmon Critical Habitat -
SRWR Chinook Salmon Critical Habitat -
NC Steelhead Critical Habitat -
CCC Steelhead Critical Habitat - **X**
SCCC Steelhead Critical Habitat -
SC Steelhead Critical Habitat -
CCV Steelhead Critical Habitat -
Eulachon Critical Habitat -
sDPS Green Sturgeon Critical Habitat - **X**

ESA Marine Invertebrates

Range Black Abalone (E) -
Range White Abalone (E) -

ESA Marine Invertebrates Critical Habitat

Black Abalone Critical Habitat -

ESA Sea Turtles

East Pacific Green Sea Turtle (T) -
Olive Ridley Sea Turtle (T/E) -
Leatherback Sea Turtle (E) -
North Pacific Loggerhead Sea Turtle (E) -

ESA Whales

Blue Whale (E) -
Fin Whale (E) -
Humpback Whale (E) -
Southern Resident Killer Whale (E) -
North Pacific Right Whale (E) -
Sei Whale (E) -
Sperm Whale (E) -

ESA Pinnipeds

Guadalupe Fur Seal (T) -
Steller Sea Lion Critical Habitat -

Essential Fish Habitat

Coho EFH - **X**
Chinook Salmon EFH - **X**
Groundfish EFH -
Coastal Pelagics EFH -
Highly Migratory Species EFH -

MMPA Species (See list at left)

ESA and MMPA Cetaceans/Pinnipeds

See list at left and consult the NMFS Long Beach office
562-980-4000

MMPA Cetaceans -
MMPA Pinnipeds -

Quad Name **Petaluma River**
Quad Number **38122-B5**

ESA Anadromous Fish

SONCC Coho ESU (T) -
CCC Coho ESU (E) -
CC Chinook Salmon ESU (T) -
CVSR Chinook Salmon ESU (T) -
SRWR Chinook Salmon ESU (E) -
NC Steelhead DPS (T) -
CCC Steelhead DPS (T) - **X**
SCCC Steelhead DPS (T) -
SC Steelhead DPS (E) -
CCV Steelhead DPS (T) -
Eulachon (T) -
sDPS Green Sturgeon (T) - **X**

ESA Anadromous Fish Critical Habitat

SONCC Coho Critical Habitat -
CCC Coho Critical Habitat -
CC Chinook Salmon Critical Habitat -
CVSR Chinook Salmon Critical Habitat -
SRWR Chinook Salmon Critical Habitat -
NC Steelhead Critical Habitat -
CCC Steelhead Critical Habitat - **X**
SCCC Steelhead Critical Habitat -
SC Steelhead Critical Habitat -
CCV Steelhead Critical Habitat -
Eulachon Critical Habitat -

sDPS Green Sturgeon Critical Habitat - X

ESA Marine Invertebrates

Range Black Abalone (E) -
Range White Abalone (E) -

ESA Marine Invertebrates Critical Habitat

Black Abalone Critical Habitat -

ESA Sea Turtles

East Pacific Green Sea Turtle (T) -
Olive Ridley Sea Turtle (T/E) -
Leatherback Sea Turtle (E) -
North Pacific Loggerhead Sea Turtle (E) -

ESA Whales

Blue Whale (E) -
Fin Whale (E) -
Humpback Whale (E) -
Southern Resident Killer Whale (E) -
North Pacific Right Whale (E) -
Sei Whale (E) -
Sperm Whale (E) -

ESA Pinnipeds

Guadalupe Fur Seal (T) -
Steller Sea Lion Critical Habitat -

Essential Fish Habitat

Coho EFH - X
Chinook Salmon EFH - X
Groundfish EFH - X
Coastal Pelagics EFH - X

Highly Migratory Species EFH -

MMPA Species (See list at left)

ESA and MMPA Cetaceans/Pinnipeds
See list at left and consult the NMFS Long Beach office 562-980-4000

MMPA Cetaceans -
MMPA Pinnipeds -

Quad Name **Inverness**
Quad Number **38122-A7**

ESA Anadromous Fish

SONCC Coho ESU (T) -
CCC Coho ESU (E) - **X**
CC Chinook Salmon ESU (T) -
CVSR Chinook Salmon ESU (T) -
SRWR Chinook Salmon ESU (E) -
NC Steelhead DPS (T) -
CCC Steelhead DPS (T) - **X**
SCCC Steelhead DPS (T) -
SC Steelhead DPS (E) -
CCV Steelhead DPS (T) -
Eulachon (T) -
sDPS Green Sturgeon (T) - **X**

ESA Anadromous Fish Critical Habitat

SONCC Coho Critical Habitat -
CCC Coho Critical Habitat - **X**
CC Chinook Salmon Critical Habitat -
CVSR Chinook Salmon Critical Habitat -
SRWR Chinook Salmon Critical Habitat -
NC Steelhead Critical Habitat -

CCC Steelhead Critical Habitat - X
SCCC Steelhead Critical Habitat -
SC Steelhead Critical Habitat -
CCV Steelhead Critical Habitat -
Eulachon Critical Habitat -
sDPS Green Sturgeon Critical Habitat - X

ESA Marine Invertebrates

Range Black Abalone (E) - X
Range White Abalone (E) -

ESA Marine Invertebrates Critical Habitat

Black Abalone Critical Habitat - X

ESA Sea Turtles

East Pacific Green Sea Turtle (T) - X
Olive Ridley Sea Turtle (T/E) - X
Leatherback Sea Turtle (E) - X
North Pacific Loggerhead Sea Turtle (E) -

ESA Whales

Blue Whale (E) - X
Fin Whale (E) - X
Humpback Whale (E) - X
Southern Resident Killer Whale (E) - X
North Pacific Right Whale (E) - X
Sei Whale (E) - X
Sperm Whale (E) - X

ESA Pinnipeds

Guadalupe Fur Seal (T) - X
Steller Sea Lion Critical Habitat -

Essential Fish Habitat

Coho EFH - **X**
Chinook Salmon EFH - **X**
Groundfish EFH - **X**
Coastal Pelagics EFH - **X**
Highly Migratory Species EFH -

MMPA Species (See list at left)

ESA and MMPA Cetaceans/Pinnipeds

See list at left and consult the NMFS Long Beach office 562-980-4000

MMPA Cetaceans - **X**
MMPA Pinnipeds - **X**

Quad Name **San Geronimo**
Quad Number **38122-A6**

ESA Anadromous Fish

SONCC Coho ESU (T) -
CCC Coho ESU (E) - **X**
CC Chinook Salmon ESU (T) -
CVSR Chinook Salmon ESU (T) -
SRWR Chinook Salmon ESU (E) -
NC Steelhead DPS (T) -
CCC Steelhead DPS (T) - **X**
SCCC Steelhead DPS (T) -
SC Steelhead DPS (E) -
CCV Steelhead DPS (T) -
Eulachon (T) -
sDPS Green Sturgeon (T) -

ESA Anadromous Fish Critical Habitat

SONCC Coho Critical Habitat -

CCC Coho Critical Habitat - X
CC Chinook Salmon Critical Habitat -
CVSR Chinook Salmon Critical Habitat -
SRWR Chinook Salmon Critical Habitat -
NC Steelhead Critical Habitat -
CCC Steelhead Critical Habitat - X
SCCC Steelhead Critical Habitat -
SC Steelhead Critical Habitat -
CCV Steelhead Critical Habitat -
Eulachon Critical Habitat -
sDPS Green Sturgeon Critical Habitat -

ESA Marine Invertebrates

Range Black Abalone (E) -
Range White Abalone (E) -

ESA Marine Invertebrates Critical Habitat

Black Abalone Critical Habitat -

ESA Sea Turtles

East Pacific Green Sea Turtle (T) -
Olive Ridley Sea Turtle (T/E) -
Leatherback Sea Turtle (E) -
North Pacific Loggerhead Sea Turtle (E) -

ESA Whales

Blue Whale (E) -
Fin Whale (E) -
Humpback Whale (E) -
Southern Resident Killer Whale (E) -
North Pacific Right Whale (E) -
Sei Whale (E) -
Sperm Whale (E) -

ESA Pinnipeds

Guadalupe Fur Seal (T) -
Steller Sea Lion Critical Habitat -

Essential Fish Habitat

Coho EFH - **X**
Chinook Salmon EFH - **X**
Groundfish EFH -
Coastal Pelagics EFH -
Highly Migratory Species EFH -

MMPA Species (See list at left)

ESA and MMPA Cetaceans/Pinnipeds

See list at left and consult the NMFS Long Beach office 562-980-4000

MMPA Cetaceans -
MMPA Pinnipeds -

Quad Name **San Rafael**
Quad Number **37122-H5**

ESA Anadromous Fish

SONCC Coho ESU (T) -
CCC Coho ESU (E) - **X**
CC Chinook Salmon ESU (T) -
CVSR Chinook Salmon ESU (T) - **X**
SRWR Chinook Salmon ESU (E) - **X**
NC Steelhead DPS (T) -
CCC Steelhead DPS (T) - **X**
SCCC Steelhead DPS (T) -
SC Steelhead DPS (E) -
CCV Steelhead DPS (T) - **X**

Eulachon (T) -
sDPS Green Sturgeon (T) - X

ESA Anadromous Fish Critical Habitat

SONCC Coho Critical Habitat -
CCC Coho Critical Habitat - X
CC Chinook Salmon Critical Habitat -
CVSR Chinook Salmon Critical Habitat -
SRWR Chinook Salmon Critical Habitat - X
NC Steelhead Critical Habitat -
CCC Steelhead Critical Habitat - X
SCCC Steelhead Critical Habitat -
SC Steelhead Critical Habitat -
CCV Steelhead Critical Habitat -
Eulachon Critical Habitat -
sDPS Green Sturgeon Critical Habitat - X

ESA Marine Invertebrates

Range Black Abalone (E) - X
Range White Abalone (E) -

ESA Marine Invertebrates Critical Habitat

Black Abalone Critical Habitat - X

ESA Sea Turtles

East Pacific Green Sea Turtle (T) - X
Olive Ridley Sea Turtle (T/E) - X
Leatherback Sea Turtle (E) - X
North Pacific Loggerhead Sea Turtle (E) -

ESA Whales

Blue Whale (E) - X
Fin Whale (E) - X

Humpback Whale (E) - X
Southern Resident Killer Whale (E) - X
North Pacific Right Whale (E) - X
Sei Whale (E) - X
Sperm Whale (E) - X

ESA Pinnipeds

Guadalupe Fur Seal (T) - X
Steller Sea Lion Critical Habitat -

Essential Fish Habitat

Coho EFH - X
Chinook Salmon EFH - X
Groundfish EFH - X
Coastal Pelagics EFH - X
Highly Migratory Species EFH -

MMPA Species (See list at left)

ESA and MMPA Cetaceans/Pinnipeds

See list at left and consult the NMFS Long Beach office 562-980-4000

MMPA Cetaceans - X
MMPA Pinnipeds - X

Quad Name **Novato**
Quad Number **38122-A5**

ESA Anadromous Fish

SONCC Coho ESU (T) -
CCC Coho ESU (E) - X
CC Chinook Salmon ESU (T) -
CVSR Chinook Salmon ESU (T) -

SRWR Chinook Salmon ESU (E) -
NC Steelhead DPS (T) -
CCC Steelhead DPS (T) - X
SCCC Steelhead DPS (T) -
SC Steelhead DPS (E) -
CCV Steelhead DPS (T) -
Eulachon (T) -
sDPS Green Sturgeon (T) - X

ESA Anadromous Fish Critical Habitat

SONCC Coho Critical Habitat -
CCC Coho Critical Habitat - X
CC Chinook Salmon Critical Habitat -
CVSR Chinook Salmon Critical Habitat -
SRWR Chinook Salmon Critical Habitat -
NC Steelhead Critical Habitat -
CCC Steelhead Critical Habitat - X
SCCC Steelhead Critical Habitat -
SC Steelhead Critical Habitat -
CCV Steelhead Critical Habitat -
Eulachon Critical Habitat -
sDPS Green Sturgeon Critical Habitat - X

ESA Marine Invertebrates

Range Black Abalone (E) -
Range White Abalone (E) -

ESA Marine Invertebrates Critical Habitat

Black Abalone Critical Habitat -

ESA Sea Turtles

East Pacific Green Sea Turtle (T) -
Olive Ridley Sea Turtle (T/E) -
Leatherback Sea Turtle (E) -
North Pacific Loggerhead Sea Turtle (E) -

ESA Whales

Blue Whale (E) -
Fin Whale (E) -
Humpback Whale (E) -
Southern Resident Killer Whale (E) -
North Pacific Right Whale (E) -
Sei Whale (E) -
Sperm Whale (E) -

ESA Pinnipeds

Guadalupe Fur Seal (T) -
Steller Sea Lion Critical Habitat -

Essential Fish Habitat

Coho EFH - **X**
Chinook Salmon EFH - **X**
Groundfish EFH - **X**
Coastal Pelagics EFH - **X**
Highly Migratory Species EFH -

MMPA Species (See list at left)

ESA and MMPA Cetaceans/Pinnipeds

See list at left and consult the NMFS Long Beach office 562-980-4000

MMPA Cetaceans -
MMPA Pinnipeds -

Quad Name **Double Point**
Quad Number **37122-H7**

ESA Anadromous Fish

SONCC Coho ESU (T) -

CCC Coho ESU (E) - X
CC Chinook Salmon ESU (T) -
CVSR Chinook Salmon ESU (T) -
SRWR Chinook Salmon ESU (E) -
NC Steelhead DPS (T) -
CCC Steelhead DPS (T) - X
SCCC Steelhead DPS (T) -
SC Steelhead DPS (E) -
CCV Steelhead DPS (T) -
Eulachon (T) -
sDPS Green Sturgeon (T) - X

ESA Anadromous Fish Critical Habitat

SONCC Coho Critical Habitat -
CCC Coho Critical Habitat - X
CC Chinook Salmon Critical Habitat -
CVSR Chinook Salmon Critical Habitat -
SRWR Chinook Salmon Critical Habitat -
NC Steelhead Critical Habitat -
CCC Steelhead Critical Habitat - X
SCCC Steelhead Critical Habitat -
SC Steelhead Critical Habitat -
CCV Steelhead Critical Habitat -
Eulachon Critical Habitat -
sDPS Green Sturgeon Critical Habitat - X

ESA Marine Invertebrates

Range Black Abalone (E) - X
Range White Abalone (E) -

ESA Marine Invertebrates Critical Habitat

Black Abalone Critical Habitat - X

ESA Sea Turtles

East Pacific Green Sea Turtle (T) - X
Olive Ridley Sea Turtle (T/E) - X
Leatherback Sea Turtle (E) - X
North Pacific Loggerhead Sea Turtle (E) -

ESA Whales

Blue Whale (E) - X
Fin Whale (E) - X
Humpback Whale (E) - X
Southern Resident Killer Whale (E) - X
North Pacific Right Whale (E) - X
Sei Whale (E) - X
Sperm Whale (E) - X

ESA Pinnipeds

Guadalupe Fur Seal (T) - X
Steller Sea Lion Critical Habitat -

Essential Fish Habitat

Coho EFH - X
Chinook Salmon EFH - X
Groundfish EFH - X
Coastal Pelagics EFH - X
Highly Migratory Species EFH -

MMPA Species (See list at left)

ESA and MMPA Cetaceans/Pinnipeds

See list at left and consult the NMFS Long Beach office 562-980-4000

MMPA Cetaceans - X
MMPA Pinnipeds - X

Quad Name **Bolinas**
Quad Number **37122-H6**

ESA Anadromous Fish

SONCC Coho ESU (T) -
CCC Coho ESU (E) - **X**
CC Chinook Salmon ESU (T) -
CVSR Chinook Salmon ESU (T) -
SRWR Chinook Salmon ESU (E) -
NC Steelhead DPS (T) -
CCC Steelhead DPS (T) - **X**
SCCC Steelhead DPS (T) -
SC Steelhead DPS (E) -
CCV Steelhead DPS (T) -
Eulachon (T) -
sDPS Green Sturgeon (T) - **X**

ESA Anadromous Fish Critical Habitat

SONCC Coho Critical Habitat -
CCC Coho Critical Habitat - **X**
CC Chinook Salmon Critical Habitat -
CVSR Chinook Salmon Critical Habitat -
SRWR Chinook Salmon Critical Habitat -
NC Steelhead Critical Habitat -
CCC Steelhead Critical Habitat - **X**
SCCC Steelhead Critical Habitat -
SC Steelhead Critical Habitat -
CCV Steelhead Critical Habitat -
Eulachon Critical Habitat -
sDPS Green Sturgeon Critical Habitat - **X**

ESA Marine Invertebrates

Range Black Abalone (E) - **X**
Range White Abalone (E) -

ESA Marine Invertebrates Critical Habitat

Black Abalone Critical Habitat - X

ESA Sea Turtles

East Pacific Green Sea Turtle (T) - X
Olive Ridley Sea Turtle (T/E) - X
Leatherback Sea Turtle (E) - X
North Pacific Loggerhead Sea Turtle (E) -

ESA Whales

Blue Whale (E) - X
Fin Whale (E) - X
Humpback Whale (E) - X
Southern Resident Killer Whale (E) - X
North Pacific Right Whale (E) - X
Sei Whale (E) - X
Sperm Whale (E) - X

ESA Pinnipeds

Guadalupe Fur Seal (T) - X
Steller Sea Lion Critical Habitat -

Essential Fish Habitat

Coho EFH - X
Chinook Salmon EFH - X
Groundfish EFH - X
Coastal Pelagics EFH - X
Highly Migratory Species EFH -

MMPA Species (See list at left)

ESA and MMPA Cetaceans/Pinnipeds

See list at left and consult the NMFS Long Beach office 562-980-4000

MMPA Cetaceans - **X**

MMPA Pinnipeds - **X**

IPaC **U.S. Fish & Wildlife Service**

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Project information

NAME

West Marin Drainage Maintenance Project

LOCATION

Marin County, California

DESCRIPTION

None

Local office

Sacramento Fish And Wildlife Office

(916) 414-6600

(916) 414-6713

Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Log in to IPaC.
2. Go to your My Projects list.
3. Click PROJECT HOME for this project.
4. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Birds

NAME	STATUS

California Least Tern Sterna antillarum browni — Endangered
Wherever found
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/8104

Marbled Murrelet Brachyramphus marmoratus — Threatened
There is **final** critical habitat for this species. The location of the critical habitat is not available.
https://ecos.fws.gov/ecp/species/4467

Northern Spotted Owl Strix occidentalis caurina — Threatened
Wherever found
There is **final** critical habitat for this species. The location of the critical habitat is not available.
https://ecos.fws.gov/ecp/species/1123

Western Snowy Plover Charadrius nivosus nivosus — Threatened
There is **final** critical habitat for this species. The location of the critical habitat is not available.
https://ecos.fws.gov/ecp/species/8035

Reptiles

NAME	STATUS
Green Sea Turtle Chelonia mydas	Threatened

No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/6199

Amphibians

NAME	STATUS
California Red-legged Frog Rana draytonii	Threatened

Wherever found
There is **final** critical habitat for this species. The location of the critical habitat is not available.
https://ecos.fws.gov/ecp/species/2891

Fishes

NAME	STATUS
Delta Smelt Hypomesus transpacificus	Threatened

Wherever found
There is **final** critical habitat for this species. The location of the critical habitat is not available.
https://ecos.fws.gov/ecp/species/321

Tidewater Goby Eucyclogobius newberryi — Endangered
Wherever found
There is **final** critical habitat for this species. The location of the critical habitat is not available.
https://ecos.fws.gov/ecp/species/57

Insects

NAME	STATUS

Monarch Butterfly Danaus plexippus — Candidate
Wherever found
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/9743

Myrtle's Silverspot Butterfly Speyeria zerene myrtleae — Endangered
Wherever found
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/6929

Crustaceans

NAME	STATUS

California Freshwater Shrimp Syncaris pacifica — Endangered
Wherever found
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/7903

Flowering Plants

NAME	STATUS

Marin Dwarf-flax Hesperolinon congestum — Threatened
Wherever found
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/5363

Showy Indian Clover Trifolium amoenum — Endangered
Wherever found
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/6459

Sonoma Alopecurus Alopecurus aequalis var. sonomensis — Endangered
Wherever found
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/557

Tiburon Paintbrush Castilleja affinis ssp. neglecta Endangered
Wherever found
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/2687

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird

species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE. "BREEDS ELSEWHERE" INDICATES THAT THE BIRD DOES NOT LIKELY BREED IN YOUR PROJECT AREA.)
Allen's Hummingbird Selasphorus sasin This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9637	Breeds Feb 1 to Jul 15
Bald Eagle Haliaeetus leucocephalus This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Jan 1 to Aug 31
Black Swift Cypseloides niger This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8878	Breeds Jun 15 to Sep 10
Black Turnstone Arenaria melanocephala This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds elsewhere
California Spotted Owl Strix occidentalis occidentalis This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/7266	Breeds Mar 10 to Jun 15

California Thrasher Toxostoma redivivum — Breeds Jan 1 to Jul 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Cassin's Finch Carpodacus cassinii — Breeds May 15 to Jul 15
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9462

Clark's Grebe Aechmophorus clarkii — Breeds Jun 1 to Aug 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Common Yellowthroat Geothlypis trichas sinuosa — Breeds May 20 to Jul 31
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/2084

Golden Eagle Aquila chrysaetos — Breeds Jan 1 to Aug 31
This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.
https://ecos.fws.gov/ecp/species/1680

Long-eared Owl asio otus — Breeds Mar 1 to Jul 15
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/3631

Marbled Godwit Limosa fedoa — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9481

Nuttall's Woodpecker Picoides nuttallii — Breeds Apr 1 to Jul 20
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/9410

Oak Titmouse Baeolophus inornatus — Breeds Mar 15 to Jul 15
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9656

Olive-sided Flycatcher Contopus cooperi — Breeds May 20 to Aug 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/3914

Short-billed Dowitcher Limnodromus griseus — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9480

Tricolored Blackbird Agelaius tricolor — Breeds Mar 15 to Aug 10
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/3910

Willet Tringa semipalmata — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Wrentit Chamaea fasciata — Breeds Mar 15 to Aug 10
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Yellow Rail Coturnicops noveboracensis — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9476

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

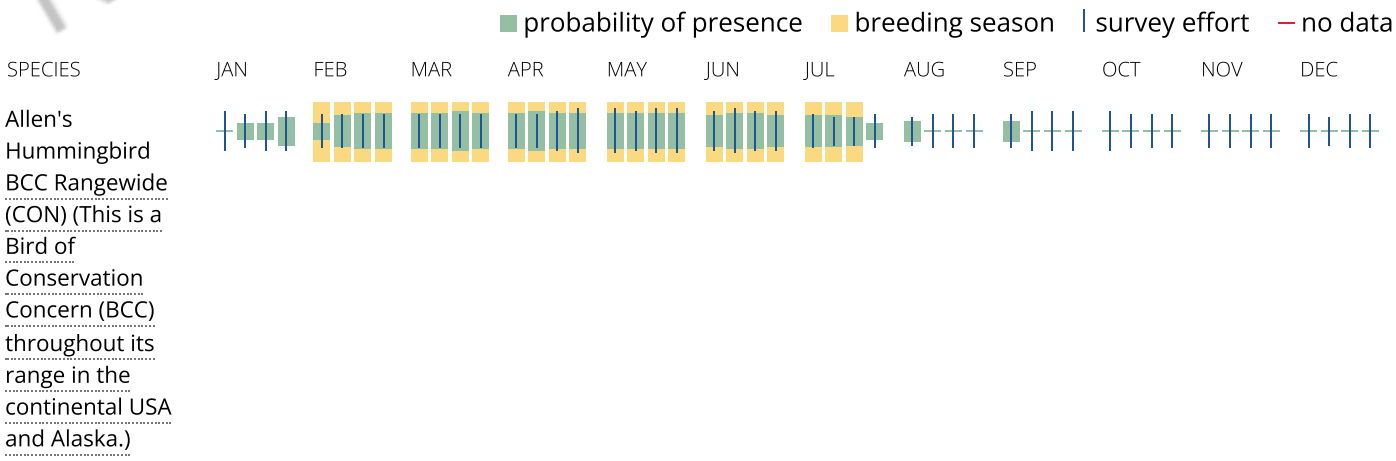
Breeding Season (▪)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

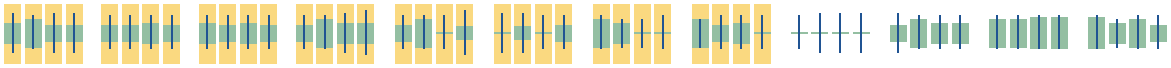
To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

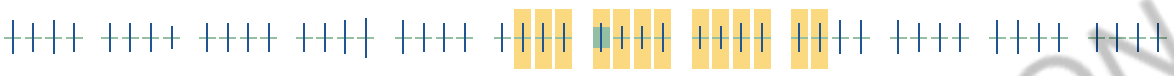
Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



Bald Eagle
Non-BCC Vulnerable (This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.)



Black Swift
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

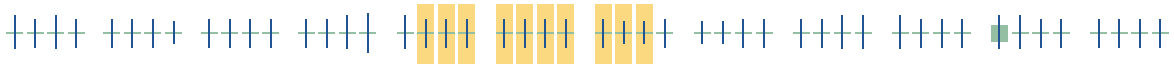


Black Turnstone
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

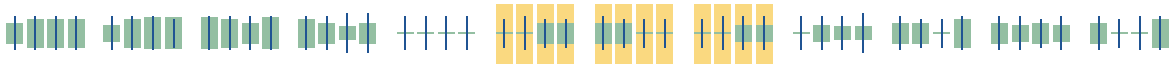
California Spotted Owl
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

California Thrasher
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Cassin's Finch BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

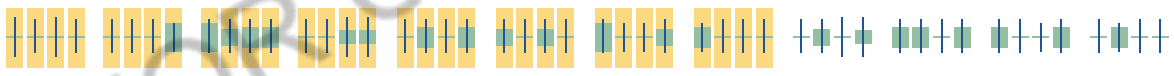


Clark's Grebe BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

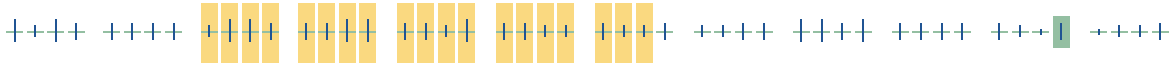


Common Yellowthroat BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)

Golden Eagle Non-BCC Vulnerable (This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.)



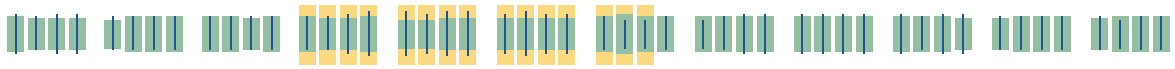
Long-eared Owl BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



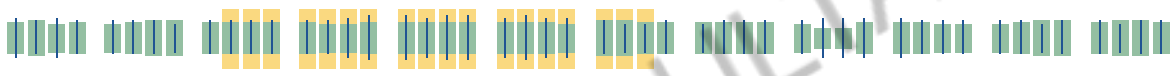
Marbled Godwit BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

SPECIES JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

Nuttall's Woodpecker BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)



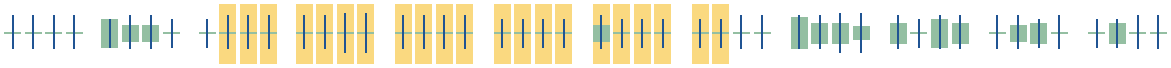
Oak Titmouse BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Olive-sided Flycatcher BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Short-billed Dowitcher BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Tricolored Blackbird BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Willet BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Wrentit BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Yellow Rail BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the AKN Phenology Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review.

Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

WETLAND INFORMATION IS NOT AVAILABLE AT THIS TIME

This can happen when the National Wetlands Inventory (NWI) map service is unavailable, or for very large projects that intersect many wetland areas. Try again, or visit the NWI map to view wetlands at this location.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

Appendix C

Cultural Resources Assessment

Technical Report

CULTURAL RESOURCES ASSESSMENT

West Marin Drainage Rehabilitation Project

Marin County, CA

August 2022

Prepared for:

Marin County Department of Public Works
3501 Civic Center Drive
Room 304
San Rafael, California 94903
Contact: Betsy Swenerton

(415)473-6680

Prepared by:

Horizon Water and Environment
P.O. Box 2727
Oakland, CA 94612
Dean Martorana, MA, RPA

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Acronyms and Abbreviations

AB	assembly bill
APE	area of potential effects
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CRHR	California Register of Historical Resources
FIGR	Federated Indians of Graton Rancheria
GIS	geographic information system
Horizon	Horizon Water and Environment
NAHC	Native American Heritage Commission
NHPA	National Historic Preservation Act
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWIC	Northwest Information Center
PRC	Public Resources Code
Project	West Marin Drainage Rehabilitation Project
RPA	registered professional anthropologist
TCR	tribal cultural resource
USC	United States Code
WRCC	Western Regional Climate Center

Executive Summary

This document reports the results of a cultural resource assessment of the West Marin Drainage Rehabilitation Project (project) (referred below as the project, proposed project or proposed undertaking) that is being conducted by the County of Marin (the County).

The report documents cultural resources inventory methods and results as required for compliance with federal and California regulations. The study consisted of a literature review to identify any previously recorded cultural resources that could be affected by the proposed project and a field survey to locate any cultural resources that may exist but have not yet been recorded.

Based on the research and field study conducted, the project/undertaking will have no effect to an historic property pursuant to 36 Code of Federal Regulations (CFR) 800.4(d)(1), and it will have a less than significant effect to historical resources or unique archaeological resources under California Environmental Quality Act (CEQA).

This report has been prepared based on certain key assumptions made by Horizon Water and Environment (Horizon) that substantially affect its conclusions and recommendations. These assumptions are that the information gathered during the record search is up to date and accurate, and that the field survey results accurately identified the presence or absence of archaeological resources visible on the ground surface. These assumptions, although thought to be reasonable and appropriate, may not prove to be true in the future. Horizon's conclusions are conditioned upon these assumptions.

Information obtained from these sources in this timeframe (records search data as of December 2020 and a field survey in December 2021) is assumed to be correct and complete. Horizon does not assume any liability for findings or lack of findings based on misrepresentation of information presented to Horizon or for items that are not visible, made visible, accessible, or present at the time of this inventory.

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1 Introduction

The County is implementing the West Marin Drainage Rehabilitation Project to repair and maintain 32 culverts and repair three bank slip-outs on approximately 14 miles of roadway in west Marin County (**Figure 1**)**.**

This purpose of this Cultural Resource Assessment is to characterize the existing cultural resource setting and to assess the potential for project actions to cause adverse effects to historic properties within the area of potential effects (APE) and the vicinity surrounding the project, which includes 35 discrete project sites, including 32 culvert repair/replacement sites and three slip-outs sites located along Lagunitas, Nicasio, and San Geronimo creeks in west Marin County (**Figure 2**). The APE has a combined area of about 1 acre along various segments of roadway on a series of perennial riverine features as well as intermittent and ephemeral channels.

This cultural resource inventory was conducted to satisfy requirements of the California Environmental Quality Act (CEQA) and Section 106 of the National Historic Preservation Act (NHPA) (36 CFR Part 800). An archaeological field survey was completed by Horizon on December 29, 2021, for the purpose of identifying cultural resources within the APE of the proposed project/undertaking.

1.1 Project Location and Purpose

The project is located in the western portion of Marin County, along three roads: Point Reyes – Petaluma Road, Lucas Valley Road, and Nicasio Valley Road (see **Figure 2**). The individual project locations are depicted on the Inverness, San Geronimo, and Novato U.S. Geological Survey 7.5-miniute topographic quadrangles. Elevations in the project area range from approximately 25 feet above mean sea level to approximately 525 feet above mean sea level.

The study corridor extends west to east, from the intersection of Highway 1 and Point Reyes – Petaluma Road in the town of Point Reyes Station to the intersection of Point Reyes – Petaluma Road with Platform Bridge Road, approximately 2.5 miles east. A second portion of the project starts approximately 4 miles southeast of the Nicasio Reservoir, at the intersection of Lucas Valley Road and Nicasio Valley Road. The project corridor here has two branches. The north branch runs along the Lucas Valley Road west to east for approximately 4 miles. The south branch runs along the Nicasio Valley Road north to south for approximately 3 miles (**Figure 2**).

The project corridor crosses largely undeveloped land. Adjacent land uses include rural residential, rangeland, and open space. There is an artificial reservoir with a dam in between project sites (Nicasio Reservoir and Seeger Dam).

