Draft Environmental Impact Report/Environmental Assessment and Section 4(f) De Minimis Determination

State Route 1 Lagunitas Creek Bridge Project

Caltrans District 04

Marin County
04-13000350 PM 28.4 to 28.6
EA 04-0G642

The environmental review, consultation, and any other action required in accordance with applicable federal laws for this project is being, or has been, carried-out by Caltrans under its assumption of responsibility pursuant to 23 USC 327.

April 2017
For individuals with sensory disabilities, this document can be made available in Braille, in large print, on audiocassette, or on computer disk. To obtain a copy in one of these alternative formats, please write to Caltrans, Attn: Eric DeNardo, Branch Chief, 111 Grand Avenue, Oakland, CA 94623-0660; or call (510) 286-5645 (voice); or use the California Relay Service TTY number (800) 735-2929.
General Information About This Document

What’s In This Document:
The California Department of Transportation (Caltrans), as assigned by the Federal Highway Administration (FHWA), has prepared this Draft Environmental Impact Report (EIR)/Environmental Assessment (EA) and Section 4(f) De Minimis Determination, which examines the potential environmental impacts of the alternatives being considered for the proposed project located in Marin County, California. Caltrans is the lead agency for preparing the Draft EIR/EA and Section 4(f) De Minimis Determination in compliance with the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). This document tells you why Caltrans is proposing the project, alternatives considered, how the alternatives could affect the existing environment, the potential impacts of each of the alternatives, and the proposed avoidance, minimization, and/or mitigation measures.

What You Should Do:
• Please read the document.
• This document is available in electronic format at:
  http://www.dot.ca.gov/dist4/lagunitascreekbridge/
• Additional copies of this document are available for review at:
  Caltrans District 4, 111 Grand Avenue, Oakland, CA
  Point Reyes Library, 11431 State Route One, Point Reyes Station, CA 94956
  Inverness Library, 15 Park Ave, Inverness, CA 94937
  Petaluma Public Library, 100 Fairground Drive, Petaluma, CA 94952
• Attend the Draft EIR/EA public meeting scheduled for May 10, 2017 from 6:00 to 8:30 p.m. at the Buck Hall at Marconi State Historic Park, 18500 State Highway One, Marshall, CA, 94940.
• We would like to hear what you think. If you have any comments regarding the proposed project, please attend the public meeting and/or send your written comments to Caltrans by the deadline of June 9, 2017.
• Submit comments via postal mail to:
  Caltrans, District 4
  Attn: Lagunitas Creek Bridge Project
  Eric DeNardo, Office of Environmental Analysis, MS-8B
  111 Grand Avenue
  Oakland, CA 94623

• Submit comments via email to: lagunitas_bridge@dot.ca.gov

• Be sure to submit comments by the deadline: 5:00 p.m. on June 9, 2017.

What Happens Next:
After comments on this Draft EIR/EA and Section 4(f) De Minimis Determination are received from the public and reviewing agencies, Caltrans, as assigned by the FHWA, may (1) give environmental approval to the proposed project, (2) do additional environmental studies, or (3) abandon the project. If the project is given environmental approval and funding is appropriated, Caltrans could design and construct all or part of the project.

For individuals with sensory disabilities, this document can be made available in Braille, in large print, on audiocassette, or on computer disk. To obtain a copy in one of these alternative formats, please write to Caltrans, Attn: Eric DeNardo, Branch Chief, 111 Grand Avenue, Oakland, CA 94623-0660; or call (510) 286-5645 (voice); or use the California Relay Service TTY number (800) 735-2929.
Replace the existing bridge over Lagunitas Creek at post mile (PM) 28.4 to 28.6 of SR 1 in Marin County, California.

DRAFT ENVIRONMENTAL IMPACT REPORT / ENVIRONMENTAL ASSESSMENT AND SECTION 4(f) DE MINIMIS DETERMINATION
Submitted Pursuant to: (State) Division 13, California Public Resources Code (Federal) 42 USC 4332(2)(C) and 49 USC 303

THE STATE OF CALIFORNIA
Department of Transportation


Responsible Agencies: California Transportation Commission, San Francisco Regional Water Quality Control Board, California Department of Fish and Wildlife, California Coastal Commission, State Historic Preservation Officer, Marin County

April 12, 2017
Date of Approval

Bijan Sarshar
District Director
California Department of Transportation CEQA/NEPA Lead Agency

The following person may be contacted for additional information concerning this document:

California Department of Transportation
Attn: Eric DeNardo
Office of Environmental Analysis, MS-8B
111 Grand Avenue
Oakland, CA 94612
(510) 286-5645
Summary

Introduction

The California Department of Transportation (Caltrans) proposes to replace the bridge over Lagunitas Creek on State Route (SR) 1 in Marin County (see Figures S-1 and S-2) to provide a safe, seismically stable crossing of Lagunitas Creek on SR 1. This Draft Environmental Impact Report (EIR)/Environmental Assessment (EA) and Section 4(f) De Minimis Determination for the Lagunitas Creek Bridge Project (project) evaluates one No-Build Alternative and five Build Alternatives. The Build Alternatives are combinations of three bridge types (three-span bridge with a short steel-truss center span, three-span concrete bridge, and full-span steel-truss bridge) and two construction methods referred to as conventional construction and accelerated bridge construction (ABC). The alternatives being carried forward from the nine Build Alternatives that were originally evaluated were screened through an interdisciplinary process considering engineering, environmental, and community input factors. The six project alternatives evaluated in this Draft EIR/EA are as follows:

- Alternative 1 – No-Build
- Alternative 2a – Three-span, short steel-truss bridge, ABC, longitudinal move-in
- Alternative 2b – Three-span, short steel-truss bridge, conventional construction
- Alternative 3a – Three-span, concrete bridge, ABC, longitudinal move-in
- Alternative 4a – Full-span, steel-truss bridge, ABC, longitudinal move-in
- Alternative 4b – Full-span, steel-truss bridge, ABC, transverse slide-in

Caltrans is the lead agency responsible for preparing this Draft EIR/EA in compliance with the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA).

Overview of the Project Limits

SR 1 is a 549-mile-long major north-south state highway that runs along most of the Pacific coastline, with long sections situated on coastal bluffs. The entire length of SR 1 in Marin County is listed as being eligible for designation as a State Scenic Highway.
FIGURE S-1
Project Vicinity
State Route 1 Lagunitas Creek Bridge Project
EA 0G642, MRN-1 Post Mile 28.4 – 28.6
ID: 04-13000350
Marin County, California
The proposed project site is located at post mile (PM) 28.5, south of the unincorporated town of Point Reyes Station in Marin County. The project limits extend from SR 1 PMs 28.4 to 28.6, from the “T” intersection with Sir Francis Drake Boulevard north to B Street in Point Reyes Station. Sir Francis Drake Boulevard extends west from SR 1 toward Point Reyes National Seashore and north toward the unincorporated town of Inverness (see Figure S-1). The existing bridge is approximately 0.4 mile east of the San Andreas fault line. Nearby recreation areas include Whitehouse Pool Park, Point Reyes National Seashore, two tracts of the Golden Gate National Recreational Area, and Tomales Bay Ecological Reserve. The bridge was constructed in 1929 by Marin County, and serves as a vital connection between Point Reyes Station and the unincorporated town of Olema to the south (Figure S-1).

Projects in the Study Area

Proposed projects planned for development in the project vicinity include 12 projects, the majority of which are roadway and bridge improvements. Six of the roadway projects involve overlay and resurfacing, slope stabilization, culvert replacement, and installation of rumble strips. The three bridge projects involve scour mitigation, a tributary culvert replacement, and one bridge replacement. Other planned projects and plans include the Tomales Bay Vessel Management Plan and Mooring Program, the Lagunitas Creek Floodplain and Riparian Enhancement Design Project, the West Marin Safe Routes to School Plan, and the Giacomini Wetland Restoration Project.

For a complete description of proposed projects in the EIR/EA study area, refer to Section 2.4, Cumulative Impacts, of this EIR/EA.
Purpose and Need

Project Purpose
The project purpose is to provide a safe, seismically stable crossing of Lagunitas Creek on SR 1.

Project Need
According to the Seismic Evaluation of Lagunitas Creek Bridge (Caltrans 2017), deficiencies in the existing bridge would likely cause the bridge to fail during a strong seismic event. The existing bridge (concrete with steel-truss components) was designed to carry trucks lighter (15-ton trucks) than present-day trucks (e.g., 36-ton trucks). Heavy loads can add strain and advance the structural weakening of the existing bridge. Deficiencies exist in the concrete columns, substructure, and superstructure connections; steel trusses; piles; concrete roadway; and floor beams. In addition, the steel-truss span has no redundant structural elements; therefore, if any key structural connection or component is compromised, then the bridge could fail during a seismic event or under heavy live loads. In addition, the abutment columns are estimated to have a demand-over-capacity ratio of 1.6 to withstand seismic activity. A ratio of over 1.0 indicates that columns are in a brittle state; visual inspection of diagonal cracks in the abutments provides evidence of this.

The existing bridge has two 11-foot-wide lanes, a 2-foot-wide shoulder on the east side, and a 3-foot-wide sidewalk on the west side of the bridge. The existing bridge and the shoulders along SR 1 fail to provide continuous shared access for pedestrians, bicyclists, and equestrians in the project area, and it fails to meet minimum roadway standards (12-foot-wide lanes, 4-foot-wide shoulders, and 6-foot-wide sidewalk).

Proposed Action

Project Description
The proposed project would replace the existing 152-foot-long, 34-foot-wide, three-span bridge with a new bridge that would have 11-foot-wide northbound and southbound lanes and 5-foot-wide shoulders on both sides. The new bridge would also accommodate one 6-foot-wide sidewalk on the west side of the bridge with railings or barriers to separate it from the shoulder and travel lanes. The sidewalk

---

1 “Live load” refers to a temporary, moving load that a structure must support, such as vehicles and trucks crossing a bridge, as opposed to a dead load which is relatively constant, such as the weight of the structure itself.
would accommodate shared access by pedestrians, bicyclists and equestrians. The Americans with Disabilities Act (ADA) requires 6-foot-wide sidewalks in constrained areas such as bridges.

Three bridge types are considered in this Draft EIR/EA evaluation: a three-span bridge with a short steel-truss center span, a three-span concrete bridge, or a full-span steel-truss bridge, as shown in Figure S-3. Refer to Section 2.1.6, Visual/Aesthetics, for additional visual simulations of the alternatives.

There are two construction methods considered in this analysis: conventional and ABC. Conventional construction methods would require up to a 3-year construction period, and traffic would be detoured via a temporary bridge for the duration of construction of the new bridge. The ABC method could shorten the construction schedule to under 1 year. Under the ABC method there would be full closure of the Lagunitas Creek Bridge for approximately 2 to 3 weeks and traffic would be detoured in a south-to-north direction beginning by turning east on Sir Francis Drake Boulevard from SR 1 in Olema, turning north on Platform Bridge Road, turning left to continue northward and westward on Point Reyes-Petaluma Road, and then turning north or south (depending upon the destination) back onto SR 1. The detour would be approximately 9 miles through winding rural roads (Figure S-4).

**Project Alternatives**

One No-Build Alternative and five Build Alternatives that include the combination of bridge types with possible construction methods are under consideration. The six Alternatives are summarized in Table S-1.
Summary

Three-Span Short Steel-Truss Bridge

Three-Span Concrete Bridge

Full-Span Steel-Truss Bridge

Figure S-3 Three Alternative Bridge Designs under Environmental Review
FIGURE S-4
Proposed Detour During Bridge Closure
State Route 1 Lagunitas Creek Bridge Project
EA 0G642, MRN-1 Post Mile 28.4 – 28.6
ID: 04-13000350
Marin County, California
### Table S-1 Summary of Key Differences Among Alternatives

<table>
<thead>
<tr>
<th>Alternative, Construction Method</th>
<th>Piers in the Water Channel&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Temporary Construction and Staging Area&lt;sup&gt;b&lt;/sup&gt;</th>
<th>Height Above and Width At Roadway Surface&lt;sup&gt;c&lt;/sup&gt; (All dimensions are approximate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alternative 1 – No-Build</td>
<td>2</td>
<td>No staging area necessary</td>
<td>Height: 7 feet at truss panels Width: 34 feet</td>
</tr>
<tr>
<td>Alternative 2a—Three-span steel-truss bridge, ABC, longitudinal move-in</td>
<td>2</td>
<td>2.50 acres</td>
<td>Height: 12-foot truss panels Width: 47 – 50 feet</td>
</tr>
<tr>
<td>Alternative 2b—Three-span steel-truss bridge, conventional construction</td>
<td>2</td>
<td>2.61 acres</td>
<td>Height: 12-foot truss Width: 47 – 50 feet</td>
</tr>
<tr>
<td>Alternative 3a—Three-span concrete bridge, ABC, longitudinal move-in</td>
<td>2</td>
<td>2.52 acres</td>
<td>Height: 2-foot barrier or ornamental truss (height may vary) Width: 43 – 45 feet, depending on whether ornamental truss is added</td>
</tr>
<tr>
<td>Alternative 4a—Full-span steel-truss bridge, ABC, longitudinal move-in</td>
<td>None</td>
<td>2.51 acres</td>
<td>Height: 21 – 30 feet with cross bars Width: 47 – 50 feet</td>
</tr>
<tr>
<td>Alternative 4b—Full-span steel-truss bridge, ABC, transverse slide-in</td>
<td>None</td>
<td>2.81 acres</td>
<td>Height: 21 – 30 feet with cross bars Width: 47 – 50 feet</td>
</tr>
</tbody>
</table>

**Notes:**

<sup>a</sup> Each pier includes two columns in the water and a pier cap connecting the columns upon which the superstructure is supported.

<sup>b</sup> All Build Alternatives have a minimum of 2.5 acres.

<sup>c</sup> Width includes travel lanes, shoulder, sidewalk, structural elements, and rail barriers.

Consistent with Deputy Directive 64-R1 Complete Streets – Integrating the Transportation System, which states that the needs of users of all ages and abilities must be met, safe non-motorized accessibility elements are included in each alternative. Each Build Alternative includes widening the shoulder and extending the culvert that lies approximately 180 feet north of the existing bridge to accommodate a wider shoulder; adding a demarcated crosswalk on Sir Francis Drake Boulevard at the intersection with SR 1; and relocating utilities. In addition, each Build Alternative would include use of staging areas at the following locations:

- A vacant parcel at SR 1 and Third Street, which would include partial temporary construction easement on Whitehouse Pool Park

- A portion of the veterinary business on the northeast side of the bridge

- A portion of a residence to the southeast of the bridge
Unique design elements of the Build Alternatives are summarized in Table S-1.

**NO-BUILD ALTERNATIVE**
Under the No-Build Alternative, the existing bridge would continue to operate with a substandard capacity for modern truck traffic, would continue to deteriorate, and could fail during a strong seismic event. There would be no action to improve the safety and seismic design of the existing bridge.

**BUILD ALTERNATIVES**
Table S-1 provides a high-level summary of key differences between the five Build Alternatives (Alternatives 2a, 2b, 3a, 4a and 4b). Illustrations of the cross-section of each alternative are provided in Figure S-5.

**Construction**
A construction management plan would be developed in advance of construction. It would address circulation and detour planning; community information; best management practices for maintaining dust, noise, and visual disturbances; and guidance on maintaining regulatory commitments.

The two construction methods considered in this analysis are referred to as conventional construction and accelerated bridge construction. Conventional construction methods would require up to a 3-year construction period, whereas the ABC methods could shorten the construction schedule to under 1 year with notable trade-offs, such as full closure of the Lagunitas Bridge crossing for approximately 2 to 3 weeks.

Under the conventional construction method, construction would occur in three phases over 3 years. Bridge construction generally follows three phases: 1) mobilizing, clearing and grubbing of staging and construction areas, and developing traffic detours, 2) removing existing bridge and preparing for new bridge placement, and 3) construction of the new bridge on-site and restoring disturbed soil areas. Most of the work elements are also the same for the ABC method, although they would be able to be completed within a single year by removing the existing bridge when pre-assembled bridge components are ready to be placed.

Under the ABC method the dismantling of the existing bridge and placing the new bridge would require a 2- to 3-week closure and more concentrated, intense construction (up to 24 hours per day) efforts.
Summary

State Route 1 Lagunitas Creek Bridge Project

Draft Environmental Impact Report/Environmental Assessment 04-0G642

Figure S-5  Cross Sections for Each Bridge Design under Environmental Review

Construction Cost

This project is funded by the State Highway Operation and Protection Program (SHOPP) 2016/17: Bridge Seismic Restoration and the Bridge Rehabilitation and Reconstruction Program (201.113 Program) (Transportation Improvement Program ID: VAR170010). It is scheduled for construction in 2019 for ABC methods and from 2019 through 2022 for conventional construction methods. Following are projected total project costs for the five Build Alternatives:

- The estimated construction cost for Alternative 2a is approximately $8.7 million.
- The estimated construction cost for Alternative 2b is approximately $12.6 million.
• The estimated construction cost for Alternative 3a is $8 million.
• The estimated construction cost for Alternative 4a is $9.1 million.
• The estimated construction cost for Alternative 4b is $10.1 million.

**Joint California Environmental Quality Act/National Environmental Policy Act Document**

The proposed project is a joint project by Caltrans and the Federal Highway Administration (FHWA), and is subject to state and federal environmental review requirements. Project documentation, therefore, has been prepared in compliance with both CEQA and NEPA. Caltrans is the lead agency under NEPA and CEQA. In addition, FHWA’s responsibility for environmental review, consultation, and any other action required in accordance with applicable federal laws for this project is being, or has been, carried out by Caltrans under its assumption of responsibility pursuant to 23 United States Code 327.

Some impacts determined to be significant under CEQA may not lead to a determination of significance under NEPA. Because NEPA is concerned with the significance of the project as a whole, quite often a “lower level” document is prepared for NEPA. One of the most common joint document types is an Environmental Impact Report/Environmental Assessment.

After receiving comments from the public and reviewing agencies, a Final EIR/EA will be prepared. Caltrans may prepare additional environmental and/or engineering studies to address comments. The Final EIR/EA will include responses to comments received on the Draft EIR/EA and will identify the preferred alternative. If the decision is made to approve the project, a Notice of Determination will be published for compliance with CEQA, and Caltrans will decide whether to issue a Finding of No Significant Impact (FONSI) or require an Environmental Impact Statement (EIS) for compliance with NEPA. A Notice of Availability of the FONSI will be sent to the affected units of federal, state, and local government, and to the State Clearinghouse in compliance with Executive Order 12372.

**Permits and Approvals Needed**

Table S-2 shows the permits, reviews, and approvals required for project construction.
### Table S-2 Permits, Reviews, and Approvals Required for Project Construction

<table>
<thead>
<tr>
<th>Agency</th>
<th>Permit/Approval</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. Fish and Wildlife Service (USFWS)</td>
<td>Endangered Species Act, Section 7, Biological Opinion</td>
<td>Once the preferred alternative is chosen, formal consultation with USFWS will be initiated.</td>
</tr>
<tr>
<td>National Marine Fisheries Service (NMFS)</td>
<td>Endangered Species Act, Section 7, Biological Opinion Essential Fish Habitat</td>
<td>Once the preferred alternative is chosen, formal consultation with NMFS will be initiated.</td>
</tr>
<tr>
<td>National Oceanic and Atmospheric Administration (NOAA), Greater Farallones National Marine Sanctuary</td>
<td>Permit</td>
<td>Following environmental document certification, approval will be sought.</td>
</tr>
<tr>
<td>U.S. Army Corps of Engineers (USACE)</td>
<td>Clean Water Act, Section 404</td>
<td>Following environmental document certification, permit application will be submitted.</td>
</tr>
<tr>
<td>U.S. Coast Guard (USCG)</td>
<td>Use of Navigable Waters</td>
<td>Prior to environmental certification, Caltrans will coordinate with USCG to obtain written approval of use of navigable waters.</td>
</tr>
<tr>
<td>California Department of Fish and Wildlife (CDFW)</td>
<td>California Fish and Game Code Section 1602 Lake and Streambed Alteration Agreement California Fish and Game Code Section 2081 Incidental Take Permit</td>
<td>Following environmental document certification, permit application will be submitted. Following environmental document certification, permit application will be submitted.</td>
</tr>
<tr>
<td>Regional Water Quality Control Board (RWQCB)</td>
<td>Clean Water Act Section 401</td>
<td>Following environmental document certification, permit application will be submitted.</td>
</tr>
<tr>
<td>California Coastal Commission</td>
<td>Coastal Development Permit</td>
<td>Following environmental document certification, permit application will be submitted.</td>
</tr>
<tr>
<td>Marin County Parks</td>
<td>Temporary Construction Easement</td>
<td>Following environmental document certification, permit application will be submitted.</td>
</tr>
<tr>
<td>CDFW and Marin County Parks</td>
<td>U.S. Department of Transportation Act Section 4(f)</td>
<td>Currently seeking concurrence of De Minimis determination.</td>
</tr>
<tr>
<td>Marin County Public Works</td>
<td>Congestion Management Plan</td>
<td>Following environmental document certification, permit application will be submitted.</td>
</tr>
</tbody>
</table>
Project Impacts

Table S-3 summarizes the permanent adverse effects of the Build Alternatives in comparison to the No-Build Alternative. The proposed avoidance, minimization, and/or mitigation measures to reduce the effects of the Build Alternatives are also presented. For a complete description of potential adverse effects, including temporary construction effects, and recommended measures to reduce those effects, please refer to Chapter 2.0, Affected Environment, Environmental Consequences, and Avoidance, Minimization, and/or Mitigation Measures, and Appendix F (Avoidance, Minimization and/or Mitigation Summary) of this EIR/EA.
# Table S-3  Project Impacts

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Land Use</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Division of an established community</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Consistency with state, regional, and local plans and programs</td>
<td>Not consistent</td>
<td>Consistent</td>
<td>Consistent</td>
<td>Consistent</td>
<td>Not consistent with the Point Reyes Station Community Plan Policy HR-1.3 and Marin County Local Coastal Program, New Development and Land Use Policy 3a.</td>
<td>Same as Alternative 4a</td>
<td>None</td>
</tr>
<tr>
<td>Change in land use</td>
<td>None</td>
<td>Temporary change in land use during construction.</td>
<td>Same as Alternative 2a; however, construction would be longer in duration.</td>
<td>Same as Alternative 2a</td>
<td>Same as Alternative 2a</td>
<td>Same as Alternative 2a.</td>
<td>AMM LAND USE-1: Maintain access and parking at veterinary hospital. AMM LAND USE-2: Minimize negative construction impacts on animals under veterinary care. AMM LAND USE-3: Maintain access to residential parcels affected by project.</td>
</tr>
<tr>
<td>Coastal Zone</td>
<td>None</td>
<td>Adverse effect to wetlands and waters of the U.S., visual, environmentally sensitive habitat areas, water quality, geology, cultural, or paleontology resources.</td>
<td>Same as Alternative 2a</td>
<td>Same as Alternative 2a</td>
<td>Similar to Alternative 2a; however, there would be adverse effects to visual resources.</td>
<td>Same as Alternative 4a</td>
<td>AMM VISUAL-1: Concrete aesthetics treatment. AMM VISUAL-2: Paint metal portions of the bridge a green color similar to the existing Lagunitas Bridge. AMM VISUAL-3: Construction lighting limitations. AMM VISUAL-4: Screening of staging/storage areas. Mitigation Measure BIO-4: Compensatory mitigation for jurisdictional water features. AMM BIO-1: Revegetation. AMM BIO-2: Environmental sensitive area fencing. AMM WATER-1: Design pollution prevention measures. AMM WATER-2: Treatment measures. AMM WATER-3: Stormwater Pollution Prevention Plan. AMM CULT-1: Inadvertent discovery of archaeological resources.</td>
</tr>
<tr>
<td>Community Impacts</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Community character and cohesion</td>
<td>Adverse effects to community cohesiveness if sudden closure of bridge.</td>
<td>Enhance community cohesion through improvements. Short-term disturbances during construction and full bridge closure.</td>
<td>Same as Alternative 2a, except longer disturbances during construction and detour bridge would allow continued access across Lagunitas Creek.</td>
<td>Same as Alternative 2a</td>
<td>Same as Alternative 2a</td>
<td>Same as Alternative 2a except using new bridge as temporary detour would minimize closure.</td>
<td>AMM COMM-1: Implement a Construction Management Plan (CMP).</td>
</tr>
<tr>
<td>Relocations and real property acquisition</td>
<td>None</td>
<td>Temporary relocation of patient animals and/or residential property; minor property acquisition of park property. Temporary construction easements required.</td>
<td>Same as Alternative 2a, except greater temporary construction impact on adjacent parcels for detour bridge.</td>
<td>Same as Alternative 2a</td>
<td>Same as Alternative 2a</td>
<td>Same as Alternative 2a, but greater temporary construction impact on adjacent parcels (similar to Alternative 2b).</td>
<td>None</td>
</tr>
<tr>
<td>Economic impacts</td>
<td>None</td>
<td>Short-term impact during closure, and increase of construction worker spending.</td>
<td>None expected, but longer construction could negatively affect tourist activity in Point Reyes Station.</td>
<td>Same as Alternative 2a</td>
<td>Same as Alternative 2a</td>
<td>Same as Alternative 2a, except shorter duration of bridge closure.</td>
<td>AMM COMM-1: Implement a Construction Management Plan (CMP).</td>
</tr>
<tr>
<td>Environmental justice</td>
<td>None</td>
<td>No disproportionate adverse effects.</td>
<td>Same as Alternative 2a</td>
<td>Same as Alternative 2a</td>
<td>Same as Alternative 2a</td>
<td>Same as Alternative 2a</td>
<td>None</td>
</tr>
</tbody>
</table>
### Table S-3  Project Impacts

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Parks and Recreation Facilities</td>
<td>Conversion of parklands</td>
<td>None</td>
<td>Minor conversion of park lands (&lt;0.01 ac) to transportation use. Temporary construction easement required (0.05 ac).</td>
<td>Same as Alternative 2a</td>
<td>Same as Alternative 2a</td>
<td>Same as Alternative 2a</td>
<td>AMM PARKS-1: Trailhead enhancement.</td>
</tr>
<tr>
<td></td>
<td>Disturbance to park users</td>
<td>None</td>
<td>Dust, noise, land clearing and truck trips during construction.</td>
<td>Same as Alternative 2a; however, longer in duration</td>
<td>Same as Alternative 2a</td>
<td>Same as Alternative 2a</td>
<td>Same as Alternative 2a</td>
</tr>
<tr>
<td></td>
<td>Change in access to a parkland</td>
<td>None</td>
<td>Access to Whitehouse Pool Park from trailhead would be closed during construction. Traffic delays affect accessibility to park.</td>
<td>Same as Alternative 2a; however, longer in duration</td>
<td>Same as Alternative 2a</td>
<td>Same as Alternative 2a</td>
<td>Same as Alternative 2a; however, shorter period of closure for access over Lagunitas Creek. AMM PARKS-2: Trail closure signs.</td>
</tr>
<tr>
<td></td>
<td>Recreational use of waterway</td>
<td>None</td>
<td>The public boat launch downstream of the project site in Whitehouse Pool Park would remain open during construction. But the portion of Lagunitas Creek within the project site would be closed to boaters for a period of time during construction.</td>
<td>Same as Alternative 2a, except closure of Lagunitas Creek for kayakers would be up to 2 years longer.</td>
<td>Same as Alternative 2a; Same as Alternative 2a.</td>
<td>Same as Alternative 2a.</td>
<td>AMM PARKS-3: Notify the public of creek closure.</td>
</tr>
<tr>
<td>Utilities/Emergency Services</td>
<td>Utilities</td>
<td>None</td>
<td>Temporary disruption to relocate existing utilities during construction.</td>
<td>Same as Alternative 2a; however, duration of relocation would be longer.</td>
<td>Same as Alternative 2a</td>
<td>Same as Alternative 2a</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>Emergency services</td>
<td>None</td>
<td>Bridge closure would impact emergency service responsiveness.</td>
<td>Potential delay for emergency response vehicles or emergency evacuation during construction. Minimal adverse impact.</td>
<td>Same as Alternative 2a</td>
<td>Same as Alternative 2a</td>
<td>Similar to Alternative 2a; however, shorter bridge closure duration. AMM UTIL-2: Provide emergency personnel – If Alternative 2a, 3a, 4a, or 4b is selected. AMM TRANS-1: Construction traffic management plan. AMM TRANS-2: Emergency service access provision.</td>
</tr>
<tr>
<td>Traffic and Transportation/Pedestrian and Bicycle Facilities</td>
<td>Safety and seismic design standards</td>
<td>Seismic threat would remain, no safety improvement</td>
<td>Significant improvement over current conditions.</td>
<td>Same as Alternative 2a</td>
<td>Same as Alternative 2a</td>
<td>Same as Alternative 2a</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>Improvements to pedestrian and bicycle safety</td>
<td>None</td>
<td>Beneficial, meet ADA requirements and continuity to Point Reyes Station</td>
<td>Same as Alternative 2a</td>
<td>Same as Alternative 2a</td>
<td>Same as Alternative 2a</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>Effects during construction</td>
<td>No effect</td>
<td>Temporary delays due to slower speeds. Period of full bridge closure.</td>
<td>Same as Alternative 2a except longer period of temporary delays, but temporary detour bridge would provide continuous access across the creek.</td>
<td>Same as Alternative 2a</td>
<td>Same as Alternative 2a</td>
<td>Same as Alternative 2a with exception of shorter period of bridge closure. AMM TRANS-1: Construction Traffic Management Plan. AMM TRANS-2: Emergency service access provision. AMM TRANS-3: Shuttle service for pedestrian and bicyclists.</td>
</tr>
</tbody>
</table>
## Table S-3  Project Impacts

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Visual/Aesthetics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Degradation of existing visual character or quality</td>
<td>None</td>
<td>Moderate change to existing visual quality. Moderate overall visual effect.</td>
<td>Same as Alternative 2a</td>
<td>Moderate low to moderate high change to existing visual quality. Moderate overall visual effect.</td>
<td>High level of change to existing visual quality. Adverse overall visual effect.</td>
<td>Same as Alternative 4a</td>
<td>AMM VISUAL-1: Concrete aesthetics treatment. AMM VISUAL-2: Paint metal portions of the bridge a green color similar to the existing Lagunitas Bridge. AMM VISUAL-4: Screening of staging/storage areas. AMM VISUAL-5: Replacement plantings to match existing plantings. AMM BIO-1, 4, 14 and 22: Revegetating disturbed areas.</td>
</tr>
<tr>
<td>Create a new source of light or glare</td>
<td>None</td>
<td>Temporary construction lighting.</td>
<td>Similar to Alternative 2a; however, temporary lighting would be used for longer period.</td>
<td>Same as Alternative 2a</td>
<td>Same as Alternative 2a</td>
<td>Same as Alternative 2a</td>
<td>AMM VISUAL-3: Construction lighting limitations.</td>
</tr>
<tr>
<td><strong>Cultural Resources</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Create an adverse change in the significance of a historical resource</td>
<td>No effect</td>
<td>No effect</td>
<td>No effect</td>
<td>No effect</td>
<td>No effect</td>
<td>No effect</td>
<td>None</td>
</tr>
<tr>
<td>Create an adverse change in the significance of an archaeological resource</td>
<td>None expected</td>
<td>None expected</td>
<td>None expected</td>
<td>None expected</td>
<td>None expected</td>
<td>None expected</td>
<td>AMM CULT-1: Inadvertent discovery of archaeological resources.</td>
</tr>
<tr>
<td>Disturbance to human remains</td>
<td>None expected</td>
<td>None expected</td>
<td>None expected</td>
<td>None expected</td>
<td>None expected</td>
<td>None expected</td>
<td>AMM CULT-1: Inadvertent discovery of archaeological resources.</td>
</tr>
<tr>
<td><strong>Hydrology</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expose people/structures to a significant risk of loss</td>
<td>Existing adverse effect before and during storm events.</td>
<td>No effect</td>
<td>No effect</td>
<td>No effect</td>
<td>No effect</td>
<td>No effect</td>
<td>None</td>
</tr>
<tr>
<td>Increase on 100-year floodplain</td>
<td>No effect</td>
<td>No effect</td>
<td>No effect</td>
<td>No effect</td>
<td>No effect</td>
<td>No effect</td>
<td>None</td>
</tr>
<tr>
<td><strong>Water Quality and Storm Water Runoff</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Result in substantial drainage pattern alteration</td>
<td>No effect</td>
<td>No effect</td>
<td>No effect</td>
<td>No effect</td>
<td>No effect</td>
<td>No effect</td>
<td>None</td>
</tr>
<tr>
<td>Violation of water quality standards and/or Substantially degrade water quality during construction</td>
<td>None</td>
<td>No violations, but Temporary, minimal effects to water quality.</td>
<td>Similar to Alternative 2a; however, longer duration, and more concrete cast-in place and more temporary fill could result in increase in turbidity or debris in creek</td>
<td>Same as Alternative 2a</td>
<td>Same as Alternative 2a</td>
<td>Same as Alternative 2a</td>
<td>AMM WATER-1: Design pollution prevention measures. AMM WATER-2: Treatment measures. AMM WATER-3: Stormwater Pollution Prevention Plan.</td>
</tr>
<tr>
<td>Change to groundwater supply or groundwater recharge</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td><strong>Geology/Soils/Seismic/Topography</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surface fault rupture</td>
<td>No effect</td>
<td>No effect</td>
<td>Same as Alternative 2a</td>
<td>Same as Alternative 2a</td>
<td>Same as Alternative 2a</td>
<td>Same as Alternative 2a</td>
<td>None</td>
</tr>
<tr>
<td>Strong seismic ground shaking</td>
<td>Adverse effect</td>
<td>No effect</td>
<td>Same as Alternative 2a</td>
<td>Same as Alternative 2a</td>
<td>Same as Alternative 2a</td>
<td>Same as Alternative 2a</td>
<td>None</td>
</tr>
<tr>
<td>Seismically induced ground failure, including liquefaction, settlement, and lateral spreading</td>
<td>Adverse effect</td>
<td>No effect</td>
<td>No effect</td>
<td>No effect</td>
<td>No effect</td>
<td>No effect</td>
<td>None</td>
</tr>
</tbody>
</table>

State Route 1 Lagunitas Creek Bridge Project  
Draft Environmental Impact Report/Environmental Assessment 04-00642  
Draft Environmental Impact Report/Environmental Assessment 04-00642
## Table S-3 Project Impacts

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Other seismic hazards</td>
<td>No effect</td>
<td>No effect</td>
<td>No effect</td>
<td>No effect</td>
<td>No effect</td>
<td>No effect</td>
<td>None</td>
</tr>
<tr>
<td>Construction impacts</td>
<td>Low effect</td>
<td>No effect</td>
<td>No effect</td>
<td>No effect</td>
<td>No effect</td>
<td>No effect</td>
<td>None</td>
</tr>
<tr>
<td>Paleontology</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Destruction of paleontological resources (e.g., fossil remains and sites) as a result of ground disturbance</td>
<td>None expected</td>
<td>Effect would be negligible to unlikely.</td>
<td>Similar to Alternative 2a, but because two bridges would be constructed, the potential to encounter resources would be slightly larger.</td>
<td>Same as Alternative 2a</td>
<td>Same as Alternative 2b</td>
<td>Same as Alternative 2b</td>
<td>None</td>
</tr>
<tr>
<td>Hazardous Waste/Materials</td>
<td>Effects from known hazardous material release sites</td>
<td>No effect</td>
<td>Effects from known sites are unlikely.</td>
<td>Same as Alternative 2a</td>
<td>Same as Alternative 2a</td>
<td>Same as Alternative 2a</td>
<td>None</td>
</tr>
<tr>
<td>Risk of hazardous material release to humans or the environment</td>
<td>No effect</td>
<td>Effects from exposure during construction may result in contaminant exposure to human and the environment.</td>
<td>Same as Alternative 2a</td>
<td>Same as Alternative 2a</td>
<td>Same as Alternative 2a</td>
<td>Same as Alternative 2a</td>
<td>AMM HAZ-1: Asbestos survey</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>AMM HAZ-2: Sample for naturally occurring asbestos (NOA) and other contaminants in soil and creek sediments.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>AMM HAZ-3: Measures to protect against NOA and other contaminants in soil and creek sediments.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>AMM HAZ-4: Recycle asphalt-concrete.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>AMM HAZ-5: Prepare and implement a Health and Safety Plan and Lead Compliance Plan.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>AMM HAZ-3: Measures to protect against NOA and other contaminants in soil and creek sediments.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disturbance of contaminants in creek sediment</td>
<td>No effect</td>
<td>Effect from removal and installation of piers would disturb creek sediment.</td>
<td>Similar to Alternative 2a, with greater disturbance in the creek.</td>
<td>Same as Alternative 2a</td>
<td>Similar to Alternative 2a</td>
<td>Same as Alternative 4a</td>
<td>AMM HAZ-3: Measures to protect against NOA and other contaminants in soil and creek sediments.</td>
</tr>
<tr>
<td>Air Quality</td>
<td>Increase exposure of criteria pollutant emissions</td>
<td>No effect</td>
<td>No effect during operations, temporary increase in total maximum and average daily criteria pollutants emissions exposure.</td>
<td>Similar to Alternative 2a, with greater emissions. Longer construction period would result in longer exposure period to construction emissions.</td>
<td>Same as Alternative 2a</td>
<td>Same as Alternative 2a</td>
<td>AMM AQ-1: Control measures for construction emissions of fugitive dust.</td>
</tr>
<tr>
<td>Noise</td>
<td>Increase in noise on sensitive receptors</td>
<td>No effect</td>
<td>No effect during operations, temporary substantial increase in noise to adjacent properties during construction.</td>
<td>Similar to Alternative 2a, except longer construction period would result in longer period of construction noise on adjacent properties; however, work may be restricted to daytime hours. Also, detour bridge brings traffic closer to two sensitive receptors.</td>
<td>Same as Alternative 2a</td>
<td>Same as Alternative 2a</td>
<td>AMM NOISE-1: Construction noise best management practices. Mitigation Measure NOISE-A: Reduce construction noise from augerming or vibratory pile driving with temporary barriers.</td>
</tr>
</tbody>
</table>

State Route 1 Lagunitas Creek Bridge Project
Draft Environmental Impact Report/Environmental Assessment 04-G642
## Table S-3  Project Impacts

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Biological Resources</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Effects to habitat or sensitive natural communities</td>
<td>No effect</td>
<td>Direct impacts: Riparian tree canopy: 0.05 ac permanent 0.42 ac temporary Environmentally Sensitive Habitat Area (ESHAs): 0.05 ac permanent 0.55 ac temporary</td>
<td>Direct impacts: Riparian tree canopy: 0.06 ac permanent 0.51 ac temporary ESHAs: 0.06 ac permanent 0.67 ac temporary Indirect impacts: Wildlife dispersal</td>
<td>Direct impacts: Riparian tree canopy: 0.04 ac permanent 0.43 ac temporary ESHAs: 0.04 ac permanent 0.56 ac temporary Indirect impacts: Same as Alternative 2a</td>
<td>Direct impacts: Riparian tree canopy: 0.05 ac permanent 0.43 ac temporary ESHAs: 0.07 ac permanent 0.63 ac temporary Indirect impacts: Same as Alternative 2a</td>
<td>Direct impacts: Riparian tree canopy: 0.05 ac permanent 0.66 ac temporary ESHAs: 0.05 ac permanent 0.74 ac temporary Indirect impacts: Same as Alternative 2a</td>
<td>AMM BIO-1: Revegetation. AMM BIO-2: Environmentally sensitive area fencing. AMM BIO-5: Wetland restoration. Mitigation Measure BIO-A: Compensatory mitigation for jurisdictional water features. AMM WATER-1: Design pollution prevention measures. AMM WATER-2: Treatment measures. AMM WATER-3: Stormwater Pollution Prevention Plan. AMM AQ-1: Control measures for construction emissions of fugitive dust.</td>
</tr>
<tr>
<td>Effects to wetlands and other waters</td>
<td>No effect</td>
<td>Direct impacts: Bridge No permanent and &lt;0.01 ac temporary impacts to or other waters of the U.S. and State. Indirect impacts: Increased erosion and sedimentation. Culvert: Permanent impacts of &lt;0.01 ac and 0.02 ac of temporary impacts.</td>
<td>Direct impacts: Same as Alternative 2a Indirect impacts: Same as Alternative 2a Culvert: Same as Alternative 2a</td>
<td>Direct impacts: Same as Alternative 2a Indirect impacts: Same as Alternative 2a Culvert: Same as Alternative 2a</td>
<td>Direct impacts: Same as Alternative 2a Indirect impacts: Same as Alternative 2a Culvert: Same as Alternative 2a</td>
<td>Direct impacts: Same as Alternative 2a Indirect impacts: Same as Alternative 2a Culvert: Same as Alternative 2a</td>
<td>AMM BIO-1: Revegetation. AMM BIO-2: Environmentally sensitive area fencing. AMM BIO-5: Wetland restoration. Mitigation Measure BIO-A: Compensatory mitigation for jurisdictional water features. AMM WATER-1: Design pollution prevention measures. AMM WATER-2: Treatment measures. AMM WATER-3: Stormwater Pollution Prevention Plan. AMM AQ-1: Control measures for construction emissions of fugitive dust.</td>
</tr>
<tr>
<td>Effects to Plants</td>
<td>No effect</td>
<td>No direct or indirect effects on special-status plant species.</td>
<td>Same as Alternative 2a</td>
<td>Same as Alternative 2a</td>
<td>Same as Alternative 2a</td>
<td>Same as Alternative 2a</td>
<td>AMM BIO-1: Revegetation. AMM BIO-2: Environmentally sensitive area fencing. AMM BIO-5: Wetland restoration. Mitigation Measure BIO-A: Compensatory mitigation for jurisdictional water features. AMM BIO-6: Pre-construction plant surveys.</td>
</tr>
<tr>
<td>Effects to Animals (sensitive or special-status species)</td>
<td>No effect</td>
<td>Direct impacts: &lt;0.01 ac of Tomales roach habitat &lt;0.01 ac of western pond turtle aquatic habitat 0.05 ac of western pond turtle upland habitat Removal of trees and riparian canopy affects migratory birds Indirect impacts: Shading Temporary erosion and sedimentation and water diversion</td>
<td>Direct impacts: Same as Alternative 2a except: 0.06 ac of western pond turtle upland habitat</td>
<td>Direct impacts: Same as Alternative 2a except: 0.04 ac of western pond turtle upland habitat Indirect impacts: Same as Alternative 2a</td>
<td>Direct impacts: No direct impact of Tomales roach habitat No direct impact of western pond turtle aquatic habitat 0.05 ac of western pond turtle upland habitat Indirect impacts: Same as Alternative 2a</td>
<td>Direct impacts: Same as Alternative 4a Indirect impacts: Same as Alternative 2a</td>
<td>AMM BIO-7: Migratory birds. AMM BIO-8: Bat tree removal. AMM BIO-9: Woodrat house relocation. AMM BIO-10: Minimize night work. AMM BIO-11: Western pond turtle pre-construction survey. Mitigation Measure BIO-A: Compensatory mitigation for jurisdictional water features.</td>
</tr>
<tr>
<td>---------------------------------------------------------</td>
<td>-------------------------------------</td>
<td>-------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------</td>
<td>------------------------------------------------------------------</td>
<td>------------------------------------------------------------------</td>
<td>------------------------------------------------------------------</td>
</tr>
<tr>
<td>Effects to threatened and endangered species</td>
<td>No effect</td>
<td>Same as Alternative 2a, with longer duration of effects during construction.</td>
<td>Same as Alternative 2a.</td>
<td>Same as Alternative 2a.</td>
<td>Same as Alternative 2a.</td>
<td>Same as Alternative 2a.</td>
<td>AMM BIO-1: Revegetation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Direct Impacts to Critical Habitats:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>AMM BIO-2: Environmental sensitive area fencing.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Steelhead (Goby) CFS/ Coho/Chinook critical habitat:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>AMM BIO-7: Migratory birds.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.04 ac permanent 0.16 ac temporary</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>AMM BIO-12: MSB surveys prior to vegetation removal.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CCC Coho salmon critical habitat:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>AMM BIO-13: Vegetation removal in early fall.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.07 ac permanent 0.42 ac temporary</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>AMM BIO-14: Recess with MSB foraging plant species.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CRLF critical wetland habitat:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>AMM BIO-15: Protections for in-water work.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&lt;0.01 ac permanent 0.18 ac temporary</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Mitigation Measure BIO-B: CCC coho mitigation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CRLF critical upland habitat:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>AMM BIO-16: Pre-construction survey for CRLF.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.05 ac permanent 1.84 ac temporary</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>AMM BIO-17: Biologist authority to stop construction.</td>
</tr>
<tr>
<td>Invasive species</td>
<td>No effect</td>
<td>Same as Alternative 2a, except larger area of soil disturbance.</td>
<td>Same as Alternative 2a.</td>
<td>Same as Alternative 2a.</td>
<td>Same as Alternative 2b, except the duration would be shorter</td>
<td>AMM BIO-22: Replanting with native seed mix.</td>
<td>AMM BIO 23: Invasive Species.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Notes: This table covers permanent impacts from construction and operation of the proposed project. For a complete description of potential adverse effects, including temporary construction effects, and recommended avoidance and minimization measures and mitigation measures, please refer to Chapter 2 and Appendix F of this Environmental Impact Report/Environmental Assessment.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ABC = accelerated bridge construction
ac = acres
AMM = avoidance and minimization measure
CCC = Central California Coast
CDFW = California Department of Fish and Wildlife
CFS = California freshwater shrimp
CRLF = California red-legged frog
ESHA = Environmentally Sensitive Habitat Area
MSB = Myrtle’s silverspot butterfly
NMFS = National Marine Fisheries Service
NOA = naturally occurring asbestos
SDR = Seismic Design Recommendations memorandum
USFWS = United States Fish and Wildlife Service

State Route 1 Lagunitas Creek Bridge Project
Draft Environmental Impact Report/Environmental Assessment 04-0G642
Table of Contents

General Information About This Document ................................................................. i
Summary ...................................................................................................................... i
Introduction .............................................................................................................. i
Overview of the Project Limits ................................................................................ i
Projects in the Study Area ....................................................................................... iii
Purpose and Need ..................................................................................................... iv
  Project Purpose ..................................................................................................... iv
  Project Need ....................................................................................................... iv
Proposed Action ....................................................................................................... iv
  Project Description ........................................................................................... iv
  Project Alternatives ......................................................................................... v
    No-Build Alternative ...................................................................................... ix
    Build Alternatives ....................................................................................... ix
  Construction ..................................................................................................... ix
  Construction Cost ........................................................................................... x

Joint California Environmental Quality Act/National Environmental Policy Act
  Document .......................................................................................................... xi

Permits and Approvals Needed ................................................................................ xii

Project Impacts ....................................................................................................... xiii

List of Abbreviated Terms ....................................................................................... xix

Chapter 1  Proposed Project ................................................................................... 1-1

1.1  Introduction .................................................................................................. 1-1

1.2  Purpose and Need ....................................................................................... 1-1
  1.2.1  Project Purpose ....................................................................................... 1-1
  1.2.2  Project Need ............................................................................................ 1-3
    1.2.2.1  Live Load ....................................................................................... 1-3
    1.2.2.2  Seismic Strength .......................................................................... 1-3
    1.2.2.3  Road Safety .................................................................................. 1-5
  1.2.3  Independent Utility and Logical Termini .............................................. 1-6

1.3  Project Description ....................................................................................... 1-7
  1.3.1  No-Build Alternative .............................................................................. 1-7
  1.3.2  Build Alternatives ................................................................................... 1-7
    1.3.2.1  Bridge types .................................................................................. 1-8
    1.3.2.2  Construction Methods .................................................................. 1-8
    1.3.2.3  Common Design Features of the Build Alternatives .................. 1-16
    1.3.2.4  Alternative 2a: Three-span, Short Steel-truss Bridge, ABC, Longitudinal Move-in ............................................................... 1-19
    1.3.2.5  Alternative 2b: Three-span, Short Steel-truss Bridge, Conventional Construction........................................................ 1-20
    1.3.2.6  Alternative 3a: Three-span, Concrete Bridge, ABC, Longitudinal Move-in ............................................................... 1-23
    1.3.2.7  Alternative 4a: Full-span, Steel-truss Bridge, ABC, Longitudinal Move-in ............................................................... 1-25
    1.3.2.8  Alternative 4b: Full-span, Steel-truss Bridge, ABC, Transverse Slide-in ............................................................... 1-27
  1.4  Comparison of Alternatives ....................................................................... 1-30
  1.5  Selection of a Preferred Alternative ............................................................ 1-31
Table of Contents

1.6 Alternatives Considered but Withdrawn from Further Consideration .......... 1-31
  1.6.1 Early Screening ........................................................................................................ 1-31
    1.6.1.1 TSM and TDM ........................................................................................................ 1-32
    1.6.1.2 New Bridge on New Alignment .............................................................................. 1-32
  1.6.2 Existing Alignment ...... 1-32
    1.6.2.1 Alternatives 3b and 4c .......................................................................................... 1-33
    1.6.2.2 Alternative 5: Suspension Bridge .......................................................................... 1-33
    1.6.2.3 Alternative 6: Retrofit Existing Bridge ................................................................. 1-34

1.7 Required Permits and Approvals ................................................................. 1-36
1.8 Construction Cost ............................................................................................... 1-37

Chapter 2

Affected Environment, Environmental Consequences, and Avoidance, Minimization, and/or Mitigation Measures ........................................... 2-1

2.1 Human Environment ...................................................................................... 2-2
  2.1.1 Land Use ................................................................................................................. 2-2
    2.1.1.1 Regulatory Setting ......................................................................................... 2-2
    2.1.1.2 Existing and Future Land Use .......................................................................... 2-3
    2.1.1.3 Consistency with State, Regional, and Local Plans ........................................... 2-7
    2.1.1.4 Environmental Consequences ........................................................................... 2-9
    2.1.1.5 Avoidance, Minimization, and/or Mitigation Measures ................................ 2-13
    2.1.2 Community Impacts .............................................................................................. 2-14
    2.1.2.1 Community Character and Cohesion ................................................................. 2-14
    2.1.2.2 Relocation and Real Property Acquisition ........................................................ 2-24
    2.1.2.3 Environmental Justice ...................................................................................... 2-30
  2.1.3 Parks and Recreational Facilities ........................................................................ 2-36
    2.1.3.1 Regulatory Setting .............................................................................................. 2-36
    2.1.3.2 Affected Environment .......................................................................................... 2-37
    2.1.3.3 Environmental Consequences ............................................................................ 2-42
    2.1.3.4 Avoidance, Minimization, and/or Mitigation Measures ................................ 2-47
  2.1.4 Utilities and Emergency Services ...................................................................... 2-48
    2.1.4.1 Affected Environment .......................................................................................... 2-48
    2.1.4.2 Environmental Consequences .......................................................................... 2-50
    2.1.4.3 Avoidance, Minimization, and/or Mitigation Measures ................................ 2-53
  2.1.5 Traffic and Transportation/Pedestrian and Bicycle Facilities ..................... 2-53
    2.1.5.1 Regulatory Setting .............................................................................................. 2-53
    2.1.5.2 Affected Environment .......................................................................................... 2-54
    2.1.5.3 Environmental Consequences .......................................................................... 2-59
    2.1.5.4 Avoidance, Minimization, and/or Mitigation Measures ................................ 2-68
  2.1.6 Visual/Aesthetics .............................................................................................. 2-71
    2.1.6.1 Regulatory Setting .............................................................................................. 2-71
    2.1.6.2 Affected Environment .......................................................................................... 2-71
    2.1.6.3 Environmental Consequences .......................................................................... 2-79
    2.1.6.4 Avoidance, Minimization, and/or Mitigation Measures ................................ 2-100
  2.1.7 Cultural Resources ........................................................................................... 2-101
    2.1.7.1 Regulatory Setting .............................................................................................. 2-101
    2.1.7.2 Affected Environment .......................................................................................... 2-102
    2.1.7.3 Environmental Consequences .......................................................................... 2-104
    2.1.7.4 Avoidance, Minimization, and/or Mitigation Measures ................................ 2-105
  2.2 Physical Environment .................................................................................... 2-106
    2.2.1 Hydrology and Floodplain .................................................................................. 2-106
      2.2.1.1 Regulatory Setting ............................................................................................. 2-106
      2.2.1.2 Affected Environment ...................................................................................... 2-106
# Table of Contents

## 2.2.1 Environmental Consequences
- Avoidance, Minimization, and/or Mitigation Measures ................................................. 2-114

## 2.2.2 Water Quality and Storm Water Runoff
- Regulatory Setting........................................................................................................ 2-120
- Affected Environment.................................................................................................. 2-125
- Environmental Consequences..................................................................................... 2-130
- Avoidance, Minimization, and/or Mitigation Measures ............................................. 2-133

## 2.2.3 Geology/Soils/Seismic/Topography
- Regulatory Setting........................................................................................................ 2-136
- Affected Environment.................................................................................................. 2-136
- Environmental Consequences..................................................................................... 2-142
- Avoidance, Minimization, and/or Mitigation Measures ............................................. 2-146

## 2.2.4 Paleontology
- Regulatory Setting........................................................................................................ 2-146
- Affected Environment.................................................................................................. 2-147
- Environmental Consequences..................................................................................... 2-149
- Avoidance, Minimization, and/or Mitigation Measures ............................................. 2-151

## 2.2.5 Hazardous Waste/Materials
- Regulatory Setting........................................................................................................ 2-151
- Affected Environment.................................................................................................. 2-152
- Environmental Consequences..................................................................................... 2-158
- Avoidance, Minimization, and/or Mitigation Measures ............................................. 2-164

## 2.2.6 Air Quality
- Regulatory Setting........................................................................................................ 2-166
- Affected Environment.................................................................................................. 2-168
- Environmental Consequences..................................................................................... 2-175
- Avoidance, Minimization, and/or Mitigation Measures ............................................. 2-183
- Climate Change............................................................................................................ 2-184

## 2.2.7 Noise
- Regulatory Setting........................................................................................................ 2-184
- Affected Environment.................................................................................................. 2-188
- Environmental Consequences..................................................................................... 2-190
- Avoidance, Minimization, and/or Mitigation Measures ............................................. 2-198

## 2.3 Biological Environment

### 2.3.1 Natural Communities
- Affected Environment.................................................................................................. 2-200
- Environmental Consequences..................................................................................... 2-207
- Avoidance, Minimization and Mitigation Measures ................................................. 2-215

### 2.3.2 Wetlands and Waters of the U.S.
- Regulatory Setting........................................................................................................ 2-216
- Affected Environment.................................................................................................. 2-219
- Environmental Consequences..................................................................................... 2-221
- Avoidance, Minimization, and/or Mitigation Measures ............................................. 2-230

### 2.3.3 Plant Species
- Regulatory Setting........................................................................................................ 2-231
- Affected Environment.................................................................................................. 2-232
- Environmental Consequences..................................................................................... 2-233
- Avoidance, Minimization, and/or Mitigation Measures ............................................. 2-235

### 2.3.4 Animal Species
- Regulatory Setting........................................................................................................ 2-235
- Affected Environment.................................................................................................. 2-236
Table of Contents

2.3.4.3 Environmental Consequences .................................................. 2-242
2.3.4.4 Avoidance, Minimization, and/or Mitigation Measures .......... 2-249

2.3.5 Threatened and Endangered Species ........................................... 2-251
  2.3.5.1 Regulatory Setting ............................................................... 2-251
  2.3.5.2 Affected Environment ............................................................. 2-252
  2.3.5.3 Environmental Consequences ................................................ 2-264
  2.3.5.4 Avoidance, Minimization, and/or Mitigation Measures .......... 2-272

2.3.6 Invasive Species ............................................................................ 2-277
  2.3.6.1 Regulatory Setting ............................................................... 2-277
  2.3.6.2 Affected Environment ............................................................. 2-277
  2.3.6.3 Environmental Consequences ................................................ 2-279
  2.3.6.4 Avoidance, Minimization, and/or Mitigation Measures .......... 2-281

2.4 Cumulative Impacts .......................................................................... 2-282
  2.4.1 Regulatory Setting ....................................................................... 2-282
  2.4.2 Resources Analyzed ..................................................................... 2-283
  2.4.3 Resources with No Cumulative Impacts ....................................... 2-283
  2.4.4 Resource Study Areas ................................................................... 2-284
    2.4.4.1 Visual/Aesthetics .................................................................. 2-287
    2.4.4.2 Land Use/Coastal Zone ......................................................... 2-287
    2.4.4.3 Biological Environment ....................................................... 2-288
  2.4.5 Historical Context/Current Status ............................................... 2-289
  2.4.6 Proposed Project Impacts ............................................................. 2-293
    2.4.6.1 Land Use/Coastal Zone, Visual/Aesthetics, and Biological Environment ......................................................................................... 2-293
  2.4.7 Reasonably Foreseeable Projects ............................................... 2-298

2.4.8 Cumulative Impacts Determinations .............................................. 2-300

Chapter 3 California Environmental Quality Act Evaluation ......................... 3-1

3.1 Determining Significance under CEQA ........................................... 3-1
3.2 Effects of the Build Alternatives ..................................................... 3-2
  3.2.1 No Effects .................................................................................. 3-2
    3.2.1.1 Biological Resources – Northern Spotted Owl ......................... 3-2
    3.2.1.2 Mineral Resources .................................................................. 3-2
    3.2.1.3 Population and Housing During Operation ............................. 3-2
    3.2.1.4 Recreation During Operation .................................................. 3-3
    3.2.1.5 Hazards and Hazardous Materials ....................................... 3-3
    3.2.1.6 Transportation and Traffic During Operation ......................... 3-3
    3.2.1.7 Utilities and Service Systems During Operation ...................... 3-3
    3.2.1.8 Public Services During Operation .......................................... 3-3
    3.2.1.9 Air Quality During Operation ................................................ 3-4
    3.2.1.10 Noise During Operation ....................................................... 3-4
  3.2.2 Less than Significant Effects of the Build Alternatives .................. 3-4
    3.2.2.1 Air Quality During Construction ............................................. 3-4
    3.2.2.2 Biological Resources: Riparian Habitat, Special-status Plant Species, Myrtle’s Silverspot Butterfly, Special-status Mammals, Migratory Birds, and Invasive Species ......................................................... 3-5
    3.2.2.3 Cultural Resources .................................................................. 3-7
    3.2.2.4 Geology and Soils .................................................................. 3-7
    3.2.2.5 Hazards and Hazardous Materials ....................................... 3-8
    3.2.2.6 Hydrology and Water Quality ................................................. 3-9
    3.2.2.7 Recreation During Construction ............................................. 3-10
    3.2.2.8 Transportation and Traffic During Construction ..................... 3-11
# Table of Contents

3.2.2.9 Utilities and Service Systems During Construction .......................................................... 3-11
3.2.2.10 Paleontological Resources ......................................................................................... 3-12
3.2.2.11 Public Services .......................................................................................................... 3-12

3.2.3 Significant Environmental Effects of the Build Alternatives ........................................... 3-12
3.2.3.1 Biological Resources .................................................................................................. 3-13
3.2.3.2 Noise ......................................................................................................................... 3-16

3.2.4 Unavoidable Significant Environmental Effects ............................................................... 3-17
3.2.4.1 Visual/Aesthetics Resources ...................................................................................... 3-17
3.2.4.2 Land Use and Planning ............................................................................................. 3-18

3.2.5 Climate Change ............................................................................................................... 3-19
3.2.5.1 Regulatory Setting ..................................................................................................... 3-19
3.2.5.2 Environmental Setting .............................................................................................. 3-25
3.2.5.3 Project Analysis .......................................................................................................... 3-26

3.2.6 Greenhouse Gas Reduction Strategies ............................................................................... 3-27
3.2.6.1 Statewide Efforts ...................................................................................................... 3-27
3.2.6.2 Project-Level GHG Reduction Strategies .................................................................. 3-30
3.2.6.3 Adaptation Strategies ............................................................................................... 3-31
3.2.6.4 Adaptation to Sea-Level Rise .................................................................................. 3-34

3.3 Mitigation Measures for Significant Impacts Under CEQA .................................................. 3-35
3.3.1 Biological Mitigation Measures ....................................................................................... 3-35
3.3.2 Noise Mitigation Measures ............................................................................................ 3-36

## Chapter 4 Comments and Coordination .................................................................................. 4-1
4.1 Introduction .......................................................................................................................... 4-1
4.2 Scoping Process .................................................................................................................. 4-1
4.2.1 Notice of Preparation ...................................................................................................... 4-1
4.2.2 Scoping Meeting ............................................................................................................ 4-2

4.3 Consultation and Coordination with Public Agencies ......................................................... 4-3
4.3.1 U.S. Army Corps of Engineers ..................................................................................... 4-5
4.3.2 National Marine Fisheries Service .............................................................................. 4-5
4.3.3 U.S. Fish and Wildlife Service ...................................................................................... 4-5
4.3.4 California Department of Fish and Wildlife .................................................................. 4-6
4.3.5 California Coastal Commission ..................................................................................... 4-6
4.3.6 Native American Consultation ...................................................................................... 4-6
4.3.7 State Historic Preservation Officer ............................................................................... 4-7
4.3.8 Regional Water Quality Control Board ....................................................................... 4-7
4.3.9 Marin County .................................................................................................................. 4-8

4.4 Public Participation ............................................................................................................. 4-8
4.4.1 Stakeholder Working Group .......................................................................................... 4-8
4.4.2 Notice of Availability of the Draft Environmental Document ........................................ 4-9
4.4.3 Public Meeting ............................................................................................................... 4-10

## Chapter 5 List of Preparers ..................................................................................................... 5-1
California Department of Transportation .................................................................................. 5-1
CH2M ...................................................................................................................................... 5-2
ICF International .................................................................................................................... 5-2
Northgate .................................................................................................................................. 5-2
WRECO Consultants .............................................................................................................. 5-3

## Chapter 6 Distribution List .................................................................................................... 6-1

## Chapter 7 References List ...................................................................................................... 7-1
# List of Tables

<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>S-1</td>
<td>Summary of Key Differences Among Alternatives</td>
</tr>
<tr>
<td>S-2</td>
<td>Permits, Reviews, and Approvals Required for Project Construction</td>
</tr>
<tr>
<td>S-3</td>
<td>Project Impacts</td>
</tr>
<tr>
<td>I-1</td>
<td>Summary of Key Differences Among Alternatives</td>
</tr>
<tr>
<td>I-2</td>
<td>Permits, Reviews, and Approvals Required for Project Construction</td>
</tr>
<tr>
<td>2.1.1-1</td>
<td>Planned Developments in the Study Area</td>
</tr>
<tr>
<td>2.1.1-2</td>
<td>Consistency with State, Regional, and Local Plans and Programs</td>
</tr>
<tr>
<td>2.1.2-1</td>
<td>Demographic Data for Study Area and Marin County</td>
</tr>
<tr>
<td>2.1.2-2</td>
<td>Community Impacts and Construction Management Plan Measures</td>
</tr>
<tr>
<td>2.1.2-3</td>
<td>Temporary Construction Easements by Build Alternative</td>
</tr>
<tr>
<td>2.1.2-4</td>
<td>Minority Populations</td>
</tr>
<tr>
<td>2.1.2-5</td>
<td>Household Income and Poverty Status</td>
</tr>
<tr>
<td>2.1.5-1</td>
<td>Summary of Access Considerations during Bridge Closure for Alternatives Employing ABC</td>
</tr>
<tr>
<td>2.1.6-1</td>
<td>Viewer Groups Anticipated Response to Changes</td>
</tr>
<tr>
<td>2.1.6-2</td>
<td>Visual Impact Ratings Using Viewer Response and Resource Change</td>
</tr>
<tr>
<td>2.1.6-3</td>
<td>Summary of Key View Narrative Ratings: Alternatives 2a and 2b</td>
</tr>
<tr>
<td>2.1.6-4</td>
<td>Summary of Key View Narrative Ratings: Alternative 3a</td>
</tr>
<tr>
<td>2.1.6-5</td>
<td>Summary of Key View Narrative Ratings: Alternative 3a with Ornamental Truss</td>
</tr>
<tr>
<td>2.1.6-6</td>
<td>Summary of Key View Narrative Ratings: Alternatives 4a and 4b</td>
</tr>
<tr>
<td>2.1.6-7</td>
<td>Summary of Key View Narrative Ratings: Alternatives 4a and 4b with Arched Truss</td>
</tr>
<tr>
<td>2.2.1-1</td>
<td>Hydraulic Summary: Existing Condition, Alternative 2a and Alternative 2b</td>
</tr>
<tr>
<td>2.2.1-2</td>
<td>Hydraulic Summary: Existing Condition, Alternatives 3a, 4a, and 4b</td>
</tr>
<tr>
<td>2.2.5-1</td>
<td>Summary of Known and Potential Hazardous Materials Release Sites Located within 0.25 Mile of the Project Area</td>
</tr>
<tr>
<td>2.2.6-1</td>
<td>National and California Ambient Air Quality Standards Applicable in California</td>
</tr>
<tr>
<td>2.2.6-2</td>
<td>Ambient Air Quality Monitoring Data Measured at the 4th Street (San Rafael) Monitoring Station</td>
</tr>
<tr>
<td>2.2.6-3</td>
<td>Attainment Status of Project Area in Marin County</td>
</tr>
<tr>
<td>2.2.6-4</td>
<td>Comparison of Construction Schedule and Traffic Detour/Redirection by Alternative</td>
</tr>
<tr>
<td>2.2.6-5</td>
<td>Estimated Total Criteria Pollutant Emissions from Construction of All Build Alternatives (tons)</td>
</tr>
<tr>
<td>2.2.6-6</td>
<td>Estimated Maximum Daily Criteria Pollutant Emissions from Construction of All Build Alternatives (pounds per day)</td>
</tr>
<tr>
<td>2.2.6-7</td>
<td>Estimated Average Daily Criteria Pollutant Emissions from Construction of All Build Alternatives (pounds per day)</td>
</tr>
<tr>
<td>2.2.7-1</td>
<td>Noise Abatement Criteria</td>
</tr>
<tr>
<td>2.2.7-2</td>
<td>Construction Noise Levels for Alternatives 2a, 3a, and 4a</td>
</tr>
<tr>
<td>2.2.7-3</td>
<td>Construction Noise Levels for Alternative 2b and Alternative 4b</td>
</tr>
<tr>
<td>2.3.1-1</td>
<td>Land Cover Types in the BSA</td>
</tr>
<tr>
<td>2.3.1-2</td>
<td>Potential Direct Effects to Natural Communities</td>
</tr>
<tr>
<td>2.3.2-1</td>
<td>Potential Impacts to Wetlands</td>
</tr>
<tr>
<td>2.3.2-2</td>
<td>Potential Impacts to Other Waters of the U.S. and State</td>
</tr>
</tbody>
</table>
Table 2.3.4-1  CDFW Fully Protected Species and Species of Special Concern with the Potential to Occur in the BSA ................................................................. 2-237
Table 2.3.4-2  Permanent, Direct Impacts on the Tomales Roach and Western Pond Turtle by Habitat Type .................................................................................. 2-244
Table 2.3.4-3  Temporary Construction Impacts to Tomales Roach and Western Pond Turtle by Habitat Type ............................................................................. 2-246
Table 2.3.4-4  Total Direct Impacts on Tomales Roach and Western Pond Turtle by Habitat Type ............................................................................................ 2-249
Table 2.3.5-1  Caltrans Finding of Effect per FESA ..................................................................................................................... 2-264
Table 2.3.5-2  Total Impacts on Habitats for Threatened and Endangered Species ...... 2-267
Table 2.3.6-1  Invasive Plant Species Known to Occur in the Region and Habitats of the BSA ..................................................................................................... 2-278
Table 2.4-1  Cumulative Impact Analysis by Resource Area ........................................ 2-284
Table 2.4-2  Cumulative Projects: Past, Present, and Reasonably Foreseeable Projects in the Vicinity of the Lagunitas Creek Bridge Project ........................................ 2-292
Table 3.2-1  Potential Direct Effects to Natural Communities ........................................ 3-6
Table 3.2-2  Potential Impacts to Wetlands and Waters of the U.S. and State .......... 3-14
Table 4-1  Agency Coordination Meetings and Contacts ............................................. 4-3

List of Figures

Figure S-1  Project Vicinity ............................................................................................... ii
Figure S-2  Profile View Looking East at Lagunitas Creek Bridge ................................ iii
Figure S-3  Three Alternative Bridge Designs under Environmental Review .......... vi
Figure S-4  Proposed Detour During Bridge Closure .................................................... vii
Figure S-5  Cross Sections for Each Bridge Design under Environmental Review ...... x
Figure 1-1  Project Vicinity ............................................................................................ 1-2
Figure 1-2  Profile View Looking East at Lagunitas Creek Bridge ............................... 1-3
Figure 1-3  Diagonal Cracks in the Abutments .............................................................. 1-4
Figure 1-4  Three Alternative Bridge Designs under Environmental Review .......... 1-9
Figure 1-5  Proposed Detour During Bridge Closure ................................................... 1-12
Figure 1-6  Simulations of ABC, Longitudinal Move-in Method by Bridge Type (Looking North) .............................................................. 1-14
Figure 1-7  Illustration of the ABC, Transverse Slide-in Method for Full-span Bridge (Looking North) ................................................................. 1-15
Figure 1-8  Cross Sections for Each Bridge Design under Environmental Review (Conceptual) ................................................................. 1-17
Figure 1-9  Alternative 2a Project Impacts Three-span, Short Steel, ABC, Longitudinal Move-in .............................................................. 1-21
Figure 1-10 Alternative 2b Project Impacts Three-span, Short Steel Truss Bridge, Conventional Construction ................................................................................ 1-22
Figure 1-11 Alternative 3a Project Impacts Three-Span, Concrete Bridge, ABC, Longitudinal Move-In .............................................................. 1-24
Figure 1-12 Example Design Variations for Alternative 3a: Three-span Concrete Bridge, ABC, Longitudinal Move-in .............................................................. 1-25
Figure 1-13 Examples of Square and Curved Full-span, Steel-truss Bridge, ABC, Transverse Slide-in ................................................................. 1-26
Figure 1-14 Alternative 4a Project Impacts Full-Span Steel Truss Bridge, ABC, Longitudinal Move-in .............................................................. 1-28
Figure 1-15 Alternative 4b Project Impacts Full-Span Steel Truss Bridge, ABC, Transverse Slide-in ................................................................. 1-29
Table of Contents

| Figure 2.1.1-1 | Zoning Designations | 2-4 |
| Figure 2.1.1-2 | General Plan Land Use Designations | 2-5 |
| Figure 2.1.2-1 | Temporary Construction Easements For Alternative 2a | 2-26 |
| Figure 2.1.2-2 | Temporary Construction Easements For Alternative 2b | 2-29 |
| Figure 2.1.2-3 | Temporary Construction Easements For Alternative 3a | 2-31 |
| Figure 2.1.2-4 | Temporary Construction Easements For Alternative 4a | 2-32 |
| Figure 2.1.2-5 | Temporary Construction Easements For Alternative 4b | 2-33 |
| Figure 2.1.3-1 | Parks and Recreational Areas in the Project Vicinity | 2-38 |
| Figure 2.1.3-2 | Recreational Facilities in the Study Area | 2-40 |
| Figure 2.1.3-3 | Project Impacts to Whitehouse Pool Park | 2-43 |
| Figure 2.1.5-1 | Transportation Analysis Study Area | 2-56 |
| Figure 2.1.6-1 | Key View Locations Map | 2-74 |
| Figure 2.1.6-2 | Key View 1 (KV1) View of Bridge from the SR 1 and Sir Francis Drake Boulevard Intersection, Looking North | 2-75 |
| Figure 2.1.6-3 | Key View 2 (KV2) View from North Bank of Lagunitas Creek within Whitehouse Pool Park, West of the Lagunitas Creek Bridge, Looking East | 2-75 |
| Figure 2.1.6-4 | Visual Impact Assessment Process Concept Diagram | 2-80 |
| Figure 2.1.6-5 | KV1: Existing and Proposed Conditions, Alternatives 2a/2b | 2-82 |
| Figure 2.1.6-6 | KV2: Existing and Proposed Conditions, Alternatives 2a/2b | 2-84 |
| Figure 2.1.6-7 | KV1: Existing and Proposed Conditions, Alternative 3a | 2-87 |
| Figure 2.1.6-8 | KV1: Existing and Proposed Conditions, Alternative 3a, Ornamental Truss | 2-88 |
| Figure 2.1.6-9 | KV2: Existing and Proposed Conditions, Alternative 3a | 2-89 |
| Figure 2.1.6-10 | KV2: Existing and Proposed Conditions, Alternative 3a, Ornamental Truss | 2-91 |
| Figure 2.1.6-11 | KV1: Existing and Proposed Conditions, Alternatives 4a/4b | 2-92 |
| Figure 2.1.6-12 | KV1: Existing and Proposed Conditions, Alternative 4a/4b, Arched Truss | 2-94 |
| Figure 2.1.6-13 | KV2: Existing and Proposed Conditions, Alternatives 4a/4b | 2-95 |
| Figure 2.1.6-14 | KV2: Existing and Proposed Conditions, Alternatives 4a/4b, Arched Truss | 2-96 |
| Figure 2.2.1-1 | Watershed Map at Project Location | 2-108 |
| Figure 2.2.1-2 | Land Uses Within the Watershed | 2-109 |
| Figure 2.2.1-3 | FEMA Flood Insurance Rate Map 06041C0233D | 2-112 |
| Figure 2.2.1-4 | Federal Emergency Management Agency Floodplain Map Overlay | 2-113 |
| Figure 2.2.2-1 | Tomales Bay Wetland Area with Local Flowpaths | 2-127 |
| Figure 2.2.2-2 | Topography and Elevation of Site and Neighboring Land | 2-129 |
| Figure 2.2.3-1 | Geology 2 Miles from Project Area | 2-138 |
| Figure 2.2.3-2 | Alquist-Priolo Fault Hazard Zone | 2-141 |
| Figure 2.2.4-1 | Geology 0.5 Mile from Project Area | 2-148 |
| Figure 2.2.5-1 | Locations of Known, Potential, or Unlikely Hazardous Materials Release Sites | 2-157 |
| Figure 2.2.7-1 | Noise Levels of Common Activities | 2-187 |
| Figure 2.2.7-2 | Noise Receptors and Measurement Locations | 2-189 |
| Figure 2.3.1-1 | Biological Study Area | 2-201 |
| Figure 2.3.1-2 | Land Cover Types in the Biological Study Area | 2-205 |
| Figure 2.3.1-3 | Potential Environmentally Sensitive Habitat Areas in the Biological Study Area | 2-208 |
| Figure 2.3.2-1 | Potential Jurisdictional Waters of the U.S. and State | 2-220 |
Figure 2.3.2-2a Alternative 2a Project Impacts to Potential Jurisdictional Waters of the U.S. and State.......................................................... 2-224
Figure 2.3.2-2b Alternative 2b Project Impacts to Potential Jurisdictional Waters of the U.S. and State.......................................................... 2-225
Figure 2.3.2-2c Alternative 3a Project Impacts to Potential Jurisdictional Waters of the U.S. and State.......................................................... 2-226
Figure 2.3.2-2d Alternative 4a Project Impacts to Potential Jurisdictional Waters of the U.S. and State.......................................................... 2-227
Figure 2.3.2-2e Alternative 4b Project Impacts to Potential Jurisdictional Waters of the U.S. and State.......................................................... 2-228
Figure 2.3.3-1 Protected Species Plants within 5 Miles of the Project Location .......... 2-234
Figure 2.3.4-1 CNDDDB Occurrence of CDFW Species of Special Concern within 5 Miles of the Project Location......................................... 2-239
Figure 2.3.5-1 Critical Habitats within the Biological Study Area ............................ 2-254
Figure 2.3.5-2 Tidewater Goby Survey Locations .......................................................... 2-258
Figure 2.3.5-3 Potential California Red-legged Frog and Western Pond Turtle Habitat within the Biological Study Area................................. 2-263
Figure 2.3.5-4 CNDDDB Occurrence of Threatened and Endangered Species within 5 Miles of the Project Location......................................... 2-266
Figure 2.4-1 Visual/Aesthetics and Land Use/Coastal Zone Resource Study Area ... 2-285
Figure 2.4-2 Lagunitas Creek Watershed Biological Resource Study Area............... 2-286
Figure 2.4-3 Other Planned Projects within the Lagunitas Creek Bridge Vicinity ...... 2-291
Figure 3-1 2020 Business as Usual (BAU) Emissions Projection 2014 Edition ........ 3-26
Figure 3-2 The Governor’s Climate Change Pillars: 2030 Greenhouse Gas Reduction Goals.......................................................... 3-28
Figure 3-3 Potential Sea-Level Rise at Project Location.............................................. 3-34