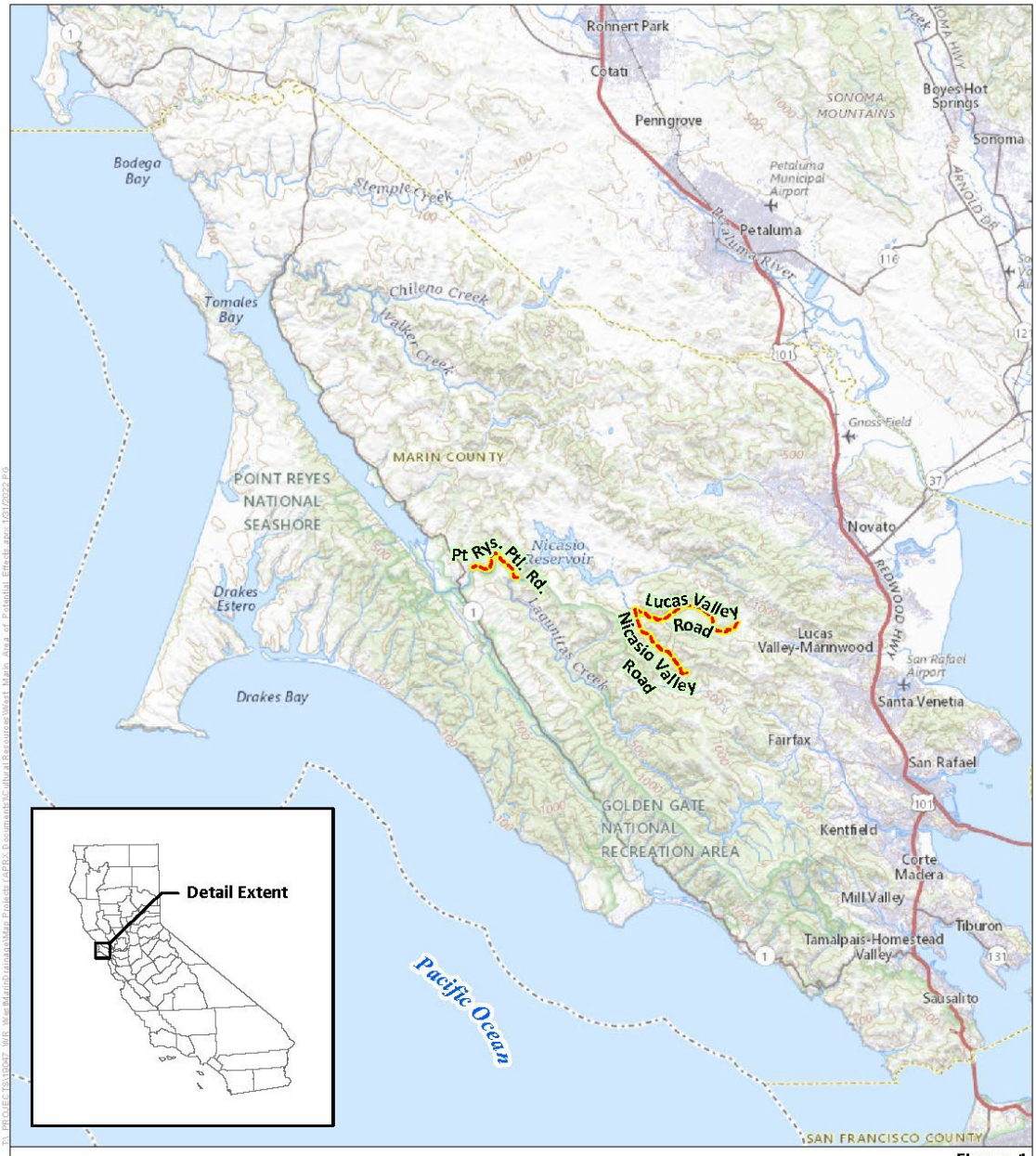
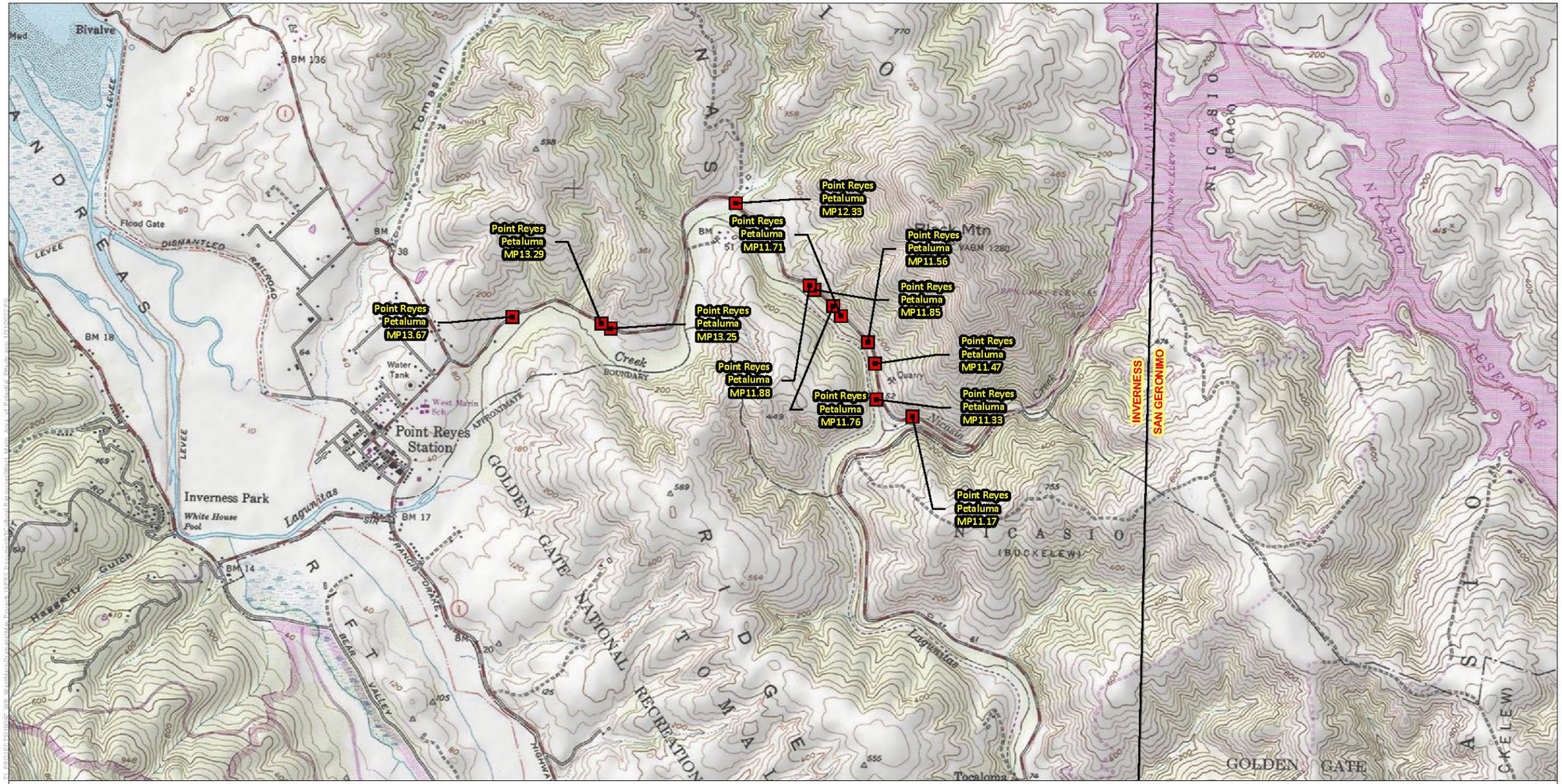


Figure 1
Project Vicinity

West Marin Drainage
Rehabilitation Project
Cultural Resource Assessment



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Scale: 1:24,000

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Miles

Project Locations

USGS Quad Index

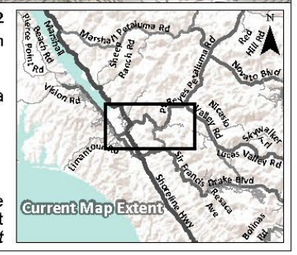
Horizon WATER and ENVIRONMENT

Data Source: ESRI 2018; Wood Rogers 2020

Figure 2
Project Location

Pt Reyes Station Area

West Marin Drainage Rehabilitation Project
Cultural Resources Assessment



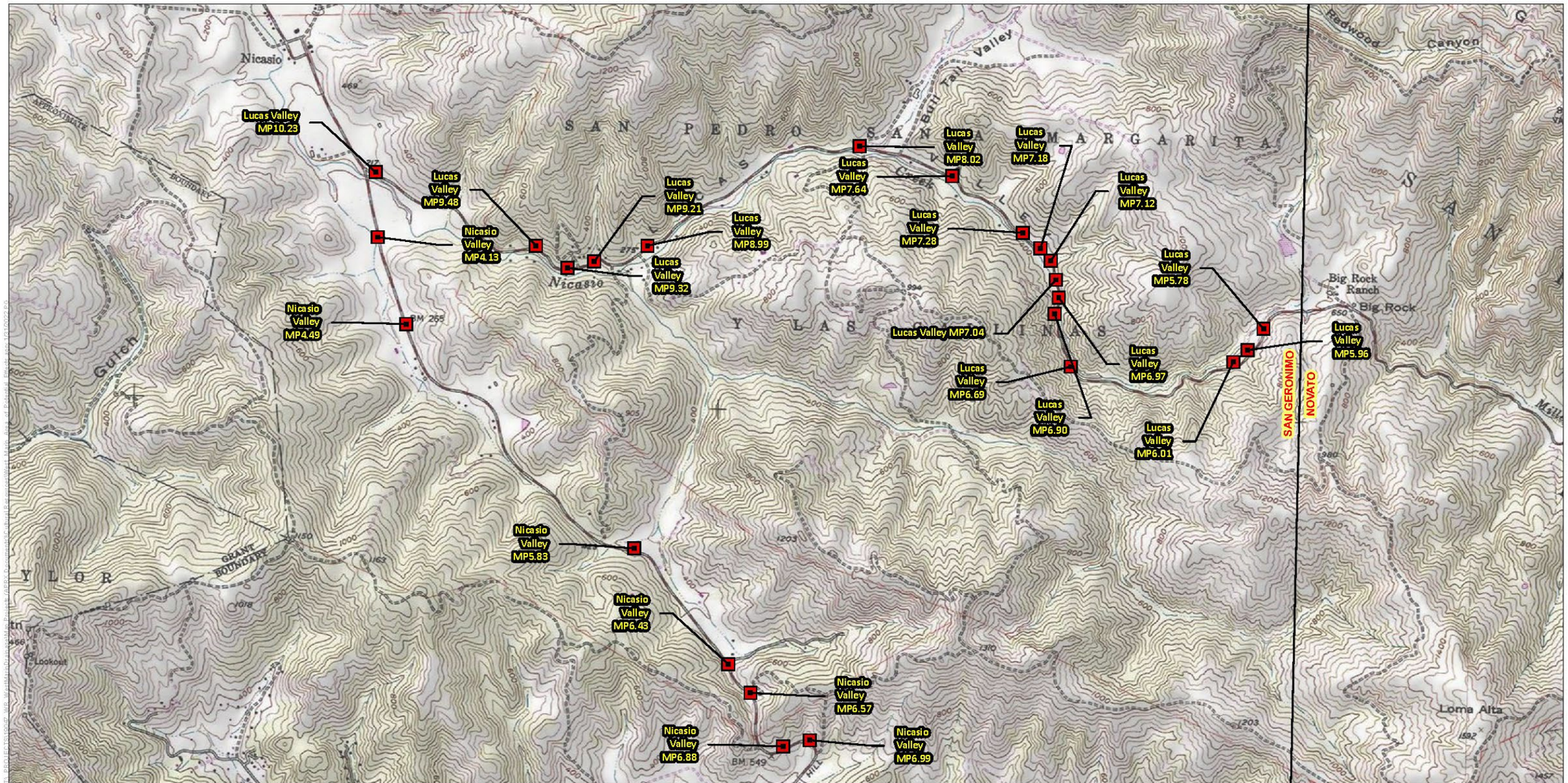


Figure 2
Project Location

Nicasio Valley and Lucas Valley Roads Area

West Marin Drainage
Rehabilitation Project
Cultural Resources Assessment

1.2 Project Description

The project addresses culvert deficiencies using a variety of maintenance treatment types specific for each location. A culvert assessment report was prepared to proactively address declining infrastructure before it failed. One hundred and fifty culverts along this 14-mile stretch of roadway were assessed. The culvert assessment report identified 32 road culverts requiring urgent improvement due to dilapidated conditions that could incur flooding risk, safety issues, and environmental impacts. Culvert maintenance treatment types may include extending culvert outfall pipes to avoid flanking or undermining; grouting or lining culvert interiors; paving culvert inverts replacing damaged sections or failed pipes in-kind; installing larger diameter pipes where culverts are undersized; installing inlet drop structures to capture sediment before it enters the culvert; placing rock riprap at culvert inlets and/or outlets; constructing concrete headwalls; and improving fish passage. The project would not install culverts in new locations. The project activities will be confined to the road prism and County right-of-way to the extent feasible to complete the maintenance activity.

Area of Potential Effects

The archaeological APE for each project location includes the culvert infrastructure and a 20-foot buffer (**Figure 3**). All staging areas for work will be within existing roadways and will largely be on adjacent road shoulders. The vertical APE is anticipated to not exceed the level of existing disturbance associated with each culvert or slip-out location, which varies throughout, but tends to average around 5 to 10 feet below the existing road grade. The total area of all project sites representing the APE is about 1 acre.

The proposed actions are located along rural roads that contain no built environment within the boundaries of the proposed project, other than the roads itself and the existing culvert infrastructure which are largely underground and, by and large, not visible from the road. Further, the proposed actions do not include any above-ground structures. Consequently, no architectural APE was defined that differed from the archaeological APE.

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Figure 3
Area of Potential Effects

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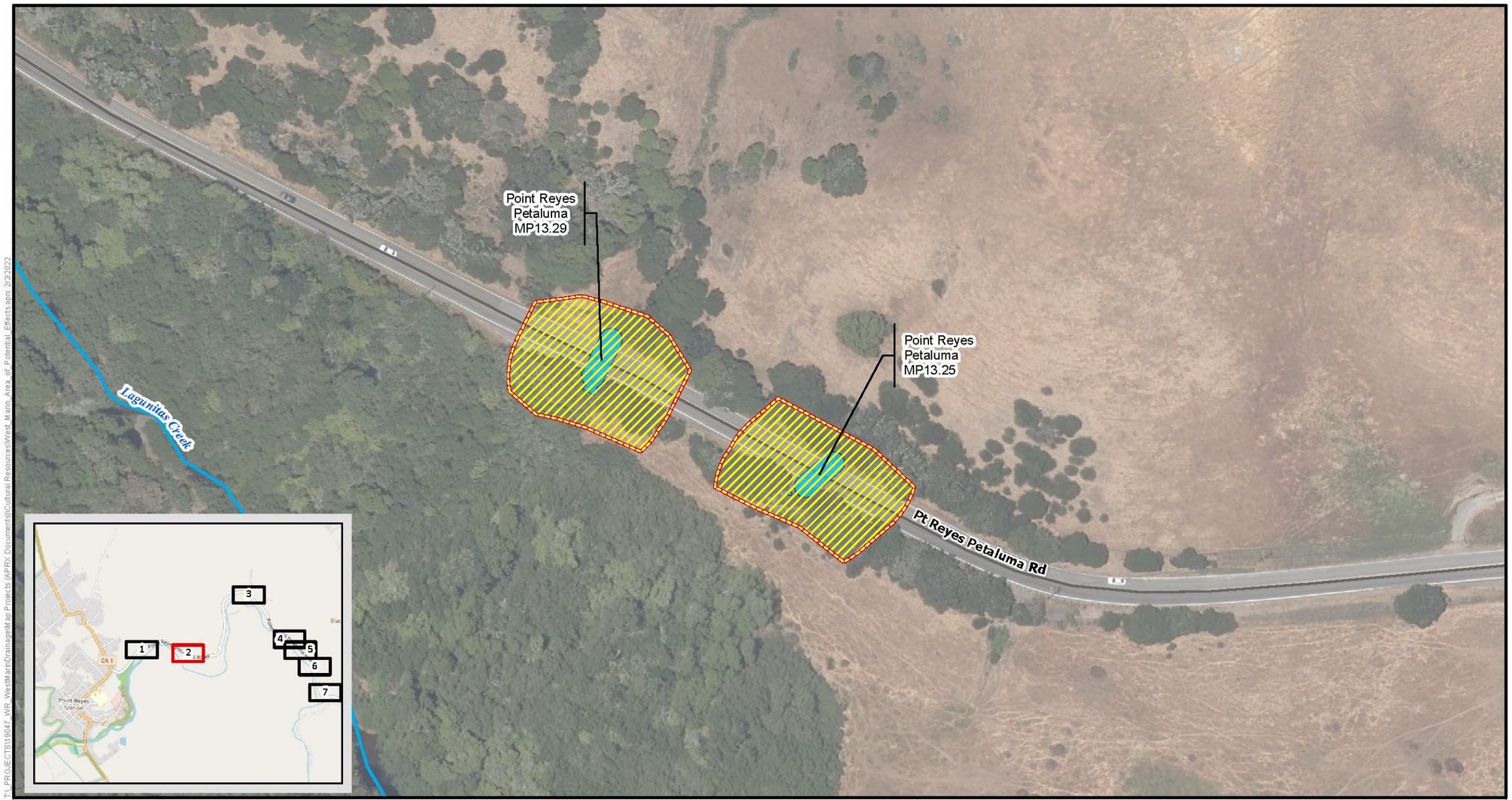
Cultural Resources Assessment


Point Reyes
Petaluma
MP13.29
Point Reyes
Petaluma
MP13.25
Lagunitas Creek
Pt Reyes Petaluma Rd
1
2
3
4
5
6
7
Point Reyes Station
CA 1
Basemap Sources: © OpenStreetMap (and) contributors, CC-BY-SA, Golden Gate National Parks Conservancy
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Feet
Horizon
WATER and ENVIRONMENT
Survey Coverage Area 12.31-Acres
Area of Potential Effects 1.03-Acres
Road
Arterial
Stream/River: Perennial
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Figure 3
Area of Potential Effects

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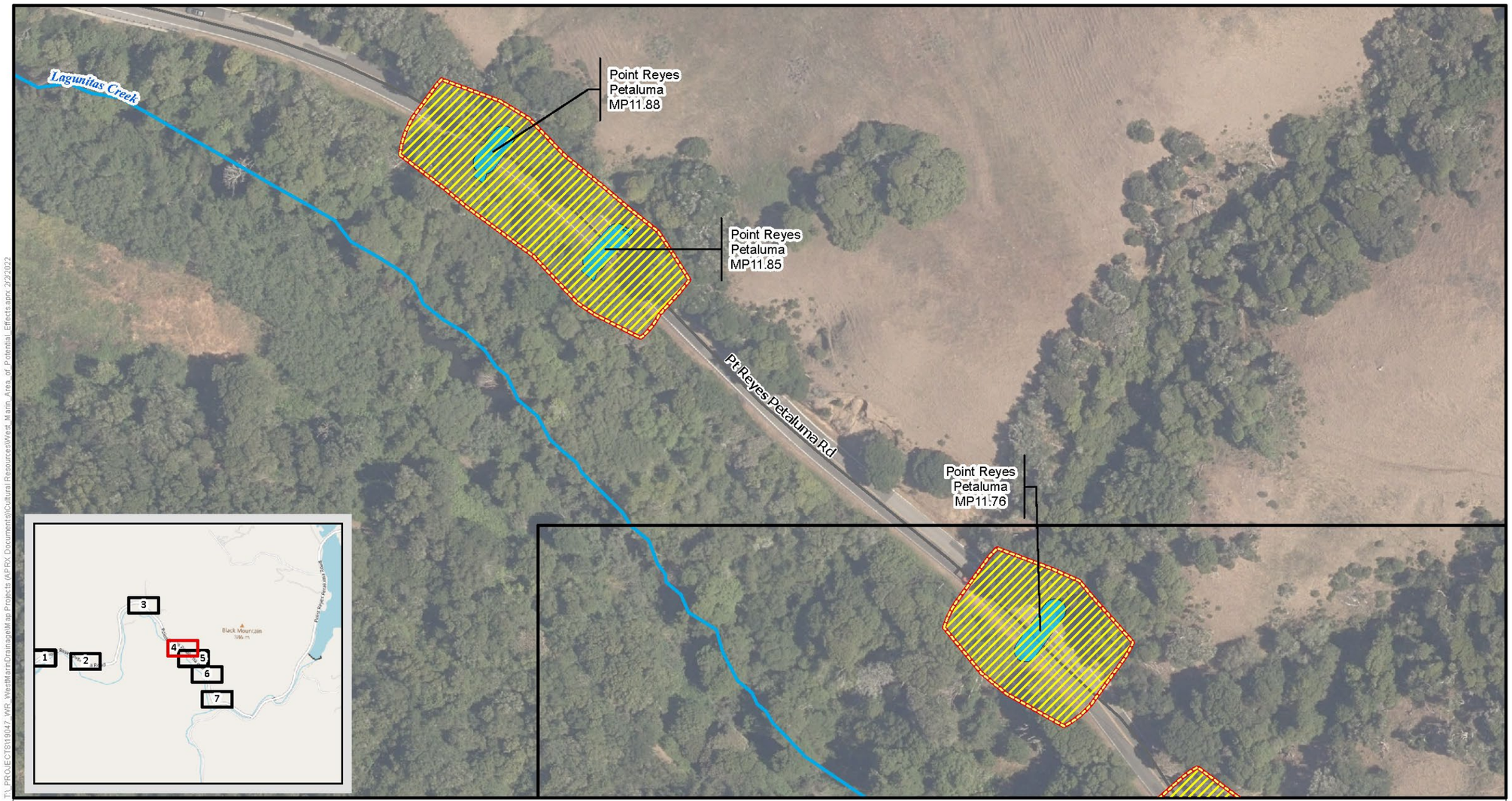

Figure 3
Area of Potential Effects

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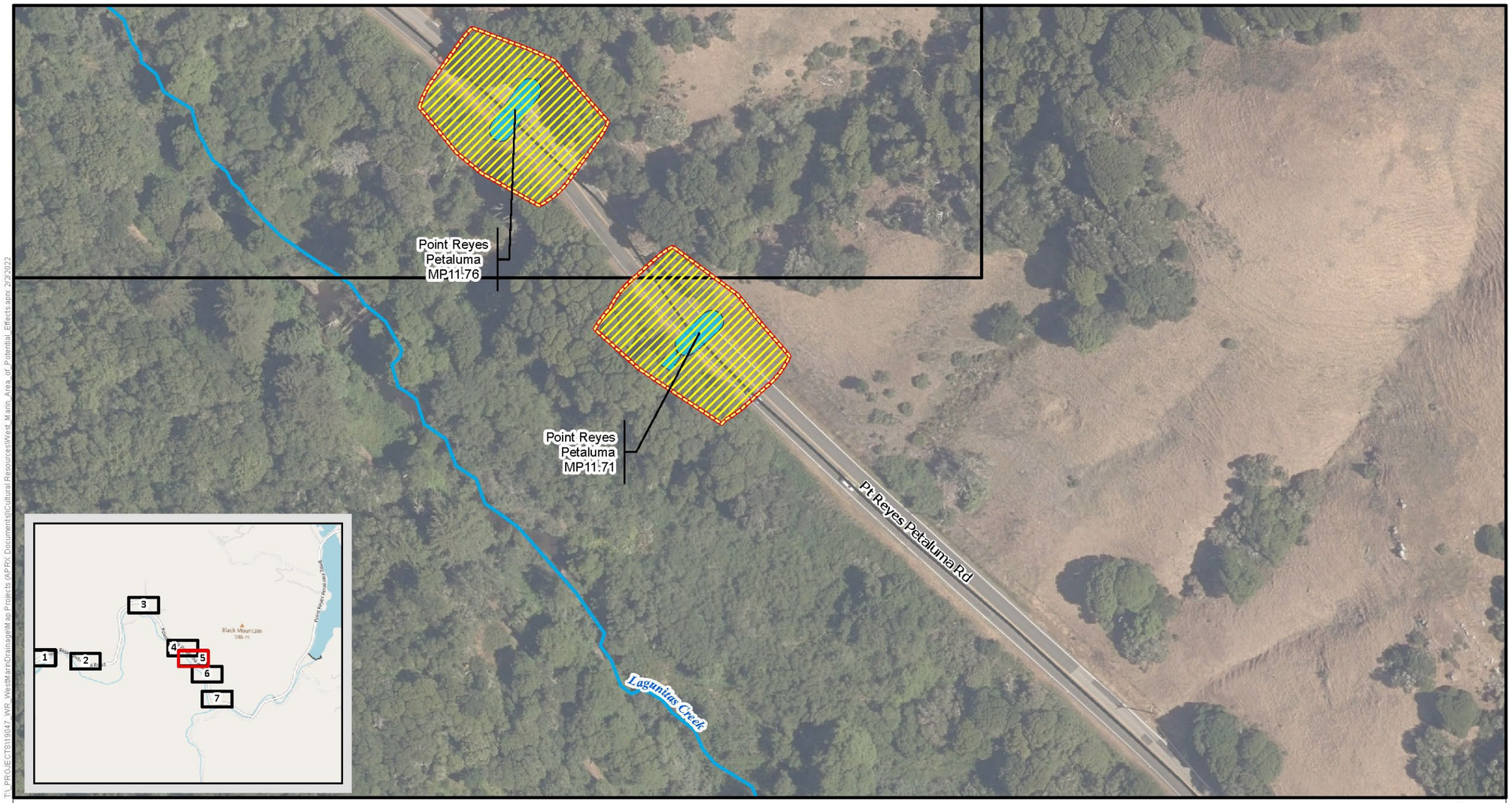

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Figure 3
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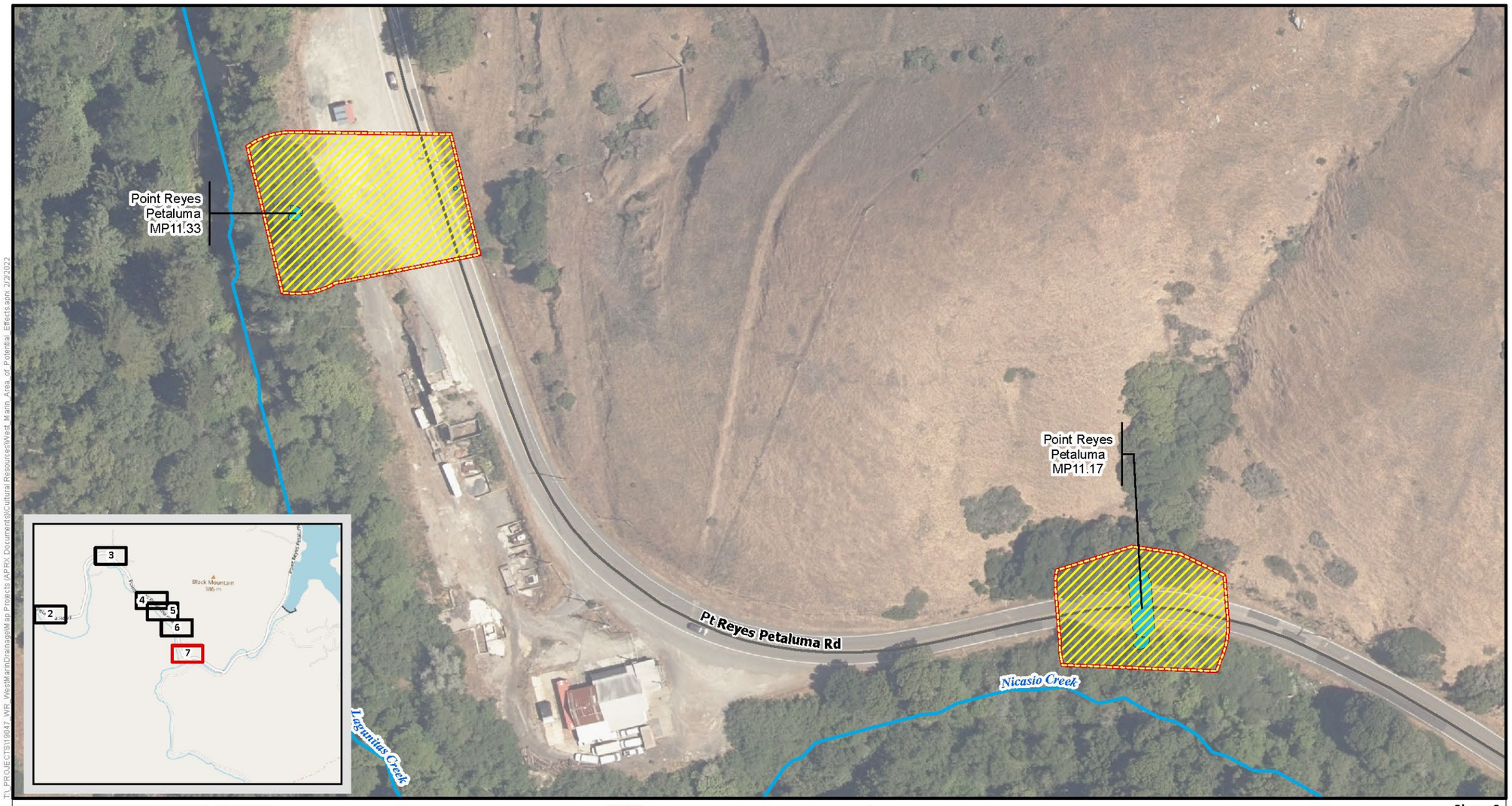

Figure 3
Area of Potential Effects

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Figure 3
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Figure 3
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Cultural Resources Assessment


Nicasio Valley Rd
Nicasio Valley MP6.57
10
11
12
13
French Ranch Open Space Preserve
Point Reyes Petaluma Road
Tomasini Point
Spirit Rock
San Geronimo Commons
San Francisco Drive Boulevard
San Geronimo
Woodacre
Basemap Sources: © OpenStreetMap (and) contributors, CC-BY-SA, Golden Gate National Parks Conservancy
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Nicasio Valley MP6.88
Nicasio Valley Rd
Nicasio Valley MP6.99
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French Ranch Open Space Preserve
Spirit Rock
San Geronimo
San Francis Drake Boulevard
Woodacre
Basemap Sources: © OpenStreetMap (and) contributors, CC-BY-SA, Golden Gate National Parks Conservancy
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Survey Coverage Area 12.31-Acres
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Nicasio Valley Rd
Lucas Valley
MP10.23
Lucas Valley Rd
Nicasio Creek
Nicasio Valley Rd
14
8
15
16
17
9
Nicasio Valley Road
Basemap Sources: © OpenStreetMap (and) contributors, CC-BY-SA, Golden Gate National Parks Conservancy
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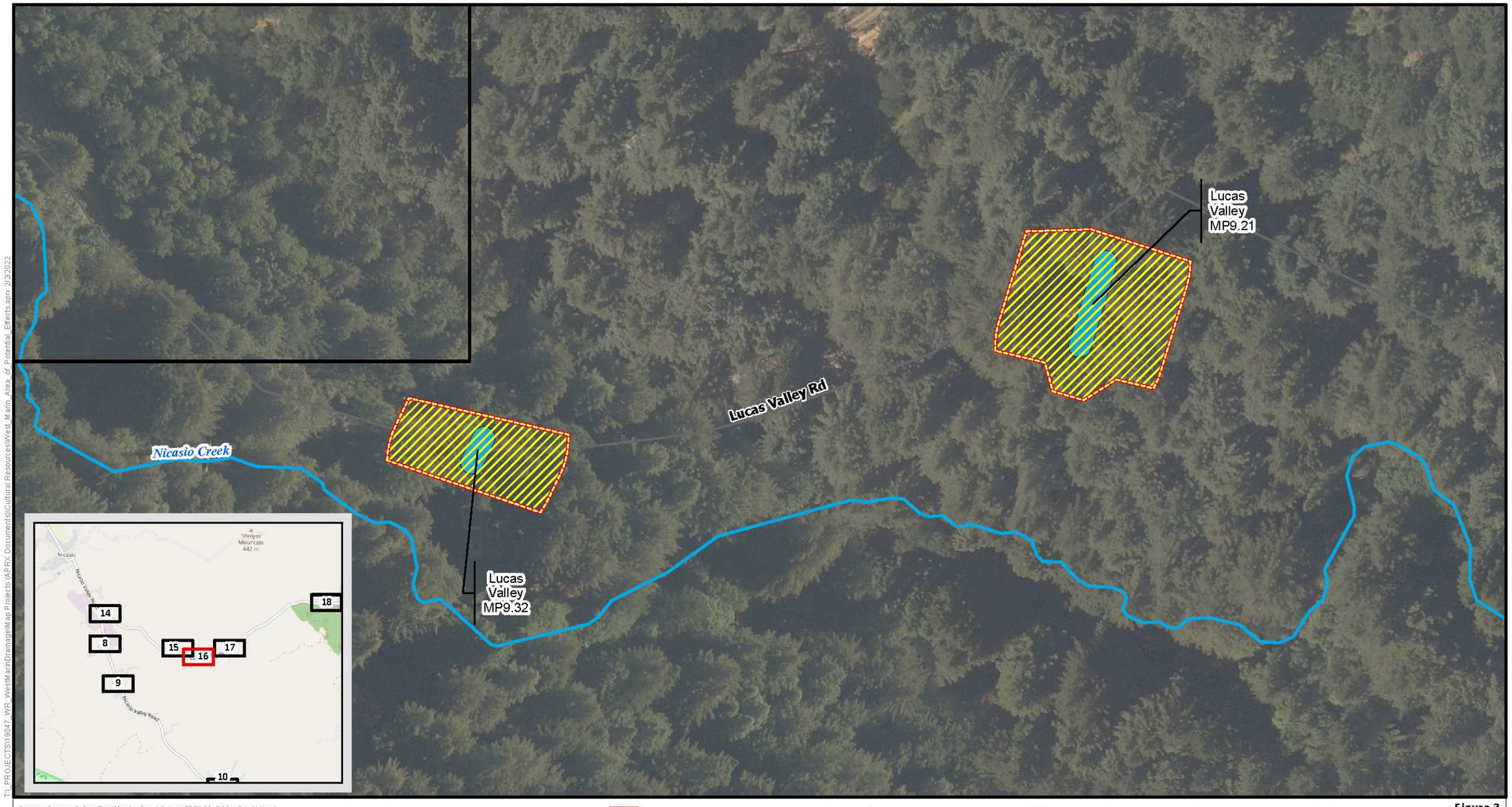
Lucas Valley MP9.21
Lucas Valley Rd
Nicasio Creek
Lucas Valley MP9.32
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17
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10
Shroyer Mountain 442 m
Nicasio
Lucas Valley Road
Basemap Sources: © OpenStreetMap (and) contributors, CC-BY-SA, Golden Gate National Parks Conservancy
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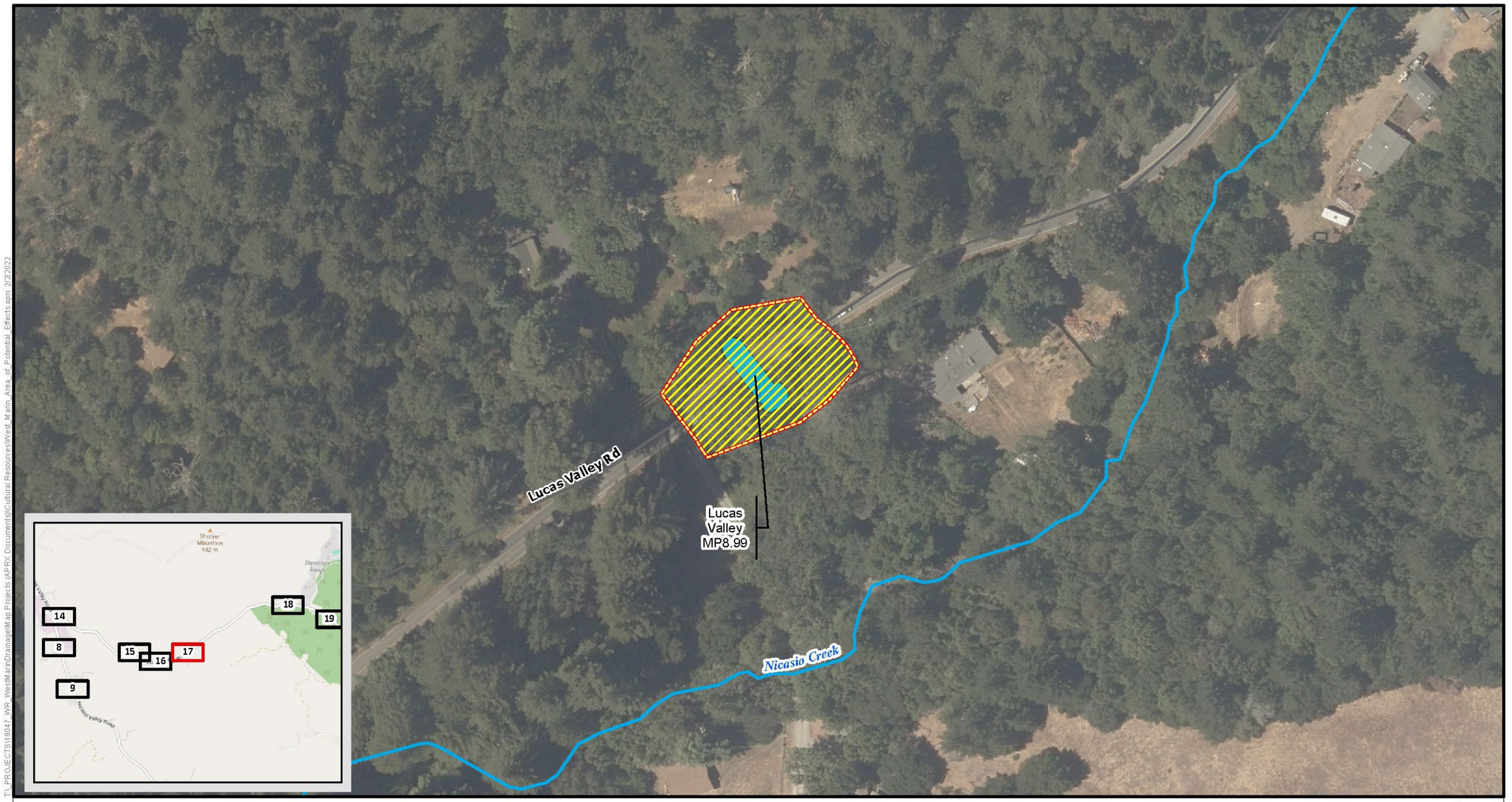