List of Appendices

Appendix A CEQA Environmental Checklist
Appendix B Section 4(f)
Appendix C Title VI Policy Statement
Appendix D Summary of Relocation Benefits
Appendix E List of Technical Studies
Appendix F Avoidance, Minimization, and/or Mitigation Summary
Appendix G Agency Correspondence
Appendix H Floodplain Evaluation Report Summary
Appendix I Biological Resources—Species Tables
Appendix J Known and Potential Hazardous Materials Sites
Appendix K Project Design
Appendix L Notice of Preparation
Appendix M Potential Impacts to Coastal Resources
Appendix N USFWS, NMFS, and CNPS Species Lists
# List of Abbreviated Terms

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>°F</td>
<td>degrees Fahrenheit</td>
</tr>
<tr>
<td>µg/m³</td>
<td>micrograms per cubic meter</td>
</tr>
<tr>
<td>AASHTO</td>
<td>American Association of State Highway and Transportation Officials</td>
</tr>
<tr>
<td>AB</td>
<td>Assembly Bill</td>
</tr>
<tr>
<td>ABAG</td>
<td>Association of Bay Area Governments</td>
</tr>
<tr>
<td>ABC</td>
<td>accelerated bridge construction</td>
</tr>
<tr>
<td>AC</td>
<td>asphalt concrete</td>
</tr>
<tr>
<td>ACS</td>
<td>American Community Survey</td>
</tr>
<tr>
<td>ADA</td>
<td>Americans with Disabilities Act</td>
</tr>
<tr>
<td>ADL</td>
<td>aerially deposited lead</td>
</tr>
<tr>
<td>AGR</td>
<td>Agricultural Supply</td>
</tr>
<tr>
<td>AMM</td>
<td>Avoidance and Minimization Measure</td>
</tr>
<tr>
<td>APE</td>
<td>area of potential effects</td>
</tr>
<tr>
<td>ARB</td>
<td>California Air Resources Board</td>
</tr>
<tr>
<td>AST</td>
<td>aboveground storage tank</td>
</tr>
<tr>
<td>ATCM</td>
<td>Airborne Toxic Control Measure</td>
</tr>
<tr>
<td>BAAQMD</td>
<td>Bay Area Air Quality Management District</td>
</tr>
<tr>
<td>Basin Plan</td>
<td>San Francisco Bay Water Quality Control Plan</td>
</tr>
<tr>
<td>BAU</td>
<td>business-as-usual</td>
</tr>
<tr>
<td>BFE</td>
<td>Base Flood Elevation</td>
</tr>
</tbody>
</table>
List of Abbreviated Terms

BiMRock  block-in-matrix rock
BMP  best management practice
bgs  below ground surface
BSA  biological study area
C-VCR-B2  residential or village commercial/ recreational
C-RC  recreational commercial
C₂H₃Cl  vinyl chloride
CAAAQS  California ambient air quality standards
CAFE  Corporate Average Fuel Economy
Cal EMA  California Office of Emergency Services
CAL FIRE  California Department of Forestry and Fire Protection
Cal/EPA  California Environmental Protection Agency
Cal-IPC  California Invasive Plant Council
Caltrans  California Department of Transportation
CC  California Coastal
CCA  California Coastal Act
CCC  Central California Coast
CCR  California Code of Regulations
CDFW  California Department of Fish and Wildlife
CDP  Coastal Development Permit
CERCLA  Comprehensive Environmental Response, Compensation, and Liability Act
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEQ</td>
<td>Council on Environmental Quality</td>
</tr>
<tr>
<td>CEQA</td>
<td>California Environmental Quality Act</td>
</tr>
<tr>
<td>CESA</td>
<td>California Endangered Species Act</td>
</tr>
<tr>
<td>CFGC</td>
<td>California Fish and Game Code</td>
</tr>
<tr>
<td>CFR</td>
<td>Code of Federal Regulations</td>
</tr>
<tr>
<td>CFS</td>
<td>California freshwater shrimp</td>
</tr>
<tr>
<td>CH2M</td>
<td>CH2M HILL, Inc.</td>
</tr>
<tr>
<td>CH₄</td>
<td>methane</td>
</tr>
<tr>
<td>CIA</td>
<td>Community Impact Assessment</td>
</tr>
<tr>
<td>CIDH</td>
<td>cast-in-drilled-hole</td>
</tr>
<tr>
<td>CIPI</td>
<td>California Invasive Plant Inventory</td>
</tr>
<tr>
<td>CMP</td>
<td>Construction Management Plan</td>
</tr>
<tr>
<td>CNDDDB</td>
<td>California Natural Diversity Database</td>
</tr>
<tr>
<td>CNPS</td>
<td>California Native Plant Society</td>
</tr>
<tr>
<td>CO</td>
<td>carbon monoxide</td>
</tr>
<tr>
<td>CO₂</td>
<td>carbon dioxide</td>
</tr>
<tr>
<td>CO-CAT</td>
<td>Coastal Ocean Climate Action Team</td>
</tr>
<tr>
<td>COLD</td>
<td>Cold Freshwater Habitat</td>
</tr>
<tr>
<td>COMM</td>
<td>Commercial and Sport Fishing</td>
</tr>
<tr>
<td>CRHR</td>
<td>California Register of Historical Resources</td>
</tr>
<tr>
<td>CRLF</td>
<td>California red-legged frog</td>
</tr>
<tr>
<td>CTC</td>
<td>California Transportation Commission</td>
</tr>
</tbody>
</table>
## List of Abbreviated Terms

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>CTP</td>
<td>California Transportation Plan</td>
</tr>
<tr>
<td>CWA</td>
<td>Clean Water Act</td>
</tr>
<tr>
<td>CZMA</td>
<td>Coastal Zone Management Act</td>
</tr>
<tr>
<td>dBA</td>
<td>A-weighted decibels</td>
</tr>
<tr>
<td>DOC</td>
<td>California Department of Conservation</td>
</tr>
<tr>
<td>DPS</td>
<td>Distinct Population Segment</td>
</tr>
<tr>
<td>DSA</td>
<td>disturbed soil area</td>
</tr>
<tr>
<td>DWR</td>
<td>California Department of Water Resources</td>
</tr>
<tr>
<td>EA</td>
<td>Environmental Assessment</td>
</tr>
<tr>
<td>EDR</td>
<td>Environmental Data Resources, Inc.</td>
</tr>
<tr>
<td>EIR</td>
<td>Environmental Impact Report</td>
</tr>
<tr>
<td>EIS</td>
<td>Environmental Impact Statement</td>
</tr>
<tr>
<td>EO</td>
<td>Executive Order</td>
</tr>
<tr>
<td>ESHA</td>
<td>environmentally sensitive habitat area</td>
</tr>
<tr>
<td>ESA</td>
<td>environmentally sensitive area</td>
</tr>
<tr>
<td>ESL</td>
<td>environmental study limit</td>
</tr>
<tr>
<td>ESU</td>
<td>Evolutionary Significant Unit</td>
</tr>
<tr>
<td>FCAA</td>
<td>Federal Clean Air Act</td>
</tr>
<tr>
<td>FEMA</td>
<td>Federal Emergency Management Agency</td>
</tr>
<tr>
<td>FESA</td>
<td>federal Endangered Species Act</td>
</tr>
<tr>
<td>FFRMS</td>
<td>Federal Flood Risk Management Standard</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Full Form</td>
</tr>
<tr>
<td>--------------</td>
<td>-----------</td>
</tr>
<tr>
<td>FHWA</td>
<td>Federal Highway Administration</td>
</tr>
<tr>
<td>FIGR</td>
<td>Federated Indians of Graton Rancheria</td>
</tr>
<tr>
<td>FIRM</td>
<td>Flood Insurance Rate Map</td>
</tr>
<tr>
<td>FIS</td>
<td>Flood Insurance Study</td>
</tr>
<tr>
<td>FONSI</td>
<td>Finding of No Significant Impact</td>
</tr>
<tr>
<td>FRSH</td>
<td>Freshwater Replenishment</td>
</tr>
<tr>
<td>FTA</td>
<td>Federal Transit Administration</td>
</tr>
<tr>
<td>FTIP</td>
<td>Federal Transportation Improvement Program</td>
</tr>
<tr>
<td>GGNRA</td>
<td>Golden Gate National Recreation Area</td>
</tr>
<tr>
<td>GHG</td>
<td>greenhouse gas</td>
</tr>
<tr>
<td>gr</td>
<td>granitic rocks</td>
</tr>
<tr>
<td>Guidelines</td>
<td>Section 404(b)(1) Guidelines</td>
</tr>
<tr>
<td>H</td>
<td>high</td>
</tr>
<tr>
<td>H₂S</td>
<td>hydrogen sulfide</td>
</tr>
<tr>
<td>HFC-134a</td>
<td>1,1,1,2-tetrafluoroethane</td>
</tr>
<tr>
<td>HFC-152a</td>
<td>difluoroethane</td>
</tr>
<tr>
<td>HFC-23</td>
<td>fluoroform</td>
</tr>
<tr>
<td>HSG</td>
<td>hydrologic soil group</td>
</tr>
<tr>
<td>IPaC</td>
<td>Information for Planning and Conservation</td>
</tr>
<tr>
<td>IPCC</td>
<td>Intergovernmental Panel on climate change</td>
</tr>
<tr>
<td>IPUD</td>
<td>Inverness Public Utilities District</td>
</tr>
<tr>
<td>ITP</td>
<td>Incidental Take Permit</td>
</tr>
</tbody>
</table>
### List of Abbreviated Terms

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>kfs</td>
<td>sandstone and shale (Cretaceous)</td>
</tr>
<tr>
<td>KV</td>
<td>Key View</td>
</tr>
<tr>
<td>L</td>
<td>low</td>
</tr>
<tr>
<td>LCP</td>
<td>Local Coastal Program</td>
</tr>
<tr>
<td>LEDPA</td>
<td>Least Environmentally Damaging Practical Alternative</td>
</tr>
<tr>
<td>Leq</td>
<td>equivalent sound level</td>
</tr>
<tr>
<td>Leq(h)</td>
<td>hourly equivalent sound level</td>
</tr>
<tr>
<td>L(_{\text{max}})</td>
<td>maximum sound level</td>
</tr>
<tr>
<td>LUST</td>
<td>leaking underground storage tank</td>
</tr>
<tr>
<td>M</td>
<td>moderate</td>
</tr>
<tr>
<td>MAR</td>
<td>Marine Habitat</td>
</tr>
<tr>
<td>Marin Transit</td>
<td>Marin County Transit District</td>
</tr>
<tr>
<td>MBTA</td>
<td>Migratory Bird Treaty Act</td>
</tr>
<tr>
<td>MHW</td>
<td>Mean High Water</td>
</tr>
<tr>
<td>MIGR</td>
<td>Fish Migration</td>
</tr>
<tr>
<td>MLD</td>
<td>Most Likely Descendent</td>
</tr>
<tr>
<td>MMTCO(<em>{2})(</em>{\text{e}})</td>
<td>million metric tons of carbon dioxide equivalent</td>
</tr>
<tr>
<td>MOVES</td>
<td>Motor Vehicle Emission Simulator</td>
</tr>
<tr>
<td>mph</td>
<td>miles per hour</td>
</tr>
<tr>
<td>MPO</td>
<td>Metropolitan Planning Organization</td>
</tr>
<tr>
<td>MS4</td>
<td>municipal separate storm sewer system</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Description</td>
</tr>
<tr>
<td>--------------</td>
<td>-------------</td>
</tr>
<tr>
<td>MSAT</td>
<td>mobile source air toxics</td>
</tr>
<tr>
<td>MSB</td>
<td>Myrtle’s silverspot butterfly</td>
</tr>
<tr>
<td>MTC</td>
<td>Metropolitan Transportation Commission</td>
</tr>
<tr>
<td>MUN</td>
<td>Municipal and Domestic Supply</td>
</tr>
<tr>
<td>N₂O</td>
<td>nitrous oxide</td>
</tr>
<tr>
<td>NA</td>
<td>not applicable</td>
</tr>
<tr>
<td>NAC</td>
<td>noise abatement criteria</td>
</tr>
<tr>
<td>NAAQS</td>
<td>National Ambient Air Quality Standards</td>
</tr>
<tr>
<td>NAHC</td>
<td>Native American Heritage Commission</td>
</tr>
<tr>
<td>NAV</td>
<td>Navigation</td>
</tr>
<tr>
<td>NAVD 88</td>
<td>North American Vertical Datum of 1988</td>
</tr>
<tr>
<td>NEPA</td>
<td>National Environmental Policy Act</td>
</tr>
<tr>
<td>NES</td>
<td>Natural Environment Study</td>
</tr>
<tr>
<td>NESHAP</td>
<td>National Emissions Standards for Hazardous Air Pollutants</td>
</tr>
<tr>
<td>NFIP</td>
<td>National Flood Insurance Program</td>
</tr>
<tr>
<td>NGVD</td>
<td>National Geodetic Vertical Datum</td>
</tr>
<tr>
<td>NHPA</td>
<td>National Historic Preservation Act</td>
</tr>
<tr>
<td>NHTSA</td>
<td>National Highway Traffic Safety Administration</td>
</tr>
<tr>
<td>NMFS</td>
<td>National Marine Fisheries Service</td>
</tr>
<tr>
<td>NMWD</td>
<td>North Marin Water District</td>
</tr>
<tr>
<td>NNL</td>
<td>National Natural Landmarks</td>
</tr>
<tr>
<td>NO₂</td>
<td>nitrogen dioxide</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Description</td>
</tr>
<tr>
<td>--------------</td>
<td>-------------</td>
</tr>
<tr>
<td>NOA</td>
<td>naturally occurring asbestos</td>
</tr>
<tr>
<td>NOAA</td>
<td>National Oceanic and Atmospheric Administration</td>
</tr>
<tr>
<td>NOx</td>
<td>nitrogen oxide</td>
</tr>
<tr>
<td>NOP</td>
<td>Notice of Preparation</td>
</tr>
<tr>
<td>NPDES</td>
<td>National Pollutant Discharge Elimination System</td>
</tr>
<tr>
<td>NPS</td>
<td>National Park Service</td>
</tr>
<tr>
<td>NRCS</td>
<td>Natural Resources Conservation Service</td>
</tr>
<tr>
<td>NRHP</td>
<td>National Register of Historic Places</td>
</tr>
<tr>
<td>NSO</td>
<td>northern spotted owl</td>
</tr>
<tr>
<td>O₃</td>
<td>ozone</td>
</tr>
<tr>
<td>OPR</td>
<td>Office of Planning and Research</td>
</tr>
<tr>
<td>OSHA</td>
<td>Occupational Safety and Health Act</td>
</tr>
<tr>
<td>OSTP</td>
<td>Office of Science and Technology</td>
</tr>
<tr>
<td>PA</td>
<td>Programmatic Agreement</td>
</tr>
<tr>
<td>Pb</td>
<td>lead</td>
</tr>
<tr>
<td>PG&amp;E</td>
<td>Pacific Gas and Electric Company</td>
</tr>
<tr>
<td>PM</td>
<td>post mile; particulate matter</td>
</tr>
<tr>
<td>PM₂.₅</td>
<td>particulate matter 2.5 micrometers or smaller</td>
</tr>
<tr>
<td>PM₁₀</td>
<td>particulate matter 10 micrometers or smaller</td>
</tr>
<tr>
<td>ppm</td>
<td>parts per million</td>
</tr>
<tr>
<td>PRC</td>
<td>Public Resources Code</td>
</tr>
<tr>
<td>PQS</td>
<td>Professionally Qualified Staff</td>
</tr>
</tbody>
</table>
List of Abbreviated Terms

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Qal</td>
<td>alluvium (Quaternary)</td>
</tr>
<tr>
<td>Qoal</td>
<td>older alluvium (Quaternary)</td>
</tr>
<tr>
<td>RAP</td>
<td>Relocation Assistance Plan</td>
</tr>
<tr>
<td>RARE</td>
<td>Preservation of Rare and Endangered Species</td>
</tr>
<tr>
<td>RCEM</td>
<td>Road Construction Emissions Model</td>
</tr>
<tr>
<td>RCNM</td>
<td>Roadway Construction Noise Model</td>
</tr>
<tr>
<td>RCRA</td>
<td>Resource Conservation and Recovery Act</td>
</tr>
<tr>
<td>REC-1</td>
<td>Water Contact Recreation</td>
</tr>
<tr>
<td>REC-2</td>
<td>Noncontact Water Recreation</td>
</tr>
<tr>
<td>Resources Agency</td>
<td>California Natural Resources Agency</td>
</tr>
<tr>
<td>ROG</td>
<td>reactive organic gas</td>
</tr>
<tr>
<td>ROW</td>
<td>right-of-way</td>
</tr>
<tr>
<td>RTP</td>
<td>Regional Transportation Plan</td>
</tr>
<tr>
<td>RWQCB</td>
<td>Regional Water Quality Control Board</td>
</tr>
<tr>
<td>SB</td>
<td>Senate Bill</td>
</tr>
<tr>
<td>SCS</td>
<td>Sustainable Communities Strategy</td>
</tr>
<tr>
<td>SDC</td>
<td>Seismic Design Criteria</td>
</tr>
<tr>
<td>SDR</td>
<td>Seismic Design Recommendations memorandum</td>
</tr>
<tr>
<td>sf</td>
<td>square feet</td>
</tr>
<tr>
<td>SF₆</td>
<td>sulfur hexafluoride</td>
</tr>
<tr>
<td>SFBAAB</td>
<td>San Francisco Bay Area Air Basin</td>
</tr>
<tr>
<td>SHELL</td>
<td>Shellfish Harvesting</td>
</tr>
</tbody>
</table>
### List of Abbreviated Terms

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SHOPP</td>
<td>State Highway Operation and Protection Program</td>
</tr>
<tr>
<td>SHPO</td>
<td>State Historic Preservation Officer</td>
</tr>
<tr>
<td>SIP</td>
<td>State Implementation Plan</td>
</tr>
<tr>
<td>SLR</td>
<td>sea-level rise</td>
</tr>
<tr>
<td>SLR Guidance</td>
<td>California Sea-Level Rise Interim Guidance Document</td>
</tr>
<tr>
<td>SO$_2$</td>
<td>sulfur dioxide</td>
</tr>
<tr>
<td>SO$_X$</td>
<td>sulfur oxide</td>
</tr>
<tr>
<td>SPWN</td>
<td>Fish Spawning</td>
</tr>
<tr>
<td>SR</td>
<td>State Route</td>
</tr>
<tr>
<td>SSP</td>
<td>Caltrans Standard Specifications</td>
</tr>
<tr>
<td>STEVE</td>
<td>Standard Tracking and Exchange Vehicle for Environmental Systems</td>
</tr>
<tr>
<td>SWG</td>
<td>Stakeholder Working Group</td>
</tr>
<tr>
<td>SWMP</td>
<td>Storm Water Management Plan</td>
</tr>
<tr>
<td>SWPPP</td>
<td>Storm Water Pollution Prevention Plan</td>
</tr>
<tr>
<td>SWRCB</td>
<td>State Water Resources Control Board</td>
</tr>
<tr>
<td>TCE</td>
<td>temporary construction easement</td>
</tr>
<tr>
<td>THPO</td>
<td>Tribal Historic Preservation Officer</td>
</tr>
<tr>
<td>TMDL</td>
<td>Total Maximum Daily Load</td>
</tr>
<tr>
<td>TMP</td>
<td>Traffic Management Plan</td>
</tr>
<tr>
<td>TDM</td>
<td>Transportation Demand Management</td>
</tr>
<tr>
<td>TSM</td>
<td>Transportation System Management</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Full Form</td>
</tr>
<tr>
<td>--------------</td>
<td>-----------</td>
</tr>
<tr>
<td>U.S.</td>
<td>United States</td>
</tr>
<tr>
<td>UCLA</td>
<td>University of California, Los Angeles</td>
</tr>
<tr>
<td>UCMP</td>
<td>University of California Museum of Paleontology</td>
</tr>
<tr>
<td>Uniform Act</td>
<td>Uniform Relocation Assistance and Real Property Acquisition Policies Act</td>
</tr>
<tr>
<td>USACE</td>
<td>United States Army Corps of Engineers</td>
</tr>
<tr>
<td>USC</td>
<td>United States Code</td>
</tr>
<tr>
<td>USDOT</td>
<td>United States Department of Transportation</td>
</tr>
<tr>
<td>USEPA</td>
<td>United States Environmental Protection Agency</td>
</tr>
<tr>
<td>USFS</td>
<td>United States Forest Service</td>
</tr>
<tr>
<td>USFWS</td>
<td>United States Fish and Wildlife Service</td>
</tr>
<tr>
<td>USGS</td>
<td>United States Geological Survey</td>
</tr>
<tr>
<td>USGCRP</td>
<td>U.S. Global Change Research Program</td>
</tr>
<tr>
<td>UST</td>
<td>underground storage tank</td>
</tr>
<tr>
<td>VAU</td>
<td>Visual Assessment Unit</td>
</tr>
<tr>
<td>VMT</td>
<td>vehicle miles traveled</td>
</tr>
<tr>
<td>vph</td>
<td>vehicles per hour</td>
</tr>
<tr>
<td>WARM</td>
<td>Warm Freshwater Habitat</td>
</tr>
<tr>
<td>WDR</td>
<td>Waste Discharge Requirement</td>
</tr>
<tr>
<td>WILD</td>
<td>Wildlife Habitat</td>
</tr>
<tr>
<td>WPCP</td>
<td>Water Pollution Control Plan</td>
</tr>
<tr>
<td>WPT</td>
<td>western pond turtle</td>
</tr>
</tbody>
</table>
### List of Abbreviated Terms

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>WSE</td>
<td>water surface elevation</td>
</tr>
<tr>
<td>XP1</td>
<td>Extended Phase 1</td>
</tr>
</tbody>
</table>
Chapter 1 Proposed Project

1.1 Introduction

The California Department of Transportation (Caltrans) is the lead agency under the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA) for the State Route (SR) 1 Lagunitas Creek Bridge Project (the proposed project), which proposes to replace the bridge crossing Lagunitas Creek on SR 1 in Marin County. The bridge is located at post mile (PM) 28.5, which is south of the unincorporated town of Point Reyes Station and just north of the “T” intersection of SR 1 with Sir Francis Drake Boulevard. Sir Francis Drake Boulevard extends west from SR 1 toward Point Reyes National Seashore and north toward the unincorporated town of Inverness (see Figure 1-1). The existing bridge is approximately 0.4 mile east of the San Andreas fault line. Notable nearby recreation areas include Whitehouse Pool Park adjacent to the project to the west; Point Reyes National Seashore to the south and west; two tracts of the Golden Gate National Recreational Area to the west and north, and to the east and south; and Tomales Bay Ecological Reserve to the northwest. The bridge was constructed in 1929 by Marin County, and serves as a vital connection between Point Reyes Station and the unincorporated town of Olema to the south (see Figure 1-1).

SR 1 within the project area is an eligible, but not officially designated, state scenic highway. This project is funded by the State Highway Operation and Protection Program (SHOPP) 2016/17: Bridge Seismic Restoration and the Bridge Rehabilitation and Reconstruction Program (201.113 Program) (Transportation Improvement Program ID: VAR170010); it is estimated to cost between $8 million and $12.5 million and scheduled for construction from 2019 through 2022.

The Federal Highway Administration’s (FHWA’s) responsibility for environmental review, consultation, and any other action required in accordance with applicable federal laws for this project is being, or has been, carried out by Caltrans under its assumption of responsibility pursuant to 23 United States Code (USC) 327.

1.2 Purpose and Need

1.2.1 Project Purpose
The project purpose is to provide a safe, seismically stable crossing of Lagunitas Creek on SR 1. Figure 1-2 shows Lagunitas Creek Bridge.
1.2.2 Project Need
The proposed project is needed to meet current safety and seismic design standards. The Lagunitas Creek Bridge does not meet the American Association of State Highway and Transportation Officials and Caltrans safety and seismic design standards, such as live load, seismic strength, and roadway safety. The sections following describes these deficiencies in more detail.

1.2.2.1 Live Load
Caltrans defines live load capacity as the ability of the structure to safely carry truckloads of a given size. The existing bridge was designed to carry trucks much lighter (15-ton trucks) than present-day trucks (i.e., 36-ton trucks). The bridge is posted for weight limit which does not include all modern-day truck loads. Modern truck loads can add strain and advance the structural weakening of the existing bridge.

1.2.2.2 Seismic Strength
Modern seismic design standards address a structure’s ability to withstand a significant seismic event. Seismic activity can impart great forces into a bridge structure, causing components of the bridge to buckle or rupture, ultimately undermining the stability or support of the bridge. Compared to current seismic standards, the 1929 design used to construct the bridge is obsolete and does not provide the required survivability in the event of a strong earthquake.

The bridge’s ability to withstand a seismic load depends on the structural strength and ductility\(^1\) of all bridge components, including abutments, T-beam spans, steel trusses,

---
\(^1\) Ductility: a component’s ability to deform under loading without losing significant strength (compression stress).
The buried, under-reinforced concrete columns supporting the abutments are susceptible to failure under large bending and shear loads. The abutment columns are estimated to have a demand-over-capacity ratio of 1.6 to withstand seismic activity. A ratio of over 1.0 indicates that columns are in a brittle state; visual inspection of diagonal cracks in the abutments provides evidence of this (see Figure 1-3).

Figure 1-3: Diagonal Cracks in the Abutments

- The substructure-to-superstructure connections are inadequate for large seismic displacements. The demand-over-capacity ratio of the bridge piers, which are made of unreinforced concrete, ranges from 1.1 to 2.56, indicating that the piers are vulnerable to seismic activity and in a brittle state.

- The steel trusses could significantly displace horizontally and buckle, which could lead to failure of the steel-truss span. The bearing anchor bolts connecting the

---

2 The substructure for this bridge, made up of the abutments (and piers), supports the superstructure, which consists of the two reinforced concrete T-beam spans and the central steel-truss span.
Chapter 1 Proposed Project

The truss with the superstructure with the substructure have a shear demand-over-capacity ratio of 2.7 (which should only reach a maximum measure of 1.0 to be safe). These bolts will not be able to transfer the seismic forces to the substructure, which could cause the truss to shear off from the piers and abutments during a seismic event.

- Piles are of unknown depth and type, and may not have sufficient lateral and vertical support for the substructure. The connection of the pile to the pile cap cold crack or separate, particularly in the liquefiable soils that are present.

- Bridge maintenance records indicate the existing concrete roadway deck is worn and weathered and in need of replacement.

- The critical steel truss components and floor beams have large amounts of built-up rust on their surfaces. Reinforcing the truss may require replacing each member of the truss with new steel, which would add weight to the structure.

In addition, the steel-truss span has no redundant structural elements; therefore, if any key structural connection or component is compromised, the bridge could fail during a seismic event or under heavy live loads.

1.2.2.3 Road Safety

Safety standards for roadway design consider speed, transportation modes, and surrounding land use. Roadway safety standards consider the size of current vehicles using the road and the required safe distances between motorized and non-motorized traffic. The existing bridge has 11-foot-wide lanes, 2-foot-wide shoulders, and a 3-foot-wide sidewalk, which is not up to safety design standards and fails to meet minimum roadway standards such as 12-foot-wide lanes, 4-foot-wide shoulders and 6-foot-wide sidewalk. The Americans with Disabilities Act (ADA) requires 6-foot-wide sidewalks in constrained areas such as bridges. Further, the existing bridge and the shoulders along SR 1 fail to provide continuous access for multimodal forms of transportation such as bicyclists, equestrians, and pedestrians in the project area.

In accordance with Caltrans ADA guidance in Section 4.2 of the Design Information Bulletin 82-05, Caltrans discussed the non-motorized accessibility with community members and with the Safety Routes to School program leader in Marin County (CH2M 2017). The resulting input included concerns about the lack of a safe crossing at Sir Francis Drake Boulevard and SR 1.
In addition, Caltrans received input that the shoulder north of the bridge creates unsafe conditions for pedestrians and bicyclists. Currently, non-motorized travelers proceeding north to Point Reyes Station cross to the west side of SR 1, south of the bridge, then cross the bridge using the walkway located on the west side, and continue on the west side of SR 1 into Point Reyes Station (Caltrans 2017). The west shoulder is bound by the roadway to the east and to the west. On the west side, the Whitehouse Pool Park, the terrain drops approximately 2 to 5 feet without a protective barrier in place. Also, an overflow culvert under the roadway, located north of the bridge, narrows the shoulder to less than 1 foot wide, which requires pedestrians or bicyclists to use the vehicle travel lane. This narrow area of the shoulder immediately follows a curve in the road, which may cause southbound vehicles to veer into the narrow shoulder.

1.2.3 Independent Utility and Logical Termini

Logical termini for a project are defined as rational end points for transportation improvements. These rational end points should facilitate a thorough review of the environmental effects. Having independent utility means a project’s improvements are usable and constitute a reasonable expenditure even if no additional transportation improvements are made in the area.

Federal Highway Administration regulations (23 Code of Federal Regulations [CFR] 771.111[f]) require that the action evaluated (project):

- Connect logical termini and be of sufficient length to address environmental matters on a broad scope.

- Have independent utility or independent significance (be usable and be a reasonable expenditure even if no additional transportation improvements in the area are made).

- Not restrict consideration of alternatives for other reasonably foreseeable transportation improvements.

The bridge is located at PM 28.5, and the project limits extend from SR 1 PMs 28.4 to 28.6, from B Street in Point Reyes Station south to include the “T” intersection with Sir Francis Drake Boulevard. The proposed project would have independent utility, providing a long-term, seismically stable crossing of Lagunitas Creek on SR 1 and improved connectivity for all modes, including pedestrian and bicycle access from Sir Francis Drake Boulevard into the Point Reyes Station commercial center. The termini
include crossing improvement considerations and conforming the bridge cross section with the roadway south to the Sir Francis Drake Boulevard intersection at SR 1 and north to the intersection with B Street and SR 1 in Point Reyes Station. The logical termini provide the distance to incorporate solutions for both the bridge and the safety of pedestrians and bicycles.

1.3 Project Description

This section describes the proposed action and the project alternatives developed to meet the project purpose and need, while avoiding or minimizing environmental impacts. Five Build Alternatives and one No-Build Alternative are currently under consideration, as described in the following subsections. Section 1.4.1, Comparison of Alternatives, discusses the reasons for moving forward with one conventional construction method alternative and four accelerated bridge construction (ABC) method alternatives.

1.3.1 No-Build Alternative

Under the No-Build Alternative, the existing bridge would continue to operate with a substandard capacity for modern truck traffic. The bridge also would continue to deteriorate and could fail during a strong seismic event. There would be no action to improve the safety and seismic design of the existing bridge. The No-Build Alternative does not meet the purpose and need for the project. For this environmental analysis, this No-Build Alternative serves as the baseline condition upon which the impacts of Build Alternatives are compared.

1.3.2 Build Alternatives

The proposed project would replace the existing 152-foot-long, 34-foot-wide, three-span bridge on the same horizontal and vertical alignments, as closely as bridge design and conditions allow. Any variation from existing horizontal and vertical profile is described under the alternative descriptions below. The proposed bridge would have 11-foot-wide northbound and southbound lanes and 5-foot-wide shoulders. The new bridge would also accommodate one 6-foot-wide sidewalk on the west side of the bridge that would be cantilevered off of the main superstructure or on a 6- to 8-inch raised concrete surface on the main superstructure, with railings or barriers between it and the shoulder and travel lanes.
1.3.2.1 BRIDGE TYPES
The three bridge types under evaluation include a three-span bridge with a short steel-truss center span, three-span concrete bridge, and/or full-span steel-truss bridge, as shown in conceptual renderings (see Figure 1-4). Refer to Section 2.1.6, Visual/Aesthetics, for other visual simulations of the Alternatives.

1.3.2.2 CONSTRUCTION METHODS
There are two construction methods considered in this analysis: conventional and ABC. Conventional construction methods would require up to a 3-year construction period, whereas the ABC methods could shorten the construction schedule to under 1 year with notable trade-offs, such as full closure of the Lagunitas Bridge for approximately 2 to 3 weeks.

Under the conventional method, construction would occur in three phases over 3 years. Conventional construction work elements are summarized below and listed in the general order of the three phases. Most work elements are also the same for the ABC methods, although they would be able to be completed within a single year:

- Year 1—Mobilizing and Building the Detour Bridge
  - Grading, slope rounding, clearing, and grubbing temporary and permanent impact areas. Vegetation would be removed in the year prior to construction and between September 1 and October 15
  - Installing screening and noise barriers to shield adjacent properties and adjusting local access to these properties, as necessary
  - Installing sediment and debris stormwater barriers around the construction site
  - Installing cofferdams (e.g., using sheet pile walls) to create dry areas for work within the creek channel (for new piers and removal of old piers)
  - Extending the culvert north of the Lagunitas Creek Bridge
  - Constructing a temporary detour bridge*

---

3 Elements unique to the conventional construction method in this list are designated with an asterisk.
4 Cofferdams would first be built around the location of new piers. Once new piers are built, and old bridge deck removed, the cofferdams would be connected to build an enclosed area around new and old piers to the closest shore. Cofferdams would parallel the stream channel and connect to the streambanks on either end, making the water channel temporarily more narrow during installation of new piers and removal of old piers.
Three-span, short steel-truss bridge

Three-span, concrete bridge

Full-span, steel-truss bridge

Figure 1-4 Three Alternative Bridge Designs under Environmental Review
Relocating utilities

Managing both daily, evening, and weekend traffic by implementing a combination of:

- Managing speeds through the construction zone
- Rerouting traffic to the temporary bridge*

Year 2—Removing Existing Bridge and Preparing for New Bridge Placement

- Building a protective cover around the existing bridge to prevent debris from entering the waterway and managing construction waste removal to limit spoil piles, dust, and debris with onsite dump trucks, as necessary.
- Removing concrete deck slabs and T-span beams with jackhammers; dismantling the truss and floor beams
- Removing piers 3 feet below the creek channel bottom (from within the cofferdams to protect the stream from receiving concrete debris)
- Augering or using vibratory methods to drive piles for abutments beyond existing abutments but within the roadway during nighttime, one-lane closures whereas piles outside the roadway may be performed during daytime hours

Year 3—Constructing the New Bridge and Removing the Detour Bridge

- Completing construction of abutments, and piers if needed for the new bridge (casting pier caps and approach reinforced-concrete slabs)
- Constructing the superstructure with either cast-in-place concrete*, precast concrete components, and/or steel-truss span (depending on alternate type selected)
- Installing drainage systems that avoid direct discharge into Lagunitas Creek
- Placing utilities in final alignment
- Restoring approach roadway sections with subbase material (angular rock) under a layer of aggregate base, over which asphalt concrete is applied
Chapter 1 Proposed Project

- Adding a crosswalk at the Sir Francis Drake Boulevard and SR 1 intersection across Sir Francis Drake Boulevard

- Installing steel barrier railing along the edge of the shoulder on the bridge and extending 4 feet beyond the abutments on either side of the bridge

- Removing temporary bridge structure*

- Restoring temporary impacted areas by either returning staging areas to original condition or, if previously vegetated areas, applying a combination of compost, revegetating with native plants and trees, and hydroseeding with an appropriate native seed mix

In-water work is typically limited to mid-summer to early fall periods to minimize effects on sensitive aquatic species. This limitation influences the construction process and typically results in a 3-year process for conventional construction. This typical 3-year conventional construction period would affect the perceived connectivity for this rural region, which depends on tourism for economic sustainability. This duration also would extend impacts on the sensitive environmental resources. The ABC methods, which would allow completion of all three phases within a single year, were developed to respond to the community concerns that may result from a 3-year conventional construction period.

The ABC methods involve building the abutments and piers outside of the existing bridge footprint while allowing traffic to remain on the existing bridge. Once the abutments and piers are in place, and the precast or preassembled components of the bridge superstructure are made available in nearby staging areas, the existing bridge would be closed to traffic before the bridge would be dismantled. Construction crews would work 24 hours a day/7 days a week to remove the existing bridge and install the new bridge’s superstructure components on the preconstructed abutments and piers. This closure would last 14 to 21 days, depending on the bridge type and associated ABC methods. During the closure, traffic would be detoured in a south-to-north direction beginning by turning east on Sir Francis Drake Boulevard from SR 1 in Olema, turning north on Platform Bridge Road, turning left to continue north and west on Point Reyes-Petaluma Road, and then turning north or south (depending on the destination) onto SR 1. The detour would be approximately 9 miles through winding rural roads (see Figure 1-5).
FIGURE 1-5
Proposed Detour During Bridge Closure
State Route 1 Lagunitas Creek Bridge Project
EA 0G642, MRN-1 Post Mile 28.4 – 28.6
ID: 04-13000350
Marin County, California

LEGEND
- Project Area
- Proposed Detour During Bridge Closure
  - Highways
  - Major Roads
  - Local Traffic

Service Layer Credits: Content may not reflect National Geographic's current map policy. Sources: National Geographic, Esri, DeLorme, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.
All ABC methods would be complete within 12 months and would include the removal and replacement of the existing bridge during the dry season\(^5\). This window for in-stream work is intended to minimize and avoid impacts on wildlife and aquatic species by performing construction when they are less active or not present in the immediate project area.

There are important differences in how each ABC method can be applied for each bridge type. The following two ABC methods differ primarily in terms of how the superstructure is installed:

- **Longitudinal move-in.** The three-span, short steel-truss; full-span truss; and three-span concrete bridge types can each begin to be built with the abutments and piers outside of the existing bridge footprint while traffic continues across this bridge. During closure, the bridge superstructure would be installed longitudinally, starting from either abutment, and moving across the creek toward the center (see Figure 1-6). This ABC method is referred to as the longitudinal move-in method.

- **Transverse slide-in.** The full-span, steel-truss bridge can also be built adjacent to the existing bridge, before being moved horizontally along conveyor rails to replace the existing bridge (see Figure 1-7). This ABC method is referred to as the transverse slide-in method.

The remainder of this section describes the bridge designs and unique aspects of their associated construction methods.

\(^5\) Dry season is typically defined as June 1 through October 15, but details would be determined through the permitting process in consultation with the U.S. Fish and Wildlife Service, National Marine Fisheries Service, and California Department of Fish and Wildlife.
Figure 1-6  Simulations of ABC, Longitudinal Move-in Method by Bridge Type (Looking North)
Five Build Alternatives are proposed when considering the combination of bridge types with possible construction methods:

- Alternative 2a: Three-span, short steel-truss bridge, ABC, longitudinal move-in
- Alternative 2b: Three-span, short steel-truss bridge, conventional construction (with detour bridge)
- Alternative 3a: Three-span, concrete bridge, ABC, longitudinal move-in
- Alternative 4a: Full-span, steel-truss bridge, ABC, longitudinal move-in
- Alternative 4b: Full-span, steel-truss bridge, ABC, transverse slide-in

The alternatives considered but withdrawn from further consideration are noted in Section 1.5, which discusses how the full range of alternatives initially considered were narrowed to these six alternatives.

The five proposed Build Alternatives include the same roadway section of 11-foot-wide lanes, 5-foot-wide shoulders, and one 6-foot-wide sidewalk to be constructed on the west side with a barrier between the sidewalk and shoulder and travel lanes or
cantilevered from the superstructure. The cross sections for each bridge design type are illustrated on Figure 1-8.

### 1.3.2.3 COMMON DESIGN FEATURES OF THE BUILD ALTERNATIVES
Consistent with Deputy Directive 64-R1 Complete Streets – Integrating the Transportation System, which states that the needs of users of all ages and abilities must be met, safe non-motorized accessibility elements are included in each alternatives. Each Build Alternative includes widening the shoulder and extending the culvert that lies approximately 180 feet north of the existing bridge to accommodate a wider shoulder; adding a demarcated crosswalk on Sir Francis Drake Boulevard at the intersection with SR 1; and relocating utilities. In addition, each Build Alternative would include use of staging areas at the following locations:

- A vacant parcel at SR 1 and Third Street, which would include partial temporary construction easement on Whitehouse Pool Park
- A portion of the veterinary business on the northeast side of the bridge
- A portion of a residence to the southeast of the bridge
Figure 1-8  Cross Sections for Each Bridge Design under Environmental Review (Conceptual)
Reconstructing the Overflow Culvert

To address the safety of the west shoulder for non-motorized users, the culvert would have to be extended. This culvert functions only as an overflow water outlet beneath SR 1 during upstream flooding of Lagunitas Creek. It is currently only as width of the roadway, which consists of the existing travel lanes plus 1-foot-wide shoulders on either side. The project would extend the culvert to create 5-foot-wide shoulders on both sides of SR 1 consistent with the roadway prism to provide safer bicycle and pedestrian access across the bridge to Point Reyes Station. The widening for the shoulder and the culvert extension would require the acquisition of a narrow area of park property on the west side of and parallel to SR 1 right-of-way. The culvert would also require a temporary construction easement outside the SR 1 right-of-way.

Extending the culvert would occur in two stages. During Stage 1, temporary K-rails would be placed on one side of SR 1 to close off one side for construction activities, resulting in one-directional traffic flow managed with flaggers. Culvert extension would involve saw cutting the existing pavement to excavate towards the ends of the culvert system. All excavated material would be stockpiled in a staging area. Then, the new culvert structure would be installed and backfilled with approved soil, followed by roadway widening and paving. The temporary K-rails and traffic control devices would be removed and that side of the road re-opened to traffic. The same method would be used to extend the other end of the culvert during Stage 2. The managed one-way traffic flow is anticipated to endure approximately 2 months.

Crosswalk Improvement

To provide safer access for pedestrians, a crosswalk would be added across Sir Francis Drake Boulevard at the SR 1 intersection. This would not result in changing the roadways, the intersection, or shoulders. This portion of construction would only include painting the crosswalk in place during non-peak hours on a weekday or at nighttime, after the bridge construction and roadway restoration. Closure of the intersection would not be required.

Utility Relocation

Utilities in the project area include two water lines, fiber cable conduit, and overhead poles (Pacific Gas and Electric and AT&T). The water line and cable conduit beneath the bridge would be temporarily relocated during construction to avoid disruption of service. The water line beneath the culvert would be relocated prior to extension of the culvert. The waterline at the bridge would be redirected through a parallel line until the utility can be re-attached to the new bridge. These water lines are part of the...
North Marin Water District. The electrical and telephone line is immediately northwest of the bridge. The electrical and telephone line would temporarily be relocated to the veterinarian clinic’s parking lot northeast of the bridge until the bridge and roadway are restored. The area of this pole would be small, with a maximum area of 3 feet. The use of the parcel would require three non-consecutive days: two days to install the pole and relocate the electric distribution line, and at the end of the construction period, one more day to remove the pole. The relocation would occur during non-business hours to minimize use of the parking area by residents and business. The proposed relocation area for the electrical and telephone line is shown on Figures 1-9, 1-10, 1-11, 1-14, and 1-15 in the following subsections, which depict the temporary staging area for each alternative.

1.3.2.4 ALTERNATIVE 2A: THREE-SPAN, SHORT STEEL-TRUSS BRIDGE, ABC, LONGITUDINAL MOVE-IN

The three-span, steel-truss bridge would be similar to the existing bridge, with a reinforced concrete T-span beam at either end and a short, steel-truss center span. The T-span beam would connect from the pile-supported abutments at the top of the creek bank to the piers. The piers would support both the T-span and the steel-truss center span. Alternative 2a would be constructed with the ABC longitudinal move-in method. To maintain traffic on the bridge, the pier and abutment pilings would be placed outside the existing bridge footprint. Under the longitudinal move-in method, new pier columns would be constructed outside the existing bridge, while traffic is maintained on the existing bridge.

Piling for the new abutments would be constructed behind the existing abutments to support the new abutments, making the total length of the bridge approximately 10 feet longer on either side (approximately 170 feet total length with all three spans). Placing the piles for the new abutments would require nighttime, one-lane closures on the existing bridge to allow new abutment piles within the existing roadway. Once all substructure preparations are complete, access over Lagunitas Creek would be closed for 2 to 3 weeks, during which time traffic would be detoured (see detour description in Section 1.3.2.2), and the existing bridge would be dismantled.

To minimize the duration of the full bridge closure, rather than pouring the concrete deck, precast concrete deck pieces, precast beam concrete T-spans, and railing components would be prepared in advance and placed with the assistance of cranes and the steel-truss span would be pre-assembled in segments. All pre-cast and pre-assembled pieces would be located on adjacent staging areas for maximum efficiency.
The staging area would require temporary construction easements. The two properties west of the bridge would be used for staging. The two properties east of the bridge would be required to access existing and new pier locations. Two additional staging areas are identified on vacant parcels beyond the bridge site, including one 300 feet north on private property and one south of the bridge on the southwest corner of Sir Francis Drake Boulevard (see Figure 1-9). Access to the private property north of the bridge would be via B Street, and Sir Francis Drake Boulevard would be used to access the staging area south of the bridge. Temporary impacts are discussed in Chapter 2.

Staging areas would be grubbed and graded. Vegetation within 20 to 50 feet on either side of the bridge would be removed to clear the area for construction access. The total area of temporary disturbance in the creek as well as staging areas would be 2.5 acres (see Figure 1-9).

In parallel with building the bridge, the roadway approaches on either end would be restored to match with the new bridge abutment. Final demobilization and restoration of staging areas would continue after the bridge is reopened.

1.3.2.5 ALTERNATIVE 2B: THREE-SPAN, SHORT STEEL-TRUSS BRIDGE, CONVENTIONAL CONSTRUCTION

Alternative 2b is the same bridge type as Alternative 2a – the difference between the two alternatives is the construction method. Under the conventional construction method, a temporary two-lane bridge would be constructed east of the existing bridge; thus, closure of SR 1 would not be required (for more detail see Section 1.3.2.2). The staging area for Alternative 2b would be approximately 0.1 acre larger than Alternative 2a to accommodate the construction of the temporary bridge. The total area of temporary disturbance in the creek, as well as staging areas and the temporary bridge, would be 2.6 acres (see Figure 1-10). This is the same area that would be impacted were any of the alternatives to be constructed with conventional construction.

Throughout the construction period, traffic would be diverted to use the temporary bridge to cross Lagunitsa Creek at reduced speeds (approximately 15 to 20 miles per hour [mph]). The temporary bridge would be 38-feet wide to allow two lanes of traffic and a separate bicycle and pedestrian way on the east side of the temporary bridge. The temporary bridge would have a concrete deck on precast girders.
FIGURE 1-9
Alternative 2a
Project Impacts
Three-span Short Steel-Truss, ABC, Longitudinal Move-In
State Route 1 Lagunitas Creek Bridge Project
EA 0G642, MRN-1 Post Mile 28.4 – 28.6
ID: 04-13000350
Marin County, California

Note: The boundaries of the staging areas shown on this figure are estimates. There would be no direct take of residences and businesses.
FIGURE 1-10
Alternative 2b
Project Impacts
Three-span, Short Steel-Truss Bridge, Conventional Construction
State Route 1 Lagunitas Creek Bridge Project
EA 0G642, MRN-1 Post Mile 28.4 – 28.6
ID: 04-13000350
Marin County, California

Note:
The boundaries of the staging areas shown on this figure are estimates. There would be no direct take of residences and businesses.
supported on temporary abutments and piers directly east of the existing bridge piers. The staging areas would be used for storing material and equipment and constructing the temporary bridge.

Applying the conventional construction method allows the contractor to pour the concrete T-span beams and deck slabs in place and work without the pressure of a narrowly restricted timeframe. Following the opening of the new bridge, the temporary bridge would be removed and the disturbed area would be restored.

1.3.2.6 ALTERNATIVE 3A: THREE-SPAN, CONCRETE BRIDGE, ABC, LONGITUDINAL MOVE-IN

Alternative 3a (see Figure 1-11) proposes a three-span, precast/prestressed concrete bridge with steel barrier railings. A design option includes aesthetic treatments attached to the sides of the bridge, such as ornamental truss panels. Because an ornamental truss would not be a structural feature, variations of design would be more flexible within weight limitations. Figure 1-12 provides a simulation of the concrete bridge with and without an ornamental truss similar to the existing truss. If this bridge type was selected to be built, design concepts for an ornamental truss would be developed during the final design phase.

The construction method for Alternative 3a would be the same as Alternative 2a, including number and location of piers in the creek, and duration of traffic detour during the short-term bridge closure (2 to 3 weeks), except the temporary area of disturbance would be slightly larger (2.52 acres rather than 2.50 acres with Alternative 2a). The concrete bridge has the potential to be the narrowest bridge of the Build Alternatives; however, the center span girders would result in a 4-foot-deep soffit6 (1 foot deeper than the current soffit), which would require the entire bridge structure to be raised slightly to preserve the freeboard (clearance for water flow under the bridge).

When the new substructure has been constructed, the existing bridge would be closed to traffic and dismantled. The new superstructure would be erected with cranes moving the girders and precast/prestressed concrete slabs in place. Aesthetic treatments such as ornamental trusses, if included in the final design, would be installed. Then, once the new roadway is finished, the bridge would be opened to

---

6 The soffit is the underside of the bridge.
Alternative 3a

Project Impacts

Three-span Concrete Bridge, ABC, Longitudinal Move-In

State Route 1 Lagunitas Creek Bridge Project

EA 0G642, MRN-1 Post Mile 28.4 – 28.6

ID: 04-13000350

Marin County, California

Note:
The boundaries of the staging areas shown on this figure are estimates. There would be no direct take of residences and businesses.
traffic and revegetating disturbed areas and restoring the staging areas would be finalized.

**Figure 1-12 Example Design Variations for Alternative 3a: Three-span Concrete Bridge, ABC, Longitudinal Move-in**

1.3.2.7 **ALTERNATIVE 4A: FULL-SPAN, STEEL-TRUSS BRIDGE, ABC, LONGITUDINAL MOVE-IN**

The single, steel-truss span would be a longer and taller structure than the three-span steel truss for Alternatives 2a and 2b. It would have to span beyond the existing abutments as an approximately 170-foot-long truss. A truss of this span length would require overhead cross frames for structural stability of the truss panels. The height of
this full-span truss could vary between 20 and 30 feet high. The truss could be either square or curved, as shown on Figure 1-13. Because it would span from one abutment to the other, no piers would be required in the water.

Figure 1-13 Examples of Square and Curved Full-span, Steel-truss Bridge, ABC, Transverse Slide-in
Before the existing bridge is closed to traffic and dismantled, the entire steel-truss span would be preassembled at one of the larger construction staging areas. It would then be moved to the bridge site and longitudinally installed from one abutment to the other using large cranes from both river banks.

The staging areas (approximately 2.51 acres), construction duration, and roadway closure would be the same as for each alternative that includes the ABC, longitudinal move-in construction method (see Figure 1-14).

1.3.2.8 **ALTERNATIVE 4B: FULL-SPAN, STEEL-TRUSS BRIDGE, ABC, TRANSVERSE SLIDE-IN**

The full-span, steel-truss bridge design for Alternative 4b is the same as Alternative 4a. However, the bridge pre-assembly area would be adjacent to the existing structure on the upstream side. The total staging area, including over (but not within) the waterway, would be 2.81 acres (see Figure 1-15). This is the largest of the staging areas among the Build Alternatives.

The transverse slide-in method would maintain traffic on the existing bridge while the new steel-truss superstructure is built. Piles would be necessary for both the temporary and new final abutments. Constructing the new permanent abutments beyond the existing abutments would require nighttime, one-lane closures. The new abutments would accept the new bridge superstructure through a rail-type system. When the new bridge superstructure is completed and the existing bridge is dismantled, the new superstructure would be pushed transversely using a rail-type system from the temporary abutments onto the new permanent abutments (see Figure 1-7).

Once the new bridge is built, traffic would be diverted from the existing bridge to the new bridge in its temporary location, while the existing bridge is being dismantled. During this time, traffic would use the new bridge to cross Lagunitas Creek at reduced speeds (approximately 15 to 20 mph). This reduces the needed time to close SR 1 as compared to the ABC, longitudinal move-in method.

Once the existing bridge is dismantled, traffic would be detoured for 7 to 14 days while the new bridge is moved transversely (shifted horizontally) into its new position (see Figure 1-7) and roadway surface repaved before reopening the bridge to traffic. This construction method only applies to the full-span, steel-truss bridge type.
Alternative 4a
Project Impacts
Full-span Steel-Truss Bridge, ABC, Longitudinal Move-In
State Route 1 Lagunitas Creek Bridge Project
EA 0G642, MRN-1 Post Mile 28.4 – 28.6
ID: 04-13000350
Marin County, California
FIGURE 1-15
Alternative 4b
Project Impacts
Full-span Steel-Truss Bridge, ABC, Transverse Slide-In
State Route 1 Lagunitas Creek Bridge Project
EA 0G642, MRN-1 Post Mile 28.4 – 28.6
ID: 04-13000350
Marin County, California

Note:
The boundaries of the staging areas shown on this figure are estimates. There would be no direct take of residences and businesses.
### 1.4 Comparison of Alternatives

The five proposed Build Alternatives include the same roadway section; however, depending on the bridge design type, the width of the bridge cross-section varies (see Figure 1-7). Table 1-1 provides a high-level comparison of other key physical differences among the alternatives. Refer to Table S-3 in the Summary for differences among alternative impacts.

**Table 1-1 Summary of Key Differences Among Alternatives**

<table>
<thead>
<tr>
<th>Alternative – Construction Method</th>
<th>No. of Piers in the Water Channel&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Temporary Construction and Staging Area&lt;sup&gt;b&lt;/sup&gt;</th>
<th>Height Above and Width at Roadway Surface&lt;sup&gt;c&lt;/sup&gt; (All dimensions are approximate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alternative 1: No-Build&lt;sup&gt;d&lt;/sup&gt;</td>
<td>2</td>
<td>No staging area necessary</td>
<td>Height: 7 feet Width: 34 feet</td>
</tr>
<tr>
<td>Alternative 2a: Three-span, steel-truss bridge, ABC, longitudinal move-in</td>
<td>2</td>
<td>2.50 acres</td>
<td>Height: 12-foot truss panels Width: 47 to 50 feet</td>
</tr>
<tr>
<td>Alternative 2b: Three-span, steel-truss bridge, conventional construction</td>
<td>2</td>
<td>2.61 acres</td>
<td>Height: 12-foot truss Width: 47 to 50 feet</td>
</tr>
<tr>
<td>Alternative 3a: Three-span, concrete bridge, ABC, longitudinal move-in</td>
<td>2</td>
<td>2.52 acres</td>
<td>Height: 2-foot barrier or ornamental truss (height may vary) Width: 43 to 45 feet, depending whether ornamental truss is added</td>
</tr>
<tr>
<td>Alternative 4a: Full-span, steel-truss bridge, ABC, longitudinal move-in</td>
<td>None</td>
<td>2.51 acres</td>
<td>Height: 21 to 30 feet with cross bars Width: 47 to 50 feet</td>
</tr>
<tr>
<td>Alternative 4b: Full-span, steel-truss bridge, ABC, transverse slide-in</td>
<td>None</td>
<td>2.81 acres</td>
<td>Height: 21 to 30 feet with cross bars Width: 47 to 50 feet</td>
</tr>
</tbody>
</table>

**Notes:**

<sup>a</sup> Each pier includes two columns in the water and a pier cap connecting the columns upon which the superstructure is supported.

<sup>b</sup> All Build Alternatives would disturb a minimum of 2.5 acres for staging and temporary construction.

<sup>c</sup> Width includes travel lanes, shoulder, sidewalk, structural elements, and rail barriers.

<sup>d</sup> The No-Build Alternative is included as a point of comparison.

The other key differences among the Build Alternatives are the duration of construction and where the components of the bridge are assembled. Alternative 2b, three-span, steel-truss bridge, conventional construction, would require the longest construction period, approximately 3 years. This alternatives would involve the construction of a temporary bridge east of the existing bridge and would not require a full closure of the Lagunitas Crossing. While Alternative 2b is the only alternative...
evaluated with conventional construction, the impacts would be comparable if
conventional construction were performed with any of the bridge types. All other
alternatives would be constructed in less than 1 year using the ABC methods.
Alternative 4b, full-span, steel-truss bridge, ABC, transverse slide-in, would result in
similar or slightly larger temporary disturbance area than Alternative 2b because the
new bridge would be built adjacent to the east side of the existing bridge, but it would
require less than 1 year for construction and the shortest full closure of the Lagunitas
Creek Bridge of all the ABC alternatives.

1.5 Selection of a Preferred Alternative

After the public circulation period, all comments will be considered, and Caltrans will
select a preferred alternative and make the final determination of the project’s effect
on the environment. Under CEQA, Caltrans will certify that the project complies with
CEQA, prepare findings for all significant impacts identified, prepare a Statement of
Overriding Considerations for impacts that will not be mitigated below a level of
significance, and certify that the findings and Statement of Overriding Considerations
have been considered prior to project approval. Caltrans will then file a Notice of
Determination with the State Clearinghouse that will identify whether the project will
have significant impacts, if mitigation measures were included as conditions of
project approval, that findings were made, and that a Statement of Overriding
Considerations was adopted. Similarly, if Caltrans, as assigned by FHWA, determines
the National Environmental Policy Act (NEPA) action does not significantly impact
the environment, Caltrans will issue a Finding of No Significant Impact (FONSI). In
addition, FHWA’s responsibility for environmental review, consultation, and any
other action required in accordance with applicable federal laws for this project is
being, or has been, carried out by Caltrans under its assumption of responsibility
pursuant to 23 USC 327.

1.6 Alternatives Considered but Withdrawn from Further
Consideration

1.6.1 Early Screening
Transportation System Management (TSM) and Transportation Demand Management
(TDM) strategies and considering a new alignment for a bridge replacement were
dismissed early in the process.
1.6.1.1 TRANSPORTATION SYSTEM MANAGEMENT AND TRANSPORTATION DEMAND MANAGEMENT

TSM and TDM strategies are used to manage traffic flow and congestion. Example strategies of TSM include adjusting signal timing or vehicle detection systems to change signals. Examples of TDM are to influence the volume of traffic by providing incentives to carpool or influence the timing of persons commute to reduce the numbers of vehicles during high peak period commute hours. The project need does not include managing traffic flow and volume. TSM and TDM were not considered for the Lagunitas Bridge Project.

1.6.1.2 NEW BRIDGE ON NEW ALIGNMENT

A new alignment for the bridge and roadway would require relocating several residents and businesses, disturbing open spaces and/or parks facilities, and would result in environmental impacts substantially greater than the Build Alternatives under consideration. To avoid relocating homes and businesses, SR 1 would have to be realigned to avoid Point Reyes Station. The shortest distance to avoid the town and re-connect with the northern portion of SR 1 would impact Golden Gate National Recreation Area, which lies to the east of SR 1 south of Point Reyes Station. This realigned roadway would bisect large open space and grazing areas. Section 4(f) of the Department of Transportation Act of 1966, which is codified in federal law in Title 49 of the United States Code in Section 303 (Section 4(f)), requires federal projects to avoid the use of park lands unless there is no prudent or feasible alternative. This new crossing of Lagunitas Creek would be located east of Point Reyes Station where there are no developed areas. Environmental impacts would involve farmlands, sensitive riparian habitats, and wetland habitats. It could also mean that fewer visitors would drive through Point Reyes Station, which would negatively affect the economy of the community. Therefore, a new alignment was not carried forward.

1.6.2 Existing Alignment

The following Build Alternatives for the existing alignment were considered but dismissed:

- Alternative 3b: Three-span, concrete bridge, conventional (includes building a detour bridge)
- Alternative 4c: Full-span, steel truss bridge, conventional construction (includes building a detour bridge)
• Alternative 5: Single-span, suspension bridge, conventional construction (includes building a detour bridge)

• Alternative 6: Retrofit existing bridge, conventional construction (includes building a detour bridge)

The full alternatives analysis process is recorded in the Lagunitas Creek Bridge Alternatives Analysis Report (CH2M 2017). The following sections summarize the reasons these alternatives were not carried forward.

1.6.2.1 ALTERNATIVES 3B AND 4C
The bridge types associated with Alternatives 3b and 4c are represented in Alternatives 3a and 4a, respectively. Both Alternatives 3b and 4c include the conventional construction method. One alternative with conventional construction (Alternative 2b) was carried forward in the environmental analysis. The community and environmental regulatory agencies strongly opposed the longer construction period of conventional construction. The following issues contributed to their opposition:

• Effects on the economy.

• Lasting noise, air quality, and debris effects on nearby businesses, including effects on animals in recovery at the veterinarian hospital adjacent to the bridge.

• Prolonged disturbance on the sensitive habitats that support threatened and endangered species associated with Lagunitas Creek.

Alternative 2b, which includes conventional construction, is carried forward as a point of comparison against the ABC construction method and to disclose the full range of impacts of the project. However, all remaining alternatives that include the conventional construction were removed from further consideration.

1.6.2.2 ALTERNATIVE 5: SUSPENSION BRIDGE
The suspension bridge towers would have to be supported by large and deep foundations, which would require relocation of one combined business/residence and permanent use of park land in the Whitehouse Pool Park, located on the northwest side of the bridge. The property impacts would not be avoidable by shifting the bridge because the alignment is constrained on both sides. None of the other bridge alternatives would result in similar permanent property impacts. Construction noise, dust, and visual intrusion would not vary among the alternatives, except for the
suspension bridge alternative. The large foundations would require many more piles (as much as three times the number of piles) than the other bridge alternatives, resulting in long durations of noise and vibratory effects. Furthermore, the suspension bridge is not conducive to applying the ABC method (built in less than 1 year) and would require a 3-year construction period. In addition to these failings, the large mass and scale of the suspension towers and foundations would not be visually compatible with the character of the community. Therefore, the suspension bridge was not carried forward for a more detailed environmental review.

1.6.2.3 ALTERNATIVE 6: RETROFIT EXISTING BRIDGE
Caltrans explored the possibility of retrofitting the existing bridge as an alternative to bridge replacement. According to the Seismic Evaluation of Lagunitas Creek Bridge (Caltrans 2017), many elements of the bridge are extremely vulnerable to failure during a seismic event. See Section 1.2.2, Project Need, for details about the current condition of the bridge. Caltrans structural engineers explored the methods for retrofitting the bridge and learned that retrofitting the bridge would require the following:

- As explained in Section 1.2.2, Project Need, there are existing bridge deficiencies associated with the piles, piers, and abutments, as well as the truss itself. Virtually each major structural elements of the bridge would require reinforcement, replacement, or refurbishing. This effort would be unpredictable and could have unforeseen delays.

- An extensive support structure would have to be built under the bridge to support the bridge during the dismantling and restoration process. Working on reinforcements to the piers and abutments would require removing the bridge deck and T-spans. The presence of thick rust in the truss would require removing gusset plates and thickening the steel members to meet current seismic requirements. Without truss members, the bridge deck could not be supported. The existing bridge does not have redundancy in the structure; therefore, as the bridge is dismantled to be retrofitted, the structure would have to rely a massive temporary support structure built under and within Lagunitas Creek to avoid collapse.

- A support structure would be difficult to construct and remove within the limited allowable in-water work period mandated by the federal Endangered Species Act to protect threatened and endangered species. A creek water diversion would be necessary. Due to the amount of development on three corners of the bridge, a
creek diversion would require relocating a business and/or residence, large impacts on extensive riparian habitat, as well as substantial changes to Whitehouse Pool Park. As remarked previously, Section 4(f) requires that federally funded projects avoid parklands if there are feasible and prudent alternatives to do so. A creek water diversion has the potential for substantial impacts on protected species and their habitat due to destruction of habitat, large amounts of siltation from new water course, and a narrower channel that would change the water velocity. The regulatory agencies would resist permitting a project that would result in substantial environmental impacts to protected aquatic species if other alternatives with less impact are equally feasible.

- A temporary detour bridge would be necessary to safely maintain circulation during construction for the following reasons:
  - There is not enough room on the bridge for both construction workers and moving vehicles, creating safety issues for drivers and workers during the retrofit.
  - The temporary support structure would have to be strong enough to carry both the weight of the existing bridge and the weight of passing vehicles, which together are heavier than the requirements for the final retrofit bridge.
  - The retrofit would require removing the bridge deck and truss elements, not only to replace or refurbish but also to access and strengthen the piers and abutments.

Finally, the retrofit would not resemble the existing bridge because the steel members would be thicker, the piers and abutment foundations would be enlarged, and the lanes would be narrower in order to accommodate the required protective railings. Narrowing the lanes would not be in compliance with Caltrans safety design standards. There would be no improvements to sidewalks for bicycle, pedestrian, or equestrian users. The current sidewalk conditions do not meet ADA requirements, and under the retrofit alternative, this lack of compliance would continue.

Because the retrofit alternative would be an extensive effort, would result in comparatively much higher environmental impacts (including use of park land and adverse effects on special status species) than other alternatives under consideration, would not provide improvements for multimodal connectivity (such as pedestrians,
bicyclists, and equestrian users), this alternative was not carried forward into further environmental review.

1.7 Required Permits and Approvals

The permits, reviews, and approvals listed in Table 1-2 would be required for project construction.

**Table 1-2 Permits, Reviews, and Approvals Required for Project Construction**

<table>
<thead>
<tr>
<th>Agency</th>
<th>Permit/Approval</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. Fish and Wildlife Service (USFWS)</td>
<td>Endangered Species Act, Section 7, Biological Opinion</td>
<td>Once the preferred alternative is chosen, formal consultation with USFWS will be initiated.</td>
</tr>
<tr>
<td>National Marine Fisheries Service (NMFS)</td>
<td>Endangered Species Act, Section 7, Biological Opinion</td>
<td>Once the preferred alternative is chosen, formal consultation with NMFS will be initiated.</td>
</tr>
<tr>
<td>National Oceanic and Atmospheric Administration (NOAA), Greater Farallones National Marine Sanctuary</td>
<td>Permit</td>
<td>Following environmental document certification, permit application will be submitted.</td>
</tr>
<tr>
<td>U.S. Army Corps of Engineers (USACE)</td>
<td>Clean Water Act, Section 404</td>
<td>Following environmental document certification, permit application will be submitted.</td>
</tr>
<tr>
<td>U.S. Coast Guard (USCG)</td>
<td>Use of Navigable Waters</td>
<td>Prior to environmental certification, Caltrans will coordinate with U.S. Coast Guard to obtain written consent of use of navigable waters.</td>
</tr>
<tr>
<td>California Department of Fish and Wildlife (CDFW)</td>
<td>California Fish and Game Code, Section 1602 Lake and Streambed Alteration Agreement</td>
<td>Following environmental document certification, permit application will be submitted.</td>
</tr>
<tr>
<td></td>
<td>California Fish and Game Code, Section 2081 Incidental Take Permit</td>
<td>Following environmental document certification, permit application will be submitted.</td>
</tr>
<tr>
<td>Regional Water Quality Control Board (RWQCB)</td>
<td>Clean Water Act Section 401</td>
<td>Following environmental document certification, permit application will be submitted.</td>
</tr>
<tr>
<td>California Coastal Commission</td>
<td>Coastal Development Permit</td>
<td>Following environmental document certification, permit application will be submitted.</td>
</tr>
<tr>
<td>Marin County Parks</td>
<td>Temporary Construction Easement</td>
<td>Following environmental document certification, permit application will be submitted.</td>
</tr>
<tr>
<td>CDFW and Marin County Parks</td>
<td>US Department of Transportation Act Section 4(f),</td>
<td>Currently seeking concurrence of <em>De Minimis</em> determination.</td>
</tr>
</tbody>
</table>
### Table 1-2 Permits, Reviews, and Approvals Required for Project Construction

<table>
<thead>
<tr>
<th>Agency</th>
<th>Permit/Approval</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marin County Public Works</td>
<td>Congestion Management Plan</td>
<td>Following environmental document certification, permit application will be submitted.</td>
</tr>
</tbody>
</table>

### 1.8 Construction Cost

This project is funded by the SHOPE 2016/17: Bridge Seismic Restoration (201.113 Program) scheduled for construction in 2019 for ABC methods, and from 2019 through 2022 for conventional construction methods. Following are projected total project costs for the five Build Alternatives:

- The estimated construction cost for Alternative 2a, Three-span, short steel-truss bridge, ABC, longitudinal move-in, is approximately $8.7 million.

- The estimated construction cost for Alternative 2b, Three-span, short steel-truss bridge, conventional construction, is approximately $12.6 million.

- The estimated construction cost for Alternative 3a, Three-span, concrete bridge, ABC, longitudinal move-in, is approximately $8 million.

- The estimated construction cost for Alternative 4a, Full-span, steel-truss bridge, ABC, longitudinal move-in, is approximately $9.1 million.

- The estimated construction cost for Alternative 4b, Full-span, steel-truss bridge, ABC, transverse slide-in, is approximately $10.1 million.
Chapter 2  Affected Environment, Environmental Consequences, and Avoidance, Minimization, and/or Mitigation Measures

This chapter explains the impacts that the proposed project would have on the human and physical environments in the project area. It describes the existing environment that could be affected by the project; potential direct and indirect impacts from each alternative during the construction and operation phases; and proposed avoidance, minimization, and/or mitigation measures that have been incorporated into the project.

As part of the public scoping and environmental analysis conducted for this project, the following environmental issues were considered, but either the resources are not present or no adverse impacts were identified. Consequently, there is no further discussion regarding these issues in this document.

Wild and Scenic Rivers – The project area does not include any waterways designated as a National Wild and Scenic River.

Growth – The purpose of the proposed project is to provide a safe, seismically stable crossing of Lagunitas Creek on SR 1 in Marin County, California. The project would not add capacity to SR 1 nor induce changes in access that may be considered growth-inducing in terms of land use, economic vitality, or population density.

Accessibility will not change during operation and construction phases and therefore the project would not affect growth. Use of the detour route during construction (Alternatives 2a, 3a, 4a, and 4b) and detour bridge (Alternative 2b) would continue to provide accessibility to and from the community, as well as to recreational opportunities in the area. As discussed in Section 2.1.2, Community Impacts, there would be some traffic delay in reaching the community of Point Reyes Station and recreational opportunities in the project area, which could affect tourism to the area. However, the traffic delay would be short-term periods and during off peak commuting hours, and up to 3 weeks during a full closure. Because the Project would not induce growth in the community or region, it would not result in indirect effects to resources of concern, such as cultural resources or biological resources.
Chapter 2 Affected Environment, Environmental Consequences, and Avoidance, Minimization, and/or Mitigation Measures

No known major developments are planned for the project vicinity. Projects currently underway in the vicinity consist only of moderate expansions to existing residences and commercial buildings (Marin County 2016).

Farmlands/Timberlands – The project site is located within an area classified entirely as Urban and Built-Up Land by the California Department of Conservation (CDC 2016) and contains no qualifying farmland, forest, or timberland. Existing forest lands are within protected lands and would not be affected by this operation or the construction phases.

While these resources are analyzed in this EA, none of the project alternatives would result in adverse effects on the following:

- Paleontological resources
- Historic properties
- Archaeological resources

2.1 Human Environment

2.1.1 Land Use

2.1.1.1 REGULATORY SETTING

This project has the potential to affect resources protected by the Coastal Zone Management Act of 1972 (CZMA). The CZMA is the primary federal law enacted to preserve and protect coastal resources. The CZMA sets up a program under which coastal states are encouraged to develop coastal management programs. States with an approved coastal management plan are able to review federal permits and activities to determine if they are consistent with the state’s management plan.

California has developed a coastal zone management plan and has enacted its own law, the California Coastal Act of 1976, to protect the coastline. The policies established by the California Coastal Act are similar to those for the CZMA, they include the protection and expansion of public access and recreation; the protection, enhancement, and restoration of environmentally sensitive areas; the protection of agricultural lands; the protection of scenic beauty; and the protection of property and life from coastal hazards. The California Coastal Commission is responsible for implementation and oversight under the California Coastal Act.

Just as the federal CZMA delegates power to coastal states to develop their own coastal management plans, the California Coastal Act delegates power to local governments to enact their own local coastal programs (LCPs). LCPs determine the
short- and long-term use of coastal resources in their jurisdiction consistent with the California Coastal Act goals. A federal consistency determination may be needed as well.

### 2.1.1.2 Existing and Future Land Use

Information in this section is based on the Community Impact Assessment prepared for this project (Caltrans 2017) and the LCPs. This coastal zone is covered by the Marin County LCP (Marin County 1981).

The project area (see Figure 1-1) extends approximately 0.1 mile north and 0.05 mile south of the existing Lagunitas Creek Bridge, at the southern end of the community of Point Reyes Station. The study area for this land use analysis is an area surrounding the project limits, within which nearby uses may be most directly impacted by construction and changes in access (see Figure 2.1.1-1).

Existing land uses west, south, and east of the project area are generally rural. South and west of the project site are a few small businesses, including a meat market and law firm, and single-family homes fronting onto State Route 1 (SR 1) and Sir Francis Drake Boulevard both. Immediately north is a veterinary hospital that also includes one residential unit attached to the same building. North of the project area is the commercial core of Point Reyes Station. There are a number of parks in the vicinity of the project area including Whitehouse Pool Park, immediately adjacent to the west side of the project area, Point Reyes National Seashore about 0.25 mile west and south, and Golden Gate National Recreation Area is about 0.1 mile south, west, and east. The project area is zoned residential or village commercial/residential (C-VCR-B2) (Marin County 2007) (see Figure 2.1.1-1). The Countywide Plan land use designation for the project area is recreational commercial (C-RC).

The Marin Countywide Plan (Marin County 2007) designations in the project area and vicinity correspond relatively closely to zoning designations and are mostly open space, agriculture, and low-density or rural residential with commercial designations in a few small areas (see Figure 2.1.1-2). The existing and future land use plan emphasizes open space preservation for vast areas as opposed to residential or agricultural uses.

As discussed under Growth in Section 2.0, no major developments are planned for the project area. Projects currently underway in the vicinity consist only of moderate expansions of existing residences and commercial buildings (Marin County 2016).
FIGURE 2.1.1-1
Zoning Designations
State Route 1 Lagunitas Creek Bridge Project
EA 0G642, MRN-1 Post Mile 28.4 – 28.6
ID: 04-13000350
Marin County, California

Reference: Marin County Code of Ordinances
(Marin County 2016a)
FIGURE 2.1.1-2
General Plan Land Use Designations
State Route 1 Lagunitas Creek Bridge Project
EA 0G642, MRN-1 Post Mile 28.4 – 28.6
ID: 04-13000350
Marin County, California

Reference: Marin Countywide Plan
(Marin County 2007)

LEGEND
Study Area
Project Area
Half-mile Radius

General Plan
Agriculture and Conservation
(AG1, AG2, AG3, C-AG1, C-AG3)
General Commercial
(C-GC)
Recreational Commercial
(C-RC)

Neighborhood Commercial/Mixed Use
(C-NC)
Low Density Residential
(C-SF5, C-MF2)
Low to Medium Density Residential
(C-MF3)
Very Low Density Residential
(C-SF2)
Rural Residential
(C-SF3, C-SF4, C-PR)
Open Space
(C-OS, OS)

See inset map for project area detail

Service Layer Credits: Sources: Esri, USGS, Marin County
Planned developments in the study area are listed in Table 2.1.1-1. According to the Point Reyes Community Plan, the goal for growth is to accommodate increased tourism without changing local character or quality of life (Marin County 2001).

### Table 2.1.1-1 Planned Developments in the Study Area

<table>
<thead>
<tr>
<th>Development Name</th>
<th>Jurisdiction</th>
<th>Status</th>
<th>Description</th>
<th>Development Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baruch (P1279)</td>
<td>Marin County (West Marin)</td>
<td>Under Design Review</td>
<td>Single-family residence addition/remodel</td>
<td>Adding 839 sf to existing 2,067-sf structure</td>
</tr>
<tr>
<td>Demmel (P1279)</td>
<td>Marin County (West Marin)</td>
<td>Under Design Review</td>
<td>Single-family residence addition/remodel</td>
<td>Existing structure 842 sf, no new square footage to be added</td>
</tr>
<tr>
<td>Donnelly (15-0137)</td>
<td>Marin County (West Marin)</td>
<td>Under Design Review</td>
<td>Single-family residence addition/remodel</td>
<td>Adding 274 sf to 2,495-sf structure</td>
</tr>
<tr>
<td>Husband (P1210)</td>
<td>Marin County (West Marin)</td>
<td>Under Design Review</td>
<td>New single-family residence</td>
<td>Constructing new 2,270-sf home</td>
</tr>
<tr>
<td>Stublarec (P1283)</td>
<td>Marin County (West Marin)</td>
<td>Under Design Review</td>
<td>Single-family residence addition/remodel</td>
<td>Adding 830 sf to 462-sf structure</td>
</tr>
<tr>
<td>Switzer (P1134)</td>
<td>Marin County (West Marin)</td>
<td>Under Design Review</td>
<td>Single-family residence addition/remodel</td>
<td>Adding 1,054 sf to existing structure</td>
</tr>
<tr>
<td>West Marin EAH Senior Housing (P1104)</td>
<td>Marin County (West Marin)</td>
<td>Under Design Review</td>
<td>Multifamily residence addition/remodel</td>
<td>Adding 1,000 sf to existing structure</td>
</tr>
<tr>
<td>West Marin Service Center (P1135)</td>
<td>Marin County (West Marin)</td>
<td>Under Design Review and Appeal to Planning Commission</td>
<td>Institutional addition/remodel</td>
<td>Adding 2,075 sf to existing 3,175-sf structure</td>
</tr>
<tr>
<td>Wilson (14-0105)</td>
<td>Marin County (West Marin)</td>
<td>Under Design Review</td>
<td>Renovation of Grandi building in Point Reyes Station for mixed use</td>
<td>No additional square footage to be added</td>
</tr>
</tbody>
</table>

**Note:**
sf = square feet

Historically, annual growth in Point Reyes Station has been approximately 10 dwelling units per year (Marin County 2001). The Association of Bay Area Governments and Metropolitan Transportation Commission regional growth strategy is to preserve the rural character of small North Bay communities, such as the project vicinity, by concentrating population into inner Bay Area communities (ABAG and MTC 2013).
Coastal Zone
The project area is located in Unit 2 of the Coastal Zone of Marin County, which includes the coastal area from Olema north to the Sonoma-Marin County border. This Coastal Zone is covered by the Marin County LCP (Marin County 1981). In addition, a permit from the Greater Farallones National Marine Sanctuary will be required for this project. Significant coastal resources, such as wetlands, riparian habitats, access to recreational activities, and visual resources occur in the project area. Wetlands and riparian habitats are discussed in Section 2.3, Biological Environment. Recreational activities within the coastal zone are discussed in Section 2.1.3. Visual resources and important viewsheds are discussed in Section 2.1.6.

2.1.1.3 CONSISTENCY WITH STATE, REGIONAL, AND LOCAL PLANS
Applicable plans, goals, and policies were reviewed for consistency with all Build Alternatives (see Table 2.1.1-2). Applicable plans include the following:

- **Plan Bay Area: Regional Transportation Plan and Sustainable Communities Strategy for the San Francisco Bay Area 2013 to 2040** (ABAG and MTC 2013)
- **Marin Countywide Plan** (Marin County 2007)
- **Point Reyes Station Community Plan** (Marin County 2001)
- **Marin County Local Coastal Program, Unit 2 (LCP)** (Marin County 1981)

### Table 2.1.1-2 Consistency with State, Regional, and Local Plans and Programs

<table>
<thead>
<tr>
<th>Policy</th>
<th>Build Alternatives (Alternatives 2a, 2b, 3a, 4a, 4b)</th>
<th>No-Build Alternative (Alternative 1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regional Transportation Plan. Plan Bay Area 2013</td>
<td>Consistent. Implementation of the Build Alternatives would involve replacing the Lagunitas Creek Bridge, which would occur in an already developed area. The new bridge would not increase roadway capacity, would not spur new development that would increase greenhouse gas emissions, and would not conflict with policies that promote compact, mixed-use commercial and residential development. Build Alternatives would improve safety along SR 1 for bike and pedestrian access and provide facilities consistent with the ADA and the Safe Routes to School Program.</td>
<td>Not consistent. The existing bridge sidewalk is not consistent with ADA requirements and fails to provide shoulders wide enough for cyclists. Sidewalks and shoulders are less safe for pedestrians and cyclists, hindering the implementation of the Safe Routes to School Program.</td>
</tr>
</tbody>
</table>
Table 2.1.1-2 Consistency with State, Regional, and Local Plans and Programs

<table>
<thead>
<tr>
<th>Policy</th>
<th>Build Alternatives (Alternatives 2a, 2b, 3a, 4a, 4b)</th>
<th>No-Build Alternative (Alternative 1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regional growth strategy is to maintain rural character of communities: “by concentrating growth in the inner Bay Area and communities with frequent transit service, this growth strategy will help North Bay communities maintain their rural and small town character. While accommodating a very limited amount of new growth, rural centers and corridors will enhance the pedestrian environment and access to local services in the traditional downtowns of these communities.” P. 56-57</td>
<td>Consistent. See above.</td>
<td>Not consistent. The existing bridge sidewalk is not consistent with ADA requirements and fails to provide shoulders wide enough for cyclists. Sidewalks and shoulders are less safe for pedestrians and cyclists, hindering the implementation of the Safe Routes to School Program.</td>
</tr>
<tr>
<td>Marin Countywide Plan</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Policy TR-1.6: Keep Rural Character in West Marin. Maintain roads in West Marin as two-lane routes, with the possible additions of bicycle lanes, turn lanes at intersections, and turnouts for slow-moving traffic.</td>
<td>Consistent. The Build Alternatives would replace the current bridge with a structure that would not alter the existing rural character of West Marin.</td>
<td>Not consistent. The No-Build Alternative would not result in a change to the rural character of West Marin, given that the current bridge would remain in place. However, the No-Build Alternative would not provide safety additions such as bike lanes or cross walks.</td>
</tr>
<tr>
<td>Point Reyes Station Community Plan</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Policy PA-3.8: Rural Improvement Standards. Improvements such as roads, driveways, parking areas, and residential and commercial lighting should be compatible with the rural environment. For example, the use of gravel instead of asphalt as cover for parking areas is encouraged. Outdoor lighting shall serve the safety of ingress and egress but shall not detract from the enjoyment of the natural nightscape.</td>
<td>Consistent. The Build Alternatives would be compatible in scale and character within the context of the rural character of the project area. No new lighting is proposed.</td>
<td>Consistent. The No-Build Alternative would leave the current bridge in place, thereby resulting in no change to the rural character of the project area.</td>
</tr>
<tr>
<td>Policy HR-1.3: New Construction. All new construction located within the Point Reyes Station Historic Area (Appendix B) shall be consistent in scale, design, materials, and texture with the surrounding community character.</td>
<td>Consistent. The Build Alternatives (2a, 2b, and 3a) would be compatible in scale and character within the context of the surrounding community. Inconsistent. Alternatives 4a and 4b would not be compatible in scale and character within the context of the surrounding community (see Section 2.1.6, Visual/Aesthetics)</td>
<td>Consistent. The No-Build Alternative would leave the current bridge in place, thereby resulting in no change to the character of the project area.</td>
</tr>
</tbody>
</table>
Table 2.1.1-2  Consistency with State, Regional, and Local Plans and Programs

<table>
<thead>
<tr>
<th>Policy</th>
<th>Build Alternatives (Alternatives 2a, 2b, 3a, 4a, 4b)</th>
<th>No-Build Alternative (Alternative 1)</th>
</tr>
</thead>
</table>
| Policy T-1.1: Maintain Rural Character of Roadways. Roadway improvements should be limited to projects that enhance safety only and do not increase the capacity of the road network. Specifically, all roads in the Planning Area, including State Highway 1, should retain their rural, scenic character with a two-lane width or less and without curbs, gutters, sidewalks, traffic lights, and street lights. The only area to be considered for sidewalks and similar roadway improvements shall be the Downtown Area. Other permitted roadway projects should be limited to:  
  • Slope stabilization  
  • Drainage control  
  • Safety improvements  
  • Expansion of shoulder paving to accommodate bicyclists and pedestrians  
  • Creation of vista and slower traffic turn-outs  
  • Improvements to accommodate public transit | Consistent. The Build Alternatives would maintain the rural character of the project area, would enhance safety of the Lagunitas Creek crossing and would not increase the capacity of the road network. Sidewalks and shoulders meet minimum requirements only. | Not consistent. The No-Build Alternative would leave the current bridge in place, thereby resulting in no change to the rural character of the project area. However, the No-Build Alternative would not provide safety additions such as bike lanes, cross walks, or turnouts for slow-moving traffic. |

Notes:
ADA = Americans with Disabilities Act  
SR = State Route

2.1.1.4 ENVIRONMENTAL CONSEQUENCES
This section reviews how the project may result in changes to land uses and then reviews the consistency with the Marin County LCP.

Land Use
Transportation projects can convert existing land uses into transportation use through property acquisition or through changes in access; in addition, changes in the physical environment caused by changes in transportation patterns can indirectly lead to changes in land use.

Alternative 1: No-Build Alternative
Under Alternative 1, the project would not be constructed. As discussed in Table 2.1.1-2, Alternative 1 is not consistent with policies in the Regional
Chapter 2 Affected Environment, Environmental Consequences, and Avoidance, Minimization, and/or Mitigation Measures

Transportation Plan and Sustainable Communities Strategy for the San Francisco Bay Area 2013 to 2040 (ABAG and MTC 2013), Marin Countywide Plan (Marin County 2007), and Point Reyes Station Community Plan (Marin County 2001).

Alternative 2a: Three-span, Short Steel-truss Bridge, ABC, Longitudinal Move-in

Operational Impacts
The project is consistent with all applicable land use goals, policies, and programs. As discussed in Section 2.1.3, Parks and Recreational Facilities, there would be one minor conversion of park lands to transportation use on the northwest side of the project limits. To widen the shoulder to enhance connectivity between the bridge, and the Whitehouse Pool Park trailhead toward Point Reyes Station, a narrow sliver of park land of less than 0.01 acre (less than 1,000 square feet) would be acquired. There are no recreational activities affected by this acquisition, thus no further indirect impacts to land use are expected. Therefore, there would be no adverse effects to land use as a result of this project for Alternative 2a.

Construction Impacts
During construction, several properties would be affected for construction staging and access to the bridge site. These staging and access areas would temporarily change the land use of these areas. Construction would require a temporary construction easement of less than 0.05 acre (under 2,000 square feet) within Whitehouse Pool Park. Portions of six private properties would be used for construction access and staging materials and equipment. Two affected properties are undeveloped dirt or gravel areas. Another affected property contains a veterinary hospital in which construction staging would remove one point of access and several parking stalls. The noise and dust of the construction may affect veterinary activities and the comfort of the patient animals. This may result in a short-term change of use. On a residential property southeast of the project area, construction access to the bridge site would require using the front yard of one residential unit and potentially change the access for this home and two others that share this driveway. The equipment staging, noise, and change in access may result in temporarily changing the use from residential to construction zone. Relocation and real property acquisition of affected properties and conformance with the Uniform Relocation Act is discussed in Section 2.1.2.2. Noise impacts to affected properties are discussed in Section 2.2.7.
Alternative 2b: Three-span, Short Steel-truss Bridge, Conventional Construction (with Detour Bridge)

Operational Impacts
Alternative 2b would be consistent with all applicable land use goals, policies, and programs. The conversion of park land to transportation use would be the same as that under Alternative 2a.

Construction Impacts
Construction impacts would be the similar to Alternative 2a, except of longer duration. The 3-year construction period may place additional strain on the veterinary hospital business and the livability of the residential units. This may have an indirect effect of property owners preferring to move or sell their property and business, and may result in a request to change the land use. Because the Marin Countywide Plan (Marin County 2007) has strong rural policies, it is anticipated that a change of owners would not result in a change of residential land use designation. A relocation of the veterinary hospital would result in a different business moving into the same location but would not change the commercial land use designation.

Alternative 3a: Three-span, Concrete Bridge, ABC, Longitudinal Move-in

Operational and Construction Impacts
Alternative 3a and the design option to add an ornamental truss to resemble the existing bridge would be consistent with all applicable land use goals, policies, and programs. Operation and construction impacts would be the same as those under Alternative 2a.

Alternative 4a: Full-span, Steel-truss Bridge, ABC, Longitudinal Move-in

Operational Impacts
Alternative 4a would not be consistent with the Point Reyes Station Community Plan (Marin County 2001) Policy HR-1.3 and Marin County Local Coastal Program, Unit 2 (Marin County 1981), New Development and Land Use Policy 3a, because the height and width of the proposed bridge would not be compatible with the scale and character of the surrounding community. Under this alternative, the truss would be 20 to 30 feet high compared to the existing bridge, which has a 7-foot-tall truss. Therefore, this alternative would have an adverse effect on the existing character and scale of the surrounding community.

Construction Impacts
All direct and indirect construction impacts would be the same as those under Alternative 2a.
Chapter 2 Affected Environment, Environmental Consequences, and Avoidance, Minimization, and/or Mitigation Measures

**Alternative 4b: Full-span, Steel-truss Bridge, ABC, Transverse Slide-in**

**Operational Impacts**
All direct and indirect impacts would be the same as those under Alternative 4a.

**Construction Impacts**
All direct and indirect impacts would be the same as those under Alternative 4a, except the staging area would resemble Alternative 2b because the bridge would be built adjacent to the existing bridge before sliding it into the final alignment. Therefore, construction impacts would resemble Alternative 2b without the same duration of construction. This is a short-term effect that would not result in lasting changes of land use.

**Coastal Zone**
Table M-1 in Appendix M summarizes impacts to coastal zone resources by Build Alternative. As discussed in Table M-1, measures to minimize impacts to coastal resources affected by the project are included in other resources analyses in this environmental impact report/environmental assessment as noted. These measures are preliminary and subject to change pending both final design and coordination with the California Coastal Commission and Greater Farallones National Marine Sanctuary.

For wetlands and other waters of the U.S. and state, these include AMM BIO-5, which requires the reseeding and restoration of all disturbed areas of wetland and other waters of the U.S. and state within the project site. Mitigation Measure BIO-A requires habitat enhancements such as large in-stream woody debris are planned during stream bank reconstruction within other waters of the U.S. and state. Offsite restoration efforts to offset project impacts to wetlands and other waters of the U.S., if needed, will be coordinated during the design phase of this project. Water quality Avoidance and Minimization Measures (AMMs) are provided in Section 2.2.2 to minimize adverse effects of stormwater runoff pollution, erosion, and sedimentation to preserve natural vegetation. Air quality AMMs provided in Section 2.2.6 and biological AMMs provided in Section 2.3.1 would ensure best practices in construction and revegetation.

For visual resources, AMMs Visual-1 through AMM Visual-4 listed in Section 2.1.6.4 would reduce the visual effects of Alternatives 2a, 2b, and 3a. These include color treatment of the concrete piers and bridge deck to blend with their natural setting. Color treatment of the crash cushions match the color of the bridge truss. Measures also include revegetation disturbed areas, implementing restrictions on construction lighting, and screening construction staging and storage areas. The
visual impact of Alternatives 4a and 4b would be adverse because they would be out of scale with surrounding development.

For environmentally sensitive habitat areas (ESHAs), mitigation measures AMM BIO-1 and AMM BIO-2 listed in Section 2.3.1.3 would minimize adverse environmental effects by establishing a revegetation planting plant and implementation as well as installing fencing to prevent unnecessary impacts on the ESHAs. Caltrans will coordinate with California Coastal Commission to determine the mitigation ratio for native and non-native riparian tree replacement.

For water quality, all Build Alternatives would result in an increase in 0.07 acre of impervious surface compared to the existing condition. The project would implement AMM WATER-1 through AMM WATER-3 listed in Section 2.2.2.4 to minimize impacts to water quality. The AMMs include a stormwater pollution prevention plan containing best management practices to reduce erosion, stabilize disturbed soil areas, and maximize vegetated surfaces; stormwater treatment measures such as bioremediation with basins or swales; and temporary creek diversions during construction to minimize sediment runoff.

For coastal geologic hazards, Caltrans is required to prepare Final Seismic Design Recommendations (SDR), and Final Foundations Reports consistent with Caltrans Seismic Design Criteria, prior to final design. The bridge design and the construction work will be performed in compliance with the Caltrans SDC, Final SDR, Final Foundations Report, and the Caltrans Standard Specifications. Complying with these reports, memoranda, and specifications will minimize the identified design/construction impacts. No avoidance, minimization, and/or mitigation measures are required.

For cultural and paleontological resources, compliance with Caltrans Standard Specifications and implementation of AMM CULT-1 as discussed in Sections 2.1.7.4 and 2.2.4.4 would ensure that no adverse effects would occur to unanticipated cultural or paleontological resources.

2.1.1.5 AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

Land Use
All Build Alternatives would permanently convert 0.01 acre (less than 1,000 square feet) of park lands in Whitehouse Pool Park to transportation use on the northwest side of the project limits. Measures that address this minor land use conversion are discussed in Section 2.1.3, Parks and Recreational Facilities.
During construction, temporary easements would be placed on some neighboring properties for construction staging and access to the bridge site under all Build Alternatives. These temporary impacts will be minimized by implementing the following avoidance and minimization measures:

- **AMM LAND USE-1: Maintain access and parking at veterinary hospital.** Prior to construction, the California Department of Transportation (Caltrans) will reconfigure access and parking to allow for continued availability of that parking and access.

- **AMM LAND USE-2: Minimize negative construction impacts on animals under veterinary care.** Caltrans will coordinate with the veterinary clinic to minimize negative construction impacts on animals under care, if needed. Measure(s) could include temporary relocation of animals under care.

- **AMM LAND USE-3: Maintain access to residential parcels affected by project.** Prior to construction, Caltrans will reconfigure access and parking in residential lots with temporary construction easements, as necessary, to allow for continued availability of parking and access.

Implementation of the avoidance and minimization measures in Section 2.2.7, Noise, would further minimize the effect of construction noise on animals.

2.1.2 Community Impacts

2.1.2.1 COMMUNITY CHARACTER AND COHESION

**Regulatory Setting**

The National Environmental Policy Act (NEPA) of 1969, as amended, established that the federal government use all practicable means to ensure that all Americans have safe, healthful, productive, and aesthetically and culturally pleasing surroundings (42 United States Code [USC] 4331[b][2]). The Federal Highway Administration, in its implementation of NEPA (23 Code of Federal Regulations [CFR] 109[h]), directs that final decisions on projects are to be made in the best overall public interest. This requires taking into account adverse environmental impacts, such as destruction or disruption of human-made resources, community character and cohesion, and the availability of public facilities and services.

Under the California Environmental Quality Act, an economic or social change by itself is not to be considered a significant effect on the environment. However, if a social or economic change is related to a physical change, then social or economic
change may be considered in determining whether the physical change is significant. Since this project would result in physical change to the environment, it is appropriate to consider changes to community character and cohesion in assessing the significance of the project’s effects.

**Affected Environment**

Community character is defined as the combination of demographics, housing characteristics, economic conditions, and communities of the study area as well as community facilities. Community cohesion is defined as the degree to which residents have a sense of belonging to their neighborhood, a level of commitment to the community, or a strong attachment to neighbors, groups, and institutions, usually as a result of continued association over time.

Information in this section is based on the Community Impact Assessment (CIA) prepared for this project (Caltrans 2017).

The study area for community character and cohesion includes the communities in the vicinity of the project area with the most potential to be affected by the project. These are generally within 5 miles of the project site, and include the unincorporated communities of Olema, Point Reyes Station, Inverness Park, Inverness, and Seahaven (see Figure 2.1.1-1 in Section 2.1.1). The study area also includes regional destinations such as Point Reyes National Seashore, Tomales Bay State Park, and Tomales Bay Ecological Reserve.

The bridge is a vital access corridor to and from Point Reyes Station from State Route 1 (SR 1) and Sir Francis Drake Boulevard. Point Reyes Station is the main commercial district in the study area and includes many businesses that support tourism, including bed and breakfasts, small inns, cafés, restaurants, ice cream shops, and boutiques selling local products and artwork. Point Reyes Station also has a variety of other small businesses that support the larger region. The downtown area is characterized by commercial buildings built from the turn of the 20th century to present, closely adjoined by homes of various sizes and age. Point Reyes Station has several community, business, or politically oriented groups or networks, including Main Street Moms Organize or Bust, Point Reyes Village Association, Point Reyes Community Garden, Point Reyes Open Studios, a farming network, Saturday Farmers’ Market, a local businesses network, and a local radio station. Point Reyes Station offers many community gathering places, such as a weekly farmers market, community center, restaurants, cafés, and parks.
Olema, approximately 2 miles south of the project area along SR 1, consists of a few shops, two restaurants, a lodge, several bed and breakfasts, a large private campground, and a few single-family homes. The Bear Valley Visitor Center in Point Reyes National Seashore is 0.25 mile from town on Bear Valley Road. Inverness is northwest of Point Reyes Station, west of the Tomales Bay inlet, accessed via Sir Francis Drake Boulevard and on the way to Point Reyes National Seashore. Inverness has a small downtown area with a general store, post office, library, a few restaurants, shops, and inns. It has a small public marina, a few private piers, and the Inverness Yacht Club. Seahaven and Inverness Park are residential communities at the north and south ends of Inverness, respectively.

These communities are interdependent. For instance, study area children attend kindergarten and first grade in Inverness, second through eighth grade in Point Reyes Station, and high school in Tomales Bay. Also, the fire department serving the entire study area is located in Point Reyes Station, with only volunteer fire departments in Inverness and Bolinas. Shopping is spread around each of the communities; however, Point Reyes Station has the only bank and hardware store for the study area.

These smaller communities are part of a larger area, locally known as West Marin, which contains 13 unincorporated rural communities. West Marin communities are connected by a number of social, political, and business organizations (West Marin Commons 2016), including the West Marin Chamber of Commerce, West Marin Multi-Services Center (provides social services), West Marin Environmental Action Committee, West Marin Community Services (supports low-income and Latino families across West Marin), Food and Farm Tours of West Marin, West Marin Lion’s Club, and West Marin Rotary Club. Children’s schools and sports leagues include all or many West Marin communities. All West Marin communities are served by the same newspaper, the Point Reyes Light, which was founded in 1948.

Demographic data compiled in the CIA (Caltrans 2017) contain indications of potential high community character and cohesion in the study area. Indicators include a high proportion of the following: long-term residency tenure, households of two or more people, rates of home ownership, frequent personal contact, ethnic homogeneity, and percentage of elderly residents. Data were collected from the 2010 to 2014 5-year American Community Survey (ACS) for population, age, race, ethnicity, income, and households characteristics (U.S. Census Bureau 2014). The data are summarized in Table 2.1.2-1 and in Tables 2.1.2-4 and 2.1.2-5 in Section 2.1.2.3, Environmental Justice.
Table 2.1.2-1 Demographic Data for Study Area and Marin County

<table>
<thead>
<tr>
<th>Area</th>
<th>Study Area</th>
<th>Marin County</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Population</td>
<td>2,665</td>
<td>256,802</td>
</tr>
<tr>
<td>Under 18</td>
<td>9%</td>
<td>21%</td>
</tr>
<tr>
<td>Over 65</td>
<td>29%</td>
<td>18%</td>
</tr>
<tr>
<td>Median Age</td>
<td>54.5</td>
<td>45.1</td>
</tr>
<tr>
<td>Average Residents per Household</td>
<td>2.1</td>
<td>2.4</td>
</tr>
<tr>
<td>Householder Living Alone</td>
<td>44%</td>
<td>31%</td>
</tr>
<tr>
<td>Median Household Income</td>
<td>$50,452</td>
<td>$91,529</td>
</tr>
<tr>
<td>Below Poverty Level</td>
<td>17%</td>
<td>9%</td>
</tr>
<tr>
<td>Owner-Occupied Housing</td>
<td>49%</td>
<td>63%</td>
</tr>
<tr>
<td>Renter-Occupied Housing</td>
<td>51%</td>
<td>37%</td>
</tr>
<tr>
<td>Vacant Units</td>
<td>40%</td>
<td>8%</td>
</tr>
</tbody>
</table>

Source: U.S. Census Bureau 2014

As shown in Table 2.1.2-1, the data indicate that just over half the households in the study area have two or more people. The percentage of owner-occupied housing is about the same as the percentage of rental-occupied housing, and most units are single-family homes (see Land Use, Section 2.1.1). The high percentage of rental housing is partially attributed to the tourism aspect of renting vacation units near vast areas of open spaces and nearby beaches. The percentage of elderly residents is relatively high (29 percent). As shown in Table 2.1.4 in Section 2.1.2.3, Environmental Justice, ethnic homogeneity is fairly high in the study area, with almost 80 percent of the population identifying as white. The highest concentration of minority population is Hispanic or Latino. Limited English proficiency, which can be an additional indicator of the presence of minority populations, is low (U.S. Census Bureau 2014).

Environmental Consequences

The following section provides information on the potential impacts associated with the proposed project on community character and cohesion.

Alternative 1: No-Build Alternative

Under the No-Build Alternative, there would be no impacts associated with project construction; however, the risk of bridge failure during a strong seismic event would continue. The bridge provides critical access for routine community functions,
ranging from emergency services, to primary school attendance, to goods and services for communities west and south of Point Reyes Station. A sudden closure would require a 9-mile detour for many daily activities and may jeopardize social networks and community facilities until the bridge could be replaced. Therefore, the No-Build Alternative has the potential to have adverse effects to community character and cohesiveness within the study area.

**Alternative 2a: Three-span, Short Steel-truss Bridge, ABC, Longitudinal Move-in**

**Operational Impacts**

Alternative 2a would operate and function as the current bridge with improved access for pedestrians, bicycles, and equestrian travelers. The bridge may improve community character and cohesion and safety. The new bridge would enhance community character and cohesion by implementing shoulder improvements that would increase pedestrian access, meet Americans with Disabilities Act requirements, and provide access for bicyclists and equestrian travelers. The crosswalk at Sir Francis Drake Boulevard and the widened shoulder north of the bridge would enhance safety for school children and other pedestrians, consistent with the initiative for Safe Routes to School. The enhanced stability during a seismic event would secure emergency access necessary to meet other community concerns during an emergency. Therefore, the bridge would provide continued support for strong community character and cohesion.

**Construction Impacts**

During most of the construction period, the existing bridge would remain in use with minor delays in traffic on weekends due to slower speeds within the construction zone and, occasionally, one-lane traffic restrictions. Construction could constitute a short-term disturbance for those living and visiting the region. Disturbances from visual impacts and increases in dust and noise would likely be limited to residents and businesses immediately adjacent to the construction area, such as the veterinary hospital, the law office at the intersection of Sir Francis Drake Boulevard and SR 1, and other businesses along B Street and SR 1. Noise may affect some community events and functions in the town of Point Reyes Station, such as the farmers market on Saturdays from June through November. While these effects may be annoying, they would not impede or sever continued community character and cohesion. In addition, access would be maintained to tourist destinations.
However, during the full closure period of the bridge, access to Point Reyes Station from the south would be affected for up to 3 weeks. During the bridge closure period, construction may continue 24 hours a day, 7 days a week for 2 to 3 weeks. As is discussed in Section 2.2.6, Air Quality, and Section 2.2.7, Noise, adjacent residents and businesses would be affected by both daytime and nighttime construction noise and dust. Night-time lighting would be directed downward, but those immediately adjacent would be affected by the brightness.

People who live immediately south or west of the project area along SR 1 or Sir Francis Drake Boulevard would temporarily have to use a 9-mile detour to reach Point Reyes Station, which would add approximately 20 minutes to automobile travel time each way. During the January 2016 Stakeholder Working Group (SWG) meeting, the stakeholders discussed the services that would be affected by the detour route such as deliveries, tourists, emergency access, and depending on timing, farmer’s market and school (CH2M 2016). The detour would affect workers, deliveries, equestrian users, and tourists. Various local businesses depend on tourism, and thus there could be short-term indirect effects on the communities’ economy. These effects would be reduced if the closure occurred between November and February. This detour would not be feasible for pedestrians, local bicycle trips, and equestrian travelers. The detour may dissuade local travelers from taking routine trips into town in favor of more consolidated, infrequent trips, or it may influence them to go outside of town for their routine shopping. Because of the rural nature of the study area, residents are likely to avoid the Point Reyes Station altogether or to use other routes to access communities farther east for shopping trips. The closure would not impede these trips because there are routes eastward that do not require crossing the bridge, for both the north and south sides of the community.

Community functions such as emergency services, routine deliveries, some farming deliveries, and attendance at the farmers market would be affected for the short closure period. If bridge closure occurs during the school year, many study area children would have to take the detour to reach and return from school. The detour could add up to 40 minutes of extra travel time per day. Bridge closure would also impede emergency service access to communities south of Point Reyes Station. Unless closure was outside of the market season (the farmers market is generally open from June through October), the farmers market may not receive the same patronage during bridge closure, although access via the detour would still be possible. The only public transit operating in the study area (Marin Transit) crosses Lagunitas Creek Bridge in a route that connects all study area communities. Marin
Transit buses would be detoured during bridge closure, which would make each trip longer by approximately 20 minutes.

The temporary bridge closure under Alternative 2a could temporarily reduce tourism, especially to Point Reyes Station, and cause short-term economic impacts. Point Reyes National Seashore is the biggest tourist destination in the study area. During bridge closure, Point Reyes Station would be effectively cut off from the most heavily traveled routes to Point Reyes National Seashore (those from the south and east), unless a long detour is taken. (Point Reyes Station would still be easily reachable from destinations such as San Rafael, Tomales Bay State Park, or other northern coastal communities.) Visitors to Point Reyes National Seashore who may have stopped in Point Reyes Station for meals, refreshments, or shopping would likely stop elsewhere in or outside the study area because of the bridge closure and the need to take the 9-mile detour route. As a result, businesses in Point Reyes Station that serve visitors, including restaurants, cafés, inns, gift shops, boutiques, ice cream shops, delicatessens, gas stations, and the farmers market (from June through November), are likely to see reduced revenues during the 2- to 3-week closure period, which could also decrease local sales tax revenues. However, restaurants and other businesses in Olema or Inverness may see extra business during this period, which could offset any sales tax revenue decrease. If the bridge closure occurred during tourist season, from April through October, economic impacts could be worse than other months.

A bridge closure would alter traffic patterns for local residents (Inverness, Inverness Park, and Seahaven), potentially causing them to have to travel farther for work or to procure goods and services. Because of the rural nature of the study area, trips such as major shopping trips, medical appointments, and automotive servicing are already likely to be conducted out of the study area. The closure would not impede these regional trips, because access eastward to larger metropolitan areas is available without crossing the bridge for both north and south sides of the community. Commercial, postal, and residential deliveries within the study area could be delayed or postponed or redirected to make northern deliveries at different times than southern deliveries.

Businesses in the project vicinity could be affected by higher noise levels, particularly Point Reyes Animal Hospital, which is located adjacent to the project area. Construction noise might stress the animals under veterinary care and negatively affect the business. However, customers may continue to patronize the animal hospital because other veterinarians are located at least 10 miles away.
To address community impacts, a construction management plan would be developed to provide early notifications and planning for the bridge closure and to address short-term resolutions for community services.

**Alternative 2b: Three-span, Short Steel-truss Bridge, Conventional Construction (with Detour Bridge)**

**Operational Impacts**
All direct and indirect impacts would be the same as those under Alternative 2a.

**Construction Impacts**
Alternative 2b would result in temporary effects on community character and cohesion due to the relatively long-term construction period that may deter patronage of nearby businesses and would create a longer period of potential noise, dust, and visual impacts for local residents. Potential noise, dust, and visual impacts would be similar to those described for Alternative 2a; however, impacts from this conventional construction alternative would last 2 years longer than they would with Alternative 2a, and the area of construction would be larger because Alternative 2b would require a detour bridge to be built east of the existing bridge. The detour bridge would direct traffic flow closer to the animal hospital and to one residence south of Lagunitas Creek. These direct impacts, while short-term, would have a larger effect on those in close proximity.

Alternative 2b would not, however, require a full closure (as would be required for the other Build Alternatives). The detour bridge would allow continued flow of traffic throughout the approximately 3-year construction period. Minor weekend traffic delay would not adversely affect community character and cohesion.

Increased traffic in the project vicinity during the 3-year construction period may influence some regional visitors to delay their visit to the study area or to enter Point Reyes Station less frequently than they would otherwise. However, visitors would still have access to the businesses in Point Reyes Station, and local residents would likely continue to patronize local businesses. Alternative 2b could affect the Point Reyes Animal Hospital due to increased noise and reduced access as a result of the temporary construction staging. But, as discussed for Alternative 2a, customers are likely to continue to patronize the veterinary hospital due to the lack of other nearby veterinarians. Alternative 2b is not likely to cause economic impacts to the study area.
Alternative 3a: Three-span, Concrete Bridge, ABC, Longitudinal Move-in
Operational Impacts
All direct and indirect impacts would be the same as those under Alternative 2a.

Construction Impacts
The direct and indirect impacts of Alternative 3a would be the same as those under Alternative 2a.

Alternative 4a: Full-span, Steel-truss Bridge, ABC, Longitudinal Move-in
Operational Impacts
All direct and indirect impacts would be the same as those under Alternative 2a. The aesthetics of this bridge type are discussed under Section 2.1.6, Visual/Aesthetics, which indicates that Alternatives 4a and 4b result in an adverse effect on visual resources primarily due to the bulk and scale of the truss.

Construction Impacts
All direct and indirect impacts would be the same as those under Alternative 2a.

Alternative 4b: Full-span, Steel-truss Bridge, ABC, Transverse Slide-in
Operational Impacts
All direct and indirect impacts would be the same as those under Alternative 4a.

Construction Impacts
All direct and indirect impacts would be similar to Alternative 2a, except that the new bridge would be built east of the existing bridge prior to horizontally sliding the bridge into its new location. Like Alternative 2b in which a detour bridge would be constructed adjacent to the existing bridge, the Alternative 4b project footprint and it related impacts (noise, dust, and visual impacts) would be greater on the neighboring veterinary hospital and residences than all other alternatives. The benefit would be that the new bridge, in its temporary location, would be used as a traffic detour while the existing bridge is being dismantled, which would reduce the duration of the full closure to 2 weeks. The duration of closure required for Alternative 4b would be shorter than Alternatives 2a, 3a, and 4a, which use the ABC, longitudinal move-in method, but construction would result in an area of disturbance as large as Alternative 2b, which uses the conventional construction method and involves a detour bridge.

Avoidance, Minimization, and/or Mitigation Measures
The project would improve accessibility for pedestrians, bicycles, and equestrian users and would not result in long-term adverse effects on community character and
cohesion; therefore, no avoidance, minimization, or mitigation measures are proposed for the operational phase.

During construction, the project would result in temporary effects on community character and cohesion under Alternative 2b due to a relatively long construction period that may deter patronage to the study area due to noise and visual disturbances. Measures that address noise impacts are discussed in Section 2.1.7.

The ABC alternatives (Alternatives 2a, 3a, 4a, and 4b) would result in short-term effects on community character and cohesion, especially during the short-term closure of Lagunitas Creek Bridge. To address these impacts, the following measure is proposed:

- **AMM COMM-1: Implement a Construction Management Plan (CMP).** To address construction-related impacts, a CMP would be developed and tailored to the alternative selected. Table 2.1.2-2 outlines the major community functions that may be affected and measures that would be incorporated into the CMP to minimize impacts.

### Table 2.1.2-2 Community Impacts and Construction Management Plan Measures

<table>
<thead>
<tr>
<th>Community Functions Affected by Bridge Closure</th>
<th>Measures to Be Included in the Construction Management Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delivery and truck services, including postal service, house-direct deliveries, small grocery deliveries, utility meter reading, FedEx, UPS, and other delivery services</td>
<td>Provide broad announcements and frequent outreach, advertise the closure, and provide instructions and wayfinding signage for detour route. Caltrans will coordinate with trucking dispatch companies to plan deliveries around bridge closures.</td>
</tr>
<tr>
<td>Emergency service</td>
<td>Coordinate to develop provision for adequate emergency vehicles and personnel on both sides of Lagunitas Creek.</td>
</tr>
<tr>
<td>Pedestrian bicycle access</td>
<td>Provide support shuttle service to assist pedestrians and bicycles (school children and others).</td>
</tr>
<tr>
<td>Tourism (bed and breakfast, farmers market, and park visitors)</td>
<td>Develop wayfinding signs to direct choices from Petaluma Highway for Point Reyes National Seashore and to access from Cotati for tourist points north to avoid hassles of the long detour. Provide affected businesses with opportunity to link their websites to bridge construction updates on the Caltrans website. Use social media to communicate status of the road closure and to provide more information about the detour routes. Media channels include twitter, WAZE, radio announcements, press releases, links on tourist web pages to daily updated SR 1 traffic map, linking Google Earth© maps with Caltrans information, etc.</td>
</tr>
</tbody>
</table>
Table 2.1.2-2 Community Impacts and Construction Management Plan Measures

<table>
<thead>
<tr>
<th>Community Functions Affected by Bridge Closure</th>
<th>Measures to Be Included in the Construction Management Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residents and local business workers</td>
<td>Develop a communication plan that includes an on-call liaison to help troubleshoot unforeseen issues that arise, and provide daily notifications on progress and web cameras to help maintain interest and understanding about ABC and project progress.</td>
</tr>
<tr>
<td>West Marin Stage Coach transit shuttle (routes include Sir Francis Drake Boulevard, SR 1, and Bear Valley Road connecting Point Reyes, Inverness, Bolinas)</td>
<td>Support additional service buses to make up for longer travel times required by detour routes during the bridge closure period. In addition, coordinate with Marin Transit on relocating the route and the Point Reyes Station bus stop to accommodate passengers in this vicinity. Another bus may be needed to supplement the delays resulting from the detour during bridge closure period.</td>
</tr>
</tbody>
</table>

Notes:
ABC = accelerated bridge construction; Caltrans = California Department of Transportation; SR = State Route

2.1.2.2 RELOCATION AND REAL PROPERTY ACQUISITION

Regulatory Setting
The Caltrans Relocation Assistance Program (RAP) is based on the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (as amended) and Title 49 CFR Part 24. The purpose of the RAP is to ensure that persons displaced as a result of a transportation project are treated fairly, consistently, and equitably so that such persons will not suffer disproportionate injuries as a result of projects designed for the benefit of the public as a whole. See Appendix D for a summary of the RAP.

All relocation services and benefits are administered without regard to race, color, national origin, or sex in compliance with Title VI of the Civil Rights Act (42 USC 2000d, et seq.). Appendix C includes the Caltrans Title VI Policy Statement.

Affected Environment
Information in this section is based on the CIA prepared for this project (Caltrans 2017) and on the project design located in Appendix M.

This section concerns those properties that would be directly affected by the project footprint, including temporary construction areas. These properties include Whitehouse Pool Park immediately adjacent to the northwest corner of the project; a parcel containing a veterinary hospital partially within the northeast end of the project area; a driveway serving residences on the southeast side of the project area; and a
Chapter 2 Affected Environment, Environmental Consequences, and Avoidance, Minimization, and/or Mitigation Measures

law firm that includes a residential unit immediately adjacent to the southwest side of the project area. Additional residential units continue south facing SR 1 and west along Sir Francis Drake Boulevard.

Environmental Consequences

Alternative 1: No-Build Alternative
No temporary or permanent acquisition of parcels or relocations would occur under Alternative 1.

Alternative 2a: Three-span, Short Steel-truss bridge, ABC, Longitudinal Move-in

Operational Impacts
Alternative 2a would not require the relocation of any residential or business owners. It would require a minor property acquisition that would affect park property. A small portion (0.01 acre) of Whitehouse Pool Park would be acquired to accommodate shoulder widening just north of the Lagunitas Creek Bridge. The acquisition of park property is also discussed in Section 2.1.3, Parks and Recreational Facilities. All other improvements would be within the existing SR 1 right-of-way.

Construction Impacts
Alternative 2a would require temporary construction easements for construction access to the bridge, for staging equipment and materials, and for relocating utilities (see Figure 2.1.2-1). These temporary construction easements (TCEs) would affect a portion of the following nine parcels:

1. Vacant lot at southwest corner of B Street and SR 1 (Parcel 119-233-03).
2. Vacant lot on SR-1 (Parcel 119-235-09).
3. Whitehouse Pool Park at the northwest corner of the Lagunitas Creek Bridge (Parcel 119-240-15).
4. Law office on the southwest corner of the Lagunitas Creek Bridge that includes a residential unit (Parcel 119-240-47).
5. Parking lot of the Point Reyes Animal Hospital on the northeast side of Lagunitas Creek Bridge (Parcel 119-240-50). This property also includes a residence.
FIGURE 2.1.2-1
Temporary Construction Easements for Alternative 2a
State Route 1 Lagunitas Creek Bridge Project
EA 0G642, MRN-1 Post Mile 28.4 – 28.6
ID: 04-13000350
Marin County, California
6. Single-family residence on the southeast side of the Lagunitas Creek Bridge (Parcel 166-161-13). This property provides access to the adjacent property (Parcel 166-161-10).

7. Single-family residence on the east side of the intersection of Sir Francis Drake Boulevard and SR 1 (Parcel 166-161-10).

8. Vacant lot at southwest corner of Sir Francis Drake Boulevard and SR 1 (Parcel 166-170-12).

9. Commercial lot that is partially undeveloped (Parcel 166-170-24).

Table 2.1.2-3 provides a list of TCEs by parcel.

On the property that includes the veterinary hospital, construction staging would remove one point of access and several parking stalls. The noise and dust of the construction may affect veterinary activities and the comfort of the patient animals. On the residential property southeast of the project area, construction access to the bridge site would require using the front yard of one residential unit and potentially change the access for this home and two others that share this driveway. Temporary relocation of the patient animals or residential property to the southeast of the bridge may be necessary. Compliance with the Uniform Real Property and Relocation Assistance Act of 1970, as amended, would reduce potential for adverse effects. Because temporary relocation may be needed, Appendix D is included for the benefit of the reader.
Table 2.1.2–3  Temporary Construction Easements by Build Alternative

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>119-233-03</td>
<td>0.96</td>
<td>0.96</td>
<td>0.96</td>
<td>0.96</td>
<td>0.96</td>
</tr>
<tr>
<td>119-235-09</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00¹</td>
</tr>
<tr>
<td>119-240-15</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
<td>0.02</td>
</tr>
<tr>
<td>119-240-47</td>
<td>0.04</td>
<td>0.05</td>
<td>0.04</td>
<td>0.04</td>
<td>0.05</td>
</tr>
<tr>
<td>119-240-50</td>
<td>0.40</td>
<td>0.43</td>
<td>0.40</td>
<td>0.40</td>
<td>0.49</td>
</tr>
<tr>
<td>166-161-10</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.03</td>
</tr>
<tr>
<td>166-161-13</td>
<td>0.11</td>
<td>0.18</td>
<td>0.11</td>
<td>0.11</td>
<td>0.27</td>
</tr>
<tr>
<td>166-170-12</td>
<td>0.32</td>
<td>0.32</td>
<td>0.32</td>
<td>0.32</td>
<td>0.32</td>
</tr>
<tr>
<td>166-170-24</td>
<td>0.05</td>
<td>0.05</td>
<td>0.05</td>
<td>0.05</td>
<td>0.05</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1.90</strong></td>
<td><strong>2.01</strong></td>
<td><strong>1.90</strong></td>
<td><strong>1.90</strong></td>
<td><strong>2.19</strong></td>
</tr>
</tbody>
</table>

**Notes:**
See Figures 2.1.2-1 through 2.1.2-5 for the locations of the temporary construction easements (TCEs) on each parcel for each alternative.

¹ The TCE on parcel 119-235-09 would be approximately 20 square feet.

**Alternative 2b: Three-span, Short Steel-truss Bridge, Conventional Construction (with detour bridge)**

**Operational Impacts**
Parkland acquisition would be the same as that under Alternative 2a.

**Construction Impacts**
See Figure 2.1.2-2 for the TCE necessary for Alternative 2b. This alternative would have similar impacts to most neighboring properties as Alternative 2a. However, the zone of temporary construction impact on the parcel containing the veterinary clinic (Parcel Number 119-240-50) and the residential property southeast of Lagunitas Creek Bridge (Parcel Number 166-161-13) would be greater. Alternative 2b would also create a temporary construction zone on another residential parcel (166-161-10). This parcel is immediately south of Parcel 166-161-13, on the southeast side of the bridge.
FIGURE 2.1.2-2
Temporary Construction Easements for Alternative 2b
State Route 1 Lagunitas Creek Bridge Project
EA 0G642, MRN-1 Post Mile 28.4 – 28.6
ID: 04-13000350
Marin County, California

Note: The boundaries of the staging areas shown on this figure are estimates. There would be no direct take of residences and businesses.
Chapter 2 Affected Environment, Environmental Consequences, and Avoidance, Minimization, and/or Mitigation Measures

Alternative 3a: Three-span, Concrete Bridge, ABC, Longitudinal Move-in
Operational Impacts
Parkland acquisition would be the same as that under Alternative 2a.

Construction Impacts
Temporary construction easements would be the same as those under Alternative 2a. Figure 2.1.2-3 shows the temporary construction easement for Alternative 3a.

Alternative 4a: Full-span, Steel-truss Bridge, ABC, Longitudinal Move-in
Operational Impacts
Parkland acquisition would be the same as that under Alternative 2a.

Construction Impacts
Temporary construction easements would be the same as those under Alternative 2a. Figure 2.1.2-4 shows the temporary construction easement for Alternative 3a.

Alternative 4b: Full-span, Steel-truss Bridge, ABC, Transverse Slide-in
Operational Impacts
Parkland acquisition would be the same as that under Alternative 2a.

Construction Impacts
See Figure 2.1.2-5 for the TCE necessary for Alternative 4b. Alternative 4b would have the same impacts to most neighboring properties as Alternative 2a. However, the zone of temporary construction impact on the parcel containing the veterinary clinic (Parcel Number 119-240-50) and the residential property southeast of Lagunitas Creek Bridge (Parcel Number 166-161-13) would be greater.

Avoidance, Minimization, and/or Mitigation Measures
Temporary construction easements and property acquisition would comply with the Uniform Real Property and Relocation Assistance Act of 1970, as amended. See Appendix D for a summary of how Caltrans implements this act. Because temporary relocation may be required, Appendix D is included as a benefit for the reader.

2.1.2.3 ENVIRONMENTAL JUSTICE

Regulatory Setting
All projects involving a federal action (funding, permit, or land) must comply with Executive Order (EO) 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, signed by President William J. Clinton on February 11, 1994. This order directs federal agencies to take the appropriate and necessary steps to identify and address disproportionately high and
FIGURE 2.1.2-3
Temporary Construction Easements for Alternative 3a
State Route 1 Lagunitas Creek Bridge Project
EA 0G642, MRN-1 Post Mile 28.4 – 28.6
ID: 04-13000350
Marin County, California

Note:
The boundaries of the staging areas shown on this figure are estimates. There would be no direct take of residences and businesses.
FIGURE 2.1.2-4
Temporary Construction Easements for Alternative 4a
State Route 1 Lagunitas Creek Bridge Project
EA 0G642, MRN-1 Post Mile 28.4 – 28.6
ID: 04-13000350
Marin County, California

Note:
The boundaries of the staging areas shown on this figure are estimates. There would be no direct take of residences and businesses.
FIGURE 2.1.2-5
Temporary Construction Easements for Alternative 4b
State Route 1 Lagunitas Creek Bridge Project
EA 0G642, MRN-1 Post Mile 28.4 – 28.6
ID: 04-13000350
Marin County, California

Note:
The boundaries of the staging areas shown on this figure are estimates. There would be no direct take of residences and businesses.
adverse effects of federal projects on the health or environment of minority and low-income populations to the greatest extent practicable and permitted by law. Low income is defined based on the Department of Health and Human Services poverty guidelines. For 2015, the poverty-level threshold for a family of four was $24,250.

All considerations under Title VI of the Civil Rights Act of 1964 and related statutes have also been included in this project. Caltrans’ commitment to upholding the mandates of Title VI is demonstrated by its Title VI Policy Statement, signed by the Director, which can be found in Appendix C.

**Affected Environment**

Information in this section is based on the CIA prepared for this project (Caltrans 2017).

The study area for environmental justice analysis includes the communities in the vicinity of the project area with the most potential to be affected by the project and includes. These include the unincorporated communities of Olema, Point Reyes Station, and Inverness (see Figure 1-1). The study area also includes regional destinations such as Point Reyes National Seashore and Tomales Bay Ecological Reserve (see Figure 1-1). Within the study area, the transportation routes in the project footprint form a crucial connection point between the Point Reyes Station community, SR 1, and Sir Francis Drake Boulevard to the south. North of the project footprint, in the larger community of Point Reyes Station, residences are interspersed with businesses. South and west of the project area, there are fewer than 25 residences along Sir Francis Drake Boulevard and SR 1.

Demographic data for the study area were derived from the 2010 to 2014, 5-year ACS (U.S. Census Bureau 2014) for four Census Block Groups.

Table 2.1.2-4 provides information on minority populations in the study area. Most of the population in the study area is white (non-minority). As indicated in the table, the study area has a lower concentration of minority population than Marin County. The highest concentration of minority population is Hispanic or Latino. Limited-English proficiency, which can be an additional indicator of the presence of minority populations, is low in the study area. The primary language other than English is Spanish.
#### Table 2.1.2-4 Minority Populations

<table>
<thead>
<tr>
<th>Area</th>
<th>Non-Minority Population (percent)</th>
<th>Minority Population (percent)</th>
<th>Limited English Proficiency (percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>White Alone</td>
<td>Hispanic or Latino</td>
<td>African American</td>
</tr>
<tr>
<td>Study Area</td>
<td>78</td>
<td>17</td>
<td>2</td>
</tr>
<tr>
<td>Marin County</td>
<td>72</td>
<td>16</td>
<td>3</td>
</tr>
</tbody>
</table>

Source: U.S. Census Bureau 2014.

As shown in Table 2.1.2-5, the study area has a lower median household income and a higher percentage of residents who would be considered low-income than Marin County. The study area also has a low percentage of persons who would be considered transit dependent, as indicated by the category “households with no vehicle.” Except for a few small apartment buildings and senior citizen facility in Point Reyes Station, housing in the study area is mostly single-family. Lot sizes outside of the community centers are large. The age, size, and architecture of homes is diverse. Historically, the trend in the study area has been to build bigger, costlier houses (Marin County 2001). Median home price in the study area is estimated to be $900,000 (U.S. Census Bureau 2014) or $1,000,000 (Zillow 2016).

#### Table 2.1.2-5 Household Income and Poverty Status

<table>
<thead>
<tr>
<th>Area</th>
<th>Median Household Income</th>
<th>Below Poverty Level (percent)</th>
<th>Households with No Vehicle Available (percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study Area</td>
<td>$50,452</td>
<td>17</td>
<td>4</td>
</tr>
<tr>
<td>Marin County</td>
<td>$91,529</td>
<td>9</td>
<td>5</td>
</tr>
</tbody>
</table>

Source: U.S. Census Bureau 2014.

There is a senior citizen facility, but no other social-service facilities or organizations unique to low-income or minority groups in the study area.

**Environmental Consequences**

**Alternative 1: No-Build Alternative**

**Operational and Construction Impacts**

No disproportionately high and adverse impacts would occur to minority and/or low-income populations under Alternative 1 because no disturbance to the site would occur.
All Build Alternatives
 Operational and Construction Impacts
 No minority or low-income populations that would be adversely affected by the proposed project have been identified as determined above. Therefore, this project is not subject to the provisions of EO 12898.

Avoidance, Minimization, and/or Mitigation Measures
 No avoidance, minimization and/or mitigation measures related to environmental justice would be required.

2.1.3 Parks and Recreational Facilities
 2.1.3.1 REGULATORY SETTING
 Section 4(f) protects publicly owned lands of a park, recreation area, or wildlife and waterfowl refuge or land of a historical site of national, state, or local significance, as determined by the federal, state, regional, or local officials having jurisdiction over the resource.

The Federal Highway Administration (FHWA) may not approve the use of a Section 4(f) resource unless:

- There is no feasible and prudent avoidance alternative to the use of land from the property.
- The action includes all possible planning to minimize harm to the property resulting from such use.

Section 6(f) properties are recreation resources funded by the Land and Water Conservation Fund (LWCF) Act. Converting any portion of these lands must follow Code of Federal Regulations (CFR) Title 36, Section 59.3 of the LWCF Program.

This project will affect facilities that are protected by the Park Preservation Act (California Public Resources Code Sections 5400-5409). The Park Preservation Act prohibits local and state agencies from acquiring any property which is in use as a public park at the time of acquisition unless the acquiring agency pays sufficient compensation or land, or both, to enable the operator of the park to replace the park land and any park facilities on that land.

Marin Countywide Plan
 The Open Space Element of the Marin Countywide Plan sets forth goals and policies to enhance the quality of life in Marin through the acquisition, protection, and
Chapter 2 Affected Environment, Environmental Consequences, and Avoidance, Minimization, and/or Mitigation Measures

responsible stewardship of baylands, ridgeland, and environmentally sensitive lands targeted for preservation (Marin County 2007). The goal and policies in the Open Space Element applicable to the Whitehouse Pool Park within the project study area are the following:

- **Goal OS-1. Sustainably Managed Open Space.** Manage open space in a sustainable manner for environmental health and the long-term protection of resources.

- **Policy OS-1.2. Protect Open Space for Future Generations.** Ensure protected lands remain protected in perpetuity, and that adequate funding is available to maintain it for the benefit of residents, visitors, wildlife, and the environment.

- **Policy OS 2.4. Support Open Space Efforts along Stream.** This policy is intended to restore, enhance, and maintain natural vegetation and other habitat values along streams.

2.1.3.2 AFFECTED ENVIRONMENT

Many visitors come to this region of Marin County to explore the state and national park resources and seashore environments. The study area for this analysis of project impacts to parks and recreation resources consists of the project footprint plus an approximately 0.25-mile buffer around the project footprint to consider both direct and indirect impacts of the project. Parks in the study area include the Whitehouse Pool Park, immediately adjacent to the project area to the west; two tracts of Golden Gate National Recreation Area (GGNRA) located to the west and north, and the east and south, of the project area; and Point Reyes National Seashore to the west and south. Though not within the study area, Tomales Bay Ecological Reserve is also located nearby to the northwest. These parks collectively provide a regional attraction for wildlife enthusiasts and those who want to explore a network of parks that collectively preserve a coastal ecosystem supporting a broad range of wildlife and native plant species and open space viewing opportunities. These parks draw tourist for passive uses, wildlife watching, and recreationalists alike. Each of these park resources is subject to Section 4(f) protection. There are no known Section 6(f) resources within the study area. Figure 2.1.3-1 shows the parks within 0.5 mile of the project vicinity.
FIGURE 2.1.3-1
Parks and Recreational Areas in the Project Vicinity

State Route 1 Lagunitas Creek Bridge Project
EA 0G642, MRN-1 Post Mile 28.4 – 28.6
ID: 04-13000350
Marin County, California
Whitehouse Pool Park. Whitehouse Pool Park consists of two parcels north and south of Lagunitas Creek. The park is owned by the California Department of Fish and Wildlife (CDFW) and operated by Marin County Parks. The portion of Whitehouse Pool Park immediately west of the project area, north of Lagunitas Creek, is approximately 10.5 acres. This part of the park has approximately 4,167 linear feet of public hiking trails, benches, and kayaking access. The portion of Whitehouse Pool Park located off of Sir Francis Drake Boulevard, south of Lagunitas Creek, is approximately 12.5 acres with 2,763 linear feet of hiking trails. This park parcel is located approximately 0.7 mile west of the project area. The southern park parcel also provides opportunities for picnicking, wildlife viewing, and kayaking access. The parking lot, off of Sir Francis Drake Boulevard west of the project limits, provides access to Whitehouse Pool Park (Marin County 2010). Figure 2.1.3-2 shows the recreational facilities in Whitehouse Pool Park.

Whitehouse Pool Park is a local park primarily serving the residents of the Point Reyes Station and Inverness communities. Input received during a project SWG meeting on February 23, 2016, indicates that park users are mostly locals who use the park to reach Point Reyes Station from communities south of the Lagunitas Creek Bridge or for passive enjoyment of Lagunitas Creek and wildlife viewing.

On occasion, there are some unpermitted encampments for homeless persons. Transportation and active uses of the park result in moderate noise levels throughout the day. In the park, the trails are unpaved dirt trails that range from approximately 2.5- to 3.5-feet wide.

Whitehouse Pool Park has two public access points: one immediately northwest of the project area via a trailhead on State Route 1 (SR 1 north of the Lagunitas Creek Bridge, and the second a trailhead to GGNRA on C Street and 3rd Street in Point Reyes Station. These two points provide access to all recreational facilities in the park. Figure 2.1.3-2 shows the two trailheads and recreational facilities in the park.

Whitehouse Pool Park is also a site for bird watching, nature study, wildlife viewing (including coho salmon [Oncorhynchus kisutch]), and kayaking. The park provides significant wildlife habitat for a variety of species (Marin County 2010). The natural community in the park is riparian, with plants such as arroyo willows (Salix lasiolepis), California bay laurel (Umbellularia californica), and California blackberries (Rubus ursinus). Most vegetation along SR 1 consists of willows.
FIGURE 2.1.3-2
Recreational Facilities in the Study Area
State Route 1 Lagunitas Creek Bridge Project
EA 0G642, MRN-1 Post Mile 28.4 – 28.6
ID: 04-13000350
Marin County, California
The vegetation inside the park consists of myriad riparian plants with the more mature plants in the middle of the park, west of SR 1.

In a meeting among Caltrans, Marin County, CDFW, and National Park Service (NPS) staff, it was agreed that Whitehouse Pool Park is an important park that is actively managed (Mejia 2016). Whitehouse Pool Park is a Section 4(f) resource because it is publicly owned, used for recreation, and open to the public. Section 4(f) resources are parks, wildlife and waterfowl refuge, and recreational lands operated and/or owned by a public entity, and historic sites that must be considered in transportation development projects. Refer to Appendix B for the Section 4(f) de minimis determination.

**Golden Gate National Recreation Area.** Several national and state park and open space resources surround the study area but are not immediately adjacent to the project area. However, they provide the context of the largely preserved recreational resources in the project area. GGNRA is a non-contiguous series of open space lands and other sites in and around the San Francisco Bay Area that extends from southern San Mateo County to northern Marin County. The nearest part of GGNRA to the project area is immediately north of Whitehouse Pool Park (see Figure 2.1.3-1). This portion of GGNRA consists of 770 acres, with 1,457 feet of trails. The Point Reyes National Seashore branch of the NPS manages the GGNRA lands in this area. There is also a nearby area of GGNRA east and south of the project area, which borders the east side of SR 1 beginning around 1,000 feet south of the project area. This park land was not considered in the parks and recreational resources analysis for this project because the nearest trailhead is 3.2 miles southwest of the project footprint for all Build Alternatives.

**Tomales Bay Ecological Reserve.** Tomales Bay Ecological Reserve is a wildlife refuge northwest of the portion of GGNRA north of Whitehouse Pool Park (see Figure 2.1.3-1). The 482-acre, which is owned and operated by CDFW, contains salt marsh and tidal flats and provides recreational opportunities such as hiking, fishing, and wildlife viewing (CDFW 2016). This resource is connected via canoe recreation from Lagunitas Creek to Tomales Bay, but is otherwise over 0.5 mile away from the project site.

**Point Reyes National Seashore.** Southwest of the project area is Point Reyes National Seashore, owned and operated by the NPS. This park encompasses approximately 71,000 acres in West Marin County, with approximately 150 miles of
hiking trails for public use (NPS 2016). The nearest Point Reyes National Seashore trailhead off Sir Francis Drake Boulevard is south of Whitehouse Pool Park, approximately 0.3 mile west of the project area.

There are no access points to GGNRA, Point Reyes National Seashore, or Tomales Bay Ecological Reserve immediately adjacent to the project footprint for all Build Alternatives. As a result, public access to those parks is not discussed further.

2.1.3.3 ENVIRONMENTAL CONSEQUENCES

Alternative 1: No-Build Alternative

Under Alternative 1, potential adverse effects to parks or public access in the project area would not occur. There would be no direct, indirect, temporary, or permanent disruption to public access or use of parks.

Alternative 2a: Three-span, Short Steel-truss Bridge, ABC, Longitudinal Move-in

Operational Impacts

Under Alternative 2a, a narrow sliver of property acquisition of less than 0.01 acre (less than 1,000 square feet) would be required along the eastern edge of the park to accommodate the extension of the overflow culvert and provide a continuous shoulder along SR 1 from the bridge northward to B Street. Figure 2.1.3-3 shows the impacts of the proposed project on Whitehouse Pool Park.

However, prior to construction, Caltrans will compensate CDFW for the permanent conversion of park to SR 1 shoulder use in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act (Uniform Act).

This would reduce the total park land available and result in the removal of approximately 250 linear feet of riparian vegetation along SR 1. While this would reduce the total acres of park land available for the public, it would not reduce the recreational uses or the users’ experience of the park over the long term. This permanent impact would not affect the existing trails or benches; therefore, it would not have adverse impacts to the recreational activities of the park. Public access to parks and recreational facilities would be similar to existing conditions. Widening the shoulders north of the bridge would improve safety for pedestrians who access Whitehouse Pool Park via the trailhead on SR 1 north of Lagunitas Creek. Operation of Alternative 2a would improve public access to the park and therefore would result in a benefit to park users.
FIGURE 2.1.3-3
Project Impacts to Whitehouse Pool Park
State Route 1 Lagunitas Creek Bridge Project
EA 0G642, MRN-1 Post Mile 28.4 – 28.6
ID: 04-13000350
Marin County, California

Note: Permanent and temporary impacts to Whitehouse Pool Park are the same for all build alternatives.
This alternative would not result in changes in access or induce more use of the park resources because the project would not increase the capacity of the park or add new recreational facilities.

The operational phase would not affect the surrounding recreational resources of the Tomales Bay Ecological Reserve, GGNRA lands, or Point Reyes National Seashore.

**Construction Impacts**
During construction of Alternative 2a, there would be temporary impacts on Whitehouse Pool Park land. The project would require a temporary construction easement to have room to build the bridge, extend the shoulder, and lengthen the overflow culvert. Approximately 0.05 acre (approximately 2,000 square feet) would be temporarily disturbed by shoulder widening, culvert extension, and bridge construction. Vegetation in the temporary construction easement area would be removed. Similar to operational impacts, Caltrans will compensate CDFW for the temporary disturbance of park land.

Construction activities would increase dust and noise levels in the project area. Activities such as land clearing and truck trips between the staging area and bridge construction site would expose park users to dust particles. Additionally, augering or vibratory driving and operation of construction equipment would increase ambient noise levels in the project area. Under the ABC method, construction activities would last up to 1 year, with most of the noise- and dust-generating activities occurring in the span of a few months. Therefore, the increased exposure to noise and dust would have short-term indirect adverse impacts on the passive uses of the park, such as wildlife viewing and hiking.

Public access to Whitehouse Pool Park from the trailhead on SR 1, immediately north of the bridge, would be closed to the public during construction. There would be no public access at this trailhead for up to 1 year. Closure of the trailhead on SR 1 would prohibit locals from using the trail as a shortcut to reach Point Reyes Station. However, access to Whitehouse Pool Park via the GGNRA trailhead would remain open. The public would continue to have access to the recreational opportunities in Whitehouse Pool Park. Therefore, there would be temporary adverse impacts on access to the easternmost portion of the park because locals south of the bridge would not be able to reach Point Reyes Station via the park until project construction is completed. The westernmost portion of the park would remain accessible via the trailhead located on C Street and Third Street.
During construction, a designated construction zone area that includes the creek within the project area, as well as areas immediately upstream and downstream of the project area, would be closed off to kayakers to ensure public safety. Under the ABC method, the construction zone would prohibit the recreational use of this reach of the creek for up to 1 year. Therefore, closure of this reach of the creek for recreational use would result in a temporary adverse impact. Although kayakers would not be able to cross under the bridge, they would be able to kayak upstream and downstream of the construction zone.

The construction phase could affect the accessibility and convenience for visitors who want to get to Point Reyes Station for food and lodging during their visit to Tomales Bay Ecological Reserve, GGNRA lands, or Point Reyes National Seashore. Additionally, traffic delays during periods of one-way traffic and when visitors need to be detoured while access across the creek is closed for up to 3 weeks may affect the overall experience of the park resources. Impeded access may deter some park visitors from coming during that period if they learn of the closure and/or one-way traffic delays. However, the closure period would be temporary and would not substantially affect the tourist attraction of these resources.

**Alternative 2b: Three-span, Short Steel-truss Bridge, Conventional (with Detour Bridge)**

**Operational Impacts**
All direct and indirect operational impacts on Whitehouse Pool Park would be the same as those under Alternative 2a, in terms of property acquisition and improvements to the accessibility of the trailhead through a wider shoulder.

**Construction Impacts**
Alternative 2b would result in a longer duration of temporary impacts than those of Alternative 2a. Although Alternative 2b would have similar impacts on parks as Alternative 2a from noise, dust, and creek closure, the duration of these impacts would be 3 years. Further, the section of the creek that would need to be closed during construction would be longer than under Alternative 2a because it would include the existing bridge and the temporary detour bridge area. Because of the longer duration and longer creek reach closure of the construction impacts, Alternative 2b would have adverse impacts on the enjoyment of park users and may result in fewer users accessing the park for the duration of the construction phase.

Similar to Alternative 2a, accessibility and convenience for visitors who use Point Reyes Station for food and lodging during their visit to the other parks in the region...
would experience traffic delays during construction. The traffic delays under Alternative 2b would be intermittent, with more intensity during peak tourism periods over a 3-year period. Unlike Alternative 2a, the temporary detour bridge would provide continuous access across the creek until the new bridge is completed. Therefore, similar to Alternative 2a, the traffic delay would not substantially affect the tourist attraction to the parks in the region.

**Alternative 3a: Three-span, Concrete Bridge, ABC, Longitudinal Move-in**

**Operational Impacts**
All direct and indirect operational impacts on Whitehouse Pool Park and nearby state and national parks would be the same as those under Alternative 2a.

**Construction Impacts**
All direct and indirect construction impacts on Whitehouse Pool Park, nearby state and national parks, and public access would be the same as those under Alternative 2a.

**Alternative 4a: Full-span, Steel-truss Bridge, ABC, Longitudinal Move-in**

**Operational Impacts**
All direct and indirect operational impacts on Whitehouse Pool Park and nearby state and national parks would be same as those under Alternative 2a.

**Construction Impacts**
All direct and indirect construction impacts on Whitehouse Pool Park, nearby state and national parks, and public access would be the same as those under Alternative 2a.

**Alternative 4b: Full-span, Steel-truss Bridge, ABC, Transverse Slide-in**

**Operational Impacts**
All direct and indirect operational impacts on Whitehouse Pool Park and nearby state and national parks would be same as those under Alternative 2a.

**Construction Impacts**
Alternative 4b would have similar impacts on Whitehouse Pool Park, nearby state and national parks, and public access as Alternative 2a. The difference is that the transverse slide-in method would close access over Lagunitas Creek for a shorter period (up to 2 weeks), and therefore would result in a shorter period of inconvenience for park visitors. Another difference is that the reach of Lagunitas Creek that would be closed off for kayakers would be longer, similar to Alternative 2b, because the new span would be built immediately east of the existing
bridge prior to slide-in, therefore prohibiting recreational use of a larger area of the creek.

2.1.3.4 AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

During construction, the Build Alternatives would have temporary impacts on parks and recreational facilities. No recreational aspect of the park would be permanently affected, however, a narrow area paralleling the roadway would be removed from the park. Prior to construction, Caltrans will coordinate with the U.S. Coast Guard on the use of navigable waterways. See Appendix B for a discussion of the Section 4(f) de minimis determination. Caltrans would implement the following mitigation measures and AMMs:

- **AMM PARKS-1: Trailhead enhancement.** Following construction, Caltrans will replace the trailhead marker with a durable sign designed in cooperation with Marin County Parks. The sign will include at minimum a trail map, brief information about the park and safety, and include an area for posting park-related information.

- **AMM PARKS-2: Trail closure signs.** Prior to construction, Caltrans or its contractor will place two trail closure signs inside the park. One sign will be located on the trail that leads to the staging area north of the bridge. The second sign will be located on the trail, west of the trailhead, immediately north of the bridge. Notice of trail closure will also be posted at the western part of Whitehouse Pool Park off of Sir Francis Drake Boulevard, at the trailhead located at C Street and Third Street in Point Reyes Station, and at the GGNRA and Whitehouse Pool Park property boundary. Caltrans will collaborate with Marin County or CDFW.

- **AMM PARKS-3: Notify the public of creek closure.** Prior to construction, Caltrans or its contractor will post construction zone signs 100 feet upstream and 50 feet downstream of the bridge to notify kayakers and other boaters of the construction zone creek closure. Advance notice of the detour routes and duration of closure will be distributed to the pertinent park agencies so they can post notices on their websites to facilitate dissemination of information to visitors. Notice of the construction zone will be posted at kayak rental locations such as Blue Waters Kayaking in Inverness and Marshall, Clavey Paddlesports in Petaluma, and Point Reyes Outdoors in Point Reyes Station.
After construction, Caltrans or its contractor will revegetate all disturbed areas with native plants in Whitehouse Pool Park with the implementation of AMMs BIO-1, 4, 14, and 22.

Additionally, AMM NOISE-1, Construction best management practices, will reduce noises resulting from project construction activities and AMM AQ-1, Implement basic and additional control measures for construction emissions of fugitive dust, will reduce the potential exposure of park users and community to construction generated dust levels in the project area. These measures are presented in Sections 2.2.7, Noise and 2.2.6, Air Quality, respectively.

2.1.4 Utilities and Emergency Services

2.1.4.1 AFFECTED ENVIRONMENT

The utilities and emergency services study area is the immediate 1 mile surrounding the project footprint and the public services that serve this area. Public services are primarily fire, sheriff, paramedic services, the U.S. Postal Service, and solid waste collection and disposal facilities. Utilities in the project footprint include two water lines operated by the North Marin Water District (NMWD), one telephone line operated by AT&T, and power lines operated by Pacific Gas and Electric (PG&E).

Water Utilities

Potable water supply in Marin County comes from sources such as groundwater storage, recycled water, and surface water. The source for potable water supply in Point Reyes Station is groundwater. Potable water for Point Reyes Station and nearby communities is supplied through the Point Reyes Treatment Plant, which is operated by NMWD, a publicly owned utility (Marin County 2001). Two water lines are within the project footprint, both operated by NMWD. One water line lies beneath the bridge, and the other lies beneath the culvert.

Septic systems are regulated and operated by the Marin County Environmental Health Services office. There is no wastewater service provider for the community of Point Reyes Station.

Communication Services

AT&T provides telephone service in the project area and the surrounding communities in Marin County. There is one telephone pole and a telephone line immediately northwest of the bridge, located in the project footprint for all Build Alternatives.
Electricity and Gas
PG&E is the primary electricity and natural gas service provider for residences and businesses in Marin County and the surrounding areas. PG&E retains service and power lines within the project footprint for all Build Alternatives.

Fire and Sheriff Protection
The Marin County Fire Department provides fire protection services for Marin County. The closest stations to the project area are the Point Reyes Fire Station (0.3 mile north of the project footprint), and the Hicks Valley Fire Station (approximately 11 miles northeast of the project footprint in Petaluma). Point Reyes Station maintains working relationships with local fire departments, community organizations, and local, state, and federal agencies to provide additional disaster response resources to support the amount of visitors in the area (Marin County 2016). The Point Reyes Fire Station also provides firefighting assistance to rangers and firefighters in Point Reyes National Seashore, Golden Gate National Recreation Area, and Tomales Bay State Park. In addition, the communities of Inverness and Bolinas have volunteer fire departments.

The closest sheriff department station is the Point Reyes sub-station of Marin County Sheriff’s Office, located at 101 Fourth Street (approximately 0.5 mile north of the project footprint). The same building that houses the fire station also contains a Marin County Sheriff’s Office substation and a ham radio disaster communication command center. Most of Marin County is unincorporated and therefore falls under the jurisdiction of the County Sheriff’s Office. Marin County (including Point Reyes Station) has a low crime rate that has been consistently lower than the state’s for multiple years (Marin County 2007).

Emergency Medical Services
No hospitals are located within or near the project area; the closest hospital is the Novato Community Hospital, located approximately 25 miles east of the project footprint. The Point Reyes Fire Station provides paramedic and other medical emergency response services (Marin County 2016). The station includes a structural firefighting engine, a wildland firefighting engine, paramedic rescue ambulance, utility pickup truck, and flood evacuation boat (Caltrans 2017).

Postal Service
The U.S. Postal Service receives and delivers mail at the U.S. Post Office at 11260 State Route 1, Point Reyes Station, California. This post office is 0.3 mile north of the
project area. The unincorporated communities of Olema, Inverness, and Marshall each also have a U.S. Post Office.

**Solid Waste Processing and Disposal Facilities**
The Redwood Landfill and Recycling Center offers recycling, yard waste, construction and demolition debris, and garbage collection services in Marin County. Redwood Landfill is located at 8950 Redwood Highway in Novato, approximately 21.1 miles northeast of the project area. Redwood Empire Disposal provides garbage service and disposes of the waste at the Redwood Landfill (Ratto Group 2016).

### 2.1.4.2 ENVIRONMENTAL CONSEQUENCES

**Alternative 1: No-Build Alternative**
Under Alternative 1, the project would not be implemented and existing utilities and emergency services would operate under the existing conditions into the future. However, during a seismic event, the utilities beneath the bridge would be disrupted by a bridge failure. Potential adverse impacts to utilities and emergency systems would occur as a result of the deteriorating condition of the bridge under alternative. Impacts to utilities and emergency services would therefore be potentially adverse.

**Alternative 2a: Three-span, Short Steel-truss Bridge, ABC, Longitudinal Move-in**

**Operational Impacts**
Alternative 2awould not cause service disruption or an increase in demand on utilities and public services. All utilities would be placed in the final alignment during construction and would be restored to existing service capacity following construction. Therefore, there would be no effect on utilities.

Additionally, the project (under all alternatives) would not induce long-term employment or induce population growth that would require additional police, fire, or emergency medical personnel or facilities. Operation of the project would have no effect on police, fire, or emergency medical services because the project would not result in a change to traffic patterns on SR 1. Emergency services would maintain existing response times under all alternatives; therefore, there would be no increase in demand for services, and there would be no impact.

**Construction Impacts**
Construction of Alternative 2a would result in temporary disruption of utilities. Under Alternative 2a, the power lines within the project footprint of Alternative 2a would be temporarily relocated north of the bridge, in the animal hospital parking lot, with the
utilities to be placed into the final alignment at the end of construction. The area within which the utility pole would be temporarily relocated is approximately 0.21 acre of land (see Figure 1-8). The specific location within the 0.21 acre is undetermined at this time.

Relocation of water and telephone utilities could result in temporary, short-term disruptions in the utility service area. The California Department of Transportation (Caltrans) would coordinate with utility companies in advanced utility relocation, prior to construction. Utility companies would inform the public of any potential disruptions to utilities, and advanced coordination with utilities and nearby residences would be required as part of construction plans. The two water lines would be relocated to a temporary location during construction. Advanced notice would be provided before a short disruption would occur during low-demand periods to minimize inconvenience. The water line at the bridge would be redirected through a parallel line until the utility could be reattached to the new bridge. Therefore, construction would result in short-term service disruption.

One-lane closures and reduced speeds during construction could delay emergency response vehicles or emergency evacuation during construction. The temporary bridge closure and 9-mile detour (over approximately 2 to 3 weeks) could impede access and increase response time to emergency calls. Caltrans discussed the necessary accommodations to meeting service requirements with a local fire department representative. Therefore, there would be minimal adverse impacts.

**Alternative 2b: Three-span, Short Steel-truss Bridge, Conventional (with Detour Bridge)**

**Operational Impacts**
All direct and indirect impacts would be the same as those under Alternative 2a.

**Construction Impacts**
Construction of Alternative 2b would result in temporary impacts to utilities similar to those described for Alternative 2a. Although Alternative 2b would result in the same utility relocation as outlined under Alternative 2a, the duration of the relocation would be for 3 years as opposed to 1 year. However, the number of utility relocations would be the same.