Figure 3
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Lucas Valley MP8.02
Lucas Valley Rd
Skywalker Trl
Nicasio Creek
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19
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Shroyer Mountain 442 m
Skywalker Ranch
Basemap Sources: © OpenStreetMap (and) contributors, CC-BY-SA, Golden Gate National Parks Conservancy
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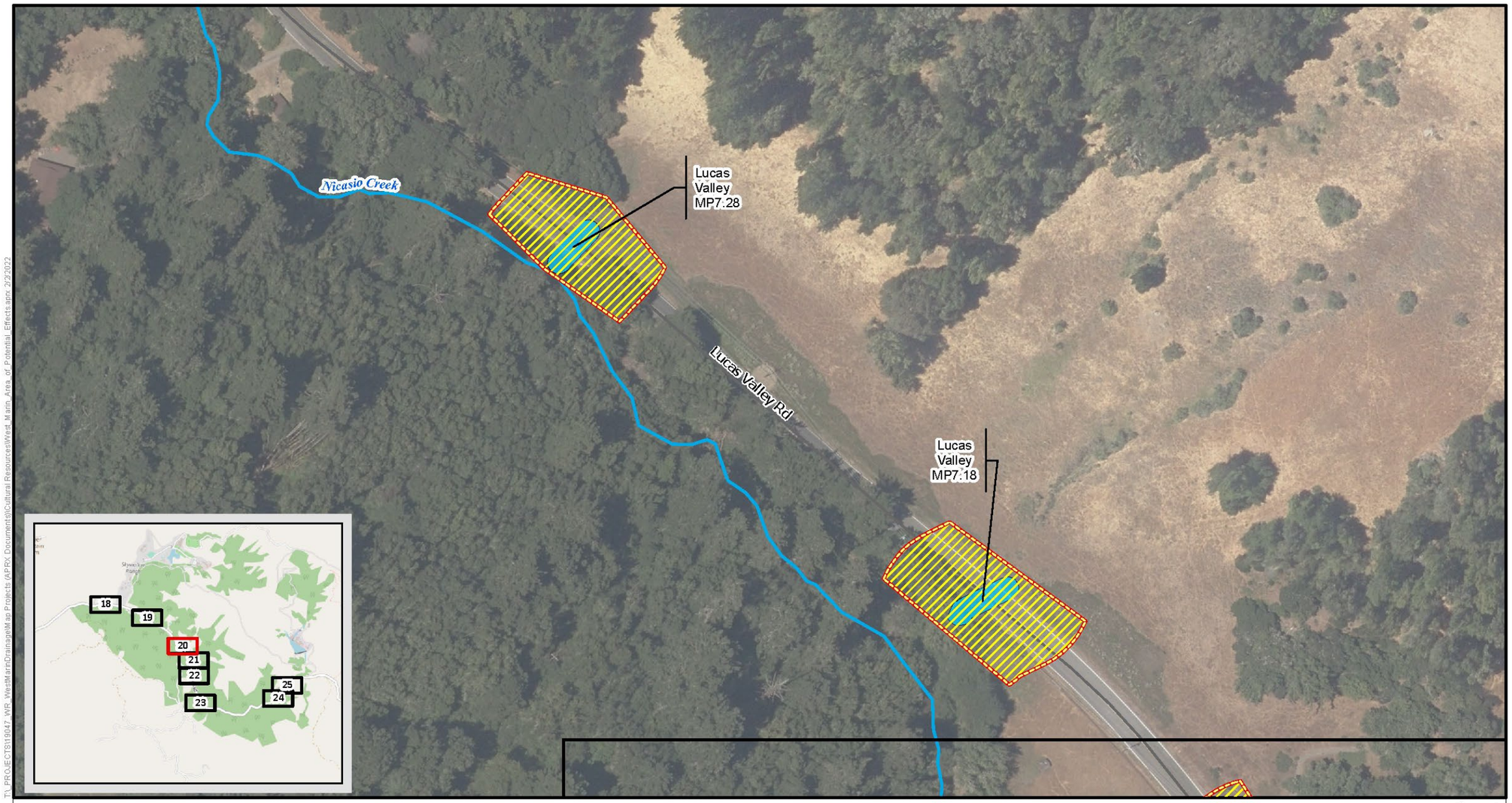

Figure 3
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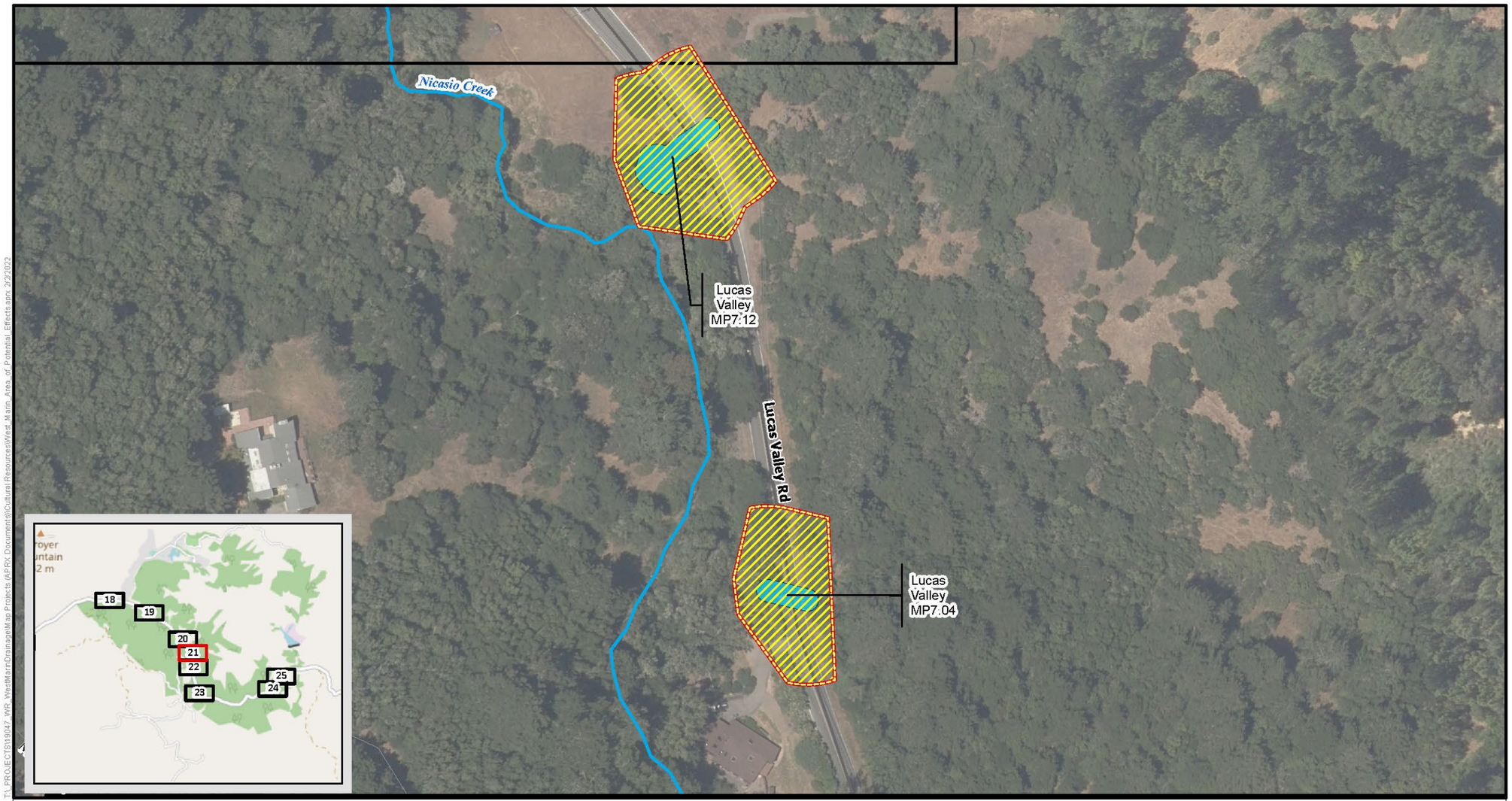

Figure 3
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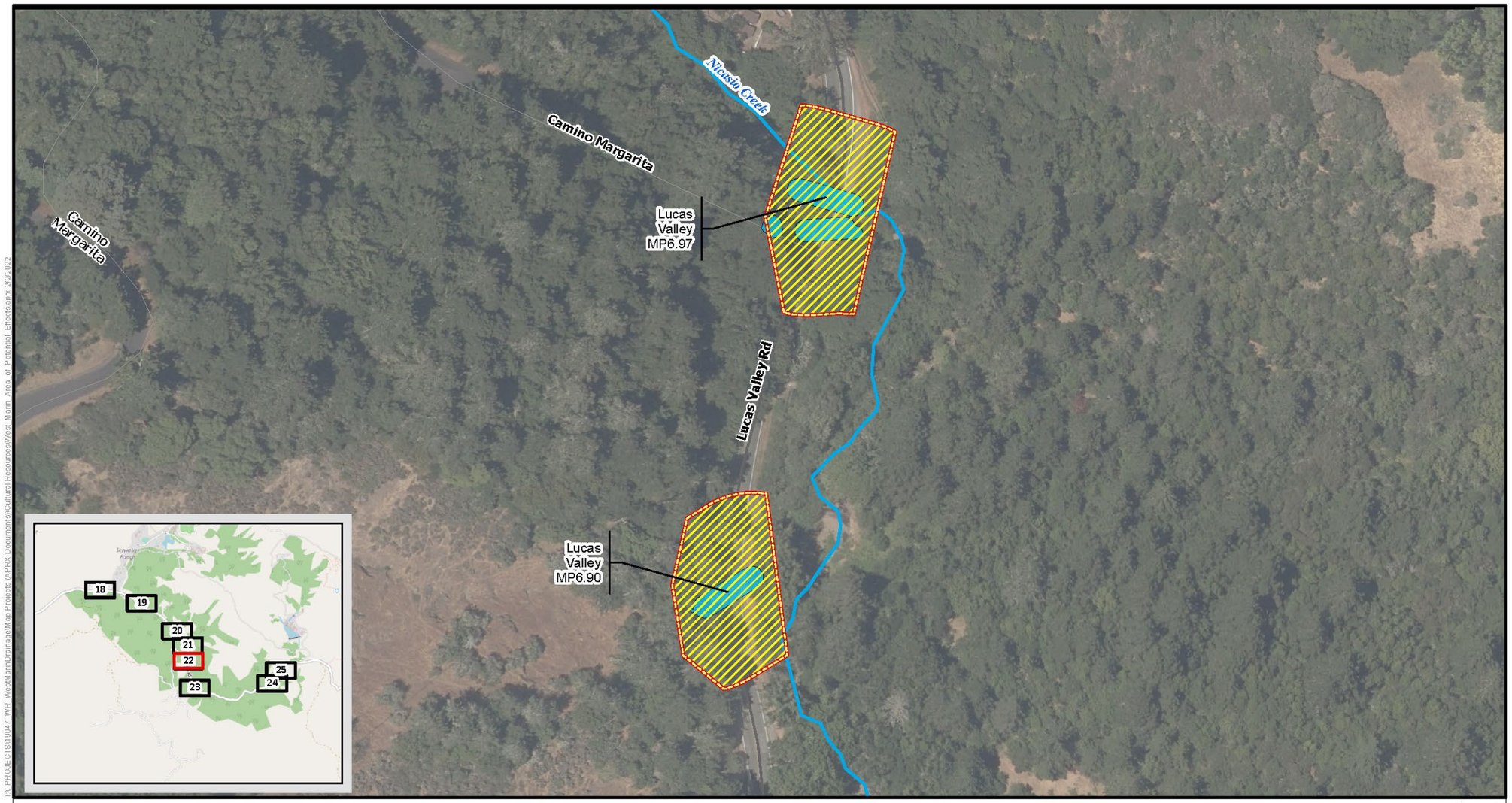

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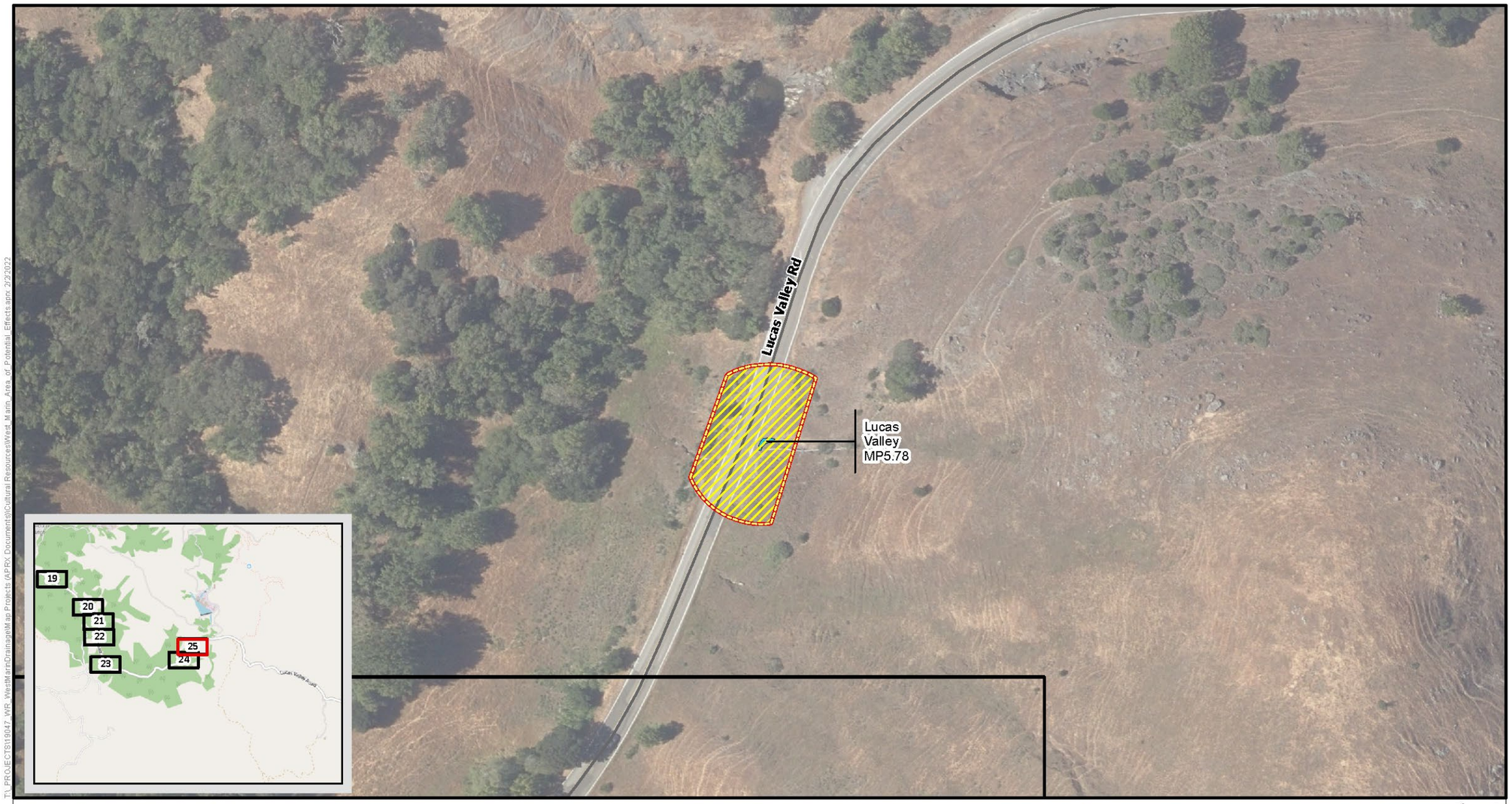

Figure 3
Area of Potential Effects

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1.3 Regulatory Setting

1.3.1 State of California Regulations

CEQA and State CEQA Guidelines

The proposed project seeks to acquire permits from the Regional Water Quality Control Board and the California Department of Fish and Wildlife, and therefore must comply with CEQA (Public Resources Code [PRC] 21000 et seq.) and the CEQA Guidelines (California Code of Regulations [CCR], Title 14, Chapter 3), which determine, in part, whether the project has a significant effect on a unique archaeological resource (per PRC 21083.2) or a historical resource (per PRC 21084.1).

CEQA Guidelines CCR 15064.5 notes that "a project with an effect that may cause a substantial adverse change in the significance of a historical resource is a project that may have a significant effect on the environment." Lead agencies are required to identify potentially feasible measures or alternatives to avoid or mitigate significant adverse changes in the significance of a historical resource before such projects are approved. According to the CEQA guidelines, historical resources are:

- Listed in, or determined to be eligible for listing in, the California Register of Historic Resources (CRHR) (per PRC 5024.1(k));
- Included in a local register of historical resources (per PRC 5020.1) or identified as significant in a historical resource survey meeting the requirements of PRC 5024.1(g); or
- Determined by a lead state agency to be historically significant.

CEQA Guidelines CCR 15064.5 also applies to unique archaeological resources as defined in PRC 21084.1.

PRC 21080.3.1, commonly referred to as Assembly Bill 52 (AB 52), requires that CEQA lead agencies consult with a California Native American tribe that is traditionally and culturally affiliated with the geographic area of a proposed project, if requested by the tribe and if the agency intends to release a negative declaration, mitigated negative declaration, or environmental impact report for a project. The bill also specifies, under PRC 21084.2, that a project with an effect that may cause a substantial adverse change in the significance of a tribal cultural resource (TCR) is considered a project that may have a significant effect on the environment. This latter language is scheduled to be added to the CEQA checklist in the near future.

As defined in Section 21074(a) of the PRC, TCRs are:

(1) Sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe that are either of the following:

a. Included or determined to be eligible for inclusion in the CRHR; or

b. Included in a local register of historical resources as defined in subdivision (k) of Section 5020.1.

(2) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Section 5024.1. In applying the criteria set forth in subdivision (c) of Section 5024.1 for the purposes of this paragraph, the lead agency shall consider the significance of the resource to a California Native American tribe.

TCRs are further defined under Section 21074(b) and (c) as follows:

(b) A cultural landscape that meets the criteria of subdivision (a) is a TCR to the extent that the landscape is geographically defined in terms of the size and scope of the landscape; and

(c) A historical resource described in Section 21084.1, a unique archaeological resource as defined in subdivision (g) of Section 21083.2, or a "nonunique archaeological resource" as defined in subdivision (h) of Section 21083.2 may also be a tribal cultural resource if it conforms to the criteria of subdivision (a).

Mitigation measures for TCRs must be developed in consultation with the affected California Native American tribe pursuant to the newly chaptered Section 21080.3.2 or according to Section 21084.3. Section 21084.3 identifies mitigation measures that include avoidance and preservation of TCRs and treating TCRs with culturally appropriate dignity, taking into account the tribal cultural values and meaning of the resource.

California Register of Historical Resources

PRC Section 5024.1 establishes the CRHR. This register lists all California properties considered to be significant historical resources. The CRHR includes all properties listed, or determined to be eligible for listing, in the National Register of Historic Places (NRHP), including properties evaluated under Section 106 of NHPA. The criteria for listing in the CRHR are similar to those of the NRHP, and include resources that:

(1) Are associated with the events that have made a significant contribution to the broad patterns of California's history and cultural heritage;

(2) Are associated with the lives of persons important in our past;

(3) Embody the distinctive characteristics of a type, period, region, or method of construction, or represent the work of an important creative individual, or possess high artistic values; or

(4) Have yielded, or may be likely to yield, information important in prehistory or history.

The regulations set forth the criteria for eligibility as well as guidelines for assessing historical integrity and resources that have special considerations.

1.3.2 Federal Regulations

It is anticipated that portions of the project will be subject to United States Army Corps of Engineers jurisdiction and require a Section 404 Clean Water Act Permit. As a result, the project constitutes a federal undertaking as defined by Title 54 United States Code (USC) Section 300101 of the NHPA and mandates compliance with 54 USC Section 306108, commonly known as Section 106 of the NHPA, and its implementing regulations found under Title 36 of CFR Section 800, as amended in 2001. To comply with Section 106 of the NHPA, the project proponent must "take into account the effect of the undertaking on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register."

The implementing regulations of the NHPA require that cultural resources be evaluated for NRHP eligibility if they cannot be avoided by an undertaking (i.e., the proposed project). To determine site significance through application of NRHP criteria, several levels of potential significance that reflect different (although not necessarily mutually exclusive) values must be considered. As provided in Title 36 CFR Section 60.4, "the quality of significance in American history, architecture, archaeology, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association" and must be considered within the historic context. Resources must also be at least 50 years old, except in rare cases, and, to meet eligibility criteria of the NRHP, must:

(A) Be associated with events that have made a significant contribution to the broad patterns of our history; or

(B) Be associated with the lives of persons significant in our past; or

(C) Embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

(D) Have yielded, or may be likely to yield, information important in prehistory or history.

For archaeological sites evaluated under Criterion (D), integrity requires that the site remain sufficiently intact to convey information necessary to address specific important research questions.

Cultural resources also may be considered separately under the National Environmental Protection Act per Title 42 USC Sections 4321 through 4327. These sections require federal agencies to consider potential environmental impacts and appropriate mitigation measures for projects with federal involvement.

1.3.3 Regional and Local Regulations

Marin Countywide Plan

Cultural resources are addressed in Section 4.13, Historic and Archaeological Resources, under the Socioeconomics element of the Marin Countywide Plan (Marin County 2007, revised 2015). The following goal and policies in the Marin Countywide Plan are most relevant to the project.

Goal HAR-1. Historical Resource Protection. Identify and protect archaeological and historical resources as major contributors to quality of life and community vitality in Marin.

HAR-1.1: Preserve Historical and Archaeological Resources. Identify archaeological and historical resource sites.

HAR-1.3: Avoid Impacts to Historical and Archaeological Resources. Ensure that human activity avoids damaging cultural resources, where feasible.

Marin County Development Code

Marin County has the following code to ensure that the construction of new development and the establishment of new and modified uses contribute to the maintenance of a stable and healthy environment, that new development is harmonious in character with existing and future development and that the use and enjoyment of neighboring properties are protected, as established in the Countywide Plan.

22.20.040: Archaeological and Historic Resources. In the event that archaeological or historic resources are discovered during any construction, construction activities shall cease, and the Agency shall be notified so that the extent and location of discovered materials may be recorded by a qualified archaeologist, and disposition of artifacts may occur in compliance with State and Federal law. The disturbance of an Indian midden may require the issuance of an Excavation Permit by the Department of Public Works, in compliance with Chapter 5.32 (Excavating Indian Middens) of the County Code.

1.4 Personnel

Fieldwork, analysis, and reporting were carried out by the below-listed Horizon professionals. Procedures complied with NHPA Section 106 as set forth in Title 36 of the CFR, Section 800.

- **Dean Martorana**, M.A., RPA, acted as Principal Investigator for the project, conducted the archaeological field survey, and prepared this report. He has over 20 years of experience as an archaeologist and project manager in cultural resource management, as well as environmental regulatory compliance in California. He completed his M.A. in Anthropology at California State University, Long Beach (2000). He earned a certificate in Geographic Information Systems (GIS) from San Francisco State University in 2007. He is a Certified Project Manager (2014).

- **Janis Offermann**, Cultural Resources Manager, RPA. Ms. Offermann contributed to this document. She holds a M.A. in Anthropology from the University of California, Davis, has worked as an archaeologist in California for over 40 years, and has been managing cultural resources projects for more than 20 of those years. Janis meets the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (per Title 48 of the CFR, Section 44716, as amended in 1983).

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2 Project Context

2.1 Environmental Setting

2.1.1 Land Forms and Topography

The topography of Marin County is extremely varied, with elevations ranging from sea level to 2,572 feet at the peak of Mount Tamalpais. The landform and topographic conditions of individual project sites vary due to the specific physical setting and the presence of roads, culverts, channelized streams and stormwater ditches, or other site features.

2.1.2 Climate

The project exhibits a Mediterranean climate with mild, wet winters and warm, dry summers. Regional climatic conditions are moderated by a cooler, moist marine layer from the Pacific Ocean. Average annual precipitation is approximately 47 inches, with most of the precipitation occurring October through April (Western Regional Climate Center [WRCC] 2020). Temperatures are strongly influenced by the Pacific Ocean to the west and the Coast Range Mountains, which results in a variety of microclimates. Average temperatures range from a low of 39 degrees Fahrenheit (°F) in January to a high of 83°F in July (WRCC 2020).

2.1.3 Hydrology

Creeks in the vicinity of the project drain to Tomales Bay. The main creeks present in the vicinity of the project are Lagunitas Creek, Nicasio Creek, and San Geronimo Creek. Nicasio and San Geronimo Creeks are tributaries to Lagunitas Creek. Project work areas evaluated for this delineation occur in constructed road and bridge culverts and the channels immediately upstream and downstream of these crossings. Channel types vary from perennial riverine to intermittent and ephemeral drainages depending on their location within the watershed and the amount and timing of runoff or stormwater contribution to the channel.

2.1.4 Soils

Fifteen soil types are present within the project (Natural Resources Conservation Service [NRCS] 2021). These soil mapping units are listed in **Table 1.** Due to the dispersed nature of the project, only soils within 50 feet of the individual project sites were included in the table below.

Table 1. NRCS Soil Types Mapped in the Project

Map Unit Symbol	Map Unit Name	Map Unit Details
101	Ballard gravelly, loam	2 to 9 percent slopes
105	Blucher-Cole complex	2 to 5 percent slopes

Map Unit Symbol	Map Unit Name	Map Unit Details
114	Cortina gravelly sandy loam	0 to 6 percent slopes, cool, MLRA 15
120	Dipsea-Barnabe very gravelly loams	50 to 75 percent slopes
124	Felton variant-Soulajule complex	15 to 30 percent slopes
126	Felton variant-Soulajule complex	50 to 75 percent slopes
127	Fluvents	channeled
128	Gilroy-Typic Argixerolls-Bonnydoon	30 to 50 percent slopes
141	Los Osos-Bonnydoon complex	15 to 30 percent slopes
142	Los Osos-Bonnydoon complex	30 to 50 percent slopes
149	Olompali loam	9 to 15 percent slopes
157	Pits	quarries
178	Tocaloma-McMullin complex	15 to 30 percent slopes
180	Tocaloma-McMullin complex	50 to 75 slopes
185	Tocaloma-Saurin association	extremely steep

2.2 Geomorphic Setting and Geoarchaeology

The project area is characterized predominately by a northwest-southeast trending ridge that is comprised of volcanic rock and pillow basalt, serpentinite, and chert. More specifically, the geologic units underlying the project APE generally belong to the Franciscan Complex (Blake, Graymer, and Jones 2000). The Franciscan Complex includes Cretaceous and Jurassic-aged sandstone with smaller amounts of shale, chert, limestone, and conglomerate. Specific units underlying the segment of Point Reyes–Petaluma Road between Point Reyes Station and Nicasio Reservoir include Sandstone and shale (Cretaceous), Melange, and Greenstone (Jurassic) (Blake, Graymer, and Jones 2000). Indeed, the depth to bedrock in this mélange matrix is very shallow, or around 30 to70 centimeters.

With respect to the eastern project road segments (i.e., Nicasio Valley Road and Lucas Valley Road), underlying units in these areas primarily include Melange, Metamorphic rocks (Cretaceous and Jurassic), Chert (Cretaceous and Jurassic), and surficial deposits of Quaternary-aged alluvium (Qal) (Blake, Graymer, and Jones 2000).

Geoarchaeology

As a result of the dynamic nature of California's landscape, archaeological sites deposited over the last circa (ca.) 13,500 years (roughly the time that humans are known to have lived in California) have been subject to numerous geomorphic processes that have either buried, destroyed, or left these sites intact on the surface. These geomorphic processes can include alluvial fan deposition due to changing climate,

fluctuating river courses and related floodplain deposition. In general, most Pleistocene-age or older landforms have little potential for harboring buried archaeological resources, as they developed prior to human migration into North America (ca. 13,000 years before the present [B.P.]). However, Pleistocene surfaces buried below younger Holocene deposits do have a potential for containing archaeological deposits. Holocene alluvial deposits may contain buried soils (paleosols) that represent periods of landform stability before renewed deposition. The identification of paleosols within Holocene-age landforms is of particular interest because they represent formerly stable surfaces that have a potential for preserving archaeological deposits.

Given the above criteria, it is possible to forecast the burial sensitivity by looking at the intersection of existing geomorphic, stratigraphic, and soils spatial variables, as well as any behavioral variables that may forecast human occupation. Therefore, a review of the project sites and the geomorphic conditions that underlie these locations was conducted using geologic mapping of the Bay Area prepared by Witter et al. (2006) and the geoarchaeological overview of the Bay Area, including Marin County, conducted by Meyer and Rosenthal (2007).

The entire project area and much of the surrounding lands are comprised of Pre-Holocene (>11,800 years), undifferentiated substrates, which are not associated with a high potential for buried archaeology on the basis of the age of the complex (or pre-dates human occupation of the region) (Witter et al. 2006). In addition, due to the steep terrain indicative of the project sites along these corridors, the potential for buried deposits is considered low due to the general lack of depositional landforms in these areas and the overall low probability of long-term human settlement in landscapes where much of the setting is represented by steep slopes. Therefore, the potential for substantial buried or surface archaeological sites within the project area is considered low.

2.3 Prehistoric Context

The prehistory of the project area reflects information known about the indigenous population from the time the region was first populated with humans until the arrival of the first Europeans, who visited and recorded their journeys through the written record. The prehistoric record is derived from over a century of archaeological research, and while much has been gleaned from these studies, large gaps in the data record remain. The following prehistoric culture sequence, derived from Milliken et al. (2010:114-118), briefly outlines the prehistory of the San Francisco Bay region.

The Early Holocene (Lower Archaic; 8000 to 3500 B.C.) is considered a time when populations continued to be very mobile as they practiced a foraging subsistence pattern around the region. Artifacts that characterize this period include the millingslab and handstone to process seeds, as well as large wide-stemmed and leaf-shaped projectile points.

The Early Period (Middle Archaic; 3500 to 500 B.C.) is marked by the appearance of cut shell beads in the archaeological record, as well as the presence of the mortar and pestle for processing acorns. House floors

with postholes indicate substantial living structures, which suggests a move toward establishing a more sedentary lifestyle and an increasing population.

The Middle Period, which includes the Lower Middle Period (Initial Upper Archaic; 500 B.C. to A.D. 430) and Upper Middle Period (Late Upper Archaic; A.D. 430 to 1050), appears to be a time when geographic mobility may have continued, although groups began to establish longer-term base camps in localities from which a more diverse range of resources could be exploited. The first rich black middens are recorded from this period. The addition of milling tools, obsidian and chert concave-base projectile points, and the occurrence of sites in a wider range of environments suggest that the economic base was more diverse. By the Upper Middle Period, mobility was being replaced by the development of numerous small villages. Around A.D. 430 a "dramatic cultural disruption" occurred, as evidenced by the sudden collapse of the Olivella saucer bead trade network.

The Initial Late Period (Lower Emergent; A.D. 1050 to 1550) reflects a social complexity that had developed toward lifeways of large, central villages with resident political leaders and specialized activity sites. Artifacts associated with the period include the bow and arrow, small corner-notched projectile points, and a diversity of beads and ornaments.

The Terminal Late Period (Upper Emergent; A.D. 1550 to circa 1750) generally represents the indigenous cultures that were encountered by the Spanish when they first arrived in San Francisco Bay.

2.4 Ethnographic Context

The project area lies within the traditional territory of the Coast Miwok people. Miwok is a Penutian language with three groups within California: the Lake Miwok, located to the south of Clear Lake; the Eastern Miwok, located in the Sierra Nevada foothills; and the Coast Miwok, located on the North Bay and adjacent to the coast. The Coast Miwok, in turn, have been divided into two major dialect groups, the western or Bodega, and the southern or Marin (Kelly 1978). The study project area lies more specifically within the territory of the Olema/Nicasio group, who occupied the region from the near the bottom of Tamales Bay south to include most of present-day Kent Reservoir, along with Lagunitas and Nicasio creeks, and the modern-day communities of Point Reyes Station, Nicasio, Olema, Lagunitas, San Geranimo, and Woodacre. Along the coast, they appear to have held lands from just below the Estero de Limantour south to about Wildcat Lake (Milliken 2009: Figure 1, pp. 79).

The Coast Miwok lived in an area with diverse terrain and varied food resources that they relied on for subsistence. Their intimate attachment to the land was fostered by a deep knowledge of their surroundings and the animals and plants that inhabited the landscape, such that their material surroundings and the spiritual world were inseparable (Goerke 2009). Seasonal subsistence practices followed a spiritual and ceremonial calendar. As described by Goerke (2009:22), some ceremonies were conducted on a community level and held in "the round house, in a smaller women's dance house, in a brush-enclosed clearing, or in the sweathouses of smaller rancherias. These activities helped to maintain

a proper balance between the people and the world of animals and spirits. Other ceremonies were personal, such as the rituals of hunters, or even conducted while eating.

Some animal foods such as deer, shellfish, rockfish, and crab were available year-round (Goerke 2009; Kelly 1978). However, in general, subsistence practices followed an annual cycle, and animals such as salmon and waterfowl were obtained seasonally. During the spring, food resources included small fish, greens, pinole seeds, blue dick bulbs, and other marsh and bay resources. The economic focus shifted to upland areas for hunting and gathering various vegetal resources, especially seeds and buckeye, during the summer. Acorns and hazelnuts were collected in the fall and stored for the winter. Salmon and trout were gathered during the winter runs. Other winter resources included geese, mud hens, and stored foods (Kelly 1978). The Coast Miwok were careful to leave a portion of the plants for regeneration to ensure a future crop (Goerke 2009).