Construction would also result in temporary impacts to emergency services similar to those described for Alternative 2a. Under Alternative 2b, the temporary bridge would provide access across the creek during the 3-year construction phase. The traffic
speed during the construction period would be reduced to 15 to 20 miles per hour along the bridge (current limit is 35 miles per hour). The temporary slower speed limit would be necessary to account for a slight temporary curve from SR 1 to the temporary detour bridge. Similar to Alternative 2a, this alternative could delay emergency response time; however, there would not be a bridge closure period.

**Alternative 3a: Three-span, Concrete Bridge, ABC, Longitudinal Move-in**

Operational Impacts
All direct and indirect impacts would be the same as those under Alternative 2a above.

Construction Impacts
All direct and indirect and indirect construction impacts would be the same as those under Alternative 2a.

**Alternative 4a: Full-span, Steel-truss Bridge, ABC, Longitudinal Move-in**

Operational Impacts
All direct and indirect impacts would be the same as those under Alternative 2a.

Construction Impacts
All direct and indirect construction impacts would be the same as those under Alternative 2a.

**Alternative 4b: Full-span, Steel-truss Bridge, ABC, Transverse Slide-in**

Operational Impacts
All direct and indirect impacts would be the same as those under Alternative 2a.

Construction Impacts
Both indirect and direct construction effects on utilities would be similar to those under Alternative 2a. While Alternative 4b would require a larger staging and construction area due to the nature of the transverse slide-in installation method, this would not change the temporary utility relocation site or size. The initial utility relocation would cause temporary disruptions, but is not anticipated to frequently occur during construction. Impacts to utilities during construction would therefore be short-term and minimal.

Construction of Alternative 4b would result in short-term adverse impacts to emergency services. While the new bridge is in its temporary location (adjacent to the existing bridge), it would serve as a detour bridge while the existing bridge is dismantled. During this period, traffic and emergency services would need to cross
Lagunitas Creek at reduced speeds, like under Alternative 2b. This would result in delayed emergency response times of emergency service providers. Additionally, once the existing bridge is removed, the new bridge would be closed, causing traffic and emergency services to use the detour routes for up to 2 weeks, which is a shorter period of closure than would be required for Alternatives 2a, 3a, and 4a. Avoidance measures would be the same as for Alternative 2a, as detailed in Section 2.1.4.3.

2.1.4.3 AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES
During construction, the Build Alternatives would have temporary impacts to utilities and emergency services. Implementation of the following proposed avoidance and minimization measure would minimize these impacts:

- **AMM UTIL-1: Provide emergency personnel.** If Alternative 2a, 3a, 4a, or 4b is selected, Caltrans will work with local emergency service providers to station necessary equipment on both sides of Lagunitas Creek throughout the bridge closure period.

To mitigate any impediment of emergency response or evacuation during project construction, **AMM TRANS-1: Construction traffic management plan,** and **AMM TRANS-2: Emergency service access provision,** would be implemented to notify and coordinate with emergency service providers of the construction schedule and any associated closures.

2.1.5 Traffic and Transportation/Pedestrian and Bicycle Facilities
This section discusses the proposed project’s impacts on traffic and circulation, both during construction (construction impacts) and after project completion (long-term or operational impacts).

2.1.5.1 REGULATORY SETTING
Caltrans, as assigned by the Federal Highway Administration (FHWA), directs that full consideration should be given to the safe accommodation of pedestrians and bicyclists during the development of federal-aid highway projects (see 23 CFR 652). It further directs that the special needs of the elderly and the disabled must be considered in all federal-aid projects that include pedestrian facilities. When current or anticipated pedestrian and/or bicycle traffic presents a potential conflict with motor vehicle traffic, every effort must be made to minimize the detrimental effects on all highway users who share the facility.
In July 1999, the U.S. Department of Transportation (USDOT) issued an Accessibility Policy Statement pledging a fully accessible multimodal transportation system. Accessibility in federally assisted programs is governed by the USDOT regulations (49 CFR Part 27) implementing Section 504 of the Rehabilitation Act (29 USC 794). FHWA has enacted regulations for the implementation of the 1990 Americans with Disabilities Act (ADA), including a commitment to build transportation facilities that provide equal access for all persons. These regulations require application of the ADA requirements to federal-aid projects, including Transportation Enhancement Activities.

### 2.1.5.2 Affected Environment

A series of technical reports and data have been assembled for the Lagunitas Creek Bridge Project. These include:

1. **Annual Average Daily Truck Traffic on the California State Highway System** (Caltrans 2014)

2. **Lagunitas Creek Bridge Project, Culvert Replacement Shoulder Memorandum, June 9, 2016** (recommendations for pedestrian access) (Caltrans 2016)


4. **Traffic Accident Surveillance Analysis System (TASAS), August 18, 2015** (accident data) (Caltrans 2015a)

5. **Traffic Management Memorandum, June 25, 2015** (traffic management recommendations for construction) (Caltrans 2015b)

6. **Email correspondences with the Caltrans Pedestrian and Bicycle Coordinator Branch Chief, Sergio Ruiz, May 2016** (discussion regarding pedestrian and bicycle facilities, Safe Routes to School Program, etc.)

### Existing Bridge and Setting

The existing bridge has two 11-foot-wide lanes with 2-foot-wide shoulders, and a 3-foot-wide sidewalk on the west side of the bridge. As the primary connection between Point Reyes Station and Olema, the bridge is used by a variety of users, including residents, tourists, delivery trucks, emergency responders, transit providers, pedestrians, bicyclists, and equestrians.
Traffic Conditions

The study area for the transportation analysis is presented on Figure 2.1.5-1. The major roadways in the area that may be potentially affected by the project include State Route 1 (SR 1), Sir Francis Drake Boulevard, Platform Bridge Road, Point Reyes-Petaluma Road, Shoreline Highway (portion of SR 1), and Mesa Road. Residents and visitors travelling to the area and construction workers and deliveries traveling to the site will primarily use the roadways described below.

SR 1 within the project study area is a north-south rural, two-lane highway. It generally has 2- to 5-foot-wide shoulders and no sidewalks or bicycle lanes. Travel speeds on SR 1 are generally 45 to 55 miles per hour (mph) until the roadway enters communities where speeds are lowered to 25 or 35 mph depending on land use. The posted speed limit in the immediate project area is 35 mph. The SR 1 corridor is used primarily for intercommunity travel within West Marin County and by visitors to the Marin County coast. SR 1 near the bridge has an average daily traffic volume of 2,950 vehicles, of which approximately 4 percent are trucks. The peak hour volumes over the bridge vary, depending on the day and time. To provide a better understanding of the traffic patterns in the area, Caltrans analyzed more than 10 years of weekday and weekend traffic data for SR 1 at the bridge. The traffic counts were collected between 2000 and 2013. During economically strong years, the bridge carries approximately 700 vehicles per hour (vph) (total combined volume for both directions) during the peak period on a weekday, lasting from approximately 3:00 p.m. to 5:00 p.m. During the weekend, when tourism is heaviest, there are approximately 1,300 vph. The weekend peak traffic is more sustained and can extend from 1:00 p.m. to 6:00 p.m. There is relatively little development surrounding SR 1 and there is no projected increase in traffic beyond minimal tourist growth in the area. Growth in the County is primarily concentrated in the urban areas of the North Bay (e.g., San Rafael and points south).

Shoreline Highway is the local segment of SR 1 through Point Reyes Station. The segment between Point Reyes-Petaluma Road and Mesa Road is an east-west two-lane roadway, with a mix of residential and commercial uses. This segment is part of the proposed construction detour for alternatives that require a full bridge closure (see Section 1.3.2.2 and Figure 1-4 for more information regarding the proposed detour).
FIGURE 2.1.5-1
Transportation Analysis Study Area
State Route 1 Lagunitas Creek Bridge Project
EA 0G642, MRN-1 Post Mile 28.4 – 28.6
ID: 04-13000350
Marin County, California
Sir Francis Drake Boulevard locally is a two-lane rural road that extends from SR 1 west toward Point Reyes National Seashore, and then north toward the town of Inverness. South of the bridge, in Olema, Sir Francis Drake Boulevard extends from SR 1 east toward the community of Tocaloma.

Within the project study area, the shoulder width varies along Sir Francis Drake Boulevard, with some sections as narrow as 2 feet and others as wide as 10 feet with a graveled area for parking. The bridge is located approximately 115 feet north of the stop-controlled “T” intersection of SR 1 and Sir Francis Drake Boulevard. Stop control is provided on Sir Francis Drake Boulevard. Field observations have shown that the heavier weekend traffic on SR 1 can result in long queues on Sir Francis Drake Boulevard because the traffic movements on SR 1 do not allow left turn merges onto SR 1 from Sir Francis Drake Boulevard.

Platform Bridge Road is a two-lane north-south road between Sir Francis Drake Boulevard and Point Reyes-Petaluma Road. Platform Bridge Road is a narrow rural road with extensive curves and limited shoulders. There is minimal development along this road. Platform Bridge Road is one segment of the proposed construction detour.

Point Reyes-Petaluma Road is a two-lane east-west road between San Antonio Road to the east and Shoreline Highway (SR 1) to the west. The segment between Platform Bridge Road and Shoreline Highway (SR 1) is part of the proposed construction detour. The majority of the roadway is narrow, rural, and windy with extensive curves and limited shoulders and minimal development.

Mesa Road is a north-south two-lane roadway through downtown Point Reyes Station. A sidewalk is provided on the west side of the street and parking is permitted on both sides of the street. A mix of commercial, recreational, and residential uses are located along the street. The segment between Shoreline Highway (SR 1) to the north and south is part of the proposed construction detour.

Bear Valley Road is a north-south two-lane roadway that intersects with SR 1 within the town of Olema (about 2 miles south of Point Reyes Station) and proceeds north parallel to and west of SR 1 until it connects with Sir Francis Drake Boulevard west of the SR 1/Sir Francis Drake Boulevard intersection.
Chapter 2 Affected Environment, Environmental Consequences, and Avoidance, Minimization, and/or Mitigation Measures

**Safety Conditions**
The project is needed to meet safety and seismic design standards, including live load, seismic strength, and roadway safety. Caltrans defines live load capacity as the ability of the structure to safely carry truckloads of a given size. The existing bridge was designed to carry trucks much smaller (e.g., 15-ton trucks) than present-day trucks (e.g., 36-ton trucks). Thus, the bridge is not adequate for all modern-day truck loads. Although the bridge is only rated for smaller trucks, other trucks are known to use SR 1. There are no bridge rail barriers and if a truck was to drive into a truss, the structure may be compromised and fail.

**Pedestrian and Bicycle Conditions**
Sir Francis Drake Boulevard and SR 1 are both used by children walking to and from school in Point Reyes Station. West Marin School is located on Shoreline Highway (SR 1), just north of Manana Way. Equestrians and cyclists also use this route. The lack of shoulders, bicycle paths, and sidewalks in the area have been identified as a community concern (Caltrans 2017). Marin County has identified desired improvements for their allocation of funding for the Safe Routes to School program that are focused in the town of Point Reyes Station.

Pedestrians typically walk on the west side of SR 1 to access the existing sidewalk on the west side of the bridge. North of the bridge, however, the shoulder narrows to less than 1 foot on both sides over an existing culvert (located approximately 170 feet north of the bridge). The existing narrow shoulders on SR 1, north of the bridge, result in a gap in an otherwise continuous pedestrian network connecting Point Reyes Station and areas south of Lagunitas Creek. This gap forces pedestrians and bicycles into the vehicle lanes. The existing bridge has a 3-foot-wide sidewalk, which does not meet current ADA specifications. The ADA requires a minimum of 6-foot-wide sidewalks in constrained areas such as bridges.

To improve sight-line distances for cars, the intersection at Sir Francis Drake Boulevard was moved forward, which allows drivers to look beyond the existing bridge truss to view oncoming vehicles. However, this makes the intersection wider and less safe for pedestrians to cross. Pedestrians on Sir Francis Drake Boulevard (coming from the west) cross mid-block to the north side of the street to avoid the intersection.
Transit Service
Local transit is served by the West Marin Stage Coach, which is operated by the Marin County Transit District (Marin Transit). Route 68 provides service between San Rafael to the south and Inverness to the north. Within the project vicinity, Route 68 travels along Sir Francis Drake Boulevard, SR 1, and Bear Valley Road connecting Point Reyes Station, Inverness, and Olema (Marin Transit 2016b). There is also a loop route through downtown Point Reyes Station, primarily along A Street and B Street and a station on B Street at 5th Street. Within Point Reyes Station, the service runs approximately every 1 to 2 hours between 9:00 a.m. and 8:00 p.m.

Other Users
In addition to the local residents, other users that could be affected by the bridge construction include the local workforce, small deliveries (e.g., U.S. Postal Service, FedEx, UPS, and other delivery services), large deliveries (milk trucks, hay trucks, etc.), emergency service (fire and police), and high volumes of weekend tourists to the area (the high tourist season is April through October).

2.1.5.3 ENVIRONMENTAL CONSEQUENCES
This section discusses the potential short-term environmental consequences of constructing the project, as well as the long-term impacts and improvements after construction of the bridge is complete. The environmental consequences of the project are evaluated based on changes to the traffic, safety, pedestrian, bicycle, and transit conditions.

No-Build Alternative
Under the No-Build Alternative, the existing bridge would continue to operate without the capacity for current truck volumes and loads. The bridge also would continue to deteriorate and could fail during a strong seismic event. There would be no action to improve the safety and seismic design of the existing bridge and no improvements made for pedestrian and bicycle traffic.

Alternative 2a: Three-span, Short Steel-truss Bridge, ABC, Longitudinal Move-in
Operational Impacts
Alternative 2a would be an improvement over existing conditions and would not result in any permanent long-term adverse traffic effects. The project not only would remove load restrictions, it would also improve safety and reliability for vehicles, bicyclists, and pedestrians. Current safety and seismic design standards would be met, resulting in a significant improvement over existing conditions. As previously noted,
based on the speed and accident data, the present speed limit is appropriate for this segment of SR 1 and no changes are proposed.

The new bridge would have a 6-foot-wide sidewalk on the west side of the bridge that would be cantilevered off of the main superstructure. The new bridge design would meet current ADA standards. With Alternative 2a, the development of a continuous shoulder would eliminate the existing gap in the pedestrian network and provide a significant benefit for pedestrian and bicyclist safety and comfort. Based on the Lagunitas Creek Bridge Project, Culvert Replacement Shoulder memorandum (Caltrans 2016), there is a documented demand and identified need for pedestrian access. The purpose of a shoulder at the culvert would not be specifically to encourage pedestrian use, but to accommodate pedestrians who already depend on this route. The memorandum further identifies that both sidewalks and shoulders are shown to have a proven safety benefit for pedestrians.

A signal-warrant analysis was not conducted for the intersection of SR 1 and Sir Francis Drake Boulevard, located immediately south of the bridge. Field observations have shown while there are peak periods of high-volume traffic during high tourist seasons, the majority of the weekday period is not likely to meet the minimum vehicular volume to warrant a signal. Installing a traffic signal when volumes are not met would disrupt traffic flow, increase intersection delay for drivers, and cause undue vehicle idling. Although a traffic signal is not proposed for this intersection, the widened bridge would improve safety for drivers turning from Sir Francis Drake Boulevard onto SR 1 (northbound or southbound) by providing a better line of sight of the southbound bridge traffic, thus reducing the risk of incident. A crosswalk would also be added on the west leg of the Sir Francis Drake Boulevard/SR 1 intersection (across Sir Francis Drake Boulevard) to provide improved pedestrian access.

**Construction Impacts**

**Construction Traffic**

This construction phase would include approximately 30 to 55 construction workers at any given time. The construction-added traffic represents 3.7 percent of the existing daily weekday traffic, which would be a minimal increase. Construction workers would tend to travel to the site outside of peak hours without causing congestion on surrounding roadways.

Traffic could continue to use the existing bridge at reduced speeds (approximately 15 to 20 mph) during the majority of the construction phase. During construction, the
SR 1/Sir Francis Drake Boulevard intersection would require a 3-way stop to safely manage traffic movements, and during high-volume hours, flaggers with handheld stop signs would facilitate safe traffic flow. Although there would be a reduction in vehicle speeds, traffic across the bridge would flow with minimal congestion or delays outside of weekend tourist traffic. Nonetheless, to avoid the minor construction-related congestion, northbound vehicles on SR 1 travelling to destinations west of Point Reyes Station such as the Point Reyes National Seashore or Inverness may choose to bypass the Sir Francis Drake Boulevard/SR 1 intersection via Bear Valley Road. Bear Valley Road intersects with SR 1 within the town of Olema (about 2 miles south of Point Reyes Station) and proceeds north parallel to and west of SR 1 until it connects with Sir Francis Drake Boulevard west of the SR 1/Sir Francis Drake Boulevard intersection. Based on local residents’ testimonials, this already occurs during weekend high traffic volume periods. There is no signage indicating that Bear Valley Road provides this alternative access route, and therefore it is anticipated that this bypass would be used primarily by local residents and not result in substantially higher traffic flows.

In addition, a full closure of the existing Lagunitas Creek Bridge, estimated at up to 3 weeks, would be required to remove the existing bridge and install the new deck. During this period, northbound traffic approaching the project area on SR 1 would be limited to local traffic and vehicles heading towards the Point Reyes National Seashore. Travelers heading for Point Reyes Station and points further north would be required to take the detour beginning in Olema shown on Figure 1-4. Under these conditions, the alternate route via Bear Valley Road would not be as attractive as continuing on SR 1, because there would be a relatively low volume of oncoming traffic for those heading northwest and SR 1 is a more direct route than Bear Valley Road.

**One-way Reversing Control on the Bridge**

One lane on the existing bridge may be required to be closed during off-peak traffic periods to accommodate safe construction working conditions. This would require using one-way reversing control. On two-lane highways, one-way reversing traffic control involves alternately stopping traffic in each direction for brief periods so that traffic traveling in either direction can alternately use the one open lane, in order to allow work activities to occur in the lane that is closed. Reversing control operations under ideal conditions can accommodate approximately 930 vph over a distance of 0.25 mile for a stoppage period of 5 minutes using flaggers (Caltrans 2015c). During weekdays the combined volume of traffic in both directions of travel exhibit peak
conditions between 3 and 5 p.m. with 687 vph while the weekend peak is more sustained, lasting from 1 to 6 p.m. with over 1,300 vph (Caltrans 2015d). If reverse traffic control were to occur during these periods, queues/delays upwards of 30 minutes could occur during high tourist weekend periods of traffic.

One-way reversing control operation during non-peak weekday periods would provide sufficient capacity for the complete dissipation of queues developed during the stoppage.

However, on Saturdays and Sundays between the hours of 1:00 p.m. and 6:00 p.m., the traffic volume is substantially higher than would be able to pass through a single-lane reversing control without queues building up. Because of the higher traffic volumes during the weekend, there could be up to 30 minutes of delay for motorists attempting to cross the bridge on a weekend day while reversing control is implemented (Caltrans, 2016b). Therefore, the one-lane closure should be limited to weekdays, and would preferably occur during the evenings when the traffic volume is lower. This is the approach currently proposed; thus no adverse effects from implementing one-lane reversing traffic control are anticipated.

**Full Bridge Closure**

The bridge closure of up to 3 weeks to remove the old bridge and install the new deck would require through traffic on SR 1 to be detoured approximately 9 miles, as described in Chapter 1. From south to north, the route would begin by turning east on Sir Francis Drake Boulevard from SR 1 in Olema, north on Platform Bridge Road and Point Reyes-Petaluma Road, and north or south (depending on the destination) onto SR 1 (Figure 1-4 illustrates the detour). The bridge closure has the potential to affect the entire community, including local businesses and tourism. To assess the feasibility of a full closure, Caltrans engaged key representatives of business, economic, agrarian, tourism, national parks, California Coastal Commission, and neighborhood organizations to review and consider the implications (Caltrans 2017). Collectively, the working group developed avoidance options that would be incorporated into a Traffic Management Plan (TMP) for the project. Table 2.1.5-1 provides a summary of the potential access issues during the full bridge closure.
Table 2.1.5-1 Summary of Access Considerations during Bridge Closure for Alternatives Employing ABC

<table>
<thead>
<tr>
<th>Access and Function</th>
<th>Potential Issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small Deliveries: U.S. Postal Service, house-direct deliveries, small grocery deliveries, utilities meter reading, FedEx, UPS, and other delivery services</td>
<td>• Deliveries could be rescheduled around the closure, but a detour would be available if necessary. Both deliveries and access to the Post Office would necessitate an additional 9 miles of travel.</td>
</tr>
<tr>
<td>Large Vehicle Deliveries: milk trucks, hay, etc.</td>
<td>• Many deliveries access Point Reyes Station either via Petaluma Highway/Point Reyes Road or Lucas Valley Road to Point Reyes Road. Deliveries also use Sir Francis Drake Boulevard to access the Point Reyes National Seashore and Olema areas. Deliveries, both north and south of the bridge, would have to use the detour and/or reschedule delivery times and days of delivery.</td>
</tr>
<tr>
<td>Emergency Service Access</td>
<td>• Emergency vehicles and personnel need to be available on either side of Lagunitas Creek (additional staff may be needed during closure). Volunteer fire departments would come from Bolinas, Inverness, and Lucas Valley.</td>
</tr>
<tr>
<td>Pedestrian/Bicycle Access</td>
<td>• Pedestrians and bicycles may need a shuttle service during the full closure.</td>
</tr>
<tr>
<td>Access to Farmers Market</td>
<td>• The bridge is anticipated to be closed during the summer months (for up to 3 weeks). The farmers market is open June through October and would be affected based on the proposed schedule. The farmers market may not receive the same patronage during the bridge closure. Access via the detour would still be possible.</td>
</tr>
<tr>
<td>Equestrian Access</td>
<td>• Equestrian riders would be required to transport horses via car trailers during construction and closure.</td>
</tr>
<tr>
<td>Grade-school Access</td>
<td>• The bridge is anticipated to be closed during the dry season (for up to 3 weeks sometime between June 15 and October 1). Shuttle service would be necessary for school and/or summer school sessions.</td>
</tr>
<tr>
<td>Tourism – April through October High Tourist Season</td>
<td>• The bridge is anticipated to be closed during the summer months (for up to 3 weeks). This schedule coincides with the tourist season.</td>
</tr>
</tbody>
</table>
| Resident and Local Workforce Access | • A detour would be needed for residents and the local workforce.  
• An on-call liaison would be needed to assist with unexpected issues that arise.  
• Daily notifications on progress, including web cameras may help maintain interest and understanding about construction progress, should be provided. |
| West Marin Stage Coach Transit Shuttle Access (Routes includes Sir Francis Drake Boulevard, SR 1, and Bear Valley Road connecting Point Reyes Station, Inverness, Bolinas) | • Additional transit service may be needed to alleviate the longer travel times due to the detour during the closure period.  
• Bus stop in Point Reyes may require relocation during the closure. |

Source: Caltrans 2017
The detour involves tight curves that may present difficulties for trucks. Limited capacities at intersections along the detour could add delays to detoured traffic. As a conservative assumption, 100 percent of the existing bridge traffic (2,950 average daily vehicles) is projected to be detoured. The number of detoured vehicles would depend on the time of year that the bridge is closed. A review of traffic counts collected in 2015 and 2016 for the months of April, October, and January indicate that traffic over the bridge is approximately 34 percent higher during the spring and fall.

Along the detour, temporary signalization of one-way traffic control (as opposed to using flaggers) would be implemented. Delays resulting from the signalization would depend on the signal phasing setup and account for access to and from Sir Francis Drake Boulevard and Platform Bridge Road, which may require additional stopped time or signal phasing. Caltrans completed a preliminary operational analysis of implementing a one-way signal system (Caltrans 2017). The traffic operations for the project was analyzed using the Synchro/Sim Traffic 8.0 software program. It was determined that the peak traffic period during typical weekday is from 2:00 p.m. to 3:00 p.m. and the signal cycle would be between 2 to 3 minutes. Based on the traffic volumes and signal cycle, the average delay per vehicle would be approximately 5 seconds or Level of Service A during weekday traffic, excluding Friday – Sunday travel patterns.

There would be no unserved recurrent queues and the signal cycle would be sufficient to clear all approaching vehicles. Therefore, based on the preliminary analysis, the one-way signal is operationally viable and would operate with minimal delay.

With implementation of the Construction Traffic Management Plan, and temporary one-way traffic control, would reduce potential adverse effects to traffic during the detour from full bridge closure as outlined in Table 2.1.5-1.

**Heavy Haul**
Large and heavy components for the bridge will be transported by truck along SR 1. Marin County regulates the use of trucks on county roadways and a trip transportation permit would be required for all oversize and overweight loads. The construction contractor would obtain all necessary transportation permits prior to beginning work.

**Safety Conditions**
Alternative 2a would only require 1 year of construction. This would minimize worker and motorist safety risks by minimizing construction exposure. During
majority of the construction period, traffic would continue to use the existing bridge with two exceptions: one-way reversing control operation occasionally during pile driving and when the culvert is being expanded; and during the full bridge closure, when traffic would be detoured.

There would be potential delays for emergency service responders during the period when one-way reversing control operation is implemented. However, one-way reversing control is proposed to occur in the evenings when there are fewer vehicles on the road. Coordination with emergency services would be necessary to ensure adequate access during construction.

During the full closure and resulting detour, there would be a temporary increase in travel distance and vehicle miles travelled, which could result in an increased risk of an accident. Vehicles would also be required to travel on narrow roads as part of the detour, which could also increase the potential for an accident to occur. Emergency service response times would be substantially longer if only dependent on the detour to reach areas south of the current location in Point Reyes Station; however, this negative impact would be avoided (see Section 2.1.5.4).

**Pedestrian and Bicycle Conditions**
With Alternative 2a, pedestrians and bicyclists could continue to use the existing sidewalk on the west side of the bridge, except during the full bridge closure. There would be no adverse effects while the bridge is open. The bridge closure would result in a negative impact on pedestrian and bicycle accessibility and movement; however, this impact would be minimized (see Section 2.1.5.4).

**Transit Conditions**
With Alternative 2a, transit could continue to use the existing bridge, at reduced speeds, during the majority of the construction phase. The full closure of the bridge would require rerouting the Marin Transit bus route to the proposed detour. The rerouting would add time to the transit route and would require changing the service schedule, thus resulting in a temporary short-term adverse effect. The Point Reyes Station bus stops may need to be temporarily relocated to reduce further bus travel time delay during the detour period.
Alternative 2b: Three-span, Short Steel-truss Bridge, Conventional (with Detour Bridge)

Operational Impacts
Alternative 2b beneficial impacts would be the same as those under Alternative 2a. There would be no adverse effects on transportation during operation.

Construction Impacts
The only difference between Alternative 2a and Alternative 2b is that Alternative 2b would employ the conventional construction method and traffic would be diverted to a temporary bridge to cross Lagunitas Creek for the duration of the construction period. Traffic speeds would be reduced to approximately 15 to 20 mph. The temporary bridge would be 38 feet wide to allow two lanes of traffic (for the majority of the construction period) with a separate bicycle and pedestrian way on the east side of the temporary bridge. With this method, one-lane nighttime closures on the bridge may be required during pile placement for the new abutments. During the one-lane closures, a reversing control operation would be implemented, as described for Alternative 2a.

For the majority of the construction phase, the temporary bridge would have two lanes open for northbound and southbound traffic, which would be operationally equivalent to the current configuration. Existing traffic operations on SR 1 would remain the same when two lanes on the temporary bridge are open. Although a reduction in vehicle speeds due to construction activities may occur, traffic would flow continuously and minimal congestion or delays are expected to occur. Delays during construction due to slower traffic speeds using the temporary bridge would not result in substantial delay beyond normal high volume flow conditions.

Construction Traffic
This method would engage approximately 18 construction workers (or 36 trips assuming 2 trips per worker). The construction-added traffic represents 1.2 percent of the existing daily traffic on SR 1, which would be a minimal increase. No adverse effects are anticipated as a result of the construction-added traffic under the conventional construction method. Construction workers would also arrive and depart the site outside of weekday peak hours.

Heavy Haul
The heavy haul routes would be the same as under Alternative 2a, except the construction-related truck trips would be spread over a longer period of time.
Safety Conditions
With the conventional construction methods, the temporary bridge structure would be operationally equivalent to the current configuration. There would be no increased safety risk. Vehicles would be required to travel at slower speeds within the construction work zone.

There would be potential delays for emergency service responders during the period when one-way reversing control operation is implemented. However, one-way reversing control is proposed to occur in the evenings when there are fewer vehicles on the road. Coordination with emergency services would be necessary to ensure adequate access during construction.

Pedestrian and Bicycle Conditions
With this construction method, a separate bicycle and pedestrian path would be provided on the east side of the temporary bridge and separated with a K-rail barrier. The K-rail would provide an added safety benefit. There would be no impediment to pedestrians or bicyclists on the bridge.

Given the relatively low number of trucks (one per day) needed to construct the project, pedestrian and bicycle traffic along SR 1, to the north and south, is not anticipated to be affected by the construction-related truck traffic.

Transit Conditions
With this construction method, Marin Transit could use the temporary bridge. There would be no impediment to regular transit service, except slightly slower travel speeds in and around the construction work zone. Depending on the time of day, the slower travel speeds could result in schedule delays. However, these delays would be minimal.

Alternative 3a: Three-span, Concrete Bridge, ABC, Longitudinal Move-in Operational and Construction Impacts
All direct and indirect operation and construction impacts would be the same as those under Alternative 2a, except the sidewalk would not be cantilevered. The sidewalk would be a raised sidewalk on the bridge with a railing separation from shoulder and travel lanes.

Alternative 4a: Full-span, Steel-truss Bridge, ABC, Longitudinal Move-in Operational and Construction Impacts
All direct and indirect operation and construction impacts would be the same as those under Alternative 2a.
**Chapter 2 Affected Environment, Environmental Consequences, and Avoidance, Minimization, and/or Mitigation Measures**

**Alternative 4b: Full-span, Steel-truss Bridge, ABC, Transverse Slide-in**

**Operational Impacts**

All direct and indirect operation impacts would be the same as those under Alternative 2a.

**Construction Impacts**

Direct and indirect impacts would be the same as those under Alternative 2b, except that the total construction period would be shorter. The new bridge would be constructed adjacent to the existing bridge and used as a detour bridge during dismantling of the existing bridge and prior to being slid into its final position. By redirecting traffic onto the new bridge, the dismantling can be done without closing the crossing. For other ABC alternatives, the dismantling of the existing bridge is a portion of the closure. This alternative would only have to close during the period where the new bridge is being slid into the new location horizontally, thus shortening the duration of the full closure. Further, delays during construction due to slower traffic speeds using the temporary transverse bridge would not result in substantial delay beyond normal high-volume flow conditions.

During the shortened closure, Alternative 4b would result in the same direct and indirect construction impacts as those under Alternative 2a.

**2.1.5.4 AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES**

The following avoidance and minimization measures would reduce traffic impacts during construction.

- **AMM TRANS-1: Construction Traffic Management Plan.** Prior to construction, the TMP will be prepared by Caltrans Operations Staff and coordinated with Marin County. The objective of developing the TMP is to balance short-term and long-term effects to the travelling public with the safe, efficient delivery of the bridge project and work zone activities. A TMP will be implemented regardless of which Build Alternative is selected; however, the specific elements of the TMP will vary depending on the alternative and construction method.

  The avoidance and minimization measures would address the potential issues recorded in Table 2.1.5-1 and would be further developed in the TMP. The TMP would include, at minimum, the following elements:
Chapter 2 Affected Environment, Environmental Consequences, and Avoidance, Minimization, and/or Mitigation Measures

A. Public Information (All Build Alternatives)
Provide the public with roadway information in advance so that they can plan their travel accordingly (e.g., brochures, telephone hotline, mailers, project website, etc.). When the public is equipped with work zone information before they begin traveling, they have the opportunity to adjust their travel plans.

B. Motorist Information (All Build Alternatives)
Motorist information is vital to travelers approaching a work zone who still have time to make a decision that could divert them away from possible congestion. With available information on travel delays (e.g., through portable changeable message signs, etc.) or alternative routes prior to travel, motorists can play an active role in completing their trips more smoothly and help reduce overall congestion.

C. Incident Management (All Build Alternatives)
This element includes having a Traffic Management Team to assist in managing traffic during incidents and planned closure activities that could result in vehicle delays. This element also includes coordinating with local responder agencies to arrange for priority response to the work zone for incidents.

D. Construction Strategies (Varies by Build Alternative)
Construction strategies can be effective in reducing congestion in a work zone. For this project, the following minimization strategies have already been incorporated into the construction methods:

- Conduct night work (all Build Alternatives)
- Restrict truck/heavy vehicle travel during peak hours (all Build Alternatives)
- Restrict construction workforce travel during peak hours (all Build Alternatives)
- Use a temporary bridge to allow continued access, with either two-way or one-way reserving control (Alternative 2b)
- Provide pedestrian and bicycle access on the temporary bridge (Alternative 2b)
- Use the existing bridge during construction (Alternatives 2a, 3a, 4a, and 4b)
Chapter 2 Affected Environment, Environmental Consequences, and Avoidance, Minimization, and/or Mitigation Measures

- One-way reverse traffic control would only be used during off-peak hours unless total need is shorter than 48-hour period and restricted to Monday through Thursdays.

- Provide a pedestrian/bicycle shuttle during full bridge closure (Alternatives 2a, 3a, 4a, and 4b)

The following additional minimization strategies would be included in the TMP:

- Coordination with Marin Transit
- Potential transit service schedule changes

E. Detour Route for Bridge Closure (Alternatives 2a, 3a, 4a, and 4b)
A detour is proposed for these alternatives that require a full road closure. This strategy involves rerouting all traffic during the anticipated 2- to 3-week bridge closure. During the work, traffic conditions on the detour would be monitored for acceptable levels of delay on motorist.

F. Deter Use of Bear Valley Road (Alternatives 2a, 3a, 4a, and 4b)
To reduce the potential for non-locals traveling to and from points west of Point Reyes Station to use Bear Valley Road to avoid the SR 1/Sir Francis Drake Boulevard intersection during the construction period, signs will be posted to redirect such traffic and/or a series of temporary speed bumps will be installed to reduce the attractiveness of this route. Caltrans will work with Marin County to develop an effective deterrent for using this road. This would not be necessary during the bridge closure since access to areas west of Point Reyes Station via SR 1 and Sir Francis Drake Boulevard will be unimpeded.

G. Truck Traffic (Alternatives 2a, 3a, 4a, and 4b)
The detour proposed for the bridge closure for Alternatives 2a, 3a, 4a, and 4b includes two acute angle intersections (at Point Reyes-Petaluma Road/Platform Bridge Road, and Platform Bridge Road/Sir Francis Drake Boulevard) that may be difficult for truck traffic to negotiate. The TMP would describe the proposed signalizing at the intersection, in combination with advance notification to the California Trucking Association to assist in planning around this temporary closure.
H. Transit Modification (Alternatives 2a, 3a, 4a, and 4b)
Prior to closing Lagunitas Creek crossing, contractor will coordinate with Marin Transit to accommodate the Point Reyes Station bus stop.

- **AMM TRANS-2: Emergency service access provision.** During the full bridge closure (for all alternatives except Alternative 2b), coordination with emergency services providers will be conducted to ensure adequate access during construction. AMM UTIL-1: Provide Emergency Personnel would include providing additional emergency services staff as needed during the bridge closure for alternatives 2a, 3a, 4a and 4b to confirm that adequate service is available on either side of the bridge.

- **AMM TRANS-3: Shuttle service for pedestrians and bicyclists.** During the full bridge closure (for all alternatives except Alternative 2b), a shuttle service will be provided to facilitate school access and other routine accessibility for pedestrians and bicyclists to and from Point Reyes Station community, using the proposed construction detour shown on Figure 1-4, in Chapter 1.

2.1.6 Visual/Aesthetics

2.1.6.1 REGULATORY SETTING
The National Environmental Policy Act (NEPA) of 1969, as amended, establishes that the federal government use all practicable means to ensure all Americans safe, healthful, productive, and *aesthetically* (emphasis added) and culturally pleasing surroundings (42 USC 4331[b][2]). To further emphasize this point, the Federal Highway Administration (FHWA) in its implementation of NEPA (23 USC 109[h]) directs that final decisions on projects are to be made in the best overall public interest, taking into account adverse environmental impacts, including, among others, the destruction or disruption of aesthetic values.

The California Environmental Quality Act (CEQA) establishes that it is the policy of the state to take all action necessary to provide the people of the state “with…enjoyment of aesthetic, natural, scenic and historic environmental qualities” (California Public Resources Code Section 21001[b]).

2.1.6.2 AFFECTED ENVIRONMENT
The information presented in this section was drawn from the visual impact assessment prepared for this project (Caltrans 2017a). The visual impact assessment was prepared in accordance with the guidelines in FHWA’s *Visual Impact Assessments for Highway Projects* (FHWA 1981).
Visual Setting
The proposed project is located on State Route (SR) 1 between B Street and Sir Francis Drake Boulevard, south of the unincorporated community of Point Reyes Station in Marin County, California. SR 1 is a Caltrans eligible State Scenic Highway, not officially designated (Caltrans 2017b). The study area is the area visible from the project site, which extends approximately 0.25 to 0.5 mile beyond the northern and southern limits of the construction footprint, depending on the direction the viewer is facing. The project spans Lagunitas Creek and is located in an area surrounded by Tomales Bay State Park, the Golden Gate National Recreation Area, and Point Reyes National Seashore lands. Therefore, vast amounts of open space provide a serene backdrop for travelers along SR 1 north and south of the project area. Lagunitas Creek is the main stem of the largest watershed in Marin, which empties into Tomales Bay. The landscape is characterized by flat alluvial plains that define the upper portion of Tomales Bay. The study area is located approximately 30 miles northwest of San Francisco.

Land uses within the study area are primarily rural residential and agricultural, but also include areas of commercial uses, which cater to tourists visiting the Point Reyes National Seashore. The local visual character of the project site and its vicinity are defined primarily by Point Reyes Station, which is a rural community centered on SR 1, just north of the Lagunitas Creek Bridge. Because Point Reyes Station serves as a tourist destination, weekend activity transforms the rural community into a bustling commercial center catering to large groups of cyclists, recreationalists, motorcyclists, and tourists.

Defining characteristics of the area immediately surrounding Lagunitas Creek in the project area are the riparian vegetation on the creek’s banks, the overhead utility infrastructure, and the neighboring buildings. The riparian landscape is a mixture of species such as red willow (Salix laevigata), coast live oak (Quercus agrifolia), and California buckeye (Aesculus californica). Overhead utilities include a combination of power and telecommunication cables strung on separate poles above and immediately west of the bridge. The neighboring buildings to the south of the bridge are one-story residential structures, with the building immediately southwest of the bridge being used as a law office. To the north is a one-story commercial building, housing the Point Reyes Animal Hospital, which also includes residential units attached to the same building.
To the west of the bridge is Whitehouse Pool Park, which is accessed both just north of the bridge and from other points within Point Reyes Station and further west along Lagunitas Creek.

The entire length of SR 1 in Marin County is listed as being eligible for designation as a State Scenic Highway.

**Visual Assessment Units and Key Views**

Visual assessment units (VAUs) are used in visual impact assessments to differentiate areas that have their own distinct visual character and visual quality. For the purposes of this visual analysis, the Lagunitas Creek Bridge Project study area was designated as a single VAU because of its relatively small size and consistently distributed visual characteristics. To analyze potential visual impacts, representative key views (KVs) were identified that would most clearly demonstrate changes to the visual environment in the project area that would result from project implementation. The two KVs listed below were identified because they are publicly accessible (see Figure 2.1.6-1), and used as the basis for the analysis of the visual impacts associated with each project alternative. These are:

- **KV1:** This view from the SR 1 and Sir Francis Drake Boulevard intersection, looking north toward the Lagunitas Creek Bridge, was selected because it offers visual assessment as one would view the roadway approaching the bridge. (See Figure 2.1.6-2).

- **KV2:** This view from the north bank of Lagunitas Creek within Whitehouse Pool Park, just west of the Lagunitas Creek Bridge, looking east toward the Lagunitas Creek Bridge, was selected because it offers visual assessment as one would view the bridge from the side, as from walking within Whitehouse Pool Park (see Figure 2.1.6-3).
FIGURE 2.1.6-1
Key View Locations Map
State Route 1 Lagunitas Creek Bridge Project
EA 0G642, MRN-1 Post Mile 28.4 – 28.6
ID: 04-13000350
Marin County, California

LEGEND

Key View Photo Location

Imagery Source: Google ©2016, modified by CH2M
Chapter 2 Affected Environment, Environmental Consequences, and Avoidance, Minimization, and/or Mitigation Measures

Figure 2.1.6-2  Key View 1 (KV1) View of Bridge from the SR 1 and Sir Francis Drake Boulevard Intersection, Looking North

Figure 2.1.6-3  Key View 2 (KV2) View from North Bank of Lagunitas Creek within Whitehouse Pool Park, West of the Lagunitas Creek Bridge, Looking East
Visual quality throughout the project’s VAU is generally high. The project’s location has a high degree of vividness characterized by low-density development, the green trusses of the Lagunitas Creek Bridge, and dense riparian vegetation, punctuated with tall deciduous and evergreen trees. Views of Lagunitas Creek also contribute to the high degree of vividness. Visual resources in the study area are generally intact, although many pleasing views of the immediate and surrounding areas are interrupted by numerous overhead utility lines and poles. The small number of commercial and residential structures are interspersed with riparian and ornamental landscaping that create a unified visual pattern. Visual harmony is slightly interrupted only by the overhead utility lines.

The following text describes the existing visual character of the project site, as seen from the two KV locations evaluated in this visual analysis.

**KV1: View from the SR 1 and Sir Francis Drake Boulevard Intersection Looking North Toward the Lagunitas Creek Bridge**
The existing visual character at the project site from the perspective of KV1 is characterized by the riparian vegetation along the banks of Lagunitas Creek and the ornamental landscape found on both the southwestern and southeastern corners of the bridge. The roadway’s narrow shoulders, green truss structures, and pedestrian sidewalk on the western side of the bridge are the most prominent physical features visible from this KV. The bridge’s truss structures frame a view to the historic Grandi Building, which is located to the north in the community of Point Reyes Station.

**KV2: View from the North Bank of Lagunitas Creek, Just West of the Lagunitas Creek Bridge Looking East Toward the Lagunitas Creek Bridge**
KV2 is a view toward the project site from the north bank of Lagunitas Creek, from within Whitehouse Pool Park. This location is accessed either via a public trail that begins immediately northwest of the bridge or from a trailhead located on C Street and 3rd Street. The view is characterized by the riparian landscape, the bridge deck structure, the green truss structures, and the pedestrian sidewalk and guardrail on the western side of the bridge. The existing piers are obscured by existing vegetation, but would be visible during and after construction, until vegetation grew back.

**Existing Visual Resources**
Visual resources in the study area are defined and identified by assessing the visual character and visual quality of these resources. These resources are detailed in the following subsections.
The existing landscape setting in the larger vicinity of the project exhibits some of the following formal characteristics:

- The topography of the surrounding area is characterized by generally flat to gently rolling horizontal forms and lines. The landforms have strong continuity, appearing as a coherent and distinct landscape setting. This is punctuated by the rectilinear vertical forms of the Lagunitas Creek Bridge and nearby buildings, as well as the more rounded forms of the prevalent vegetation that are a defining feature of the area.

- Colors are dominated by the pastureland/grassland, which is predominantly green and brown during winter and spring, and changes to golden and brown in summer and fall.

- The predominant texture is that of the fine grass/pastureland, which is kept short and highly uniform by grazing, and the varying texture of the multiple types of trees in the project area.

- SR 1 and the Lagunitas Creek Bridge are generally subordinate in scale and dominance to the overall landscape setting.

Visual quality is evaluated by identifying the vividness, intactness, and unity present in the study area, defined as follows:

- **Vividness** is the extent to which the landscape is memorable and associated with distinctive, contrasting, and diverse visual elements.

- **Intactness** is the integrity of visual features in the landscape and the extent to which the existing landscape is free from non-typical visual intrusions.

- **Unity** is the extent to which all visual elements combine to form a coherent, harmonious visual pattern.

**Viewer Groups**

There are two major types of viewer groups for roadway projects: highway neighbors and highway users. Each viewer group has its own particular level of viewer exposure and viewer sensitivity. This specificity results in distinct and predictable visual concerns for each group, which help to predict the group’s responses to visual changes. For instance, a commuter is generally less sensitive than a resident to changes that occur in their routine visual environment.
**Viewer Response**
Viewer response is a measure or prediction of the viewer’s reaction to changes in the visual environment. Viewer response has two dimensions: viewer exposure and viewer sensitivity.

**Viewer Exposure**
Viewer exposure is a measure of the viewer’s ability to see a particular object. Viewer exposure has three attributes: location, quantity, and duration. Location is the position of the viewer in relationship to the object being viewed. The closer the viewer is to the object, the greater is its exposure. Quantity refers to how many people see the object. The more people who can see an object or the greater frequency with which an object is seen, the greater its exposure is to viewers. Duration refers to how long a viewer is able to keep an object in view. The longer an object can be kept in view, the greater its exposure. High viewer exposure helps predict a likelihood that viewers will have a response to a visual change.

**Viewer Sensitivity**
Viewer sensitivity is a measure of the viewer’s recognition of a particular object. It has three attributes: activity, awareness, and local values. Activity relates to the preoccupation of viewers—are they preoccupied, thinking of something else, or truly engaged in observing their surroundings? The more viewers are actually observing their surroundings, the more sensitivity they will have of changes to visual resources. Awareness relates to the focus of view—either the focus is wide and the view is general, or the focus is narrow and the view is specific. The more specific the awareness, the more sensitive a viewer is to change. Local values and attitudes also affect viewer sensitivity. If a viewer group values aesthetics in general or if a specific visual resource has been protected by local, state, or national designation, viewers are likely to be more sensitive to visible changes. High viewer sensitivity helps predict that viewers will have a high concern for any visual change.

Table 2.1.6-1 provides an overview of the two primary viewer groups for this roadway project: highway neighbors and highway users. The table includes a general description of the viewer group’s anticipated responses to potential change of their visual surroundings.
Table 2.1.6-1 Viewer Groups Anticipated Response to Changes

<table>
<thead>
<tr>
<th>Viewer Groups</th>
<th>Viewer Exposure (Duration/Exposure)</th>
<th>Viewer Sensitivity to Change in Landscape and Bridge</th>
<th>General Viewer Response to Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Highway Neighbors (Viewers to the Road)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Workers</td>
<td>Long and frequent</td>
<td>Low sensitivity to change in landscape and bridge</td>
<td>Medium high response</td>
</tr>
<tr>
<td>Residents</td>
<td>Long and frequent</td>
<td>High sensitivity to changes in landscape and bridge</td>
<td>High response</td>
</tr>
<tr>
<td>Whitehouse Pool Park Visitors</td>
<td>Long and frequent</td>
<td>High sensitivity to change in landscape and bridge</td>
<td>High response</td>
</tr>
<tr>
<td><strong>Highway Users (Views from the Road)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drivers – Tourists</td>
<td>Short and infrequent</td>
<td>Sensitive to the changes in the landscape, but may not be sensitive to changes to the roadway and bridge</td>
<td>High to low response</td>
</tr>
<tr>
<td>Drivers – Commuters/ Business</td>
<td>Short and infrequent to frequent</td>
<td></td>
<td>Low response</td>
</tr>
<tr>
<td>Drivers – Residents</td>
<td>Long and frequent</td>
<td></td>
<td>High response</td>
</tr>
<tr>
<td>Bicyclists/ Pedestrians</td>
<td>Long and frequent</td>
<td></td>
<td>High response</td>
</tr>
</tbody>
</table>

Because of the relative similarities in viewer responses, it is appropriate for this visual impact analysis to aggregate the overall viewer response for all the viewer groups as high.

2.1.6.3 ENVIRONMENTAL CONSEQUENCES

The greatest visual impact to the project site would be from the replacement of the existing bridge to meet current seismic and design standards. In all the Build Alternatives, a consistent contributor to resource change is the addition of 5-foot-wide shoulders and crash attenuators. The ratings for each alternative incorporates this change into the resource change rating. The proposed Build Alternatives result in the following visual resource changes, which are measured in change levels of: low, moderate-low, moderate, moderate-high, or high. For all of the following alternative resource assessments, removal of the overhead utilities and replacement of removed planting are assumed and included in the rating.

Visual impacts are determined by assessing project-related changes to visual resources and predicting viewer response to those changes. These impacts can be
beneficial or detrimental. A generalized visual impact assessment process is illustrated in Figure 2.1.6-4.

**Figure 2.1.6-4  Visual Impact Assessment Process Concept Diagram**

Table 2.1.6-2 provides a reference for determining relative levels of visual impact by combining resource change and viewer response.

**Table 2.1.6-2 Visual Impact Ratings Using Viewer Response and Resource Change**

<table>
<thead>
<tr>
<th>Resource Change</th>
<th>Viewer Response (VR)</th>
<th>Low (L)</th>
<th>Moderate-Low (ML)</th>
<th>Moderate (M)</th>
<th>Moderate-High (MH)</th>
<th>High (H)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low (L)</td>
<td></td>
<td>L</td>
<td>ML</td>
<td>ML</td>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td>Moderate-Low (ML)</td>
<td></td>
<td>ML</td>
<td>ML</td>
<td>M</td>
<td>M</td>
<td>MH</td>
</tr>
<tr>
<td>Moderate (M)</td>
<td></td>
<td>ML</td>
<td>M</td>
<td>MH</td>
<td>MH</td>
<td>MH</td>
</tr>
<tr>
<td>Moderate-High (MH)</td>
<td></td>
<td>M</td>
<td>M</td>
<td>MH</td>
<td>MH</td>
<td>H</td>
</tr>
<tr>
<td>High (H)</td>
<td></td>
<td>M</td>
<td>MH</td>
<td>MH</td>
<td>H</td>
<td>H</td>
</tr>
</tbody>
</table>

The following subsections present environmental consequences associated with the proposed project from the perspective of each KV. Visual simulations, representing
each of the Build Alternatives as viewed from KV1 and KV2, have been created to illustrate the changes in the visual environment that would result from the proposed project. These simulations are shown in the figures alongside the existing views from these locations for comparison.

**Visual Impacts by Alternative**

**Alternative 1: No-Build Alternative**

**Operation and Construction Impacts**

Under the No-Build Alternative, the Lagunitas Creek Bridge would not be replaced and the project site would remain unaltered. Therefore, there would not be a change to the visual quality.

**Alternative 2a: Three-span, Short Steel-truss Bridge, ABC, Longitudinal Move-in**

**Operational Impacts**

This alternative is a similar structure to the existing bridge, with green pony trusses of equal length; however, the proposed trusses would be approximately 4 feet taller than the existing trusses and would be rounded arch trusses, rather than square. Proposed pedestrian guardrails would mimic the existing guardrail, but would be taller with more closely spaced pickets to meet current safety regulations. No new lights would be added to the bridge, just as there are no existing street lights currently. The required piers in Lagunitas Creek would be at the location of the existing piers, which are to be removed, causing minimal resource change when viewed by pedestrians from Lagunitas Creek within the Marin County Whitehouse Pool Park west of the bridge. This alternative would result in a low change on the visual resource. This is supported by the review of each KV and the visual simulation of Alternative 2a, as recorded below.

**KV1: From SR 1 South of the Lagunitas Creek Bridge Looking North**

As shown in Figure 2.1.6-5, from the perspective of KV1, the most notable visual changes in the study area, resulting from implementation of Alternative 2a, would be the addition of modern crash attenuators, roadside safety devices, widened shoulders, and the arching forms of the new bridge trusses. The utility lines would be replaced in a location outside the view of the KV1 image shown in Figure 2.1.6-5. There are no existing street lights and no new lighting is proposed, so no light or glare impacts would occur to neighboring viewers. The wider bridge would open up the view toward the Point Reyes Station. The industrial aesthetic evoked by the original design would still be apparent, but the increased width of the new roadway, from 26 to
FIGURE 2.1.6-5
KV1: Existing and Proposed Conditions, Alternatives 2a/2b
State Route 1 Lagunitas Creek Bridge Project
EA 0G642, MRN-1 Post Mile 28.4 – 28.6 ID:
04-13000350
Marin County, California
32 feet (11-foot-wide lanes and 5-foot-wide shoulders), and taller trusses would result in a departure from the original design. The views from this location would mostly affect travelers and users of the bridge, as well as the two residences nearest the bridge. While the change would be apparent in the early years following project completion, the cleared vegetation would return and, ultimately, the viewers would not experience a substantial change in the visual quality of the surroundings. The level of change to the visual quality would be low.

**KV2: From North Bank West of Lagunitas Creek Bridge Looking East**

As shown in Figure 2.1.6-6, from the perspective of KV2, a low to moderate amount of change in overall visual character compared to the original bridge would be apparent. The bridge structure and piers would be larger and more visible because vegetation would be removed to access the bridge; this vegetation would take several years to grow back. The similar structural pattern and color of the trusses compared to the original would maintain consistency in overall visual character, despite the introduction of the arch and the presence of structural piles. The deck treatment would resemble in scale and color that of the original bridge, resulting in a low to moderate level of change to the visual quality.

**Construction Impacts**

The use of various construction staging areas would be required under this alternative (please see Figure 1-8 in Chapter 1). Establishment of these temporary staging areas would, in some cases, involve removal of existing vegetation, which would alter the existing visual character of the project area. As part of the project, removed vegetation would be replaced following the completion of bridge construction to match existing vegetation, to the extent feasible. Project construction activities would involve the use of, and extended presence of, construction materials and equipment at the project site in an area where they are not normally part of the visual setting. In addition, nighttime construction activity would require the use of lighting equipment that would alter the character of the existing nighttime environment. These impacts would most affect neighboring viewers and, to a lesser degree, would provide a visual distraction from the surroundings for visitors traveling through the construction area. The visual disturbance would be a high resource change to surrounding visual quality, but, because this alternative incorporates an accelerated schedule of less than 1 year, the impact overall would be low.
Key View #2: Existing Conditions – From North bank West of Lagunitas Creek Bridge looking East

Key View #2: Proposed Conditions – Alternatives 2a/2b: Steel Truss, 3-span – From North bank West of Lagunitas Creek Bridge looking East

FIGURE 2.1.6-6
KV2: Existing and Proposed Conditions, Alternatives 2a/2b
State Route 1 Lagunitas Creek Bridge Project
EA 0G642, MRN-1 Post Mile 28.4 – 28.6 ID: 04-13000350
Marin County, California
Alternative 2b: Three-span, Short Steel-truss Bridge, Conventional Construction (with Detour Bridge)

Operational Impacts
The relative change to the visual resource would be the same as Alternative 2a, a low change. This is supported by the review of each KV and the visual simulation of Alternative 2a and 2b.

KV1: From SR 1 South of the Lagunitas Creek Bridge Looking North
Operational impacts for this alternative would be the same as those described for Alternative 2a (see Figure 2.1.6-5).

KV2: From North Bank West of Lagunitas Creek Bridge Looking East
Operational impacts for this alternative would be the same as those described for Alternative 2a (see Figure 2.1.6-6).

Construction Impacts
Construction impacts associated with staging areas and nighttime construction would be similar to those described for Alternative 2a. However, key differences include the use of a temporary detour bridge immediately adjacent to and east of the existing bridge, as well as a conventional construction method that would result in a 3-year construction period, compared to the 1-year construction period associated with other Build Alternatives. Use of a detour bridge would require additional vegetation removal above the amount that would be removed under Alternative 2a (please see Figure 1-10). Also, the mass and bulk of the temporary detour bridge would result in a broader area of disturbance to the visual setting, with considerably more vegetation removal and widening of the roadway surface through adjacent properties. This area would result in a wide area of relatively long-term visual change, compared to existing conditions wherein the existing bridge alone spans Lagunitas Creek with mature riparian habitat at either side. These construction impacts, although greater than those associated with Alternative 2a, would be reversible; and after the removal of the temporary bridge and re-establishment of cleared vegetation, the project’s temporary visual impacts would become a low level of change to the visual quality.

Alternative 3a: Three-span, Concrete Bridge, ABC, Longitudinal Move-in

Operational Impacts
The concrete bridge alternative creates a moderate-low resource change because of its absence of truss structures, which is an aesthetic departure from the original bridge. Without the truss structures, views are more open and unobstructed. Green paint that is similar to the existing bridge would be applied to the pedestrian guardrail to
visually reference the existing bridge’s truss. New piers would be placed in the existing location of the original piers. This alternative would result in a moderate to low change on the visual resource. This is supported by the review of each KV and the visual simulation of Alternative 3a, as recorded below.

Adding an ornamental truss to the concrete bridge alternative recreates the character of the original Lagunitas Creek Bridge, resulting in a low level of change to the visual resource.

**KV1: From SR 1 South of the Lagunitas Creek Bridge Looking North**

Similar to Alternatives 2a and 2b, under Alternative 3a, the view seen from the perspective of KV1, as shown in Figure 2.1.6-7, is notable for the addition of crash attenuators and the widened roadway, as compared to existing conditions. The absence of trusses under this design would result in a more open view toward the banks of Lagunitas Creek, but would detract from the original character of the site by removing a major visual resource. Therefore, the resource change under this alternative would be a medium-low impact on visual quality.

Figure 2.1.6-8 presents a view of Alternative 3a with an ornamental truss design option. The ornamental truss is an alternative design for Alternative 3a. However, Caltrans would determine the final truss design after the public review period. To preserve the original historic character of the bridge, this design option would incorporate an ornamental truss that mimics the existing bridge’s truss structures. The visual changes caused by the addition of crash attenuators, roadside safety devices, and widened shoulders are similar to the changes associated with Alternatives 2a and 2b. Resource change under this alternative would be a low-level impact, because it would open some views, while maintaining features of the existing character.

**KV2: From North Bank West of Lagunitas Creek Bridge Looking East**

As shown in Figure 2.1.6-9, Alternative 3a as seen from KV2 would represent a departure from the overall visual character of the existing bridge. From this view, the primary design similarity between the existing and proposed bridge would be the color of the guardrail and the cantilevered sidewalk. The materials and structure of the deck would be different than the original. The bridge deck would be deeper and the piers would be larger than those of the original bridge. However, the lack of a truss feature would result in a more open view toward the Bolinas Ridge, which lies east of the bridge. The visual contrast of the thick concrete materials and larger piers would have a low impact on the viewers’ experience of the bridge. However, the overall view would be more open and, therefore, there would be a low overall impact on the visual quality.
Key View #1: Existing Conditions – From South of Lagunitas Creek Bridge looking North

Key View #1: Proposed Conditions – Alternative 3a, Concrete Bridge – From South of Lagunitas Creek Bridge looking North

FIGURE 2.1.6-7
KV1: Existing and Proposed Conditions, Alternative 3a
State Route 1 Lagunitas Creek Bridge Project
EA 0G642, MRN-1 Post Mile 28.4 – 28.6
ID: 04-13000350
Marin County, California
Figure 2.1.6-8
KV1: Existing and Proposed Conditions, Alternative 3a, Ornamental Truss
State Route 1 Lagunitas Creek Bridge Project
EA 0G642, MRN-1 Post Mile 28.4 – 28.6
ID: 04-13000350
Marin County, California
Key View #2: Existing Conditions – From North bank West of Lagunitas Creek Bridge looking East

Key View #2: Proposed Conditions – Alternative 3a: Concrete Bridge – From North bank West of Lagunitas Creek Bridge looking East

FIGURE 2.1.6-9
KV2: Existing and Proposed Conditions, Alternative 3a
State Route 1 Lagunitas Creek Bridge Project
EA 0G642, MRN-1 Post Mile 28.4 – 28.6
ID: 04-13000350
Marin County, California
Figure 2.1.6-10 is a view of Alternative 3a with an ornamental truss design. From KV2, the contrast between the original bridge and this design option would be more pronounced than from KV1. As in the case of the design without the ornamental truss, the thickened profile of the concrete deck and piers would be a departure from the existing bridge structure. However, this visual change would be offset by the addition of the ornamental truss structures. Resource change under this design option would be low.

**Construction Impacts**

Construction impacts for this alternative would be the same as described above for Alternative 2a in duration and level of visual disturbance.

**Alternative 4a: Full-span, Steel-truss Bridge, ABC, Longitudinal Move-in**

Operational Impacts
The single-span alternative creates the greatest visual change of the three alternatives. The overhead truss, in concert with side trusses that are approximately 2 to 3 times the height and have increased thickness than the existing trusses, are the primary contributors to the impact on the visual resources. To reduce the visual change, the proposed truss structures would take design cues from the original in color and form. Changes to the visual resources are notable when viewed from the shores of Lagunitas Creek within Whitehouse Pool Park, created by the removal of the existing piers and the increased scale of the truss structure. A high rating for the level of visual resource change results from the view screening and blockage by the new bridge structure. The ratio of constructed versus natural elements is greatly increased with the taller and denser structure. This alternative would result in a high degree of change to the visual resource.

This design option to provide an arched truss, instead of box trusses, would result in a structure 10 feet taller. It would also contribute to a high level of change in visual resources, if implemented. This analysis is supported by the review of each KV and the visual simulation of Alternative 4a, as recorded below.

**KV1: From SR 1 South of the Lagunitas Creek Bridge Looking North**

Figure 2.1.6-11 presents a view of Alternative 4a from the perspective of KV1. The most notable visual feature of Alternative 4a is the large box truss structure that users of the bridge would pass through. The box truss structure would have an interior height of at least 15 feet and an exterior height of at most 21 feet for the box truss, which would be approximately twice the height of the existing trusses; together with the widened roadway, new crash attenuators, roadside safety devices, screening of distant views and increased shadow cast by the structure, the new bridge would be a
Key View #2: Existing Conditions – From North bank West of Lagunitas Creek Bridge looking East

Key View #2: Proposed Conditions – Alternative 3a: Concrete Bridge with Ornamental Truss – From North bank West of Lagunitas Creek Bridge looking East

FIGURE 2.1.6-10
KV2: Existing and Proposed Conditions, Alternative 3a, Ornamental Truss
State Route 1 Lagunitas Creek Bridge Project
EA 0G642, MRN-1 Post Mile 28.4 – 28.6
ID: 04-13000350
Marin County, California
FIGURE 2.1.6-11

KV1: Existing and Proposed Conditions, Alternatives 4a/4b
State Route 1 Lagunitas Creek Bridge Project
EA 0G642, MRN-1 Post Mile 28.4 – 28.6 ID:
04-13000350
Marin County, California
definite contrast from the scale of the existing bridge. The resulting resource change would be rated at a high level compared to existing conditions.

Figure 2.1.6-12 presents a view of Alternative 4a with an arched truss design option. Under this design option, the horizontal truss members would reach a height of approximately 30 feet. Together with the widened roadway, new crash attenuators, roadside safety devices, and screening of distant views, the new bridge would be a definite contrast from the scale of the existing bridge. Although the arched design is pleasing in concept, this design option would result in a high level of change on the visual quality as a result of scale and mass difference from the original bridge and in the context of its surroundings.

**KV2: From North Bank West of Lagunitas Creek Bridge Looking East**

Figure 2.1.6-13 presents a view of Alternative 4a from the perspective of KV2. From this view, the scale of the larger trusses would be notable, and the box truss structure would substantially block the view toward Bolinas Ridge. The profile of the road deck would be similar to that of the existing bridge; however, no piers would be present because the bridge would span the entire creek, from bank to bank. Because KV2 has the same distant view screening impacts, truss mass and scale changes as described for KV1, this alternative would result in a high level of resource change.

Figure 2.1.6-14 presents a view of Alternative 4a with an arched truss design option. Under this design option, the horizontal truss members would reach a height of approximately 30 feet. From KV2, the scale of the bridge would appear substantially larger than the existing bridge. This design option would result in a high level of resource change because of an increase in scale, mass, and screening of background views.

**Construction Impacts**

Construction impacts for this alternative are the same as described for Alternatives 2a and 3a.

**Alternative 4b: Full-span, Steel-truss Bridge, ABC, Transverse Slide-in**

**Operational Impacts**

Operational impacts for this alternative are the same as described for Alternative 4a.

**Construction Impacts**

In terms of the area impacted and visual disturbances, construction impacts for this alternative would be similar to those described for Alternative 2b, because this bridge would be assembled in the same area where the temporary detour bridge under
FIGURE 2.1.6-12
KV1: Existing and Proposed Conditions, Alternatives 4a/4b, Arched Truss
State Route 1 Lagunitas Creek Bridge Project
EA 0G642, MRN-1 Post Mile 28.4 – 28.6
ID: 04-13000350
Marin County, California
Figure 2.1.6-13
KV2: Existing and Proposed Conditions, Alternatives 4a/4b
State Route 1 Lagunitas Creek Bridge Project
EA 0G642, MRN-1 Post Mile 28.4 – 28.6
ID: 04-13000350
Marin County, California
Key View #2: Existing Conditions – From North bank West of Lagunitas Creek Bridge looking East

Key View #2: Proposed Conditions – Alternatives 4a/4b: Steel Truss, Full Span with Arched Truss – From North bank West of Lagunitas Creek Bridge looking East

FIGURE 2.1.6-14
KV2: Existing and Proposed Conditions, Alternatives 4a/4b, Arched Truss
State Route 1 Lagunitas Creek Bridge Project
EA 0G642, MRN-1 Post Mile 28.4 – 28.6
ID: 04-13000350
Marin County, California
Alternative 2b would be built (immediately to the east of the existing bridge). While Alternative 4b would have a shorter construction period, the relative area of vegetation removal and the duration for these areas to regrow would result in a relatively long-term, although not permanent, impact (please see Figure 1-15 in Chapter 1).

Project Visual Impact Summary
Implementation of the proposed project would result in visual effects regardless of which Build Alternative is chosen. The summary of project effects presented in Table 2.1.6-3 through 2.1.6-7 compares the narrative ratings for visual resource change, viewer response, and visual impacts of the Build Alternatives for each KV. Resource change and viewer response are rated as low (L), moderate-low (ML), moderate (M), moderate-high (MH), or high (H).

Alternatives 2a and 2b: Three-span Steel-truss
The moderate visual impact resulting from Alternatives 2a and 2b (Table 2.1.6-3) is primarily a result of the introduction of crash attenuators and 5-foot-wide shoulders, as seen from KV1. Contributing factors to this impact, as seen from KV1 and KV2, are the new truss structures, which are arching and slightly larger than the existing trusses. The arched trusses partially screen views of the creek embankment and distant hillsides. Matching the existing bridge in color and material duplication reduces the changes to character. The design generates the same impacts from both KVs. The project’s overall visual effect would be considered moderate.

Table 2.1.6-3 Summary of Key View Narrative Ratings: Alternatives 2a and 2b

<table>
<thead>
<tr>
<th>Key View</th>
<th>Resource Change</th>
<th>Viewer Response</th>
<th>Visual Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>L</td>
<td>H</td>
<td>M</td>
</tr>
<tr>
<td>2</td>
<td>L</td>
<td>H</td>
<td>M</td>
</tr>
<tr>
<td>Combined</td>
<td></td>
<td></td>
<td>M</td>
</tr>
</tbody>
</table>

Notes:
L = low; M = moderate; H = high

Alternative 3a: Concrete Bridge
The moderate visual impact of Alternative 3a (Table 2.1.6-4) is attributed to the absence of trusses, which are a defining iconic feature of the existing bridge, from the
perspectives of both KV1 and KV2, as well as the introduction of crash attenuators, which would be visible from KV1. The absence of trusses is offset by the more open views toward Point Reyes Station and the Bolinas Ridge. Therefore, the overall visual effect of this alternative would be moderate.

Table 2.1.6-4 Summary of Key View Narrative Ratings: Alternative 3a

<table>
<thead>
<tr>
<th>Key View</th>
<th>Resource Change</th>
<th>Viewer Response</th>
<th>Visual Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>M</td>
<td>H</td>
<td>MH</td>
</tr>
<tr>
<td>2</td>
<td>L</td>
<td>M</td>
<td>ML</td>
</tr>
<tr>
<td>Combined</td>
<td></td>
<td></td>
<td>M</td>
</tr>
</tbody>
</table>

Notes:
L = low; M = moderate; H = high

Alternative 3a: Concrete Bridge, Ornamental Truss Design Option

In the cases of both KV1 and KV2, impacts associated with this design option are offset by the incorporation of truss structures that mimic the form and color of the existing bridge. For KV1, the moderate visual impact (Table 2.1.6-5) is primarily because of the addition of crash attenuators, roadside safety devices, widening the shoulders, and screening views with embankment plantings. For KV2, the moderate visual impact results from the more visually prominent bridge deck and support structures, which also results in screening distant hillside views. Overall, the visual effect of this alternative would be moderate.

Table 2.1.6-5 Summary of Key View Narrative Ratings: Alternative 3a with Ornamental Truss

<table>
<thead>
<tr>
<th>Key View</th>
<th>Resource Change</th>
<th>Viewer Response</th>
<th>Visual Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>L</td>
<td>H</td>
<td>M</td>
</tr>
<tr>
<td>2</td>
<td>L</td>
<td>H</td>
<td>M</td>
</tr>
<tr>
<td>Combined</td>
<td></td>
<td></td>
<td>M</td>
</tr>
</tbody>
</table>

Notes:
L = low; M = moderate; H = high
Alternatives 4a and 4b: Full-span Steel-truss
The horizontal structure high above the bridge is the defining visual change in Alternatives 4a and 4b. The increase in mass and scale, along with increase in shadow in comparison to the existing Lagunitas Creek Bridge, would result in a high visual impact (Table 2.1.6-6) for all viewer groups from both KVs; this would be considered an adverse visual effect overall.

Table 2.1.6-6 Summary of Key View Narrative Ratings: Alternatives 4a and 4b

<table>
<thead>
<tr>
<th>Key View</th>
<th>Resource Change</th>
<th>Viewer Response</th>
<th>Visual Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>H</td>
<td>H</td>
<td>H</td>
</tr>
<tr>
<td>2</td>
<td>H</td>
<td>H</td>
<td>H</td>
</tr>
<tr>
<td>Combined</td>
<td></td>
<td></td>
<td>H</td>
</tr>
</tbody>
</table>

Notes:
L = low; M = moderate; H = high

Alternatives 4a and 4b: Full-span Steel-truss with Arched Truss
The added contrast of an arching truss, combined with horizontal truss structures, make Alternatives 4a and 4b the most visually contrasting designs, compared to the existing bridge design, from both KV1 and KV2. As a result, the massive scale of this alternative creates a high visual impact (Table 2.1.6-7). The overall visual effect of this alternative would be adverse.

Table 2.1.6-7 Summary of Key View Narrative Ratings: Alternatives 4a and 4b with Arched Truss

<table>
<thead>
<tr>
<th>Key View</th>
<th>Resource Change</th>
<th>Viewer Response</th>
<th>Visual Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>H</td>
<td>H</td>
<td>H</td>
</tr>
<tr>
<td>2</td>
<td>H</td>
<td>H</td>
<td>H</td>
</tr>
<tr>
<td>Combined</td>
<td></td>
<td></td>
<td>H</td>
</tr>
</tbody>
</table>

Notes:
L = low; M = moderate; H = high
2.1.6.4 AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

Appendix M, presents a consistency analysis and project impacts to Coastal Act Section 30251. The following measures to avoid and minimize the proposed project’s visual effects have been incorporated into the proposed project:

- **AMM VISUAL-1: Concrete aesthetic treatment.** To minimize the degree of visual contrast created by the concrete piers and bridge deck in views from the side of the bridge (under the alternatives that include these elements), aesthetic treatments of texture and/or color will be selected for compatibility with the visual setting. If Alternative 3a is selected, then final design will consider whether an ornamental truss should be constructed after consultation with community stakeholders.

- **AMM VISUAL-2: Paint metal portions of the bridge a green color similar to the existing Lagunitas Bridge.** During construction, Caltrans or its contractor would paint metal portions, including truss alternatives and pedestrian safety railing, a green color that is similar to the existing bridge. Such painting would emulate the existing condition, thereby reducing the visual changes.

- **AMM VISUAL-3: Construction lighting limitations.** To minimize the trespass of light to areas outside the project site during nighttime construction, nighttime lighting will be cast downward and shielded to the greatest extent feasible.

- **AMM VISUAL-4: Screening of staging/storage areas.** To minimize the level of visual change associated with the extended presence of construction materials and equipment in construction staging and storage areas, the perimeter of these areas will be screened, where feasible, with opaque material where activities are visible to the public.

- **AMM VISUAL-5: Replace non-habitat plantings removed by construction operations.** Trees and shrubs outside of habitat areas removed by construction of the project shall be replaced at a ratio to be determined to restore the appearance of the disturbed areas. This measure applies to areas that are not already covered by the biological measures to restore sensitive habitat areas. (see AMMs BIO-1, -4, -14, and -22).
2.1.7 Cultural Resources

2.1.7.1 REGULATORY SETTING

The term “cultural resources” as used in this document refers to all “built environment” resources (structures, bridges, railroads, water conveyance systems, etc.), culturally important resources, and archaeological resources (both prehistoric and historic), regardless of significance. Laws and regulations dealing with cultural resources include:

- The National Historic Preservation Act (NHPA) of 1966, as amended, sets forth national policy and procedures for historic properties, defined as districts, sites, buildings, structures, and objects included in or eligible for the National Register of Historic Places (NRHP). Section 106 of the NHPA requires federal agencies to take into account the effects of their undertakings on such properties and to allow the Advisory Council on Historic Preservation the opportunity to comment on those undertakings, following regulations issued by the Advisory Council on Historic Preservation (36 CFR 800). On January 1, 2014, a Section 106 Programmatic Agreement (PA) between the Advisory Council, FHWA, State Historic Preservation Officer (SHPO), and Caltrans went into effect for Caltrans projects, both state and local, with FHWA involvement. The PA implements the Advisory Council’s regulations, 36 CFR 800, streamlining the Section 106 process and delegating certain responsibilities to Caltrans. The FHWA’s responsibilities under the PA have been assigned to Caltrans as part of the Surface Transportation Project Delivery Program (23 USC 327).

- Historical resources are considered under CEQA, as well as California Public Resources Code (PRC) Section 5024.1, which established the CRHR. PRC Section 5024 requires state agencies to identify and protect state-owned resources that meet NRHP listing criteria. It further specifically requires Caltrans to inventory state-owned structures in its rights-of-way. Sections 5024(f) and 5024.5 require state agencies to provide notice to and consult with the SHPO before altering, transferring, relocating, or demolishing state-owned historical resources that are listed on or are eligible for inclusion in the NRHP or are registered or eligible for registration as California Historical Landmarks.

- Assembly Bill 52 (AB 52) is an updated CEQA guideline that states that a project that could result in adverse changes to the significance of a tribal cultural resource is considered a project that could result in a significant effect on the environment. Tribal cultural resources are defined as sites, features, places, cultural landscapes,
sacred places, and objects with cultural value to a California Native American tribe and that are included in the CRHR or in a local register of historical resources or that are determined to be eligible for listing in the CRHR. Tribal cultural resources also include resources that the lead federal agency, at its discretion, chooses to identify as significant. AB 52 requires that lead agencies consult with California Native American tribes that are traditionally and culturally affiliated with the geographic area of the proposed project and that tribal cultural resources are considered in determining project impacts and mitigation.

2.1.7.2 AFFECTED ENVIRONMENT

Area of Potential Effects

In accordance with Stipulations VI.B.8 and VIII.A and Attachment 3 of the PA, under the delegated authority of the FHWA, Caltrans Professionally Qualified Staff (PQS) Lindsay Hartman, Caltrans PQS Charles Palmer, and Project Manager Joy Lee established the area of potential effects (APE) on June 9, 2016. The APE was established to include all locations where construction activities would take place. It includes the project footprints for the three bridge types, temporary easements, permanent easements, staging, and utility relocation. The vertical APE includes all areas where excavation would affect the project area below the surface. Bridge pilings would extend to a depth of 50 feet below ground surface (bgs); culvert excavation would be 10 feet bgs; guardrails would extend to a depth of 3 feet, 4 inches bgs; and construction sign posts would be installed to 6 feet bgs. Vegetation removal, grubbing, and grading would result in a maximum ground disturbance of up to 3 feet bgs.

Cultural Resources Identification Efforts

Cultural resource studies within the project APE include preparation of a Historical Resources Evaluation Report (Caltrans 2016a) and an Archaeological Survey Report (Caltrans 2016b), both of which were completed in June 2016. A Historic Property Survey Report (Caltrans 2016c) was also completed in June 2016 to summarize the findings of the cultural resources studies for consultation with SHPO.

A record search was conducted of Caltrans’ and the Northwest Information Center’s databases on April 28, 2016. Caltrans District 4 Cultural Resource Studies Office files, Caltrans Cultural Resources Database, maps, aerial photographs, and site record forms were reviewed to identify previously identified archaeological sites in the vicinity of the project area. In addition, the following local, state, and federal cultural resource inventories were reviewed: NRHP (online database [April 2016]), the
Chapter 2 Affected Environment, Environmental Consequences, and Avoidance, Minimization, and/or Mitigation Measures

California Inventory of Historic Resources (California Department of Parks and Recreation [1976 and updates]), California Historical Landmarks (California Department of Parks and Recreation [1990 and updates]), and California Points of Historic Interest Listing (California Department of Parks and Recreation [1992 and updates]) (Caltrans 2016c).

A pedestrian survey of the project area was conducted on April 27 and May 25, 2016 by Caltrans PQS archaeologists and a Caltrans PQS architectural historian. Extended Phase 1 (XP1) testing was conducted within the ROW on March 2, 2017 by a Caltrans PQS archeologist. An XP1 study was completed in March 2017 (Caltrans 2017a).

The Native American Heritage Commission (NAHC) was contacted on March 30, 2016 for a review of its Sacred Lands file to determine if there are known cultural resources sites within or near the APE of the proposed project. The NAHC responded on April 11, 2016. No Native American cultural resources were reported from the Sacred Lands file records search. The name of one interested Native American individual, Greg Sarris, Chairperson for the Federated Indians of Graton Rancheria (FIGR), was provided by the NAHC. The Senate Bill 18 statewide list of Native Americans was reviewed on March 30, 2016.

Section 106 and Assembly Bill 52 consultation was initiated with a letter to Mr. Sarris on March 30, 2016, and it was received on April 11, 2016. No response has been received. On May 10, 2016, Buffy McQuillen, Tribal Historic Preservation Officer for FIGR, was contacted by email to follow up on any comments FIGR may have on the project. A copy of the letter sent to Mr. Sarris was attached. Ms. McQuillen was contacted by telephone on June 13, 2016. She requested record search results. A follow-up email was sent on June 14, 2016 with the requested information. Consultation is ongoing. At the time of publication of this document, no archaeological resources have been identified previously nor through consultation with Native American tribes.

There are no historic properties under Section 106 and no historical resources under CEQA located within the APE. The record search indicated that there are resources in the project area that were previously determined not eligible for the NRHP and CRHR. Caltrans PQS staff determined that the prior determinations of eligibility remain valid and there are no previously identified historical resources for the purposes of CEQA. During the pedestrian survey conducted as part of this project,
Chapter 2 Affected Environment, Environmental Consequences, and Avoidance, Minimization, and/or Mitigation Measures

Caltrans PQS staff did not identify any resources within the APE that are eligible for the NRHP or CRHR. The survey also did not identify any historical resources for purposes of CEQA.

Three bridges within the APE, including the Lagunitas Creek Bridge, are listed as Category 5 in the Caltrans Historic Bridge Inventory, indicating that they are ineligible for listing on the NRHP (Caltrans 2017b). Four properties, including Lagunitas Creek Bridge (Bridge 27-0022), were evaluated and found not eligible for inclusion in the NRHP. Lagunitas Creek Bridge is a state-owned property. It was evaluated and found not to meet the National Register of Historic Places or the California Historical Landmark eligibility criteria. Caltrans consulted with the SHPO and concurrence on the lack of eligibility was given on October 27, 2016.

Section 4(f) protects publicly owned lands of a park, recreation area, or wildlife and waterfowl refuge or land of a historical site of national, state, or local significance, as determined by the federal, state, regional, or local officials having jurisdiction over the resource. As determined through the Section 106 process, there are no historic resources or historical sites of national, state, or local significance within the project APE, and therefore there are no Section 4(f) historic resources present.

2.1.7.3 ENVIRONMENTAL CONSEQUENCES
Because there are no identified historic properties within the APE, Caltrans has determined a No Historic Properties Affected finding for the purposes of Section 106 compliance. The following reviews the probability for archaeological findings.

Alternative 1: No-Build Alternative
No changes or disturbance of ground would occur under the No-Build Alternative. Therefore, no impacts on archaeological resources would occur.

Build Alternatives
Although no known archaeological resources are present, and Native American tribes have not provided information about traditional cultural properties, there is still a potential for inadvertent discovery during construction. This potential effect would be the same regardless of the Build Alternative selected.
2.1.7.4 AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

The following AMM would avoid and minimize project effects on cultural resources:

- **AMM CULT-1: Inadvertent discovery of archaeological resources.** If cultural resources are discovered during construction, all earth-moving activity within and around the immediate discovery area will be halted until a qualified archaeologist can assess the nature and significance of the find.

  If human remains are discovered, State Health and Safety Code Section 7050.5 states that further disturbances and activities shall stop in any area or nearby area suspected to overlie remains, and the County Coroner will be contacted. Pursuant to California PRC Section 5097.98, if the remains are thought to be Native American, the coroner will notify the Native American Heritage Commission, which will then notify the Most Likely Descendent (MLD). At that time, the person who discovered the remains will contact Brett Rushing, Office of Cultural Resources Studies Branch Chief, at (510) 286-6336, who will work with the MLD on the respectful treatment and disposition of the remains. Further provisions of PRC 5097.98 are to be followed as applicable.
2.2 Physical Environment

2.2.1 Hydrology and Floodplain

2.2.1.1 REGULATORY SETTING

**Executive Order 11988**

Executive Order (EO) 11988 (Floodplain Management) directs all federal agencies to refrain from conducting, supporting, or allowing actions in floodplains unless it is the only practicable alternative. The FHWA requirements for compliance are outlined in 23 CFR 650 Subpart A.

To comply, the following must be analyzed:

- The practicability of alternatives to any longitudinal encroachments.
- Risks of the action.
- Impacts on natural and beneficial floodplain values.
- Support of incompatible floodplain development.
- Measures to minimize floodplain impacts and to preserve/restore any beneficial floodplain values affected by the project.

The base floodplain is defined as “the area subject to flooding by the flood or tide having a one percent chance of being exceeded in any given year.” An encroachment is defined as “an action within the limits of the base floodplain.”

2.2.1.2 AFFECTED ENVIRONMENT

Hydrology and floodplain information for this section was provided from the Location Hydraulic Study Report prepared for the project (WRECO 2016b). The report incorporates information from the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) (FEMA 2009) and Flood Insurance Study (FIS) for Marin County (FEMA 2014). The report also incorporates information from U.S. Geological Survey (USGS) topographic maps, aerial photograph maps, and a site visit.

The hydrologic study area consists of Lagunitas Creek and its watershed within the project area.
**Watershed Description**

Lagunitas Creek originates on Mount Tamalpais in Marin County and flows approximately 22 miles before emptying into the southern end of Tomales Bay. The Lagunitas Creek watershed is approximately 103 square miles and is the largest subwatershed draining into Tomales Bay (Marin Municipal Water District 2011). Its major tributaries include San Geronimo Creek, Devils Gulch, Cheda Creek, Nicasio Creek, and Olema Creek. The watershed of Lagunitas Creek at the project location is approximately 83.2 square miles (USGS 2001; see Figure 2.2.1.1).

**Land Use**

According to the Marin County Department of Public Works’ Land Use Map for Tomales Bay Watershed, land use within the Lagunitas Creek watershed is identified as “Open Space” and “Agriculture/Rural” (Marin County Department of Public Works 2016; see Figure 2.2.1-2). Other land uses designated within the watershed are “Residential” and “Commercial.”

**Sea Level Rise**

Sea levels are estimated to rise 14 inches by 2050 and 55 inches by 2100 (Caltrans 2011). Sea level rise (SLR) will physically propagate from Tomales Bay upstream along Lagunitas Creek, raising its water surface profile (WRECO 2016a). SLR at the bay will be higher, thereby holding creek waters at a higher elevation than the current elevation of the creek at the bridge (i.e., water elevations in the creek at the bridge are affected by SLR). However, in the presence of a major storm event (100-year storm event), the creek is conveying large volumes of stormwater that the bridge opening cannot pass. The water surface elevation (WSE) will rise upstream of the bridge to an elevation that overwhelms the effect of SLR (i.e., SLR has no effect on WSE upstream of the bridge during major storm events). As such, there is no effect from SLR for the existing or proposed condition, in both the year 2050 and the year 2100 SLR scenarios, during the design storm events. The current and future freeboard (area between water elevation and bottom of the bridge) will be adequate to convey stream flows including the change in water elevation due to projected SLR during non-flood events.
FIGURE 2.2.1-1
Watershed Map at Project Location
State Route 1 Lagunitas Creek Bridge Project
EA 0G642, MRN-1 Post Mile 28.4 – 28.6
ID: 04-13000350
Marin County, California
Executive Order 13690

The Federal Flood Risk Management Standard (FFRMS) is the national flood risk management standard established by EO 13690 to be incorporated into existing processes used to implement EO 11988. EO 13690 amends “Executive Order 11988, Floodplain Management,” and directs all federal agencies to avoid conducting, allowing, or supporting construction in the base floodplain. The EO also directs federal agencies to take action to reduce the risk of flood loss, minimize the effect of floods on human safety, health, and welfare, and restore and preserve the natural and beneficial values served by the floodplain. A climate-informed science approach should be used to determine the floodplain elevation and flood hazard area.

The FFRMS requires all future federal investments in and affecting floodplains to meet the level of resilience established by EO 13690. The vertical flood elevation and corresponding horizontal floodplain determined using the approaches in the FFRMS establish the level to which a structure or facility must be resilient. This may include using structural or nonstructural methods to reduce or prevent damage; elevating a structure; or, where appropriate, designing it to adapt to, withstand, and rapidly recover from a flood event. EO 13690 implementation for floodplains provides agencies the flexibility to select one of four approaches for establishing the flood elevation and hazard area used in siting, design, and construction:

- Use data and methods informed by best-available, actionable hydrologic and hydraulic data and methods that integrate current and future changes in flooding based on climate-informed science
- Build 2 feet above the 100-year (1 percent-annual-chance) flood elevation for standard non-critical projects, and 3 feet above the 100-year flood elevation for critical projects such as hospitals and evacuation centers
- Build to the 500-year (0.2 percent-annual-chance) flood elevation
- Build to an elevation and flood hazard area that results from using any other method identified in an update to the FFRMS

EO 13690 is not a self-implementing requirement. Both the USDOT and FHWA must take actions to update their procedures before they apply to FHWA projects. USDOT has been working on an implementation plan to comply with EO 13690. However, no FHWA programs should deviate from the existing requirements (23 CFR 650A) until
promulgation of any new/revised regulation, policies, and guidance for compliance with EO 13690 (FEMA 2015a and FEMA 2015b).

Therefore, the project would continue to be compliant with FHWA regulations contained in 23 CFR 650A, Location and Hydraulic Design of Encroachments on Flood Plains. These regulations are FHWA’s current method for implementing EO 11988, which relates to floodplain management.

**California’s National Flood Insurance Program**

FEMA is the nationwide administrator of the National Flood Insurance Program (NFIP), which is a program established by the National Flood Insurance Act of 1968 to protect lives and property, and to reduce the financial burden of providing disaster assistance. Under the NFIP, FEMA has the lead responsibility for flood hazard assessment and mitigation, and it offers federally backed flood insurance to homeowners, renters, and business owners in communities that choose to participate in the program. FEMA has adopted the 100-year floodplain as the base flood standard for the NFIP. FEMA is also concerned with construction that would be within a 500-year floodplain for proposed projects that are considered “critical actions,” which are defined as any activities where even a slight chance of flooding is too great. FEMA issues the FIRMs for communities that participate in the NFIP. These FIRMs present delineations of flood hazard zones.

In California, nearly all of the state’s flood-prone communities participate in the NFIP, which is locally administered by the California Department of Water Resources’ Division of Flood Management. Under California’s NFIP, communities have a mutual agreement with the state and federal government to regulate floodplain development according to certain criteria and standards, which is further detailed in the NFIP.

**Floodplains**

The project site is in the Special Flood Hazard Area Zone AE, which represents areas subject to flooding by the 100-year flood event determined by detailed methods where base flood elevations (BFEs) are shown. At the project site, the FEMA 100-year flood elevation is approximately 17.5 feet North American Vertical Datum of 1988 (NAVD 88) (see Figure 2.2.1-3). A regulated floodway exists within the project limits. The width of the Zone AE floodplain over SR 1 is approximately 2,000 feet. The width of the floodway crossing SR 1 is approximately 860 feet (see Figure 2.2.1-4).
FIGURE 2.2.1-3
FEMA Flood Insurance Rate Map 06041C0233D
State Route 1 Lagunitas Creek Bridge Project
EA 0G642, MRN-1 Post Mile 28.4 – 28.6
ID: 04-13000350
Marin County, California
FIGURE 2.2.1-4
Federal Emergency Management Agency Floodplain Map Overlay
State Route 1 Lagunitas Creek Bridge Project
EA 0G642, MRN-1 Post Mile 28.4 – 28.6
ID: 04-13000350
Marin County, California
Chapter 2 Affected Environment, Environmental Consequences, and Avoidance, Minimization, and/or Mitigation Measures

The SR 1 bridge crossing is bounded by FEMA cross sections E and F for Lagunitas Creek at the downstream and upstream ends of the project site, respectively (see Figure 2.2.1-3). According to the FEMA FIS for Marin County and Incorporated Areas, last revised in March 17, 2014 (FEMA 2014), the base flood elevations at cross sections E and F are 13.8 feet NAVD 88 and 19.8 feet NAVD 88, respectively. No increase of any amount in the BFE is allowed in the floodway. According to the FEMA FIS flood profiles, the BFE at the existing Lagunitas Creek Bridge on SR 1 is approximately 18.3 feet NAVD 88.¹

2.2.1.3 ENVIRONMENTAL CONSEQUENCES

EO 11988 requires federal agencies to avoid, to the maximum extent possible, the long- and short-term adverse effects associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative. This section analyzes the effects associated with this project, which include risk associated with the proposed action and potential encroachments.

According to 44 CFR 60.3(d)(3), a community shall “prohibit encroachments, including fill, new construction, substantial improvements, and other development within the adopted regulatory floodway unless it has been demonstrated through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that the proposed encroachment would not result in any increase in flood levels within the community during the occurrence of the base flood discharge.” No increase of any amount in the BFE is allowed in the floodway.

As defined by 23 CFR 650A, risk means the consequences associated with the probability of flooding attributable to an encroachment. It includes the potential for property loss and hazard to life during the service life of the bridge and roadway. The potential risk associated with the implementation of the proposed action includes the following:

- Change in land use
- Change in impervious surface area

¹ Typically, each county (or community) has a FIS, which is used to locally develop FIRMs and BFEs. Marin County’s effective FEMA FIRM, number 06041C0233D, last revised on May 4, 2009 (FEMA 2009), covers the project location. The FEMA FIRM and FIS were reviewed for floodplain information.
Chapter 2 Affected Environment, Environmental Consequences, and Avoidance, Minimization, and/or Mitigation Measures

- Fill inside the floodplain
- Change in the 100-year WSE

23 CFR 650A defines a significant encroachment as a highway encroachment, and any direct support of likely base floodplain development, that would involve one or more of the following construction or flood-related effects:

- Significant potential for interruption or termination of a transportation facility that is needed for emergency vehicles or provides a community’s only evacuation route
- A significant risk
- A significant adverse effect on the natural and beneficial floodplain values
  (FHWA 1994)

The existing and proposed 100-year WSEs of Lagunitas Creek for each alternative at the project location are summarized in Table 2.2.1-1 and Table 2.2.1-2 and are discussed in the following sections. As shown in Tables 2.2.1-1 and 2.2.1-2, the 100-year WSE for Alternative 3a is similar to that for Alternatives 2a and 2b; however, the 100-year WSE for Alternative 3a is slightly different because the bridge would be narrower than the bridge proposed for Alternatives 2a and 2b.

**Alternative 1: No-Build Alternative**

Under the No-Build Alternative, the proposed project would not be implemented, and there would be no changes to the existing bridge structure; therefore, the 100-year flood profile of Lagunitas Creek would remain unchanged from the existing condition. The current effects to the roadway resulting from flooding of transportation facilities during and after extreme storm events would be adverse and would continue.

**Alternative 2a: Three-span, Short Steel-truss bridge, ABC, Longitudinal Move-in**

**Operational Impacts**

**Risk Associated with the Proposed Action**

Alternative 2a would place the proposed bridge at the same horizontal alignment and vertical profile as the existing bridge. Except for the roadway widening, land use in the project vicinity would not likely change. In addition, Caltrans and Marin County are not proposing to change the land uses within the project limits as a part of this project.
Table 2.2.1-1  Hydraulic Summary: Existing Condition, Alternative 2a and Alternative 2b

<table>
<thead>
<tr>
<th>Location/Distance from Existing Bridge Centerline</th>
<th>Existing Condition/No-Build Alternative (feet NAVD 88)</th>
<th>Alternative 2a</th>
<th>Alternative 2b</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>100-Year WSE (feet NAVD 88)</td>
<td>Elevation Change (feet)</td>
<td>100-Year WSE (feet NAVD 88)</td>
</tr>
<tr>
<td>4,640 feet Upstream (Upstream Limit of Hydraulic Model)</td>
<td>26.1</td>
<td>26.1</td>
<td>0.0</td>
</tr>
<tr>
<td>2,890 feet Upstream</td>
<td>23.5</td>
<td>23.4</td>
<td>0.0</td>
</tr>
<tr>
<td>2,630 feet Upstream</td>
<td>23.0</td>
<td>23.0</td>
<td>0.0</td>
</tr>
<tr>
<td>720 feet Upstream</td>
<td>21.4</td>
<td>21.4</td>
<td>0.0</td>
</tr>
<tr>
<td>450 feet Upstream</td>
<td>20.7</td>
<td>20.7</td>
<td>0.0</td>
</tr>
<tr>
<td>250 feet Upstream</td>
<td>20.5</td>
<td>20.5</td>
<td>0.0</td>
</tr>
<tr>
<td>90 feet Upstream</td>
<td>19.9</td>
<td>19.9</td>
<td>0.0</td>
</tr>
<tr>
<td>40 feet Upstream</td>
<td>20.1</td>
<td>20.1</td>
<td>0.0</td>
</tr>
<tr>
<td>45 feet Downstream</td>
<td>18.1</td>
<td>18.1</td>
<td>0.0</td>
</tr>
<tr>
<td>235 feet Downstream</td>
<td>17.1</td>
<td>17.1</td>
<td>0.0</td>
</tr>
<tr>
<td>465 feet Downstream</td>
<td>16.9</td>
<td>16.9</td>
<td>0.0</td>
</tr>
<tr>
<td>12,530 feet Downstream (Downstream Limit of Hydraulic Model)</td>
<td>9.8</td>
<td>9.8</td>
<td>0.0</td>
</tr>
</tbody>
</table>

Notes:
Elevations are rounded to the nearest 0.1 foot from hydraulic analysis output.
NAVD 88 = North American Vertical Datum of 1988; WSE = water surface elevation
Source: WRECO 2016b

Widening the SR 1 bridge and the bridge approach area would increase the impervious surface area within the Lagunitas Creek watershed. Alternative 2a would replace approximately 0.12 acre and create 0.07 acre of impervious surface. However, added impervious area resulting from Alternative 2a would be minimal as compared to the Lagunitas Creek watershed at the project location. Therefore, the peak 100-year flow at the project would not increase noticeably from this project.

Alternative 2a would replace the existing bridge structure with a three-span bridge that has a smaller pier footprint and maintains the horizontal alignment and vertical profile of the existing bridge. Because of the smaller pier footprint, the fill inside the existing 100-year floodplain would be minimal. In addition, Alternative 2a would incorporate lengthening and/or replacing and extending the flood overflow culvert north of the bridge by an estimated 5 feet on both the upstream and downstream side.
This would not substantially affect the combined hydraulic capacity of the bridge and culvert.

### Table 2.2.1-2 Hydraulic Summary: Existing Condition, Alternatives 3a, 4a, and 4b

<table>
<thead>
<tr>
<th>Location/Distance from Existing Bridge Centerline</th>
<th>Existing Condition/No-Build Alternative (feet NAVD 88)</th>
<th>Alternative 3a</th>
<th>Alternatives 4a and 4b</th>
</tr>
</thead>
<tbody>
<tr>
<td>4,640 feet Upstream (Upstream Limit of Hydraulic Model)</td>
<td>26.1</td>
<td>26.1</td>
<td>0.0</td>
</tr>
<tr>
<td>2,890 feet Upstream</td>
<td>23.5</td>
<td>23.5</td>
<td>0.0</td>
</tr>
<tr>
<td>2,630 feet Upstream</td>
<td>23.0</td>
<td>23.0</td>
<td>0.0</td>
</tr>
<tr>
<td>720 feet Upstream</td>
<td>21.4</td>
<td>21.4</td>
<td>0.0</td>
</tr>
<tr>
<td>450 feet Upstream</td>
<td>20.7</td>
<td>20.7</td>
<td>0.0</td>
</tr>
<tr>
<td>250 feet Upstream</td>
<td>20.5</td>
<td>20.5</td>
<td>0.0</td>
</tr>
<tr>
<td>90 feet Upstream</td>
<td>19.9</td>
<td>19.9</td>
<td>0.0</td>
</tr>
<tr>
<td>40 feet Upstream</td>
<td>20.1</td>
<td>20.1</td>
<td>0.0</td>
</tr>
<tr>
<td>45 feet Downstream</td>
<td>18.1</td>
<td>18.1</td>
<td>0.0</td>
</tr>
<tr>
<td>235 feet Downstream</td>
<td>17.1</td>
<td>17.1</td>
<td>0.0</td>
</tr>
<tr>
<td>465 feet Downstream</td>
<td>16.9</td>
<td>16.9</td>
<td>0.0</td>
</tr>
<tr>
<td>12,530 feet Downstream (Downstream Limit of Hydraulic Model)</td>
<td>9.8</td>
<td>9.8</td>
<td>0.0</td>
</tr>
</tbody>
</table>

**Notes:**
- Elevations are rounded to the nearest 0.1 foot from hydraulic analysis output.
- NAVD 88 = North American Vertical Datum of 1988; WSE = water surface elevation
- Source: WRECO 2016b

The hydraulic analysis for Alternative 2a (see Table 2.2.1-1) shows a minimal change in the 100-year flood profile of Lagunitas Creek upstream of the SR 1 bridge from the existing condition. Therefore, the proposed bridge would not likely change the extents of the 100-year floodplain in the project vicinity.

**Potential Encroachments**

After completion of the project, the proposed bridge would have the same vertical alignment and horizontal profile as the existing bridge. The existing Lagunitas Creek Bridge at the project location is not usable during a 100-year storm event because the
approach areas to the bridge crossing would be overtopped. This condition would remain unchanged in all proposed conditions. The current available evacuation route for the nearby communities would remain unchanged when the existing and proposed Lagunitas Creek Bridge is not usable during a 100-year storm event. Therefore, no traffic interruptions related to a 100-year storm event would be likely for the project.

Changes to the flow characteristics of Lagunitas Creek would be minimal, and the project would result in minimal fill within the floodplain for Alternative 2a; therefore, there would be no risk to the natural and beneficial floodplain values. The scope of the project does not include commercial development or urban growth within the existing Zone AE floodplain in the project vicinity. Therefore, the project would not result in incompatible floodplain development.

As defined by the Caltrans Standard Environmental Reference (2015), a longitudinal encroachment is an action within the limits of the base floodplain that is longitudinal to the normal direction of the floodplain. The alignment of the proposed SR 1 bridge over Lagunitas Creek for Alternative 2a is not parallel to the flow alignment of Lagunitas Creek. Therefore, the project would not be considered a longitudinal encroachment.

**Construction Impacts**
Potential construction effects to natural and beneficial floodplain values related to the proposed project include disturbance of aquatic habitats from construction activities. Construction effects related to floodplains would likely be minimal for this project because the regulatory permits required would limit work within the creek to dry periods and require removal of diversion systems prior to or during higher flow or design storm events.

**Alternative 2b: Three-span, Short Steel-truss Bridge, Conventional (with Detour Bridge)**

**Operational Impacts**

**Risk Associated with the Proposed Action**
The risks associated with change in land use, change in impervious area, fill inside the floodplain, and change in the 100-year WSE would the same as those under Alternative 2a.

**Potential Encroachments**
The potential encroachments would be the same as those under Alternative 2a.
Construction Impacts
The construction effects would be the same as those under Alternative 2a.

Alternative 2b would provide a detour route and/or onsite detour bridge during construction. The detour bridge would result in more fill within the floodplain than Alternative 2a. However, this additional fill would be temporary until the new bridge is constructed and the detour bridge is removed. The longer construction duration results in longer duration of fill in the water which, during high rain events, result in higher water levels around the construction area of the creek.

Alternative 3a: Three-span, Concrete Bridge, ABC, Longitudinal Move-in
Operational Impacts
Risk Associated with the Proposed Action
The risks associated with the change in land use, change in impervious area, fill inside the floodplain, and change in the 100-year WSE would be similar to Alternative 2a.

Potential Encroachments
The potential encroachments would be the same as those under Alternative 2a.

Construction Impacts
The construction effects would be the same as those under Alternative 2a.

Alternative 4a: Full-span, Steel-truss Bridge, ABC, Longitudinal Move-in
Operational Impacts
Risk Associated with the Proposed Action
The risks associated with the change in land use and change in impervious area would be the same as those under Alternative 2a.

Alternative 4a would replace the existing bridge with a full-span bridge with the same horizontal and vertical profile as the existing bridge. This alternative does not propose piers within the creek. Therefore, the overall fill inside the existing 100-year floodplain would be less than the present condition.

The hydraulic analysis for Alternative 4a (see Table 2.2.1-2) shows that the 100-year flood profile of Lagunitas Creek upstream of the SR 1 bridge is lower than the existing condition because piers are no longer proposed within the creek. Therefore, the proposed bridge would likely not change the extent of the 100-year floodplain in the project vicinity.
Potential Encroachments
The potential encroachments would be the same as those under Alternative 2a.

Construction Impacts
The construction effects would be the same as those under Alternative 2a.

Alternative 4b: Full-span, Steel-truss Bridge, ABC, Transverse Slide-in
Operational Impacts
The risk associated with the proposed action and potential encroachments would be similar to those under Alternative 4a.

Construction Impacts
The potential construction effects would be the same as those under Alternative 2b.

2.2.1.4 AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES
The bridge design alternatives proposed for the project would either have minimal effects to the base flood profile (Alternatives 2a, 2b, and 3a) or lower the base flood profile upstream of the proposed bridge (Alternatives 4a and 4b). Therefore, measures to avoid and minimize hydrology and floodplain-related effects of the proposed project are not be required.

2.2.2 Water Quality and Storm Water Runoff
This section discusses water quality and stormwater management within the project limits, including the regulatory setting; project location and receiving water bodies; climatology; topography and soil characteristics; potential temporary and permanent water quality impacts; and avoidance, minimization, and/or mitigation measures to reduce project impacts.

2.2.2.1 REGULATORY SETTING

Federal Requirements
Clean Water Act
In 1972, Congress amended the Federal Water Pollution Control Act, making the addition of pollutants to the waters of the U.S. from any point source\(^2\) unlawful unless the discharge is in compliance with a National Pollutant Discharge Elimination System (NPDES) permit. This act and its amendments are known today as the Clean Water Act (CWA). Congress has amended the act several times. In the 1987 amendments, Congress directed dischargers of stormwater from municipal and

\(^2\) A point source is any discrete conveyance such as a pipe or a man-made ditch.
industrial/construction point sources to comply with the NPDES permit scheme. The following are important CWA sections:

- Sections 303 and 304 require states to issue water quality standards, criteria, and guidelines.

- Section 401 requires an applicant for a federal license or permit to conduct any activity that may result in a discharge to waters of the U.S. to obtain certification from the state that the discharge will comply with other provisions of the act. This is most frequently required in tandem with a Section 404 permit request (see below).

- Section 402 establishes the NPDES, a permitting system for the discharges (except for dredge or fill material) of any pollutant into waters of the U.S. Regional Water Quality Control Boards (RWQCBs) administer this permitting program in California. Section 402(p) requires permits for discharges of stormwater from industrial/construction and municipal separate storm sewer systems (MS4s).

- Section 404 establishes a permit program for the discharge of dredge or fill material into waters of the U.S. This permit program is administered by USACE.

The goal of the CWA is “to restore and maintain the chemical, physical, and biological integrity of the Nation’s waters.”

The USACE issues two types of 404 permits: General and Standard permits. There are two types of General permits: Regional permits and Nationwide permits. Regional permits are issued for a general category of activities when they are similar in nature and cause minimal environmental effect. Nationwide permits are issued to allow a variety of minor project activities with no more than minimal effects.

Ordinarily, projects that do not meet the criteria for a Nationwide permit may be permitted under one of the USACE’s Standard permits. There are two types of Standard permits: Individual permits and letters of permission. For standard permits, the USACE decision to approve is based on compliance with U.S. Environmental Protection Agency’s (USEPA’s) Section 404 (b)(1) Guidelines (40 CFR 230), and whether the permit approval is in the public interest. The Section 404(b)(1) Guidelines (Guidelines) were developed by the USEPA in conjunction with the USACE and allow the discharge of dredged or fill material into the aquatic system.
(waters of the U.S.) only if there is no practicable alternative which would have less adverse effects (USEPA 2010). The Guidelines state that USACE may not issue a permit if there is a least environmentally damaging practicable alternative (LEDPA) to the proposed discharge that would have lesser effects on waters of the U.S. and not have any other significant adverse environmental consequences. According to the Guidelines, documentation is needed that a sequence of avoidance, minimization, and compensation measures has been followed, in that order. The Guidelines also restrict permitting activities that violate water quality or toxic effluent\(^3\) standards, jeopardize the continued existence of listed species, violate marine sanctuary protections, or cause “significant degradation” to waters of the U.S. In addition, every permit from the USACE, even if not subject to the Section 404(b)(1) Guidelines, must meet general requirements (see 33 CFR 320.4). A discussion of the LEDPA determination, if any, for the document is included in Section 2.3.2, Wetlands and Other Waters.

**State Requirements**

**Porter-Cologne Water Quality Control Act**

California’s Porter-Cologne Act, enacted in 1969, provides the legal basis for water quality regulation within California. This act requires a “Report of Waste Discharge” for any discharge of waste (liquid, solid, or gaseous) to land or surface waters that may impair beneficial uses for surface and/or groundwater of the state. It predates the CWA and regulates discharges to waters of the state. Waters of the State include more than just waters of the U.S., like groundwater and surface waters not considered waters of the U.S. Additionally, it prohibits discharges of “waste” as defined and this definition is broader than the CWA definition of “pollutant.” Discharges under the Porter-Cologne Act are permitted by Waste Discharge Requirements (WDRs) and may be required even when the discharge is already permitted or exempt under the CWA.

The State Water Resources Control Board (SWRCB) and RWQCBs are responsible for establishing the water quality standards (objectives and beneficial uses) required by the CWA, and regulating discharges to ensure compliance with the water quality standards. Details about water quality standards in a project area are included in the applicable RWQCB Basin Plan. In California, RWQCBs designate beneficial uses for all water body segments and then set criteria necessary to protect these uses. As a result, the water quality standards developed for particular water segments are based

---

\(^3\) USEPA defines “effluent” as “wastewater, treated or untreated, that flows out of a treatment plant, sewer, or industrial outfall.”
on the designated use and vary depending on that use. In addition, the SWRCB identifies waters failing to meet standards for specific pollutants. These waters are then state-listed in accordance with CWA Section 303(d). If a state determines that waters are impaired for one or more constituents and the standards cannot be met through point source or non-point source controls (NPDES permits or WDRs), the CWA requires the establishment of Total Maximum Daily Loads (TMDLs). TMDLs specify allowable pollutant loads from all sources (point, non-point, and natural) for a given watershed.

**State Water Resources Control Board and Regional Water Quality Control Boards**
The SWRCB administers water rights, sets water pollution control policy, issues water board orders on matters of statewide application, and oversees water quality functions throughout the state by approving Basin Plans, TMDLs, and NPDES permits. RWQCBs are responsible for protecting beneficial uses of water resources within their regional jurisdiction using planning, permitting, and enforcement authorities to meet this responsibility.

**National Pollutant Discharge Elimination System Program**
**Municipal Separate Storm Sewer Systems**
Section 402(p) of the CWA requires the issuance of NPDES permits for five categories of stormwater discharges, including MS4s. An MS4 is defined as “any conveyance or system of conveyances (roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, human-made channels, and storm drains) owned or operated by a state, city, town, county, or other public body having jurisdiction over storm water, that is designed or used for collecting or conveying storm water.” The SWRCB has identified Caltrans as an owner/operator of an MS4 under federal regulations. The Caltrans MS4 permit covers all Caltrans ROW, properties, facilities, and activities in the state. The SWRCB or the RWQCB issues NPDES permits for 5 years, and permit requirements remain active until a new permit has been adopted.

Caltrans’ MS4 Permit, Order No. 2012-0011-DWQ (adopted on September 19, 2012, and effective on July 1, 2013), as amended by Order No. 2014-0077-DWQ (effective July 1, 2014) and Order No. 2015-0036-EXEC (effective April 7, 2015) has three basic requirements:
1. Caltrans must comply with the requirements of the Construction General Permit (see below); Caltrans must implement a year-round program in all parts of the state to effectively control stormwater and non-stormwater discharges; and

2. Caltrans storm water discharges must meet water quality standards through implementation of permanent and temporary (construction) best management practices (BMPs) to the maximum extent practicable, and other measures as the SWRCB determines to be necessary to meet the water quality standards.

To comply with the permit, Caltrans is developing a Statewide Storm Water Management Plan (SWMP) to address storm water pollution controls related to highway planning, design, construction, and maintenance activities throughout California. The SWMP assigns responsibilities within Caltrans for implementing storm water management procedures and practices as well as training, public education and participation, monitoring and research, program evaluation, and reporting activities. The SWMP describes the minimum procedures and practices Caltrans uses to reduce pollutants in storm water and non-storm water discharges. It outlines procedures and responsibilities for protecting water quality, including the selection and implementation of BMPs. The proposed project will be programmed to follow the guidelines and procedures outlined in the latest SWMP to address storm water runoff.

**Construction General Permit**

Construction General Permit, Order No. 2009-2009-DWQ (adopted on September 2, 2009 and effective on July 1, 2010), as amended by Order No. 2010-0014-DWQ (effective February 14, 2011) and Order No. 2012-0006-DWQ (effective on July 17, 2012). The permit regulates storm water discharges from construction sites that result in a disturbed soil area (DSA) of 1 acre or greater, and/or are smaller sites that are part of a larger common plan of development. By law, all storm water discharges associated with construction activity where clearing, grading, and excavation result in soil disturbance of at least 1 acre must comply with the provisions of the General Construction Permit. Construction activity that results in soil disturbances of less than 1 acre is subject to this Construction General Permit if there is potential for significant water quality impairment resulting from the activity as determined by the RWQCB. Operators of regulated construction sites are required to develop Storm Water Pollution Prevention Plans (SWPPPs); to implement sediment, erosion, and design pollution prevention control measures; and to obtain coverage under the Construction General Permit.
The Construction General Permit separates projects into Risk Levels 1, 2, or 3. Risk levels are determined during the planning and design phases, and are based on potential erosion and transport to receiving waters. Requirements apply according to the Risk Level determined. For example, a Risk Level 3 (highest risk) project would require compulsory storm water runoff pH and turbidity monitoring, and before construction and after construction aquatic biological assessments during specified seasonal windows. For all projects subject to the permit, applicants are required to develop and implement an effective SWPPP. In accordance with Caltrans’ SWMP and Standard Specifications, a Water Pollution Control Program (WPCP) is necessary for projects with DSA less than 1 acre.

**Section 401 Permitting**
Under Section 401 of the Clean Water Act, any project requiring a federal license or permit that may result in a discharge to a water of the U.S. must obtain a 401 Certification, which certifies that the project will be in compliance with state water quality standards. The most common federal permits triggering 401 Certification are CWA Section 404 permits issued by the USACE. The 401 permit certifications are obtained from the appropriate RWQCB, dependent on the project location, and are required before the USACE issues a 404 permit.

In some cases, the RWQCB may have specific concerns with discharges associated with a project. As a result, the RWQCB may issue a set of requirements known as WDRs under the State Water Code (Porter-Cologne Act) that define activities, such as the inclusion of specific features, effluent limitations, monitoring, and plan submittals that are to be implemented for protecting or benefiting water quality. WDRs can be issued to address both permanent and temporary discharges of a project.

**2.2.2.2 Affected Environment**
Water quality and stormwater information for this section was based upon information found in the Water Quality Study conducted by Caltrans District 4’s Office of Water Quality (Caltrans 2016). The project site is within Hydrologic Sub-Area 201.13, specifically within the Olema Creek-Lagunitas Creek sub-watershed (Hydrologic Unit Code: 180500050104). The environmental study limit (ESL), defined as the area directly affected by the project, consists of receiving water bodies, surface water, and groundwater.

The project site is within the jurisdiction of the RWQCB and is located in Marin County, south of the small unincorporated town of Point Reyes Station. The San
Francisco Bay Water Quality Control Plan (Basin Plan) (RWQCB 2015) covers all water quality regulation for the project area and seeks to protect surface waters and groundwater. The Basin Plan does not identify any Areas of Special Biological Significance within the ESL. A complete description of the sensitive plant and animal habitats known to occur within the ESL is included in Section 2.3, Biological Environment.

The project site is within the Olema Creek-Lagunitas Creek sub-watershed. Runoff from the site directly discharges to Lagunitas Creek, which flows in a westward and then northwesterly direction for approximately 18,220 feet (3.4 miles) until its outfall into Tomales Bay (see Figure 2.2.2-1). The watershed area of Lagunitas Creek, within which the project is located, is approximately 83.2 square miles (refer to Section 2.2.1, Floodplain and Hydrology, for Figure 2.2.1-1).

**Beneficial Uses**

The San Francisco Bay Basin Plan (RWQCB 2015) establishes beneficial uses for waterways and water bodies within the region. Beneficial uses for Lagunitas Creek include Agricultural Supply (AGR), Municipal and Domestic Supply (MUN), Freshwater Replenishment (FRSH), Cold Freshwater Habitat (COLD), Fish Migration (MIGR), Preservation of Rare and Endangered Species (RARE), Fish Spawning (SPWN), Warm Freshwater Habitat (WARM), Wilderness Habitat (WILD), and Water Contact/Noncontact Water Recreation (REC-1/REC-2). Beneficial uses for Tomales Bay include Commercial and Sport Fishing (COMM), Shellfish Harvesting (SHELL), Marine Habitat (MAR), MIGR, RARE, SPWN, WILD, REC-1, REC-2, and Navigation (NAV).

Further, the Basin Plan identifies the Tomales Bay wetland area as having associated beneficial uses. The beneficial uses for this salt-type wetland include MAR, MIGR, REC-1, REC-2, SPWN, and WILD. This wetland area is also depicted as part of the USGS National Map application (USGS 2016b).

Figure 2.2.2-1 shows general wetland areas as green, with “artificial path” and creek flow directions as blue, respectively.

---

4 Areas of Special Biological Significance refers to 34 designated ocean areas maintained and monitored for water quality by the SWRCB. These areas usually contain a diverse variety of aquatic species.

5 Hydrologic Sub-Area 201.13, specifically within the Olema Creek-Lagunitas Creek sub-watershed (Hydrologic Unit Code 180500050104).
LEGEND

Project Area
Flowpath

NWI Wetland Type

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Riverine

Flowpath Source:
National Hydrography Dataset (NHD) 2016
U.S. Geological Survey, National Geospatial Program

FIGURE 2.2.2-1
Tomales Bay Wetland Area with Local Flowpaths
State Route 1 Lagunitas Creek Bridge Project
EA 0G642, MRN-1 Post Mile 28.4 – 28.6
ID: 04-13000350
Marin County, California
Chapter 2 Affected Environment, Environmental Consequences, and Avoidance, Minimization, and/or Mitigation Measures

Clean Water Act 303(d) List
Both Lagunitas Creek and Tomales Bay are CWA Section 303(d)-listed as water bodies with limited water quality segments. Lagunitas Creek is listed as an impaired water body due to nutrients, pathogens, and increases in fine sediment that are being deposited in the streambed (RWQCB 2014). Tomales Bay is listed as an impaired water body due to mercury, sediment, nutrients, and elevated water quality coliform bacteria (pathogens) levels (RWQCB 2012).

Groundwater
The project site is not included as part of the California Department of Water Resources (DWR) Bulletin 118 (DWR 2003). Similarly, it does not have attributes associated with the DWR Groundwater Information Center Interactive Map Application (DWR 2016a).

Climatography
The project is located in a Mediterranean climate region characterized by warm summers and mild wet winters. Rain events are most likely to occur between October 15 and April 15 (Caltrans 2003). The mean annual precipitation is approximately 42.5 inches, reported as part of the USGS StreamStats query (USGS 2016a).

Topography and Soil Characteristics
The project is located within a relatively narrow, flat valley, with hilly terrain to the east and west; this valley is essentially the transform boundary along the San Andreas Fault. Land uses include rural commercial and residential, especially north of the project site at Point Reyes Station. The USGS’s National Map web-based application (USGS 2016b) indicates that the elevation at the project site, just north of the bridge, is approximately 20 feet above sea level (see Figure 2.2.2-2).

The Natural Resources Conservation Service (NRCS) Web Soil Survey tool (NRCS 2016) indicates that the Hydrologic Soil Group (HSG) at the project site and neighboring land is classified as “C/D,” with the soil type as Blucher-Cole complex. HSG C and D soils have moderately high to high runoff potential, respectively, when thoroughly wet.

---

6 The Bulletin 118 series was drafted to help preserve vital groundwater resources in California. It is a comprehensive report that covers the 515 alluvial groundwater basins that compose of 38 percent of the state’s total water supply (DWR 2016b). This groundwater management bulletin was most recently updated in 2003.
FIGURE 2.2.2-2
Topography and Elevation of Site and Neighboring Land
State Route 1 Lagunitas Creek Bridge Project
EA 0G642, MRN-1 Post Mile 28.4 – 28.6
ID: 04-13000350
Marin County, California
2.2.2.3 ENVIRONMENTAL CONSEQUENCES

Alternative 1: No-Build Alternative
Under the No-Build Alternative, the proposed project would not be implemented, and there would be no changes to the existing bridge structure; therefore, there would be no impacts on water quality and stormwater from the existing condition.

Alternative 2a: Three-span, Short Steel-truss Bridge, ABC, Longitudinal Move-in

Operational Impacts
Fill Effects to Surface Water
Because approximately 80 square feet (0.002 acre) of permanent fill would be placed into Lagunitas Creek, Alternative 2a would result in permanent effects from fill within a surface water. This is only slightly larger than the fill for the existing piers that would be removed.

Changes in Impervious Area
With the new bridge replacement, Alternate 2a would replace approximately 0.12 acre of impervious surface, which would contribute to pollutants. The exact quantity of new impervious surface would depend on the final dimensions of the bridge. With a maximum proposed width of 50 feet, new surface would be approximately 0.07 acre (approximately 2,500 to 3,000 square feet). The summation of these results is approximately 0.19 acre of net new and replaced impervious surface. The quantity of DSA is anticipated to be approximately 2.5 acres.

The new and existing impervious surfaces were estimated based on the planning level geometrics for Alternative 2a. Additional impervious surface from new paved areas would reduce infiltration into the ground and increase sheet flow of stormwater. The additional flow would have the potential to transport an increased amount of sediment and pollutants to Lagunitas Creek. The increase in impervious areas could also potentially increase the volume and velocity of stormwater flow to downstream receiving water bodies.

With implementation of permanent design pollution prevention and stormwater treatment BMPs, effects to existing water quality from changes in impervious area are anticipated to be minimal.

Construction Impacts
Demolition of the existing bridge structure must involve debris containment, stockpiling, and hauling of material away from the water channel. If necessary,
installation and removal of falsework and/or temporary shoring must proceed with care, as this may be required along the banks and bed of the creek, including abutment locations.

Other than the replacement of the bridge, construction would include extending the flood overflow culvert north of the bridge, ground disturbance such as grading and earth-moving activities; stockpiling of soils; and the loading, unloading, transport of excavated and fill material. These construction activities could result in heavy metals and sediment. Heavy metals associated with vehicle tire and brake wear, oil and grease, and exhaust emissions are the primary pollutants associated with transportation corridors. Rainfall could carry loose soils into adjacent waterways, resulting in increased sedimentation and potential effects to water quality, such as an increase in turbidity.

During construction, staging areas, material handling, and spill prevention and containment measures have the potential to affect water quality, because improperly handled fluid or material may enter directly to Lagunitas Creek. Accidental spills or releases of hazardous materials, such as fuel or water with high pH from concrete work associated with bridge construction or overflow culvert improvements, could degrade the quality of stormwater runoff or reach a stream during dry weather conditions. This contamination could affect the water quality of Lagunitas Creek and Tomales Bay. The potential for an accidental spill or release would be low, and, if one did occur, proper protocol as outlined in the SWPPP would govern its management.

Concrete operations to construct columns of piers and abutments can affect water quality. The project description includes the construction of cofferdams with sheet metal followed by dewatering inside the cofferdam in order to isolate the areas from in-water work. This would provide an adequate dry working environment for any falsework/temporary shoring installation, cast-in-drilled-hole (CIDH), and concrete operations, and would reduce water quality effects from sedimentation. Alternative 2a would include support piers in the water as well as for the abutments. For the piers, the anticipated foundation method would be CIDH.

Bentonite slurry mixture, a type of clay made by hydrating bentonite powder for several hours, is commonly used to maintain the integrity of the hole while drilling continues. Use of bentonite is essential because its plate-like particle construction gives it the ability to seal holes. If any substances fall into the hole during
Chapter 2 Affected Environment, Environmental Consequences, and Avoidance, Minimization, and/or Mitigation Measures

construction, the mixture will be able to hold outside materials in suspension and prevent hole contamination (Seavey and Ashford 2004). The bentonite would displace any groundwater that is present; once drilling is complete, the slurry itself would be displaced by the placement of the rebar cage and concrete into the hole, and it can then be safely disposed of along with any suspended contaminants. The installation of cofferdam would minimize water quality impacts.

In compliance with the Construction General Permit and the Caltrans MS4 Permit, the proposed project is required to develop and implement an effective SWPPP, because the DSA is greater than 1 acre. Prior to commencement of construction activities, a SWPPP must be prepared by the contractor and approved by Caltrans, pursuant to the Construction General Permit and the Caltrans MS4 Permit, which includes measures to protect sensitive areas and to prevent and minimize stormwater and non-stormwater discharges. With proper implementation of BMPs and adherence to the requirements of these permits, potential temporary effects to water quality would be minimal.

Alternative 2b: Three-span, Short Steel-truss Bridge, Conventional Construction (with Detour Bridge)

Operational Impacts
All direct and indirect impacts related to water quality would be the same as under Alternative 2a.

Construction Impacts
Direct impacts would be greater than under Alternative 2a due to a slightly expanded area of disturbance (approximately 0.1 acre more) for construction and use of the detour bridge, as well as the potential for using a cast-in-place method for deck construction. Casting the concrete deck would have a potential for spills of concrete directly into the stream. An underdeck containment would be installed as part of BMPs for construction to avoid such spills reaching the water. The construction period would be longer; therefore, potential threats to water quality would occur over a longer period.

The detour bridge for Alternative 2b would result in more temporary fill (for up to 2 to 4 columns supporting the bridge for a maximum total of another 80 square feet) within the creek. This temporary fill could result in an increase in turbidity or construction material debris within the creek.
Alternative 3a: Three-span, Concrete Bridge, ABC, Longitudinal Move-in 

Operational Impacts  
Direct and indirect impacts related to water quality would be the same as under Alternative 2a.

Construction Impacts  
The direct and indirect impacts of the longitudinal move-in approach for the three-span bridge would be the same as under the longitudinal move-in approach for Alternative 2a, in that the staging areas would be located where the pre-cast components, partial truss assembly, and materials would be held.

Alternative 4a: Full-span, Steel-truss Bridge, ABC, Longitudinal Move-in 

Operational Impacts  
Direct and indirect impacts would be the same as under Alternative 2a, except for permanent fill. No permanent fill would be implemented for 4a, which would mean a significantly smaller impact on water quality.

Construction Impacts  
The construction area would be slightly larger (approximately 0.11 acre more) and duration would be the same as under Alternative 2a; therefore, the impacts would be relatively the same.

Alternative 4b: Full-span, Steel-truss Bridge, ABC, Transverse Slide-in 

Operational Impacts  
Direct and indirect impacts would be the same as under Alternative 2b, except for permanent fill. No permanent fill would be implemented for 4b, which would mean a significantly smaller impact on water quality.

Construction Impacts  
Under Alternative 4b, all direct and indirect impacts would be greater than all other alternatives, because the new bridge would be built east of the existing bridge prior to horizontally sliding the bridge into its new location. The area disturbed would be slightly larger than under Alternative 3a.

2.2.2.4 AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES  
The AMMs described are proposed to avoid and minimize potential project effects to water quality. In addition, compliance with Caltrans 2015 Standard Specification 13-3, Stormwater Pollution Prevention Plan, would further minimize effects to water quality. The design features to address water quality effects are a condition of
Caltrans’ NPDES permit. These design features or BMPs will be developed and incorporated into the final design of the selected Build Alternative.

**Operation Phase**

AMMs to avoid and minimize effects following completion of the proposed project include the following:

- **AMM WATER-1: Design pollution prevention measures.** To comply with the Caltrans MS4 Permit, the project is required to implement a SWPPP containing BMPs for stormwater pollution control. Design pollution prevention BMPs are permanent measures implemented to improve stormwater quality by reducing erosion, stabilizing disturbed soil areas, and maximizing vegetated surfaces. In addition, design pollution prevention measures would be used to dissipate the velocity of flows. Strategies include the following:
  - Erosion control features for stormwater conveyance features and to stabilize slopes
  - Preservation of vegetation
  - Flow-attenuating devices (e.g., flared-end-section, outlet protection/velocity dissipation devices)

The design pollution prevention measures will be identified on the plans developed during the design phase. This includes identifying erosion control measures on the erosion control plan sheets, showing environmentally sensitive area (ESA) fencing around vegetation to be preserved, and specifying flow attenuation devices on the drainage plan sheets.

- **AMM WATER-2: Treatment measures.** Permanent stormwater treatment measures will be constructed on- or offsite to minimize potential effects from increases in impervious surface. Permanent treatment measures are used to remove pollutants from stormwater runoff prior to being discharged from the Caltrans ROW. The preferred treatment BMP type is bioretention, which may be designed as either a basin or swale. These measures remove pollutants by retention of stormwater, adsorption to soil or grass, and infiltration through the soil. These measures are effective at removing debris and solid particles, as well as some dissolved constituents. However, the soils at the project site might not provide the required infiltration rate due to their HSG C and D classifications,
making them unsuitable for a bioretention system. As a result, soil will have to be imported for any bioretention system. Seed mixes and/or plants used for erosion control, bioretention BMPs, and similar functions will be regionally native and appropriate for the project site. Where bioretention is not feasible due to site constraints, the proposed side slopes and the existing natural ditches will treat the roadway runoff by natural dispersion from infiltration in or near roadside areas. The feasibility of bioretention or other treatment measures will be completed during the design phase.

The proposed stormwater treatment measures will address potential increases in volume of flow by promoting infiltration of runoff. Vegetation within or along the treatment measures will reduce flow velocity.

**Construction Phase**

AMMs to avoid and minimize effects during construction of the proposed project include the following:

- **AMM WATER-3: Storm water pollution prevention plan.** The SWPPP will detail the implementation of temporary construction site BMPs during all phases of construction to avoid or minimize stormwater and water quality effects to surface water, groundwater, or domestic water supplies. The temporary construction site BMPs specified in the SWPPP will be implemented to avoid and minimize pollutant loads in potential stormwater/non-stormwater discharges. Water quality inspector(s) will inspect construction areas to determine if the BMPs are adequate and adjust them, if necessary. Strategies applicable to this project may include the following:
  - Soil stabilization: temporary fence (ESA-type); move-in/move-out; hydroseeding; geotextiles, mats, plastic covers, and erosion control blankets; hydraulic mulch
  - Sediment control: fiber rolls, silt fence, sediment trap, gravel bag berm, check dams, drainage inlet protection
  - Non-stormwater management: dewatering operations, material and equipment use over water, avoidance of potable water use.
  - Waste management and materials pollution control: concrete waste management, material delivery and storage, material use, stockpile
management, spill prevention and control, soil waste management, hazardous waste and/or contaminated soil management, and liquid waste management.

The SWPPP will also include a construction site monitoring program detailing the monitoring and sampling to be completed during construction to verify the effectiveness of the temporary construction site BMPs.

### 2.2.3 Geology/Soils/Seismic/Topography

#### 2.2.3.1 REGULATORY SETTING

For geologic and topographic features, the key federal law is the Historic Sites Act of 1935, which establishes a national registry of natural landmarks and protects “outstanding examples of major geological features.” Topographic and geologic features are also protected under the California Environmental Quality Act (CEQA).

This section also discusses geology, soils, and seismic concerns as they relate to public safety and project design. Earthquakes are prime considerations in the design and retrofit of structures. Caltrans’ Office of Earthquake Engineering is responsible for Caltrans projects. Structures are designed using Caltrans’ Seismic Design Criteria (SDC). The SDC provides the minimum seismic requirements for highway bridges designed in California. A bridge’s category and classification will determine its seismic performance level and which methods are used for estimating the seismic demands and structural capabilities. For more information, please see Caltrans’ Division of Engineering Services, Office of Earthquake Engineering, Seismic Design Criteria (Caltrans 2013).

The *Marin Countywide Plan* (Marin County 2007) includes a Public Safety section that includes considerations of seismic safety. In addition, seismic safety is addressed in the *Marin County Local Hazard Mitigation Plan, 2012 Update* (Marin County Sheriff’s Office of Emergency Services 2012).

#### 2.2.3.2 AFFECTED ENVIRONMENT

**Regional Geologic Setting**

The project is located in the central portion of the Coast Ranges Geomorphic Province of California. The Coast Ranges form a series of northwest-trending mountain ranges and valleys extending along the California Coast from the Oregon border on the north to California Transverse Ranges on the south (California Geological Survey 2002). The project is situated in Olema Valley, a topographic trough extending from Tomales Bay on the north to the Bolinas Lagoon on the south.
The dominant feature of the Olema Valley is the San Andreas Fault, an 800-mile-long fault zone that generally forms the dividing line between major tectonic plates, with the Pacific Plate situated west of the fault and the North American Plate situated east of the fault.

The geology of the Olema Valley in the vicinity of the project is shown on Figure 2.2.3-1. On a regional basis, bedrock east of the San Andreas Fault consists of the Franciscan Complex, a sometimes chaotic mix of oceanic crustal rocks (basalt altered to greenstone) that formed in late Mesozoic time (Jurassic and Cretaceous) and was gradually accreted onto the North American continental margin by plate tectonic motion (Stoffer 2005). Other rocks in the Franciscan Complex include chert, shale, and sandstone formed from sediments that accumulated in mid-ocean to outer continental margin environments. Serpentinite occurs in scattered outcrops throughout the region. Serpentinite, and alluvial sediments derived from it, can contain naturally occurring asbestos minerals. A sliver of Franciscan rocks that contain limestone (Calera limestone) occurs within the San Andreas Fault Zone in the Olema Valley (Stoffer 2005). Tertiary marine sediments are located west of the San Andreas Fault. There are no mineral resources that have a significant mining value in the project area. Franciscan Complex bedrock can provide stable foundation support for properly engineered structures.

Local Geologic Setting/Soils

In December, Caltrans issued a Revised Seismic Design Recommendations memorandum (SDR) (Caltrans 2016a). Two geotechnical borings were drilled for the replacement bridge in July and August 2016 and are reported in the Revised SDR. Caltrans Office of Geotechnical Design – West Geotechnical Services has issued a Draft Preliminary Foundation Report for Lagunitas Creek Bridge Memorandum, dated December 8, 2016 (Draft Foundation Report) (Caltrans 2016b). A Final Foundations Report and a Final SDR will be developed by the Caltrans after the preferred alternative is selected. The following information is derived from the Revised SDR, the Draft Foundation Report, and cited references.

The project area is underlain by alluvial deposits of Quaternary age associated with Lagunitas Creek. Lagunitas Creek flows southwest from Nicasio Reservoir to Tomales Bay. Older marine terrace deposits, also of Quaternary age, deposited during high sea level events, are also mapped in the vicinity of the project area and may underlie the surficial alluvium. The alluvium and terrace deposits are both underlain at depth by Franciscan Mélange (Galloway 1977, Blake et al. 2000).
FIGURE 2.2.3-1
Geology 2 miles from Project Area
State Route 1 Lagunitas Creek Bridge Project
EA 0G642, MRN-1 Post Mile 28.4 – 28.6
ID: 04-13000350
Marin County, California

Source:
Geologic map and map database of parts of Marin, San Francisco, Alameda, Contra Costa, and Sonoma Counties, California
M.C. Blake, Jr., R.W. Graymer, and D.L. Jones
Digital database by: Adam Soule and R.W. Graymer

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Legend

- Jfg - Greenstone (Jurassic)
- Jfgs - Greenstone (Jurassic)
- KJfch - Chert (Cretaceous and Jurassic)
- Kfs - Sandstone and shale (Cretaceous)
- Oal - Alluvium (Quaternary)
- Qt - Terrace deposits (Quaternary)
- Sch - Metamorphic Rocks - small remnant masses of mica schist
- Ti - Laird Sandstone
- Tm - Monterey Shale (late and middle Miocene)
- fsr - Mélange
- gr - Granitic rocks
- Is - Metamorphic Rocks - embedded in the granitic rocks
- Water

Project Area
2 miles from Project Area
Creeks
Bedrock at the site is the Cretaceous Franciscan Complex mélange (Wagner et al. 1990). Franciscan bedrock is known as ‘Block-in-Matrix’ rock, or BiMRock (Medley 1994, Wakabayashi and Medley 2004). This means that hard, resistant blocks of rock are randomly distributed in a highly sheared, weaker matrix. The blocks may be as small as centimeter-scale, or as large as tens of meters across. Normal stratigraphic relations (layer-cake geology) do not apply to BiMRock, as blocks are random in size and in distribution. The mélange is described as a tectonic mixture of variably sheared shale and sandstone containing (1) hard tectonic inclusions, largely of greenstone, chert, graywacke, and their metamorphosed equivalents, plus exotic high-grade metamorphic rocks and serpentinite and (2) variably resistant masses of graywacke, greenstone, and serpentinite up to several miles in longest dimension, and including minor discrete masses of limestone too small to be shown, (Blake et al. 2000). The geotechnical soil boring RW-16-001, drilled north of the existing bridge, encountered loose sand underlain by dense to very dense sand with gravel extending to the bottom of the borings at 81.5 feet. Soil Boring RW-16-002, located south of the existing bridge, encountered very dense sand in the upper 10 feet bgs, underlain by 20 feet of interlayered firm silty clay, medium dense sandy silt and silty sand. Bedrock (Franciscan Complex mélange) consisting of mudstone/graywacke was encountered at about 30 feet and extended to bottom of the boring at 80 feet (Caltrans, 2016a).

**Groundwater**

Groundwater levels were not measured during the test boring program. However, it is expected that the groundwater level in the vicinity of the bridge is within the upper 10 feet of the ground surface and is expected to fluctuate seasonally with the creek level. The assumed groundwater level for design purposes is at elevation 10 (10 feet bgs) (Caltrans, 2016b).

**Physiography and Topography**

The project area is a relatively flat alluvial plain containing the Lagunitas Creek stream channel. The elevation of the ground surface at the boring locations is approximately 20 feet North Geodetic Vertical Datum 1929 (NGVD 29) (Caltrans 2016b), while the floor of Lagunitas Creek is approximately 2 feet NGVD 29 (Marin County 2016).

**Faults and Seismicity**

The project area is located in a highly seismically active region of northern California. Some of the faults in the coastal region north of San Francisco Bay area are capable of producing earthquakes that may result in very strong ground shaking.
The nearest major active fault to the project area is the San Andreas (North Coast) strike slip fault, capable of a maximum magnitude of 8. The fault is 0.4 mile (0.7 kilometer) west/southwest of the project.

Other principal active faults in the vicinity of the project include the San Andreas (Peninsula) strike slip fault, capable of a maximum magnitude 8 earthquake, 20.5 miles (33 kilometers) from the site; and the San Gregorio strike slip fault, capable of a maximum magnitude of 7.4, located 13.3 miles (21.3 kilometers) from the site (California Seismic Hazard Map, Version 2.3.07 [Caltrans 2016a]).

**Seismic Hazards**

**Surface Fault Rupture and Ground Shaking**

The Seismic Hazards Mapping Act provides for a statewide seismic hazard mapping and technical advisory program to assist cities and counties in fulfilling their responsibilities for protecting the public health and safety from the effects of strong ground shaking, liquefaction, landslides, or other ground failure and other seismic hazards caused by earthquakes. Specifically, the act was intended to assist counties and cities in the exercise of their responsibility to prohibit the location of developments and structures for human occupancy across the trace of active faults. Such buildings or structures within the zone may be required by the county or city, prior to the approval of a project, to prepare a geologic report defining and delineating any hazard of surface fault rupture.

Surface fault rupture is a slip of a fault that reaches the surface. The faults in the project vicinity are strike-slip faults. The San Andreas Fault in the Point Reyes area has historically produced surface rupture. The San Andreas Fault in the project area is mapped on the State of California Special Studies Zones Inverness Quadrangle (CDMG 1974), and is shown on Figure 2.2.3-2. The Fault Hazard Zone indicates the limits of an area where surface rupture may occur.

Due to proximity to the San Andreas and other nearby active faults, the risk of violent ground shaking is high in the project area (Caltrans 2016a).

**Liquefaction**

Liquefaction is a process whereby strong ground shaking causes loose, saturated, unconsolidated sediments to lose strength and to behave as a fluid. This subsurface process can cause ground deformation at the surface, including lateral spreading and
FIGURE 2.2.3-2
Alquist-Priolo Fault Hazard Zone
State Route 1 Lagunitas Creek Bridge Project
EA 0G642, MRN-1 Post Mile 28.4 – 28.6
ID: 04-13000350
Marin County, California
seismically induced settlement and sand boils. Loss of bearing strength and ground movements associated with liquefaction may result in damage to structures and roadways. Loose, saturated sandy and silty soils are particularly susceptible to liquefaction.

The USGS Earthquake Hazard Program identifies the project area as having a “very high” liquefaction susceptibility (USGS 2006). Layers of loose-to-compact granular materials were encountered below the design groundwater table at both borings. These loose-to-compact granular material layers are susceptible to liquefaction during a seismic event (Caltrans 2016a).

**Seismically Induced Effects on Structures**

Seismic events can alter the ground and cause strain on manmade structures in the form of landslides, lateral spreading or seismic settlement. Landslides can be induced by the addition of seismic forces resulting from an earthquake. The earthquake imparts additional horizontal and vertical forces to the earth mass and may cause an exceedance of resisting forces, resulting in a landslide.

Lateral spreading can be induced by the addition of seismic forces from an earthquake, resulting in liquefaction of supporting soil layers. Seismic settlement is defined as downward movement of the ground surface resulting from earthquake shaking, densification of dry granular soils, and/or liquefaction. The settlement may be total or differential settlement localized to the area with poor soil conditions as defined in the Caltrans SDC (Caltrans 2013). Caltrans has acknowledged these design risks and the Revised SDR states that the seismically induced impacts, such as landslides, seismic spreading, and settlement, will be analyzed and addressed in the Final SDR (Caltrans 2016a).

**Other Seismic Hazards**

Tsunamis are caused when fault rupture generates a wave than moves rapidly from the source area. Areas susceptible to tsunamis are often exposed shorelines. Tsunami wave height and run-up is greatly reduced in embayments. The project area is not in an area subject to inundation from a tsunami (California Department of Conservation 2014).

**2.2.3.3 ENVIRONMENTAL CONSEQUENCES**

**Alternative 1: No-Build Alternative**

Under the No-Build Alternative, the existing Lagunitas Bridge would not be replaced to meet current seismic and safety standards. The bridge would continue to wear and
deteriorate further. Current bridge physical limitations and geologic, soil, and seismic risks would remain a threat to the bridge integrity and function.

The project area is located in a highly seismically active region of northern California. Because of the high risk of liquefaction and related lateral spreading, the support piles beneath the existing piers and the abutment footings could become unstable or displace to the extent that the bridge would collapse or be severely damaged during a strong seismic event. A seismically related collapse or significant damage would make the bridge unusable and interrupt the normal flow of people, goods, and services in the project area. This alternative would expose people to the risk of loss, injury, or death. Therefore, the No-Build Alternative poses the potential for an adverse effect.

**Alternative 2a: Three-span, Short Steel-truss Bridge, ABC, Longitudinal Move-in**

**Operational Impacts**

**Geology/Soils**

Operation of Alternative 2a would not affect the geology and soils present at the project site.

**Surface Fault Rupture**

The project site is not within an Alquist-Priolo Earthquake Fault Zone boundary. Published geologic maps show no faults crossing the project site, and there is no other indication of faulting on the property.

**Strong Seismic Ground Shaking**

With the San Andreas Fault located 0.4 mile from the site, the project would likely be subjected to strong seismically induced ground shaking within the design life of the project. The project would be designed to meet Caltrans safety and seismic standards that would withstand the event of a strong seismic ground shaking. Compliance with Caltrans seismic standards would minimize the risk of strong seismic groundshaking on the structure and increase the safety of users on the bridge.

**Seismically Induced Ground Failure, Including Liquefaction, Settlement, and Lateral Spreading**

According to the USGS Earthquake Hazard Program, the project area has “very high” liquefaction susceptibility (USGS 2016). This was further validated through borings in close proximity to the existing bridge (Caltrans 2016a). Due to the presence of
liquefiable soils, there is a potential for seismic related ground settlement and lateral spreading.

Potential liquefiable soil layers may densify during a seismic event and lose strength and compact. This may result in total and differential settlement, lateral deformation of slopes adjacent to a free face, and dynamic loads on bridge components. The Final Foundations Report and Final SDR would outline the required design measures that to reduce the risks from liquefaction, settlement and lateral spreading. Implementation of the measures in the Final Foundations Report and Final SDR is required.

Other Seismic Hazards
The project area is not in an area where tsunamis, volcanoes, or rock falls are potential hazards (California Emergency Management Agency, California Geological Survey, and University of Southern California 2009). Therefore, there would be no effect from tsunamis, volcanoes, or rock falls.

Construction Impacts
Earthwork
Clearing and grading associated with the bridge construction and the temporary materials storage areas would disturb the natural vegetation. This construction work would expose bare soil and may result in loss of topsoil due to soil erosion. Alternative 2a has a temporary construction and staging area of 2.5 acres, the smallest area of disturbance of any of the Build Alternatives. Alternatives 2b is slightly larger, followed by Alternatives 3a and 4a. Alternative 4b disturbs the largest area. There would be no adverse effect from erosion.

Settlement
Settlement from placement of abutments fill loads is anticipated to occur during construction. Construction of the bridge, abutments, retaining walls, backfill, embankments, and roadways would be carried out in accordance with the Caltrans Standard Specifications (Caltrans 2015). After identification of the preferred alternative, Caltrans would prepare and be required to implement the findings from a Final Foundations Report and Final SDR that would include engineering measures to reduce the risk of settlement. Compliance would reduce the risk from settlement. There would be no adverse effect.
Expansive Soils
Expansive soils can pose a risk to stability of structures. However, the proposed project bridge foundations would be built to Caltrans Bridge Design Specification requirements. The Final Foundations Report and Final SDR would consider the expansive soils in the project area, and would develop measures to reduce the risks from expansive soils. Implementation of the Final Foundations Report and Final SDR, to be prepared after identification of the preferred alternative, is required, and would reduce the potential adverse effects of expansive soils on the bridge and abutments.

Alternative 2b: Three-span, Short Steel-truss Bridge, Conventional (with Detour Bridge)
Operational Impacts
All operational impacts would be the same as under Alternative 2a.

Construction Impacts
Earthwork
Impacts under Alternative 2b would be similar to Alternative 2a. The temporary construction and staging area would be 2.61 acres. Unlike other Build Alternatives, the conventional construction method is two years longer than the ABC method. Compliance with the Construction General Permit SWPPP measures would be enforced for the full construction period; however, because the duration of earthwork is longer, the potential for loss of topsoil, soil erosion and dust generation is greater. There would be no adverse effects.

Alternative 3a: Three-span, Concrete Bridge, ABC, Longitudinal Move-in
Operational Impacts
All operational impacts would be same as under Alternative 2a.

Construction Impacts
The construction impacts (earthwork, settlement, expansive soils) and the longitudinal move-in approach for the three-span concrete bridge would be the same as for the longitudinal move-in approach under Alternative 2a.

Alternative 4a: Full-span, Steel-truss Bridge, ABC, Longitudinal Move-in
Operational Impacts
All operational impacts would be the same as under Alternative 2a.
Construction Impacts
All construction impacts from Alternative 4a (earthwork, settlement, expansive soils) are the same as under Alternative 2a.

Alternative 4b: Full-span, Steel-truss Bridge, ABC, Transverse Slide-in

Operational Impacts
All operational impacts would be the same as under Alternative 2a.

Construction Impacts
Earthwork
All earthwork construction impacts would be the same as under Alternative 2a, except that the temporary construction and staging for this alternative is 0.31 acre greater than Alternatives 2a, 3a, and 4a.

2.2.3.4 AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES
Caltrans is required to prepare Final Seismic Design Recommendations (SDR), and Final Foundations Reports consistent with Caltrans Seismic Design Criteria, prior to final design. The bridge design and the construction work will be performed in compliance with the Caltrans SDC, Final SDR, Final Foundations Report, and the Caltrans Standard Specifications. Implementation of Caltrans Standard Specification Section 19, Earthwork, and AMM Water-3, SWPPP (see Section 2.2.2, Water Quality) would reduce erosion from earthwork activities. Complying with these reports, memoranda, and specifications will minimize the identified design/construction impacts. No avoidance, minimization, and/or mitigation measures are required.

2.2.4 Paleontology
2.2.4.1 REGULATORY SETTING
Paleontology is a natural science focused on the study of ancient animal and plant life as it is preserved in the geologic record as fossils. A number of federal statutes specifically address paleontological resources, their treatment, and funding for mitigation as a part of federally authorized projects. Because this project would receive federal funding, the following laws, ordinances, and regulations apply:

- 16 USC 461-467 (the National Registry of Natural Landmarks) establishes the National Natural Landmarks (NNL) program. Under this program, property owners agree to protect biological and geological resources such as paleontological features. Federal agencies and their agents must consider the existence and location of designated NNLs, and of areas found to meet the criteria
for national significance, in assessing the effects of their activities on the environment under National Environmental Policy Act (NEPA).

- 23 USC 1.9(a) requires that the use of federal-aid funds must be in conformity with federal and state law.

- 23 USC 305 authorizes the appropriation and use of federal highway funds for paleontological salvage as necessary by the highway department of any state, in compliance with 16 USC 431-433 and state law.

- Under California law, paleontological resources are protected by the California Environmental Quality Act.

### 2.2.4.2 AFFECTED ENVIRONMENT

The San Andreas Fault, a strike-slip fault that extends roughly 800 miles through California and forms the boundary between the Pacific Plate and the North American Plate, is approximately 0.4 mile west of the project area. West of the fault, on the Pacific Plate, the geology is characterized by granites of the Salinian Block (Blake et al. 2000). Within the project area, on the North American Plate, the geology is characterized by marine rocks of the Franciscan Complex.

To assess the paleontological sensitivity of sediments in the project area, geological maps, aerial photography, airborne Lidar data (Morell 2009), scientific literature, and the University of California Museum of Paleontology at Berkeley (UCMP) database were consulted (UCMP 2016) for a study area of approximately 0.05 of the project limits. This study area provides the assurance that sensitive geologic units nearby are not missed.

Two geologic units underlie the project area, which includes the maximum project footprint for all Build Alternatives (see Figure 2.2.4-1): Alluvium (Qal) and Older Alluvium (Qoal) (Blake et al. 2000).

**Alluvium (Quaternary) (Qal)** underlies the majority of the project area. Qal generally consists of sand, gravel, silt, and clay. These are fluvial sediments deposited by the Lagunitas and Olema Creeks and are less than 10,000 years old at shallow depths. A locality search of the UCMP database revealed no records of fossils found in alluvium in the project vicinity. Accordingly, this sediment is considered to be of low paleontological sensitivity at shallow depths (less than 20 feet below ground surface [bgs]) in the project area.
FIGURE 2.2.4-1
Geology 0.5 mile from Project Area
State Route 1 Lagunitas Creek Bridge Project
EA 0G642, MRN-1 Post Mile 28.4 – 28.6
ID: 04-13000350
Marin County, California

Source:
Geologic map and map database of parts of Marin, San Francisco, Alameda, Contra Costa, and Sonoma Counties, California
M.C. Blake, Jr., R.W. Graymer, and D.L. Jones
Digital database by: Adam Soule and R.W. Graymer

LEGEND
Project Area
0.5 Mile from Project Area
Geologic Units
- Kfs - Sandstone and shale (Cretaceous)
- Qal - Alluvium (Quaternary)
- Qoal - Older alluvium (Quaternary)

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Older alluvium (Quaternary) (Qoal) underlies the laydown area at the north end of the project area. Qoal consists of poorly sorted sandstone and conglomerate\(^7\) with frequent crossbedding. This unit locally contains small wood fragments and includes thinly laminated siltstone or claystone interbedded gravels. These sediments are older than 10,000 years and to correspond to fluvial terracing around and just upstream of the project site visible on Lidar mapping (Morell 2009). Given their age and the fine nature of the deposits, they may have some potential for fossil preservation. Occasionally, faunal remains have been found in Late Pleistocene (roughly 100,000 to 10,000 years before present) alluvium elsewhere in the Bay Area (Tomiya et al. 2011). Accordingly, Qoal is considered to be of moderate sensitivity.

The following geologic units are also within 0.5 mile of the project area, but are too far from the project site to be affected by project construction (see Figure 2.2.4-1).

Sandstone and Shale (Cretaceous) (Kfs) are marine rocks of the Franciscan Complex that occur in the hills east of the project site. Invertebrate fossils have been found in the Franciscan Complex in Marin and surrounding counties (UCMP 2016; Wright 1974), but they are not very common. This unit is considered to be of moderate sensitivity.

Granitic Rocks (gr) are plutonic, igneous rocks from the Salinian Block. These rocks are generally considered to have little or no paleontological sensitivity.

### 2.2.4.3 ENVIRONMENTAL CONSEQUENCES

This section provides information on the potential impacts associated with the proposed project on paleontological resources.

**Alternative 1: No-Build Alternative**

Alternative 1 would not create ground disturbance so there would be no adverse effects to paleontological resources.

**Alternative 2a: Three-span, Short Steel-truss Bridge, ABC, Longitudinal Move-in**

**Operational Impacts**

Operation of the project would not create ground disturbance; therefore, it would not affect paleontological resources.

---

\(^7\) Conglomerate is a coarse-grained sedimentary rock consisting of rounded gravel embedded in a matrix of finer sediment such as sand, silt, or clay.
Construction Impacts
Construction of Alternative 2a would involve open excavation including grubbing, grading, and digging to up to 20 feet bgs. Closed excavation including vibratory pile driving or augering would also occur to depths exceeding 20 feet bgs. All bridge construction would occur on Qal.

Because the majority of open excavation would occur on Qal sediment at depths up to 20 feet bgs that contains low probability of paleontological resources, impacts are not likely to occur. Deeper, closed excavation such as vibratory pile driving or augering would not be considered an adverse effect on paleontological resources because fossils would not be recoverable even if encountered.