Conical grass-covered dwellings with slightly excavated central hearths were the most common type of housing. Tule or sedge mats were used to cover the floor. Each such dwelling accommodated from six to 10 nuclear or extended family members. During most of the year, the Coast Miwok appear to have resided in small camps close to resource gathering sites. As winter approached, they would return inland to the winter village which was commonly located next to a stream and acorn supply. This village usually consisted of a maximum of 10 houses and contained more substantial structures such as a large earth oven, dance house, and one or possibly two sweathouses. Both the sweathouse and the dance house were semi-subterranean pole and stick structures covered in brush, grass, and earth (Kelly 1978).

Coast Miwok groups lived in a number of small autonomous political entities comprised of intermarried families of some 200 to 400 people (Milliken 2009). These groups were often led by a nonhereditary male headman, called a *hoipu,* and two female authority figures known as *maien.* The *hoipu* acted as an advisor and coordinator, settling internal disputes and organizing labor for communal ceremonies and hunts. The *maien* also held important leadership roles, organizing and overseeing numerous activities, particularly ceremonial festivals such as the Acorn Dance, *sünwele* dance, and certain aspects of the Bird Cult (Kelly 1978). It is likely that they also played a larger role than recorded in the ethnographies, as some informants indicated that the *maien* was a "woman chief" and had some superiority over the *hoipu* (Goerke 2009:27). Local groups interacted with neighboring groups through trade, feasts, seasonal ceremonial dances, and marriage. Both sexes acted as doctors.

The material culture of the Coast Miwok reflects a balance between what was locally available and what could be obtained through trade. As common to most California groups, basketry was a well-developed art among the Coast Miwok and baskets were used for multiple functions. Twined baskets were most often used for cooking, storage, seed processing, as burden baskets, and other utilitarian functions. Coiled baskets, produced with the aid of bone awls, were more often used for decorative and ceremonial functions, commonly being adorned with woodpecker and duck feathers, abalone and clamshell pendants. Other textiles included nets for fishing and rabbit skin blankets or capes. Ground stone milling equipment was essential for processing the multitude of plant and seed resources utilized by the Coast Miwok. Obsidian, obtained through trade, was a preferred source for arrow-sized projectile points and

butchering knives, while green chalcedony was preferred for general utility knives (Kelly 1978). Animal bone was used to make various implements from hide scrapers, fishhooks, and needles to labrets and bird bone whistles. Olivella and abalone shell was most often used to make beads and pendants, while clamshell was used to make disk-shaped beads to be used as currency throughout Central California in later times.

The Coast Miwok were visited by Sir Francis Drake in 1579 and by Sebastian Rodriquez Cermeno in 1595. Exploration of the Petaluma River again brought Europeans into Coast Miwok territory in 1775; however, extended encounters with European settlers did not occur until the following year with the establishment of the Presidio of San Francisco and Mission San Francisco de Asís (Kyle et al. 2002). In 1817, Mission San Raphael Arcángel was established within Marin County and the conscription of local Native Americans as a labor source began shortly thereafter. By the 1820s, a large percentage of Coast Miwok were associated with the missions.

As described below under *History*, in addition to the establishment of the mission and development of the surrounding lands to grow food to support the missions, Marin County was later occupied by Mexican citizenry who were allotted land grants, and then by farmers, ranchers, and loggers who provided supplies for an increasingly urban population in San Francisco, as well as the argonauts who joined the frenzy for gold during the Gold Rush. All of these activities further displaced Miwok who were not within the missions or working on the ranchos. They also degraded the landscape such that the small Miwok populations who strove to continue traditional subsistence practices found it increasingly more difficult, if not impossible to survive. Simultaneously, the indigenous population suffered tremendous loss due to introduced diseases, abuse, and open genocide.

By the late 1800s, the Miwok living in Marin County were landless and primarily worked seasonally on farms throughout the region. The Bureau of Indian Affairs purchased 15.45 acres in 1920 for displaced Coast Miwok and Southern Pomo people living in the vicinity of Marshall, Bodega, Tomales, and Sebastopol. Located in Graton, southern Sonoma County, this became the Graton Rancheria. The land was steep, with little water, and not suited for permanent residency. It was, however, used seasonally for the resources it could provide (Goerke 2009).

In the 1950s, the federal government terminated its relationship with many of the rancherias in California, including Graton. This resulted in the dissolution of rancheria lands, with the exception of one family who was able to hold on to their 1-acre parcel. The Coast Miwok and Pomo descendants of Graton began their effort for federal recognition in the 1990s, and they were re-granted federal status in 2000, becoming the Federated Indians of Graton Rancheria (FIGR). A gathering was held in Coast Miwok ancestral territory at Point Reyes National Seashore in 2001 to celebrater their reclaimed status (Goerke 2009). FIGR purchased 254 acres near Rohnert Park, Sonoma County, in 2005 to establish a reservation. The land was taken into trust by the federal government in 2010. This created the opportunity for the tribe to establish the Graton Resort and Casino, which opened in 2013. Revenues from the casino have allowed the tribe to become self-sufficient and has also allowed for the development of cultural and language programs to preserve traditional ways (FIGR 2022).

2.5 Historic-Era Context

The historic period of California began with Spanish exploration of the Pacific Coast during the I6th century, namely a brief visit by Juan Cabrillo in 1542. During the following two centuries, explorations of the California coast were conducted by the Spanish, English, and Russians. Sir Francis Drake, who visited the coast of the Marin Headlands in 1579, as noted above, is the most famous of the explorers associated with Marin County (Kyle et al. 2002).

Though the exact location of Drake's landing has yet to be confirmed, it has been established that Sebastian Cermeño visited the area of Drake's Bay in 1595. However, the County was not occupied by the Spanish until 1817, when Mission San Rafael Arcángel was founded (Kyle et al. 2002). Originally an outpost hospital for Mission Dolores in San Francisco, it became a full mission in 1822 and was the penultimate mission to be established in Alta California. After Mexico gained its independence from Spain, Mission San Rafael Arcángel was the first of the missions to be secularized (California Missions Foundation 2022).

In 1822, the Republic of Mexico claimed its independence from Spain, and Alta California came under the rule of Mexico. It was during this time that a number of large land claims or grants were established in California, many under the control of individual citizens. As many as 500 land claims were made during this time, many of which became known as "ranchos" (Kyle et al. 2002). Grants in the project area included Rancho Nicasio (Point Reyes–Petaluma Road) and Rancho San Pedro Santa Margarita y Las Gallinas (Lucas Valley and Ignacio Valley roads). The location of Rancho Nicasio was once a sheep ranch for Mission San Rafael (Milliken 2009:53). Governor Figueroa awarded Rancho Nicasio to Teodosio Quilajuequi, a Coast Miwok Indian from Mission San Raphael, and his tribe in 1835. Covering 80,000 acres, it was the largest land grant associated with Marin County, and provided a home to a native population of about 500 (FIGR 2022). The history of the rancho is convoluted but it appears that, by a decade later, Governor Micheltorena revoked the grant and gave all but 4,000 acres of the property to Pablo de la Guerra and Jaun Bautista Cooper (FIGR 2022; Kyle et al 2002). A short while later, it was further subdivided among Henry Helleck, Daniel Funk, William Renolds, James Black, and B.R. Buckelew. James Black received approximately 9,500 acres of land along the Petaluma-Point Reyes Road in 1847 or 1848 (Salisbury 2016). A portion of this ranch continues to exist as Black Mountain Ranch in the project area. Rancho San Pedro, Santa Margarita y Las Gallinas was comprised of 21,678 was located directly east and adjacent to Rancho Nicasio. It was granted to Timothy Murphy in 1844.

By the late 1820s and 1830s, American explorers and fur trappers were entering California and Oregon by traveling overland from the east, and by the early 1840s groups of settlers were making the trip. The opportunity to obtain land in Alta California attracted a number of young men from the east who were eager to take advantage of the opportunity and establish themselves in business enterprises. The Bidwell-Bartleson Party of 1841 represents the first overland migration of American settlers that paved the way for successive migrations over the following decades. After the annexation of Texas in 1845, war broke out between the United States and Mexico, and hostilities soon began in California in 1846. The surrender of the Mexican governor in 1847 led to the Treaty of Guadalupe Hidalgo in 1848 and the annexation of Alta California to the United States (Kyle et al. 2002). At the time of the Treaty in 1848, gold was discovered

in the American River east-northeast of Sutter's Fort, leading to the Gold Rush of 1849 and the Euroamerican settlement of the western Sierra Nevada foothill region.

The city of San Francisco continuously grew from its inception as a Spanish mission and presidio, becoming an important port that received immigrants and goods during the Mexican period. But with the advent of the Gold Rush, the size and importance of the city exploded as thousands of argonauts passed through the port to make their way to the Mother Lode. Some of the new arrivals, however, stayed in the city to establish business to support the miners. With the expanding need to provide food staples to the growing urban population, as well as providing for miners in the Sierra Nevada foothills, would-be farmers and ranchers looked north to Marin County.

The ranchos of the Mexican era were generally self-sufficient, largely by relying on the labor of the local Coast Miwok. They raised cattle, sheep, and horses for trade, and provided much their own food by growing their own vegetables and grains, along with establishing small orchards in some instances. Logging also developed as nearby settlements grew (Miller and Caywood 2008). During the early American period, settlers moved into west Marin County and expanded this tradition. The area was also used for harvesting lumber for the San Francisco building boom. Dairy cows were imported in the early 1850s, and the industry developed rapidly, particularly on the Point Reyes Peninsula.

With the advent of increased population and the need to transport goods to market, new roads were developed and, in the early 1870s, plans formed for a narrow gage railroad from San Rafael to Tomales Bay. The North Pacific Coast Railroad began operations in 1874/75, with termini in San Rafael and Sausalito ferry lines into San Francisco and the new town of Point Reyes Station; it eventually followed Tomales Bay to the north to Cazadero in Sonoma County. The line was abandoned in the 1930s (Miller and Caywood 2008; PacificNG.org 2022), but remnants are still visible adjacent the Point Reyes–Petaluma Road.

The area has continued to remain rural to this day, supported by the many dairy ranches that persist, along with tourism at nearby Point Reyes National Seashore National Park, which was established in 1962.

3 Native American Correspondence and Archival Research

3.1 Archival Research

A record search of the project area was conducted by the Northwest Information Center (NWIC) of the California Historical Resources Information System at Sonoma State University, Rohnert Park, California, in December 2020 (NWIC File No.: 20-0967). The record search area included the entire length of the roadways within the project area with a ¼-mile search buffer to either side of the road. The purpose of the record search was to identify any studies that included the project area as well as previously recorded cultural resources at or within close proximity to the locations of the project sites.

The record search determined that portions of Point Reyes–Petaluma Road, Lucas Valley Road, and Nicasio Valley Road within the project area had previously been included in 32 studies; another 33 studies had been conducted within the ¼-mile buffer area. Nearly all of the studies were along Point Reyes–Petaluma Road. More information about the previous studies is included in **Appendix A**.

Four previously recorded cultural resources were identified by the record search (**Table 3**).

Table 3. NWIC Records Search Results – Previously Recorded Resources

P Number Trinomial	Resource Type	Resource Name (Date Constructed)	Within Project Site or Buffer?	Resource Eligibility Status
P-21-000418 CA-MRN-000464	Pre-contact milling feature and petroglyphs	Manuel's Hill	Buffer	Not Evaluated
P-57-002919	Historic District	Olema Valley/Lagunitas Loop Ranches Historic District (Olema Valley Dairy Ranches Historic District)	Buffer	Listed in the NRHP
P-57-003017	Commercial	Rich Redi-Mix Concrete Plant (1958)	Buffer	Recommended Not Eligible
P-57-003018	Historic Ranch	Black Mountain Ranch	Project Site	Recommended Eligible

Source: NWIC File No.: 20-0967

Resource P-21-000418 is located north of and well away from the edge of Lucas Valley Road, on a hill above a cut slope. It is a Native American site that consists of numerous serpentine outcroppings with

mortars and cupules. The site has not been evaluated for eligibility listing in the NRHP/CRHR. There are no project sites in the immediate vicinity of the resource.

The Olema Valley/Lagunitas Loop Ranches Historic District (Historic District) (also known as the Olema Valley Dairy Ranches Historic District), P-57-002919, is just south of portions of Point Reyes–Petaluma Road that contain project sites. The Historic District, which was listed in the NRHP in 2018, covers 14,127 acres within Olema Valley, and is comprised of 19 contiguous ranches that date to 1856. The Historic District stretches from Point Reyes Station south to the junction of State Route 1 and Olema-Bolinas Road. The historic property lies almost entirely to the east of State Route 1; Point Reyes–Petaluma Road within the proposed project lies just north of its northern boundary. The Built Environment Resources Directory for Marin County (Office of Historic Preservation 2022) indicates that the Historic District has been assigned the California Historical Resource Status Code of 2S2: Individually determined eligible for the NRHP by consensus through the Section 106 process; listed in the CRHR.

The Rich Redi-Mix Concrete Plant, P-57-003017, is located directly adjacent the south edge of Point Reyes–Petaluma Road, at the base of Black Mountain, and 0.35 mile west of the junction with Platform Bridge Road. Project sites are located near the resource, but not within the boundaries of the property.

Resource P-57-003018, Black Mountain Ranch (Ranch), overlaps Point Reyes–Petaluma Road within the project area where individual project sites are located. The Ranch is largely north of the road, but also extends south of the road and, thus, overlaps the northernmost limits of the Olema Valley/Lagunitas Loop Ranches Historic District in some areas. Originally part of the Nicasio Land Grant, the Ranch has been operating as a cattle ranch since 1848 when James Black acquired 9,500 acres of the larger rancho. Today the ranch covers 1,200 acres. The Ranch is considered eligible for the NRHP under Criterion A as a medium-sized family-owned ranch that operated during a significant period of rural development in Marin County; under Criterion B for its association with James Black and the Gallagher family, two of the first nonnative peoples to settle in the area; and under Criterion C for its example of local rural vernacular architecture, especially the barn and cabin within the resource boundaries. The Ranch "also appears to contribute to the significance and integrity of the neighboring Olema Valley/ Lagunitas Loop Ranches Historic District" (Salisbury 2016). However, Point Reyes-Petaluma Road within the project area is not identified as a contributing element of the Ranch.

4 Inventory Methods and Pedestrian Survey Results

A pedestrian archaeological survey was conducted of the individual project locations on December 30, 2021. The ground surface visibility generally was poor given the proximity of the culverts to road cuts and substantial vegetation cover throughout the area. Most of the locations were in areas of steep slopes. Culvert locations that were located in valleys or exhibited gradual slopes were surveyed with transects of less than 20-meters. All other areas were subject to a cursory survey (>20-meters), particularly in areas of steep slopes (>20 percent) or high levels of vegetation cover. All areas of observed mineral soil were more closely inspected for archaeological deposits. The project APE has been subject to significant surface alteration during the construction of the adjacent roadway and the culverts themselves. The total area subject to archaeological survey was about 20 acres. No archaeological resources were identified as a result of the survey.

No built environment resources were identified at the project sites, other than the culvert structures themselves. As described in Chapter 2, Project Description, the culverts to be replaced or repaired include numerous features, such as concrete or masonry inlets or head walls, metal pipe, and riprap. Culverts are minor, ubiquitous infrastructure elements that do not warrant recordation or NRHP/CRHR evaluation, unless they contribute to the significance of larger historic properties such as districts or cultural landscape (California Department of Transportation 2014). However, the culverts along Point Reyes-Petaluma Road are not identified as contributing elements of the Ranch. Therefore, they were not recorded as part of the cultural resources study.

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5 Summary and Conclusions

A cultural resources field investigation was conducted of the project's APE on December 30, 2021. No archaeological resources were identified as a result of both the archival and field research within the project APE.

While the proximity to river and riparian habitats would indicate a higher potential to encounter archaeological resources in flat valleys or alluvial contexts, the project APE is located in steep canyon cuts along existing roadways and, as such, the potential for the APE to contain substantial archaeological deposits is considered low. Indeed, the closest archaeological site to the project sites is P-21-000418, which is located a ¼-mile north of the edge of Lucas Valley Road, on a hill above a cut slope, and consists of a petroglyph and milling station without evidence of substantial habitation. Given the highly discrete and constrained locations associated with the proposed project, the likelihood of encountering an archaeological site in this steep topography is considered low. Further, the level of disturbance associated with the proposed actions are not expected to exceed the levels of existing or previous disturbance.

Despite the low sensitivity of the project area, as planning moves forward, any changes to the project footprint or the nature of the proposed project should be reviewed by an archaeologist for changes to the potential to impact archaeological sites that may be considered significant resources. As in most cases, the possibility of encountering cultural resources, while low, still exists in this area. Therefore, mitigations, such as, but not limited to the following, should be implemented as planning proceeds.

> In the event that any prehistoric or historic subsurface cultural resources are discovered during ground-disturbing activities, all work within 100 feet of the resources shall be halted and the Project Proponent shall consult with a qualified archaeologist to assess the significance of the find. If any find is determined to be significant (CEQA Guidelines 15064.5[a][3] or as unique archaeological resources per Section 21083.2 of the California Public Resources Code), representatives of the Proponent and a qualified archaeologist shall meet to determine the appropriate course of action. In considering any suggested mitigation proposed by the consulting archaeologist in order to mitigate impacts to historical resources or unique archaeological resources, the lead agency shall determine whether avoidance is necessary and feasible in light of factors such as the nature of the find, project design, costs, and other considerations. If avoidance is infeasible, other appropriate measures—including the execution of a data recovery process, if avoidance of significant impacts to an historical resource is not feasible, and as defined by the consulting archaeologist. Work may proceed on other parts of the project site while mitigation for historical resources or unique archaeological resources is carried out.
>
> Similarly, although unlikely, the possibility of encountering human remains cannot be discounted. Under Section 7050.5 of the California Health and Safety Code, it is a misdemeanor to knowingly disturb a human burial. If human remains are encountered, work must halt in the vicinity of the remains and, as required by law, the Marin County coroner should be notified immediately. An

archaeologist should also be contacted to evaluate the find. If human remains are determined to be of Native American origin, the coroner must notify the NAHC within 24 hours of that determination. In accordance with PRC Section 5097.98, the NAHC, in turn, will immediately contact an individual who is most likely descended from the remains (i.e., the Most Likely Descendant). The Most Likely Descendant has 48 hours to inspect the site and recommend treatment of the remains. The landowner is obligated to work with the Most Likely Descendant in good faith to find a respectful resolution to the situation and entertain all reasonable options regarding the Most Likely Descendant's preferences for treatment.

6 References

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Appendix A
Records Search Documentation

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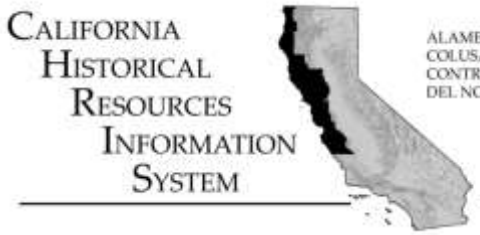

CALIFORNIA HISTORICAL RESOURCES INFORMATION SYSTEM

ALAMEDA, COLUSA, CONTRA COSTA, DEL NORTE, HUMBOLDT, LAKE, MARIN, MENDOCINO, MONTEREY, NAPA, SAN BENITO, SAN FRANCISCO, SAN MATEO, SANTA CLATA, 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
nwic@sonoma.edu
http://www.sonoma.edu/nwic

12/10/2020 NWIC File No.: 20-0967

Janis Offermann
Horizon Water and Environment
400 Capitol Mall, Suite 2500
Sacramento, CA 95814

Re: West Marin Drainage Rehabilitation Project

The Northwest Information Center received your record search request for the project area referenced above, located on the Inverness, San Geronimo, Novato USGS 7.5' quad(s). The following reflects the results of the records search for the project area and a ¼ mi. radius:

Resources within project area:	P-21-002919, P-21-003017, P-21-003018
Resources within ¼ mi. radius:	P-21-000418
Reports within project area:	[32] Please see attached list, page 3
Reports within ¼ mi. radius:	[33] Please see attached list, page 4 [No shapes or PDFs ** included in results]

Resource Database Printout (list):	☒ enclosed	☐ not requested	☐ nothing listed
Resource Database Printout (details):	☒ enclosed	☐ not requested	☐ nothing listed
Resource Digital Database Records:	☒ enclosed	☐ not requested	☐ nothing listed
Report Database Printout (list):	☒ enclosed	☐ not requested	☐ nothing listed
Report Database Printout (details):	☒ enclosed	☐ not requested	☐ nothing listed
Report Digital Database Records:	☐ enclosed	☒ not requested	☐ nothing listed
Resource Record Copies:	☒ enclosed	☐ not requested	☐ nothing listed
Report Copies: [within Project Areas only]	☒ enclosed	☐ not requested	☐ nothing listed
OHP Built Environment Resources Directory:	☒ enclosed	☐ not requested	☐ nothing listed
Archaeological Determinations of Eligibility:	☐ enclosed	☐ not requested	☒ nothing listed
CA Inventory of Historic Resources (1976):	☒ enclosed	☐ not requested	☐ nothing listed
Caltrans Bridge Survey:	☒ enclosed	☐ not requested	☐ nothing listed
Ethnographic Information:	☐ enclosed	☒ not requested	☐ nothing listed
Historical Literature:	☐ enclosed	☒ not requested	☐ nothing listed

Historical Maps:	☐ enclosed	☐ not requested	☒ nothing listed
Local Inventories:	☒ enclosed	☐ not requested	☐ nothing listed
GLO and/or Rancho Plat Maps:	☒ enclosed	☐ not requested	☐ nothing listed

*Notes:

** Invoice will be kept open until 12/17/2020 so you can request PDFs if desired. PDFs can be requested after that date but will be billed separately as a "Copy Job".

Please forward a copy of any resulting reports from this project to the office as soon as possible. Due to the sensitive nature of archaeological site location data, we ask that you do not include resource location maps and resource location descriptions in your report if the report is for public distribution. If you have any questions regarding the results presented herein, please contact the office at the phone number listed above.

The provision of CHRIS Data via this records search response does not in any way constitute public disclosure of records otherwise exempt from disclosure under the California Public Records Act or any other law, including, but not limited to, records related to archeological site information maintained by or on behalf of, or in the possession of, the State of California, Department of Parks and Recreation, State Historic Preservation Officer, Office of Historic Preservation, or the State Historical Resources Commission.

Due to processing delays and other factors, not all of the historical resource reports and resource records that have been submitted to the Office of Historic Preservation are available via this records search. Additional information may be available through the federal, state, and local agencies that produced or paid for historical resource management work in the search area. Additionally, Native American tribes have historical resource information not in the CHRIS Inventory, and you should contact the California Native American Heritage Commission for information on local/regional tribal contacts.

Should you require any additional information for the above referenced project, reference the record search number listed above when making inquiries. Requests made after initial invoicing will result in the preparation of a separate invoice.

Thank you for using the California Historical Resources Information System (CHRIS).

Sincerely,

Annette Neal

Researcher

Reports Within Project Areas

DocCo	DocNo
S-	000848
S-	001324
S-	001871
S-	002058
S-	002458
S-	007888
S-	008226
S-	009462
S-	009795
S-	012088
S-	013217
S-	013788
S-	013857
S-	015529
S-	016138
S-	016554
S-	017773
S-	017835
S-	018217
S-	020395
S-	029655
S-	030204
S-	032454
S-	032596
S-	033041
S-	033600
S-	034910
S-	039157
S-	042138
S-	049780
S-	051596
S-	051733

Reports In 0.25 mi. Buffer**

DocCo	DocNo
S-	002485
S-	002804
S-	008708
S-	009573
S-	009809
S-	009811
S-	009814
S-	009815
S-	009898
S-	010725
S-	012926
S-	015802
S-	017449
S-	017454
S-	018323
S-	018349
S-	019128
S-	020360
S-	020600
S-	021675
S-	022600
S-	023781
S-	027346
S-	028400
S-	038670
S-	039157
S-	039282
S-	042608
S-	042610
S-	043717
S-	046397
S-	048512
S-	051599

****No PDFs/no Shapes included in results**

Report Detail: S-000848

Identifiers

Report No.: S-000848

Other IDs:	*Type*	*Name*
	Agency Nbr	Contract AA550-CT6-52

Cross-refs:

Citation information

Author(s): David A. Fredrickson

Year: 1976 (Jan)

Title: A Summary of Knowledge of the Central and Northern California Coastal Zone and Offshore Areas, Vol. III, Socioeconomic Conditions, Chapter 7: Historical & Archaeological Resources

Affliliation: The Anthropology Laboratory, Sonoma State College; Winzler & Kelly Consulting Engineers

No. pages: 223

No. maps:

Attributes: Archaeological, Architectural/historical, Management/planning, Other research

Inventory size:

Disclosure: Not for publication

Collections: No

General notes

This report's study area extends outside of the NWIC service area (into San Luis Obispo, Santa Barbara, & Ventura counties). 9880 prehistoric and historic resources were identified in the 17 counties when the report was written in 1976. There were no location maps in the report. Report is mapped in GIS as an 'other report' for the 14 NWIC counties mentioned in report.

Associated resources

No. resources: 0

Has informals: Yes

Location information

County(ies): Alameda, Contra Costa, Del Norte, Humboldt, Marin, Mendocino, Monterey, Napa, Other, San Francisco, San Mateo, Santa Clara, Santa Cruz, Solano, Sonoma

USGS quad(s): ~All quads - Alameda Co., ~All quads - Contra Costa Co., ~All quads - Del Norte Co., ~All quads - Humboldt Co., ~All quads - Marin Co., ~All quads - Mendocino Co., ~All quads - Monterey Co., ~All quads - Napa Co., ~All quads - San Francisco Co., ~All quads - San Mateo Co., ~All quads - Santa Clara Co., ~All quads - Santa Cruz Co., ~All quads - Solano Co., ~All quads - Sonoma Co.

Address:

PLSS:

Database record metadata

	Date	*User*
Entered:	4/7/2005	nwic-main
Last modified:	8/7/2020	neala

IC actions:	*Date*	*User*	*Action taken*
	4/7/2005	jay	Appended records from NWICmain bibliographic database.
	12/9/2015	hagell	edited database
	12/5/2016	hagell	added note.

Record status: Verified

Report Detail: S-001324

Identifiers

Report No.: S-001324
Other IDs:
Cross-refs:

Citation information

Author(s): Stephen A. Dietz
Year: 1978
Title: An Archaeological Reconnaissance of Certain Portions of Bulltail Ranch, Marin County, California
Affliliation:
No. pages:
No. maps:
Attributes: Archaeological, Field study
Inventory size: c 300 ac
Disclosure: Not for publication
Collections:

General notes

Associated resources

Primary No.	*Trinomial*	*Name*
P-21-000438	CA-MRN-000487	Bulltail Ranch #1

No. resources: 1
Has informals: No

Location information

County(ies): Marin
USGS quad(s): San Geronimo
Address:
PLSS:

Database record metadata

	Date	*User*
Entered:	4/7/2005	nwic-main
Last modified:	7/15/2008	guldenj

IC actions:	*Date*	*User*	*Action taken*
	4/7/2005	jay	Appended records from NWICmain bibliographic database.

Record status:

Report Detail: S-001871

Identifiers

Report No.: S-001871
Other IDs:
Cross-refs:

Citation information

Author(s): Deborah A. Rippey
Year: 1980 (Jan)
Title: An Archaeological Survey of the Big Rock Ranch, Marin County, California.
Affliliation: The Cultural Resources Facility, Sonoma State University
No. pages:
No. maps:
Attributes: Archaeological, Field study
Inventory size: 30 ac
Disclosure: Not for publication
Collections: No

General notes

An isolated piece of obsidian was also found.

Associated resources

Primary No.	*Trinomial*	*Name*
P-21-000418	CA-MRN-000464	Manuel's Hill
P-21-000664	CA-MRN-000495	Irma's Site

No. resources: 2
Has informals: No

Location information

County(ies): Marin
USGS quad(s): Novato
Address:
PLSS:

Database record metadata

	Date	*User*
Entered:	4/7/2005	nwic-main
Last modified:	4/18/2019	hagell

IC actions:	*Date*	*User*	*Action taken*
	4/7/2005	jay	Appended records from NWICmain bibliographic database.
	4/18/2019	hagell	added month, collections, note

Record status:

Report Detail: S-002058

Identifiers

Report No.: S-002058
Other IDs:
Cross-refs:

Citation information

Author(s): Theo N. Mabry
Year: 1980 (Feb)
Title: Archaeological Records Search and Field Survey of Certain Portions of the Luiz & Grady Ranches, Miller Creek, Gallinas Valley, Marin County, California.
Affliliation: Archaeological Planning Collaborative
No. pages:
No. maps:
Attributes: Archaeological, Field study
Inventory size: c 170 ac
Disclosure: Not for publication
Collections: No

General notes

Associated resources

No. resources: 0
Has informals: No

Location information

County(ies): Marin
USGS quad(s): Novato
Address:
PLSS:

Database record metadata

	Date	*User*	
Entered:	4/7/2005	nwic-main	
Last modified:	4/19/2017	hagell	
IC actions:	*Date*	*User*	*Action taken*
	4/7/2005	jay	Appended records from NWICmain bibliographic database.
	4/19/2017	hagell	added attributes, affiliation, disclosure, collections. Edited title.

Record status:

Report Detail: S-002458

Identifiers

Report No.: S-002458
Other IDs:
Cross-refs:

Citation information

Author(s): Neil Ramiller, Suzanne Ramiller, Roger Werner, and Suzanne Stewart
Year: 1981 (Jan)
Title: Overview of Prehistoric Archaeology for the Northwest Region, California Archaeological Sites Survey: Del Norte, Humboldt, Mendocino, Lake, Sonoma, Napa, Marin, Contra Costa, Alameda
Affliliation: Northwest Regional Office, California Archaeological Sites Survey, Anthropological Studies Center, Sonoma State University
No. pages:
No. maps:
Attributes: Archaeological, Other research
Inventory size:
Disclosure: Not for publication
Collections: No

Sub-desig.: a
Author(s): Suzanne Ramiller
Year: 1982 (Jan)
Title: Prehistoric Archaeology Overview Northwest Region; California Archaeological Inventory, Volume I: Humboldt and Del Norte Counties
Affiliation: Anthropological Studies Center, Sonoma State University
Report type(s): Archaeological, Other research
Inventory size:
No. pages:
Disclosure: Not for publication
Collections: No
PDF Pages: 6-59

Sub-desig.: b
Author(s): Roger H. Werner
Year: 1982 (Jan)
Title: Archaeological Overview of Mendocino and Lake Counties
Affiliation: Anthropological Studies Center, Sonoma State University
Report type(s): Archaeological, Other research
Inventory size:
No. pages:
Disclosure: Not for publication
Collections: Yes
PDF Pages: 60-132

Report Detail: S-002458

Sub-desig.: c
Author(s): Suzanne Stewart
Year: 1982 (Jan)
Title: Prehistoric Archaeology Overview Northwest Region; California Archaeological Inventory, Volume 3: Napa and Sonoma Counties
Affiliation: Anthropological Studies Center, Sonoma State University
Report type(s): Archaeological, Other research
Inventory size:
No. pages:
Disclosure: Not for publication
Collections: No
PDF Pages: 133-266

Sub-desig.: d
Author(s): Suzanne B. Stewart
Year: 1982 (Jan)
Title: Archaeological Overview of Alameda, Contra Costa, and Marin Counties
Affiliation: Anthropological Studies Center, Sonoma State University
Report type(s): Archaeological, Other research
Inventory size:
No. pages:
Disclosure: Not for publication
Collections: No
PDF Pages: 267-345

Sub-desig.: e
Author(s): Neil Ramiller
Year: 1982 (Jan)
Title: Environmental Overview of the Northwest Region
Affiliation: Anthropological Studies Center, Sonoma State University
Report type(s): Archaeological, Other research
Inventory size:
No. pages:
Disclosure: Not for publication
Collections: No
PDF Pages: 346-420

General notes

Associated resources

Primary No.	*Trinomial*	*Name*
P-01-000080	CA-ALA-000060	Castro Valley
P-01-000084	CA-ALA-000307	West Berkeley Shell Mound
P-01-000086	CA-ALA-000309	Emeryville Shellmound
P-01-000104	CA-ALA-000328	Nelson's 328
P-01-000119	CA-ALA-000389	Site #1
P-01-000124	CA-ALA-000394	Pleasanton Meadows Site
P-01-000125	CA-ALA-000396	Noble's Rest Stop
P-01-000126	CA-ALA-000398	ICR-WR-4
P-01-000127	CA-ALA-000399	ICR-WR-5
P-01-000137	CA-ALA-000410	ICR-WR-16
P-01-000139	CA-ALA-000413	Santa Rita Village
P-01-002053	CA-ALA-000300	
P-01-002104	CA-ALA-000397	ICR-WR-3
P-07-000047	CA-CCO-000030	[none]
P-07-000079	CA-CCO-000137	Monument Site; Concord Man Si

P-07-000080	CA-CCO-000138	Hotchkiss Mound
P-07-000081	CA-CCO-000139/H	Simone Mound
P-07-000082	CA-CCO-000140	Bethel Tract
P-07-000083	CA-CCO-000141	C-141, Orwood Mound #2
P-07-000092	CA-CCO-000150	Veale Tract #1
P-07-000093	CA-CCO-000151	[none]
P-07-000105	CA-CCO-000222/H	Keller Ranch
P-07-000131	CA-CCO-000250	Nelson Survey Map #250a
P-07-000146	CA-CCO-000267	Nelson No. 267
P-07-000147	CA-CCO-000268	Voided, see P-07-000461, P-07-
P-07-000148	CA-CCO-000269	Nelson No. 269
P-07-000149	CA-CCO-000270	Nelson No. 270
P-07-000150	CA-CCO-000271	Nelson No. 271
P-07-000151	CA-CCO-000272	Nelson No. 272
P-07-000168	CA-CCO-000290	Nelson No. 290
P-07-000173	CA-CCO-000295	Nelson No. 295
P-07-000175	CA-CCO-000298	Nelson's No. 298, Stege
P-07-000177	CA-CCO-000300	Nelson's 300, Stege
P-07-000185	CA-CCO-000308	Stone Valley Site
P-07-000186	CA-CCO-000309	The Rossmoor Site
P-07-000190	CA-CCO-000352	Diablo Road Site
P-07-000323	CA-CCO-000553/H	Alvarado Park, Wildcat Regional
P-07-000440	CA-CCO-000259	Barker's Rodeo
P-07-000447	CA-CCO-000389	492-1-A
P-07-000448	CA-CCO-000390	492-2-A
P-07-000449	CA-CCO-000391	492-3-B
P-07-000462	CA-CCO-000655	Nelson's 268B
P-07-000470	CA-CCO-000372	[none]
P-07-000474	CA-CCO-000392	492-4-B
P-07-000476	CA-CCO-000698/H	Nelson No. 259
P-07-000481	CA-CCO-000356	[none]
P-07-000674	CA-CCO-000311	Burial Notes
P-07-000710	CA-CCO-000349	Void, see P-07-000323
P-07-000724	CA-CCO-000377	SL-1
P-07-004621		#1 Claeys Ranch
P-08-000015	CA-DNO-000011/H	Ta'gia n te (OHP)
P-08-000018	CA-DNO-000014/H	CInya'tLtci (Waterman 1925)
P-08-000021	CA-DNO-000017/H	MesLteLn
P-08-000090	CA-DNO-000088	Cemetry of Meslteltun
P-12-000125	CA-HUM-000067/H	Loud 67
P-12-000175	CA-HUM-000118	Patrick's Point #4
P-12-000186	CA-HUM-000129/H	Tsa'hpekw
P-12-000194	CA-HUM-000169	Tsurai
P-12-000199	CA-HUM-000174	Cone Rock, Sea Gull Rock
P-12-000202	CA-HUM-000177	MM-1 -- First Night Out Site; MM
P-12-000207	CA-HUM-000182	Shelter Cove, X-1
P-12-000209	CA-HUM-000184	Etter Mound, X-3
P-12-000210	CA-HUM-000185	X-4
P-12-000211	CA-HUM-000186	X-5
P-12-000263	CA-HUM-000245	Stormy Saddle Site
P-12-000264	CA-HUM-000246	Pine Ridge Site
P-12-000266	CA-HUM-000248	Humboldt Gully Site
P-12-000336	CA-HUM-000323	Nooning Creek
P-12-000442	CA-HUM-000435	Mud Springs Site
P-12-000445	CA-HUM-000439	RNP-S-4
P-12-000458	CA-HUM-000452	RNP-S-22; REDW00072
P-12-000824	CA-HUM-000841	Little Black Sand Site; SC-7
P-17-000006	CA-LAK-000261	The Houx Site; Fredrickson "A"
P-17-000026	CA-LAK-000510	5A