Excavation on Qoal would have the potential to affect paleontological resources; however, the portion of the project area underlain by Qoal is negligible and is on the outer edge of a laydown yard in which no grading would occur. Thus, the project would not be likely to affect potential paleontological resources within Qoal.

Alternative 2b: Three-span, Short Steel-truss Bridge, Conventional Construction (with Detour Bridge)
Operational Impacts
Operational impacts would be same as those under Alternative 2a.

Construction Impacts
Under Alternative 2b, the potential to encounter paleontological resources would be greater than under Alternative 2a because two bridges would be constructed. However, the potential to have an adverse effect on paleontological resources is still similar to that under Alternative 2a.

Alternative 3a: Three-span, Concrete Bridge, ABC, Longitudinal Move-in
Operational Impacts
Operational impacts would be the same as those under Alternative 2a.

Construction Impacts
All direct and indirect impacts would be the same as those under Alternative 2a.

Alternative 4a: Full-span, Steel-truss Bridge, ABC, Longitudinal Move-in
Operational Impacts
Operational impacts would be the same as those under Alternative 2a.
Construction Impacts
All direct and indirect impacts would be the same as those under Alternative 2a.

Alternative 4b: Full-span, Steel-truss Bridge, ABC, Transverse Slide-in
Operational Impacts
Operational impacts would be the same as those under Alternative 2a.

Construction Impacts
All direct and indirect impacts would be the same as those under Alternative 2a.

2.2.4.4 AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES
Compliance with Caltrans Standard Specification 14-7.03 requires that construction work be halted in the event that unanticipated paleontological resources are discovered, that the resource not be disturbed, and that the engineer is notified. Compliance with this specification would minimize potential effects to paleontological resources.

2.2.5 Hazardous Waste/Materials
Hazardous materials are generally substances that, by their nature and reactivity, have the capacity to cause harm or health hazards during normal exposure or an accidental release or mishap, and they are characterized as being toxic, corrosive, flammable, reactive, an irritant, or a strong sensitizer.

2.2.5.1 REGULATORY SETTING
Hazardous materials including hazardous substances and wastes are regulated by many state and federal laws. Statutes govern the generation, treatment, storage, and disposal of hazardous materials, substances, and waste, and also the investigation and mitigation of waste releases, air and water quality, human health, and land use.

The primary federal laws regulating hazardous wastes/materials are the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA) and the Resource Conservation and Recovery Act of 1976 (RCRA). The purpose of CERCLA, often referred to as “Superfund,” is to identify and clean up abandoned contaminated sites so that public health and welfare are not compromised. RCRA provides for “cradle to grave” regulation of hazardous waste generated by operating entities. Other federal laws include:

- Community Environmental Response Facilitation Act (CERFA) of 1992
- Clean Water Act
- Clean Air Act
Chapter 2 Affected Environment, Environmental Consequences, and Avoidance, Minimization, and/or Mitigation Measures

- Safe Drinking Water Act
- Occupational Safety and Health Act (OSHA)
- Atomic Energy Act
- Toxic Substances Control Act (TSCA)
- Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)

In addition to the acts listed above, Executive Order (EO) 12088, *Federal Compliance with Pollution Control Standards*, mandates that necessary actions be taken to prevent and control environmental pollution when federal activities or federal facilities are involved.

California regulates hazardous materials, waste, and substances under the authority of the California Health and Safety Code and is also authorized by the federal government to implement RCRA in the state. California law also addresses specific handling, storage, transportation, disposal, treatment, reduction, cleanup, and emergency planning of hazardous waste. The Porter-Cologne Water Quality Control Act also restricts disposal of wastes and requires cleanup of wastes that are below hazardous waste concentrations but could impact ground and surface water quality. California regulations that address waste management and prevention and cleanup of contamination include Title 22 Division 4.5 Environmental Health Standards for the Management of Hazardous Waste, Title 23 Waters, and Title 27 Environmental Protection.

Worker and public health and safety are key issues when addressing hazardous materials that may affect human health and the environment. Proper management and disposal of hazardous material is vital if it is found, disturbed, or generated during project construction.

### 2.2.5.2 Affected Environment

The analysis summarized in this section focuses on determining whether health risks related to hazardous waste and materials are present within the project area, including construction activities and staging areas. The analysis is based on the following:

- An Environmental Data Resources, Inc. (EDR) database search for a 0.25-mile radius of the project area boundary (EDR 2016a)

- A Geotracker database search for environmental records and data for facilities regulated by the California State Water Resources Control Board (SWRCB) (2016), also within the project area and surrounding areas as described above
• A review of historical aerial photographs, topographic maps, and a Sanborn\textsuperscript{®} map (historical fire insurance map) (EDR 2016b) covering the project area and adjacent areas

The EDR and Geotracker database searches identified known or potential releases of hazardous materials that could impact soils and/or groundwater in the project area. Following record review and evaluation of hazardous materials release sites, each site was assigned a level of likelihood related to hazardous materials release, and by consequence, potential impacts of the project.

The assessment did not include soil or groundwater sampling, or sampling for asbestos or lead-based paint. The assessment was limited to identifying sites that may impact the project area, but the assessment did not identify whether the project area contains contamination, or the extent of any known or suspected contamination that may be present. Site-specific investigations would be required for the potential contaminants of concern to be fully evaluated and quantified. Coordination or consultation with regulatory or local agencies or property owners will be needed if contaminants are present within the project area.

The assessment identified no sites with environmental records within the project area. A total of 20 sites with environmental records were identified outside of, but within 0.25 mile of, the project area (see Figure 2.2.5-1). The site name, location, and description of known operations, releases, investigations, and remedial actions at each site are presented in Appendix J and are summarized below in Table 2.2.5-1.

### Table 2.2.5-1 Summary of Known and Potential Hazardous Materials Release Sites Located within 0.25 Mile of the Project Area

<table>
<thead>
<tr>
<th>Site ID Number</th>
<th>Site Name and Location (^{a})</th>
<th>Description</th>
<th>Hazardous Materials Release Site Determination</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pacific Bell (0.010 mile north)</td>
<td>Handler (non-generator) of hazardous waste under RCRA; no compliance violations reported. Potential chemical types handled are unknown.</td>
<td>Unlikely release (^{b})</td>
</tr>
<tr>
<td>2</td>
<td>MacMahon Residence (0.011 mile southwest)</td>
<td>Former UST removed in 1986. Potential chemical types stored are not identified, but likely to have been vehicle fuels.</td>
<td>Potential release (^{c})</td>
</tr>
<tr>
<td>3</td>
<td>Pacific Bell (0.043 mile north-northwest)</td>
<td>Small quantity generator of hazardous waste under RCRA; former large quantity generator with no violations reported. Potential chemical types generated are unknown.</td>
<td>Unlikely release (^{b})</td>
</tr>
</tbody>
</table>
### Table 2.2.5-1 Summary of Known and Potential Hazardous Materials Release Sites Located within 0.25 Mile of the Project Area

<table>
<thead>
<tr>
<th>Site ID Number</th>
<th>Site Name and Location a</th>
<th>Description</th>
<th>Hazardous Materials Release Site Determination</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Chevron/Redwood Oil Bulk Plant (0.072 mile north-northeast)</td>
<td>Former fuel bulk terminal was active until 1990; cleanup program overseen by the RWQCB (Geotracker Case ID SL1822P640). Releases of diesel, gasoline, kerosene, and other petroleum from ASTs to soil and groundwater occurred. Five ASTs, piping, and soil were removed in 1999. Regulatory closure occurred in 2012 on the basis of (1) adequate investigation, (2) primary source (ASTs) and secondary source (impacted soil) removals, (3) decreasing trends of concentrations in groundwater, (4) low likelihood of groundwater use for drinking water, and (5) residual concentrations in soil and groundwater of no apparent threat to public health or the environment.</td>
<td>Known release (low risk) d</td>
</tr>
<tr>
<td>5</td>
<td>Wilson Property (0.076 mile north-northeast)</td>
<td>Former UST was removed in 1989. Potential chemical types stored are not identified, but likely to have been vehicle fuels.</td>
<td>Potential release c</td>
</tr>
<tr>
<td>6</td>
<td>Mahoney Investments (0.077 mile north-northeast)</td>
<td>Former UST removed in 1988. Potential chemical types stored are not identified, but likely to have been vehicle fuels.</td>
<td>Potential release c</td>
</tr>
<tr>
<td>7</td>
<td>Cheda Chevrolet (0.077 mile north)</td>
<td>Auto maintenance facility and former garage, service station, and body and fender/auto painting shop. The site was overseen by the RWQCB as a LUST cleanup site (Geotracker Case ID T0604100248). One 500-gallon UST contained waste oil. Leaks from two 1,000-gallon unleaded gasoline USTs were stopped in 1991, and the USTs were removed. Groundwater and soil were potentially affected by gasoline. Groundwater, soil, and soil gas investigations were conducted from 1997 to 2008. Regulatory closure occurred in 2009 on the basis of the primary source removal, localized containment and limited human contact with impacted soils and groundwater, decreasing trends and likely continued natural attenuation of total petroleum hydrocarbons in groundwater, and volatile organic compounds in soil gas below human health screening levels.</td>
<td>Known release (low risk) d</td>
</tr>
<tr>
<td>8</td>
<td>Two Ball Inn (0.098 mile north)</td>
<td>Former UST removed in 1988. Potential chemical types stored are not identified, but likely to have been vehicle fuels.</td>
<td>Potential release c</td>
</tr>
<tr>
<td>9</td>
<td>Toby’s Trucking, Inc. (0.104 mile north-northwest)</td>
<td>Former UST removed in 1992. Potential chemical types stored are not identified, but likely to have been vehicle fuels.</td>
<td>Potential release c</td>
</tr>
<tr>
<td>10</td>
<td>Building Supply Center (0.108 mile north)</td>
<td>Two USTs containing diesel motor vehicle and an unreported fuel type; no leaks reported. One UST was removed in 1992.</td>
<td>Potential release c</td>
</tr>
</tbody>
</table>
### Table 2.2.5-1 Summary of Known and Potential Hazardous Materials Release Sites Located within 0.25 Mile of the Project Area

<table>
<thead>
<tr>
<th>Site ID Number</th>
<th>Site Name and Location</th>
<th>Description</th>
<th>Hazardous Materials Release Site Determination</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>Pacific Bell Facility (0.127 mile north-northeast)</td>
<td>LUST cleanup site overseen by the RWQCB (Geotracker Case ID T0604100099). One 1,300-gallon diesel fuel UST was removed in 1987. Release of diesel to soil was investigated. Based on verification soil sample results, no further action was required by Marin County and RWQCB; regulatory closure occurred in 1997.</td>
<td>Known release (low risk) d</td>
</tr>
<tr>
<td>12</td>
<td>Lawrence H. Arndt (0.158 mile north-northwest)</td>
<td>One tank containing regular motor vehicle fuel listed in SWRCB’s Historical UST Registered Database.</td>
<td>Potential release c</td>
</tr>
<tr>
<td>13</td>
<td>Marin County Fire and Sheriff (0.158 mile north-northwest)</td>
<td>Former UST containing unleaded gasoline was removed from the site; last inspected in 2002.</td>
<td>Potential release c</td>
</tr>
<tr>
<td>14</td>
<td>Marin County - Point Reyes Fire Department (0.160 mile north-northwest)</td>
<td>One UST permitted by Marin County is present. Specific chemical types stored are not identified, but likely to be vehicle fuels.</td>
<td>Potential release c</td>
</tr>
<tr>
<td>15</td>
<td>Toby’s Trucking, Inc. (0.182 mile north-northwest)</td>
<td>LUST cleanup site overseen by the RWQCB. Groundwater was potentially affected by diesel fuel. Regulatory closure occurred in 1996.</td>
<td>Known release (low risk) d</td>
</tr>
<tr>
<td>16</td>
<td>Greenbridge Gas and Auto (0.188 mile north-northwest)</td>
<td>Two LUST cleanup sites (Geotracker Case ID T0604100321) were overseen by the RWQCB and Marin County. One LUST had an enforcement action for a gasoline leak to groundwater that was stopped in 1999. Regulatory closure for both LUSTs occurred in 1999.</td>
<td>Known release (low risk) d</td>
</tr>
<tr>
<td>17</td>
<td>Michael Medina (0.188 mile west)</td>
<td>Farm with one UST containing unleaded motor vehicle fuel listed in SWRCB’s Historical UST Registered Database.</td>
<td>Potential release c</td>
</tr>
<tr>
<td>18</td>
<td>Genazzi Ranch (0.211 mile south-southeast)</td>
<td>Dairy ranch with one UST installed in 1981 containing regular motor vehicle fuel; listed in SWRCB’s Historical UST Registered Database.</td>
<td>Potential release c</td>
</tr>
<tr>
<td>19</td>
<td>U.S. Coast Guard CAMSPAC (0.247 mile north-northwest)</td>
<td>The facility is a RCRA small quantity generator of hazardous waste, and a former large quantity generator with no violations reported. Chemical types generated include air emissions of carbon dioxide, nitrogen oxides, nickel, formaldehyde, benzene, volatile organic compounds, and particulate matter.</td>
<td>Unlikely release b</td>
</tr>
<tr>
<td>20</td>
<td>U.S. Coast Guard (0.250 mile north-northwest)</td>
<td>LUST cleanup site overseen by the RWQCB. Groundwater was potentially affected by diesel fuel. The UST was removed in 1997 and regulatory closure occurred in 1998.</td>
<td>Known release (low risk) d</td>
</tr>
</tbody>
</table>
### Table 2.2.5-1  Summary of Known and Potential Hazardous Materials Release Sites Located within 0.25 Mile of the Project Area

<table>
<thead>
<tr>
<th>Site ID Number</th>
<th>Site Name and Location a</th>
<th>Description</th>
<th>Hazardous Materials Release Site Determination</th>
</tr>
</thead>
</table>

**Notes:**

a Site location shown on Figure 2.2.5-1. Distances and orientation are from project area boundary.

b Unlikely release of hazardous waste/materials at the site due to the nature of site operations and lack of reported violations.

c No known release of hazardous waste/materials at the site, but a potential for release is associated with facilities and operations (e.g., former or current USTs).

d Known release of hazardous waste/materials at the site, but considered low in risk of hazard to the project due to lack of exposure, adequate investigation, completed remediation, site closure, and/or distance from project site.

AST = aboveground storage tank  
ID = identification  
LUST = leaking underground storage tank  
RCRA = Resource Conservation and Recovery Act  
RWQCB = Regional Water Quality Control Board  
SWRCB = State Water Resources Control Board  
UST = underground storage tank

Sources: EDR 2016a; SWRCB 2016

Of the 20 sites, six are known hazardous materials release sites, including a bulk fuel plant with aboveground storage tanks (ASTs), auto maintenance and current or former service stations, and other facilities with underground storage tanks (USTs). Chemical releases consisted of diesel, gasoline, and other petroleum products and associated contaminants.

Eleven sites were conservatively considered potential hazardous materials release sites because they historically contained or currently contain USTs with motor vehicle fuel (see Table 2.2.5-1). Seven of these sites had USTs removed for unreported reasons, three contained USTs as reported in a historical UST registered database, and one contains a currently permitted UST.

The remaining three sites with environmental records were considered unlikely to have been the sites of past releases (see Table 2.2.5-1). These facilities are regulated by RCRA and include one handler of hazardous waste and two small quantity generators of hazardous waste, both of which were formerly large quantity generators with no recorded violations.
FIGURE 2.2.5-1
Locations of Known, Potential, or Unlikely Hazardous Materials Release Sites
State Route 1 Lagunitas Creek Bridge Project
EA 0G642, MRN-1 Post Mile 28.4 – 28.6
ID: 04-13000350
Marin County, California

LEGEND

Project Area

0.25 Mile Radius Zone around Project Area

- Known Hazardous Materials Release Site
- Potential Hazardous Materials Release Site
- Unlikely Hazardous Materials Release Site

Note:
Site ID numbers defined in Table 2. HwM-1
Source: EDR (2016), SWRCB (2016)
In addition, demolition or construction activities could increase the risk of human exposure to airborne contaminants from materials in bridge and roadway structures and surface soils within the project area, and could also contribute to or mobilize contaminants in Lagunitas Creek sediments, as described below.

2.2.5.3 ENVIRONMENTAL CONSEQUENCES

A comparison of potential impacts of hazardous materials on the project by project alternative is presented below.

Alternative 1: No-Build Alternative

The No-Build Alternative would construct no replacement of and make no alterations to the existing Lagunitas Creek Bridge. Therefore, the No-Build Alternative would avoid any health and environmental risks associated with any hazardous materials in the project area.

Alternative 2a: Three-span, Short Steel-truss Bridge, ABC, Longitudinal Move-in

Operational Impacts

Operation of the new bridge would generate metal pollutants associated with vehicle tire and brake wear and non-point source pollution including vehicle fuel and oil leaks. These releases are considered minimal and are identical to those under the existing condition (i.e., No-Build Alternative).

Construction Impacts

Potential Risk of Known Hazardous Material Sites

Six known hazardous materials release sites located within 0.25 mile of the project area were identified (see Table 2.2.5-1). However, none of these sites are located within or adjacent to the project area (see Figure 2.2.5-1). In each case, the cleanup status was designated as Completed – Case Closed by the SWRCB, typically following UST or AST removal actions, investigations characterizing the nature and extent of releases, and additional soil remediation in the case of the Chevron/Redwood Oil Bulk Plant. No deed restrictions are associated with any of these properties, and any remaining contamination in soil or groundwater was determined to be locally contained, below environmental screening levels, and/or decreasing in concentration through likely continued natural attenuation. For these reasons, all six of the known hazardous materials release sites are considered unlikely to impact humans or the environment as a result of releases and exposures during project construction under Alternative 2a. For project excavations that extend to groundwater, groundwater sampling and analysis would take place during the design
phase to determine if groundwater is contaminated. Water pollution control measures should include monitoring, inspecting and managing work activities such that any discharge of pollutants to surface water, groundwater, and municipal-separate storm sewer systems is reduced.

Eleven sites were conservatively considered potential hazardous materials release sites. One of these, a residence at 11150 Sir Francis Drake Boulevard (site #2 on Figure 2.2.5-1), is located adjacent to the southwestern corner of the project. This site contained a UST that was removed in 1986. All USTs at the potential release sites have been permitted by state and county agencies, and no releases of fuels or other hazardous substances have been reported. As such, no potential release sites are considered likely to impact humans or the environment due to releases and exposures during construction.

The remaining three sites with environmental records include a handler of hazardous waste and one small quantity waste generator (Pacific Bell facilities #1 and #3, respectively, on Figure 2.2.5-1) located near the northwestern staging area for the project. These sites are considered unlikely to have had past releases, are without hazardous waste violations, and are therefore also unlikely to impact the project with hazardous materials.

Thus, no known hazardous materials release sites would impact humans or the environment due to releases and exposures during construction, and no major sources of offsite contamination need to be considered or mitigated.

**Potential Risk of Construction Activities**

Other potential impacts from hazardous materials associated with project construction under Alternative 2a include the following:

- Potential construction worker exposures to aerially deposited lead (ADL) and other heavy metals in surface and near-surface soils near the bridge during demolition and construction

- Potential construction worker exposure to naturally occurring asbestos (NOA) in soil disturbed during construction activities

- Potential construction worker exposures to asbestos fibers and lead particles emitted to the air during demolition of the old bridge
Potential construction worker exposures to lead and hexavalent chromium in yellow thermoplastic and yellow paint released during bridge and roadway demolition of the old bridge

Impacts to surface water and sediment quality of Lagunitas Creek due to potential release of constituents in asphalt-concrete grindings and Portland cement concrete grindings during demolition of the old bridge

Potential mobilization of any chlorinated pesticides, arsenic, or other metals above levels of concern in Lagunitas Creek sediments caused by sediment disturbance during bridge demolition and construction (e.g., removal and construction of piers)

Potential spills of hazardous waste or materials including asphalt, solvents, gasoline, diesel fuel, and equipment oils and lubricants during construction

During earthmoving activities, ADL potentially present in the surface and near-surface soils within approximately 30 feet of the roadway edge due to past emissions from vehicles powered by leaded gasoline could be encountered. Lead can be hazardous to humans as exposure can adversely affect the nervous, circulatory, and reproductive systems and can severely damage the brain and kidneys, and is a probable human carcinogen. Vehicle tire and brake wear could also result in the accumulation of other heavy metals in soils near the bridge.

Asbestos has been identified in components of Caltrans bridges, such as expansion joints and guardrail shims. Additionally, lead may be present in paint applied to beams and other bridge surfaces. Asbestos is a recognized carcinogen, and lead is a probable carcinogen and toxin as noted above. Asbestos fibers and lead particles emitted to the air during demolition activities could present a source of exposure to construction workers.

During construction, NOA can also be encountered in areas underlain by serpentinite and other ultramafic rocks associated with rocks of the Franciscan Complex, a Jurassic-Cretaceous rock assemblage that forms the upland areas east of the project area. Quaternary alluvial deposits derived from erosion of these bedrock areas can also contain NOA. Although NOA has not been previously identified immediately adjacent to the project area, available geologic reports (Galloway 1977) indicate that serpentinite rock is present in the region (i.e., within the Franciscan Complex in and near the San Andreas Fault zone in Olema Valley). There is a potential for NOA to
occur within the project area in sedimentary and alluvial deposits originating from erosion of the above sources.

Yellow thermoplastic and yellow paint used for traffic striping and pavement marking contained lead chromate as recently as 2004. The residue and debris produced from these materials during bridge and roadway demolition could be a source of exposure to construction workers, as these materials could contain concentrations of lead or hexavalent chromium that exceed hazardous waste thresholds.

Potential hazardous materials impacts from Alternative 2a would occur over the construction period (i.e., 1 year). The existence or significance of any hazards associated with potential ADL, NOA, asbestos, and lead in bridge structures, and lead and hexavalent chromium in yellow thermoplastic and yellow paint are unknown and would be assessed further through sampling. Sampling for ADL in soil and creek sediments, excavation and disposal of ADL-impacted soils or sediments, and additional measures to protect construction workers and other nearby receptors will be conducted. Existing bridge structures that would be removed by the project will be tested for lead-based paint by a qualified and licensed inspector prior to demolition, and removal of loose and peeling lead-based paint will be addressed in a lead compliance plan to reduce associated hazards. Yellow thermoplastic and yellow painted traffic stripe and pavement marking will be managed as an assumed hazardous waste, and removal, handling, testing, and disposal will be conducted in accordance with local, state, and federal regulations to reduce associated hazards. If warranted, appropriate avoidance, minimization, and/or mitigation measures will be implemented (see the Avoidance, Minimization, and/or Mitigation Measures section below) to minimize potential adverse effects from the exposure of the environment or humans.

Asphalt-concrete grindings and Portland cement concrete grindings have a relatively high pH and may contain heavy metals and petroleum hydrocarbons that can impact stormwater runoff and threaten surface water quality if not managed properly. Earthmoving activities during construction would expose workers and the environment to adverse effects from exposure to the hazardous materials in the ground. However, during construction, the contractor will implement a health and safety plan and the stormwater pollution prevention measures discussed in Section 2.2.2, Water Quality and Stormwater Runoff.
Earthmoving activities in the creek would disturb unknown contaminants in the soil from surrounding land uses. Residues from organochlorine pesticides and arsenic from inorganic pesticides used in the past have the potential to accumulate and persist in sediments of water bodies draining agricultural watersheds. Land uses in the Lagunitas Creek watershed include grazing by dairy and beef cattle and horses, limited farming for feed crops and vegetables, and golf courses, which may have contributed pesticides into the creek sediments. Limited sampling data from Lagunitas Creek sediments at a location less than 0.5 mile west of Lagunitas Creek Bridge indicated that organochlorine pesticide concentrations were below detection limits and sediment quality guidelines, and that metals were also below sediment quality guidelines, with the exception of chromium and nickel, which slightly exceeded the probable effect concentrations (RWQCB 2007).

Alternative 2a would require the construction of two new piers in the creek bed, resulting in greater disturbance of contaminants above levels of concern in the creek sediments (e.g., chlorinated pesticides or metals) than the full-span alternatives (4a and 4b), which do not include piers in their design. Lagunitas Creek is on the U.S. Environmental Protection Agency approved 2012 303(d) list of contaminated waters for nutrients, pathogens, and sedimentation (SWRCB 2012). The extent of any sediment contamination is unknown and would be investigated with sampling.

The potential for accidental spill of hazardous waste or materials would be minimized by the preparation and implementation of a Spill Prevention, Control, and Countermeasure Program. However, in the event of a spill of hazardous waste or materials during construction, notification, and cleanup operations would be undertaken in full compliance with the county emergency response plan to limit hazards to humans and the environment. Hazardous spills will be cleaned up and reported in conformance with the applicable material safety data sheet and the instructions posted at the project site. The National Response Center, at (800) 424-8802, will be notified of spills of federal reportable quantities in conformance with the requirements in 40 CFR 110, 117, and 302.

One school, Papermill Creek Children’s Corner preschool, is within 0.25 mile of the project area, approximately 1,100 feet northwest (EDR 2016a). Due to the limited scale of the project, distance to the preschool, and minimization measures to be adopted for the protection of the environment, no impacts to sensitive receptors at this school are anticipated.
Alternative 2b: Three-span, Short Steel-truss Bridge, Conventional Construction (with Detour Bridge)

Operational Impacts
Operational impacts under Alternative 2b would be the same as those under Alternative 2a.

Construction Impacts
Construction impacts under Alternative 2b would also be similar to those under Alternative 2a. Potential hazardous materials impacts from Alternative 2b would be spread over a longer construction period (i.e., 3 years). This alternative would involve a slightly wider land-based footprint than Alternatives 2a, 3a, and 4a due to the construction of the temporary bridge and abutments next to the existing bridge. This larger footprint could expose a slightly larger area of potentially contaminated roadside soils to construction. This alternative would require the construction of four sets of piers in the creek bed, two for the temporary bridge and two permanent, resulting in the greatest disturbance of any contaminants in the creek sediments among all alternatives.

Alternative 3a: Three-span, Concrete Bridge, ABC, Longitudinal Move-in

Operational Impacts
Operational impacts under Alternative 3a would be similar to those under Alternative 2a.

Construction Impacts
Construction impacts under Alternative 3a would also be similar to those under Alternative 2a. Potential hazardous materials impacts from Alternative 3a would occur over the construction period (i.e., 1 year). This alternative would require the construction of two new piers in the creek bed, and would therefore result in greater disturbance of unknown contaminants in the creek sediments than Alternatives 4a and 4b, which do not include piers in their design.

Alternative 4a: Full-span, Steel-truss Bridge, ABC, Longitudinal Move-in

Operational Impacts
Operational impacts under Alternative 4a would be similar to those under Alternative 2a.

Construction Impacts
Construction impacts under Alternative 4a would also be similar to those under Alternative 2a. Similar to Alternative 2a, Alternative 4a would occur over the
construction period (i.e., 1 year). This alternative would not require the construction of new piers in the creek bed, minimizing the disturbance of any contaminants in the creek sediments.

**Alternative 4b: Full-span, Steel-truss Bridge, ABC, Transverse Slide-in**

**Operational Impacts**

Operational impacts under Alternative 4b would be similar to those under Alternative 2a.

**Construction Impacts**

Construction impacts under Alternative 4b would also be similar to those under Alternative 2a. Potential hazardous materials impacts from Alternative 4b would occur over the construction period (i.e., 1 year). This alternative would involve a wider land-based footprint than Alternatives 2a, 3a, and 4a due to the construction of the new steel-truss superstructure and temporary abutments and piles next to the existing bridge. This larger footprint could expose a larger area of potentially contaminated roadside soils to construction. Like Alternative 4a, this alternative would not require the construction of new piers in the creek bed, minimizing the disturbance of any contaminants in the creek sediments.

**2.2.5.4 AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES**

As discussed above, no specific hazardous materials release sites are likely to be affected by the project or affect project construction activities. Thus, no sources of contamination outside the project area need to be avoided, minimized, or mitigated.

Compliance with Caltrans 2015 Standard Specifications 13-2.03, Water Pollution Program, and 14-11, Hazardous Waste and Contamination, would minimize the potential for hazardous waste contamination to the environment during construction.

The following avoidance and minimization measures in response to other potential construction-related sources of hazardous materials in the project area have been incorporated into each Build Alternative to minimize the potential exposure of workers and the environment to hazardous substances:

- **AMM HAZ-1: Asbestos survey.** Existing bridge structures that would be removed by the project will be tested for asbestos by a qualified and licensed inspector prior to demolition. All asbestos-containing material, if found, will be removed by a certified contractor in accordance with local, state, and federal requirements.
• **AMM HAZ-2: Sample for NOA and contaminants in soil and creek sediments.** The sampling and analysis is recommended to evaluate the potential presence of hazardous substances in roadside soils and creek sediments during the design phase and construction. All soils subject to excavation will be tested.

• **AMM HAZ-3: Measures to protect against NOA and contaminants in creek sediments.** If NOA or contaminants in creek sediments are identified through sampling and analysis, additional measures will be needed to protect construction workers, other nearby receptors, or the environment.

• **AMM HAZ-4: Recycle asphalt-concrete.** Asphalt-concrete and Portland cement concrete grindings may be reused in accordance with San Francisco Bay Regional Water Quality Control Board Water guidelines for Caltrans’ projects. If the material cannot be reused, it will be transported offsite and disposed of at a Caltrans or contractor approved landfill facility.

• **AMM HAZ-5: Prepare and implement a Health and Safety Plan and Lead Compliance Plan.** A Health and Safety Plan and Lead Compliance Plan will be prepared to prevent exposure of construction workers to hazardous materials during the demolition of bridge and roadway structures and construction of the new bridge. The plan will include proper personal protective equipment work requirements, soil and air space monitoring requirements, documentation and reporting requirements, and action levels. Workers should be required to complete an OSHA training class to manage any hazardous substances encountered safely and exposures are minimized.

The costs for inspecting, sampling, testing, special handling, and managing and/or disposing of potentially hazardous materials are unknown at this stage of preliminary design and environmental review. Prior to demolition and construction, the following tasks will be conducted: (1) inspecting, sampling, and testing bridge structures, roadside soils, and creek sediments, (2) managing, removing, and disposing of any hazardous materials identified, and (3) installing sediment screens around piers. Costs could range from $40,000 to $70,000 for inspecting, sampling, testing, and associated work plans and reports, depending on the number of samples collected and laboratory analyses used. Costs could range from $75,000 to $500,000 for management, removal, and disposal of hazardous materials and installation of sediment screens, depending on the quantities and hazardous waste classifications of such materials. During demolition and construction, suspended sediments in the creek will be
monitored. The estimated costs for monitoring suspended sediments are $20,000 to $35,000.

The investigations of structural materials, soils, and sediments, including work plans and reports, will likely occur over 3 months, assuming document approvals are obtained in a timely fashion. Management, removal, and disposal of identified hazardous materials will require approximately 3 months, but could extend up to 6 months if significant abatement of lead was required.

The construction contractor(s) will comply with all federal, state, and local regulations regarding management of hazardous wastes and materials that are handled or generated during project construction.

2.2.6 Air Quality

This section describes the environmental and regulatory setting for air quality. It also describes impacts on air quality that would result from implementation of the proposed project. Impacts related to greenhouse gases and climate change are described in Chapter 3. The analysis of the air quality effects for the proposed project is based on the Construction Emissions Analysis Memorandum prepared by California Department of Transportation (Caltrans) District 4 staff (Caltrans 2016).

2.2.6.1 Regulatory Setting

The Federal Clean Air Act (FCAA), as amended, is the primary federal law that governs air quality while the California Clean Air Act is its companion state law. These laws, and related regulations by the United States Environmental Protection Agency (USEPA) and the California Air Resources Board (ARB), set standards for the concentration of pollutants in the air. At the federal level, these standards are called National Ambient Air Quality Standards (NAAQS). NAAQS and state Ambient Air Quality Standards have been established for six transportation-related criteria pollutants that have been linked to potential health concerns: carbon monoxide (CO), nitrogen dioxide (NO₂), ozone (O₃), particulate matter (PM), which is broken down for regulatory purposes into particles of 10 micrometers or smaller (PM₁₀) and particles of 2.5 micrometers and smaller (PM₂.₅), and sulfur dioxide (SO₂). In addition, national and state standards exist for lead (Pb), and state standards exist for visibility reducing particles, sulfates, hydrogen sulfide (H₂S), and vinyl chloride. The NAAQS and state standards are set at levels that protect public health with a margin of safety, and are subject to periodic review and revision. Both state and federal regulatory schemes also cover toxic air contaminants (air toxics); some
criteria pollutants are also air toxics or may include certain air toxics in their general definition.

Federal air quality standards and regulations provide the basic scheme for project-level air quality analysis under the National Environmental Policy Act (NEPA). In addition to this environmental analysis, a parallel “Conformity” requirement under the FCAA also applies.

**Conformity**
The conformity requirement is based on FCAA Section 176(c), which prohibits the U.S. Department of Transportation (USDOT) and other federal agencies from funding, authorizing, or approving plans, programs, or projects that do not conform to State Implementation Plan (SIP) for attaining the NAAQS. “Transportation Conformity” applies to highway and transit projects and takes place on two levels: the regional—or, planning and programming level—and the project level. The proposed project must conform at both levels to be approved.

Conformity requirements apply only in nonattainment and “maintenance” (former nonattainment) areas for the NAAQS, and only for the specific NAAQS that are or were violated. USEPA regulations at 40 Code of Federal Regulations (CFR) 93 govern the conformity process. Conformity requirements do not apply in unclassifiable/attainment areas for NAAQS and do not apply at all for state standards regardless of the status of the area.

Regional conformity is concerned with how well the regional transportation system supports plans for attaining the NAAQS for CO, NO₂, O₃, PM₁₀, and PM₂.₅, and in some areas (although not in California), SO₂. California has attainment or maintenance areas for all of these transportation-related “criteria pollutants” except SO₂, and also has a nonattainment area for Pb; however, Pb is not currently required by the FCAA to be covered in transportation conformity analysis. Regional conformity is based on emission analysis of Regional Transportation Plans (RTPs) and Federal Transportation Improvement Programs (FTIPs) that include all transportation projects planned for a region over a period of at least 20 years (for the RTP), and 4 years (for the FTIP). RTP and FTIP conformity uses travel demand and emission models to determine whether or not the implementation of those projects would conform to emission budgets or other tests at various analysis years showing that requirements of the FCAA and the SIP are met. If the conformity analysis is successful, the Metropolitan Planning Organization (MPO), Federal Highway
Administration (FHWA), and Federal Transit Administration (FTA) make the
determinations that the RTP and FTIP are in conformity with the SIP for achieving
the goals of the FCAA. Otherwise, the projects in the RTP and/or FTIP must be
modified until conformity is attained. If the design concept, scope, and “open-to-
traffic” schedule of a proposed transportation project are the same as described in the
RTP and the FTIP, then the proposed project meets regional conformity requirements
for purposes of project-level analysis.

Conformity analysis at the project level includes verification that the project is
included in the regional conformity analysis and a “hot-spot” analysis if an area is
“nonattainment” or “maintenance” for CO and/or particulate matter (PM\textsubscript{10} or PM\textsubscript{2.5}).
A region is “nonattainment” if one or more of the monitoring stations in the region
measures a violation of the relevant standard and the USEPA officially designates the
area nonattainment. Areas that were previously designated as nonattainment areas but
subsequently meet the standard may be officially redesignated to attainment by
USEPA, and are then called “maintenance” areas. “Hot-spot” analysis is essentially
the same, for technical purposes, as CO or PM analysis performed for NEPA
purposes. Conformity does include some specific procedural and documentation
standards for projects that require a “hot-spot” analysis. In general, projects must not
cause the “hot-spot” related standard to be violated, and must not cause any increase
in the number and severity of violations in nonattainment areas. If a known CO or
particulate matter violation is located in the project vicinity, the project must include
measures to reduce or eliminate the existing violation(s) as well.

2.2.6.2 AFFECTED ENVIRONMENT

Climate and Topography

The project lies within the Marin County Basins region of the San Francisco Bay
Area Air Basin (SFBAAB). 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 (the strait that
connects San Francisco Bay to the Pacific Ocean), and on the north by Sonoma
County. Most of Marin's population lives in the eastern part of the county, in small,
sheltered valleys. These valleys act like a series of miniature air basins. Although
there are a few mountains above 1,500 feet, most of the terrain is only 800 to 1,000
feet high, which usually is not high enough to block the marine layer. Because of the
wedge shape of the county, northeast Marin County is farther from the ocean than is
the southeastern section. This extra distance from the ocean allows the marine air to
be moderated by bayside conditions as it travels to northeastern Marin County. In
southern Marin County, the distance from the ocean is short and elevations are lower,
Chapter 2 Affected Environment, Environmental Consequences, and Avoidance, Minimization, and/or Mitigation Measures

resulting in higher incidence of maritime air in that area (Bay Area Air Quality Management District [BAAQMD] 2011).

Wind speeds are highest along the west coast of Marin, averaging about 8 to 10 miles per hour. The complex terrain in central Marin creates sufficient friction to slow the air flow. At Hamilton Air Force Base in Novato, the annual average wind speeds are approximately 5 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-50 degrees Fahrenheit (°F) in the winter and the low-60°F in the summer. The warmest months are September and October. The eastern side of Marin County has warmer weather than the western side because of its distance from the ocean and because the hills that separate eastern Marin from western Marin occasionally block the flow of the marine air. The temperatures of cities next to the bay are moderated by the cooling effect of the bay in the summer and the warming effect of the bay in the winter. For example, San Rafael experiences average maximum summer temperatures in the low-80°F and average minimum winter temperatures in the low-40°F. Inland towns such as Kentfield experience average maximum temperatures that are 2 degrees cooler in the winter and 2 degrees warmer in the summer (BAAQMD 2011).

Existing Air Quality

Existing air quality conditions in the project area can be characterized in terms of the NAAQS and California ambient air quality standards (CAAQS) that the federal and state governments have established, respectively, for several different pollutants. For
some pollutants, separate standards have been set for different measurement periods. As previously discussed, most standards have been set to protect public health. For some pollutants, standards have been based on other values (such as protection of crops, protection of materials, or avoidance of nuisance conditions). Table 2.2.6-1 shows the state and federal standards for a variety of pollutants.

There is one air quality monitoring station located within Marin County and it was used to characterize existing air quality conditions in the project area. Monitoring stations are used by the ARB and USEPA to determine whether the County and SFBAAB meet CAAQS and NAAQS and to determine the region’s attainment status related to these standards. Data from these monitoring stations must meet certain criteria in order to comply with and be used for these purposes. Monitoring data concentrations are typically expressed in terms of parts per million (ppm) or micrograms per cubic meter (µg/m³).

The nearest air quality monitoring station to the project area is in the city of San Rafael on 4th Street. This station is approximately 16.8 miles southeast of the project site and has monitored all criteria pollutants through 2015. Table 2.2.6-2 summarizes air quality monitoring data from the San Rafael monitoring station during the last 3 years for which complete data are available (2013–2015).
## Table 2.2.6-1 National and California Ambient Air Quality Standards Applicable in California

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Symbol</th>
<th>Average Time</th>
<th>Standard (ppm)</th>
<th>Standard (µg/m³)</th>
<th>Violation Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>California</td>
<td>National</td>
<td>California</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Ozone</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 hour</td>
<td>0.09</td>
<td>NA</td>
<td>180</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8 hours</td>
<td>0.070</td>
<td>0.070</td>
<td>137</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>If exceeded</td>
<td>If exceeded</td>
<td>If exceeded</td>
</tr>
<tr>
<td>Carbon monoxide</td>
<td>CO</td>
<td>8 hours</td>
<td>9.0</td>
<td>9</td>
<td>10,000</td>
</tr>
<tr>
<td>(Lake Tahoe only)</td>
<td></td>
<td>1 hour</td>
<td>20</td>
<td>35</td>
<td>23,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8 hours</td>
<td>6</td>
<td>NA</td>
<td>7,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>If exceeded</td>
<td>If exceeded</td>
<td>If exceeded</td>
</tr>
<tr>
<td>Nitrogen dioxide</td>
<td>NO₂</td>
<td>Annual arithmetic mean</td>
<td>0.030</td>
<td>0.053</td>
<td>57</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 hour</td>
<td>0.18</td>
<td>0.100</td>
<td>339</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>If exceeded</td>
<td>If exceeded</td>
<td>If exceeded</td>
</tr>
<tr>
<td>Sulfur dioxide</td>
<td>SO₂</td>
<td>Annual arithmetic mean</td>
<td>NA</td>
<td>0.030</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>24 hours</td>
<td>0.04</td>
<td>0.14</td>
<td>105</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 hour</td>
<td>0.25</td>
<td>75</td>
<td>655</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>If exceeded</td>
<td>If exceeded</td>
<td>If exceeded</td>
</tr>
<tr>
<td>Hydrogen sulfide</td>
<td>H₂S</td>
<td>1 hour</td>
<td>0.03</td>
<td>NA</td>
<td>42</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>If equaled or exceeded</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>Vinyl chloride</td>
<td>C₂H₃Cl</td>
<td>24 hours</td>
<td>0.01</td>
<td>NA</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>If equaled or exceeded</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>Inhalable Particulate Matter</td>
<td>PM₁₀</td>
<td>Annual arithmetic mean</td>
<td>NA</td>
<td>NA</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td></td>
<td>24 hours</td>
<td>NA</td>
<td>NA</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>If exceeded</td>
<td>If exceeded</td>
<td>If exceeded</td>
</tr>
<tr>
<td>PM₂.₅</td>
<td></td>
<td>Annual arithmetic mean</td>
<td>NA</td>
<td>NA</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td></td>
<td>24 hours</td>
<td>NA</td>
<td>NA</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>If 3-year average of 98th percentile at each population-oriented monitor within an area is exceeded</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# Table 2.2.6-1 National and California Ambient Air Quality Standards Applicable in California

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Symbol</th>
<th>Average Time</th>
<th>Standard (ppm)</th>
<th>Standard (µg/m³)</th>
<th>Violation Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>California</td>
<td>National</td>
<td>California</td>
<td>National</td>
</tr>
<tr>
<td>Sulfate particles</td>
<td>SO₄</td>
<td>24 hours</td>
<td>NA</td>
<td>NA</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>NA</td>
<td>NA</td>
<td>If equaled or exceeded</td>
</tr>
<tr>
<td>Lead particles</td>
<td>Pb</td>
<td>Calendar quarter</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>NA</td>
<td>1.5</td>
<td>If equaled or exceeded</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30-day average</td>
<td>NA</td>
<td>NA</td>
<td>1.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>NA</td>
<td>1.5</td>
<td>If equaled or exceeded</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rolling 3-month average</td>
<td>NA</td>
<td>NA</td>
<td>0.15</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>NA</td>
<td>0.15</td>
<td>If equaled or exceeded</td>
</tr>
</tbody>
</table>

**Notes:**
All standards are based on measurements at 25 degrees Celsius and 1 atmosphere pressure; national standards shown are the primary (health effects) standards.
NA = not applicable.
ppm = parts per million
Source: ARB 2016a.
### Table 2.2.6-2 Ambient Air Quality Monitoring Data Measured at the 4th Street (San Rafael) Monitoring Station

<table>
<thead>
<tr>
<th>Pollutant Standards</th>
<th>San Rafael</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2013</td>
</tr>
<tr>
<td><strong>1-Hour Ozone</strong></td>
<td></td>
</tr>
<tr>
<td>Maximum 1-hour concentration (ppm)</td>
<td>0.081</td>
</tr>
<tr>
<td>1-hour California designation value</td>
<td>0.07</td>
</tr>
<tr>
<td>1-hour expected peak day concentration</td>
<td>0.071</td>
</tr>
<tr>
<td><strong>Number of days standard exceeded</strong></td>
<td></td>
</tr>
<tr>
<td>CAAQS 1-hour (&gt;0.09 ppm)</td>
<td>0</td>
</tr>
<tr>
<td><strong>8-Hour Ozone</strong></td>
<td></td>
</tr>
<tr>
<td>National maximum 8-hour concentration (ppm)</td>
<td>0.069</td>
</tr>
<tr>
<td>National second-highest 8-hour concentration (ppm)</td>
<td>0.061</td>
</tr>
<tr>
<td>State maximum 8-hour concentration (ppm)</td>
<td>0.070</td>
</tr>
<tr>
<td>State second-highest 8-hour concentration (ppm)</td>
<td>0.061</td>
</tr>
<tr>
<td>8-hour national designation value</td>
<td>0.053</td>
</tr>
<tr>
<td>8-hour California designation value</td>
<td>0.059</td>
</tr>
<tr>
<td>8-hour expected peak day concentration</td>
<td>0.059</td>
</tr>
<tr>
<td><strong>Number of days standard exceeded</strong></td>
<td></td>
</tr>
<tr>
<td>NAAQS 8-hour (&gt;0.075 ppm)</td>
<td>0</td>
</tr>
<tr>
<td>CAAQS 8-hour (&gt;0.070 ppm)</td>
<td>0</td>
</tr>
<tr>
<td><strong>Carbon Monoxide (CO)</strong></td>
<td></td>
</tr>
<tr>
<td>National maximum 8-hour concentration (ppm)b</td>
<td>1.1</td>
</tr>
<tr>
<td>National second-highest 8-hour concentration (ppm)b</td>
<td>0.9</td>
</tr>
<tr>
<td><strong>Number of days standard exceeded</strong></td>
<td></td>
</tr>
<tr>
<td>NAAQS 8-hour (&gt;9 ppm)</td>
<td>0</td>
</tr>
<tr>
<td><strong>Particulate Matter (PM_{10})^c</strong></td>
<td></td>
</tr>
<tr>
<td>National maximum 24-hour concentration (µg/m³)b</td>
<td>51.5</td>
</tr>
<tr>
<td>National second-highest 24-hour concentration (µg/m³)b</td>
<td>32.8</td>
</tr>
<tr>
<td>State maximum 24-hour concentration (µg/m³)d</td>
<td>54.4</td>
</tr>
<tr>
<td>State second-highest 24-hour concentration (µg/m³)d</td>
<td>34.4</td>
</tr>
<tr>
<td>State annual average concentration (µg/m³)e</td>
<td>15.6</td>
</tr>
<tr>
<td>National annual average concentration (µg/m³)</td>
<td>15.1</td>
</tr>
<tr>
<td><strong>Number of days standard exceeded</strong></td>
<td></td>
</tr>
<tr>
<td>NAAQS 24-hour (&gt;150 µg/m³)f</td>
<td>0.0</td>
</tr>
<tr>
<td>CAAQS 24-hour (&gt;50 µg/m³)f</td>
<td>5.7</td>
</tr>
<tr>
<td><strong>Particulate Matter (PM_{2.5})</strong></td>
<td></td>
</tr>
<tr>
<td>National maximum 24-hour concentration (µg/m³)b</td>
<td>44.9</td>
</tr>
<tr>
<td>National second-highest 24-hour concentration (µg/m³)b</td>
<td>44.4</td>
</tr>
<tr>
<td>State maximum 24-hour concentration (µg/m³)c</td>
<td>44.9</td>
</tr>
<tr>
<td>State second-highest 24-hour concentration (µg/m³)c</td>
<td>44.4</td>
</tr>
</tbody>
</table>
Table 2.2.6-2  Ambient Air Quality Monitoring Data Measured at the 4th Street (San Rafael) Monitoring Station

<table>
<thead>
<tr>
<th>Pollutant Standards</th>
<th>San Rafael</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2013</td>
</tr>
<tr>
<td>National annual designation value (µg/m³)</td>
<td>24</td>
</tr>
<tr>
<td>National annual average concentration (µg/m³)</td>
<td>10.7</td>
</tr>
<tr>
<td>State annual designation value (µg/m³)</td>
<td>--</td>
</tr>
<tr>
<td>State annual average concentration (µg/m³)</td>
<td>--</td>
</tr>
<tr>
<td><strong>Number of days standard exceeded</strong>&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>NAAQS 24-hour (&gt;35 µg/m³)</td>
<td>2.0</td>
</tr>
</tbody>
</table>

Notes:

<sup>a</sup> An exceedance is not necessarily a violation.
<sup>b</sup> National statistics are based on standard conditions data. In addition, national statistics are based on samplers using federal reference or equivalent methods.
<sup>c</sup> Measurements usually are collected every 6 days.
<sup>d</sup> State statistics are based on local conditions data, except in the South Coast Air Basin, for which statistics are based on standard conditions data. In addition, state statistics are based on California approved samplers.
<sup>e</sup> State criteria for ensuring that data are sufficiently complete for calculating valid annual averages are more stringent than the national criteria.
<sup>f</sup> Mathematical estimate of how many days’ concentrations would have been measured as higher than the level of the standard had each day been monitored.

- = insufficient data available to determine the value.

µg/m³ = micrograms per cubic meter
CAAQS = California ambient air quality standards
NAAQS = national ambient air quality standards
ppm = parts per million
Sources: ARB 2016b; USEPA 2016a.

Table 2.2.6-2 indicates that the San Rafael monitoring station exceeded the state PM<sub>10</sub> standard in 2013 and the federal PM<sub>2.5</sub> standard in multiple instances for all reported years during the 3-year monitoring period. No violations of the state or federal CO, 1-hour ozone, or 8-hour ozone standards have occurred at this monitoring station during this 3-year monitoring period.

**Attainment Status**

The USEPA has classified all of Marin County as being a marginal nonattainment area for 8-hour ozone NAAQS and moderate nonattainment for PM<sub>2.5</sub>, as shown in Table 2.2.6-3. For CO NAAQS, the USEPA has classified the urbanized, eastern part of Marin County as a moderate maintenance area (<12.7 ppm) and the rest of the county as an attainment area. Because the project area is located in the non-urbanized, western part of Marin County, the project area is designated as an attainment area for CO NAAQS. For PM<sub>10</sub> NAAQS, the USEPA has designated Marin County as an
attainment area (USEPA 2016b). ARB has classified Marin County as a nonattainment area for 8-hour ozone, PM$_{10}$, and PM$_{2.5}$ CAAQS. For CO CAAQS, ARB has classified Marin County as an attainment area (ARB 2016c).

### Table 2.2.6-3  Attainment Status of Project Area in Marin County

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Attainment Status</th>
<th>State</th>
<th>Federal</th>
</tr>
</thead>
<tbody>
<tr>
<td>8-hour Ozone</td>
<td>Nonattainment</td>
<td>Marginal Nonattainment</td>
<td></td>
</tr>
<tr>
<td>Carbon Monoxide</td>
<td>Attainment</td>
<td>Attainment*</td>
<td></td>
</tr>
<tr>
<td>PM$_{10}$</td>
<td>Nonattainment</td>
<td>Attainment</td>
<td></td>
</tr>
<tr>
<td>PM$_{2.5}$</td>
<td>Nonattainment</td>
<td>Moderate Nonattainment</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
* The urbanized, eastern part of Marin County is a moderate maintenance area (≤ 12.7 parts per million), while the project area is located in the non-urbanized part of the County, which is an attainment area for carbon monoxide.

PM$_{2.5}$ = particulate matter 2.5 micrometers or smaller
PM$_{10}$ = particulate matter 10 micrometers or smaller

Sources: ARB 2016c; USEPA 2016b.

#### 2.2.6.3 ENVIRONMENTAL CONSEQUENCES

**Alternative 1: No-Build Alternative**

The No-Build Alternative would result in no impacts on air quality. Short-term construction emissions would not be generated and there would be no potential to generate construction emissions or expose sensitive receptors to substantial pollutant concentrations. There would likewise be minimal change in vehicle miles traveled (VMT) or traffic conditions, relative to existing conditions, and as a result, no change in operational criteria pollutant emissions. Because the existing bridge would not be demolished unless it collapses during an earthquake, there would be no potential for exposure to structural asbestos, lead-based paint, or nuisance odors. Impacts would be less than the Build Alternatives.

**Alternative 2a: Three-span, Short Steel-truss Bridge, ABC, Longitudinal Move-in**

**Operational Impacts**

**Regional and Project-level Conformity**

The proposed project is a bridge reconstruction project and is exempt from regional and project-level conformity determination per 40 CFR 93.126. The project is listed in the current 2015 Transportation Improvement Programs (TIP) under the grouped
listing of SHOOPP – Bridge Preservation Projects (VAR110044), and the current project description matches that in the 2015 TIP. Consequently, an analysis to document regional and project-level conformity is not required for the proposed project.

**Potential for Generation of Operation-related Emissions of Ozone Precursors, Carbon Monoxide, and Particulate Matter**

Alternative 2a would result in no change in VMT or traffic conditions, relative to the No-Build Alternative. Accordingly, it would not result in changes in operational criteria pollutant emissions. There would be no impact to emissions of O₃ precursors, CO, and particulate matter.

**Potential for Generation of Mobile Source Air Toxics Emissions**

Mobile source air toxics (MSAT) emissions were evaluated using the FHWA Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents (Interim Guidance) (FHWA 2012). The project is classified as a “Projects with No Meaningful Potential MSAT Effects, or Exempt Projects” from FHWA’s MSAT guidance because it is exempt from conformity in accordance with 40 CFR 93.126. The language below is based on Appendix A of FHWA’s Interim Guidance and describes the project’s MSAT effects.

This project has been determined to generate minimal air quality impacts for FCAA criteria pollutants and has not been linked with any special MSAT concerns. As such, this project would not result in changes in traffic volumes, vehicle mix, basic project location, or any other factor that would cause an increase in MSAT impacts of the project from that of the No-Build Alternative.

Moreover, USEPA regulations for vehicle engines and fuels will cause overall MSAT emissions to decline substantially over the next several decades. Based on regulations now in effect, an analysis of national trends with USEPA's MOVES (Motor Vehicle Emission Simulator) model forecasts a combined reduction of over 80 percent in the total annual emission rate for the priority MSAT from 2010 to 2050 while VMT is projected to increase by over 100 percent. This will both reduce the background level of MSAT as well as the possibility of even minor MSAT emissions from this project.

**Construction Impacts**

**Construction Conformity**

Construction activities will not last for more than 5 years at one general location, so construction-related emissions do not need to be included in regional and project-
level conformity analysis (40 CFR 93.123(c)(5)). Consequently, an analysis to
document construction conformity is not required for the proposed project.

**Potential for Temporary Increase in O₃ Precursors (ROG and NOₓ), CO, and PM₁₀
Emissions during Grading and Construction Activities**

The amount of CO, PM₁₀, PM₂.₅, reactive organic gas (ROG), nitrogen oxide (NOₓ),
and sulfur oxide (SOₓ) emissions related to the construction of this project under each
Build Alternative was estimated using the most current Sacramento Metropolitan Air
Quality Management District’s Road Construction Emissions Model (RCEM),
Version 8.1.0. Construction-related greenhouse gases including carbon dioxide (CO₂),
methane (CH₄), and nitrous oxide (N₂O) were also calculated using the RCEM.

The RCEM is a spreadsheet tool designed to estimate emissions through all phases of
a roadway construction project based on the project size, duration of construction
activities, and level of daily construction activities that involve off-road construction
vehicles, load hauling (on-road heavy-duty vehicle trips), worker commute trips, and
site-generated fugitive dust (PM₁₀ and PM₂.₅). To control the generation of
construction-related PM₁₀ emissions, construction procedures are required to follow
Caltrans Standard Specifications (Caltrans 2015). Section 2.2.6.4 describes the
relevant AMM and Caltrans Standard Specifications.

Construction activities for the project would occur over a maximum of 12 months for
Alternative 2a, and emissions would vary daily depending on the activities. The
project would involve some short periods of managed one-way directional flow over
the bridge and temporary closure of SR 1, and vehicle emissions resulting from
additional travel by the detoured traffic are accounted for in the analysis. In addition,
a 24 hours per day/7 days per week work schedule during bridge closure would be
required for a period of 2 to 3 weeks under Alternative 2a. Construction emissions
produced during the extended hours are captured by raising the number of working
days per month in the emissions modeling. Table 2.2.6-4 summarizes construction
schedule and traffic redirection/detour information for all alternatives.
Table 2.2.6-4  Comparison of Construction Schedule and Traffic Detour/Redirect by Alternative

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Construction Duration (months)</th>
<th>24 Hours per Day/7 Days per Week Construction</th>
<th>Traffic Detour/Redirecta</th>
</tr>
</thead>
<tbody>
<tr>
<td>2a</td>
<td>12</td>
<td>Yes</td>
<td>Detour</td>
</tr>
<tr>
<td>2b</td>
<td>36</td>
<td>No</td>
<td>Redirect</td>
</tr>
<tr>
<td>3a</td>
<td>12</td>
<td>Yes</td>
<td>Detour</td>
</tr>
<tr>
<td>4a</td>
<td>12</td>
<td>Yes</td>
<td>Detour/Redirect</td>
</tr>
<tr>
<td>4b</td>
<td>12</td>
<td>Yes</td>
<td>Detour/Redirect</td>
</tr>
</tbody>
</table>

Notes:

a Detour = 9 mile route involving south-to-north direction beginning by turning east on Sir Francis Drake Boulevard from State Route 1 in Olema, turning north on Platform Bridge Road, turning left to continue northward and westward on Point Reyes-Petaluma Road, and then turning north or south (depending upon the destination) back onto State Route 1.

Redirect = Directing traffic to a temporary bridge just east of the existing bridge.

Table 2.2.6-5 summarizes total (tons) criteria pollutant emissions associated with project construction, Table 2.2.6-6 summarizes maximum daily criteria (pounds per day) pollutant emissions associated with project construction, and Table 2.2.6-7 summarizes average daily criteria (pounds per day) pollutant emissions associated with project construction.

Table 2.2.6-5  Estimated Total Criteria Pollutant Emissions from Construction of All Build Alternatives (tons)

<table>
<thead>
<tr>
<th>Alternative</th>
<th>ROG</th>
<th>CO</th>
<th>NOx</th>
<th>PM_{10} Exhaust</th>
<th>PM_{10} Fugitive</th>
<th>PM_{10} Total</th>
<th>PM_{2.5} Exhaust</th>
<th>PM_{2.5} Fugitive</th>
<th>PM_{2.5} Total</th>
<th>SOx</th>
</tr>
</thead>
<tbody>
<tr>
<td>2a</td>
<td>1.98</td>
<td>16.96</td>
<td>16.49</td>
<td>0.63</td>
<td>0.28</td>
<td>0.58</td>
<td>0.52</td>
<td>0.06</td>
<td>0.58</td>
<td>0.04</td>
</tr>
<tr>
<td>2b</td>
<td>4.19</td>
<td>34.08</td>
<td>35.45</td>
<td>1.20</td>
<td>0.41</td>
<td>1.13</td>
<td>1.04</td>
<td>0.09</td>
<td>1.13</td>
<td>0.07</td>
</tr>
<tr>
<td>3a</td>
<td>1.98</td>
<td>16.96</td>
<td>16.49</td>
<td>0.63</td>
<td>0.28</td>
<td>0.58</td>
<td>0.52</td>
<td>0.06</td>
<td>0.58</td>
<td>0.04</td>
</tr>
<tr>
<td>4a</td>
<td>1.98</td>
<td>16.96</td>
<td>16.49</td>
<td>0.63</td>
<td>0.28</td>
<td>0.58</td>
<td>0.52</td>
<td>0.06</td>
<td>0.58</td>
<td>0.04</td>
</tr>
<tr>
<td>4b</td>
<td>1.90</td>
<td>16.07</td>
<td>15.83</td>
<td>0.60</td>
<td>0.27</td>
<td>0.55</td>
<td>0.50</td>
<td>0.06</td>
<td>0.55</td>
<td>0.04</td>
</tr>
</tbody>
</table>

Notes:

CO = carbon monoxide; NOx = nitrogen oxide; PM_{2.5} = particulate matter 2.5 micrometers or smaller; PM_{10} = particulate matter 10 micrometers or smaller; ROG = reactive organic gases; SOx = sulfur oxide

Source: Caltrans 2016.
### Table 2.2.6-6  Estimated Maximum Daily Criteria Pollutant Emissions from Construction of All Build Alternatives (pounds per day)

<table>
<thead>
<tr>
<th>Alternative</th>
<th>ROG (pounds per day)</th>
<th>CO (pounds per day)</th>
<th>NOx (pounds per day)</th>
<th>PM$_{10}$</th>
<th>PM$_{2.5}$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Exhaust</td>
<td>Fugitive</td>
<td>Total</td>
<td>Exhaust</td>
<td>Fugitive</td>
</tr>
<tr>
<td>2a</td>
<td>53.19</td>
<td>445.43</td>
<td>446.78</td>
<td>16.76</td>
<td>16.20</td>
</tr>
<tr>
<td>2b</td>
<td>13.45</td>
<td>106.88</td>
<td>114.27</td>
<td>3.84</td>
<td>5.70</td>
</tr>
<tr>
<td>3a</td>
<td>53.19</td>
<td>445.43</td>
<td>446.78</td>
<td>16.76</td>
<td>16.20</td>
</tr>
<tr>
<td>4a</td>
<td>53.19</td>
<td>445.43</td>
<td>446.78</td>
<td>16.20</td>
<td>16.20</td>
</tr>
<tr>
<td>4b</td>
<td>52.93</td>
<td>437.45</td>
<td>445.39</td>
<td>16.46</td>
<td>17.70</td>
</tr>
<tr>
<td>BAAQMD</td>
<td>54</td>
<td>NA</td>
<td>54</td>
<td>82</td>
<td>BMPs$^a$</td>
</tr>
</tbody>
</table>

### Notes:
- BAAQMD considers BMPs sufficient to reduce fugitive PM$_{10}$ and PM$_{2.5}$.

BAAQMD = Bay Area Air Quality Management District; BMP = best management practice; CO = carbon monoxide; NA = not applicable; NOx = nitrogen oxide; PM$_{2.5}$ = particulate matter 2.5 micrometers or smaller; PM$_{10}$ = particulate matter 10 micrometers or smaller; ROG = reactive organic gases; SOx = sulfur oxide

Source: Yang 2016

### Table 2.2.6-7  Estimated Average Daily Criteria Pollutant Emissions from Construction of All Build Alternatives (pounds per day)

<table>
<thead>
<tr>
<th>Alternative</th>
<th>ROG (pounds per day)</th>
<th>CO (pounds per day)</th>
<th>NOx (pounds per day)</th>
<th>PM$_{10}$</th>
<th>PM$_{2.5}$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Exhaust</td>
<td>Fugitive</td>
<td>Total</td>
<td>Exhaust</td>
<td>Fugitive</td>
</tr>
<tr>
<td>2a</td>
<td>14.99</td>
<td>128.46</td>
<td>124.92</td>
<td>4.77</td>
<td>2.11</td>
</tr>
<tr>
<td>2b</td>
<td>10.59</td>
<td>86.06</td>
<td>99.52</td>
<td>3.04</td>
<td>1.05</td>
</tr>
<tr>
<td>3a</td>
<td>14.99</td>
<td>128.46</td>
<td>124.92</td>
<td>4.77</td>
<td>2.11</td>
</tr>
<tr>
<td>4a</td>
<td>14.99</td>
<td>128.46</td>
<td>124.92</td>
<td>4.77</td>
<td>2.11</td>
</tr>
<tr>
<td>4b</td>
<td>14.36</td>
<td>121.76</td>
<td>119.93</td>
<td>4.52</td>
<td>2.07</td>
</tr>
<tr>
<td>BAAQMD</td>
<td>54</td>
<td>NA</td>
<td>54</td>
<td>82</td>
<td>BMPs$^a$</td>
</tr>
</tbody>
</table>

### Notes:
- BAAQMD considers BMPs sufficient to reduce fugitive PM$_{10}$ and PM$_{2.5}$.

BAAQMD = Bay Area Air Quality Management District; BMP = best management practice; CO = carbon monoxide; NA = not applicable; NOx = nitrogen oxide; PM$_{2.5}$ = particulate matter 2.5 micrometers or smaller; PM$_{10}$ = particulate matter 10 micrometers or smaller; ROG = reactive organic gases; SOx = sulfur oxide

Source: Yang 2016
Table 2.2.6-5 indicates that total emissions associated with Alternative 2a would be less than with Alternative 2b, more than with Alternative 4b, and equal to Alternatives 3a and 4a. Alternative 2a would result in less total emissions than Alternative 2b because Alternative 2a would have a shorter construction duration. Alternative 2a would result in more total emissions than Alternative 4b because the duration of the traffic detour associated with Alternative 2a would result in more emissions than the traffic detour/redirection associated with Alternative 4b. Alternatives 2a, 3a, and 4a would have equal emissions because they would all have a similar construction schedule and traffic detour.

Table 2.2.6-6 and Table 2.2.6-7 indicate that maximum daily and average daily emissions associated with Alternative 2a, respectively, would be similar to those under Alternatives 3a and 4a, and these three alternatives would have the greatest amount of emissions of all alternatives. This is because the duration of the traffic detour associated with Alternatives 2a, 3a, and 4a would result in more emissions than the traffic detour/redirection associated with Alternative 4b, while the 3-year construction period associated with Alternative 2b would spread out total construction activity over a much longer time period than all other Build Alternatives.

Because Caltrans has statewide jurisdiction, and the setting for projects varies so extensively across the state, Caltrans has not developed, and has no intention of developing, thresholds of significance for CEQA. Furthermore, because most air district thresholds have not been established by regulation or by delegation down from a federal or state agency with regulatory authority over Caltrans, Caltrans is not required to adopt those thresholds in its documents. Nevertheless, BAAQMD thresholds of significance\(^8\) are provided in Tables 2.2.6-6 and 2.2.6-7 for reference. In addition, construction activities, equipment, and vehicles would comply with federal, state, and local regulations (e.g., ARB’s On-Road Heavy-Duty Diesel Vehicles (In-Use) Regulation—Truck and Bus Regulation), which would further minimize and reduce construction-related emissions.

**Potential for Disturbance of Soil Containing Naturally Occurring Asbestos/Structural Asbestos Exposure**

According to the California Department of Conservation’s (DOC’s) *A General Location Guide for Ultramafic Rocks in California*, there are no geologic features

\(^8\) BAAQMD’s CEQA thresholds have been subject to legal challenge. Although BAAQMD does not recommend its significance thresholds for use by local agencies, BAAQMD’s proposed thresholds are supported by substantial evidence and are well-grounded in air quality regulations, scientific evidence, and scientific reasoning concerning air quality and greenhouse gas emissions.
normally associated with NOA (i.e., serpentine rock or ultramafic rock near fault zones) in or near the project area (DOC 2000). Small pockets of NOA can be found south, east, and north of the project area in Marin County. Accordingly, there is no potential for impacts related to NOA emissions during construction activities. However, construction activities that involve the demolition of any structure containing asbestos would be subject to USEPA’s National Emissions Standards for Hazardous Air Pollutants (NESHAP) and ARB’s Airborne Toxic Control Measures (ATCMs), and the project would be required to comply with the federal NESHAP and state ATCM asbestos requirements. Further, BAAQMD Regulation 11, Rule 2 addresses the control of asbestos emissions from demolition activities, and Caltrans is required to comply with Regulation 11, Rule 2.

**Alternative 2b: Three-span, Short Steel-truss Bridge, Conventional Construction (with Detour Bridge)**

**Operational Impacts**
All direct and indirect operational impacts for Alternative 2b would be the same as those under Alternative 2a.

**Potential for Generation of Mobile Source Air Toxics Emissions**
Impacts related to MSAT for Alternative 2b would be the same as those under Alternative 2a.

**Construction Impacts**

**Construction Conformity**
Construction conformity for Alternative 2b would be the same as for Alternative 2a.

**Potential for Temporary Increase in O₃ Precursors (ROG and NOₓ), CO, and PM₁₀ Emissions during Grading and Construction Activities**
Alternative 2b would require the construction of a temporary two-lane bridge east of the existing bridge. As a result, the construction period would be 24 months longer, and the project footprint would be 0.11 acre larger with Alternative 2b than with Alternative 2a. The analysis of total emissions presented in Table 2.2.6-5 indicates that criteria pollutant emissions associated with Alternative 2b would be higher than with Alternatives 2a, 3a, 4a, and 4b due to more total construction activity. However, as indicated in Table 2.2.6-6 and Table 2.2.6-7, this increase of total construction activity would be spread out over a much longer time period than all other Build Alternatives and result in maximum daily and average daily criteria pollutant emissions lower than under other Build Alternatives.
Potential for Disturbance of Soil Containing Naturally Occurring Asbestos/Structural Asbestos Exposure
NOA impacts for Alternative 2b would be the same as those under Alternative 2a.

Alternative 3a: Three-span, Concrete Bridge, ABC, Longitudinal Move-in and Alternative 4a: Full-span, Steel-truss Bridge, ABC, Longitudinal Move-in
Operational Impacts
All direct and indirect operational impacts for Alternatives 3a and 4a would be the same as those under Alternative 2a.

Potential for Generation of Mobile Source Air Toxics Emissions
Impacts related to MSAT for Alternatives 3a and 4a would be the same as those under Alternative 2a.

Construction Impacts
Construction Conformity
Construction conformity for Alternatives 3a and 4a would be the same as for Alternative 2a.

Potential for Temporary Increase in O₃ Precursors (ROG and NOₓ), CO, and PM₁₀ Emissions during Grading and Construction Activities
Because the construction method for Alternatives 3a and 4a would be the same as for Alternative 2a, the estimated criteria pollutant emissions for Alternatives 3a and 4a are the same as for Alternative 2a.

All construction impacts for Alternatives 3a and 4a would be the same as those under Alternative 2a.

Potential for Disturbance of Soil Containing Naturally Occurring Asbestos/Structural Asbestos Exposure
NOA impacts for Alternatives 3a and 4a would be the same as for Alternative 2a.

Alternative 4b: Full-span, Steel-truss Bridge, ABC, Transverse Slide-in
Operational Impacts
All direct and indirect operational impacts for Alternative 4b would be the same as those under Alternative 2a.

Potential for Generation of Mobile Source Air Toxics Emissions
Impacts related to MSAT for Alternative 4b would be the same as for Alternative 2a.
Construction Impacts

Construction Conformity

Construction conformity for Alternative 4b would be the same as for Alternative 2a.

Potential for Temporary Increase in O₃ Precursors (ROG and NOₓ), CO, and PM₁₀ Emissions during Grading and Construction Activities

The construction method for Alternative 4b would be the same as for Alternative 2a, except that the new bridge would be built east of the existing bridge prior to horizontally sliding the bridge into its new location. As a result, the construction area over Lagunitas Creek would be 0.31 acre larger than under Alternative 2a. The new bridge, in its temporary location, can be used as a traffic detour while the existing bridge is being dismantled and would reduce the duration of the bridge closure. The difference in construction method results in a larger staging area than with Alternative 2a, but also a shorter duration of redirected traffic during the bridge closure.

As shown in Table 2.2.6-5, total emissions associated with Alternative 4b would be less than with all other Build Alternatives, attributable primarily to the traffic detour/redirect associated with construction activities.

Table 2.2.6-6 and Table 2.2.6-7 indicate that maximum daily and average daily emissions associated with Alternative 4b would be greater than with Alternative 2b, but less than with other Build Alternatives. This is primarily because of the differences in overall construction period and traffic detour/redirect, respectively.

Consequently, all construction impacts for Alternative 4b would be less than Alternative 2a.

Potential for Disturbance of Soil Containing Naturally Occurring Asbestos/Structural Asbestos Exposure

NOA impacts for Alternative 4b would be the same as for Alternative 2a.

2.2.6.4 AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

Compliance with Caltrans Standard Specifications and AMM AQ-1 (see below) would reduce the effects of emissions during construction. Compliance with Caltrans Standard Specifications Section 14, “Environmental Stewardship,” which addresses the contractor’s responsibility on many items of concern such as air pollution, would reduce emissions and dust. Section 14-9.02 includes specifications relating to controlling air pollution by complying with air pollution control rules, regulations and ordinances, and Section 14-11.04 is directed at controlling dust.
AMM AQ-1: Control measures for construction emissions of fugitive dust. Avoidance measures to control dust required by BAAQMD (2011) would be implemented to the extent practicable when the measures have not already been incorporated into the project and do not conflict with requirements of Caltrans’ Standard Specifications, Special Provisions, and the National Pollutant Discharge Elimination System stormwater permit. The additional measures could involve limiting vehicle speeds to 15 mph on unpaved roads, and grading and excavation would be suspended when average wind speeds exceeds 20 mph.

2.2.6.5 CLIMATE CHANGE
The Council on Environmental Quality (CEQ) released Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Reviews (August 1, 2016). This final guidance provides a framework for federal agencies to consider both the effects of a proposed action on climate change, as indicated by its estimated greenhouse gas emissions, and the effects of climate change on a proposed action. Climate change is discussed in Chapter 3 of this document. As the CEQ guidance aligns with the analysis required by the state of California under CEQA, the analysis in Chapter 3 will be used to inform the NEPA decision for the project.

2.2.7 Noise
Noise from the construction and operation of transportation projects can result in long- and short-term (temporary) effects to nearby noise-sensitive land uses. Once it is determined whether nearby land uses would experience adverse effects, abatement measures that could reduce the level of effect may be decided upon. The analysis of the noise effects for the proposed project described below is based on the Noise Analysis Memorandum prepared by Caltrans District 4 staff (Caltrans 2016).

2.2.7.1 REGULATORY SETTING
NEPA and CEQA provide the broad basis for analyzing and abating highway traffic noise effects. The intent of these laws is to promote the general welfare and to foster a healthy environment. The requirements for noise analysis and consideration of noise abatement and/or mitigation, however, differ between NEPA and CEQA.

California Environmental Quality Act
CEQA requires a strictly baseline versus build analysis to assess whether a proposed project will have a noise impact. If a proposed project is determined to have a significant noise impact under CEQA, then CEQA dictates that mitigation measures must be incorporated into the project unless those measures are not feasible. The rest
of this section will focus on the NEPA 23 CFR 772 noise analysis; see Chapter 3 of this document for further information on noise analysis under CEQA.

**National Environmental Policy Act and 23 CFR 772**

For highway transportation projects with FHWA (and Caltrans, as assigned) involvement, the Federal-Aid Highway Act of 1970 and the associated implementing regulations (23 CFR 772) govern the analysis and abatement of traffic noise impacts. 23 CFR 772 identifies various types of projects that require an operational traffic noise analysis. A noise analysis is required for all Type I projects. In general, a Type I project involves construction of a highway on a new location or the physical alteration of an existing highway where there is either a substantial horizontal or a substantial vertical alteration. A noise analysis is also required for Type II projects. A Type II project is a federal-aid highway project for noise abatement on an existing highway. A Type III project is a federal-aid highway project that does not meet the classifications of a Type I or Type II project. For a Type III project, a highway agency is not required to complete a noise analysis or consider abatement measures.

All Build Alternative are Type III projects because they will not result in a substantial vertical or horizontal realignment of the roadway and will not increase the capacity of the roadway. As such, an analysis of noise impacts is not required and a detailed discussion of the noise analysis requirements of 23 CFR 772 is not provided here. However, due to public and agency comments received during the scoping period regarding the community’s concern about construction noise, this environmental impact report/environmental assessment analyzes noise impacts. The regulations require that potential noise impacts in areas of frequent human use be identified during the planning and design of a highway project. The regulations include noise abatement criteria (NAC) that are used to determine when a noise impact would occur. The NAC differ depending on the type of land use under analysis. For example, the NAC for residences (67 A-weighted decibels [dBA]) is lower than the NAC for commercial areas (72 dBA). Table 2.2.7-1 lists the NAC for use in the NEPA 23 CFR 772 analysis.
Table 2.2.7-1  Noise Abatement Criteria

<table>
<thead>
<tr>
<th>Activity Category</th>
<th>NAC, Hourly A-Weighted Noise Level, dBA $L_{eq}(h)$</th>
<th>Description of Activity Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>57 (Exterior)</td>
<td>Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.</td>
</tr>
<tr>
<td>B$^1$</td>
<td>67 (Exterior)</td>
<td>Residential.</td>
</tr>
<tr>
<td>C$^1$</td>
<td>67 (Exterior)</td>
<td>Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings.</td>
</tr>
<tr>
<td>D</td>
<td>52 (Interior)</td>
<td>Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.</td>
</tr>
<tr>
<td>E</td>
<td>72 (Exterior)</td>
<td>Hotels, motels, offices, restaurants/bars, and other developed lands, properties, or activities not included in A–D or F.</td>
</tr>
<tr>
<td>F</td>
<td>No NAC—reporting only</td>
<td>Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical, etc.), and warehousing.</td>
</tr>
<tr>
<td>G</td>
<td>No NAC—reporting only</td>
<td>Undeveloped lands that are not permitted.</td>
</tr>
</tbody>
</table>

Notes:
1 Includes undeveloped lands permitted for this activity category.
$L_{eq}(h) = \text{hourly equivalent sound level}$

Figure 2.2.7-1 lists the noise levels of common activities to enable readers to compare the actual and predicted highway noise-levels discussed in this section with common activities.
According to Caltrans' *Traffic Noise Analysis Protocol for New Highway Construction, Reconstruction, and Retrofit Barrier Projects* (Caltrans 2011), a noise impact occurs when the predicted future noise level with the project substantially exceeds the existing noise level (defined as a 12 dBA or more increase) or when the future noise level with the project approaches or exceeds the NAC. Approaching the NAC is defined as coming within 1 dBA of the NAC.

If it is determined that the project will have noise impacts, then potential abatement measures must be considered. Noise abatement measures that are determined to be reasonable and feasible at the time of final design are incorporated into the project plans and specifications. This document discusses noise abatement measures that would likely be incorporated in the project.
Caltrans’ Traffic Noise Analysis Protocol sets forth the criteria for determining when an abatement measure is reasonable and feasible. Feasibility of noise abatement is basically an engineering concern. A minimum 7 dBA reduction in the future noise level must be achieved for an abatement measure to be considered feasible. Other considerations include topography, access requirements, other noise sources, and safety considerations. The reasonableness determination is basically a cost-benefit analysis. Factors used in determining whether a proposed noise abatement measure is reasonable include residents’ acceptance and the cost per benefited residence.

2.2.7.2 AFFECTED ENVIRONMENT

The Noise Analysis Memorandum for the Lagunitas Creek Bridge Project (Caltrans 2016) was prepared in July 2016. As discussed above, all Build Alternatives qualify as Type III projects and therefore do not require an operational traffic noise analysis under the requirements of 23 CFR 772. A discussion of construction noise is however provided per public and agency comments received during the scoping period.

The proposed project site is located south of the unincorporated town of Point Reyes Station and just north of the northernmost intersection of SR 1 and Sir Francis Drake Boulevard nearest the project location (see Figure 1-1). The area surrounding the proposed project includes Activity Categories B, C, and E land uses, as defined under 23 CFR 772 (see Table 2.2.7-1). These nearby land uses include residences and offices adjacent to the intersection of SR 1 and Sir Francis Drake Boulevard (south of the bridge); a baseball field southwest of the bridge across Sir Francis Drake Boulevard; and the Point Reyes Animal Hospital northeast of the bridge. There are also commercial and residential land uses further north of the project site, in the town of Point Reyes Station.

Existing Conditions

Three 24-hour noise measurements were conducted at locations near the project area on May 19 and 20, 2016. The measurement locations M1, M2, and M3 are shown on Figure 2.2.7-2. As it is impractical to take measurements at every potential noise receptor in the project area, the three measurement locations were selected to be representative of noise sensitive uses in the project area.
FIGURE 2.2.7-2
Noise Receptors and Measurement Locations
State Route 1 Lagunitas Creek Bridge Project
EA 0G842, MRN-1 Post Mile 28.4 – 28.6
ID: 04-13000350
Marin County, California
At Position M2, which is closest to the bridge, the maximum measured 1-hour equivalent sound level ($L_{eq}$) was 58 dBA (during the 2 p.m. hour). At Positions M1 and M3, the maximum measured 1-hour $L_{eq}$ values were 55 and 49 dBA, respectively. These measurements demonstrate that ambient noise levels in the project vicinity are relatively quiet, even with vehicle traffic traveling along SR 1 and Sir Francis Drake Boulevard.

### 2.2.7.3 ENVIRONMENTAL CONSEQUENCES

#### Alternative 1: No-Build Alternative

**Construction Impacts**

With the No-Build Alternative, short-term construction noise would not be generated. The No-Build Alternative would result in no construction noise- or vibration-related effects.

#### Alternative 2a: Three-span, Short Steel-truss Bridge, ABC, Longitudinal Move-in

**Construction Impacts**

As described in the Noise Analysis Memorandum (Caltrans 2016), noise generated by project-related construction activities would depend on the individual pieces of construction equipment being utilized, the type and amount of equipment operating at any given time, the timing and duration of construction activities, the proximity of nearby sensitive land uses, and the presence or absence of shielding at these sensitive land uses. Construction noise levels would vary on a day-to-day basis during each phase of construction, depending on the specific task being performed. Construction activity for Alternative 2a would occur over a period of 12 months.

Construction phases anticipated with the project under all alternatives, including Alternative 2a, would include clearing and grubbing, earthwork, demolition, excavation, pile driving, grading, concrete work, utility installation, structure work, and paving. Construction noise would primarily result from the operation of heavy construction equipment and arrival and departure of heavy-duty trucks. Note that construction of the project is anticipated to occur during both daytime and nighttime hours.

Construction noise would mostly be of concern either in areas where impulse-related noise levels from construction activities would be concentrated for extended periods of time, where noise levels from individual pieces of equipment are substantially higher than ambient conditions in noise-sensitive areas, or when construction
activities would occur during noise-sensitive early morning, evening, or nighttime hours.

The FHWA Roadway Construction Noise Model (RCNM) was used to calculate the noise levels anticipated during each phase of construction. This construction noise model takes into consideration representative sound levels for the most common types of construction equipment and the approximate usage factors of such equipment. The usage factors represent the percentage of time that the equipment would be operating at full power. Vehicles and equipment likely to be used during each phase of construction were input into the RCNM to estimate the maximum sound level (L_{max}) during an interval and average hourly L_{eq} at various distances. Hourly average noise levels resulting from multiple pieces of construction equipment would be additive, resulting in slightly higher calculated noise levels.

As sound travels away from its source, its intensity and frequency content change due to geometric spreading, ground absorption, and, if obstructions are present, reflection and diffraction. Geometric spreading (the effect of distance) causes noise levels to drop off at a rate of 6 dBA per doubling of distance from the noise source. The other three factors would result in varying degrees of additional attenuation, depending on site conditions.

Results from the RCNM for different construction activities under Alternative 2a are presented in Table 2.2.7-2. The results are shown for receptor locations identified in Figure 2.2.7-2. Note that the modeling results for Alternative 2a are also applicable to Alternatives 3a and 4a.

The model results indicated that demolition of the existing structure and vibratory pile driving associated with the installation of the new structure would generate the highest noise during construction of the proposed project; these construction activities would result in noise levels that are substantially higher than the existing ambient noise levels.
Table 2.2.7-2  
Construction Noise Levels for Alternatives 2a, 3a, and 4a

<table>
<thead>
<tr>
<th>Receptor</th>
<th>Address</th>
<th>Clearing &amp; Grubbing</th>
<th>Demolition</th>
<th>Earthwork</th>
<th>Paving</th>
<th>Structure (excludes pile driving)</th>
<th>Augering</th>
<th>Vibratory Pile Driving</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>L\text{max}</td>
<td>L\text{eq}</td>
<td>L\text{max}</td>
<td>L\text{eq}</td>
<td>L\text{max}</td>
<td>L\text{eq}</td>
<td>L\text{max}</td>
</tr>
<tr>
<td>R1</td>
<td>11150 Sir Francis Drake Blvd.</td>
<td>89</td>
<td>87</td>
<td>97</td>
<td>92</td>
<td>89</td>
<td>89</td>
<td>83</td>
</tr>
<tr>
<td>R2</td>
<td>10980 Shoreline Hwy.</td>
<td>84</td>
<td>83</td>
<td>87</td>
<td>85</td>
<td>81</td>
<td>81</td>
<td>83</td>
</tr>
<tr>
<td>R3</td>
<td>11030 Shoreline Hwy.</td>
<td>81</td>
<td>79</td>
<td>84</td>
<td>82</td>
<td>78</td>
<td>78</td>
<td>81</td>
</tr>
</tbody>
</table>

At 100 ft.  
Various  
78 77 84 82 78 78 77 75 78 78 78 73 89 82

At 500 ft.  
Various  
64 63 70 68 64 64 63 61 64 64 64 59 75 68

At 1000 ft.  
Various  
58 57 64 62 58 58 57 55 58 58 58 53 69 62

Notes:
1 See Figure 2.2.7-2 for the locations of Receptors R1, R2, and R3.
Results generated using the Federal Highway Administration’s Roadway Construction Noise Model. All construction noise values are the same for Alternatives 2a, 3a, and 4a.

\text{ft} = \text{feet}  
L\text{eq} = \text{equivalent sound level}  
L\text{max} = \text{maximum sound level}
The houses next to the intersection of SR 1 and Sir Francis Drake Boulevard, represented by R1 and R2, and Point Reyes Animal Hospital, represented by R3, would be exposed to the highest levels of construction noise because of their proximity to the project site. For example, R1 is located as close as 20 feet away from proposed project construction areas; at this receptor, noise levels could reach 103 dBA $L_{\text{max}}$ and 96 dBA $L_{\text{eq}}$ during vibratory pile-driving operations. Noise levels in other parts of the property would be lower because sound drops off at the rate of 6 dBA per doubling of distance. Construction noise levels during demolition would be in the range of 82 to 92 dBA $L_{\text{eq}}$ at receptors R1, R2, and R3 under this alternative.

Project construction under Alternative 2a would result in noise levels that are substantially higher than ambient noise levels (up to 96 dBA $L_{\text{eq}}$ during construction as compared to the existing maximum 58 dBA $L_{\text{eq}}$ ambient noise level. Further, construction may need to occur during both daytime and nighttime hours to meet the shortened construction schedule; nighttime construction activities can be more disturbing to nearby sensitive receptors than daytime construction activities. Because construction would result in temporary increases in ambient noise levels, the project would have adverse effects on nearby sensitive receptors under Alternative 2a.

Note that in addition to construction equipment operating during the construction of the proposed project, Alternative 2a would require closing SR 1 for up to 3 weeks. During the closure, traffic would be detoured along the route shown on Figure 1-4, which is (for northbound travelers on SR 1) by turning east off of SR 1 onto Sir Francis Drake Boulevard in Olema, turning north on Platform Bridge Road, turning left on Point Reyes Petaluma Road to proceed north and then west, and then turning north or south (depending on the destination) onto SR 1. Traffic volume during the detour is projected to reach 687 vph during the peak hours on weekdays and 1,300 vph on weekends. This represents an increase over the existing volumes on Sir Francis Drake Boulevard, on Platform Bridge Road, and on Point Reyes Petaluma Road. An estimated 15 residential receptors are within 500 feet of these roadways and would be affected by the noise increase caused by the detour. However, depending on the distances and intervening terrain, the resulting noise levels and the amount of increase would vary from receptor to receptor. In flat terrain with no obstructions, traffic noise would be 64 dBA $L_{\text{eq}}$ at 50 feet from the roadway and 61 dBA $L_{\text{eq}}$ at 100 feet during the weekend peaks, when the heaviest volumes would occur. Because these predicted traffic noise levels are below the Caltrans noise abatement criterion for residential uses (67 dBA) and because the detour would be in effect for 3 weeks or
less, no effects related to traffic noise are anticipated to occur during the detour period.

Noise associated with construction is controlled by Caltrans Standard Specifications Section 14-8.02, Noise Control, which states:

- Do not exceed 86 dBA at 50 feet from the job site activities from 9:00 p.m. to 6:00 a.m.

- Equip an internal combustion engine with the manufacturer-recommended muffler. Do not operate an internal combustion engine on the job site without the appropriate muffler.

Typically, work occurring within the Caltrans ROW is not subject to local noise ordinances; however, Caltrans would work with the contractor to meet local requirements where feasible.

Alternative 2b: Three-span, Short Steel-truss Bridge, Conventional Construction (with Detour Bridge)

Construction Impacts

Noise generated by project-related construction activities under Alternative 2b would be similar to noise generated under Alternative 2a. Note that construction activity for Alternative 2b would occur over a period of 36 months, as opposed to the 12-month construction period proposed under Alternative 2a. This elongated period may allow work hours to be restricted to daytime hours, thus reducing the effect on adjacent properties during evening hours.

Construction of the temporary bridge under Alternative 2b would occur in the same location where the new full-span bridge truss would be built under Alternative 4b, prior to being slid into its final position. Therefore, the RCNM results for different construction activities under Alternative 2b presented in Table 2.2.7-3 are also applicable to Alternative 4b.
Table 2.2.7-3  Construction Noise Levels for Alternative 2b and Alternative 4b

<table>
<thead>
<tr>
<th>Receptor(^1)</th>
<th>Address</th>
<th>Clearing &amp; Grubbing</th>
<th>Demolition</th>
<th>Earthwork</th>
<th>Paving</th>
<th>Structure (excludes pile driving)</th>
<th>Augering</th>
<th>Vibratory Pile Driving</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>(L_{\text{max}})</td>
<td>(L_{\text{eq}})</td>
<td>(L_{\text{max}})</td>
<td>(L_{\text{eq}})</td>
<td>(L_{\text{max}})</td>
<td>(L_{\text{eq}})</td>
<td>(L_{\text{max}})</td>
</tr>
<tr>
<td>R1</td>
<td>11150 Sir Francis Drake Blvd.</td>
<td>89</td>
<td>87</td>
<td>97</td>
<td>92</td>
<td>89</td>
<td>89</td>
<td>85</td>
</tr>
<tr>
<td>R2</td>
<td>10980 Shoreline Hwy.</td>
<td>89</td>
<td>87</td>
<td>87</td>
<td>85</td>
<td>89</td>
<td>89</td>
<td>85</td>
</tr>
<tr>
<td>R3</td>
<td>11030 Shoreline Hwy.</td>
<td>84</td>
<td>83</td>
<td>84</td>
<td>82</td>
<td>84</td>
<td>84</td>
<td>84</td>
</tr>
<tr>
<td>At 100 ft.</td>
<td>Various</td>
<td>78</td>
<td>77</td>
<td>84</td>
<td>82</td>
<td>78</td>
<td>78</td>
<td>77</td>
</tr>
<tr>
<td>At 500 ft.</td>
<td>Various</td>
<td>64</td>
<td>63</td>
<td>70</td>
<td>68</td>
<td>64</td>
<td>64</td>
<td>63</td>
</tr>
<tr>
<td>At 1000 ft.</td>
<td>Various</td>
<td>58</td>
<td>57</td>
<td>64</td>
<td>62</td>
<td>58</td>
<td>58</td>
<td>57</td>
</tr>
</tbody>
</table>

Notes:

\(^1\) See Figure 2.2.7-2 for the locations of Receptors R1, R2, and R3.

Results generated using the Federal Highway Administration's Roadway Construction Noise Model. All construction noise values are the same for Alternative 2b and Alternative 4b.
As described for Alternative 2a, construction noise levels could reach 103 dBA $L_{\text{max}}$ and 96 dBA $L_{\text{eq}}$ at nearby receptors (modeled at Receptor R1) during vibratory pile-driving operations. Construction noise levels during demolition would be in the range of 82 to 92 dBA $L_{\text{eq}}$ at Receptors R1, R2, and R3 under this alternative, as was the case with Alternative 2a. In general, construction noise levels at all receptors would be substantially higher than ambient noise levels.

Because the construction of the temporary bridge and roadway under Alternative 2b would occur at close range to Receptors R2 and R3, these receptors would be affected more by construction noise during this alternative than they would be under other alternatives.

Note that in addition to construction equipment operating during the construction of the proposed project, Alternative 2b would involve using a temporary bridge that would move traffic travelling on SR 1 closer to Receptors R2 and R3 during removal of the existing bridge and construction of the new bridge. The temporary bridge and roadway east of the existing alignment would shorten the distances to traffic from 75 feet to 50 feet for Receptor R2, and from 85 to 75 feet for Receptor R3. The potential noise increase due to the temporary rerouting of traffic would be low because the vehicle speed on the temporary bridge would be limited to 15 to 20 miles per hour; the noise effects of vehicles traveling at reduced speeds are generally low. Further, the increase would be temporary, and construction noise from the operation of heavy equipment would likely overshadow any minor increases in traffic noise related to this detour.

Typically, work occurring within the Caltrans ROW is not subject to local noise ordinances; however, Caltrans would work with the contractor to meet local requirements where feasible.

Project construction under Alternative 2b would result in noise levels that are substantially higher than ambient noise levels (up to 96 dBA $L_{\text{eq}}$ during construction as compared to the existing maximum 58 dBA $L_{\text{eq}}$ ambient noise level) and could result in noise that exceeds 86 dBA at 50 feet. Further, construction is proposed to occur during both daytime and nighttime hours; nighttime construction activities can be more disturbing to nearby sensitive receptors than daytime construction activities. Note that as construction activity for Alternative 2b would occur over 36 months, as opposed to 12 months for Alternative 2a, elevated noise levels from construction would occur for a longer period of time under this alternative. Construction would
result in temporary increases in ambient noise levels. Therefore, the project would have effects on nearby sensitive receptors under Alternative 2b.

**Alternative 3a: Three-span, Concrete Bridge, ABC, Longitudinal Move-in Construction Impacts**

Noise generated by project-related construction activities for Alternative 3a at the nearby receptors and receptors along the detour route would be the same as the noise effects discussed under Alternative 2a. The RCNM results for different construction activities under Alternative 3a are presented in Table 2.2.7-2.

**Alternative 4a: Full-span, Steel-truss Bridge, ABC, Longitudinal Move-in Construction Impacts**

Noise generated by project-related construction activities under Alternative 4a would be the same as noise generated under Alternative 2a. Construction noise levels at the nearby receptors (modeled at Receptors R1, R2, and R3) and receptors along the detour route would be the same as those under Alternative 2a. Construction activity for Alternative 4a would occur over a period of 12 months.

RCNM results for different construction activities under Alternative 4a are presented in Table 2.2.7-2, under the discussion for Alternative 2a construction noise effects.

Project construction under Alternative 4a would result in noise levels that are substantially higher than ambient noise levels (up to 96 dBA L_{eq} during construction as compared to the existing maximum 58 dBA L_{eq} ambient noise level). Construction would result in temporary increases in ambient noise levels. Further, construction is proposed to occur during both daytime and nighttime hours; nighttime construction activities can be more disturbing to nearby sensitive receptors than daytime construction activities. Therefore, the project would have adverse effects on nearby sensitive receptors under Alternative 4a.

**Alternative 4b: Full-span, Steel-truss Bridge, ABC, Transverse Slide-in Construction Impacts**

Noise generated by project-related construction activities under Alternative 4b would be similar to noise generated under Alternatives 2b. Construction activity for Alternative 4b would occur over a period of 12 months.

RCNM results for different construction activities under Alternative 4b are presented in Table 2.2.7-3.
As described for the alternatives discussed above, noise levels could reach 103 dBA $L_{\text{max}}$ and 96 dBA $L_{\text{eq}}$ at nearby receptors (modeled at Receptor R1) during vibratory pile driving operations. Construction noise levels during demolition would be in the range of 82 to 92 dBA $L_{\text{eq}}$ at Receptors R1, R2, and R3 under this alternative. In general, construction noise levels at all receptors would be substantially higher than ambient noise levels.

Similar to Alternative 2b, Alternative 4b would involve using a temporary bridge that would move traffic travelling on SR 1 closer to Receptors R2 and R3 during removal of the existing bridge and construction of the new bridge. Noise effects from relocating traffic closer to Receptors R2 and R3 would be the same as under Alternative 2b.

Project construction under Alternative 4b would result in noise levels that are substantially higher than ambient noise levels (up to 96 dBA $L_{\text{eq}}$ during construction as compared to the existing maximum 58 dBA $L_{\text{eq}}$ ambient noise level). Construction would result in temporary increases in ambient noise levels. Further, construction is proposed to occur during both daytime and nighttime hours; nighttime construction activities can be more disturbing to nearby sensitive receptors than daytime construction activities. Therefore, the project would have adverse effects on nearby sensitive receptors under Alternative 4b.

**2.2.7.4 AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES**

During construction, the Build Alternatives would result in temporary construction noise effects. Implementation of the following proposed avoidance and minimization and mitigation measure would reduce the effects.

- **AMM NOISE-1: Construction noise best management practices.** Although construction noise would be short-term and intermittent, implementation of best management practices would reduce temporary noise effects resulting from construction activities.

To reduce the potential for noise effects resulting from project construction activities, the following measures will be implemented during all phases of construction activities:

- Restrict overly loud construction activities to between 7:00 a.m. and 8:00 p.m. (except on holidays), where feasible.
- Equip all internal combustion engine-driven equipment with intake and exhaust mufflers that are in good condition and appropriate for the equipment. All equipment must be equipped with sound control devices that are no less effective than those provided on the original equipment. No equipment will have an unmuffled exhaust.

- Prohibit unnecessary idling (i.e., greater than 5 minutes in duration) of internal combustion engines within 50 feet of residences.

- Locate all stationary noise-generating construction equipment, such as air compressors, portable power generators, or self-powered lighting systems, as far as practical from noise-sensitive receptors.

- Utilize “quiet” air compressors and other “quiet” equipment where such technology exists.

- Require construction equipment to conform to Section 14-8.02, Noise Control, of the latest Caltrans Standard Specifications.

- **Mitigation Measure NOISE-A: Reduce construction noise from augering or vibratory pile driving with temporary barriers.** During construction, Caltrans or its contractor will implement a measure or measures such as the ones described below to reduce construction noise from augering or vibratory pile driving on the adjacent property owners.

Options to abate construction noise in the source-to-receiver noise path include using temporary enclosures around stationary equipment, temporary barriers, and noise curtains. Other strategies include effectively using temporary earth mounds as barriers, creating buffer zones between equipment and residences, or using existing structures as barriers. The effectiveness of the temporary barrier can vary depending on its material and placement. The barrier is usually most effective if positioned either close to the noise source or close to the receptor.
2.3 Biological Environment

The following analysis is based on the Natural Environment Study (NES) prepared for the State Route 1 (SR) 1 Lagunitas Creek Bridge Project (Caltrans 2017) and various other surveys completed for this project. These surveys include wetland delineations, habitat and community characterizations, fish passage assessment, bat habitat assessment, western pond turtle survey, tree survey, and rare plant surveys.

2.3.1 Natural Communities

This section of the document discusses natural communities of concern. The focus of this section is on biological communities, not individual plant or animal species. The biological study area (BSA) for this project comprised 47.86 acres and consists of the project footprint plus a 500-foot buffer extending from the edge of the project footprint (shown in Figure 2.3.1-1). The 500-foot buffer was chosen to account for potential impacts to protected plant and animal species from noise, vibration, dust, and other construction activities anticipated to occur. This section also includes information on wildlife corridors, including fish passage, and habitat fragmentation. Wildlife corridors are areas of habitat used by wildlife for seasonal or daily migration. Habitat fragmentation involves the potential for dividing sensitive habitat and thereby lessening its biological value.

Habitat areas designated as critical habitat under the federal Endangered Species Act are discussed in the Threatened and Endangered Species Section, 2.3.5. Wetlands and other waters are discussed in Section 2.3.2, Wetlands and Other Waters.

2.3.1.1 Affected Environment

The natural communities within the BSA connect adjacent habitats and support wildlife movement. Specific wildlife use of the communities is noted in the individual sections as applicable.

The California Coastal Act calls for the protection of environmentally sensitive habitat areas (ESHAs) in Section 30240(a) of the Coastal Act. ESHAs, as defined in the California Coastal Act, include but are not limited to wetlands and riparian vegetation communities. Section 30240(a) states, “Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values, and only uses dependent on those resources shall be allowed within those areas.” ESHAs within the project footprint include coastal wetlands and riparian vegetation.
FIGURE 2.3.1-1
Biological Study Area
State Route 1 Lagunitas Creek Bridge Project
EA 0G642, MRN-1 Post Mile 28.4 – 28.6
ID: 04-13000350
Marin County, California
The California Department of Fish and Wildlife (CDFW) inventories sensitive vegetation alliances (natural communities), for tracking purposes, in the California Natural Diversity Database (CNDDB). A vegetation alliance assigned with global ranking codes of G1 through G3 means that all of the vegetation associations within that alliance are considered high inventory priority by CDFW. Vegetation alliances identified by CNDDB as sensitive (CDFW 2010) are considered by CDFW to be significant resources; these alliances will be avoided to the maximum extent possible.

Habitat categories that the California Coastal Commission considers to be ESHAs include wetlands (discussed in Section 2.3.2, Wetlands and Other Waters) and riparian vegetation (discussed below). The undeveloped northwestern corner of the BSA supports natural communities of special concern. These communities include wetlands, riparian trees, and grassland, which are foraging habitats for migratory and species of special concern birds and dispersal habitat for California red-legged frog, and are managed by Marin County Parks and Open Space District and the National Park Service (NPS) Giacomini Wetlands.

**Physical Context**

The project area is situated along Lagunitas Creek, which feeds into the southern end of Tomales Bay, a narrow water body that opens to the Pacific Ocean to the north. The bay has partially filled the San Andreas fault zone, which is the geographically distinct boundary around the intersection of the North American and Pacific plates; at the project location, this fault zone is approximately 0.5 mile wide. The topography of the area consists of gentle slopes on either side of the valley and linear pressure ridges within the valley.

The project area is underlain by alluvium, associated with Lagunitas Creek, and marine terrace deposits placed during high sea level events. Lagunitas Creek is the primary hydrological feature within the project area, draining 107 square miles of west central Marin County from the slopes of Mount Tamalpais. From its headwaters, the creek flows northwest for 26 miles to Tomales Bay through mostly undeveloped, protected lands. There are 4 dams along 8 miles of Lagunitas Creek upstream of the project area. Lagunitas Creek is tidally influenced in the project area. According to the Federal Emergency Management Agency Flood Insurance Study, tidal conditions at Lagunitas Creek determine the water surface elevations. The water surface elevations for Lagunitas Creek in North American Vertical Datum of 1988 (NAVD 88) are 5.87 feet during 10-year tidal conditions, and 9.89 feet during 100-year tidal conditions. The existing bridge is not sufficient to convey the 100-year storm flow.
without being overtopped. Sea level rise was not found to have an impact of the water surface elevations at the bridge (WRECO 2016).

The National Oceanic and Atmospheric Administration Tide Station 9415050 “Point Reyes, CA” shows current tide levels with a mean sea level at 3.08 feet (NAVD 88), mean high water at 5.08 feet, and mean higher high water at 5.74 feet.

**Land Cover**

The area surrounding the project hosts diverse vegetation communities. It is predominantly undeveloped agricultural lands, used to graze cattle, and protected open space that is managed by the Golden Gate National Recreation Area (GGNRA), Point Reyes National Seashore, and Marin County Parks and Open Space District. Both GGNRA and Point Reyes are areas within the National Park Service (NPS).

The project location is bordered on the northwest by undeveloped land owned by the California Department of Fish and Wildlife (CDFW) and managed by Marin County Parks and Open Space District. This public park area consists of wetlands, riparian woodland, and grasslands, and supports public trails. A trailhead begins at SR 1 in the Caltrans right-of-way and extends west into White House Pool Park, and then into the Giacomini Wetlands Preserve owned by the Point Reyes National Seashore. The parcels bordering the bridge on the northeast, southeast, and southwest are all private property with residential and business uses. These parcels support riparian trees, waters within the border of Lagunitas Creek, and a mix of disturbed, paved, and landscaped areas.

The Multi-Resolution Land Characteristics Consortium National Land Cover Database (Homer et al. 2015) was used to assess the land cover types within the 47.86-acre BSA. The resulting land cover types, in order of most abundant to least abundant, are woody wetlands; developed, high intensity; developed, open space; grasslands/herbaceous and developed, low intensity (Table 2.3.1-1 and Figure 2.3.1-2).
Table 2.3.1-1  Land Cover Types in the BSA

<table>
<thead>
<tr>
<th>Marin County Land Cover Type</th>
<th>Acres</th>
<th>Percent of BSA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developed, High Intensity</td>
<td>8.60</td>
<td>18.0</td>
</tr>
<tr>
<td>Developed, Low Intensity</td>
<td>4.15</td>
<td>8.7</td>
</tr>
<tr>
<td>Developed, Medium Intensity</td>
<td>3.20</td>
<td>6.7</td>
</tr>
<tr>
<td>Developed, Open Space</td>
<td>6.32</td>
<td>13.2</td>
</tr>
<tr>
<td>Emergent Wetlands</td>
<td>2.37</td>
<td>5.0</td>
</tr>
<tr>
<td>Grassland/Herbaceous</td>
<td>5.89</td>
<td>12.3</td>
</tr>
<tr>
<td>Landscaped</td>
<td>0.76</td>
<td>1.6</td>
</tr>
<tr>
<td>Open Water</td>
<td>1.10</td>
<td>2.3</td>
</tr>
<tr>
<td>Deciduous Forest/Woodland</td>
<td>15.47</td>
<td>32.3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>47.86</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Source:
National Land Cover Database (Homer et al. 2015)

The mapped deciduous forest/woodland as identified in Table 2.3.1-1 and Figure 2.3.1-2 is a riparian forest and includes stands of willows, box elder, oaks, and other trees.

As observed by a Caltrans biologist during 2015 site visits, the land parcels surrounding the roadway support a variety of native and non-native vegetation, primarily landscape vegetation around homes and businesses. Ruderal grasses, non-native herbs, blackberry thickets, and wetlands within willow thickets flank the roadway in non-landscaped areas.

**Vegetation**

Vegetation types within the BSA were mapped based on rare plant and floristic surveys, which Caltrans conducted in 2013 through 2016, and aerial images, using the classifications of *the Manual of California Vegetation* (Sawyer et al. 2009). Vegetation types include red willow thickets (*Salix laevigata* Woodland Alliance), wet meadows community, and poison hemlock (*Conium maculatum*) patches-Himalayan blackberry (*Rubus armeniacus*) and California blackberry (*Rubus ursinus*) brambles, agriculture and urban areas occur in the BSA. The following sections describe only sensitive natural vegetation types within the BSA.
FIGURE 2.3.1-2
Land Cover Types in the Biological Study Area
State Route 1 Lagunitas Creek Bridge Project
EA 0G642, MRN-1 Post Mile 28.4 – 28.6
ID: 04-13000350
Marin County, California
Chapter 2 Affected Environment, Environmental Consequences, and Avoidance, Minimization, and/or Mitigation Measures

Red Willow Thickets (*Salix laevigata* Woodland Alliance)
A dense thicket of red willow lines the northern bank of Lagunitas Creek throughout the BSA. Red willow thickets are also present along the dispersed wetland areas along the southbound lane of SR 1, which is the western edge of the roadway. Box elder (*Acer negundo*), California buckeye (*Aesculus californica*), and coast live oak (*Quercus agrifolia*) were also observed in this alliance, with abundant arroyo willow (*Salix lasiolepis*) in the sub-canopy.

Caltrans mapped riparian trees within the project area on April 12, 2016. The BSA supports a total of 17.79 acres of riparian tree canopy cover, most of which are red willow thickets. The survey was constrained by a lack of access to the private property parcel that is adjacent to the southeastern corner of the bridge; however, this area was reviewed from adjacent properties with binoculars and from aerial photographs.

**Wet Meadow Community**
This vegetation community is located primarily within the mean high tide mark of Lagunitas Creek. These wet meadows were not categorized to the natural community alliance level; rather, they are categorized based on wetland type, as described further in Section 2.3.2, Wetlands and Other Waters. This wet meadow community is a mixture of perennial grasses and marsh species that occur in mesic areas. Dominant species observed in this community included rush (*Juncus* sp.), tall flat sedge (*Cyperus eragrostis*), and meadow barley (*Hordeum brachyantherum*). The wet meadow community covers less than 2 percent of the BSA.

**Wildlife Corridors, Migration Routes**
Lagunitas Creek supports a riparian corridor of willows and wetlands within the BSA. Riparian woodland corridors can offer important wildlife forage, refugia, denning, nesting sites, and thermal relief, and can provide connectivity between wildlife habitat areas through otherwise developed lands.

Lagunitas Creek provides a freshwater migration corridor for aquatic species, including Central California Coast (CCC) steelhead and coho salmon. Freshwater migration corridors, like Lagunitas Creek within the project area, are essential for conservation of sensitive species. Lagunitas Creek is presumed to also be used by mammals as a wildlife corridor.
**Environmentally Sensitive Habitat Areas**

The BSA was found to support 17.80 acres of riparian trees, a habitat identified as an ESHA by the California Coastal Commission. Environmentally Sensitive Habitat Areas within the BSA consist of riparian vegetation, wetlands, and other waters. The riparian habitat consists of red willow thickets, as described earlier. Section 2.3.2, Wetlands and Other Waters, describes the remaining ESHA. There is a total of 19.17 acres of California Coastal Commission ESHAs in the BSA (Figure 2.3.1-3). This finding is preliminary pending verification by California Coastal Commission.

### 2.3.1.2 ENVIRONMENTAL CONSEQUENCES

This section discusses the project’s potential direct, indirect, temporary, and permanent effects on natural communities within the BSA. Direct effects are caused by the project and occur at the same time and place as the action. Indirect effects are caused by the project but are later in time or farther removed in distance, but are still reasonably foreseeable. Temporary effects are those that are short in duration and can be restored to their pre-project condition or better. The potential permanent and temporary direct effects of the project on natural communities are summarized in Table 2.3.1-2; potential permanent and temporary direct effects of the project on Environmentally Sensitive Habitat Areas are summarized in Table 2.3.1-2.

#### Table 2.3.1-2 Potential Direct Effects to Natural Communities

<table>
<thead>
<tr>
<th>Type of Effect</th>
<th>Culvert Extension</th>
<th>Alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Riparian Tree Canopy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permanent (acre)</td>
<td>0.04</td>
<td>0</td>
</tr>
<tr>
<td>Temporary (acre)</td>
<td>0.08</td>
<td>0</td>
</tr>
<tr>
<td>Environmentally Sensitive Habitat Areas (ESHAs)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permanent (acre)</td>
<td>0.04</td>
<td>0</td>
</tr>
<tr>
<td>Temporary (acre)</td>
<td>0.08</td>
<td>0</td>
</tr>
</tbody>
</table>

**Alternative 1: No-Build Alternative**

The project conditions under the No-Build Alternative would remain similar to the existing conditions. No riparian vegetation or ESHAs would be disturbed, and wildlife corridors and migration routes would not be affected.
FIGURE 2.3.1-3
Potential Environmentally Sensitive Habitat Areas in the Biological Study Area
State Route 1 Lagunitas Creek Bridge Project
EA 0G642, MRN-1 Post Mile 28.4 – 28.6
ID: 04-13000350
Marin County, California
Alternative 2a: Three-span, Short Steel-truss bridge, ABC, Longitudinal Move-in

Operational Impacts
The operational phase refers to the new footprint of the proposed roadway, culverts, and bridge, as well as the use and maintenance of the proposed roadways and project facilities. This phase would result in permanent effects to biological resources.

Riparian Vegetation
The larger bridge footprint would result in permanent impacts to riparian habitat and trees. However, maintenance or operation of the new bridge would not have effects to riparian vegetation above or beyond those currently experienced with existing conditions, because this build alternative would not change how the bridge is used or maintained.

Riparian trees within the project area would be permanently impacted through removal, to allow for the new footprint of the bridge, the culvert, and road widening.

The culvert extension would result in permanent impacts to 0.04 acre of riparian tree canopy because of tree removal for the culvert extension and road widening (see Table 2.3.1-2).

Wildlife Corridors, Migration Routes
The permanent effects to Lagunitas Creek and the associated riparian corridor described previously would be minimized, per agency requirements. Therefore, Alternative 2a would not result in a permanent effect to the wildlife’s ability to use the corridor for dispersal.

Environmentally Sensitive Habitat Areas
The culvert extension would result in direct and permanent impacts to 0.05 acre of ESHAs under California Coastal Commission jurisdiction from riparian tree removal and removal of wetlands (less than 0.01 acre). Impacts to wetlands are described in Section 2.3.2 Wetlands and Waters of the U.S.

Under Alternative 2a, the bridge replacement would result in 0.05 acre of permanent, direct impacts to ESHAs. Permanent impacts would result from the construction of the bridge abutments and from the bridge support piers needed for Alternative 2a.
Construction Impacts
Construction refers to building the project. Construction impacts would occur over a limited amount of time, but may have temporary or permanent effects on biological resources.

Riparian Vegetation
Riparian trees within the project area would be impacted, through trimming or removal, to allow for access and staging during the construction of the bridge, the culvert, and road widening.

The culvert extension would result in temporary impacts to approximately 0.08 acre of riparian tree canopy because of tree trimming for the culvert extension and road widening (see Table 2.3.1-2).

Under Alternative 2a, the construction of the bridge abutments, road widening, and the associated construction access and staging areas would result in 0.42 acre of temporary impacts from canopy trimming and tree removal, where smaller trees can be replaced in kind during the same year as removal. These estimates were based on an analysis of tree canopy cover overlap with project activities. The estimates may not capture tree impacts from construction activities that compromise the tree root structure, which would vary considerably by tree species and the final project design.

Wildlife Corridors, Migration Routes
As described above and in Section 2.3.2, Wetland and Other Waters, Alternative 2a would temporarily affect Lagunitas Creek because of dewatering and the construction-related riparian vegetation trimming and clearing. This would cause a temporary reduction in cover and suitable habitat that is used by wildlife for dispersal and foraging. In addition, ESA wildlife exclusion fence would be installed to protect individual animals by preventing them from entering the work zone. This measure would create a temporary barrier to migration routes on all upland habitats and applies to all build alternatives.

Environmentally Sensitive Habitat Areas
The culvert extension would result in direct temporary impacts to 0.55 acre of ESHAs under California Coastal Commission jurisdiction, because of riparian tree trimming and dewatering associated with construction and construction access areas.

Under Alternative 2a, the bridge replacement would result in 0.51 acre of temporary direct impacts to ESHAs. Temporary impacts would result from the water diversion
system, construction areas required for removal of the existing bridge structure, and construction access areas. These adverse effects would be minimized by removal of temporary fill and the restoration of the creek bed following construction.

**Alternative 2b: Three-span, Short Steel-truss Bridge, Conventional Construction (with Detour Bridge)**

**Operational Impacts**

**Riparian Vegetation**

Impacts from culvert extension would be the same as under Alternative 2a.

Under Alternative 2b, the bridge replacement would result in 0.06 acre of permanent direct impacts to riparian trees. This is greater than Alternative 2a, because Alternative 2b has a greater area of temporary detour bridge structure overlapping riparian vegetation and a disturbance lasting for 3 years instead of less than 1 year.

**Wildlife Corridors, Migration Routes**

Permanent impacts to wildlife migration would be the same as for Alternative 2a.

**Environmentally Sensitive Habitat Areas**

Impacts from culvert extension would be the same as under Alternative 2a.

Under Alternative 2b, the bridge replacement would result in 0.06 acre of permanent direct impacts to ESHAs. This is greater than Alternative 2a because of a larger overlap with ESHA and a disturbance lasting for 3 years instead of less than 1 year.

**Construction Impacts**

**Riparian Vegetation**

Impacts from culvert extension would be the same as under Alternative 2a.

Under Alternative 2b, the bridge replacement would result in 0.51 acre of temporary direct impacts to riparian trees. Alternative 2b would temporarily disturb a greater area of the riparian vegetation during construction of the temporary detour bridge. These impacts would be considered permanent by regulatory agencies if they last longer than 1 year. However, for the purpose of the environmental impact report/environmental assessment, the impacts are considered temporary because conditions will be restored after construction.

**Wildlife Corridors, Migration Routes**

Under Alternative 2b, temporary impacts to wildlife migration routes would consist of temporary disturbance to a greater area of the riparian vegetation during
construction of the temporary detour bridge. Also, the disturbance would last for 3 years instead of less than 1 year. Therefore, effects to the wildlife corridor would be greater than under Alternative 2a.

**Environmentally Sensitive Habitat Areas**

Impacts from culvert extension would be the same as under Alternative 2a.

Under Alternative 2b, the bridge replacement would result in 0.67 acre of temporary impacts to ESHAs. Alternative 2b would temporarily disturb a greater area of the riparian vegetation than Alternative 2a during construction of the temporary detour bridge.

**Alternative 3a: Three-span, Concrete Bridge, ABC, Longitudinal Move-in**

**Operational Impacts**

**Riparian Vegetation**

Impacts from culvert extension would be the same as under Alternative 2a.

Under Alternative 3a, the bridge replacement would result in 0.04 acre of permanent direct impacts to riparian trees. The primary difference would be that the concrete bridge under this alternative would be 43 to 45 feet wide, instead of 47 to 50 feet wide as under Alternative 2a, thereby creating slightly less permanent loss of riparian vegetation.

**Wildlife Corridors, Migration Routes**

The effects to wildlife corridors and migration routes would be the less than under Alternative 2a because it would disturb a smaller riparian area.

**Environmentally Sensitive Habitat Areas**

Impacts resulting from culvert extension would be the same as under Alternative 2a.

Under Alternative 3a, the bridge replacement would result in 0.04 acre of permanent direct impacts to ESHAs. The concrete bridge would not be as wide as the steel-truss bridge.

**Construction Impacts**

**Riparian Vegetation**

Impacts from culvert extension would be the same as under Alternative 2a.

Under Alternative 3a, the bridge replacement would have 0.43 acre of temporary direct impacts to riparian trees. This represents a slightly greater area than under Alternative 2a.
Wildlife Corridors, Migration Routes
Alternative 4a would have fewer impacts to wildlife corridors and migration routes than Alternative 2a because removing piers from the creek would expand wildlife habitat and remove potential impediments to dispersal and use.

Environmentally Sensitive Habitat Areas
Impacts from culvert extension would be the same as under Alternative 2a. Under Alternative 3a, the bridge replacement would result in 0.56 acre of temporary direct impacts to ESHAs.

Alternative 4a: Full-span, Steel-truss Bridge, ABC, Longitudinal Move-in
Operational Impacts
Riparian Vegetation
Impacts from culvert extension would be the same as under Alternative 2a.

Under Alternative 4a, the bridge replacement would result in 0.05 acre of permanent direct impacts to riparian trees. The full-span (this alternative) and three-span (Alternatives 2a, 2b, and 3a) bridges have similar footprints in the riparian areas. Therefore, the permanent direct impacts to riparian vegetation of this alternative are similar to Alternative 2a.

Wildlife Corridors, Migration Routes
Alternative 4a would have fewer impacts to wildlife corridors and migration routes than Alternative 2a because removing piers from the creek would expand wildlife habitat and remove potential impediments to dispersal and use.

Environmentally Sensitive Habitat Areas
Impacts from culvert extension would be the same as under Alternative 2a.

Under Alternative 4a, the bridge replacement would result in 0.05 acre of permanent direct impacts to ESHAs. Permanent impacts would be the same as Alternative 2a.

Construction Impacts
Riparian Vegetation
Impacts from culvert extension would be the same as under Alternative 2a.

Under Alternative 4a, the bridge replacement would result in 0.43 acre of temporary direct impacts to riparian trees. Alternative 4a has a similar temporary impact to riparian vegetation as the other longitudinal move-in alternatives, including Alternative 2a, which do not require construction east of the existing bridge.
Wildlife Corridors, Migration Routes
The effects to wildlife corridors and migration routes would be the same as those under Alternative 2a.

Environmentally Sensitive Habitat Areas
Impacts from culvert extension would be the same as under Alternative 2a.

Under Alternative 4a, the bridge replacement would result in 0.55 acre of temporary, direct impacts to ESHAs. The temporary impacts are same as those of Alternative 2a.

Alternative 4b: Full-span, Steel-truss Bridge, ABC, Transverse Slide-in

Operational Impacts
Riparian Vegetation
Impacts from culvert extension would be the same as under Alternative 2a.

Under Alternative 4b, the bridge replacement would result in 0.05 acre of permanent direct impacts to riparian trees. This alternative results in the same final design footprint as Alternative 4a. Therefore, the permanent impacts are the same as for Alternative 4a.

Wildlife Corridors, Migration Routes
Alternative 4b would have the same impacts as Alternative 4a.

Environmentally Sensitive Habitat Areas
Impacts from culvert extension would be the same as under Alternative 2a.

Under Alternative 4b, the bridge replacement would result in 0.05 acre of permanent direct impacts to ESHAs. This alternative has a similar design as Alternative 4a. Therefore, the permanent impacts are the same.

Construction Impacts
Riparian Vegetation
Impacts from culvert extension would be the same as under Alternative 2a.

Under Alternative 4b, the bridge replacement would result in 0.66 acre of temporary direct impacts to riparian trees. Accessing the pre-assembly area adjacent to the existing structure, as required in this alternative, would result in greater temporary impacts for access during construction. Because this is an ABC alternative, with construction completed in 1 year, the vegetation would be affected for less than 1 year.
**Wildlife Corridors, Migration Routes**
The effects to wildlife corridors and migration routes would be the same as those under Alternative 2a.

**Environmentally Sensitive Habitat Areas**
Impacts from culvert extension would be the same as under Alternative 2a.

Under Alternative 4b, the bridge replacement would result in 0.83 acre of temporary direct impacts to ESHA.

### 2.3.1.3 AVOIDANCE, MINIMIZATION AND MITIGATION MEASURES

The following measures are proposed to avoid, minimize, and mitigate project effects to natural communities:

- **AMM BIO-1: Re-vegetation.** After construction, Caltrans will restore all temporarily disturbed areas with a locally appropriate assemblage of native species. All fill or construction debris will be removed. Appropriate methods and plant species used to revegetate such areas will be determined on a site-specific basis. (This planting plan will include consideration of this and AMMs BIO-4, -5, -14, and 22; Mitigation Measures BIO-B, -C, and -D; and AMMs VISUAL-3 and PARKS-3).

- **AMM BIO-2: Environmentally sensitive area fencing.** Prior to construction, Caltrans will delineate the boundaries of each active construction area with temporary, high-visibility, wildlife exclusion fencing to prevent the encroachment of construction personnel and equipment beyond the described construction footprint and to promote exclusion of the California red-legged frog from active work areas. The fencing will be removed only when all construction equipment is removed from the job site, following each construction season.

- **AMM BIO-3: Worker environmental awareness training.** Prior to construction, Caltrans will work with USFWS and NMFS, and will be responsible for hiring a USFWS-approved and NMFS-approved Biological Monitors who will manage necessary pre- and during construction surveys, in addition to conducting a worker environmental awareness training. All construction crews will be required to attend the training. The training will address and special status species that have the potential to occur within the project limits, AMMs, terms of the biological opinion, project permits, agreements, certifications, environmental sensitive areas, and other related matters. Upon completion of training, employees
will certify that they attended the training and understand all the conservation and protection measures.

- **AMM BIO-4: Tree replacement.** After construction, Caltrans will minimize impacts resulting from tree removal in the riparian zone of Lagunitas Creek by installing replacement riparian plantings. Caltrans will coordinate further with CDFW, California Coastal Commission, National Marine Fisheries Service, and San Francisco Bay Regional Water Quality Control Board to determine the mitigation ratio for native and non-native riparian tree replacement. Tree replacement would occur onsite if feasible. (This planting plan will include consideration of this and AMMs BIO-4, -5, -14, and -22; Mitigation Measures BIO-B, -C, and -D; and AMMs VISUAL-3 and PARKS-3).

### 2.3.2 Wetlands and Waters of the U.S.

Wetlands and other waters provide valuable habitat to fish and wildlife. Wetlands also attenuate flooding, collect sediment, and filter nutrients and contaminants.

#### 2.3.2.1 Regulatory Setting

Wetlands and other waters are protected under a number of laws and regulations. At the federal level, the Federal Water Pollution Control Act, more commonly referred to as the Clean Water Act (CWA) (33 USC 1344), is the primary law regulating wetlands and surface waters. One purpose of the CWA is to regulate the discharge of dredged or fill material into waters of the U.S., including wetlands. Waters of the U.S. include navigable waters, interstate waters, territorial seas, and other waters that may be used in interstate or foreign commerce. To classify wetlands for the purposes of the CWA, a three-parameter approach is used that includes the presence of hydrophytic (water-loving) vegetation, wetland hydrology, and hydric soils (soils formed during saturation/inundation). All three parameters must be present, under normal circumstances, for an area to be designated as a jurisdictional wetland under the CWA.

Section 404 of the CWA establishes a regulatory program that provides that discharge of dredged or fill material cannot be permitted if a practicable alternative exists that is less damaging to the aquatic environment or if the nation’s waters would be significantly degraded. The Section 404 permit program is run by the U.S. Army Corps of Engineers (USACE) with oversight by the U.S. Environmental Protection Agency (USEPA).
The USACE issues two types of 404 permits: General and Standard permits. There are two types of General permits: Regional permits and Nationwide permits. Regional permits are issued for a general category of activities when they are similar in nature and cause minimal environmental effect. Nationwide permits are issued to allow a variety of minor project activities with no more than minimal effects.

Ordinarily, projects that do not meet the criteria for a Nationwide Permit may be permitted under one of USACE’s Standard permits. There are two types of Standard permits: Individual permits and Letters of Permission. For Standard permits, the USACE decision to approve is based on compliance with USEPA’s Section 404(b)(1) Guidelines (USEPA 40 CFR Part 230), and whether permit approval is in the public interest. The 404 (b)(1) Guidelines (Guidelines) were developed by the USEPA in conjunction with the USACE, and allow the discharge of dredged or fill material into the aquatic system (waters of the U.S.) only if there is no practicable alternative which would have less adverse effects. The Guidelines state that the USACE may not issue a permit if there is a least environmentally damaging practicable alternative (LEDPA) to the proposed discharge that would have lesser effects on waters of the U.S., and not have any other significant adverse environmental consequences.

The Executive Order for the Protection of Wetlands (EO 11990) also regulates the activities of federal agencies with regard to wetlands. Essentially, this EO states that a federal agency, such as the Federal Highway Administration (FHWA) and/or California Department of Transportation (Caltrans), as assigned, cannot undertake or provide assistance for new construction located in wetlands unless the head of the agency finds: 1) that there is no practicable alternative to the construction and 2) the proposed project includes all practicable measures to minimize harm.

At the state level, wetlands and waters are regulated primarily by the State Water Resources Control Board (SWRCB), the Regional Water Quality Control Boards (RWQCBs), and the California Department of Fish and Wildlife (CDFW). In certain circumstances, the Coastal Commission may also be involved. Sections 1600-1607 of the California Fish and Game Code (CFGC) require any agency that proposes a project that will substantially divert or obstruct the natural flow of or substantially change the bed or bank of a river, stream, or lake to notify CDFW before beginning construction. If CDFW determines that the project may substantially and adversely affect fish or wildlife resources, a Lake or Streambed Alteration Agreement will be required. CDFW jurisdictional limits are usually defined by the tops of the stream or lake banks, or the outer edge of riparian vegetation, whichever is wider. Wetlands
under jurisdiction of the USACE may or may not be included in the area covered by a Streambed Alteration Agreement obtained from the CDFW.

The RWQCBs were established under the Porter-Cologne Water Quality Control Act to oversee water quality. Discharges under the Porter-Cologne Act are permitted by Waste Discharge Requirements (WDRs) and may be required even when the discharge is already permitted or exempt under the CWA. In compliance with Section 401 of the CWA, the RWQCBs also issue water quality certifications for activities which may result in a discharge to waters of the U.S. This is most frequently required in tandem with a Section 404 permit request. Please see Section 2.2.2, Water Quality and Stormwater Runoff for more details.

**California Coastal Act**

The California Coastal Commission, in partnership with coastal cities and counties, plans and regulates the use of land and water in the California Coastal Zone. Development activities, which are broadly defined by the California Coastal Act to include (among others) construction of buildings, divisions of land, and activities that change the intensity of land use or public access to coastal waters, generally require a coastal permit from either the Coastal Commission or appropriate local government. The proposed project consists of bridge and roadway replacement within the Coastal Zone, and therefore, a coastal development permit (CDP) for this project will be required. For this project, the Marin County Local Coastal Program would defer to the Coastal Commission for consolidated CDP review per Section 30601.3 of the Coastal Act. The Coastal Zone Management Act states that coastal management agencies with regulatory control have federal consistency review authority over all federal activities and federally licensed, permitted, or assisted activities wherever they may occur within the coastal zone. Caltrans will need to obtain a federal consistency determination from the Coastal Commission as part of the project.

The California Coastal Act defines coastal wetlands as “lands within the coastal zone which may be covered periodically or permanently with shallow water and include saltwater marshes, freshwater marshes, open or closed brackish water marshes, swamps, mudflats, and fens.” The Coastal Commission regulations (Title 14 California Code of Regulations [CCR] 13577[b]) further define coastal wetlands as land where the water table is at, near, or above the land surface long enough to promote the formation of hydric soils or to support the growth of hydrophytes.
2.3.2.2 AFFECTED ENVIRONMENT

The following analysis is based on the Natural Environment Study (NES) prepared for the State Route 1 Lagunitas Creek Bridge Project (Caltrans 2017). This report serves as the basis for establishing the environmental baseline for the proposed project.

Survey Results

The wetland survey included all project areas except for one area that was constrained by a lack of access to the private property parcel adjacent to the southeastern corner of the bridge. This area was surveyed remotely using binoculars and aerial imagery.

Within the project biological study area (BSA), 2.18 acres of wetlands and 2.23 acres of other waters of the U.S. and State were delineated. Wetland areas were delineated throughout the floodplain of Lagunitas Creek, primarily to the northwest of the bridge under Marin County Parks’ management and on either side of the culvert north of the bridge. Additional wetlands were delineated within the banks of Lagunitas Creek below the estimated Mean High Water (MHW) level. Other waters were primarily waters of Lagunitas Creek below the estimated MHW. The wetlands and other waters of the U.S. and State within the BSA are mapped in Figure 2.3.2-1. Because these figures have yet to be verified by the USACE, all wetlands and other waters of the U.S. referred to in this section are considered potentially jurisdictional.

These wetlands and other waters are also protected by the Coastal Commission, CDFW, and San Francisco Bay Regional Water Quality Control Board (RWQCB). These agencies typically extend jurisdiction to the edge of riparian vegetation, which is present adjacent to the bed and banks of Lagunitas Creek.

Areas of wetlands delineated as waters of the U.S. and State, described above, also meet the definition of Coastal Commission wetlands. The riparian tree species found within the BSA adjacent to the waters of the U.S. are primarily red willow, a hydrophytic plant species, and, therefore, also constitute Coastal Commission wetlands. Section 2.3.1, Natural Communities, discusses the riparian community in more detail. The remainder of this section focuses on wetlands, as defined by the three-parameter approach.
FIGURE 2.3.2-1
Potential Jurisdictional Waters of the U.S. and State
State Route 1 Lagunitas Creek Bridge Project
EA 0G642, MRN-1 Post Mile 28.4 – 28.6
ID: 04-13000350
Marin County, California
2.3.2.3 **ENVIRONMENTAL CONSEQUENCES**

This section describes the estimated impacts to wetlands and other waters of the U.S. as a result of the culvert extension and each of the six bridge replacement alternatives. The following permits would be required for each of the Build Alternatives:

- Caltrans would be required to obtain a Section 404 permit from the USACE; the project would likely qualify for Nationwide Permit 14: Linear Transportation Projects.

- The project would require a Section 401 Water Quality Certification (see also Section 2.2.2, Water Quality and Stormwater Runoff) from the RWQCB.

- A CDP would also be needed for impacts on wetlands and other waters within Coastal Commission’s jurisdiction.

- A CDFW Streambed Alteration Agreement would be required because of the proposed alteration of the bed and banks of Lagunitas Creek.

Each alternative would result in permanent, direct impacts to wetlands as a result of the road widening and culvert extension north of the bridge, and potentially in permanent, direct impacts to other waters of the U.S. and State because of the construction of new bridge piers (for Alternatives 2a, 2b, and 3a). Per the Regulatory Guidance Letter 90-08 dated December 14, 1990, the USACE is not expected to regulate the piles as fill; however, these piles are considered a permanent impact for this environmental evaluation. The alternatives with a free-span bridge, Alternatives 4a and 4b, would avoid permanent impacts to other waters of the U.S. and State while removing existing piles, thus, resulting in a net decrease of fill. The culvert extension is the same under each of the Build Alternatives.

Temporary, direct impacts to both wetlands and waters will occur because of construction staging and access. Temporarily disturbed areas will be graded to as near original topography as practicable and reseeded with an appropriate mix of native species to restore habitat functions.

For each alternative, temporary impacts to wetlands and other waters of the U.S. result from the water diversion system, establishment of construction areas for removal of the existing bridge structure, and construction access. The final determination for impacts to wetlands and other waters will be made during the permitting phase of the project.
Permanent and temporary direct impacts to wetlands and other waters would result in adverse effects that will be minimized by the measures described in Section 2.3.2.4. The extent of the impacts to wetlands are summarized in Table 2.3.2-1 and shown on Figures 2.3.2-2a through 2e. Potential impacts to other waters of the U.S. and State are summarized in Table 2.3.2-2.

**Alternative 1: No-Build Alternative**
Under the No-Build Alternative, there would be no impacts to wetlands or waters of the U.S or State.

**All Build Alternatives: Culvert Extension**
The culvert extension would result in permanent impacts to less than 0.01 acre (less than 1,000 square feet) and temporary impacts to 0.02 acre (less than 1,000 square feet) of wetlands. Other waters of the U.S. do not exist within the culvert extension footprint. None of the alternatives would result in permanent impacts to wetlands outside the culvert extension.

**Alternative 2a: Three-span, Short Steel-truss Bridge, ABC, Longitudinal Move-in**

**Operational Phase**
The bridge would result in less than 0.01 acre (less than 1,000 square feet) of permanent impacts to other waters of the U.S. as a result of installing two bridge support piers needed for Alternatives 2a.

**Construction Phase**
Grading, clearing, and grubbing of upland areas could result in indirect temporary impacts from increased erosion and sedimentation, and adversely impact wetlands and Lagunitas Creek. These indirect impacts during construction would be avoided through implementation of the general avoidance, minimization, and mitigation measures (AMMs), such the use of silt fences or fiber rolls.

Alternative 2a would result in temporary impacts of 0.16 acre to other waters of the U.S. and state and less than 0.01 acre (less than 1,000 square feet) of wetlands as a result of the bridge construction. For this Environmental Impact Report/Environmental Assessment (EIR/EA), these impacts are considered temporary, because these habitats will be restored after construction.
### Table 2.3.2-1 Potential Impacts to Wetlands

<table>
<thead>
<tr>
<th>Project Element</th>
<th>Permanent Impacts (acre [square feet])</th>
<th>Temporary Impacts (acre [square feet])</th>
<th>Total Impacts (acre [square feet])</th>
</tr>
</thead>
<tbody>
<tr>
<td>Culvert extension</td>
<td>&lt;0.01 acre*</td>
<td>0.02 acre</td>
<td>0.02 acre</td>
</tr>
<tr>
<td><strong>Bridge Replacement Project Alternative</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alternative 1 – No-Build</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Alternative 2a—Three-span, short steel-truss bridge, ABC, longitudinal move-in</td>
<td>0</td>
<td>&lt;0.01 acre*</td>
<td>&lt;0.01 acre*</td>
</tr>
<tr>
<td>Alternative 2b—Three-span, short steel-truss bridge, conventional (with detour bridge)</td>
<td>0</td>
<td>&lt;0.01 acre*</td>
<td>&lt;0.01 acre*</td>
</tr>
<tr>
<td>Alternative 3a—Three-span, concrete bridge, ABC, longitudinal move-in</td>
<td>0</td>
<td>&lt;0.01 acre*</td>
<td>&lt;0.01 acre*</td>
</tr>
<tr>
<td>Alternative 4a—Full-span, steel-truss bridge, ABC, longitudinal move-in</td>
<td>0</td>
<td>&lt;0.01 acre*</td>
<td>&lt;0.01 acre*</td>
</tr>
<tr>
<td>Alternative 4b—Full-span, steel-truss bridge, ABC, transverse slide-in</td>
<td>0</td>
<td>&lt;0.01 acre*</td>
<td>&lt;0.01 acre*</td>
</tr>
</tbody>
</table>

**Note:**
* Impact area rounded to 0.01 acre.

### Table 2.3.2-2 Potential Impacts to Other Waters of the U.S. and State

<table>
<thead>
<tr>
<th>Project Element</th>
<th>Permanent Impacts (acre)</th>
<th>Temporary Impacts (acre)</th>
<th>Total Impacts (acre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Culvert extension</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Bridge Replacement Project Alternative</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alternative 1 – No-Build</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Alternative 2a—Three-span, short steel-truss bridge, ABC, longitudinal move-in</td>
<td>&lt;0.01 acre*</td>
<td>0.16 acre</td>
<td>0.16 acre</td>
</tr>
<tr>
<td>Alternative 2b—Three-span, short steel-truss bridge, conventional (with detour bridge)</td>
<td>&lt;0.01 acre*</td>
<td>0.21 acre</td>
<td>0.21 acre</td>
</tr>
<tr>
<td>Alternative 3a—Three-span, concrete bridge, ABC, longitudinal move-in</td>
<td>&lt;0.01 acre*</td>
<td>0.16 acre</td>
<td>0.16 acre</td>
</tr>
<tr>
<td>Alternative 4a—Full-span, steel-truss bridge, ABC, longitudinal move-in</td>
<td>0</td>
<td>0.16 acre</td>
<td>0.16 acre</td>
</tr>
<tr>
<td>Alternative 4b—Full-span, steel-truss bridge, ABC, transverse slide-in</td>
<td>0</td>
<td>0.24 acre</td>
<td>0.24 acre</td>
</tr>
</tbody>
</table>

**Note:**
* Impact area rounded to 0.01 acre.
FIGURE 2.3.2-2a
Alternative 2a
Project Impacts to Potential Jurisdictional Waters of the U.S. and State

State Route 1 Lagunitas Creek Bridge Project
EA 0G642, MRN-1 Post Mile 28.4 – 28.6
ID: 04-13000350
Marin County, California
FIGURE 2.3.2-2b

Alternative 2b
Project Impacts to Potential Jurisdictional Waters of the U.S. and State

State Route 1 Lagunitas Creek Bridge Project
EA 0G642, MRN-1 Post Mile 28.4 – 28.6
ID: 04-13000350
Marin County, California
FIGURE 2.3.2-2c
Alternative 3a
Project Impacts to Potential Jurisdictional Waters of the U.S. and State

State Route 1 Lagunitas Creek Bridge Project
EA 0G642, MRN-1 Post Mile 28.4 – 28.6
ID: 04-13000350
Marin County, California
FIGURE 2.3.2-2d
Alternative 4a
Project Impacts to Potential Jurisdictional Waters of the U.S. and State

State Route 1 Lagunitas Creek Bridge Project
EA 0G642, MRN-1 Post Mile 28.4 – 28.6
ID: 04-13000350
Marin County, California
FIGURE 2.3.2-2e

Alternative 4b

Project Impacts to Potential Jurisdictional Waters of the U.S. and State

State Route 1 Lagunitas Creek Bridge Project
EA 0G642, MRN-1 Post Mile 28.4 – 28.6
ID: 04-13000350
Marin County, California
Alternative 2b: Three-span, Short Steel-truss Bridge, Conventional (with Detour Bridge)

Operational Impacts
Alternative 2b would result in permanent impacts of less than 0.01 acre (less than 1,000 square feet) of other waters of the U.S. or State as a result of installing three support piers. The bridge would not result in permanent impacts to wetlands.

Construction Impacts
Construction impacts would be similar to those under Alternative 2a, except this alternative would disturb a larger amount of Lagunitas Creek, (0.21 acre) for the construction and use of the detour bridge construction. It would result in the same amount of temporary impacts to wetlands, (less than 0.01 acre) as Alternative 2a because the detour bridge would be constructed on the eastern side where no wetlands are located.

Alternative 3a: Three-span, Concrete Bridge, ABC, Longitudinal Move-in

Operational and Construction Impacts
All direct and indirect permanent and construction impacts would be same as those for Alternative 2a.

Alternative 4a: Full-span, Steel-truss Bridge, ABC, Longitudinal Move-in

Operational Impacts
Alternative 4a would avoid permanent impacts to wetlands and waters of the U.S. and State

Construction Impacts
Alternative 4a construction impacts would be same to those under Alternative 2a for impacts to wetland, and other waters of the U.S. and State.

Alternative 4b: Full-span, Steel-truss Bridge, ABC, Transverse Slide-in

Operational Impacts
Alternative 4b would avoid permanent impacts to wetlands and waters of the U.S. and State.

Construction Impacts
Construction impacts would be the same as for Alternative 2a, except Alternative 4b would have greater temporary impacts to other waters of the U.S. and State (approximately 0.24 acre) because of the construction of a temporary bridge.
2.3.2.4 AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

There is no feasible project alternative that would accomplish the purpose and need of the project without impacting wetlands and other waters of the U.S. and State. Caltrans has worked to avoid and minimize to the maximum extent practicable impacts to wetlands and other waters.

Wetland impacts will be avoided at all staging areas. The final design of the water diversion system required for construction activities below the MHW will avoid and minimize impacts to waters of the U.S. and State as much as practicable. Caltrans proposes several AMMs to protect wetlands and other waters. Avoidance and minimization efforts are required in Sections 401 and 404 of the CWA and Section 1600 of the CFGC. Caltrans will consult and seek permits from the USACE, RWQCB, and CDFW for impacts to wetlands and waters of the U.S. The potential for this project to result in adverse impacts because of erosion and sediment transport will be reduced by implementing the temporary and permanent best management practices (BMPs) outlined in the Stormwater Pollution Prevention Plan (SWPPP). Caltrans’ erosion control BMPs will be implemented to minimize water-related erosion.

Caltrans will implement the following AMMs presented elsewhere in this document:

- Dust preventions AMMs provided in Section 2.2.6, Air Quality, AMM AIR-1: Control measures for construction emissions of fugitive dust.

- Water Quality AMMs provided in Section 2.2.2:
  - AMM WATER-1: Design pollution prevention measures
  - AMM WATER-2: Treatment measures
  - AMM WATER-3: Stormwater Pollution Prevention Plan

- Biological AMMs provided in Section 2.3.1, Natural Communities:
  - AMM BIO-1: Revegetation
  - AMM BIO-2: ESA fencing

The following wetlands and other waters-specific AMMs will also be implemented to further minimize and compensate for project impacts:
- **AMM BIO-5: Wetland Restoration.** Onsite restoration will consist of the reseeding and restoration of all temporarily disturbed areas of wetland and other waters of the U.S. and State within the project footprint. Native topsoil will be retained for and used during restoration to help re-establish wetland plant species. (This planting plan will include consideration of this and AMMs BIO-1, -4, -14, and -22; Mitigation Measures BIO-B, -C, and -D; and AMMs VISUAL-3 and PARKS-3).

- **Mitigation Measure BIO-A: Compensatory mitigation for jurisdictional water features.** Caltrans will implement onsite mitigation prior to project completion, which will consist of habitat enhancements such as large in-stream woody debris that are planned during stream bank reconstruction within other waters of the U.S. and State. Offsite enhancement efforts to offset project impacts to wetlands and other waters of the U.S., if needed, may consist of funding to mitigation banks and will be coordinated during the design phase of this project. This will require the Caltrans Biologist to develop the detailed instream habitat enhancement in coordination with CDFW, to restore Tomales roach and western pond turtle habitat (see Section 2.3.4.4, Table 2.3.4-4).

### 2.3.3 Plant Species

Plants provide natural diversity, reduce erosion, and support wildlife functions. Native plants may be of particular value to rare wildlife species as host or nectar plants.

#### 2.3.3.1 REGULATORY SETTING

The U.S. Fish and Wildlife Service (USFWS) and California Department of Fish and Wildlife (CDFW) have regulatory responsibility for the protection of special-status plant species. “Special-status” species are selected for protection because they are rare and/or subject to population and habitat declines. Special status is a general term for species that are provided varying levels of regulatory protection. The highest level of protection is given to threatened and endangered species; these are species that are formally listed or proposed for listing as endangered or threatened under the federal Endangered Species Act (FESA) and/or the California Endangered Species Act (CESA). Please see Section 2.3.4, Threatened and Endangered Species, in this document for detailed information about these species.
Chapter 2 Affected Environment, Environmental Consequences, and Avoidance, Minimization, and/or Mitigation Measures

This section of the document discusses all the other special-status plant species, including CDFW species of special concern, USFWS candidate species, and California Native Plant Society (CNPS) rare and endangered plants.

The regulatory requirements for FESA can be found at 16 USC Section 1531, et seq. See also 50 CFR Part 402. The regulatory requirements for CESA can be found at California Fish and Game Code (CFGC) Section 2050 et seq. Caltrans projects are also subject to the Native Plant Protection Act, found at CFGC Section 1900-1913, and the California Environmental Quality Act, California Public Resources Code Sections 2100-21177.

The Marin County Native Tree Protection and Preservation ordinance (Marin County 2012) applies to protected and heritage trees located on improved and unimproved lots in non-agricultural unincorporated areas of Marin County. Protected and heritage trees include specific species with defined diameters at breast-height trees as defined under the Marin County Development Code Chapter 22.130. The Marin County Native Tree Protection and Preservation ordinance does not apply to projects located within the coastal zone; therefore, it is not discussed further in this document.

2.3.3.2 AFFECTED ENVIRONMENT

This section was prepared using the Natural Environment Study prepared for the State Route 1 Lagunitas Creek Bridge Project (Caltrans 2017) and based on multi-year rare plant surveys.

The methods for the botanical surveys conducted for this project followed the CNPS botanical survey guidelines; CDFW protocols for surveying special-status plants; and USFWS botanical survey guidelines for federally listed, proposed, and candidate plants. Limitations included drought conditions during the rare plant survey periods, and the inaccessibility of the southeast quadrant of the project footprint and the Biological Study Area (BSA). This inaccessible private parcel was evaluated from the roadside and adjacent parcels using binoculars, aerial imagery, and available vegetation mapping. It appears to be landscaped and ruderal and therefore does not represent potential habitat for rare plant species.

Prior to conducting the habitat assessment and rare plant field surveys, queries of the California Natural Diversity Database (CNDDB), USFWS, and CNPS databases were conducted to determine the special-status plant species previously documented within or in the vicinity of the BSA. Additional background information was reviewed from *The Status of Rare, Threatened, and Endangered Plants and Animals of California*
2000-2004 (CDFW 2005) regarding the documented or potential occurrence of special-status plant species within or near the BSA.

Data from the USFWS, CNDDB, and CNPS sources listed above were used to compile a table of special-status plant species in the region (Inverness USGS 7.5-minute topographic quadrangle and the seven surrounding quadrangles) (see Appendix I). Special-status plants documented within 5 miles of the project location are shown on Figure 2.3.3-1.

**Special-Status Plants**

Willows (*Salix* spp.) were the dominant tree species within the riparian section of the BSA. This special-status community and the trees that make up that community are described in Section 2.3.1.

Eighteen special-status species have the potential to occur in the BSA based on the results of the database searches and characterization of habitats present (see Appendix I).

No special-status plant species were observed in the BSA during protocol-level rare plant surveys for this project. Although one property was not included in the surveys due to lack of access permission, the area was reviewed using binoculars and aerial photographs were taken by a Caltrans biologist from right-of-way. The area consists of landscaped and ruderal species and is not considered habitat for special-status or rare species.

**2.3.3.3 ENVIRONMENTAL CONSEQUENCES**

**Alternative 1: No-Build Alternative**

There would be no operational or construction impacts to plant species from the No-Build Alternative.

**All Build Alternatives**

Given the lack of special-status plant species found within the BSA, none of the proposed alternatives would result in direct or indirect effects on special-status plant species under the construction and operational phases of the project. However, all Build Alternatives would temporarily disturb vegetation and sensitive habitat areas. The riparian tree impacts for all Build Alternatives are addressed in Section 2.3.1 and mapped in Figures 2.3.1-2a through 2.3.1-2e.
FIGURE 2.3.3-1
Protected Species Plants within 5 Miles of the Project Location
State Route 1 Lagunitas Creek Bridge Project
EA 0G642, MRN-1 Post Mile 28.4 – 28.6
ID: 04-13000350
Marin County, California

Note:
California Natural Diversity Database version January 2017.
The occurrences shown on this map represent the known locations of the
species listed here as of the date of this version. There may be additional
occurrences or additional species within this area which have not yet been
surveyed and/or mapped. Lack of information in the CNDDB about a species
or an area can never be used as proof that no special status species occur in
an area.

LEGEND

Biological Study Area
5-mile Radius
CNDDB Occurrences
Plant (specific bounded area
with an 80-meter radius)
Plant (specific, noncircular
bounded area)
Plant (nonspecific, bounded area)
Plant (nonspecific, circular feature)

Multiple (specific, noncircular bounded area)
Multiple (nonspecific, bounded area)
Multiple (nonspecific, circular feature)
2.3.3.4 AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

To restore areas disturbed during construction, Caltrans will implement the following AMMs presented in Section 2.3.1, Natural Communities:

- AMM BIO-1: Revegetation
- AMM BIO-2: ESA fencing

Although previous surveys have not identified any special-status plant species within the BSA, Caltrans will implement AMM BIO-6:

- **AMM BIO-6: Pre-construction plant surveys.** Caltrans will conduct pre-construction surveys for special-status plant species within the BSA within 1 year prior to construction during the appropriate period of identification for potentially present species. In the unlikely event that a special-status plant species is identified within the BSA during future pre-construction surveys, the appropriate agencies will be notified and in collaboration with CDFW and or USFWS, Caltrans will define habitat restoration or establishment in conjunction with translocating the affected population, where appropriate and feasible, of these special-status plant species.

2.3.4 Animal Species

This section discusses the project’s potential impacts on non-listed animal species in the biological study area (BSA).

2.3.4.1 REGULATORY SETTING

Many state and federal laws regulate impacts to wildlife. The U.S. Fish and Wildlife Service (USFWS), the National Oceanic and Atmospheric Administration’s National Marine Fisheries Service (NMFS) and the California Department of Fish and Wildlife (CDFW) are responsible for implementing these laws. This section discusses potential impacts and permit requirements associated with animals not listed or proposed for listing under the federal or state Endangered Species Act. Species listed or proposed for listing as threatened or endangered are discussed in Section 2.3.5 below. All other special-status animal species are discussed here, including CDFW fully protected species and Species of Special Concern, and USFWS or NMFS candidate species.

Federal laws and regulations relevant to wildlife include the following:

- National Environmental Policy Act
- Migratory Bird Treaty Act
Fish and Wildlife Coordination Act
Coastal Zone Management Act

State laws and regulations relevant to wildlife include the following:

- California Environmental Quality Act
- Sections 1600 – 1603 of the California Fish and Game Code (CFGC)
- Sections 4150 and 4152 of the CFGC
- California Coastal Act
- Marine Mammal Protection Act

2.3.4.2 AFFECTED ENVIRONMENT
This section was prepared using the Natural Environment Study (NES) prepared by Caltrans (Caltrans 2017).

Animals Observed Within the BSA
Various animals have been observed within the BSA during field visits, including migratory and resident bird species, Pacific tree frogs (*Pseudacris regilla*), western brush rabbits (*Sylvilagus bachmani*), and black-tailed jack rabbits (*Lepus californicus*). Other species that are known to occur within the BSA or in the general project vicinity include North American river otter (*Lontra canadensis*), gray fox (*Urocyon cinereoargenteus*), coyote (*Canis latrans*), raccoons (*Procyon lotor*), feral cats (*Felis catus*), opossums (*Didelphis marsupialis*), mule deer (*Odocoileus hemionus*), dusky-footed woodrat (*Neotoma fuscipes*), and bats.

Lagunitas Creek has a relatively diverse aquatic ecosystem and supports many aquatic species within the BSA. The National Park Service (NPS) biological monitoring within Lagunitas Creek has resulted in observations in sampling locations close to the BSA (NPS 2016) of staghorn sculpin (*Leptocottus armatus*), steelhead (*Oncorhynchus mykiss*), coho (*Oncorhynchus kisutch*) and Chinook salmon (*Oncorhynchus tshawytscha*), three-spined stickleback (*Gasterosteus aculeatus*), tidewater goby (*Eucyclogobius newberryi*), arrow goby (*Clevidia ios*), yellow-finned goby (*Acanthogobius flavimanus*), top smelt (*Atherinops affinis*), bay pipefish (*Syngnathus leptorhynchus*), surf perch (*Cymatogaster aggregata*), mosquito fish (*Gambusia affinis*), Sacramento sucker (*Catostomus occidentalis*), California roach (*Hesperoleucus symmetricus*), starry flounder (*Platichthys stellatus*), and white crappie (*Pomox annularis*). All of these species have the potential to exist within the BSA. In addition, adult Pacific lamprey (*Entosphenus tridentatus*) migrate...
through the BSA and the benthic habitat may support juveniles (ammonocytes) of this species.