P-17-000035	CA-LAK-000753	14A
P-17-000072	CA-LAK-000036/H	Borax Lake Archaeological Distri
P-17-000114	CA-LAK-000089/H	Rattlesnake Island
P-17-000177	CA-LAK-000153	Mauldin 97
P-17-000286	CA-LAK-000267	Mauldin 196
P-17-000287	CA-LAK-000268	Previously CA-LAK-785
P-17-000289	CA-LAK-000271	[none]
P-17-000290	CA-LAK-000272	CA-LAK-272/Full Circle Field 2
P-17-000307	CA-LAK-000291	Mauldin 221
P-17-000320	CA-LAK-000305	Sam Alley Site
P-17-000392	CA-LAK-000380	The Mostin Site
P-17-000407	CA-LAK-000395	GR-11
P-17-000437	CA-LAK-000425/H	LAK-S270
P-17-000446	CA-LAK-000435/H	Diwi'lem
P-17-000470	CA-LAK-000471	27A
P-17-000531	CA-LAK-000585	2A
P-17-000535	CA-LAK-000589/H	Lewis Colony Site
P-17-000546	CA-LAK-000605	G-99
P-17-000550	CA-LAK-000609/H	G-103
P-17-000551	CA-LAK-000610	G-104
P-17-000554	CA-LAK-000613/H	Ford Flat Site
P-17-000572	CA-LAK-000643	Pirate's Buried Site
P-17-000610	CA-LAK-000711	PBL9
P-17-000639	CA-LAK-000741	[none]
P-17-000640	CA-LAK-000742/H	[none]
P-17-000673	CA-LAK-000785	Voided: see P-17-000287
P-17-000787	CA-LAK-000944/H	Middle Creek CCC Camp
P-17-000812	CA-LAK-000971/H	[none]
P-21-000017	CA-MRN-000266	PB 266
P-21-000034	CA-MRN-000001	Nelson No. 1; Olompali
P-21-000039	CA-MRN-000008	[none]
P-21-000051	CA-MRN-000020	Nelson No. 20
P-21-000053	CA-MRN-000022	Nelson No. 22
P-21-000057	CA-MRN-000026	Nelson No. 26
P-21-000058	CA-MRN-000027	Nelson No. 27
P-21-000106	CA-MRN-000076	Nelson No. 76
P-21-000143	CA-MRN-000115	Nelson No. 115
P-21-000163	CA-MRN-000138	Nelson No. 138
P-21-000177	CA-MRN-000152	Nelson No. 152
P-21-000217	CA-MRN-000192	Nelson No. 192
P-21-000221	CA-MRN-000196	Nelson No. 196
P-21-000235	CA-MRN-000216/H	DNG-1
P-21-000242	CA-MRN-000232/H	PB 232 b
P-21-000245	CA-MRN-000235/H	Beardsley's 301
P-21-000252	CA-MRN-000242/H	PB No. 242 - Cauley
P-21-000262	CA-MRN-000275	PB 275
P-21-000283	CA-MRN-000298/H	DNG-2
P-21-000290	CA-MRN-000307/H	Probably 232 C
P-21-000291	CA-MRN-000308/H	[none]
P-21-000295	CA-MRN-000315	Nelson No. 86C
P-21-000332	CA-MRN-000357/H	Bayonet Midden
P-21-000335	CA-MRN-000362	Lyon's Site
P-21-000342	CA-MRN-000370	S.A. VIII
P-21-000346	CA-MRN-000374	[none]
P-21-000347	CA-MRN-000375	4-MRN-248
P-21-000368	CA-MRN-000402	[none]
P-21-000369	CA-MRN-000403	[none]
P-21-000370	CA-MRN-000404	
P-21-000651	CA-MRN-000358	S.A. II (San Antonio II)

P-21-000653	CA-MRN-000391	[none]
P-21-002539	CA-MRN-000682	S.A. VII (Northwestern Archaeol.
P-23-000143	CA-MEN-000069	69
P-23-000387	CA-MEN-000320	Voided; See P-23-000590
P-23-000450	CA-MEN-000455	"Digger Post"
P-23-000475	CA-MEN-000483	[none]
P-23-000478	CA-MEN-000486	[none]
P-23-000492	CA-MEN-000500	[none]
P-23-000534	CA-MEN-000583	[none]
P-23-000535	CA-MEN-000584	Matuko
P-23-000536	CA-MEN-000585	[none]
P-23-000537	CA-MEN-000586	[None]
P-23-000539	CA-MEN-000588	[none]
P-23-000590	CA-MEN-000643/H	Eel River Work Center
P-23-000786	CA-MEN-000851	[none]
P-23-000789	CA-MEN-000854	Upper Twin Rocks
P-23-000790	CA-MEN-000855	Milling Stone Basin
P-23-000791	CA-MEN-000856	Wagon Trail
P-23-000792	CA-MEN-000857/H	White Hawk Top
P-23-000793	CA-MEN-000858	White Hawk Yoostabe
P-23-000796	CA-MEN-000861	Long Doe Petroglyph
P-23-000835	CA-MEN-000900	Upper Coffee Mill Flat
P-23-001034	CA-MEN-001111	Spring Site
P-23-001060	CA-MEN-001154	Neiyi
P-23-001063	CA-MEN-001157	S-6435
P-23-001520	CA-MEN-001633	Olkat
P-23-002898	CA-MEN-000405/H	Fenenga 1
P-23-002915	CA-MEN-000482	MEN-482
P-23-002936	CA-MEN-000546	Possibly Barrett's (1908, p. 140)
P-23-002945	CA-MEN-000555	[none]
P-28-000015	CA-NAP-000001/H	#1; Goddard; Oakville
P-28-000027	CA-NAP-000014	Las Trancas
P-28-000028	CA-NAP-000015/H	Suscol Mound #5
P-28-000029	CA-NAP-000016	#16; Suscol Mound #1
P-28-000032	CA-NAP-000021	ACRS-PV-I
P-28-000045	CA-NAP-000039	Tulukai
P-28-000061	CA-NAP-000057	Peripoli
P-28-000063	CA-NAP-000060	UCMA Napa 60-50
P-28-000066	CA-NAP-000063	Usibelli Coal Mine Site
P-28-000077	CA-NAP-000074	#4
P-28-000088	CA-NAP-000089	#23
P-28-000092	CA-NAP-000093	Possibly Kroeber's "Topai"
P-28-000093	CA-NAP-000094	#28
P-28-000097	CA-NAP-000098	#32
P-28-000123	CA-NAP-000129	B-53-GG
P-28-000125	CA-NAP-000131	Genoa Site
P-28-000150	CA-NAP-000158	B-59-Z
P-28-000199	CA-NAP-000234	Roy Pridmore #3
P-28-000209	CA-NAP-000247	ACRS-BD-6
P-28-000218	CA-NAP-000261	D.T.Davis #49; UCAS-B 277
P-28-000222	CA-NAP-000270	CA-NAP-270
P-28-000310	CA-NAP-000410	Querried Quarry Site
P-28-000311	CA-NAP-000411/H	[none]
P-28-000329	CA-NAP-000432	T-23
P-28-000330	CA-NAP-000433	T-41 - UCD Files
P-28-000362	CA-NAP-000468	Mudflat Site (2)
P-28-000418	CA-NAP-000535	Tom's Mounds
P-28-000419	CA-NAP-000536	[none]
P-28-000420	CA-NAP-000537	[none]

P-28-000421	CA-NAP-000538	[none]
P-28-000422	CA-NAP-000539	Klaffke's Mound
P-28-000428	CA-NAP-000545	I
P-28-000828	CA-NAP-000032	#32; Kolb; Rutherford; Pistorias
P-28-000912	CA-NAP-000311	Voided - see P-28-000212
P-49-000073	CA-SON-000004/H	Carrillo Adobe
P-49-000079	CA-SON-000020	Lithic Scatter
P-49-000112	CA-SON-000084	Santa Rosa Creek Site
P-49-000135	CA-SON-000159	Stony Glenn Lane
P-49-000194	CA-SON-000222	Nelson No. 222
P-49-000228	CA-SON-000256	P-30
P-49-000264	CA-SON-000292	The Ranch Site
P-49-000265	CA-SON-000293	Probably Kelly's Site "Tiwut-Huy
P-49-000271	CA-SON-000299	"Kili"
P-49-000291	CA-SON-000320	"Loken-Huye" (Kelly)
P-49-000292	CA-SON-000321	Peter's 321
P-49-000295	CA-SON-000324	Peter's 324
P-49-000318	CA-SON-000347	Gleason Beach 1
P-49-000329	CA-SON-000358	VOIDED - see P-49-000087
P-49-000330	CA-SON-000359	Hidden Valley Ranch
P-49-000340	CA-SON-000369	Atcacinateawalli
P-49-000342	CA-SON-000371	Foster's Ranch
P-49-000360	CA-SON-000389	Carriger Creek site
P-49-000362	CA-SON-000391	S.A.1
P-49-000363	CA-SON-000392	King #5
P-49-000369	CA-SON-000400	S.A. VII (Northwestern Archaeol.
P-49-000371	CA-SON-000402	TC-1
P-49-000423	CA-SON-000455/H	Gables Site
P-49-000424	CA-SON-000456	[none]
P-49-000434	CA-SON-000466	[none]
P-49-000483	CA-SON-000518	SDA-30
P-49-000512	CA-SON-000547/H	H-51
P-49-000521	CA-SON-000556/H	H-41
P-49-000548	CA-SON-000583/H	SRI-3001
P-49-000620	CA-SON-000670/H	SDA-1
P-49-000653	CA-SON-000710	SDA-61
P-49-000671	CA-SON-000729	SDA-104
P-49-000682	CA-SON-000740	G.E.- 8
P-49-000683	CA-SON-000741	G.E.- 9
P-49-000730	CA-SON-000789	Geyser Fourty-Four
P-49-000731	CA-SON-000790	Geyser Fourty-Five
P-49-000732	CA-SON-000791	Geyser Fourty-Six
P-49-000733	CA-SON-000792	Geyser Fourty-Seven
P-49-000846	CA-SON-000906	Miller's Garden Site
P-49-000860	CA-SON-000920	[none]
P-49-000887	CA-SON-000948	[none]
P-49-000913	CA-SON-000976	[none]
P-49-000914	CA-SON-000977	[none]
P-49-000915	CA-SON-000978	[none]
P-49-000916	CA-SON-000979	[none]
P-49-000917	CA-SON-000980	[none]
P-49-000959	CA-SON-001025	Redwood Thompson Site
P-49-000970	CA-SON-001036	Soledad
P-49-000976	CA-SON-001042	[none]
P-49-000978	CA-SON-001044	Walnut Orchard Site
P-49-000981	CA-SON-001047	Rosehip Site
P-49-000982	CA-SON-001048	Laguna Grande
P-49-000983	CA-SON-001049	Willow Marsh Site
P-49-000990	CA-SON-001058	[none]

Report Detail: S-002458

	P-49-000992	CA-SON-001060	Madrone Knoll
	P-49-001081	CA-SON-001154	Site No. 1
	P-49-001082	CA-SON-001155	Site No. 2
	P-49-001083	CA-SON-001156	Site No. 3
	P-49-001084	CA-SON-001157	Site No. 4
	P-49-001085	CA-SON-001158	Site No. 5
	P-49-001086	CA-SON-001159/H	Site No. 6
	P-49-001087	CA-SON-001160	Site No. 7
	P-49-001109	CA-SON-001182	Doberman Terrace
	P-49-001121	CA-SON-001195	Covert Lane Site
No. resources:	261		
Has informals:	No		

Location information

County(ies): Alameda, Contra Costa, Del Norte, Humboldt, Lake, Marin, Mendocino, Napa, Sonoma

USGS quad(s): ~All quads - Alameda Co., ~All quads - Contra Costa Co., ~All quads - Del Norte Co., ~All quads - Humboldt Co., ~All quads - Lake Co., ~All quads - Marin Co., ~All quads - Mendocino Co., ~All quads - Napa Co., ~All quads - Sonoma Co.

Address:

PLSS:

Database record metadata

	Date	*User*
Entered:	4/7/2005	nwic-main
Last modified:	12/3/2020	hagell

IC actions:	*Date*	*User*	*Action taken*
	4/7/2005	jay	Appended records from NWICmain bibliographic database.
	8/29/2016	hagell	edited titles, affiliations of additional citations
	4/11/2017	raelync	Report verified; awaiting verification of 55 resources.
	10/16/2018	rinerg	report GIS verified; 40 resources pending verification; marked 'db complete'
	12/3/2020	hagell	edited affiliation

Record status: Verified

Report Detail: S-007888

Identifiers

Report No.: S-007888
Other IDs:
Cross-refs:

Citation information

Author(s): David Allen Fredrickson
Year: 1973 (Mar)
Title: Early Cultures of the North Coast Ranges, California.
Affliliation: University of California, Davis
No. pages:
No. maps:
Attributes: Archaeological, Other research, Thesis/dissertation
Inventory size:
Disclosure: Not for publication
Collections: No

General notes

PhD dissertation

Associated resources

Primary No.	*Trinomial*	*Name*
P-17-000006	CA-LAK-000261	The Houx Site; Fredrickson "A"
P-17-000072	CA-LAK-000036/H	Borax Lake Archaeological Distri
P-28-000125	CA-NAP-000131	Genoa Site

No. resources: 3
Has informals: No

Location information

County(ies): Colusa, Humboldt, Lake, Marin, Mendocino, Napa, Other, Solano, Sonoma
USGS quad(s): ~All quads - Lake Co., ~All quads - Marin Co., ~All quads - Mendocino Co., ~All quads - Napa Co., ~All quads - Sonoma Co., Alderpoint, Arcata North, Arcata South, Benicia, Black Lassic, Blake Mountain, Blocksburg, Blue Lake, Board Camp Mtn, Briceland, Bridgeville, Buckeye Mtn, Bull Creek, Cannibal Island, Cape Mendocino, Capetown, Cooskie Creek, Crannell, Dinsmore, Ettersburg, Eureka, Fairfield North, Fairfield South, Ferndale, Fields Landing, Fort Seward, Fortuna, Fouts Springs, Garberville, Gilmore Peak, Harris, Honeydew, Hydesville, Iaqua Buttes, Jewett Rock, Korbel, Larabee Valley, Mad River Buttes, Maple Creek, Mare Island, Mc Whinney Creek, Miranda, Mt Vaca, Myers Flat, Owl Creek, Panther Creek, Petrolia, Redcrest, Rodgers Peak, Scotia, Shelter Cove, Showers Mountain, Shubrick Peak, St John Mtn, Stonyford, Taylor Peak, Tyee City, Weott, Yager Junction
Address:
PLSS:

Database record metadata

	Date	*User*
Entered:	4/7/2005	nwic-main
Last modified:	11/22/2019	moored

IC actions:	*Date*	*User*	*Action taken*
	4/7/2005	jay	Appended records from NWICmain bibliographic database.

Record status: Verified

Report Detail: S-008226

Identifiers

Report No.: S-008226
Other IDs:
Cross-refs:

Citation information

Author(s): E. Breck Parkman
Year: 1986 (Feb)
Title: Status of Archeological Resources in the Northern Region, California Department of Parks and Recreation
Affliliation: California Department of Parks & Recreation
No. pages:
No. maps:
Attributes: Archaeological, Other research
Inventory size:
Disclosure: Not for publication
Collections: No

General notes

The report extends outside of the NWIC service area (into Shasta, Butte, & Tehama counties) in the State Parks Northern Region.

Associated resources

Primary No.	*Trinomial*	*Name*
P-08-000007	CA-DNO-000002	O-menhipu'r - north
P-08-000015	CA-DNO-000011/H	Ta'gia n te (OHP)
P-08-000018	CA-DNO-000014/H	CInya'tLtci (Waterman 1925)
P-08-000019	CA-DNO-000015/H	Ltrume (Drucker 1937)
P-08-000022	CA-DNO-000018	Sitragitum
P-08-000023	CA-DNO-000019/H	Yontocket Indian Village Site
P-08-000025	CA-DNO-000021/H	E'tculet
P-08-000026	CA-DNO-000022	Tawasnasren
P-08-000029	CA-DNO-000025	Dno-S1
P-08-000030	CA-DNO-000026/H	TcuncuLtun
P-08-000031	CA-DNO-000027	Dno-S3
P-08-000032	CA-DNO-000028	Dno-S4
P-08-000033	CA-DNO-000029	Dno-S5
P-08-000034	CA-DNO-000030/H	Dno-S6
P-08-000035	CA-DNO-000031	Dno-S7
P-08-000036	CA-DNO-000032	DNo-S8
P-08-000037	CA-DNO-000033	DNo-S9
P-08-000038	CA-DNO-000034	Two Tree Site
P-08-000040	CA-DNO-000036	Dno-S13
P-08-000043	CA-DNO-000039	Shus-Nash-Kusk (Pulling Canoe)
P-08-000055	CA-DNO-000053	[none]
P-08-000092	CA-DNO-000090/H	RNP S-9
P-08-000244	CA-DNO-000247	LET-1
P-12-000175	CA-HUM-000118	Patrick's Point #4
P-12-000176	CA-HUM-000119	Patrick's Point S.P. #3
P-12-000177	CA-HUM-000120/H	Totskwi (Waterman 1920)
P-12-000178	CA-HUM-000121	Srepor, A Yurok Village
P-12-000179	CA-HUM-000122	Loud 2
P-12-000180	CA-HUM-000123	Pinpa
P-12-000181	CA-HUM-000124	O-pyu-weg
P-12-000182	CA-HUM-000125	Ma'ats
P-12-000184	CA-HUM-000127	Osloqw
P-12-000185	CA-HUM-000128	Paar
P-12-000186	CA-HUM-000129/H	Tsa'hpekw
P-12-000190	CA-HUM-000133	Espau Village

P-12-000193	CA-HUM-000136/H	Osegen
P-12-000197	CA-HUM-000172	S-4
P-12-000199	CA-HUM-000174	Cone Rock, Sea Gull Rock
P-12-000205	CA-HUM-000180	Resources, Div. of bchs and par
P-12-000256	CA-HUM-000236	GCRSP #1
P-12-000257	CA-HUM-000237	[none]
P-12-000258	CA-HUM-000238	[none]
P-12-000259	CA-HUM-000239	[none]
P-12-000260	CA-HUM-000240	[none]
P-12-000261	CA-HUM-000241	Patrick's Point State Park
P-12-000384	CA-HUM-000376	Patrick's Point S.P. #1
P-12-000460	CA-HUM-000454H	RNP-S-26
P-12-000467	CA-HUM-000461	[none]
P-12-000468	CA-HUM-000462	[none]
P-12-000469	CA-HUM-000463	TSB 3
P-12-000663	CA-HUM-000672	Little River State Beach # 1
P-12-000664	CA-HUM-000673H	Little River SB #2
P-12-000702	CA-HUM-000711	Void; see P-12-000256
P-12-001060	CA-HUM-000221	S-2
P-17-000004	CA-LAK-000072/H	First Field Site
P-17-000070	CA-LAK-000030	Slater Island
P-17-000436	CA-LAK-000424/H	Lak-S269
P-17-000437	CA-LAK-000425/H	LAK-S270
P-17-000535	CA-LAK-000589/H	Lewis Colony Site
P-17-000954	CA-LAK-001127	F-12
P-21-000040	CA-MRN-000009	Nelson No. 9
P-21-000072	CA-MRN-000042	Nelson No. 42
P-21-000073	CA-MRN-000043	Nelson No. 43
P-21-000074	CA-MRN-000044	Nelson No. 44
P-21-000075	CA-MRN-000045	Nelson No. 45
P-21-000139	CA-MRN-000111	Nelson No. 111
P-21-000140	CA-MRN-000112	Nelson No. 112
P-21-000143	CA-MRN-000115	Nelson No. 115
P-21-000218	CA-MRN-000193/H	Rancho Olompali; Olompali Fra
P-21-000231	CA-MRN-000209	[none]
P-21-000255	CA-MRN-000253	PB 253
P-21-000269	CA-MRN-000283/H	PB 253A
P-21-000270	CA-MRN-000284/H	Indian Beach #1
P-21-000548	CA-MRN-000469	Rat Rock Midden
P-28-000240	CA-NAP-000328/H	Bale Mill #3
P-49-000086	CA-SON-000029	Santa Rosa Obsidian Quarry
P-49-000149	CA-SON-000173	DM-2
P-49-000150	CA-SON-000174/H	Pomo 16; Fort Ross School
P-49-000164	CA-SON-000190/H	Fort Ross
P-49-000211	CA-SON-000239	P-13
P-49-000266	CA-SON-000294H	Russian Watering Site
P-49-000319	CA-SON-000348/H	Duncans Landing Site
P-49-000323	CA-SON-000352	DM-3
P-49-000324	CA-SON-000353	Peters 353
P-49-000325	CA-SON-000354	Peter's 354
P-49-000488	CA-SON-000523	SON-S59
P-49-000620	CA-SON-000670/H	SDA-1
P-49-000628	CA-SON-000681/H	SDA-22
P-49-000701	CA-SON-000760	Geysers Fifteen
P-49-001041	CA-SON-001113	SR-1
P-49-001203	CA-SON-001281	[none]
P-49-001349	CA-SON-001446H	FRO-1
P-49-001358	CA-SON-001455	Ft. Ross Campground #1

No. resources: 93

Report Detail: S-008226

Has informals: Yes

Location information

County(ies): Del Norte, Humboldt, Lake, Marin, Mendocino, Napa, Other, Sonoma

USGS quad(s): ~All quads - Del Norte Co., ~All quads - Humboldt Co., ~All quads - Lake Co., ~All quads - Marin Co., ~All quads - Mendocino Co., ~All quads - Napa Co., ~All quads - Sonoma Co.

Address:

PLSS:

Database record metadata

	Date	*User*
Entered:	4/7/2005	nwic-main
Last modified:	12/4/2019	hagell

IC actions:	*Date*	*User*	*Action taken*
	4/7/2005	jay	Appended records from NWICmain bibliographic database.
	7/2/2015	rinerg	marked as Database Complete
	9/14/2016	hagell	edited notes
	4/11/2017	raelync	Report verified; awaiting verification of 14 resources. GIS shapes are county boundaries.
	9/13/2018	rinerg	the list of quads in Location has been reduced to the "~All quads - …" selections for the 7 counties

Record status: Verified

Report Detail: S-009462

Identifiers

Report No.: S-009462
Other IDs:
Cross-refs:

Citation information

Author(s): Teresa Ann Miller
Year: 1977 (Jun)
Title: Identification and Recording of Prehistoric Petroglyphs in Marin and Related Bay Area Counties
Affliliation: San Francisco State University
No. pages:
No. maps:
Attributes: Thesis/dissertation
Inventory size:
Disclosure: Not for publication
Collections: No

General notes

Masters Thesis

Associated resources

Primary No.	*Trinomial*	*Name*
P-07-000323	CA-CCO-000553/H	Alvarado Park, Wildcat Regional
P-21-000087	CA-MRN-000057	Nelson No. 57
P-21-000376	CA-MRN-000414	Deer Island Area #1
P-21-000378	CA-MRN-000416	Deer Island Area #3
P-21-000379	CA-MRN-000417	Deer Island Area #4
P-21-000380	CA-MRN-000418	Deer Island Area #5
P-21-000381	CA-MRN-000419	Deer Island Area #6
P-21-000382	CA-MRN-000420	17 Novato
P-21-000383	CA-MRN-000421	Novato #18
P-21-000384	CA-MRN-000422	Novato #19
P-21-000386	CA-MRN-000425	Tiburon 3 Field #3
P-21-000387	CA-MRN-000426	Tiburon 4 Field #4
P-21-000388	CA-MRN-000427	Tiburon 5 Field #5
P-21-000389	CA-MRN-000428	Tiburon 6 Field #6
P-21-000390	CA-MRN-000429	Tiburon 7 Field #7
P-21-000391	CA-MRN-000430	Tiburon 8 Field #8
P-21-000392	CA-MRN-000431	Tiburon 9, 10, 11
P-21-000393	CA-MRN-000432	Tiburon 12
P-21-000394	CA-MRN-000433	Tiburon 13 Field #13
P-21-000395	CA-MRN-000434	Tiburon 14 & 15 Field #14 & #15
P-21-000396	CA-MRN-000435	Tiburon 16 Field #16
P-21-000397	CA-MRN-000436	Tiburon 17 Field #17
P-21-000398	CA-MRN-000437	Tiburon 18 Field #18
P-21-000399	CA-MRN-000438	Tiburon 19 Field #19
P-21-000400	CA-MRN-000439	Tiburon 20A
P-21-000401	CA-MRN-000440	Tiburon 21 Field #21
P-21-000402	CA-MRN-000442	Tiburon 1
P-21-000546	CA-MRN-000424	Tiburon 2
P-23-000434	CA-MEN-000433	Bell Springs Petroglyph Rock
P-23-000789	CA-MEN-000854	Upper Twin Rocks
P-23-000790	CA-MEN-000855	Milling Stone Basin
P-49-000629	CA-SON-000682	Steward's 9 PT.
P-49-000785	CA-SON-000844	Petaluma #1
P-49-000787	CA-SON-000846	Petaluma #3

No. resources: 34
Has informals: Yes

Report Detail: S-009462

Location information

County(ies): Alameda, Contra Costa, Lake, Marin, Mendocino, Napa, San Francisco, San Mateo, Santa Clara, Santa Cruz, Solano, Sonoma

USGS quad(s): ~All quads - Alameda Co., ~All quads - Contra Costa Co., ~All quads - Lake Co., ~All quads - Marin Co., ~All quads - Mendocino Co., ~All quads - Napa Co., ~All quads - San Francisco Co., ~All quads - San Mateo Co., ~All quads - Santa Clara Co., ~All quads - Santa Cruz Co., ~All quads - Solano Co., ~All quads - Sonoma Co.

Address:

PLSS:

Database record metadata

	Date	*User*
Entered:	4/7/2005	nwic-main
Last modified:	5/3/2017	hagell

IC actions:	*Date*	*User*	*Action taken*
	4/7/2005	jay	Appended records from NWICmain bibliographic database.
	10/5/2010	muchb	updated county list as per thesis content
	7/2/2015	rinerg	marked Verified
	7/13/2016	reguindinr	edited database
	7/14/2016	simsa	Updated GIS: deleted point and poly features; retained other report features for each county involved in report
	4/11/2017	raelync	Report verified, awaiting verification of 28 resources.
	4/14/2017	grahams	resources verified

Record status: Verified

Report Detail: S-009795

Identifiers

Report No.: S-009795
Other IDs:
Cross-refs:

Citation information

Author(s): Thomas Lynn Jackson
Year: 1986 (Jun)
Title: Late Prehistoric Obsidian Exchange in Central California
Affliliation: Stanford University
No. pages:
No. maps:
Attributes: Other research, Thesis/dissertation
Inventory size:
Disclosure: Not for publication
Collections: Yes

General notes

This report contains copyrighted material. Do not release until client has contacted Thomas Lynn Jackson, received permission, and the NWIC has received written verification. PhD dissertation.

Associated resources

Primary No.	*Trinomial*	*Name*
P-06-000025	CA-COL-000001	S-1 Miller
P-07-000047	CA-CCO-000030	[none]
P-07-000080	CA-CCO-000138	Hotchkiss Mound
P-07-000188	CA-CCO-000312	Franks
P-07-000440	CA-CCO-000259	Barker's Rodeo
P-17-000320	CA-LAK-000305	Sam Alley Site
P-17-000601	CA-LAK-000702	1
P-21-000163	CA-MRN-000138	Nelson No. 138
P-21-000218	CA-MRN-000193/H	Rancho Olompali; Olompali Fra
P-21-000235	CA-MRN-000216/H	DNG-1
P-21-000242	CA-MRN-000232/H	PB 232 b
P-21-000283	CA-MRN-000298/H	DNG-2
P-21-000290	CA-MRN-000307/H	Probably 232 C
P-21-000368	CA-MRN-000402	[none]
P-21-000423	CA-MRN-000471	San Jose Village
P-21-000628	CA-MRN-000201	Jesse Peter 201
P-23-001589	CA-MEN-001704	Tciya
P-23-001659	CA-MEN-001844	Men. X
P-23-003068	CA-MEN-001809	Men-1704S
P-23-003119	CA-MEN-001929	[none]
P-28-000015	CA-NAP-000001/H	#1; Goddard; Oakville
P-28-000068	CA-NAP-000065	#65
P-28-000116	CA-NAP-000118	Glass Mt. III; Glass Mt. II
P-28-000199	CA-NAP-000234	Roy Pridmore #3
P-28-000205	CA-NAP-000240	Big Basin No. 1
P-28-000828	CA-NAP-000032	#32; Kolb; Rutherford; Pistorias
P-49-000135	CA-SON-000159	Stony Glenn Lane
P-49-000360	CA-SON-000389	Carriger Creek site
P-49-000423	CA-SON-000455/H	Gables Site
P-49-000424	CA-SON-000456	[none]
P-49-000518	CA-SON-000553	[none]
P-49-000521	CA-SON-000556/H	H-41
P-49-000533	CA-SON-000568	Smiley
P-49-000536	CA-SON-000571	Poolside Cupule Rocks
P-49-000558	CA-SON-000593/H	Son 3 (SFSC); Son 4 (SFSC); H-

Report Detail: S-009795

	P-49-000801	CA-SON-000860/H	82-12
	P-57-000114	CA-YOL-000139	Elation Hill

No. resources: 37

Has informals: No

Location information

County(ies): Alameda, Colusa, Contra Costa, Lake, Marin, Mendocino, Napa, San Francisco, Solano, Sonoma, Yolo

USGS quad(s): ~All quads - Colusa Co., ~All quads - Contra Costa Co., ~All quads - Marin Co., ~All quads - Napa Co., ~All quads - San Francisco Co., ~All quads - Solano Co., ~All quads - Sonoma Co., ~All quads - Yolo Co., Aetna Springs, Albion, Altamont, Asti, Bartlett Mtn, Bartlett Springs, Benmore Canyon, Big Foot Mtn, Boonville, Burbeck, Clearlake Oaks, Cloverdale, Cold Spring, Comptche, Cow Mountain, Crockett Peak, Detert Reservoir, Dublin, Elk Mountain, Elledge Peak, Eureka Hill, Fort Bragg, Foster Mountain, Fouts Springs, Glascock Mtn, Greenough Ridge, Gualala, Gube Mountain, Hayward, Highland Springs, Hopland, Hough Springs, Hunters Point, Jericho Valley, Lake Pillsbury, Lakeport, Las Trampas Ridge, Laughlin Range, Leesville, Livermore, Lucerne, Mallo Pass Creek, Mathison Peak, Mcguire Ridge, Middletown, Midway, Mount St Helena, Northspur, Noyo Hill, Oakland East, Oakland West, Ornbaun Valley, Philo, Point Arena, Potato Hill, Potter Valley, Purdys Gardens, Redwood Point, Richmond, San Leandro, Saunders Reef, St John Mtn, The Geysers, Upper Lake, Van Arsdale Reservoir, Whispering Pines, Wilbur Springs, Willits, Wilson Valley, Yorkville, Zeni Ridge

Address:

PLSS:

Database record metadata

	Date	*User*
Entered:	4/7/2005	nwic-main
Last modified:	8/4/2017	raelync

IC actions:	*Date*	*User*	*Action taken*
	4/7/2005	jay	Appended records from NWICmain bibliographic database.
	10/21/2015	rinerg	add quads: 'all Yolo', 'all Solano', 'all Napa', 'all Sonoma', 'all Marin'; remove quad: Las Trampas Ridge; add about 75 more quads based on GIS portions in Mendocino, Lake, Colusa, ContraCosta counties
	11/30/2016	neala	added SFR & ALA county areas, fixed northern boundary, & added all appropriate quads
	4/11/2017	raelync	Report verified, awaiting verification of 17 resources.

Record status: Verified

Report Detail: S-012088

Identifiers

Report No.: S-012088
Other IDs:
Cross-refs:

Citation information

Author(s): Thomas L. Jackson
Year: 1974
Title: Report of Findings of Archaeological Reconnaissance of Proposed Nicasio Ridge Equestrian Project, Nicasio, Marin County, California
Affliliation:
No. pages:
No. maps:
Attributes: Archaeological, Field study
Inventory size: c 650 ac
Disclosure: Not for publication
Collections: No

General notes

Two unrecorded prehistoric habitation sites were found during the survey.

Associated resources

No. resources: 0
Has informals: Yes

Location information

County(ies): Marin
USGS quad(s): San Geronimo
Address:
PLSS:

Database record metadata

	Date	*User*
Entered:	4/7/2005	nwic-main
Last modified:	12/15/2016	simsa

IC actions:	*Date*	*User*	*Action taken*
	4/7/2005	jay	Appended records from NWICmain bibliographic database.
	12/14/2016	moored	Database Incomplete: No Affiliation Submitted

Record status: Verified

Report Detail: S-013217

Identifiers

Report No.: S-013217

Other IDs:	*Type*	*Name*
	Voided	S-13399
	Voided	S-13400
	Voided	S-13401

Cross-refs:

Citation information

Author(s): Thomas M. Origer
Year: 1990 (Nov)
Title: An Archaeological Survey for the AT&T Fiber Optics Cable, San Francisco to Point Arena, California
Affliliation:
No. pages:
No. maps:
Attributes: Archaeological, Field study
Inventory size: c 205 li mi
Disclosure: Not for publication
Collections: No

Sub-desig.: a
Author(s): Thomas M. Origer
Year: 1990 (Dec)
Title: Archaeological findings regarding a selection of a route through Novato for the AT&T Fiber Optics Cable (letter report)
Affiliation: Tom Origer & Associates
Report type(s): Archaeological, Field study
Inventory size:
No. pages:
Disclosure: Not for publication
Collections: No
PDF Pages: 17-18

Sub-desig.: b
Author(s): Thomas M. Origer
Year: 1991 (Apr)
Title: An archaeological study of revised portions of the AT&T route near Santa Rosa and Sausalito (letter report)
Affiliation: Tom Origer & Associates
Report type(s): Archaeological, Field study
Inventory size:
No. pages:
Disclosure: Not for publication
Collections: No
PDF Pages: 19-21

Report Detail: S-013217

Sub-desig.: c
Author(s): Thomas M. Origer
Year: 1991 (May)
Title: Archaeological study of AT&T revised fiber cable routes (letter report)
Affiliation: Tom Origer & Associates
Report type(s): Archaeological, Field study
Inventory size:
No. pages:
Disclosure: Not for publication
Collections: No
PDF Pages: 22-29

Sub-desig.: d
Author(s): Thomas M. Origer
Year: 1992 (Sep)
Title: Archaeological survey of alternative fiber optics cable routes, Point Arena (letter report)
Affiliation: Tom Origer & Associates
Report type(s): Archaeological, Field study
Inventory size:
No. pages:
Disclosure: Not for publication
Collections: No
PDF Pages: 30-32

General notes

[Informal resource: Kelly Road Site - midden soils, obsidian flakes, fire-affected rock, & possible groundstone implements. [L. Hagel 10/05/2016] [Map 1 of additional citation 'a' depicts the "Sweetwater Springs Historic District" within the cable route near the Russian River.] This copy of the report is missing many of the USGS location maps.

Associated resources

Primary No.	*Trinomial*	*Name*
P-21-000042	CA-MRN-000011	Nelson No. 11
P-21-000043	CA-MRN-000012	Nelson No. 12
P-21-000347	CA-MRN-000375	4-MRN-248
P-21-000527	CA-MRN-000600	Ancient Knoll
P-21-000528	CA-MRN-000601	Burdell Spring #1
P-21-002694		Golden Gate Bridge
P-38-001336		Golden Gate Bridge
P-49-002834	CA-SON-002322H	Northwestern Pacific Railroad

No. resources: 8
Has informals: Yes

Location information

County(ies): Marin, Mendocino, San Francisco, Sonoma
USGS quad(s): Annapolis, Asti, Big Foot Mtn, Cloverdale, Cotati, Eureka Hill, Geyserville, Gualala, Gube Mountain, Guerneville, Healdsburg, Jimtown, Mcguire Ridge, Novato, Petaluma, Petaluma River, Point Arena, Point Bonita, San Francisco North, San Geronimo, San Rafael, Santa Rosa, Saunders Reef, Sebastopol, Stewarts Point, Tombs Creek, Warm Springs Dam
Address:
PLSS:

Database record metadata

	Date	*User*
Entered:	4/7/2005	nwic-main
Last modified:	9/10/2020	hagell

IC actions:	*Date*	*User*	*Action taken*
	4/7/2005	jay	Appended records from NWICmain bibliographic database.

Report Detail: S-013217

	12/19/2012	neala	year added
	6/22/2015	mikulikc	database incomplete: no affiliation submitted
	6/24/2015	dollingers	Added several quads to location
	3/18/2016	rinerg	add quad: Eureka Hill; remove county: San Francisco (per GIS location)
	10/3/2016	castrom	This report has been reviewed and will be kept as DB Complete until survey maps can be obtained from submitter. GIS looks to have been Georef'ed from basemaps.
	10/3/2016	castrom	removed Survey coverage map that belongs to S-6335. And added informal.
	10/5/2016	Hagell	edited notes
	10/24/2016	hagell	added county
	2/3/2017	castrom	remapped the study boundaries based on the author's original Quad maps. There were missing segments of the Fiber Optic Cable Route on the Healdsburg and Gube Mtn Quads. (in progress)
	2/3/2017	castrom	original survey quad maps are in the author's possession (Tom Origer).
	2/9/2017	castrom	added pages 17-28 from the author. Created Addit. Cit a-d (Voided: S-13399, S-13400, S-13401)
	4/11/2017	raelync	Report verified, awaiting verification of 4 resources.
	6/29/2017	castrom	Resources are all verified. The report boundary is updated based on survey quad maps ("verified"). However, the author is going to send in an updated report boundary.
	6/29/2017	castrom	Report to remain DB complete until that time.
	7/24/2020	hagell	edited titles
Record status:	Database Complete		

Report Detail: S-013788

Identifiers

Report No.: S-013788
Other IDs:
Cross-refs:

Citation information

Author(s): David Chavez and Jan M. Hupman
Year: 1992 (Feb)
Title: Cultural Resources Investigations for the ILM/Grady Ranch EIR, Marin County, California
Affliliation: David Chavez & Associates
No. pages:
No. maps:
Attributes: Archaeological, Field study
Inventory size: c 320 ac
Disclosure: Not for publication
Collections:

General notes

Associated resources

Primary No.	*Trinomial*	*Name*
P-21-000418	CA-MRN-000464	Manuel's Hill
P-21-000419	CA-MRN-000465	Whit's Rock
P-21-000664	CA-MRN-000495	Irma's Site

No. resources: 3
Has informals: No

Location information

County(ies): Marin
USGS quad(s): Novato, San Geronimo
Address:
PLSS:

Database record metadata

	Date	*User*
Entered:	4/7/2005	nwic-main
Last modified:	7/1/2010	guldenj

IC actions:	*Date*	*User*	*Action taken*
	4/7/2005	jay	Appended records from NWICmain bibliographic database.

Record status:

Report Detail: S-013857

Identifiers

Report No.: S-013857

Other IDs:	*Type*	*Name*
	Submitter	ARS 88-12

Cross-refs:

Citation information

Author(s): Sally Anderson
Year: 1988 (Mar)
Title: Archaeological survey for proposed bridge widening on Nicasio Valley Road at M.P. 3.88 (letter report)
Affliliation: Archaeological Resource Service
No. pages:
No. maps:
Attributes: Archaeological, Field study
Inventory size: c 0.25 ac
Disclosure: Not for publication
Collections: No

General notes

"Chert core and four chert tools were found at distances of approximately 10 to 40 m from the bridge"

Associated resources

No. resources: 0
Has informals: Yes

Location information

County(ies): Marin
USGS quad(s): San Geronimo
Address:
PLSS: T2N R7W

Database record metadata

	Date	*User*
Entered:	4/7/2005	nwic-main
Last modified:	3/4/2019	moored

IC actions:	*Date*	*User*	*Action taken*
	4/7/2005	jay	Appended records from NWICmain bibliographic database.
	2/28/2019	feltc	Added submitter identifier, affiliation, month, collections, inf. resource info. Verified

Record status: Verified

Report Detail: S-015529

Identifiers

Report No.: S-015529
Other IDs:
Cross-refs:

Citation information

Author(s): Robert L. Gearhart II, Clell L. Bond, Steven D. Hoyt, James H. Cleland, James Anderson, Pandora Snethcamp, Gary Wesson, Jack Neville, Kim Marcus, Andrew York, and Jerry Wilson
Year: 1993 (Nov)
Title: California, Oregon, and Washington: Archaeological Resource Study
Affliliation: Espey, Huston & Associates, Inc.; Dames & Moore
No. pages:
No. maps:
Attributes: Archaeological, Other research
Inventory size:
Disclosure: Not for publication
Collections: No

General notes

The report is in six bound volumes. Approximately 3,850 shipwrecks are within the study area. The documents could not be scanned. This report extends outside of the NWIC service area into San Luis Obispo County and coastal areas in Oregon & Washington.

Associated resources

Primary No.	*Trinomial*	*Name*
P-01-000033	CA-ALA-000012	[none]
P-01-000034	CA-ALA-000013/H	SFSC-ALA-1
P-01-000084	CA-ALA-000307	West Berkeley Shell Mound
P-01-000086	CA-ALA-000309	Emeryville Shellmound
P-01-000104	CA-ALA-000328	Nelson's 328
P-07-000133	CA-CCO-000252	Nelson No. 252
P-07-000173	CA-CCO-000295	Nelson No. 295
P-07-000175	CA-CCO-000298	Nelson's No. 298, Stege
P-07-000177	CA-CCO-000300	Nelson's 300, Stege
P-17-000072	CA-LAK-000036/H	Borax Lake Archaeological Distri
P-17-000392	CA-LAK-000380	The Mostin Site
P-21-000048	CA-MRN-000017	Nelson No. 17
P-21-001915		Shipwreck Site and Remains, Sa
P-23-001704	CA-MEN-001918	Caspar Fluted Point Site
P-27-000100	CA-MNT-000281	Upper Willow Creek
P-27-000236	CA-MNT-000101/H	Kroeber A
P-27-000335	CA-MNT-000229	Golomshtok #2
P-27-000356	CA-MNT-000250/H	Isabella Meadows Cave
P-27-000386	CA-MNT-000282	Willow Creek Day Use Area
P-27-000485	CA-MNT-000391	Saunders Site
P-38-000028	CA-SFR-000028	BART Burial
P-38-000072	CA-SFR-000081H	Niantic Storeship / Hotel
P-38-000085	CA-SFR-000094H	"The Lydia"
P-38-000098	CA-SFR-000107H	Wreck of the "SS Neptune"
P-41-000080	CA-SMA-000077	University Village Site (Gerow)
P-41-000265	CA-SMA-000269	Stanford Man I
P-44-000179	CA-SCR-000177/H	Hiram Scott House

No. resources: 27
Has informals: Yes

Location information

County(ies): Alameda, Contra Costa, Del Norte, Humboldt, Marin, Mendocino, Monterey, Napa, Other, San Francisco, San Mateo, Santa Clara, Santa Cruz, Solano, Sonoma

Report Detail: S-015529

USGS quad(s): Albion, Ano Nuevo, Antioch North, Arcata North, Arcata South, Arched Rock, Bear Harbor, Benicia, Big Sur, Bodega Head, Bolinas, Burro Mountain, Cannibal Island, Cape Mendocino, Cape San Martin, Capetown, Childs Hill, Cooskie Creek, Crannell, Crescent City, Cuttings Wharf, Davenport, Denverton, Double Point, Drakes Bay, Duncans Mills, Elk, Eureka, Fairfield South, Farallon Islands, Fern Canyon, Ferndale, Fields Landing, Fort Bragg, Fort Ross, Franklin Point, Gualala, Hales Grove, Half Moon Bay, Honker Bay, Hunters Point, Inglenook, Inverness, Jersey Island, Lopez Point, Mallo Pass Creek, Mare Island, Marina, Mcguire Ridge, Mendocino, Milpitas, Mistake Point, Montara Mtn, Monterey, Moss Landing, Mountain View, Mt Carmel, Newark, Novato, Oakland East, Oakland West, Orick, Palo Alto, Partington Ridge, Petaluma Point, Petaluma River, Petrolia, Pfeiffer Point, Pigeon Point, Plantation, Point Arena, Point Bonita, Point Reyes Ne, Point Sur, Prunedale, Redwood Point, Requa, Richmond, Rodgers Peak, Salinas, San Francisco North, San Francisco South, San Gregorio, San Leandro, San Mateo, San Quentin, San Rafael, Santa Cruz, Saunders Reef, Sears Point, Seaside, Shelter Cove, Shubrick Peak, Sister Rocks, Smith River, Soberanes Point, Soquel, Stewarts Point, Tomales, Trinidad, Tyee City, Valley Ford, Villa Creek, Vine Hill, Watsonville West, Westport

Address:

PLSS:

Database record metadata

	Date	*User*
Entered:	4/7/2005	nwic-main
Last modified:	6/12/2018	rinerg

IC actions:	*Date*	*User*	*Action taken*
	4/7/2005	jay	Appended records from NWICmain bibliographic database.
	10/21/2015	mikulikc	could not scan document
	12/9/2015	hagell	edited database
	1/8/2016	mikulikc	added quad location
	3/10/2016	rinerg	remove quads: Ah Pah Ridge, Alder Peak, Ettersburg; add quad: McGuire Ridge
	4/11/2017	raelync	Report verified, awaiting verification of 9 resources.
	5/11/2017	raelync	Awaiting verification of one resource; OHP information requested from Joseph.
	6/12/2018	rinerg	add quads: Mt Carmel, Salinas

Record status: Verified

Report Detail: S-016138

Identifiers

Report No.: S-016138
Other IDs:
Cross-refs:

Citation information

Author(s): Faith Louise Duncan
Year: 1992 (Nov)
Title: Botanical Reflections of the Encuentro and the Contact Period in Southern Marin County, California
Affliliation: Department of Anthropology, University of Arizona
No. pages:
No. maps:
Attributes: Other research, Thesis/dissertation
Inventory size:
Disclosure: Not for publication
Collections: No

General notes

PhD. Dissertation; Page 52 skipped in numbering.

Associated resources

Primary No.	*Trinomial*	*Name*
P-21-000008	CA-MRN-000246	4-MRN-246
P-21-000017	CA-MRN-000266	PB 266
P-21-000038	CA-MRN-000007	Nelson No. 7
P-21-000045	CA-MRN-000014	Nelson No. 14
P-21-000055	CA-MRN-000024	Nelson No. 24
P-21-000073	CA-MRN-000043	Nelson No. 43
P-21-000163	CA-MRN-000138	Nelson No. 138
P-21-000195	CA-MRN-000170	Nelson No. 170
P-21-000218	CA-MRN-000193/H	Rancho Olompali; Olompali Fra
P-21-000224	CA-MRN-000199	Slide Ranch
P-21-000225	CA-MRN-000202	Nelson No. 26
P-21-000235	CA-MRN-000216/H	DNG-1
P-21-000242	CA-MRN-000232/H	PB 232 b
P-21-000283	CA-MRN-000298/H	DNG-2
P-21-000290	CA-MRN-000307/H	Probably 232 C
P-21-000291	CA-MRN-000308/H	[none]
P-21-000363	CA-MRN-000397	MRN 395
P-21-000368	CA-MRN-000402	[none]
P-21-000486	CA-MRN-000556/H	Void - see P-21-003013
P-21-000487	CA-MRN-000560H	North Coast Pacific Railroad
P-21-000493	CA-MRN-000566H	The Dipsea Trail-Panoramic Hig
P-21-000494	CA-MRN-000567H	H-77; Dias Ranch Site
P-21-000495	CA-MRN-000568H	Muir Woods Inn, Old Inn
P-21-000496	CA-MRN-000569	A-72 Windy Gap Site
P-21-000497	CA-MRN-000570H	Frank's Valley Road
P-21-000498	CA-MRN-000571H	Three Sequoias Site
P-21-000499	CA-MRN-000572/H	H, A-88 Big Slide Ranch
P-21-000504	CA-MRN-000577H	H-94; Ziesche Cabin Site
P-21-000526	CA-MRN-000599	A-48, Big Rock Overlook Site
P-21-000628	CA-MRN-000201	Jesse Peter 201

No. resources: 30
Has informals: No

Location information

County(ies): Marin
USGS quad(s): Bolinas, Double Point, Drakes Bay, Novato, Petaluma Point, Point Bonita, Point Reyes Ne, San Francisco North, San

Report Detail: S-016138

Geronimo, San Quentin, San Rafael, Tomales

Address:

PLSS:

Database record metadata

	Date	*User*
Entered:	4/7/2005	nwic-main
Last modified:	1/4/2018	raelync

IC actions:	*Date*	*User*	*Action taken*
	4/7/2005	jay	Appended records from NWICmain bibliographic database.
	3/18/2016	rinerg	correct quads per GIS: remove Petaluma River; add: Bolinas, Double Point, San Quentin, Petaluma Point
	8/17/2017	raelync	Report verified; awaiting verification of 10 resources.
	1/4/2018	raelync	All resources verified.

Record status: Verified

Report Detail: S-016554

Identifiers

Report No.: S-016554
Other IDs:
Cross-refs:

Citation information

Author(s): Charles Monroe Slaymaker
Year: 1982 (Sep)
Title: A Model for the Study of Coast Miwok Ethnogeography
Affliliation: University of California, Davis
No. pages:
No. maps:
Attributes: Archaeological, Thesis/dissertation
Inventory size:
Disclosure: Not for publication
Collections: No

General notes

PhD Dissertation

Associated resources

Primary No.	*Trinomial*	*Name*
P-21-000012	CA-MRN-000252	Peter's 252
P-21-000017	CA-MRN-000266	PB 266
P-21-000051	CA-MRN-000020	Nelson No. 20
P-21-000058	CA-MRN-000027	Nelson No. 27
P-21-000143	CA-MRN-000115	Nelson No. 115
P-21-000163	CA-MRN-000138	Nelson No. 138
P-21-000164	CA-MRN-000139	Nelson No. 139
P-21-000165	CA-MRN-000140	Nelson No. 140
P-21-000166	CA-MRN-000141	Nelson No. 141
P-21-000167	CA-MRN-000142	Nelson No. 142
P-21-000183	CA-MRN-000158	Nelson No. 158
P-21-000193	CA-MRN-000168	Nelson No. 168
P-21-000217	CA-MRN-000192	Nelson No. 192
P-21-000218	CA-MRN-000193/H	Rancho Olompali; Olompali Fra
P-21-000235	CA-MRN-000216/H	DNG-1
P-21-000242	CA-MRN-000232/H	PB 232 b
P-21-000244	CA-MRN-000234/H	PB 234
P-21-000245	CA-MRN-000235/H	Beardsley's 301
P-21-000252	CA-MRN-000242/H	PB No. 242 - Cauley
P-21-000262	CA-MRN-000275	PB 275
P-21-000266	CA-MRN-000280/H	PB 280
P-21-000278	CA-MRN-000293	[none]
P-21-000283	CA-MRN-000298/H	DNG-2
P-21-000290	CA-MRN-000307/H	Probably 232 C
P-21-000291	CA-MRN-000308/H	[none]
P-21-000345	CA-MRN-000373/H	"Drake's Natural Fort" - 1
P-21-000354	CA-MRN-000383/H	Martinelli -1? (D. Fredrickson, 19
P-21-000369	CA-MRN-000403	[none]
P-21-000635	CA-MRN-000230	PB 230
P-21-000640	CA-MRN-000271	PB 271; Bear Valley
P-21-000642	CA-MRN-000274	PB 274 Hidden Site
P-21-000643	CA-MRN-000301	PB 235-A, Hall Site
P-21-000644	CA-MRN-000303H	Fish Wharf Site
P-21-002539	CA-MRN-000682	S.A. VII (Northwestern Archaeol.
P-28-000264	CA-NAP-000357	Nelson's 1
P-49-000032	CA-SON-000308	Peter's 308

P-49-000256	CA-SON-000284	Peter's 332
P-49-000258	CA-SON-000286	Kelly's Site "Sado"
P-49-000259	CA-SON-000287	[none]
P-49-000260	CA-SON-000288	Kelly's Site "Lakum"
P-49-000261	CA-SON-000289/H	Historic Indian Cemetery
P-49-000262	CA-SON-000290/H	Russian Ranch; Prehistoric occu
P-49-000264	CA-SON-000292	The Ranch Site
P-49-000265	CA-SON-000293	Probably Kelly's Site "Tiwut-Huy
P-49-000266	CA-SON-000294H	Russian Watering Site
P-49-000267	CA-SON-000295H	[none]
P-49-000268	CA-SON-000296	Shellmound
P-49-000269	CA-SON-000297	Kelly's Site "Pulva-Lakum"
P-49-000270	CA-SON-000298	Small village
P-49-000271	CA-SON-000299	"Kili"
P-49-000272	CA-SON-000300	#2 (Fenenga and Riddell)
P-49-000273	CA-SON-000301	Peter's 301
P-49-000274	CA-SON-000302	Peter's 302
P-49-000275	CA-SON-000303	Peter's 303
P-49-000276	CA-SON-000304	Peter's 304
P-49-000277	CA-SON-000305	Peter's 305
P-49-000278	CA-SON-000306	Peter's 306
P-49-000279	CA-SON-000307/H	Kelly's site "Himto'gala"
P-49-000280	CA-SON-000309	Kelly's Site; "Hela'patai"
P-49-000281	CA-SON-000310	Peter's 310
P-49-000282	CA-SON-000311	Peters 311
P-49-000283	CA-SON-000312	Peter's 312
P-49-000284	CA-SON-000313	Peter's 313
P-49-000285	CA-SON-000314	Peter's 314
P-49-000287	CA-SON-000316	Peter's 316
P-49-000288	CA-SON-000317	Peter's 317
P-49-000289	CA-SON-000318	Peter's 318
P-49-000290	CA-SON-000319	Peter's 319
P-49-000291	CA-SON-000320	"Loken-Huye" (Kelly)
P-49-000292	CA-SON-000321	Peter's 321
P-49-000293	CA-SON-000322	Peter's 322
P-49-000294	CA-SON-000323	Peter's 323
P-49-000295	CA-SON-000324	Peter's 324
P-49-000296	CA-SON-000325H	Ranch house
P-49-000297	CA-SON-000326	Peters 326
P-49-000298	CA-SON-000327	Peter's 327
P-49-000299	CA-SON-000328	Camping spot
P-49-000301	CA-SON-000330	Peter's 330
P-49-000302	CA-SON-000331	Peter's 331
P-49-000304	CA-SON-000333/H	Peter's 333
P-49-000305	CA-SON-000334	State of California shell midden
P-49-000306	CA-SON-000335	Peter's 335
P-49-000307	CA-SON-000336	Peter's 336
P-49-000308	CA-SON-000337	Peter's 337
P-49-000309	CA-SON-000338	[none]
P-49-000310	CA-SON-000339	Peter's 339
P-49-000311	CA-SON-000340	Peter's 340
P-49-000312	CA-SON-000341	Kelly's Powiki
P-49-000319	CA-SON-000348/H	Duncans Landing Site
P-49-000328	CA-SON-000357	Nelson's 1
P-49-000368	CA-SON-000399/H	Cedar Grove Park, Likatuit
P-49-000369	CA-SON-000400	S.A. VII (Northwestern Archaeol.

No. resources: 92

Has informals: No

Report Detail: S-016554

Location information

County(ies): Marin, Sonoma

USGS quad(s): Bodega Head, Bolinas, Calistoga, Camp Meeker, Cotati, Cuttings Wharf, Double Point, Drakes Bay, Duncans Mills, Glen Ellen, Guerneville, Healdsburg, Inverness, Kenwood, Mare Island, Mark West Springs, Novato, Petaluma, Petaluma Point, Petaluma River, Point Bonita, Point Reyes Ne, Rutherford, San Francisco North, San Geronimo, San Quentin, San Rafael, Santa Rosa, Sears Point, Sebastopol, Sonoma, Tomales, Two Rock, Valley Ford

Address:

PLSS:

Database record metadata

	Date	*User*
Entered:	4/7/2005	nwic-main
Last modified:	1/30/2018	raelync

IC actions:	*Date*	*User*	*Action taken*
	4/7/2005	jay	Appended records from NWICmain bibliographic database.
	8/4/2015	rinerg	set collections=No
	3/18/2016	rinerg	add quads per GIS: Calistoga, Cuttings Wharf, Guerneville, Healdsburg, Kenwood, Mare Island, Mark West Springs, Rutherford, Santa Rosa, Sebastopol
	4/11/2017	raelync	Report verified, awaiting verification for 19 resources.

Record status: Verified

Report Detail: S-017773

Identifiers

Report No.: S-017773

Other IDs:	*Type*	*Name*
	Submitter	Contract #04E634-EP
	Submitter	Task Order #9

Cross-refs:

Citation information

Author(s): Angela M. Banet

Year: 1992 (Dec)

Title: Contract 04E634-EP, Task Order #9, Historic Map Review for CALTRANS Maintenance Facilities (letter report)

Affliliation: Basin Research Associates, Inc.

No. pages:

No. maps:

Attributes: Literature search

Inventory size:

Disclosure: Not for publication

Collections: No

General notes

There were no location maps in this report.

Associated resources

No. resources: 0

Has informals: No

Location information

County(ies): Alameda, Contra Costa, Marin, San Mateo, Sonoma

USGS quad(s): Annapolis, Antioch South, Briones Valley, Concord (15'), Geyserville, Guerneville, Half Moon Bay, Half Moon Bay (15'), Hayward, Hayward (15'), Healdsburg, Healdsburg (15'), Jimtown, La Honda, Las Trampas Ridge, Newark, Novato, Oakland East, Petaluma, Petaluma (15'), Petaluma River, Plantation, Plantation (15'), Redwood Point, San Geronimo, San Gregorio, San Leandro, Stewarts Point, Walnut Creek, Woodside

Address:

PLSS:

Database record metadata

	Date	*User*
Entered:	4/7/2005	nwic-main
Last modified:	6/12/2018	rinerg

IC actions:	*Date*	*User*	*Action taken*
	4/7/2005	jay	Appended records from NWICmain bibliographic database.
	7/29/2011	muchb	corrected database information
	12/16/2015	hagell	edited database
	8/11/2016	hagell	added attribute
	12/1/2016	neala	corrected quad names & remapped by all quads included within the 15' maps
	4/11/2017	raelync	Entered submitter identifier.
	6/12/2018	rinerg	add several 7.5' quads where report is digitized

Record status: Verified

Report Detail: S-017835

Identifiers

Report No.: S-017835
Other IDs:
Cross-refs:

Citation information

Author(s): Judy Myers Suchey
Year: 1975 (Dec)
Title: Biological Distance of Prehistoric Central California Populations Derived from Non-Metric Traits of the Cranium
Affliliation: University of California, Riverside
No. pages:
No. maps:
Attributes: Thesis/dissertation
Inventory size:
Disclosure: Not for publication
Collections: Yes

General notes

Burials from Santa Cruz Island and Sacramento, San Joaquin, & Los Angeles counties were also examined. The GIS contains report polygons from the paper maps. This report extends outside the NWIC service area (into San Joaquin, Sacramento, & Los Angeles counties).

Associated resources

Primary No.	*Trinomial*	*Name*
P-01-000086	CA-ALA-000309	Emeryville Shellmound
P-01-000104	CA-ALA-000328	Nelson's 328
P-01-000105	CA-ALA-000329/H	Nelsons 329; Ryan Mound
P-06-000025	CA-COL-000001	S-1 Miller
P-07-000080	CA-CCO-000138	Hotchkiss Mound
P-07-000081	CA-CCO-000139/H	Simone Mound
P-07-000083	CA-CCO-000141	C-141, Orwood Mound #2
P-07-000087	CA-CCO-000145	Byron Tract
P-21-000017	CA-MRN-000266	PB 266
P-21-000193	CA-MRN-000168	Nelson No. 168
P-21-000242	CA-MRN-000232/H	PB 232 b
P-21-000252	CA-MRN-000242/H	PB No. 242 - Cauley
P-48-000010	CA-SOL-000002	Peterson 2
P-57-000145	CA-YOL-000013	Mustang Site

No. resources: 14
Has informals: No

Location information

County(ies): Alameda, Colusa, Contra Costa, Marin, Other, Solano, Yolo
USGS quad(s): ~All quads - Alameda Co., ~All quads - Colusa Co., ~All quads - Contra Costa Co., ~All quads - Marin Co., ~All quads - Solano Co., ~All quads - Yolo Co.
Address:
PLSS:

Database record metadata

	Date	*User*
Entered:	4/7/2005	nwic-main
Last modified:	7/17/2019	hagell

IC actions:	*Date*	*User*	*Action taken*
	4/7/2005	jay	Appended records from NWICmain bibliographic database.
	4/11/2017	raelync	Report verified, awaiting verification of 8 resources.
	4/21/2017	moored	Resources verified

Record status: Verified

Report Detail: S-018217

Identifiers

Report No.: S-018217
Other IDs:
Cross-refs:

Citation information

Author(s): Glenn Gmoser
Year: 1996 (Apr)
Title: Cultural Resource Evaluations for the Caltrans District 04 Phase 2 Seismic Retrofit Program, Status Report
Affliliation: California Department of Transportation
No. pages:
No. maps:
Attributes: Archaeological, Architectural/historical, Other research
Inventory size:
Disclosure: Not for publication
Collections: No

General notes

Status report of the evaluation of bridge structures. There were no location maps in the report.

Associated resources

Primary No.	*Trinomial*	*Name*
P-01-000014	CA-ALA-000483	Site 2
P-01-000023	CA-ALA-000002/H	Ohlones Cemetery
P-01-000227	CA-ALA-000548/H	Vallejo Mill
P-07-000108	CA-CCO-000225	Anaclario Site
P-07-000119	CA-CCO-000237	Loud's 422
P-38-000002	CA-SFR-000002	Shellmound No. 439
P-38-000004	CA-SFR-000004/H	Yerba Buena Island
P-41-000273	CA-SMA-000321	Hamilton #2; San Mateo Shellmo
P-43-000106	CA-SCL-000092/H	Sargent Ranch; US-1
P-43-000297	CA-SCL-000289	GP-1
P-43-000624	CA-SCL-000677	The 237/880 Site
P-43-001078	CA-SCL-000699/H	Dollhouse Site
P-44-000010	CA-SCR-000002/H	Aptos Creek
P-44-000201	CA-SCR-000199H	Cactus Gardens
P-44-000300	CA-SCR-000313	Granite Ck. Rd./Highway 17 Inter
P-49-000195	CA-SON-000223	Nelson No. 223

No. resources: 16
Has informals: No

Location information

County(ies): Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Santa Cruz, Sonoma
USGS quad(s): ~All quads - Alameda Co., ~All quads - Contra Costa Co., ~All quads - Marin Co., ~All quads - Napa Co., ~All quads - San Francisco Co., ~All quads - San Mateo Co., ~All quads - Santa Clara Co., ~All quads - Santa Cruz Co., ~All quads - Sonoma Co.
Address:
PLSS:

Database record metadata

	Date	*User*
Entered:	4/7/2005	nwic-main
Last modified:	6/15/2017	raelync

IC actions:	*Date*	*User*	*Action taken*
	4/7/2005	jay	Appended records from NWICmain bibliographic database.
	10/13/2014	hagell	edited database
	7/14/2015	rinerg	set status=Verified

	4/11/2017	raelync	report verified, awaiting verification of 7 resources.
	4/21/2017	moored	Resources Verified
Record status:	Verified		

Report Detail: S-020395

Identifiers

Report No.: S-020395
Other IDs:
Cross-refs:

Citation information

Author(s): Donna L. Gillette
Year: 1998 (May)
Title: PCNs of the Coast Ranges of California: Religious Expression or the Result of Quarrying?
Affliliation: California State University, Hayward
No. pages:
No. maps:
Attributes: Other research, Thesis/dissertation
Inventory size:
Disclosure: Not for publication
Collections: No

General notes

Masters Thesis. This report extends outside the NWIC service area (into Fresno, Kern, Santa Barbara, San Luis Obispo, & Trinity counties; and into Oregon.).

Associated resources

Primary No.	*Trinomial*	*Name*
P-07-000094	CA-CCO-000152	[none]
P-07-000323	CA-CCO-000553/H	Alvarado Park, Wildcat Regional
P-12-000050	CA-HUM-000983	Squaw Rock
P-17-000071	CA-LAK-000034	Bachelor Valley No. 4; Smith's 1
P-17-001315	CA-LAK-001577	Lakeport PCN Boulder
P-21-000087	CA-MRN-000057	Nelson No. 57
P-21-000376	CA-MRN-000414	Deer Island Area #1
P-21-000378	CA-MRN-000416	Deer Island Area #3
P-21-000379	CA-MRN-000417	Deer Island Area #4
P-21-000381	CA-MRN-000419	Deer Island Area #6
P-21-000382	CA-MRN-000420	17 Novato
P-21-000383	CA-MRN-000421	Novato #18
P-21-000384	CA-MRN-000422	Novato #19
P-21-000386	CA-MRN-000425	Tiburon 3 Field #3
P-21-000387	CA-MRN-000426	Tiburon 4 Field #4
P-21-000388	CA-MRN-000427	Tiburon 5 Field #5
P-21-000389	CA-MRN-000428	Tiburon 6 Field #6
P-21-000390	CA-MRN-000429	Tiburon 7 Field #7
P-21-000391	CA-MRN-000430	Tiburon 8 Field #8
P-21-000392	CA-MRN-000431	Tiburon 9, 10, 11
P-21-000393	CA-MRN-000432	Tiburon 12
P-21-000394	CA-MRN-000433	Tiburon 13 Field #13
P-21-000395	CA-MRN-000434	Tiburon 14 & 15 Field #14 & #15
P-21-000396	CA-MRN-000435	Tiburon 16 Field #16
P-21-000397	CA-MRN-000436	Tiburon 17 Field #17
P-21-000398	CA-MRN-000437	Tiburon 18 Field #18
P-21-000399	CA-MRN-000438	Tiburon 19 Field #19
P-21-000400	CA-MRN-000439	Tiburon 20A
P-21-000401	CA-MRN-000440	Tiburon 21 Field #21
P-21-000402	CA-MRN-000442	Tiburon 1
P-21-000419	CA-MRN-000465	Whit's Rock
P-21-000433	CA-MRN-000481	ARS 78-72-Rock 1
P-21-000546	CA-MRN-000424	Tiburon 2
P-21-000620	CA-MRN-000636	Petroglyph site south of Ring Mo
P-21-000621	CA-MRN-000637	Petroglyph site on small north sl

Report Detail: S-020395

P-21-000624	CA-MRN-000640	Petroglyph site near Taylor Road
P-21-000661	CA-MRN-000452	Pat's Rock
P-23-000434	CA-MEN-000433	Bell Springs Petroglyph Rock
P-23-000809	CA-MEN-000874	Knight's Valley 2
P-23-000810	CA-MEN-000875	Knight's Valley Baby Rock
P-23-001698	CA-MEN-001912	Spyrock Road Petroglyphs
P-23-001725	CA-MEN-001941	Genesis #4,5,6,7,8; "V" Greenfie
P-23-001792	CA-MEN-002020	Potter Valley Petroglyphs
P-23-001798	CA-MEN-002028	Genesis #9
P-23-001799	CA-MEN-002029	Genesis #10
P-23-001803	CA-MEN-002034	Genesis #16
P-23-001804	CA-MEN-002035	Infinity #1
P-23-001930	CA-MEN-002200	Keystone Petroglyph Site
P-23-001942	CA-MEN-002213	Huntley Peak Petroglyphs
P-23-001950	CA-MEN-002221	Hidden Hill Petroglyph
P-23-001963	CA-MEN-002235	Watershed Down Petroglyph Sit
P-35-000013	CA-SBN-000012	
P-43-000067	CA-SCL-000048	Rancho Paso del Verde
P-43-000080	CA-SCL-000063	SFSU-SCL-6
P-43-000287	CA-SCL-000279	ARS 77-97-1
P-43-000289	CA-SCL-000281	ARS 77-97-3
P-43-000504	CA-SCL-000503	COE-29
P-49-000046	CA-SON-000929	Jan's Rock
P-49-000240	CA-SON-000268	Steward's 8 Pt.
P-49-000533	CA-SON-000568	Smiley
P-49-000550	CA-SON-000585	Yorty Cupule Rock
P-49-000629	CA-SON-000682	Steward's 9 PT.
P-49-000785	CA-SON-000844	Petaluma #1
P-49-000787	CA-SON-000846	Petaluma #3
P-49-000868	CA-SON-000928	Mike Whitson Rock I
P-49-000960	CA-SON-001026	Nana's Rocks
P-49-000975	CA-SON-001041	Lee's Rock
P-49-001004	CA-SON-001075	Kellies Rock
P-49-001087	CA-SON-001160	Site No. 7
P-49-001239	CA-SON-001319	Kathleen's Rock
P-49-002121	CA-SON-001383	Banded Rock Petroglyph Rock

No. resources: 71

Has informals: Yes

Location information

County(ies): Alameda, Contra Costa, Humboldt, Lake, Marin, Mendocino, Other, San Benito, Santa Clara, Sonoma

USGS quad(s): ~All quads - Alameda Co., ~All quads - Contra Costa Co., ~All quads - Humboldt Co., ~All quads - Lake Co., ~All quads - Marin Co., ~All quads - Mendocino Co., ~All quads - San Benito Co., ~All quads - Santa Clara Co., ~All quads - Sonoma Co.

Address:

PLSS:

Database record metadata

	Date	*User*
Entered:	4/7/2005	nwic-main
Last modified:	6/25/2020	hagell

IC actions:

Date	*User*	*Action taken*
4/7/2005	jay	Appended records from NWICmain bibliographic database.
9/14/2016	hagell	edited notes
3/27/2017	hagell	added note
4/11/2017	raelync	Report verified, awaiting verification of 26 resources.
6/6/2017	castrom	Verification Process is In Progress.
6/14/2017	castrom	Resources all verified. Report Marked Verified.

Record status: Verified

Report Detail: S-029655

Identifiers

Report No.: S-029655
Other IDs:
Cross-refs:

Citation information

Author(s): Brett Joseph Rushing
Year: 2004 (May)
Title: A Contextual Analysis of PCN Petroglyphs in Marin and Southern Sonoma Counties
Affliliation: San Francisco State University
No. pages:
No. maps:
Attributes: Thesis/dissertation
Inventory size:
Disclosure: Not for publication
Collections: No

General notes

Master's thesis. This report is copyrighted, a copy is available for in-house review at the NWIC. Please contact the author for pdf access.

Associated resources

Primary No.	*Trinomial*	*Name*
P-21-000017	CA-MRN-000266	PB 266
P-21-000045	CA-MRN-000014	Nelson No. 14
P-21-000048	CA-MRN-000017	Nelson No. 17
P-21-000051	CA-MRN-000020	Nelson No. 20
P-21-000058	CA-MRN-000027	Nelson No. 27
P-21-000087	CA-MRN-000057	Nelson No. 57
P-21-000143	CA-MRN-000115	Nelson No. 115
P-21-000163	CA-MRN-000138	Nelson No. 138
P-21-000177	CA-MRN-000152	Nelson No. 152
P-21-000195	CA-MRN-000170	Nelson No. 170
P-21-000217	CA-MRN-000192	Nelson No. 192
P-21-000235	CA-MRN-000216/H	DNG-1
P-21-000256	CA-MRN-000254	The Dominican College Site
P-21-000283	CA-MRN-000298/H	DNG-2
P-21-000332	CA-MRN-000357/H	Bayonet Midden
P-21-000346	CA-MRN-000374	[none]
P-21-000376	CA-MRN-000414	Deer Island Area #1
P-21-000378	CA-MRN-000416	Deer Island Area #3
P-21-000379	CA-MRN-000417	Deer Island Area #4
P-21-000381	CA-MRN-000419	Deer Island Area #6
P-21-000382	CA-MRN-000420	17 Novato
P-21-000383	CA-MRN-000421	Novato #18
P-21-000384	CA-MRN-000422	Novato #19
P-21-000386	CA-MRN-000425	Tiburon 3 Field #3
P-21-000388	CA-MRN-000427	Tiburon 5 Field #5
P-21-000389	CA-MRN-000428	Tiburon 6 Field #6
P-21-000390	CA-MRN-000429	Tiburon 7 Field #7
P-21-000391	CA-MRN-000430	Tiburon 8 Field #8
P-21-000392	CA-MRN-000431	Tiburon 9, 10, 11
P-21-000393	CA-MRN-000432	Tiburon 12
P-21-000394	CA-MRN-000433	Tiburon 13 Field #13
P-21-000395	CA-MRN-000434	Tiburon 14 & 15 Field #14 & #15
P-21-000396	CA-MRN-000435	Tiburon 16 Field #16
P-21-000397	CA-MRN-000436	Tiburon 17 Field #17
P-21-000398	CA-MRN-000437	Tiburon 18 Field #18

Report Detail: S-029655

P-21-000399	CA-MRN-000438	Tiburon 19 Field #19
P-21-000400	CA-MRN-000439	Tiburon 20A
P-21-000401	CA-MRN-000440	Tiburon 21 Field #21
P-21-000402	CA-MRN-000442	Tiburon 1
P-21-000419	CA-MRN-000465	Whit's Rock
P-21-000423	CA-MRN-000471	San Jose Village
P-21-000433	CA-MRN-000481	ARS 78-72-Rock 1
P-21-000541	CA-MRN-000255	[none]
P-21-000546	CA-MRN-000424	Tiburon 2
P-21-000620	CA-MRN-000636	Petroglyph site south of Ring Mo
P-21-000624	CA-MRN-000640	Petroglyph site near Taylor Road
P-21-000661	CA-MRN-000452	Pat's Rock
P-21-000664	CA-MRN-000495	Irma's Site
P-49-000046	CA-SON-000929	Jan's Rock
P-49-000868	CA-SON-000928	Mike Whitson Rock I
P-49-000960	CA-SON-001026	Nana's Rocks
P-49-001041	CA-SON-001113	SR-1

No. resources: 52

Has informals: No

Location information

County(ies): Marin, Sonoma

USGS quad(s): ~All quads - Marin Co., Petaluma, Petaluma River

Address:

PLSS:

Database record metadata

	Date	*User*
Entered:	4/21/2005	leigh
Last modified:	10/28/2020	hagell

IC actions:	*Date*	*User*	*Action taken*
	7/14/2016	simsa	Marked report as copyrighted, added metadata and moved full pdf.
	7/14/2016	simsa	Updated GIS: removed rep pt and rep poly features; created other report features for all of Marin County and a small southern portion of Sonoma County as per pg. 14 of pdf; updated quads in location tab
	4/11/2017	raelync	Report verified, awaiting verification of 8 resources.

Record status: Verified

Report Detail: S-030204

Identifiers

Report No.: S-030204
Other IDs:
Cross-refs:

Citation information

Author(s): Donna L. Gillette
Year: 2003 (Jun)
Title: The Distribution and Antiquity of the California Pecked Curvilinear Nucleated (PCN) Rock Art Tradition.
Affliliation: University of California, Berkeley
No. pages:
No. maps:
Attributes: Archaeological, Other research
Inventory size:
Disclosure: Not for publication
Collections: No

General notes

This report extends outside of the NWIC service area (into Fresno, San Luis Obispo, Santa Barbara, & Kern counties).

Associated resources

Primary No.	*Trinomial*	*Name*
P-01-002148	CA-ALA-000571	Alameda PCN
P-21-000384	CA-MRN-000422	Novato #19
P-23-000810	CA-MEN-000875	Knight's Valley Baby Rock

No. resources: 3
Has informals: No

Location information

County(ies): Alameda, Colusa, Contra Costa, Del Norte, Humboldt, Lake, Marin, Mendocino, Monterey, Napa, Other, San Benito, San Francisco, San Mateo, Santa Clara, Santa Cruz, Solano, Sonoma, Yolo
USGS quad(s): ~All quads - Alameda Co., ~All quads - Colusa Co., ~All quads - Contra Costa Co., ~All quads - Del Norte Co., ~All quads - Humboldt Co., ~All quads - Lake Co., ~All quads - Marin Co., ~All quads - Mendocino Co., ~All quads - Monterey Co., ~All quads - Napa Co., ~All quads - San Benito Co., ~All quads - San Francisco Co., ~All quads - San Mateo Co., ~All quads - Santa Clara Co., ~All quads - Santa Cruz Co., ~All quads - Solano Co., ~All quads - Sonoma Co., ~All quads - Yolo Co.
Address:
PLSS:

Database record metadata

	Date	*User*
Entered:	7/12/2005	kellyn
Last modified:	11/8/2017	raelync

IC actions:	*Date*	*User*	*Action taken*
	12/5/2016	hagell	added counties to note
	4/28/2017	hagell	edited note
	5/12/2017	raelync	Report verified; awaiting verification of 2 resources.

Record status: Verified

Report Detail: S-032454

Identifiers

Report No.: S-032454

Other IDs:	*Type*	*Name*
	Other	Science Notes Number 39

Cross-refs:

Citation information

Author(s): E. Breck Parkman
Year: 2006 (Oct)
Title: The Maien: A Women's Secret Society on San Francisco Bay
Affliliation: California State Parks, Diablo Vista District
No. pages:
No. maps:
Attributes: Archaeological, Other research
Inventory size:
Disclosure: Not for publication
Collections: No

General notes

Associated resources

No. resources: 0
Has informals: No

Location information

County(ies): Marin, Napa, Sonoma
USGS quad(s): Bodega Head, Bolinas, Camp Meeker, Cotati, Cuttings Wharf, Double Point, Drakes Bay, Duncans Mills, Glen Ellen, Inverness, Kenwood, Mare Island, Napa, Novato, Petaluma, Petaluma Point, Petaluma River, Point Bonita, Point Reyes Ne, Rutherford, San Francisco North, San Geronimo, San Quentin, San Rafael, Sears Point, Sebastopol, Sonoma, Tomales, Two Rock, Valley Ford
Address:
PLSS:

Database record metadata

	Date	*User*
Entered:	1/10/2007	hagell
Last modified:	10/31/2017	neala

IC actions:	*Date*	*User*	*Action taken*
	3/18/2016	rinerg	updated quads per GIS: add: Kenwood, Mare Island, Napa, Rutherford, Sebastopol; add county: Napa

Record status: Verified

Report Detail: S-032596

Identifiers

Report No.: S-032596

Other IDs:	*Type*	*Name*
	Other	Contract #04A2098
	Caltrans	EA No. 447600

Cross-refs:

Citation information

Author(s): Randall Milliken, Jerome King, and Patricia Mikkelsen

Year: 2006 (Dec)

Title: The Central California Ethnographic Community Distribution Model, Version 2.0, with Special Attention to the San Francisco Bay Area, Cultural Resources Inventory of Caltrans District 4 Rural Conventional Highways

Affliliation: Consulting in the Past; Far Western Anthropological Research Group, Inc.

No. pages:

No. maps:

Attributes: Archaeological, Other research

Inventory size:

Disclosure: Not for publication

Collections: No

General notes

The study extends outside the NWIC service area (into Calaveras, Amador, Tuolomne, Mariposa, Madera, & Tulare counties).

Associated resources

No. resources: 0

Has informals: No

Location information

County(ies): Alameda, Contra Costa, Lake, Marin, Monterey, Napa, Other, San Benito, San Francisco, San Mateo, Santa Clara, Santa Cruz, Solano, Sonoma, Yolo

USGS quad(s): ~All quads - Alameda Co., ~All quads - Contra Costa Co., ~All quads - Marin Co., ~All quads - Monterey Co., ~All quads - Napa Co., ~All quads - San Benito Co., ~All quads - San Francisco Co., ~All quads - San Mateo Co., ~All quads - Santa Clara Co., ~All quads - Santa Cruz Co., ~All quads - Solano Co., Aetna Springs, Allendale, Annapolis, Arched Rock, Asti, Bird Valley, Bodega Head, Brooks, Calistoga, Camp Meeker, Cazadero, Clarksburg, Clearlake Highlands, Cloverdale, Cotati, Courtland, Cuttings Wharf, Davis, Detert Reservoir, Duncans Mills, Eldorado Bend, Esparto, Fort Ross, Geyserville, Glascock Mtn, Glen Ellen, Grays Bend, Guerneville, Guinda, Healdsburg, Jericho Valley, Jimtown, Kelseyville, Kenwood, Knights Landing, Knoxville, Lake Berryessa, Liberty Island, Madison, Mare Island, Mark West Springs, Merritt, Middletown, Monticello Dam, Mount St Helena, Mt Vaca, Novato, Petaluma, Petaluma Point, Petaluma River, Point Reyes Ne, Rutherford, Sacramento West, Santa Rosa, Saxon, Sears Point, Sebastopol, Sonoma, Taylor Monument, The Geysers, Tombs Creek, Two Rock, Valley Ford, Warm Springs Dam, Whispering Pines, Wilson Valley, Winters, Woodland, Zamora

Address:

PLSS:

Database record metadata

	Date	*User*
Entered:	3/1/2007	hagell
Last modified:	11/7/2017	raelync

IC actions:	*Date*	*User*	*Action taken*
	3/30/2015	neala	data review; added Lake county quads
	6/12/2015	mikulikc	corrected Yolo County quad locations from "all quads" to quads intersecting the GIS feature for S-032596
	10/20/2015	rinerg	remove '~All quads - Sonoma', replace with Sonoma quads intersecting report feature
	7/20/2016	moored	GIS edited shape

Record status: Verified

Report Detail: S-033041

Identifiers

Report No.: S-033041
Other IDs:
Cross-refs:

Citation information

Author(s): Suzanne Stewart and Adrian Praetzellis
Year: 2003 (Nov)
Title: Archaeological Research Issues for the Point Reyes National Seashore - Golden Gate National Recreation Area: For Geoarchaeology, Indigenous Archaeology, Historical Archaeology, Maritime Archaeology
Affliliation: Anthropological Studies Center, Sonoma State University
No. pages:
No. maps:
Attributes: Archaeological, Architectural/historical, Other research
Inventory size: c 182,496 ac
Disclosure: Not for publication
Collections: No

Sub-desig.: a
Author(s): Jack Meyer
Year: 2003 (Nov)
Title: An Overview of Geoarchaeological Research Issues for the PRNS - GGNRA
Affiliation: Anthropological Studies Center, Sonoma State University
Report type(s): Archaeological, Other research
Inventory size:
No. pages:
Disclosure: Not for publication
Collections: No
PDF Pages: 16-63

Sub-desig.: b
Author(s): Suzanne Stewart
Year: 2003 (Nov)
Title: An Overview of Research Issues for Indigenous Archaeology for the PRNS - GGNRA
Affiliation: Anthropological Studies Center, Sonoma State University
Report type(s): Archaeological, Other research
Inventory size:
No. pages:
Disclosure: Not for publication
Collections: No
PDF Pages: 64-257

Sub-desig.: c
Author(s): Annita Waghorn
Year: 2003 (Nov)
Title: An Overview of Research Issues for Historical Archaeology for the PRNS - GGNRA
Affiliation: Anthropological Studies Center, Sonoma State University
Report type(s): Architectural/historical, Other research
Inventory size:
No. pages:
Disclosure: Not for publication
Collections: No
PDF Pages: 258-331

Report Detail: S-033041

Sub-desig.: d
Author(s): Christina MacDonald
Year: 2003 (Nov)
Title: Research Sources Relating to Historic Period Dairies
Affiliation: Anthropological Studies Center, Sonoma State University
Report type(s): Architectural/historical, Other research
Inventory size:
No. pages:
Disclosure: Not for publication
Collections: No
PDF Pages: 332-343

Sub-desig.: e
Author(s): Robert Douglass
Year: 2003 (Nov)
Title: An Overview of Research Issues for Maritime Resources for the PRNS - GGNRA
Affiliation: Anthropological Studies Center, Sonoma State University
Report type(s): Architectural/historical, Other research
Inventory size:
No. pages:
Disclosure: Not for publication
Collections: No
PDF Pages: 344-369

General notes

Associated resources

Primary No.	*Trinomial*	*Name*
P-01-000084	CA-ALA-000307	West Berkeley Shell Mound
P-07-000173	CA-CCO-000295	Nelson No. 295
P-21-000004	CA-MRN-000222/H	4-MRN-222
P-21-000005	CA-MRN-000223	4-MRN-223
P-21-000006	CA-MRN-000224/H	4-MRN-224
P-21-000008	CA-MRN-000246	4-MRN-246
P-21-000009	CA-MRN-000248	4-MRN-248
P-21-000010	CA-MRN-000249/H	4-MRN-249
P-21-000011	CA-MRN-000250	4-MRN-250
P-21-000014	CA-MRN-000263/H	PB 263
P-21-000017	CA-MRN-000266	PB 266
P-21-000020	CA-MRN-000269	PB 269
P-21-000021	CA-MRN-000270	PB 270
P-21-000022	CA-MRN-000285	4-MRN-285
P-21-000023	CA-MRN-000387/H	4-MRN-387
P-21-000024	CA-MRN-000388	Void, see P-21-000607 and P-21
P-21-000025	CA-MRN-000390	4-MRN-390
P-21-000048	CA-MRN-000017	Nelson No. 17
P-21-000058	CA-MRN-000027	Nelson No. 27
P-21-000072	CA-MRN-000042	Nelson No. 42
P-21-000073	CA-MRN-000043	Nelson No. 43
P-21-000074	CA-MRN-000044	Nelson No. 44
P-21-000075	CA-MRN-000045	Nelson No. 45
P-21-000163	CA-MRN-000138	Nelson No. 138
P-21-000177	CA-MRN-000152	Nelson No. 152
P-21-000218	CA-MRN-000193/H	Rancho Olompali; Olompali Fra
P-21-000235	CA-MRN-000216/H	DNG-1
P-21-000239	CA-MRN-000226	PB 226
P-21-000241	CA-MRN-000231	Duplication 231

P-21-000242	CA-MRN-000232/H	PB 232 b
P-21-000244	CA-MRN-000234/H	PB 234
P-21-000246	CA-MRN-000236/H	4-MRN-236
P-21-000248	CA-MRN-000238/H	
P-21-000249	CA-MRN-000239	PB 239
P-21-000252	CA-MRN-000242/H	PB No. 242 - Cauley
P-21-000254	CA-MRN-000247	
P-21-000258	CA-MRN-000258	PB 258
P-21-000261	CA-MRN-000273	PB 273
P-21-000262	CA-MRN-000275	PB 275
P-21-000263	CA-MRN-000276/H	Old Coast Guard Site
P-21-000264	CA-MRN-000277	PB 277
P-21-000265	CA-MRN-000278	PB 210B
P-21-000272	CA-MRN-000287	PB 278A
P-21-000273	CA-MRN-000288	
P-21-000275	CA-MRN-000290	PB 210A
P-21-000276	CA-MRN-000291	[none]
P-21-000277	CA-MRN-000292	[none]
P-21-000278	CA-MRN-000293	[none]
P-21-000279	CA-MRN-000294	Bryant's 240a
P-21-000281	CA-MRN-000296	[none]
P-21-000283	CA-MRN-000298/H	DNG-2
P-21-000287	CA-MRN-000304	P-B 242A
P-21-000290	CA-MRN-000307/H	Probably 232 C
P-21-000295	CA-MRN-000315	Nelson No. 86C
P-21-000311	CA-MRN-000333/H	Muir Beach Archaeological Site
P-21-000347	CA-MRN-000375	4-MRN-248
P-21-000348	CA-MRN-000376	4 MRN-376
P-21-000349	CA-MRN-000377	[none]
P-21-000350	CA-MRN-000378	
P-21-000351	CA-MRN-000380	
P-21-000354	CA-MRN-000383/H	Martinelli -1? (D. Fredrickson, 19
P-21-000357	CA-MRN-000389/H	CA-MRN-389/H
P-21-000358	CA-MRN-000392	
P-21-000359	CA-MRN-000393	[none]
P-21-000360	CA-MRN-000394/H	DNG-4
P-21-000368	CA-MRN-000402	[none]
P-21-000607	CA-MRN-000629/H	
P-21-000608	CA-MRN-000630	4-MRN-388
P-21-000609	CA-MRN-000379	
P-21-000618	CA-MRN-000228	
P-21-000628	CA-MRN-000201	Jesse Peter 201
P-21-000635	CA-MRN-000230	PB 230
P-21-000639	CA-MRN-000256	PB 256
P-21-000640	CA-MRN-000271	PB 271; Bear Valley
P-21-000641	CA-MRN-000272/H	Coast Camp site
P-21-000642	CA-MRN-000274	PB 274 Hidden Site
P-21-000643	CA-MRN-000301	PB 235-A, Hall Site
P-21-000653	CA-MRN-000391	[none]
P-21-002615	CA-MRN-000674	Pelican site
P-38-000005	CA-SFR-000005	Nelson's 397
P-38-000006	CA-SFR-000006	Loud's Presidio Mound
P-38-000007	CA-SFR-000007	Bayshore Mound
P-38-000021	CA-SFR-000021/H	Sutro Bath Sites
P-38-000028	CA-SFR-000028	BART Burial
P-38-000029	CA-SFR-000029	AC-28
P-38-000030	CA-SFR-000030	AC-29
P-38-000031	CA-SFR-000031	AC-30
P-38-000162	CA-SFR-000129	Crissy Field Site

Report Detail: S-033041

	P-41-000004	CA-SMA-000206	SFSU-5
	P-41-000027	CA-SMA-000022	Half Moon Bay
	P-41-000080	CA-SMA-000077	University Village Site (Gerow)
	P-41-000117	CA-SMA-000115	Montara Beach Site
	P-41-000127	CA-SMA-000125	Filoli
	P-41-000149	CA-SMA-000147	3 College of San Mateo
	P-49-000271	CA-SON-000299	"Kili"
	P-49-000319	CA-SON-000348/H	Duncans Landing Site

No. resources: 96

Has informals: No

Location information

County(ies): Marin, San Francisco, San Mateo

USGS quad(s): Bolinas, Double Point, Drakes Bay, Inverness, La Honda, Montara Mtn, Palo Alto, Point Bonita, Point Reyes Ne, San Francisco North, San Francisco South, Tomales, Woodside

Address:

PLSS:

Database record metadata

	Date	*User*
Entered:	4/27/2007	guldenj
Last modified:	1/4/2018	raelync

IC actions:	*Date*	*User*	*Action taken*
	8/1/2017	raelync	Report verified; awaiting verification of 57 resources.

Record status: Verified

Report Detail: S-033600

Identifiers

Report No.: S-033600

Other IDs:

Type	*Name*
Agency Nbr	Contract No. 04A2098
Caltrans	EA No. 447600

Cross-refs:

Citation information

Author(s): Jack Meyer and Jeff Rosenthal

Year: 2007 (Jun)

Title: Geoarchaeological Overview of the Nine Bay Area Counties in Caltrans District 4

Affliliation: Far Western Anthropological Research Group, Inc.

No. pages:

No. maps:

Attributes: Archaeological, Other research

Inventory size:

Disclosure: Not for publication

Collections: No

General notes

9 unrecorded prehistoric resources.

Associated resources

Primary No.	*Trinomial*	*Name*
P-01-000001	CA-ALA-000554	Castlewood Site
P-01-000002	CA-ALA-000555	Meadowlark Dairy Site
P-01-000014	CA-ALA-000483	Site 2
P-01-000063	CA-ALA-000043	De Avillo
P-01-000064	CA-ALA-000044	Kaiser
P-01-000067	CA-ALA-000047	4 Ala-47
P-01-000080	CA-ALA-000060	Castro Valley
P-01-000124	CA-ALA-000394	Pleasanton Meadows Site
P-01-000139	CA-ALA-000413	Santa Rita Village
P-01-000140	CA-ALA-000414	Iverson Site
P-01-001795	CA-ALA-000566	Hayward Bypass Site
P-01-002110	CA-ALA-000467	H&A-HBP-1
P-01-002160	CA-ALA-000574	Bernal/680
P-01-002162	CA-ALA-000576	Curtner Site
P-01-002245	CA-ALA-000586	Hwy 238-1
P-07-000019	CA-CCO-000696	Burial Site
P-07-000024	CA-CCO-000004	Slater site
P-07-000037	CA-CCO-000018/H	Marsh Site; Marsh House; The P
P-07-000047	CA-CCO-000030	[none]
P-07-000075	CA-CCO-000133	Ader site
P-07-000079	CA-CCO-000137	Monument Site; Concord Man Si
P-07-000088	CA-CCO-000146	Holland Tract
P-07-000089	CA-CCO-000147	CCO-147
P-07-000108	CA-CCO-000225	Anaclario Site
P-07-000182	CA-CCO-000305	Prehistoric Archaeological Site C
P-07-000185	CA-CCO-000308	Stone Valley Site
P-07-000186	CA-CCO-000309	The Rossmoor Site
P-07-000217	CA-CCO-000431	Murwood School Site
P-07-000239	CA-CCO-000459	Los Vaqueros #15 (LV-15)
P-07-000401	CA-CCO-000637	Dam Site
P-07-000721	CA-CCO-000368	Dutra 1
P-21-000010	CA-MRN-000249/H	4-MRN-249
P-21-000048	CA-MRN-000017	Nelson No. 17
P-21-002615	CA-MRN-000674	Pelican site

Report Detail: S-033600

P-28-000009	CA-NAP-000863	Adams Street Site
P-28-000028	CA-NAP-000015/H	Suscol Mound #5
P-28-000301	CA-NAP-000399	B- 55- V V
P-28-000967	CA-NAP-000916	Double Whoa!
P-38-000006	CA-SFR-000006	Loud's Presidio Mound
P-38-000028	CA-SFR-000028	BART Burial
P-38-000101	CA-SFR-000112	49 Stevenson
P-38-000102	CA-SFR-000113	5th & Market
P-38-000119	CA-SFR-000114	[none]
P-41-000080	CA-SMA-000077	University Village Site (Gerow)
P-41-000284	CA-SMA-000273	Coyote Pt. Marina
P-43-000016	CA-SCL-000755	SCU/Old Alameda Burial site
P-43-000189	CA-SCL-000178	MH-22
P-43-000296	CA-SCL-000288	[none]
P-43-000308	CA-SCL-000300	CA-Scl-300
P-43-000310	CA-SCL-000302	CA-Scl-302
P-43-000423	CA-SCL-000418/H	[none]
P-43-000424	CA-SCL-000419/H	441 N. 1st
P-43-000448	CA-SCL-000447/H	formerly known as CA-SCL-6E
P-43-000451	CA-SCL-000450	Rosendin 1
P-43-000485	CA-SCL-000484	[none]
P-43-000561	CA-SCL-000566	[none]
P-43-000604	CA-SCL-000609	Ronald McDonald House
P-43-000608	CA-SCL-000613/H	Stanford Man II
P-43-000614	CA-SCL-000619	Elk Site
P-43-000623	CA-SCL-000675	"Coyote Creek Site"
P-43-001015	CA-SCL-000553	Orchard 1001-1
P-43-001058	CA-SCL-000674	DC-1
P-43-001080	CA-SCL-000702	Waste Management Site
P-43-001163	CA-SCL-000828	Fuel Farm Site
P-43-001194	CA-SCL-000832	Iowa Avenue and Sunnyvale Ave
P-43-001576	CA-SCL-000849	152/156-5
P-48-000007	CA-SOL-000391	Fairfield PEC-1
P-48-000157	CA-SOL-000324	[none]

No. resources: 68

Has informals: Yes

Location information

County(ies): Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, Sonoma

USGS quad(s): ~All quads - Alameda Co., ~All quads - Contra Costa Co., ~All quads - Marin Co., ~All quads - Napa Co., ~All quads - San Francisco Co., ~All quads - San Mateo Co., ~All quads - Santa Clara Co., ~All quads - Solano Co., ~All quads - Sonoma Co.

Address:

PLSS:

Database record metadata

	Date	*User*
Entered:	9/24/2007	guldenj
Last modified:	6/20/2017	moored

IC actions:	*Date*	*User*	*Action taken*
	7/16/2015	rinerg	set Status=verified
	8/22/2016	paganob	updated other identifiers
	4/11/2017	raelync	report verified, awaiting verification of 1 resource.
	6/19/2017	bentonb	all resources verified, report record status = verified

Record status: Verified

Report Detail: S-034910

Identifiers

Report No.: S-034910
Other IDs:
Cross-refs:

Citation information

Author(s): Sandra A. Ledebuhr and Thomas M. Origer
Year: 2008 (Mar)
Title: A Cultural Resources Survey for the Gallagher Well Project, Marin County, California
Affliliation: Tom Origer & Associates
No. pages:
No. maps:
Attributes: Archaeological, Field study
Inventory size: c 5,150 li ft & 1.2 ac
Disclosure: Not for publication
Collections: No

General notes

Associated resources

No. resources: 0
Has informals: No

Location information

County(ies): Marin
USGS quad(s): Inverness

Address:	*Address*	*City*	*Assessor's parcel no.*	*Zip code*
	Point Reyes-Petaluma Hill Road	east of Point Reyes Station		

PLSS:

Database record metadata

	Date	*User*
Entered:	9/4/2008	guldenj
Last modified:	9/4/2008	guldenj

IC actions:
Record status:

Report Detail: S-039157

Identifiers

Report No.: S-039157
Other IDs:
Cross-refs:

Citation information

Author(s): Heidi Koenig
Year: 2012 (Jul)
Title: Abovenet Lucas Film Segment 2 & 3 Project, Marin County, California, Archaeological Survey Report
Affliliation: ESA, Inc.
No. pages:
No. maps:
Attributes: Archaeological, Field study
Inventory size:
Disclosure: Not for publication
Collections: No

General notes

Associated resources

No. resources: 0
Has informals: No

Location information

County(ies): Marin
USGS quad(s): Novato, San Geronimo, San Rafael
Address:
PLSS:

Database record metadata

	Date	*User*
Entered:	8/2/2012	jordanl
Last modified:	3/11/2019	hagell

IC actions:	*Date*	*User*	*Action taken*
	8/2/2012	jordanl	assigned number
	3/11/2019	hagell	edited title

Record status: Verified

Report Detail: S-042138

Identifiers

Report No.: S-042138
Other IDs:
Cross-refs:

Citation information

Author(s): L. Kyle Napton
Year: 2013 (Jul)
Title: Cultural Resources and the Proposed Marin County Open Spaces District Road and Trail Management Plan, Marin County, California
Affliliation: Historical Resources Consultant
No. pages:
No. maps:
Attributes: Archaeological, Management/planning, Other research
Inventory size:
Disclosure: Not for publication
Collections: No

General notes

Associated resources

Primary No.	*Trinomial*	*Name*
P-21-000038	CA-MRN-000007	Nelson No. 7
P-21-000070	CA-MRN-000039	Nelson No. 39
P-21-000089	CA-MRN-000059	Nelson No.59
P-21-000148	CA-MRN-000121	Nelson No. 121
P-21-000197	CA-MRN-000172	Nelson No. 172
P-21-000198	CA-MRN-000173	Nelson No. 173
P-21-000199	CA-MRN-000174	Nelson No. 174
P-21-000200	CA-MRN-000175	Nelson No. 175
P-21-000299	CA-MRN-000320	[none]
P-21-000338	CA-MRN-000366	[none]
P-21-000339	CA-MRN-000367	
P-21-000355	CA-MRN-000385	Sfsc-Mrn 385
P-21-000375	CA-MRN-000412	[none]
P-21-000378	CA-MRN-000416	Deer Island Area #3
P-21-000379	CA-MRN-000417	Deer Island Area #4
P-21-000380	CA-MRN-000418	Deer Island Area #5
P-21-000381	CA-MRN-000419	Deer Island Area #6
P-21-000383	CA-MRN-000421	Novato #18
P-21-000384	CA-MRN-000422	Novato #19
P-21-000387	CA-MRN-000426	Tiburon 4 Field #4
P-21-000389	CA-MRN-000428	Tiburon 6 Field #6
P-21-000390	CA-MRN-000429	Tiburon 7 Field #7
P-21-000391	CA-MRN-000430	Tiburon 8 Field #8
P-21-000392	CA-MRN-000431	Tiburon 9, 10, 11
P-21-000393	CA-MRN-000432	Tiburon 12
P-21-000394	CA-MRN-000433	Tiburon 13 Field #13
P-21-000395	CA-MRN-000434	Tiburon 14 & 15 Field #14 & #15
P-21-000396	CA-MRN-000435	Tiburon 16 Field #16
P-21-000397	CA-MRN-000436	Tiburon 17 Field #17
P-21-000398	CA-MRN-000437	Tiburon 18 Field #18
P-21-000399	CA-MRN-000438	Tiburon 19 Field #19
P-21-000400	CA-MRN-000439	Tiburon 20A
P-21-000401	CA-MRN-000440	Tiburon 21 Field #21
P-21-000402	CA-MRN-000442	Tiburon 1
P-21-000404	CA-MRN-000449	ARS 76-28-B Pinheiro Ridge Su
P-21-000405	CA-MRN-000450	ARS 76-28-C

Report Detail: S-042138

P-21-000422	CA-MRN-000470	Snoopy's Rock
P-21-000433	CA-MRN-000481	ARS 78-72-Rock 1
P-21-000453	CA-MRN-000511H	RO-4-H
P-21-000456	CA-MRN-000516	Temporary No. 81-7A
P-21-000528	CA-MRN-000601	Burdell Spring #1
P-21-000543	CA-MRN-000384	MRN-"B" (King's field number)
P-21-000546	CA-MRN-000424	Tiburon 2
P-21-000547	CA-MRN-000448	ARS-76-28-A
P-21-000549	CA-MRN-000488	ARS-79-31-1
P-21-000554	CA-MRN-000509	Starship
P-21-000557	CA-MRN-000519	DC-80-22A
P-21-000558	CA-MRN-000520	Temporary No. CD-80-22B
P-21-000559	CA-MRN-000521	DC-80-41A
P-21-000593	CA-MRN-000624	
P-21-000610	CA-MRN-000518H	Temporary No. 81-7C
P-21-000620	CA-MRN-000636	Petroglyph site south of Ring Mo
P-21-000621	CA-MRN-000637	Petroglyph site on small north sl
P-21-000666	CA-MRN-000512	AC-44
P-21-000667	CA-MRN-000517H	81-7B
P-21-002535	CA-MRN-000654H	San Geronimo Rock Enclosure
P-21-002546	CA-MRN-000656H	Historic artifact scatter
P-21-002633		ARS 07-039-01
P-21-002680		CRF-Arroyo Creek-01

No. resources: 59

Has informals: No

Location information

County(ies): Marin

USGS quad(s): Bolinas, Novato, Petaluma River, San Geronimo, San Quentin, San Rafael

Address:

PLSS:

Database record metadata

	Date	*User*	
Entered:	10/8/2013	castrom	
Last modified:	10/28/2020	hagell	
IC actions:	*Date*	*User*	*Action taken*
	6/15/2017	hagell	added attribute. Edited title
	10/28/2020	hagell	added P#s (from Table 4 in the report).

Record status: Verified

Report Detail: S-049780

Identifiers

Report No.: S-049780

Other IDs:

Type	*Name*
OTIS Report Number	FHWA_2016_0615_001

Cross-refs:

Citation information

Author(s): Brian F. Byrd, Adrian R. Whitaker, Patricia J. Mikkelsen, and Jeffrey S. Rosenthal
Year: 2017 (Jun)
Title: San Francisco Bay-Delta Regional Context and Research Design for Native American Archaeological Resources, Caltrans District 4
Affliliation: California Department of Transportation, District 4
No. pages:
No. maps:
Attributes: Archaeological, Management/planning, Other research
Inventory size:
Disclosure: Not for publication
Collections: No

Sub-desig.: a
Author(s): Julianne Polanco
Year: 2016 (Aug)
Title: FHWA_2016_0615_001, Caltrans District 4 Archaeological Context
Affiliation: Office of Historic Preservation
Report type(s): OHP Correspondence
Inventory size:
No. pages:
Disclosure: Unrestricted
Collections: No
PDF Pages: 489-510

General notes

A portion of this report extends outside the NWIC service area (into Sacramento County). According to the report, 1,798 Native American archaeological resources are within the study area.

Associated resources

Primary No.	*Trinomial*	*Name*
P-01-000001	CA-ALA-000554	Castlewood Site
P-01-000002	CA-ALA-000555	Meadowlark Dairy Site
P-01-000014	CA-ALA-000483	Site 2
P-01-000015	CA-ALA-000565/H	[none]
P-01-000022	CA-ALA-000001/H	Mission San Jose
P-01-000033	CA-ALA-000012	[none]
P-01-000034	CA-ALA-000013/H	SFSC-ALA-1
P-01-000038	CA-ALA-000017	[none]
P-01-000062	CA-ALA-000042	Jensen
P-01-000066	CA-ALA-000046	Nielson Farm; Stoneridge Place
P-01-000080	CA-ALA-000060	Castro Valley
P-01-000084	CA-ALA-000307	West Berkeley Shell Mound
P-01-000086	CA-ALA-000309	Emeryville Shellmound
P-01-000087	CA-ALA-000310	Nelson's 310
P-01-000089	CA-ALA-000312	Nelson's 312
P-01-000104	CA-ALA-000328	Nelson's 328
P-01-000105	CA-ALA-000329/H	Nelsons 329; Ryan Mound
P-01-000106	CA-ALA-000330	Nelson's 330
P-01-000107	CA-ALA-000331	Nelson's 331
P-01-000116	CA-ALA-000342	Voided: see P-01-002162

P-01-000117	CA-ALA-000343	M.H. Podell Presidio Apartments
P-01-000139	CA-ALA-000413	Santa Rita Village
P-01-000152	CA-ALA-000428/H	Geary Ranch
P-01-000175	CA-ALA-000453	Alvarado-Niles 1
P-01-000197	CA-ALA-000479	Dowe Ave Site
P-01-000201	CA-ALA-000485	SL1
P-01-000202	CA-ALA-000486/H	SL2
P-01-000234	CA-ALA-000424	Ardenwood Estates (AE) #1
P-01-000237	CA-ALA-000466	Olympia #1
P-01-001795	CA-ALA-000566	Hayward Bypass Site
P-01-002120	CA-ALA-000514	Hidden Valley Ranch
P-01-002160	CA-ALA-000574	Bernal/680
P-01-002162	CA-ALA-000576	Curtner Site
P-01-002245	CA-ALA-000586	Hwy 238-1
P-01-002280	CA-ALA-000621	Central Chevrolet
P-01-010509	CA-ALA-000604	Mandela-1
P-01-010610	CA-ALA-000613/H	Canyon Oaks
P-01-011556	CA-ALA-000684	Fremont Blvd South
P-07-000019	CA-CCO-000696	Burial Site
P-07-000021	CA-CCO-000001	CCO-1
P-07-000029	CA-CCO-000009	Los Vaqueros #24 (LV-24)
P-07-000033	CA-CCO-000014	Sherwood
P-07-000037	CA-CCO-000018/H	Marsh Site; Marsh House; The P
P-07-000047	CA-CCO-000030	[none]
P-07-000066	CA-CCO-000124	[none]
P-07-000070	CA-CCO-000128	Dal Porto Mound
P-07-000079	CA-CCO-000137	Monument Site; Concord Man Si
P-07-000080	CA-CCO-000138	Hotchkiss Mound
P-07-000089	CA-CCO-000147	CCO-147
P-07-000093	CA-CCO-000151	[none]
P-07-000098	CA-CCO-000156	Garden Road Cul-de Sac Site
P-07-000105	CA-CCO-000222/H	Keller Ranch
P-07-000117	CA-CCO-000235	Loud's 423a
P-07-000118	CA-CCO-000236	Buchan, Jones Mound, Loud #42
P-07-000147	CA-CCO-000268	Voided, see P-07-000461, P-07-
P-07-000148	CA-CCO-000269	Nelson No. 269
P-07-000149	CA-CCO-000270	Nelson No. 270
P-07-000150	CA-CCO-000271	Nelson No. 271
P-07-000154	CA-CCO-000275	Nelson No. 275
P-07-000168	CA-CCO-000290	Nelson No. 290
P-07-000173	CA-CCO-000295	Nelson No. 295
P-07-000174	CA-CCO-000297	Nelson's No. 297
P-07-000175	CA-CCO-000298	Nelson's No. 298, Stege
P-07-000176	CA-CCO-000299	Nelson's No. 299
P-07-000185	CA-CCO-000308	Stone Valley Site
P-07-000186	CA-CCO-000309	The Rossmoor Site
P-07-000189	CA-CCO-000320/H	Los Vaqueros #2 (LV-2)
P-07-000197	CA-CCO-000397	CCO 1(SFSC)
P-07-000217	CA-CCO-000431	Murwood School Site
P-07-000227	CA-CCO-000447/H	Los Vaqueros #9 (LV-9)
P-07-000230	CA-CCO-000450/H	Los Vaqueros #16, 21, 22 (LV-1
P-07-000238	CA-CCO-000458/H	Los Vaqueros #13 (LV-13)
P-07-000239	CA-CCO-000459	Los Vaqueros #15 (LV-15)
P-07-000242	CA-CCO-000462	Los Vaqueros #31 (LV-31)
P-07-000309	CA-CCO-000538	Big Break Regional Shoreline
P-07-000359	CA-CCO-000593	HT-6
P-07-000365	CA-CCO-000600	[none]
P-07-000366	CA-CCO-000601	Voided, see P-07-000461
P-07-000400	CA-CCO-000636	Hopper Mortar Site

P-07-000401	CA-CCO-000637	Dam Site
P-07-000440	CA-CCO-000259	Barker's Rodeo
P-07-000441	CA-CCO-000284	Nelson No. 284
P-07-000459	CA-CCO-000474/H	PRC #1
P-07-000461	CA-CCO-000654	Nelson No. 268
P-07-000462	CA-CCO-000655	Nelson's 268B
P-07-000721	CA-CCO-000368	Dutra 1
P-07-000724	CA-CCO-000377	SL-1
P-07-000790	CA-CCO-000725	Road 3A Site
P-07-000792	CA-CCO-000726/H	Powerline Site
P-07-002570	CA-CCO-000750	MP20; Mile Post 20 Site (UPDA
P-07-002592	CA-CCO-000755/H	Gas Line Site
P-07-002650	CA-CCO-000767	Biggs Mound
P-07-004537	CA-CCO-000832	PATP Site
P-21-000002	CA-MRN-000003	Nelson No. 3
P-21-000036	CA-MRN-000005/H	Nelson No. 5
P-21-000043	CA-MRN-000012	Nelson No. 12
P-21-000045	CA-MRN-000014	Nelson No. 14
P-21-000048	CA-MRN-000017	Nelson No. 17
P-21-000051	CA-MRN-000020	Nelson No. 20
P-21-000057	CA-MRN-000026	Nelson No. 26
P-21-000058	CA-MRN-000027	Nelson No. 27
P-21-000066	CA-MRN-000035	Nelson No. 35
P-21-000070	CA-MRN-000039	Nelson No. 39
P-21-000072	CA-MRN-000042	Nelson No. 42
P-21-000073	CA-MRN-000043	Nelson No. 43
P-21-000074	CA-MRN-000044	Nelson No. 44
P-21-000075	CA-MRN-000045	Nelson No. 45
P-21-000097	CA-MRN-000067/H	Nelson No. 67
P-21-000106	CA-MRN-000076	Nelson No. 76
P-21-000109	CA-MRN-000080	Nelson No. 80
P-21-000142	CA-MRN-000114	Nelson No. 114
P-21-000143	CA-MRN-000115	Nelson No. 115
P-21-000152	CA-MRN-000127	Nelson No. 127
P-21-000163	CA-MRN-000138	Nelson No. 138
P-21-000164	CA-MRN-000139	Nelson No. 139
P-21-000165	CA-MRN-000140	Nelson No. 140
P-21-000166	CA-MRN-000141	Nelson No. 141
P-21-000167	CA-MRN-000142	Nelson No. 142
P-21-000175	CA-MRN-000150/H	Nelson No. 150
P-21-000177	CA-MRN-000152	Nelson No. 152
P-21-000193	CA-MRN-000168	Nelson No. 168
P-21-000195	CA-MRN-000170	Nelson No. 170
P-21-000196	CA-MRN-000171	Nelson No. 171
P-21-000199	CA-MRN-000174	Nelson No. 174
P-21-000200	CA-MRN-000175	Nelson No. 175
P-21-000217	CA-MRN-000192	Nelson No. 192
P-21-000218	CA-MRN-000193/H	Rancho Olompali; Olompali Fra
P-21-000219	CA-MRN-000194	Nelson No. 194
P-21-000220	CA-MRN-000195	Nelson No. 195
P-21-000221	CA-MRN-000196	Nelson No. 196
P-21-000222	CA-MRN-000197	Nelson No. 197
P-21-000256	CA-MRN-000254	The Dominican College Site
P-21-000295	CA-MRN-000315	Nelson No. 86C
P-21-000305	CA-MRN-000327	Nelson No. 195e
P-21-000306	CA-MRN-000328	S.A. II (San Antonio II)
P-21-000327	CA-MRN-000352	ARS 05-018
P-21-000332	CA-MRN-000357/H	Bayonet Midden
P-21-000337	CA-MRN-000365	[none]; Miwok Park

P-21-000346	CA-MRN-000374	[none]
P-21-000369	CA-MRN-000403	[none]
P-21-000423	CA-MRN-000471	San Jose Village
P-21-000459	CA-MRN-000526	OSHP-83-1
P-21-000462	CA-MRN-000529	Lost Luggage Site
P-21-000528	CA-MRN-000601	Burdell Spring #1
P-21-000541	CA-MRN-000255	[none]
P-21-000544	CA-MRN-000406	[none]
P-21-000552	CA-MRN-000507/H	RO-2
P-21-000664	CA-MRN-000495	Irma's Site
P-21-000675	CA-MRN-000644/H	Mission Avenue Midden
P-21-002625	CA-MRN-000678	ARS 05-018
P-27-000613	CA-MNT-000530	H-28
P-28-000028	CA-NAP-000015/H	Suscol Mound #5
P-28-000029	CA-NAP-000016	#16; Suscol Mound #1
P-28-000175	CA-NAP-000189/H	"Possibly one of Vallejo's sites"
P-28-000176	CA-NAP-000190	Hageman #1
P-28-000667	CA-NAP-000795	Hageman #3
P-28-000874	CA-NAP-000265	Fagan Creek
P-38-000004	CA-SFR-000004/H	Yerba Buena Island
P-38-000006	CA-SFR-000006	Loud's Presidio Mound
P-38-000007	CA-SFR-000007	Bayshore Mound
P-38-000017	CA-SFR-000017	Nelson 394
P-38-000021	CA-SFR-000021/H	Sutro Bath Sites
P-38-000022	CA-SFR-000022H	Mission San Francisco de Asis;
P-38-000026	CA-SFR-000026	Void, see P-38-000006
P-38-000028	CA-SFR-000028	BART Burial
P-38-000029	CA-SFR-000029	AC-28
P-38-000030	CA-SFR-000030	AC-29
P-38-000031	CA-SFR-000031	AC-30
P-38-000101	CA-SFR-000112	49 Stevenson
P-38-000102	CA-SFR-000113	5th & Market
P-38-000119	CA-SFR-000114	[none]
P-38-000162	CA-SFR-000129	Crissy Field Site
P-38-000172	CA-SFR-000135	560 Mission St.
P-38-004265	CA-SFR-000136/H	1166-1188 Howard Street Afford
P-38-004318	CA-SFR-000147	Site JSG-1
P-38-004319	CA-SFR-000148/H	Central Freeway Touchdown Ra
P-38-004326	CA-SFR-000151/H	Tehama Street Site
P-38-004329	CA-SFR-000154/H	SFWBA Block 10
P-38-004352	CA-SFR-000155	Site JSG-2
P-38-004638	CA-SFR-000171	Quint Street Site
P-38-004882	CA-SFR-000175	ASC 71/10-1
P-38-005131	CA-SFR-000191/H	Schlage Lock
P-38-005503	CA-SFR-000205	Transbay Burial 1
P-41-000001	CA-SMA-000151	Nelson's 412, 413, 414; UC-ARF
P-41-000009	CA-SMA-000004	Nelson's 372; Sewell 1; San Mat
P-41-000011	CA-SMA-000006/H	Nelson's #364; Sewell 3
P-41-000027	CA-SMA-000022	Half Moon Bay
P-41-000028	CA-SMA-000023	San Bruno
P-41-000037	CA-SMA-000033	Nelson 372b
P-41-000044	CA-SMA-000040	SM-1
P-41-000075	CA-SMA-000072	[none]
P-41-000080	CA-SMA-000077	University Village Site (Gerow)
P-41-000081	CA-SMA-000078	[none]
P-41-000086	CA-SMA-000083	Fair Oaks Site
P-41-000087	CA-SMA-000084	[none]
P-41-000103	CA-SMA-000100	[none]
P-41-000117	CA-SMA-000115	Montara Beach Site

P-41-000127	CA-SMA-000125	Filoli
P-41-000136	CA-SMA-000134	Probably Nelson #406
P-41-000141	CA-SMA-000139	[none]
P-41-000142	CA-SMA-000140	Nelson #415
P-41-000149	CA-SMA-000147	3 College of San Mateo
P-41-000152	CA-SMA-000150	1050 Ralston Ave
P-41-000160	CA-SMA-000160	Hiller Mound
P-41-000204	CA-SMA-000204	Jasper Ridge Site
P-41-000244	CA-SMA-000248	Tarlton Site
P-41-000252	CA-SMA-000256	SLAC-2
P-41-000259	CA-SMA-000263/H	Oak Knoll
P-41-000263	CA-SMA-000267	1416 Bay Road
P-41-000265	CA-SMA-000269	Stanford Man I
P-41-000284	CA-SMA-000273	Coyote Pt. Marina
P-41-000308	CA-SMA-000314	San Mateo Shellmound #3; Ham
P-41-000315	CA-SMA-000335/H	Davey Glen Site
P-41-002076	CA-SMA-000368/H	Carnduff Farmstead and prehist
P-43-000016	CA-SCL-000755	SCU/Old Alameda Burial site
P-43-000019	CA-SCL-000134/H	WVC-3
P-43-000021	CA-SCL-000001	Castro-Ponce Mound
P-43-000024	CA-SCL-000004/H	Spartan Stadium
P-43-000026	CA-SCL-000006	Marcello's Enclosure
P-43-000027	CA-SCL-000007/H	Lick Mill
P-43-000032	CA-SCL-000012/H	Smaller Ynigo Mound
P-43-000050	CA-SCL-000030/H	The Third Location of Mission Sa
P-43-000057	CA-SCL-000038	Alm House Mound
P-43-000082	CA-SCL-000065	West Valley College 2
P-43-000085	CA-SCL-000068	WVC-6
P-43-000087	CA-SCL-000070/H	10-17-73-1; WVC-19
P-43-000137	CA-SCL-000124	ARS 77-21
P-43-000141	CA-SCL-000128/H	Holiday Inn Site; West San Carlo
P-43-000167	CA-SCL-000155/H	Jose Maria Alviso Adobe
P-43-000277	CA-SCL-000268/H	4-SCL-268
P-43-000285	CA-SCL-000276	Rincon 1
P-43-000295	CA-SCL-000287/H	Sand Hill Road Site
P-43-000302	CA-SCL-000294	ARS 77-21
P-43-000308	CA-SCL-000300	CA-Scl-300
P-43-000310	CA-SCL-000302	CA-Scl-302
P-43-000321	CA-SCL-000314	[none]
P-43-000324	CA-SCL-000317/H	Pueblo de San Jose de Guadalu
P-43-000334	CA-SCL-000327	[none]
P-43-000349	CA-SCL-000343	Ernst Site
P-43-000360	CA-SCL-000354	FC-1
P-43-000423	CA-SCL-000418/H	[none]
P-43-000465	CA-SCL-000464	Stanford-EIP
P-43-000479	CA-SCL-000478	Temporary Site # AES-1
P-43-000485	CA-SCL-000484	[none]
P-43-000549	CA-SCL-000548	[none]
P-43-000576	CA-SCL-000581	[none]
P-43-000578	CA-SCL-000583	Greer Road
P-43-000579	CA-SCL-000584	Creekbank Site
P-43-000581	CA-SCL-000586/H	Golf Course Site
P-43-000586	CA-SCL-000591	Downstream Site
P-43-000587	CA-SCL-000592/H	Area A
P-43-000588	CA-SCL-000593	Berryessa Creek Site
P-43-000595	CA-SCL-000600	Alma Adobe
P-43-000604	CA-SCL-000609	Ronald McDonald House
P-43-000608	CA-SCL-000613/H	Stanford Man II
P-43-000614	CA-SCL-000619	Elk Site

Report Detail: S-049780

	P-43-000618	CA-SCL-000623	Children's Hospital
	P-43-000624	CA-SCL-000677	The 237/880 Site
	P-43-000662	CA-SCL-000628	Lockhead Site
	P-43-000989	CA-SCL-000806	Buchanan Property
	P-43-000990	CA-SCL-000807/H	Woolen Mills Chinatown
	P-43-001058	CA-SCL-000674	DC-1
	P-43-001060	CA-SCL-000678	ARCO Burials
	P-43-001071	CA-SCL-000690	CA-SCL-Lick
	P-43-001163	CA-SCL-000828	Fuel Farm Site
	P-43-001164	CA-SCL-000829	VOIDED: duplicate of P-43-0009
	P-43-001172	CA-SCL-000830	Evelyn and Fair Oaks Isolated B
	P-43-001194	CA-SCL-000832	Iowa Avenue and Sunnyvale Ave
	P-43-001279	CA-SCL-000846/H	PL-1
	P-43-001531	CA-SCL-000894H	Fox California Theater
	P-43-001594	CA-SCL-000851	MST Site; 195 Tully Road
	P-43-001768	CA-SCL-000861	Sanborn Avenue
	P-43-001838	CA-SCL-000867	Coolidge Avenue Site
	P-43-001871	CA-SCL-000870	971 Schiele Ave., San Jose
	P-43-002704	CA-SCL-000919	Penitencia Creek Site
	P-43-003005	CA-SCL-000928	Milpitas Great Mall Site
	P-48-000007	CA-SOL-000391	Fairfield PEC-1
	P-48-000019	CA-SOL-000011	Siebe, Lucchetti
	P-48-000033	CA-SOL-000025/H	[none]
	P-48-000075	CA-SOL-000069	A
	P-48-000083	CA-SOL-000236	Nelson No. 236
	P-48-000150	CA-SOL-000315	Green Valley 'B'
	P-48-000175	CA-SOL-000355/H	Lynch Ranch Site
	P-48-000176	CA-SOL-000356	Green Valley Creek Site
	P-48-000188	CA-SOL-000364/H	Rockville/Suisun Roads
	P-48-000898		Hale Site
	P-49-000199	CA-SON-000227	Nelson No. 208A
	P-49-001011	CA-SON-001082/H	1-Lane Site
	P-49-001862	CA-SON-002226	Spring Site

No. resources: 289

Has informals: Yes

Location information

County(ies): Alameda, Contra Costa, Marin, Napa, Other, San Francisco, San Mateo, Santa Clara, Solano, Sonoma

USGS quad(s): Ano Nuevo, Antioch North, Antioch South, Benicia, Birds Landing, Bolinas, Bouldin Island, Brentwood, Briones Valley, Byron Hot Springs, Calaveras Reservoir, Castle Rock Ridge, Clayton, Cordelia, Cupertino, Cuttings Wharf, Denverton, Diablo, Dublin, Elmira, Fairfield North, Fairfield South, Glen Ellen, Half Moon Bay, Hayward, Honker Bay, Hunters Point, Isleton, Jersey Island, La Costa Valley, La Honda, Las Trampas Ridge, Livermore, Los Gatos, Mare Island, Milpitas, Mindego Hill, Montara Mtn, Mountain View, Mt George, Napa, Newark, Niles, Novato, Oakland East, Oakland West, Palo Alto, Petaluma, Petaluma Point, Petaluma River, Point Bonita, Redwood Point, Richmond, Rio Vista, San Francisco North, San Francisco South, San Geronimo, San Jose East, San Jose West, San Leandro, San Mateo, San Quentin, San Rafael, Santa Teresa Hills, Sears Point, Sonoma, Tassajara, Vine Hill, Walnut Creek, Woodside, Woodward Island

Address:

PLSS:

Database record metadata

	Date	*User*
Entered:	1/18/2018	vickeryn
Last modified:	12/12/2019	hagell

IC actions:	*Date*	*User*	*Action taken*
	7/17/2018	vickeryn	Added additional citation 'a'.
	11/16/2018	SalazarM	Added general note
	11/27/2018	akmenkalnsj	Corrected author and affiliation on addl citation 'a' (Polanco 2016); added San Rafael, Los Gatos, Santa Teresa Hills quads; database complete

	12/4/2018	akmenkalnsj	Verified
	8/9/2019	rinerg	add quads: 'Ano Nuevo', 'Castle Rock Ridge'
	12/12/2019	hagell	added P#s, note, & 'Isleton' to quads.
Record status:	Verified		

Report Detail: S-051596

Identifiers

Report No.: S-051596

Other IDs:

Type	*Name*
Submitter	Grant #P1430408
Submitter	HR-011

Cross-refs:

Citation information

Author(s): Melinda Salisbury

Year: 2016 (May)

Title: A Cultural Resources Investigation Report for the Redi-Mix Concrete Plant Riparian Enhancement Project (HR-011) California Department of Fish and Wildlife – FRGP 2015 (Grant #P1430408) Marin County, California

Affliliation: Cultural Resources Facility, Humboldt State University

No. pages:

No. maps:

Attributes: Archaeological, Field study

Inventory size:

Disclosure: Not for publication

Collections: No

General notes

Associated resources

Primary No.	*Trinomial*	*Name*
P-21-003017		Rich Redi-Mix Concrete Plant
P-21-003018		Black Mountain Ranch

No. resources: 2

Has informals: No

Location information

County(ies): Marin

USGS quad(s): Inverness

Address:

PLSS:

Database record metadata

	Date	*User*
Entered:	1/2/2019	Vickeryn
Last modified:	3/4/2019	surgeonj

IC actions:

Date	*User*	*Action taken*
1/2/2019	Vickeryn	Unprocessed resources-2 new
3/4/2019	surgeonj	Resources processed.

Record status: Database Complete

Report Detail: S-051733

Identifiers

Report No.: S-051733

Other IDs:

Type	*Name*
OHP PRN	NPS080215D
OHP PRN	NPS080215F

Cross-refs:

Citation information

Author(s): David Louter

Year: 2013 (Dec)

Title: SHPO review and concurrence with the updated list of contributing and non-contributing resources to the Olema Valley/Lagunitas Loop Ranches Historic District, Point Reyes National Seashore (NPS080215D)

Affliliation: National Park Services, Pacific West Region

No. pages:

No. maps:

Attributes: Architectural/historical, Evaluation, Management/planning

Inventory size:

Disclosure: Not for publication

Collections: No

Sub-desig.: a

Author(s): Milford Wayne Donaldson

Year: 2008 (May)

Title: NPS080215D, Determination of Eligibilty for six properties within Point Reyes National Seashore, Point Reyes, Marin County, CA

Affiliation: Office of Historic Preservation

Report type(s): OHP Correspondence

Inventory size:

No. pages:

Disclosure: Not for publication

Collections: No

PDF Pages: 112-113

Sub-desig.: b

Author(s): Carol Roland-Nawi

Year: 2014 (Aug)

Title: NPS080215F, Update to Olema Valley/Lagunitas Loop Ranches Historic District, Point Reyes National Seashore, California

Affiliation: Office of Historic Preservation

Report type(s): OHP Correspondence

Inventory size:

No. pages:

Disclosure: Unrestricted

Collections: No

PDF Pages: 114-114

General notes

Additional citation ‘a’ is the concurrence for the 2008 Determination of Eligibility, which we do not have. Additional citation ‘b’ is the concurrence for the update.

Associated resources

Primary No.	*Trinomial*	*Name*
P-21-002919		Olema Valley/Lagunitas Loop Ra
P-21-002928		Olema Valley Ranches Historic

No. resources: 2

Has informals: No

Report Detail: S-051733

Location information

County(ies): Marin
USGS quad(s): Bolinas, Double Point, Inverness, San Geronimo
Address:
PLSS:

Database record metadata

	Date	*User*
Entered:	1/23/2019	Vickeryn
Last modified:	11/26/2019	rinerg

IC actions:	*Date*	*User*	*Action taken*
	1/23/2019	Vickeryn	Added additional citation 'a'. Partial print-out
	3/7/2019	vickeryn	Added additional citation 'b'.

Record status: Verified

Resource Detail: P-21-002919

Identifying information

Primary No.: P-21-002919
Trinomial:
Name: Olema Valley/Lagunitas Loop Ranches Historic District
Other IDs:

Type	*Name*
Resource Name	Olema Valley/Lagunitas Loop Ranches Historic District
Other	Wilkins Ranch, McCurdy Ranch,
Other	Strain (Tiexeira) Ranch, Hagmaier Ranch,
Other	Randall Ranch, Giacomini Ranch,
Other	Parsons Ranch/Five Brooks, Olds (Stewart) Ranch,
Other	Baldwin (Truttman) Ranch, DeSousa Ranch,
Other	Bloom (Rogers) Ranch, McFadden Ranch,
Other	Edwin Gallagher Ranch, Genazzi Ranch,
Other	Mazza (Zenardi) Ranch, Codoni (McIsaac) Ranch,
Other	Neil McIsaac Ranch, Jewell Ranch,
Other	Cheda Ranch

Cross-refs:
Is a district with element 21-001896
Is a district with element 21-002653
Is a district with element 21-002681
Is a district with element 21-002682
Is a district with element 21-002832
Is a district with element 21-002857
Is a district with element 21-002862
See also 21-002382
See also 21-002383
See also 21-002384
See also 21-002385
See also 21-002386
See also 21-002387
See also 21-002388

Attributes

Resource type: District
Age: Historic
Information base: Survey
Attribute codes: AH05 (Wells/cisterns); AH07 (Roads/trails/railroad grades); AH12 (Graves/cemetery); AH15 (Standing structures); HP04 (Ancillary building); HP19 (Bridge); HP33 (Farm/ranch); HP94 (Wood Construction); HP95 (Concrete Construction); HP96 (Steel Construction); HP98 (Stone Construction); HP99 (Brick Costruction)
Disclosure: Unrestricted
Collections: No
Accession no(s):
Facility:

General notes

Recording events

Date	*Recorder(s)*	*Affiliation*	*Notes*
7/1/2008	Heather Miller, Janene Caywood	Historical Research Associates, Inc.; CRCS	NR Registration Form

Associated reports

Report No.	*Year*	*Title*	*Affiliation*
S-048932	2016	Finding of No Adverse Effect, State Route 1 Olema Creek Culvert Replacement Project, 4-MRN-1, PM 24.7, EA 04-4S780, EFIS #0400020145	Caltrans District 4
S-051732	2016	A Cultural Resources Investigation of the Lagunitas Creek Winter Habitat Enhancement	Cultural Resource Facility, Humboldt State

			Implementation – Phase II Project, Location 9 (#HI-085) California Department of Fish and Wildlife - FRGP 2015 (Grant # P1530404) Marin County, California	University
	S-051733	2013	SHPO review and concurrence with the updated list of contributing and non-contributing resources to the Olema Valley/Lagunitas Loop Ranches Historic District, Point Reyes National Seashore (NPS080215D)	National Park Services, Pacific West Region
	S-051762	2015	A Cultural Resources Investigation of the Cross Marin Trail Culvert Replacement Project at Big Bend CM-58 (#100) and Eucalyptus CM47 (#115) Culverts, Marin County, California	Cultural Resources Facility, Humboldt State University

Location information

County: Marin
USGS quad(s): Bolinas, Double Point, Inverness, San Geronimo
Address:
PLSS:
UTMs:

Management status

Database record metadata

	Date	*User*	
Entered:	6/13/2017	hagell	
Last modified:	12/19/2019	neala	
IC actions:	*Date*	*User*	*Action taken*
	6/16/2017	hagell	edited other identifier
	12/19/2019	neala	removed duplicat 'Other ID' listing
	4/12/2018	yanagig	Reviewed S-48932 for resources. District resource is P-21-002919, but there isn't a detailed map in the report. GIS by Thibaulte 6/30/2017.
	11/2/2018	yanagig	Emailed NPS for a copy of the NR certification.
Record status:	Verified		

Resource Detail: P-21-003017

Identifying information

Primary No.: P-21-003017
Trinomial:
Name: Rich Redi-Mix Concrete Plant
Other IDs:

Type	*Name*
Resource Name	Rich Redi-Mix Concrete Plant

Cross-refs: Physically overlaps or intersects 21-003018

Attributes

Resource type: Building, Structure, Site
Age: Historic
Information base: Survey, Other
Attribute codes: HP06 (1-3 story commercial building); HP11 (Engineering structure); HP46 (Walls/gates/fences) - fence line
Disclosure: Not for publication
Collections: No
Accession no(s):
Facility:

General notes

Recording events

	Date	*Recorder(s)*	*Affiliation*	*Notes*
a	5/1/2015	Melinda Salisbuy, Ronnie Zaragosa	Humboldt State University Cultural Resources Facility	

Associated reports

Report No.	*Year*	*Title*	*Affiliation*
S-051596	2016	A Cultural Resources Investigation Report for the Redi-Mix Concrete Plant Riparian Enhancement Project (HR-011) California Department of Fish and Wildlife – FRGP 2015 (Grant #P1430408) Marin County, California	Cultural Resources Facility, Humboldt State University

Location information

County: Marin
USGS quad(s): Inverness
Address:

Address	*City*	*Assessor's parcel no.*	*Zip code*
1320 Point Reyes-Petaluma Rd.	Point Reyes Station		94956

PLSS: T3N R8W Sec. MDBM
UTMs:

Management status

Database record metadata

	Date	*User*
Entered:	2/6/2019	murazzoj
Last modified:	12/9/2020	neala

IC actions:

Date	*User*	*Action taken*
2/6/2019	murazzoj	db file built; awaiting GIS
3/6/2019	akmenkalnsj	Added cross reference to 21-003018; add 'other' to info base; added T/R info; verified
2/28/2019	lucientesK	Mapped

Record status: Verified

Resource Detail: P-21-003018

Identifying information

Primary No.: P-21-003018
Trinomial:
Name: Black Mountain Ranch
Other IDs:

Type	*Name*
Resource Name	Black Mountain Ranch

Cross-refs: Physically overlaps or intersects 21-003017

Attributes

Resource type: Building, Structure, Other
Age: Historic
Information base: Survey, Other
Attribute codes: HP02 (Single family property); HP04 (Ancillary building); HP32 (Rural open space); HP33 (Farm/ranch); HP46 (Walls/gates/fences)
Disclosure: Not for publication
Collections: No
Accession no(s):
Facility:

General notes

Recording events

	Date	*Recorder(s)*	*Affiliation*	*Notes*
a	4/1/2016	Melinda Salisbury	Humboldt State University Cultural Resources Facility	

Associated reports

Report No.	*Year*	*Title*	*Affiliation*
S-051596	2016	A Cultural Resources Investigation Report for the Redi-Mix Concrete Plant Riparian Enhancement Project (HR-011) California Department of Fish and Wildlife – FRGP 2015 (Grant #P1430408) Marin County, California	Cultural Resources Facility, Humboldt State University
S-051599	2016	A Cultural Resources Investigation Report for the Black Mountain Creek Sediment Reduction and Fish Passage Project (#HU-169) California Department of Fish and Wildlife – FRGP 2015 (Grant # P1430409) Marin County, California	Cultural Resources Facility, Humboldt State University

Location information

County: Marin
USGS quad(s): Inverness
Address:

Address	*City*	*Assessor's parcel no.*	*Zip code*
14000 Point Reyes-Petaluma Rd.	Point Reyes Station		94956

PLSS: T3N R9W Sec. MDBM
UTMs:

Management status

Database record metadata

	Date	*User*
Entered:	2/6/2019	murazzoj
Last modified:	3/6/2019	akmenkalnsj

IC actions:

Date	*User*	*Action taken*
2/6/2019	murazzoj	db file built; awaiting GIS.
3/6/2019	akmenkalnsj	Added cross-reference to 21-003017; added 'other' to info base; added T/R info; verified

Record status: Verified

Appendix B
Photographic Record

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LV5.78, view SE, 12/30/2021, Overview of culvert

LV5.28, view E, 12/30/2021,View of culvert and creek

NV4.49, View S, 12/30/21, Overview of culvert

PRP13.67, View N, 12/30/21, Culvert outflow

Appendix D

Noise Calculations

Noise Calculations for West Marin Drainage

Mechanical		
Construction Equipment 1 (Jack Hammer)	89	dBA at 50 feet
Construction Equipment 2 (Concrete Saw)	90	dBA at 50 feet
Combined Daytime Noise at 50 feet (Ltotal at 50 feet)	92.5	dBA
Ltotal=10 log(10^L1/10+10^L2/10)		

Noise Threshold Limits and Distances from Project Sites to those Limits for Construction Equipment by Technique

Noise Threshold	**Threshold Level - Leq (dBA)**	**Distance to Leq Threshold from Middle of Project Site (feet)**
Sensitive Receptors	90	67.0
Source: FTA 2018		

Noise Level at Nearest Sensitive Receptor	**Distance (ft)**	**Noise Level**
Residence on Lucas Valley Road (x3)	100	86.5

Vibration Source Levels for Construction Equipment (FTA 2018)

Equipment	**PPV at 25 feet**	**VBA**
Vibratory Roller	0.21	94
Loaded Truck (Dump truck)	0.076	86

Vibration Calculations with Equations for Vibration-Causing Equipment for Project Site (Roller)

Threshold	**Distance to Threshold from Middle of Project Site (feet)**	**Notes**
PPV=PPVref * (25/d)^1.5	36.3	Building damage threshold - 0.12 PPV (extremely susceptible buildings)
VdB=VdBref-30log(d/25)	73.2	Human Annoyance (80 VdB)

Equipment List	Other Name	dBA 50 from:		FTA 2018	
		FTA 2018	FHWA Handbook	PPV at 25 feet	VBA
Air Compressor		80	80		
Dump Truck		84	84	0.076	86
Excavator			85		
Loader		80	80		
Jackhammer	Jack Hammer	88	89	0.035	79
Paver		85	85		