**Special-Status Species**

Table 2.3.4-1 lists special-status species that were either observed within the BSA or have compatible habitat within the BSA, and are not considered federally threatened or endangered. Appendix I includes explanations for the determination that these species have the potential to occur in the BSA.

### Table 2.3.4-1 CDFW Fully Protected Species and Species of Special Concern with the Potential to Occur in the BSA

<table>
<thead>
<tr>
<th>Species Name</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fish</strong></td>
<td></td>
</tr>
<tr>
<td>Tomales roach (<em>Lavinia symmetricus</em>)</td>
<td>California species of special concern</td>
</tr>
<tr>
<td><strong>Reptiles</strong></td>
<td></td>
</tr>
<tr>
<td>Western pond turtle (<em>Actinemys marmorata</em>)</td>
<td>California species of special concern, under review for listing under the federal Endangered Species Act</td>
</tr>
<tr>
<td><strong>Migratory Birds</strong></td>
<td></td>
</tr>
<tr>
<td>White-tailed kite (<em>Elanus leucurus</em>)</td>
<td>California fully protected species</td>
</tr>
<tr>
<td>California yellow warbler (<em>Setophaga petechia</em>)</td>
<td>California species of special concern</td>
</tr>
<tr>
<td>Cooper’s hawk (<em>Accipiter cooperii</em>)</td>
<td>California species of special concern</td>
</tr>
<tr>
<td>Northern harrier (<em>Circus cyaneus</em>)</td>
<td>California species of special concern</td>
</tr>
<tr>
<td>Sharp-shinned hawk (<em>Accipiter striatus</em>)</td>
<td>California species of special concern</td>
</tr>
<tr>
<td>Saltmarsh common yellowthroat (<em>Geothlypis trichas sinuosa</em>)</td>
<td>California species of special concern</td>
</tr>
<tr>
<td><strong>Mammals</strong></td>
<td></td>
</tr>
<tr>
<td>Townsend’s big-eared bat (<em>Corynorhinus townsendii</em>)</td>
<td>California species of special concern</td>
</tr>
<tr>
<td>Silver-haired bat (<em>Lasionycteris noctivagans</em>)</td>
<td>None</td>
</tr>
<tr>
<td>Hoary bat (<em>Lasiurus cinereus</em>)</td>
<td>None</td>
</tr>
<tr>
<td>Western red bat (<em>Lasiurus blossevillii</em>)</td>
<td>California species of special concern</td>
</tr>
<tr>
<td>Point Reyes jumping mouse (<em>Zapus trinotatus orarius</em>)</td>
<td>California species of special concern</td>
</tr>
<tr>
<td>California sea lions (<em>Zalophus californianus</em>)</td>
<td>Marine mammal</td>
</tr>
</tbody>
</table>
**Tomales Roach**

The Tomales roach has a limited range, consisting entirely of streams in the Tomales Bay watershed, in western Marin County. Its presence has been confirmed in Lagunitas Creek and Walker Creek, and it may have historically resided in other coastal creeks in Marin and Sonoma counties (Caltrans 2017). Its habitat is degraded by extensive alteration, primarily from water diversion infrastructure and cattle grazing.

Tomales roaches are well adapted to survive in a wide range of aquatic freshwater habitats in the warm, arid conditions of California’s Mediterranean climate. Roach is one of the few native fish that is able to endure life in isolated summer pools, in intermittent streams where temperatures are high, dissolved oxygen levels are low, and most other fish cannot survive.

There is one California Natural Diversity Database (CNDDB) occurrence (Occurrence #4) of Tomales roach that overlaps with the BSA and the project area, with an individual of this species collected during surveys in 1999. An additional CNDDB occurrence (Occurrence #2) of this species includes a reach of Lagunitas Creek upstream of the BSA (Figure 2.3.4-1). NPS biologists did not specifically observe this species during instream surveys; however, surveys were not targeted for this species and it may not have been identified among other, similar species, such as the California roach (*Hesperoleucus symmetricus*). The BSA contains suitable habitat for the species and there are no dispersal barriers to prevent this species from entering the project footprint. Therefore, for the purpose of this analysis, the species is considered potentially present.

**Western Pond Turtle**

No formal habitat assessment or protocol-level surveys have been conducted within the BSA because the western pond turtle (WPT) and its required habitat were readily visible during surveys. Individual WPT have been observed along Lagunitas Creek throughout the watershed. There is a recorded CNDDB occurrence (Occurrence #616) of this species 0.48 mile from the project area, within the Olema Marsh. This species has also been observed nesting immediately downstream of the BSA, just upland from a small sand and gravel beach accessed from the Giacomini Wetlands public trail.

On August 11, 2015, Caltrans biologists met with an NPS staff biologist to survey for WPT in the vicinity of the project area. During the survey, 18 individuals were
FIGURE 2.3.4-1
CNDDB Occurrence of CDFW Species of Special Concern within 5 Miles of the Project Location
State Route 1 Lagunitas Creek Bridge Project
EA 0G642, MRN-1 Post Mile 28.4 – 28.6
ID: 04-13000350
Marin County, California

Note:
CNDDB version February 2017.
The occurrences shown on this map represent the known locations of the species listed here as of the date of this version. There may be additional occurrences or additional species within this area which have not yet been surveyed and/or mapped. Lack of information in the CNDDB about a species or an area can never be used as proof that no special status species occur in an area.
observed, within a 1-mile stream reach both upstream and downstream of the Lagunitas Creek bridge. At least three individual WPT were observed in the BSA, upstream of the project area.

In addition to individual WPT found within the BSA and in dispersal distance to the BSA, instream woody debris suitable for use as a basking log for WPT is present along the left (southern) bank of Lagunitas Creek within the project area. Upland habitat was surveyed and found to be suitable for nesting within the BSA and surrounding, undeveloped areas. No WPT were observed in the area of the culvert extension, but the wetlands, standing water, and surrounding riparian vegetation offer suitable habitat for this species within the dispersal distance of observed individuals of this species.

**Migratory Birds**

Under the federal Migratory Bird Treaty Act (MBTA) of 1918 and CFGC Sections 3503 through 3505, 3513, and 3800, migratory birds, their nests, and eggs are protected from disturbance or destruction. Removal or disturbance of active nests during the project would be in violation of these regulations. Most birds are protected under the MBTA and CFGC, except for non-native species that have been introduced into the United States or its territories and select other species (including European starlings \(\text{Sturnus vulgaris}\) and rock doves \(\text{Columba livia}\)).

Various migratory and resident bird species have been observed in the BSA during field visits. These species include the hooded oriole (\(\text{Icterus cucullatus}\)), red-winged blackbird (\(\text{Agelaius phoeniceus}\)), house finch (\(\text{Carpodacus mexicanus}\)), western bluebird (\(\text{Sialia mexicana}\)), Brewer’s blackbird (\(\text{Euphagus cyanocephalus}\)), European starling, mallard (\(\text{Anas platyrhynchos}\)), American goldfinch (\(\text{Spinus tristis}\)), red-tailed hawk (\(\text{Buteo jamaicensis}\)), chipping sparrow (\(\text{Spizella passerina}\)), turkey vulture (\(\text{Cathartes aura}\)), black phoebe (\(\text{Sayornis nigricans}\)), Wilson’s warbler (\(\text{Wilsonia pusilla}\)), and scrub jay (\(\text{Aphelocoma californica}\)).

The following species are considered species of special concern by CDFW, in addition to being protected by the federal MBTA: California yellow warbler, saltmarsh common yellowthroat, Cooper’s hawk, northern harrier, and sharp-shinned hawk. These species are residents of riparian woodlands, open habitats interspersed with shrubs and small trees, riparian woodland near meadow edges, and grassland habitats, all of which occur within the BSA.
The white-tailed kite, a California fully protected species that is also protected by the federal MBTA, is found in rolling foothills and valley margins with scattered oaks, river bottomlands, and marshes, next to deciduous woodland. The white-tailed kite requires open grasslands or meadows for foraging close to isolated, dense-topped trees for nesting and perching. These kites are year-round residents in California, but migrate in other parts of the United States.

Caltrans biologists surveyed the general project vicinity that is likely to provide suitable nesting habitat for birds. They recorded observations of any birds from 2014 through 2016. White-tailed kites and northern harriers were observed soaring in the BSA, and commonly foraging adjacent to the BSA in the Giacomini Wetlands. Suitable nesting habitat for the white-tailed kite and northern harrier species were found within the BSA.

**Mammal Species of Special Concern**

Several species of bats and small mammals are likely to inhabit the BSA, whether for foraging, day or night roosting, or rearing of young. Various bat species prefer various day- and night-roosting structures in this region. Mammalian species occurring in the region could potentially forage in the vicinity of this project, although various species favor differing habitats and strata within habitats for foraging. The Townsend’s big-eared bat, silver-haired bat, hoary bat, western red bat, and Point Reyes jumping mouse are all California species of special concern with a potential to occur in the project area.

Formal surveys have not been conducted for bats or small mammals. Caltrans biologists visited the BSA on May 16, 2016, to assess the likelihood that bats occur in the project area. Numerous bats have been observed in the BSA near dusk, but identification of bat species while in flight was not possible. Suitable day-roosting habitat for each species was found within the BSA, in the form of large trees with pronounced crevices or cavities. Evidence of small mammals also exists throughout the BSA; and woodrat houses have been observed in the BSA.

No signs of bat roosting were observed in the bridge structure above the creek. Snags and large trees with pronounced crevices or cavities were identified in proximity to the BSA. Large snags and large trees with pronounced crevices or cavities have an increased potential to be used as day roosts by bats in this region, relative to that of live trees without pronounced crevices or cavities. In addition, large, live trees with dense foliage have the potential to be used as day roosts by foliage-roosting bat
species (such as *Lasiurine* bats [including hoary bats and western red bats] and silver-haired bats). The likelihood of use of the trees surrounding the bridge cannot be satisfactorily determined without performing fly-out counts at suspect trees; this method of detection has limited efficacy because of the bats’ short-term use of tree roosts.

The bridge structure itself is highly unlikely to be used by day- or night-roosting bats, given its lack of protected roosting locations. The habitat in the vicinity of bridge is likely to be used by bats for foraging at night. However, because the bridge is not used as a night roost by bats, it provides no special attraction for them. The riparian habitat along the creek in both directions provides the same quality of potential foraging habitat as the area immediately adjacent to the bridge.

**Marine Mammals**

In this area, Lagunitas Creek is tidally influenced. Observations of California sea lions (*Zalophus californianus*), swimming upstream from marine habitat in Tomales Bay into areas near the BSA, have been recorded. No haul-out sites, where seals or sea lions rest outside of the water, are found in the BSA.

### 2.3.4.3 ENVIRONMENTAL CONSEQUENCES

#### Alternative 1: No-Build Alternative

Under the No-Build Alternative, the proposed project would not be implemented. The No-Build Alternative would have no effects on animal species.

#### Alternative 2a: Three-span, Short Steel-truss Bridge, ABC, Longitudinal Move-in

**Operational Phase**

In general, the operation of the proposed project would have a minimal change on animals and special-status animal species within the BSA. The project would not result in increased traffic.

**Tomales Roach**

The proposed project would result in permanent, direct impacts to Tomales roach aquatic habitat of Lagunitas Creek, primarily from the support piers in the Lagunitas Creek channel proposed in the Alternative 2a bridge design. In time, removed vegetation would re-establish to return much of the habitat to its pre-project conditions. The anticipated, permanent, direct impacts of the project on the Tomales roach habitat types from culvert extension and bridge replacement alternatives are presented in Table 2.3.4-2.
The culvert extension activities would not result in effects for the Tomales roach because the culvert location is not a habitat for this species. The new bridge would be slightly larger than the existing bridge, which would cause a slight reduction in the creek bank vegetation adjacent to both ends of the bridge.

A small, permanent impact to aquatic habitat for Tomales roach would result from bridge support piers installed in the Lagunitas Creek channel; increased shading of aquatic habitat from the greater bridge widths would also occur compared to existing conditions. While shading would result in change to the existing vegetation, the reduction in productivity would be minor; and other aspects of habitat could be improved by shade, in the form of reductions in water temperatures during warmer months.

There will be permanent effects to aquatic habitat as a result of loss of a minor amount of open water from the bridge support piers. However, the project will install instream habitat enhancements, such as large woody debris integrated into the streambank reconstruction, which will provide enhanced habitat and refuge from high-velocity stream flow for Tomales roach. Riparian plantings would reduce long-term, indirect impacts of erosion and sedimentation to Lagunitas Creek from the uplands. Furthermore, per the hydrologic analysis, the bridge replacement would not significantly affect the fluvial sediment and flow regime of the creek, and the surface and topography of the creek immediately downstream of the bridge is not anticipated to change (WRECO 2016). Therefore, there would be a minimal effect to Tomales roach.

**Western Pond Turtle**

The proposed project would result in a small amount of permanent, direct impacts to upland habitat in the proposed project footprint because of the slightly wider footprint of the Alternative 2a bridge design, compared to existing conditions. The proposed project would result in permanent direct impacts to WPT aquatic habitat of Lagunitas Creek, primarily from the support piers in the Lagunitas Creek channel proposed in the Alternative 2a bridge design. In time, removed vegetation would re-establish to return much of the habitat to its pre-project conditions.

The anticipated, permanent, direct impacts of the project on the WPT habitat types from culvert extension and bridge replacement alternatives are presented in Table 2.3.4-2.
Table 2.3.4-2 Permanent, Direct Impacts on the Tomales Roach and Western Pond Turtle by Habitat Type

<table>
<thead>
<tr>
<th>Project Element</th>
<th>Tomales Roach Aquatic Habitat</th>
<th>Western Pond Turtle Aquatic Habitat</th>
<th>Western Pond Turtle Upland Habitat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Culvert extension</td>
<td>0</td>
<td>&lt;0.01*</td>
<td>0.04</td>
</tr>
<tr>
<td><strong>Bridge Replacement Project Alternative</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alternative 1 – No-Build</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Alternative 2a—Three-span, short steel-truss bridge, ABC, longitudinal move-in</td>
<td>&lt;0.01*</td>
<td>&lt;0.01*</td>
<td>0.05</td>
</tr>
<tr>
<td>Alternative 2b—Three-span, short steel-truss bridge, conventional construction (with detour bridge)</td>
<td>&lt;0.01*</td>
<td>&lt;0.01*</td>
<td>0.06</td>
</tr>
<tr>
<td>Alternative 3a—Three-span, concrete bridge, ABC, longitudinal move-in</td>
<td>&lt;0.01*</td>
<td>&lt;0.01*</td>
<td>0.04</td>
</tr>
<tr>
<td>Alternative 4a—Full-span, steel-truss bridge, ABC, longitudinal move-in</td>
<td>0</td>
<td>0</td>
<td>0.05</td>
</tr>
<tr>
<td>Alternative 4b—Full-span, steel-truss bridge, ABC, transverse slide-in</td>
<td>0</td>
<td>0</td>
<td>0.05</td>
</tr>
</tbody>
</table>

* Impact area rounded to 0.01 acre.

The culvert extension would result in permanent, direct impact to WPT aquatic habitat and WPT upland habitat (see Table 2.3.4-2).

The culvert extension activities would not result in effects for the Tomales roach because the culvert location is not habitat for this species. The new bridge would be slightly wider than the existing bridge, which would cause a slight reduction in the creek bank vegetation adjacent to both ends of the bridge. A small, permanent impact to aquatic habitat for WPT would result from bridge support piers installed in the Lagunitas Creek channel; increased shading of aquatic habitat from the greater bridge widths would also occur compared to existing conditions. While shading would result in changes to existing vegetation, the reduction in productivity would be minor, and other aspects of habitat could be improved by shade, in the form of reducing water temperatures during warmer months.

There will be permanent effects to aquatic habitat as a result of the culvert extension and loss of a minor amount of open water from the bridge support piers. However, the
Chapter 2 Affected Environment, Environmental Consequences, and Avoidance, Minimization, and/or Mitigation Measures

The project will install instream habitat enhancements, such as large woody debris integrated into the streambank reconstruction, which will provide enhanced habitat and refuge from high-velocity stream flow for WPT. Riparian plantings would reduce long-term, indirect impacts of erosion and sedimentation to Lagunitas Creek from the uplands. Furthermore, per the hydrologic analysis, the bridge replacement would not significantly affect the fluvial sediment and flow regime of the creek; and the surface and topography of the creek immediately downstream of the bridge is not anticipated to change (WRECO 2016). Therefore, there would be a minimal effect to WPT.

Migratory Birds and Mammal Species of Special Concern
The operation of the proposed project would not significantly affect nesting bird use in the project area. With the removal of trees and riparian canopy, there will be a reduction in: (1) potential roosting and other habitat for migratory birds and bat species; and (2) potential habitat for the Point Reyes jumping mouse. However, the disturbed area is surrounded by similar habitat and represents a small portion of the available habitat; the surrounding area is forested and offers alternative nesting and roosting options. The extent of tree removal from both the culvert extension and bridge replacement, with all bridge design alternatives considered, is presented in Section 2.3.1, Natural Communities, as it pertains to riparian vegetation. Direct impacts are anticipated from removing trees and woodrat nest-houses (referred to as “middens”), but no indirect impacts would result from the project. The two-phase method for tree removal would allow any bats that may be using the trees within the project limits to leave of their own accord. Intact woodrat houses will be protected in-place or relocated.

Construction Phase
Temporary, direct impacts would result from the use of upland and aquatic habitat for equipment and materials staging, as well as from clearing and grubbing of riparian vegetation for construction activities and access to construction sites. Riparian vegetation would be replanted in disturbed areas, including along the creek banks to provide shade.

Grading, clearing, and grubbing of upland areas would result in minor, indirect impacts to upland and aquatic habitat from increased erosion and sedimentation, which would adversely impact Lagunitas Creek.

The anticipated project temporary direct impacts from culvert extension and bridge replacement alternatives are presented in Table 2.3.4-3.
Table 2.3.4-3  Temporary Construction Impacts to Tomales Roach and Western Pond Turtle by Habitat Type

<table>
<thead>
<tr>
<th>Project Element</th>
<th>Construction Impacts (acres)</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Tomales Roach Aquatic Habitat</td>
<td>Western Pond Turtle Aquatic Habitat</td>
<td>Western Pond Turtle Upland Habitat</td>
</tr>
<tr>
<td>Culvert extension</td>
<td>0</td>
<td>0.02</td>
<td>0.08</td>
</tr>
<tr>
<td><strong>Bridge Replacement Project Alternative</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alternative 1 – No-Build</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Alternative 2a—Three-span, short steel-truss bridge, ABC, longitudinal move-in</td>
<td>0.16</td>
<td>0.16</td>
<td>1.84</td>
</tr>
<tr>
<td>Alternative 2b—Three-span, short steel-truss bridge, conventional construction (with detour bridge)</td>
<td>0.21</td>
<td>0.21</td>
<td>1.81</td>
</tr>
<tr>
<td>Alternative 3a—Three-span, concrete bridge, ABC, longitudinal move-in</td>
<td>0.16</td>
<td>0.16</td>
<td>1.73</td>
</tr>
<tr>
<td>Alternative 4a—Full-span, steel-truss bridge, ABC, longitudinal move-in</td>
<td>0.16</td>
<td>0.16</td>
<td>1.72</td>
</tr>
<tr>
<td>Alternative 4b—Full-span, steel-truss bridge, ABC, transverse slide-in</td>
<td>0.24</td>
<td>0.24</td>
<td>1.96</td>
</tr>
</tbody>
</table>

**Tomales Roach**

The culvert extension is completely disconnected from Lagunitas Creek and any habitat for Tomales roach. There would be no direct impacts to Tomales roach or its habitat from the culvert extension.

The construction and maintenance of the water diversion system in Lagunitas Creek, which is required to provide construction access for pier removal and new construction, would temporarily impact aquatic habitat and may adversely affect individual Tomales roach during dewatering activities. Screens on intake pumps and a dewatering and species rescue plan, would contribute to minimizing construction impacts to Tomales roach.

While Tomales roach habitat has been degraded by water diversion infrastructure, the conservation status, according to CDFW, is moderate concern. The one season of a small temporary water diversion that would be implemented for Alternative 2a would not significantly affect the population as a whole.
Western Pond Turtle
Construction activities have the potential to impact juvenile and adult life stages. Throughout construction of Alternative 2a, the WPT would not have access to some or all of the project footprint or portions of it for various periods of time; this would disrupt some basking, foraging, and dispersal. However, habitat in the vicinity is abundant and this disruption of a relatively small area is not considered substantial. The construction activities for culvert extension may require a water diversion system and dewatering of the construction area. These temporary activities may adversely affect individual WPT.

Similarly, the construction and maintenance of the water diversion system in Lagunitas Creek, which would be required to provide construction access to bridge piers, would temporarily impact these habitats and may disturb individual WPT during construction and dewatering activities. Instream and bank restoration following construction would be directed to recreate affected habitat during the final phase of the project, up to and including replacement of basking log habitat. With the restoration of temporary impacts, along with measures developed to avoid take of protected aquatic species, construction would result in minimal effects to WPT.

Migratory Birds and Mammals Species of Special Concern
Clearing and grubbing of vegetation would result in a temporary loss of habitat for the 1 year of construction of Alternative 2a. All temporarily disturbed areas within the project footprint would be restored, including the riparian area of Lagunitas Creek. Vegetation removal has the potential to directly affect individual nesting birds and mammal species of special concern.

Alternative 2b: Three-span, Short Steel-truss Bridge, Conventional Construction (with Detour Bridge)
Operational Phase
All direct and indirect permanent impacts would be similar to those under Alternative 2a, with the only difference being area of habitat impact. See Table 2.3.4-2 for area of habitat impact.

Construction Phase
Alternative 2b construction impacts to aquatic habitat would be approximately 0.05 acre larger than those of Alternative 2a because of the additional piers and in-water work for the building of a temporary detour bridge (see Table 2.3.4-3 for area of habitat impact). Alternative 2b construction impacts to upland habitat would be similar to the impacts under Alternative 2a. While a greater amount of upland habitat
would be used for the temporary detour bridge approaches, Alternative 2b would have smaller staging areas. The longer duration of construction would result in more substantial effects to animal species than Alternative 2a.

**Alternative 3a: Three-span, Concrete Bridge, ABC, Longitudinal Move-in**

**Operational Phase**
Permanent direct and indirect impacts would be similar to those in Alternative 2a, with the only difference being area of habitat impact, shown in Table 2.3.4-2. Because the concrete bridge would be 43 to 45 feet wide, instead of 47 to 50 feet wide, there would be less shading of Lagunitas Creek habitat, permanent fill to the creek, and permanent impact to upland habitat.

**Construction Phase**
Construction impacts to aquatic habitat would be the same as for Alternative 2a, because the same area would be dewatered for 1 year. Alternative 3a would require less temporary impact to upland habitat than Alternative 2a. Table 2.3.4-3 shows area of habitat impact.

**Alternative 4a: Full-span, Steel-truss Bridge, ABC, Longitudinal Move-in**

**Operational Phase**
Permanent, direct and indirect impacts would be the same as those in Alternative 2a, with the only difference being area of habitat impact, as shown in Table 2.3.4-2. However, no piers would be located in the water; therefore, less permanent impact would occur on aquatic species.

**Construction Phase**
Construction impacts would be the same as for Alternative 2a for aquatic habitat, because temporary dewatering would still be required for removing the existing piers. However, because no new piers would be necessary, the duration of disturbance would be shorter. Alternative 4a would require more upland area to be disturbed for construction than Alternative 2a. Table 2.3.4-3 shows area of habitat impact.

**Alternative 4b: Full-span, Steel-truss Bridge, ABC, Transverse Slide-in**

**Operational Phase**
All direct and indirect impacts would be the same as Alternative 4a.

**Construction Phase**
Construction impacts would be similar to those under Alternative 2b, except the duration of disturbance to animal species would be shorter. Alternative 4b would
require larger staging areas than Alternative 2b. Table 2.3.4-3 shows the area of habitat impact.

Table 2.3.4-4 shows the total direct impacts, including both temporary and permanent impacts, and including the culvert extension.

**Table 2.3.4-4 Total Direct Impacts on Tomales Roach and Western Pond Turtle by Habitat Type**

<table>
<thead>
<tr>
<th>Bridge Replacement Project Alternative (w/ Culvert Extension)</th>
<th>Total Direct Impacts (acres)</th>
<th>Tomales Roach Aquatic Habitat</th>
<th>Western Pond Turtle Aquatic Habitat</th>
<th>Western Pond Turtle Upland Habitat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Culvert Widening</td>
<td>0</td>
<td>0.02</td>
<td>0.12</td>
<td></td>
</tr>
<tr>
<td>Alternative 1—No-Build</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Alternative 2a—Three-span, short steel-truss bridge, ABC, longitudinal move-in</td>
<td>0.16</td>
<td>0.16</td>
<td>1.89</td>
<td></td>
</tr>
<tr>
<td>Alternative 2b—Three-span, short steel-truss bridge, conventional (with detour bridge)</td>
<td>0.21</td>
<td>0.21</td>
<td>1.87</td>
<td></td>
</tr>
<tr>
<td>Alternative 3a—Three-span, concrete bridge, ABC, longitudinal move-in</td>
<td>0.16</td>
<td>0.16</td>
<td>1.77</td>
<td></td>
</tr>
<tr>
<td>Alternative 4a—Full-span, steel-truss bridge, ABC, longitudinal move-in</td>
<td>0.16</td>
<td>0.16</td>
<td>1.77</td>
<td></td>
</tr>
<tr>
<td>Alternative 4b—Full-span, steel-truss bridge, ABC, transverse slide-in</td>
<td>0.24</td>
<td>0.24</td>
<td>2.01</td>
<td></td>
</tr>
</tbody>
</table>

**2.3.4.4 AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES**

Caltrans will implement reasonable and prudent measures to minimize and avoid potential disturbance of WPT and Tomales roach, through measures developed to avoid take of threatened and endangered species. The following measures are proposed to avoid and minimize project effects to migratory birds and special-status mammal species.

- **AMM BIO-7: Migratory birds.** To protect migratory birds and their nests, the following will be implemented: a). all initial major vegetation clearing, but not grubbing, will be conducted outside the typical bird nesting season of February 15 to August 31 to the extent feasible; b). no more than 3 days prior to construction or any vegetation clearing, the project area will be surveyed by a CDFW and USFWS approved biologist for migratory birds and their nests, regardless of the
time of year. Should any active nest be found, appropriate buffers will be applied. No work will occur within 50 feet of nesting non-game birds or 300 feet of nesting raptors, unless a reduced buffer has been approved by the USFWS-approved biologist. A reduced buffer may be used if nesting birds are habituated to human presence, visual barriers block direct line of site from the nest, or similar. Any nesting migratory birds or nongame birds near the project footprint will be regularly monitored by the biological monitor for signs of disturbance; work will be avoided in such areas until all birds have fledged.

- **AMM BIO-8: Bat tree removal.** Any large snags or trees with large cavities potentially used as roosting sites for bats within the construction impact area will be removed using a two-phased approach, to allow any roosting bats to leave on their own volition. This approach involves removing limbs from the tree on the afternoon of the first day and stumping the tree on the following day. Removals will be overseen by the biological monitor.

- **AMM BIO-9: Woodrat house relocation.** If woodrat houses are observed during construction, Caltrans or its contractor will confirm that the biological monitor will either protect them in place or relocate them to a similar vegetation community to avoid significant disturbance to these long-lived habitat structures.

- **AMM BIO-10: Minimize night work.** During construction, to the maximum extent practicable, the contractor will minimize all construction work at night, dawn or dusk when bats and small mammals are most active. Evening construction will be pre-determined in consultation with the assigned biological monitor.

- **AMM BIO-11: Western pond turtle pre-construction survey.** Before construction, the CDFW-approved biologist will conduct a survey for WPT. Any individual WPT found will be relocated to appropriate habitat outside of the work area by the CDFW-approved biologist.

To mitigate for impacts on Tomales roach and western pond turtle habitat, Caltrans will also implement Mitigation Measure BIO-A: Compensatory mitigation for jurisdictional water features, as presented in Section 2.3.2.4, to replace habitat features such as large in-stream woody debris to compensate for the displaced WPT and Tomales roach habitat. Displaced habitat is represented in Table 2.3.4-4, including both temporary and permanent impacts, and including the culvert extension.
This will require the Caltrans Biologist to develop the detailed instream habitat enhancement in coordination with CDFW.

### 2.3.5 Threatened and Endangered Species

#### 2.3.5.1 REGULATORY SETTING

The primary federal law protecting threatened and endangered species is the federal Endangered Species Act (FESA): 16 USC Section 1531, et seq. See also 50 CFR Part 402. This act and later amendments provide for the conservation of endangered and threatened species and the ecosystems upon which they depend. Under Section 7 of this act, federal agencies, such as the Federal Highway Administration (FHWA), are required to consult with the U.S Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration’s National Marine Fisheries Service (NMFS) to ensure that they are not undertaking, funding, permitting, or authorizing actions likely to jeopardize the continued existence of listed species or destroy or adversely modify designated critical habitat. Critical habitat is defined as geographic locations critical to the existence of a threatened or endangered species. The outcome of consultation under Section 7 may include a Biological Opinion with an Incidental Take statement, a Letter of Concurrence and/or documentation of a No Effect finding. Section 3 of FESA defines take as “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect or any attempt at such conduct.”

California has enacted a similar law at the state level, California Endangered Species Act (CESA), California Fish and Game Code (CFGC) Section 2050, et seq. CESA emphasizes early consultation to avoid potential impacts to rare, endangered, and threatened species and to develop appropriate planning to offset project-caused losses of listed species populations and their essential habitats. The California Department of Fish and Wildlife (CDFW) is the agency responsible for implementing CESA. Section 2081 of the CFGC prohibits “take” of any species determined to be an endangered species or a threatened species. Take is defined in Section 86 of the CFGC as “hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill.” CESA allows for take incidental to otherwise lawful development projects; for these actions an incidental take permit is issued by the CDFW. For species listed under both FESA and CESA requiring a Biological Opinion under Section 7 of FESA, the CDFW may also authorize impacts to CESA species by issuing a Consistency Determination under Section 2080.1 of the CFGC.

Another federal law, the Magnuson-Stevens Fishery Conservation and Management Act of 1976, was established to conserve and manage fishery resources found off the
coast, as well as anadromous species and Continental Shelf fishery resources of the United States, by exercising (A) sovereign rights for the purposes of exploring, exploiting, conserving, and managing all fish within the exclusive economic zone established by Presidential Proclamation 5030, dated March 10, 1983, and (B) exclusive fishery management authority beyond the exclusive economic zone over such anadromous species, Continental Shelf fishery resources, and fishery resources in special areas.

2.3.5.2 AFFECTED ENVIRONMENT

To prepare the Natural Environment Study (NES; Caltrans 2017), Caltrans consulted a list of special status species by consulting the following databases (Appendix I and Appendix N) and conducting field surveys, and through discussions and communication with resource agency personnel and local biological experts:

- CDFW’s California Natural Diversity Database (CNDDB)
- California Native Plant Society (CNPS) Online Inventory of Rare and Endangered Plants
- NMFS Official Species List
- USFWS’s Information for Planning and Conservation (IPaC) online endangered species database

Table 4-1 in Chapter 4 summarizes the agency and professional personnel who were consulted in the process of conducting field studies and preparing the NES and environmental document.

Special status plant species were not observed during botanical surveys within the biological study area (BSA).

Federally and state-listed wildlife species that may be present in the BSA include the endangered California freshwater shrimp (Syncaris pacifica, CFS), the Central California Coast (CCC) Evolutionarily Significant Unit (ESU) of coho salmon (Oncorhynchus kisutch), and threatened northern spotted owl (Strix occidentalis caurina; NSO). Federally listed species include the federally endangered tidewater goby (Eucyclogobius newberryi) and Myrtle’s silverspot butterfly (Speyeria zerene myrtleae, MSB), and the federally threatened California red-legged frog (Rana draytonii, CRLF), CCC Distinct Population Segment (DPS) steelhead (Oncorhynchus mykiss), and Chinook salmon (Oncorhynchus tshawytscha). These species are
discussed below. The aquatic, upland, and riparian critical habitats that support these species are presented in Figure 2.3.5-1. Caltrans has received initial technical assistance from the USFWS and NMFS because this project has the potential to adversely affect listed species and their habitat during construction activities. Measures have been incorporated into the project to reduce the likelihood of take of listed species that occur or may occur in the general project vicinity.

Caltrans will initiate formal consultation with the USFWS and NMFS at a later date, when the bridge replacement preferred alternative is selected. At that time, Caltrans will seek concurrence on its determinations as to how the project may affect listed species and habitats presented in this report. The USFWS and NMFS would issue Biological Opinions for the project that will contain measures that Caltrans will be required to incorporate to avoid and minimize impacts to listed species. An analysis of Essential Fish Habitat and potential affects to Essential Fish Habitat will be included in the NMFS Biological Opinion.

In addition, Caltrans anticipates coordination with CDFW for potential impacts to state-listed species. For state-listed species (coho salmon and CFS), it is anticipated CDFW would issue an Incidental Take Permit (ITP) that would contain measures that Caltrans will be required to incorporate to avoid and minimize impacts to the species. Under state law, any impacts to listed species from the project must be fully mitigated. The state-listed NSO would not be affected by the proposed project and would not require an ITP.

**Myrtle’s Silverspot Butterfly**

The MSB was listed as an endangered species on June 22, 1992. No critical habitat has been designated for this species.

Historically, the MSB range is believed to have included the northern California coastal dunes and bluffs from the mouth of the Russian River in Sonoma County southward to Point Año Nuevo in San Mateo County. When listed in 1992, only four occurrences of the MSB were known to exist: one population inhabited the coastal dunes at Point Reyes National Seashore, two populations occurred within state beaches in Sonoma County, and a single female was found 8 miles inland from Bodega Bay. The distribution and range of the MSB has not significantly changed since it was listed in 1992.
FIGURE 2.3.5-1
Critical Habitats within the Biological Study Area
State Route 1 Lagunitas Creek Bridge Project
EA 0G642, MRN-1 Post Mile 28.4 – 28.6
ID: 04-13000350
Marin County, California
Typical habitats supporting the MSB and its host plant, hookedspur violet (*Viola adunca*), are coastal dunes, coastal scrub, or coastal prairie at elevations ranging from sea level to 1,000 feet and as far as 3 miles inland. Critical factors in the distribution of the MSB include presence of the larval host plant and availability of nectar sources for adults.

**Survey Results**

No protocol-level surveys for MSB were conducted within the BSA. There is a CNDDB occurrence (Occurrence #10) of this species approximately 6 miles west of the BSA along the eastern shore of Drake’s Estero. The MSB has been known to move nearly 1 mile between coastal drainages, and a few miles per day inland.

This species’ host plant, *Viola adunca*, was not observed during rare and floristic plant surveys in 2014 through 2016. Nectar plants including *Cirsium vulgare*, *Achillea millefolium*, *Monardella undulate*, *Cirsium pycnocephalus*, and *Hypochaeris* spp., are present but not abundant onsite. These plant species may be viewed as secondary nectar sources. The site is not suitable for breeding habitat and is over 5 miles from known breeding locations.

**Northern Spotted Owl**

The USFWS listed the NSO as threatened under the FESA in 1990. In 2017, the California Fish and Game Commission adopted the findings for the August 25, 2016 decision to accept the petition to list the NSO as a threatened species under CESA. The BSA and project footprint are not located within critical habitat for the NSO. The NSO lives in forests with mixed mature trees and old growth trees. Although known from a wide variety of habitats, NSO generally rely on older forested habitats that include a moderate to high canopy; multilayered, multispecies canopy with large overstory trees; high incidence of large trees with large cavities and broken tops or large snags, large accumulations of fallen trees, and other woody debris on the ground; and sufficient open space below the canopy for owls to fly.

NSO home ranges (the area in which a NSO conducts its activities that provides important habitat elements for nesting, roosting, and foraging) vary widely by forest type, degree of habitat fragmentation, primary prey species, and geography. NSO home ranges vary geographically, generally increasing from south to north. The project is located in the California Coast Range (Douglas Fir/Mixed Conifer Zone) NSO physiographic province. The average NSO has a home range with an approximately 1.3-mile radius.
Survey Results

No formal protocol-level surveys for NSO have been conducted within the BSA, because very little suitable NSO foraging habitat exists within the BSA. There are numerous reported nest sites and potential nest sites, or activity centers, within 5 miles of the project area.

 Appropriately sized trees and habitat for NSO breeding are not located within the BSA. However, due to the proximity of the BSA to NSO activity centers, NSO may disperse through the area and the BSA may be suitable dispersal habitat. Woodrat (*Neotoma fuscipes*) nests within the BSA indicate the presence of a potential NSO food source and that the BSA may be suitable foraging habitat. Therefore, the BSA contains foraging and dispersal habitat for the NSO, but as the majority of the project area is along SR 1 and other developed areas, the habitat within the project area is severely degraded. No suitable nesting habitat is found in the area.

**Tidewater Goby**

The tidewater goby (*Eucyclogobius newberryi*), was federally listed as an endangered species on March 7, 1994. Critical habitat was redesignated for this species and revised January 31, 2008, with further critical habitat revisions and a re-designation published on February 6, 2013. This project falls within critical habitat for the tidewater goby.

The tidewater goby inhabits lagoons, estuaries, backwater marshes, and freshwater tributaries to estuarine environments in major coastal stream drainages. This species generally selects habitat in the upper estuary, usually within the freshwater-saltwater interface. Tidewater gobies range upstream a short distance into freshwater and downstream into water of up to about 75 percent saltwater. These conditions occur in the upper edge of large tidal bays, such as Tomales Bay.

Tidewater goby spawning typically occurs late spring through summer, with peak breeding activities occurring April through May.

Survey Results

A habitat assessment for this species was conducted within the BSA on August 11, 2015, by Caltrans biologists and National Park Service biologist Tim Bernot. Additional supporting information was obtained by experts surveying for this species. Submerged aquatic vegetation and sandy substrate ideal for tidewater goby was observed within the BSA and proposed project area under the bridge. Aquatic ecologist Darren Fong with the Golden Gate National Recreation Area and fishery...
biologist Michael Reichmuth with the NPS Inventory and Monitoring Program confirmed presence of tidewater goby within Lagunitas Creek throughout the BSA.

University of California, Los Angeles (UCLA) researcher, Brenton Spies, surveyed Lagunitas Creek during 2014-2015 assessments of this species throughout northern California. He recorded an abundance of tidewater goby within the project area, in the vicinity of the bridge (Figure 2.3.5-2). Tidewater gobies were found primarily in dense grass, submerged aquatic vegetation that strongly resembles pondweed (*Stuckenia pectinata*), and where sediment consisted of coarse sand to gravel and small cobble.

There is one CNDDB occurrence of tidewater goby (Occurrence #17) that overlaps with the project site.

**Chinook Salmon**

Chinook salmon (*Oncorhynchus tshawytscha*) that are present in Marin County coastal streams do not fall within a specified regulatory Evolutionarily Significant Unit (ESU) for this protected species, and are currently accepted as strays from either the California Coastal or one of the California Central Valley populations of Chinook salmon. For the purpose of this assessment, this species will be assessed as part of the California Coastal ESU. Chinook salmon was federally listed as threatened on September 16, 1999, and updated April 14, 2014. Critical habitat was designated for Chinook in September 2005. This project falls outside critical habitat for both the California Coastal and Central Valley Chinook salmon ESUs.

**Survey Results**

Although no formal habitat assessment or protocol-level surveys have been conducted within the BSA, spawning Chinook salmon have been documented within the Lagunitas Creek watershed and therefore this species could be present within the BSA). The BSA and project area likely provide suitable rearing (suitable for juvenile salmon) and migratory habitat for Chinook salmon.

**Central California Coast ESU Coho Salmon**

The CCC ESU of coho salmon was originally listed by NMFS as threatened on October 31, 1996; following a reassessment of the status, it was federally listed as an endangered species on June 28, 2005. Critical habitat was designated for this species on May 5, 1999 and a recovery plan was published for the CCC coho on September 12, 2012. This project falls within critical habitat for CCC coho.
FIGURE 2.3.5-2
Tidewater Goby Survey Locations
State Route 1 Lagunitas Creek Bridge Project
EA 0G642, MRN-1 Post Mile 28.4 – 28.6
ID: 04-13000350
Marin County, California
Chapter 2 Affected Environment, Environmental Consequences, and Avoidance, Minimization, and/or Mitigation Measures

The Lagunitas Creek watershed is of statewide significance for CCC ESU coho salmon. Coho salmon populations have declined substantially from historic levels throughout their California range. While the current population within Lagunitas Creek is considerably lower than historic levels, the watershed supports the largest and most stable coho population south of Noyo Creek, Mendocino County, and is of great importance to the recovery efforts across the CCC ESU.

Coho salmon are found as early-life stages in Lagunitas Creek throughout the year. They enter the Lagunitas Creek watershed through Tomales Bay in the fall months, typically between September and October. Adults migrate upstream following rain events, using the increased flow to help pass low-flow migration barriers. They will typically migrate to their stream or tributary of origin, occasionally stopping at deep pools to rest and hide from predation. Upstream migration from Tomales Bay and the lower Lagunitas Creek watershed to spawning areas can begin as early as October, but usually occurs between November and January, depending on rain events.

Coho benefit from diverse substrates, side channels, deep pools, floodplains, stream sinuosity, and, perhaps most importantly, from large woody debris.

Coho critical habitat is defined as the water, substrate, and adjacent riparian zone of estuarine and riverine reaches, including off-channel habitats, in hydrologic units that support the species (64 Fed. Reg. 24049). The physical and biological features essential for salmon survival include, but are not limited to, spawning sites, food resources, water quality and quantity, and riparian vegetation (see 50 CFR 424.12(b)). Riparian areas form the basis of healthy watersheds and affect the principle biological factors and therefore are essential to the conservation of the species and need to be included as critical habitat. (64 Fed. Reg. 24053). The BSA and project area are within federally designated critical habitat for CCC ESU coho salmon.

Survey Results

No formal habitat assessment or protocol-level surveys have been conducted within the BSA, because the CCC ESU coho salmon has been documented to occur within Lagunitas Creek throughout the BSA and project area. There is one CNDDB occurrence for this species (Occurrence #9) that summarizes their distribution throughout the Lagunitas Creek and Olema Creek watersheds, within the BSA and upstream of the project area in Lagunitas Creek. This species is well documented as occurring throughout Lagunitas Creek and its tributaries at all times of the year.
Lagunitas Creek throughout the BSA and project area likely provide suitable rearing and migration habitat for CCC ESU coho salmon.

**Central California Coast DPS Steelhead**

The federally threatened CCC DPS of steelhead consists of all steelhead runs from the Russian River in Sonoma County south to Aptos Creek in Santa Cruz County. In 1998, NMFS published a final rule to list the CCC steelhead as threatened under the FESA. Critical habitat was designated in 2005. Critical habitat for CCC steelhead is present within the BSA and project footprint.

Steelhead in Lagunitas Creek enter their natal stream in the winter and spawn almost immediately from December to April. Steelhead exhibit greater flexibility than Pacific salmon with regard to time spent in freshwater before migrating to the ocean, residing from 1 to 3 years in freshwater and one to two years in the ocean. The majority of steelhead smolts migrating to the ocean from Lagunitas Creek are 2 years of age. Like coho, steelhead prefer certain water conditions, gravel sizes, and temperature ranges for redd (spawning depression or nest) construction. Steelhead redds can be found in riffles, tops of riffles and pool tailouts. While migrating toward the ocean, steelhead smolts may either head straight to the open ocean or stay in estuarine waters for up to nine months. The role of the lower Lagunitas Creek and estuary, including Tomales Bay, for steelhead survival is just beginning to be studied. The project BSA is within federally designated critical habitat for CCC DPS steelhead.

**Survey Results**

No formal habitat assessment or protocol-level surveys have been conducted within the BSA. The CCC DPS steelhead, however, have been documented throughout the Lagunitas Creek watershed including the BSA and project area. Two CNDDB occurrences of this species document their presence in the Olema Creek watershed (Occurrence #38) and Lagunitas Creek watershed (Occurrence #6); the BSA and project area likely provide suitable rearing and migration habitat for CCC DPS steelhead.

**California Red-legged Frog**

The CRLF was federally listed as a threatened species on May 23, 1996. A recovery plan was published for the CRLF on September 12, 2002. Critical habitat was designated for this species on April 13, 2006, and a final revision was published on
March 17, 2010. The BSA is within critical habitat for the CRLF, but the project footprint is not.

The historical range of the CRLF extended coastally from the vicinity of Elk Creek in Mendocino County and inland from the vicinity of Redding, Shasta County, southward to northwestern Baja California, Mexico. The CRLF was historically documented in 46 counties, but is now extant in 238 drainages within 23 counties, representing a loss of 70 percent of its former range. The CRLF is still locally abundant within portions of the San Francisco Bay Area and the Central Coast.

California red-legged frogs predominantly inhabit permanent water sources such as streams, lakes, marshes, natural and constructed ponds, and ephemeral drainages in valley bottoms and foothills up to 4,921 feet in elevation. These areas may be characterized by the presence of dense, shrubby, or emergent vegetation closely associated with deep-water pools. Fringes of cattails (\textit{Typha} spp.) and dense stands of willows are examples of the vegetation found in such areas. The species may also be found in ephemeral creeks and drainages and in disturbed areas such as channelized creeks and drainage ditches in urban and agricultural areas.

California red-legged frogs typically breed between November and April, with earlier breeding records occurring in southern localities. Breeding often occurs in still or slow-moving water at least 2.5 feet deep with emergent vegetation, such as cattails (\textit{Typha} spp.), tules (\textit{Scirpus} spp.), or overhanging willows. Individuals occurring in coastal drainages are active year-round, whereas those found in interior sites are normally less active during the cold season.

Dispersal distances from breeding sites are typically less than 0.5 mile, with a few individuals moving up to distances of 1 to 2 miles. Meanwhile, non-migrating frogs typically stay within 200 feet of aquatic habitat and are most often associated with dense vegetative cover, such as California blackberry, poison oak, and coyote brush.

\textbf{Survey Results}

No formal habitat assessment or protocol-level surveys have been conducted within the BSA, because the CRLF has been documented as occurring within the BSA. There is a CNDDB occurrence from 2004 (Occurrence #743) within the BSA and upstream of the project area on Lagunitas Creek (Occurrence #742). The BSA and project area likely provide suitable breeding and dispersal habitat for CRLF.
The project footprint is not within federally designated critical habitat for the CRLF, but the southwesternmost area of the BSA is, as shown on Figure 2.3.5-3.

The BSA contains suitable aquatic breeding, aquatic non-breeding, and upland dispersal habitat for the CRLF (Figure 2.3.5-3). The existing paved roadway, compacted gravel areas, residential, urban, and landscaped areas do not support CRLF principal biological factors and are not included in habitat acreage. A pond to the west of the culvert north of the bridge is wet for a sufficient period of time and has appropriate aquatic vegetation to potentially support CRLF breeding. The Lagunitas Creek corridor, roadside ditches, and surrounding wetlands within the BSA are considered aquatic non-breeding habitat, while the remainder of the BSA, minus the existing roadway, is considered upland habitat (Figure 2.3.5-3).

**California Freshwater Shrimp**

The CFS was listed as endangered by the State of California on October 2, 1980, and the species was federally listed as endangered on October 31, 1988. A recovery plan was published for the CFS on July 31, 1998. Critical habitat has not been designated for this species.

CFS are endemic to perennial lowland streams in Sonoma, Marin and Napa counties. Lagunitas Creek has one of the largest populations and is the only stream that supports the CFS that runs through protected lands, and it is the most studied of any population. In a habitat assessment study of the species in Lagunitas and Olema Creeks, CFS were most abundant in calm slow moving sections of stream (64 percent) and pools (31 percent) with sandy streambed and were closely associated with submerged portions of streambank vegetation, especially blackberries, ferns, sedges, and the submerged fine roots from these and other plants. Areas with undercut banks are important high-flow refugia for the species, and this habitat feature may be a limiting factor for expansion and further recovery of the species.

**Survey Results**

No formal habitat assessment or protocol-level surveys have been conducted within the BSA, because CFS has been documented as occurring in stream reaches upstream and downstream of the BSA and is assumed present. There is a CNDDB occurrence from 1999 (Occurrence #4) that begins 1 mile upstream of the project area and extends over 8 miles up Lagunitas Creek. The next closest CNDDB occurrence is from 1997, in Olema Creek 0.17 mile upstream of where it joins Lagunitas Creek.
FIGURE 2.3.5-3
Potential California Red-legged Frog and Western Pond Turtle Habitat within the Biological Study Area
State Route 1 Lagunitas Creek Bridge Project
EA 0G642, MRN-1 Post Mile 28.4 – 28.6
ID: 04-13000350
Marin County, California

LEGEND

Project Area
Biological Study Area
California Red-Legged Frog Critical Habitat
Aquatic Habitat - Potential Breeding Pond
Aquatic Habitat
Upland Dispersal Habitat
Upland Riparian Habitat

Imagery Source: Marin County 2014
Chapter 2 Affected Environment, Environmental Consequences, and Avoidance, Minimization, and/or Mitigation Measures

(Occurrence #15). The BSA and project area within Lagunitas Creek provide suitable summer habitat for CFS. Approximately 1,275 linear feet of potential CFS habitat occurs within the BSA, with 86 to 128 linear feet within the project footprint alternatives.

Figure 2.3.5-4 shows all CNDDB occurrences of threatened and endangered species within 5 miles of the project.

2.3.5.3 ENVIRONMENTAL CONSEQUENCES

This section discusses potential effects to federally and state endangered and threatened species with the potential to be directly or indirectly affected by the Build Alternatives which as summarized from the NES (Caltrans 2017). While there are qualitative differences in the impacts between the various alternatives, pursuant to Section 7 of the FESA, Caltrans has concluded that all project alternatives would result in the same findings of effect on the federally threatened and endangered species recorded in Table 2.3.5-1. This section does not discuss impacts to Marin western flax, showy rancheria clover, Tiburon paintbrush, western snowy plover, or longfin smelt.

<table>
<thead>
<tr>
<th>Table 2.3.5-1</th>
<th>Caltrans Finding of Effect per FESA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Species</strong></td>
<td><strong>Finding of Effect</strong></td>
</tr>
<tr>
<td>Plants</td>
<td></td>
</tr>
<tr>
<td>Marin western flax (<em>Hesperolinon congestum</em>)</td>
<td>No effect</td>
</tr>
<tr>
<td>Showy rancheria clover (<em>Trifolium amoenum</em>)</td>
<td>No effect</td>
</tr>
<tr>
<td>Tiburon paintbrush (<em>Castilleja affinis var. Neglecta</em>)</td>
<td>No effect</td>
</tr>
<tr>
<td>Invertebrates</td>
<td></td>
</tr>
<tr>
<td>Myrtle’s silverspot butterfly (<em>Speyeria zerene myrtleae</em>)</td>
<td>No effect</td>
</tr>
<tr>
<td>California freshwater shrimp (<em>Syncaris pacifica</em>)</td>
<td>May affect, likely to adversely affect</td>
</tr>
</tbody>
</table>
### Table 2.3.5-1 Caltrans Finding of Effect per FESA

<table>
<thead>
<tr>
<th>Species</th>
<th>Finding of Effect</th>
<th>Reason/Justification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fish</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chinook salmon ((Oncorhynchus tshawytscha))</td>
<td>May affect, likely to adversely affect</td>
<td>Project would result in direct impacts to Chinook salmon habitat and may result in the take of individuals during construction and dewatering activities.</td>
</tr>
<tr>
<td>CCC DPS steelhead ((Oncorhynchus mykiss))</td>
<td>May affect, likely to adversely affect</td>
<td>Project would result in direct impacts to CCC DPS steelhead habitat and may result in the take of individuals during construction and dewatering activities.</td>
</tr>
<tr>
<td>CCC ESU coho ((Oncorhynchus kisutch))</td>
<td>May affect, likely to adversely affect</td>
<td>Project would result in direct and indirect impacts to CCC ESU coho habitat and may result in the take of individuals during construction and dewatering activities.</td>
</tr>
<tr>
<td>Tidewater goby ((Eucyclogobius newberry))</td>
<td>May affect, likely to adversely affect</td>
<td>Project would result in direct impacts to tidewater goby habitat and may result in the take of individuals during construction.</td>
</tr>
<tr>
<td>Longfin smelt ((Spirinchus thaleichthys))</td>
<td>No effect</td>
<td>Not expected to occur. National Park Service biologists conduct aquatic surveys of the area and have not found longfin smelt in upper Lagunitas Creek which encompasses the project footprint.</td>
</tr>
<tr>
<td><strong>Amphibians</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>California red-legged frog ((Rana draytonii))</td>
<td>May affect, likely to adversely affect</td>
<td>Project would result in direct impacts to CRLF habitat and may result in the take of individuals during construction activities.</td>
</tr>
<tr>
<td><strong>Birds</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northern spotted owl ((Strix occidentalis caurina))</td>
<td>No effect</td>
<td>No suitable nesting habitat exists within the BSA. Nesting territories are expected to be beyond the range of effects that could be caused by the proposed construction activities.</td>
</tr>
<tr>
<td>Western snowy plover ((Charadrius alexandrinus nivosus))</td>
<td>No effect</td>
<td>Not expected to occur. Sandy beach and salt pond habitat not present. Project footprint consists of paved, gravel, disturbed habitat, and aquatic surfaces. There are two CNDDDB occurrences within 5 miles of the project; the closest is 3.2 miles away.</td>
</tr>
</tbody>
</table>
FIGURE 2.3.5-4
CNDDB Occurrence of Threatened and Endangered Species within 5 Miles of the Project Location
State Route 1 Lagunitas Creek Bridge Project
EA 0G642, MRN-1 Post Mile 28.4 – 28.6
ID: 04-13000350
Marin County, California
Table 2.3.5-2 provides, by habitat, the total direct impacts on threatened and endangered species aquatic habitat and upland impacts as a result of bridge replacement and the culvert extension. Impacts on habitat for the NSO are not reported because very little suitable NSO habitat exists within the BSA, with none within the project area. Following Table 2.3.5-2, the consequences are described by species for both operational/permanent and construction/temporary impacts.

### Table 2.3.5-2  Total Impacts on Habitats for Threatened and Endangered Species

<table>
<thead>
<tr>
<th></th>
<th>Aquatic Habitat Impact (Goby, Chinook, Steelhead, Coho, CFS)</th>
<th>CCC Coho Riparian Habitat</th>
<th>CRLF Aquatic Habitat</th>
<th>CRLF Upland Habitat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Culvert Extension</td>
<td>0</td>
<td>0.12 (0.08/0.04)</td>
<td>0.02 (0.02/ &lt;0.01*)</td>
<td>0.12 (0.08/0.04)</td>
</tr>
</tbody>
</table>

**Bridge Replacement Project Alternative**

<table>
<thead>
<tr>
<th>Alternative 1 – No-Build</th>
<th>0</th>
<th>0</th>
<th>0</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alternative 2a—Three-span, short steel-truss bridge, ABC, longitudinal move-in</td>
<td>0.20 (0.16/ 0.04)</td>
<td>0.49 (0.42/ 0.07)</td>
<td>0.16 (0.16/ &lt;0.01)</td>
<td>1.89 (1.84/ 0.05)</td>
</tr>
<tr>
<td>Alternative 2b—Three-span, short steel-truss bridge, conventional (with detour bridge)</td>
<td>0.24 (0.20/0.04)</td>
<td>0.59 (0.51/ 0.08)</td>
<td>0.21 (0.21/ &lt;0.01*)</td>
<td>1.87 (1.81/ 0.06)</td>
</tr>
<tr>
<td>Alternative 3a—Three-span, concrete bridge, ABC, longitudinal move-in</td>
<td>0.18 (0.16/ 0.02)</td>
<td>0.48 (0.43/ 0.05)</td>
<td>0.16 (0.16/ &lt;0.01*)</td>
<td>1.77 (1.73/ 0.04)</td>
</tr>
<tr>
<td>Alternative 4a—Full-span, steel-truss bridge, ABC, longitudinal move-in</td>
<td>0.20 (0.16/ 0.04)</td>
<td>0.49 (0.43/ 0.07)</td>
<td>0.16 (0.16/ 0)</td>
<td>1.77 (1.72/ 0.05)</td>
</tr>
<tr>
<td>Alternative 4b—Full-span, steel-truss bridge, ABC, transverse slide-in</td>
<td>0.28 (0.24/ 0.04)</td>
<td>0.73 (0.66/ 0.07)</td>
<td>0.24 (0.24/ 0)</td>
<td>2.01 (1.96/ 0.05)</td>
</tr>
</tbody>
</table>

**Note:**

* Impact area rounded to 0.01 acre

**Alternative 1 – No-Build Alternative**

Under the No-Build Alternative, the proposed project would not be implemented. The No-Build Alternative would have minimal effects on threatened and endangered species.
Alternative 2a: Three-span, Short Steel-truss Bridge, ABC, Longitudinal Move-in

Operational Impacts

In general, the operation of the proposed project would have a minimal change to the habitat of threatened and endangered animals. The project would not result in increased traffic or otherwise alter the use of the project area.

Myrtle’s Silverspot Butterfly

The Alternative 2a project footprint does not support larval host plants for this species and is over 5 miles from known breeding locations. While the project may permanently reduce the amount of potential foraging habitat for MSB through the removal of suitable nectar plant species, these plants are not abundant within the BSA and the nectar plants that would be impacted have marginal value as habitat because they are adjacent to high-activity areas such as the roadway. No indirect impacts to MSB are anticipated. Therefore, the project would have no effect on MSB.

Northern Spotted Owl

The project is not anticipated to affect any NSO nesting habitat, as no suitable habitat exists within the BSA. Potential disturbance sources from the project would have no effect on NSO. Alternative 2a would remove approximately 0.5 acre of riparian tree canopy, but the tree species are primary Salix sp. and Acer sp. The tree species that typically support NSO roosting or nesting—evergreens such as bishop pine (Pinus muricata) and Douglas fir (Pseudotsuga menziesii)—are not present in the BSA. Coast redwood (Sequoia sempervirens), a species known to support NSO, is in the project BSA and adjacent to the project footprint, but there are less than a dozen individuals of this species, none of which are the mature, old-growth trees preferred by NSO. Therefore, negligible permanent impacts are anticipated on the NSO and the project would have no effect on NSO.

Tidewater Goby, Chinook, Steelhead, Coho, California Red-Legged Frog, and California Freshwater Shrimp

The culvert extension is disconnected from Lagunitas Creek, and there would be no impact to aquatic habitat of Lagunitas Creek. Therefore, these activities would have no effect to the tidewater goby, Chinook salmon, steelhead, or CFS or their habitats.

The culvert extension would result in minor permanent direct impacts to upland CRLF upland habitat and aquatic breeding habitat, and to coho salmon federally designated critical habitat (Table 2.3.5-2).
The proposed bridge replacement would result in permanent direct impacts to Lagunitas Creek habitat for tidewater goby, Chinook salmon, steelhead, coho salmon, CRLF, and CFS (Table 2.3.5-2) from the support piers in the Lagunitas Creek channel.

Alternative 2a (with piers in the Lagunitas Creek channel) would result in instream hydrological conditions almost identical to existing conditions. During normal flows and at bank-full flow, there is no measurable change in hydrology measured as stream velocity or shear stress due to Alternative 2a. The increased shear velocity at high flows could translate to increased sediment scour and sediment transport, but the increases modeled show a very slight difference. Given the homogenous nature of the stream reach through the BSA and the insignificant change in hydrology, the geomorphology of Lagunitas Creek throughout the BSA is not anticipated to change as a long-term result of the bridge replacement. Alternative 2a is not anticipated to substantially affect the fluvial sediment and flow regime. The geomorphology of Lagunitas Creek immediately downstream of the bridge is not anticipated to change (refer to Section 2.2.1 for hydraulic analysis).

The bridge would cast additional shading on the creek and streambank, which could alter the existing vegetation composition but may also provide more cooling to aquatic habitat during summer months when stream water temperatures can be inhospitable for tidewater goby fish. Therefore, Caltrans has determined that the proposed bridge replacement would have permanent direct effects to, and could adversely modify, CRLF, tidewater goby, and steelhead species, as well as to coho salmon critical habitat.

Construction Impacts
Temporary direct impacts result from the use of upland and aquatic habitat for construction equipment and materials staging, as well as clearing and grubbing riparian vegetation for construction activities and access to construction sites. The following discusses the temporary construction impacts of Alternative 2a on each of the threatened and endangered species.

Myrtle’s Silverspot Butterfly
Construction clearing and grubbing may result in minor, indirect impacts to MSB habitat from a change in composition of herbaceous vegetation. The amount of foraging habitat that would potentially be disturbed is minimal and degraded and/or subjected to high levels of disturbance. These indirect impacts would be avoided through implementation of measures such as erosion control, construction site best
management practices (BMPs), the Stormwater Pollution Protection Plan (SWPPP), and hydrosedding all areas with a seed mix that contains nectar species. Vegetation will be replanted in disturbed areas, including along the creek banks.

**Northern Spotted Owl**
The project construction is not anticipated to affect any NSO nesting habitat because no suitable habitat exists within the BSA and potential disturbance sources from the project would have no effect to NSO. Construction noise levels are not estimated to reach levels that would affect NSO in their known locations. Therefore, there are no temporary direct or indirect impacts to NSO or NSO habitat from Alternative 2a.

**Tidewater Goby, Chinook, Steelhead, Coho, California Red-Legged Frog and California Freshwater Shrimp**
The culvert extension would have temporary impacts to approximately 0.08 acre north of Lagunitas Creek. Culvert extension construction activities would not affect Lagunitas Creek. The tidewater goby, Chinook salmon, steelhead, and CFS are limited to the creek and do not have suitable habitat within the influence of the culvert extension activities. Therefore, culvert extension construction would have no effect to these species.

The culvert extension would affect CRLF upland and aquatic breeding habitat and federally designated coho salmon habitat due to vegetation trimming and removal, as well as a potential water diversion. Riparian trimming and removal of small trees with biological functions that can be replaced within a year of removal are considered temporary direct impacts. The water diversion and other culvert construction related activities may affect individual CRLF but not coho individuals, which do not occur within the influence of these activities (Table 2.3.5-2).

The bridge replacement would have temporary direct impacts on the Lagunitas Creek aquatic habitat. These impacts would be the same for the tidewater goby, Chinook salmon, steelhead, coho salmon, CRLF, and CFS, and are presented in Table 2.3.5-2. Temporary direct impacts on riparian habitat also affects the coho salmon and CRLF.

Alternative 2a includes grading, clearing, and grubbing of upland areas, which could result in minor, indirect impacts to upland and aquatic habitat from increased erosion and sedimentation, and adversely impact Lagunitas Creek. These indirect impacts would be avoided through implementation of measures such as erosion control, construction site BMPs, and the SWPPP. In addition, riparian plantings in disturbed
areas including along the creek banks would reduce erosion and sedimentation from the uplands in the longer term.

Because habitat conditions are homogenous upstream and downstream of the bridge throughout the BSA, and because Alternative 2a does not result in a substantial change in the hydrologic and geomorphologic conditions, indirect impacts to the aquatic habitat are not anticipated. Additional instream habitat enhancement, such as large woody debris integrated into the streambank reconstruction and revegetation of stream banks with plant species that comprise CCC DPS steelhead, CCC ESU coho salmon, CRLF, and CFS habitat (such as native *Rubus ursinus*), would provide enhanced habitat and refuge from high velocity stream flow.

Otherwise, there are no construction impacts on tidewater goby, Chinook salmon, CCC steelhead, or CFS, or their habitat, from the culvert extension.

**Alternative 2b: Three-span, Short Steel-truss Bridge, Conventional Construction (with Detour Bridge)**

**Operational Impacts**
All direct and indirect impacts would be same as for Alternative 2a.

**Construction Impacts**
Construction impacts would be similar to those under Alternative 2a, except a larger amount of upland area would be impacted and the additional piers in the water for the building of a temporary detour bridge would have greater effects on the aquatic species (tidewater goby, Chinook salmon, steelhead, coho salmon, CRLF, and CFS). Grading, clearing, and grubbing of upland areas that are not restored within 1 year of impact are considered permanent impacts. The longer duration of construction could directly affect CRLF breeding and foraging activities within the project footprint and would increase the potential for take of all of the aquatic species. The 3 years of dewatering activities would increase the potential for take of threatened and endangered aquatic species.

**Alternative 3a: Three-span, Concrete Bridge, ABC, Longitudinal Move-in**

**Operational Impacts**
All direct and indirect impacts would be the same as for Alternative 2a.

**Construction Impacts**
Construction impacts would be the same as for Alternative 2a.
Chapter 2 Affected Environment, Environmental Consequences, and Avoidance, Minimization, and/or Mitigation Measures

Alternative 4a: Full-span, Steel-truss Bridge, ABC, Longitudinal Move-in

Operational Impacts
All direct and indirect impacts would be same as for Alternative 2a, but there would be no piers located in the water. The permanent removal of concrete bridge support piers from the Lagunitas Creek channel will result in a small increase in habitat for aquatic species (tidewater goby, Chinook salmon, steelhead, coho salmon, CRLF, and CFS). Hydraulic and resulting geomorphic studies showed that Alternative 4a, which is a full-span bridge (no piers in the creek channel), allows slightly greater overall flow through the bridge during 100-year flow events, and slightly increased shear velocities along the bend, banks, and bridge abutments. However, flow and scour under the bridge would not be substantially different when compared to the No-Build or Alternative 2a.

Construction Impacts
Construction impacts would be the same as for Alternative 2a. Construction would involve removing the existing piers from the water, affecting the aquatic species similarly to Alternative 2a. However, because no new piers would be necessary, the duration of the disturbance would be lower.

Alternative 4b: Full-span, Steel-truss Bridge, ABC, Transverse Slide-in

Operational Impacts
All direct and indirect impacts would be same as for Alternative 4a.

Construction Impacts
Alternative 4b would have greater construction impacts than Alternative 2b, but the duration of construction activities would be shorter. The shorter duration of disturbance would result in a lower likelihood for take of threatened and endangered species.

2.3.5.4 Avoidance, Minimization, and/or Mitigation Measures
As indicated in Chapter 1, Proposed Project, Caltrans will be required to obtain permits from NMFS and CDFW for the potential take of federally and state threatened and endangered species. Prior to construction, Caltrans will have a formal consultation with NMFS to obtain a Biological Opinion and will request an Incidental Take Permit from CDFW. Caltrans will implement BMP Standard Specification (SSP) Section 14-10, Solid Waste Disposal and Recycling; SSP Section 13-04, Vehicle and Equipment Fueling and Maintenance; and SSP Section 13 which is the Water Pollution Control SSPs to manage debris, asphalt grinding and laying, fueling and dredging materials. These specifications would avoid pollutants and debris.
affecting sensitive species and their habitat. Also, to avoid and minimize impacts on threatened and endangered species, Caltrans will implement the following Avoidance and Minimization Measures presented elsewhere in this document, as follows:

- General AMMs identified in AMM AIR-1: Construction period BMPs as found in Section 2.2.6
- Water Quality AMMs provided in Section 2.2.2:
  - AMM WATER-1: Design pollution prevention measures
  - AMM WATER-2: Treatment measures
  - AMM WATER-3: Stormwater Pollution Prevention Plan
- Biological AMMs provided in Section 2.3.1, Natural Communities:
  - AMM BIO-1: Revegetation
  - AMM BIO-2: Environmental Sensitive Area (ESA) fencing
- Biological AMMs provided in Section 2.3.4, Animal Species
  - AMM BIO-7: Migratory Birds

**Myrtle’s Silverspot Butterfly**
- AMM BIO-12: Myrtle’s silverspot butterfly (MSB) surveys prior to vegetation clearing. Prior to construction, Caltrans or its contractor will coordinate with USFWS to designate a USFWS-approved biologist for MSB. The USFWS-approved biologist will conduct surveys for foraging MSB adults ahead of vegetation clearing during construction within the project footprint and at regular intervals until all clearing is completed.
- AMM BIO-13: Vegetation removal in early fall. During construction, Caltrans or its contractor will remove vegetation between September 1 and October 15, which is outside the typical MSB adult flight period, unless prior agreement can be obtained with CDFW, NMFS, and USFWS.
- AMM BIO-14: Reseed with MSB foraging plant species. Caltrans or its contractor will obtain USFWS agency-approved seed mixes. The seed mixes will be used after construction to revegetate disturbed areas with potential nectar species for MSB. (This planting plan will include consideration of this and AMM
BIO-1, 4, 5, 22; Mitigation Measures BIO-B, C, and D; AMM VISUAL-3; and AMM PARKS-3.)

**Tidewater Goby**

Impacts on Tidewater Goby will be avoided and minimized through AMM BIO-3 (see Section 2.3.1 Natural Communities) and AMM BIO-15, described below.

- **AMM BIO-15: Protections for in-water work.** During construction, Caltrans or its contractor will be responsible for ensuring that all in-water work in Lagunitas Creek will be conducted inside cofferdams or other temporary water diversion system and in isolation from flowing water.

  During construction, Caltrans or its contractor will be restricted from performing in-water work consistent with seasonal window approved by the appropriate resource agency (NMFS, CDFW)—for example from June 1 to October 30, when surface water flows are lowest and special-status aquatic species are least likely to be present at the project site. The exact dates of the in-water work seasonal window will be determined in coordination with resource agencies during the permitting phase of the project and based on the final project design.

  Prior to construction, Caltrans will develop a detailed Dewatering and Species Rescue Plan to be approved by CDFW, USFWS, and NMFS. This plan will guide approved biologists with experience handling special-status fish species and California freshwater shrimp in the construction monitoring, capture, removal, and relocation of special-status aquatic species, should they be encountered, in accordance with conditions of the USFWS and NMFS biological opinions and the CDFW ITP.

  Dewatering activities by the contractor during construction will avoid entrainment of special-status aquatic species by placing pump intakes away from complex vegetated banks that may contain California freshwater shrimp habitat and use a screen on intake pumps that provides water passage while physically excluding the CFS. In addition, the approach velocity to the pump intakes will not exceed 0.33 foot per second. The pump intake screens must also meet the USFWS and NMFS fish screening criteria for anadromous salmonids to prevent them from being impinged or entrained on the pump.
Central California Coast ESU Coho Salmon, Chinook Salmon, and Steelhead

- **Mitigation Measure BIO-B: CCC coho mitigation.** Caltrans will enhance the streambed within the BSA by placing large woody debris along the banks of Lagunitas Creek within the BSA. The habitat mitigation planting plan will be designed to mitigate permanent impacts at a 3:1 ratio and would be implemented within a year of completion of construction (also, see Mitigation Measure BIO-A in Section 2.3.2.4). Caltrans will work closely with CDFW, USFWS, and NMFS during the permitting phase of the project to determine appropriate onsite and, if needed, offsite mitigation to confirm all impacts from the final project designs are fully mitigated.

California Red-legged Frog

- **AMM BIO-16: Pre-construction survey for CRLF.** Prior to construction, Caltrans or its contractor will be responsible for ensuring a USFWS-approved biologist will be onsite to monitor all construction activities that could reasonably result in take of individual CRLF, including work within the creek bed and grubbing. The biologist will conduct a pre-construction survey for CRLF ahead of any ground-disturbing activities. The qualifications of the biologist(s) will be presented to the USFWS for review and written approval prior to groundbreaking at the job site.

- **AMM BIO-17: Biologist authority to stop construction.** During construction, a USFWS-approved biologist will have the authority to halt work through coordination with the Caltrans resident engineer in the event that a protected species is discovered within the project footprint. The resident engineer will confirm construction activities remain suspended in any construction area where the qualified biologist has determined that a potential direct impact of CRLF or other protected species could occur. Work will resume once the animal leaves the site voluntarily, is removed by the biologist(s) to a release site using USFWS-approved handling techniques, or is determined to not be being harassed by construction activities.

- **AMM BIO-18: Shielding lighting from sensitive habitat areas.** During nighttime work, Caltrans or its contractor will direct all lighting downward and toward the active construction work area, and away from sensitive habitat areas.
Chapter 2 Affected Environment, Environmental Consequences, and Avoidance, Minimization, and/or Mitigation Measures

- **AMM BIO-19: Limitations for rodenticides and/or herbicides.** Rodenticides and/or herbicides will be used in the project footprint during construction by the contractor only if necessary and in such a manner as to prevent primary or secondary poisoning of protected species and the depletion of vegetation upon which they depend. The contractor will observe label and other restrictions mandated by the U.S. Environmental Protection Agency, and California Department of Food and Agriculture, and other appropriate state and federal regulations.

- **AMM BIO-20: Protection against animal entrapment.** To prevent the inadvertent entrapment of the animals, all excavated, steep-walled holes or trenches more than 1 foot deep will be covered by the contractor at the close of each working day by plywood or similar materials. If it is not feasible to cover an excavation, one or more escape ramps shall be installed. Before such holes or trenches are filled, they will be thoroughly inspected for trapped animals. If, at any time, a trapped listed animal is discovered, the biologist will immediately place escape ramps or the relevant resource agency will be contacted by telephone for guidance. The relevant resource agency will be notified by the contractor or Caltrans of the incident by telephone and email within 1 working day.

- **AMM BIO-21: Resource agency access during construction.** If requested, before, during, or upon completion of groundbreaking and construction activities, Caltrans will allow access by USFWS, NMFS, CDFW, and other agency personnel into the project footprint to inspect the project and its activities.

- **Mitigation Measure BIO-C: Potential California red-legged frog (CRLF) compensatory measure.** Caltrans has the option to mitigate for permanent impacts to the California red-legged frog by funding approved mitigation bank for the project’s USFWS Service Area, at a ratio of 3:1, or mitigating onsite. Funding will be provided before the completion of construction. The final determinations of habitat impacts and required compensatory mitigation from the culvert extension and bridge replacement as well as mitigation location will be refined during Section 7 formal consultation with USFWS.

**California Freshwater Shrimp**

- **Mitigation Measure BIO-D: Habitat enhancement for California freshwater shrimp (CFS).** Caltrans or its contractor will incorporate the preferred habitat substrate vegetation for California freshwater shrimp, California blackberry...
(Rubus ursinus), into the onsite Habitat Mitigation Planting Plan to recreate beneficial habitat for this species and compensate for temporary habitat impacts. The Habitat Mitigation Planting Plan will be designed to mitigate permanent impacts at a 3:1 ratio. The Habitat Mitigation Planting Plan would be implemented within 1 year of completion of construction within the BSA. Plantings will be monitored for a minimum of 1 year, with replanting as necessary within that year. (This planting plan will include consider the planting implications as noted in AMMs BIO-1, -4, -5, -14, and -22; Mitigation Measures BIO-B and -C; and AMMs VISUAL-3 and PARKS-3.)

Please also refer to AMM BIO-15 for measures protecting CFS during in-water work.

2.3.6 Invasive Species
2.3.6.1 REGULATORY SETTING
On February 3, 1999, President William J. Clinton signed Executive Order (EO) 13112 requiring federal agencies to combat the introduction or spread of invasive species in the United States. The order defines invasive species as “any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem whose introduction does or is likely to cause economic or environmental harm or harm to human health.” Federal Highway Administration (FHWA) guidance issued August 10, 1999 directs the use of the State’s invasive species list, maintained by the California Invasive Species Council (CISC), to define the invasive species that must be considered as part of the National Environmental Policy Act analysis for a proposed project.

2.3.6.2 AFFECTED ENVIRONMENT
Information regarding invasive species was obtained from the Natural Environment Study (Caltrans 2017).

Invasive Plants Observed within the Biological Study Area
Several invasive plant species identified by the California Invasive Plants Council (Cal-IPC) as being a serious problem in California occur within the biological study area (BSA). These species are identified on the California Invasive Plant Inventory (CIPI) (Cal-IPC 2016). The CIPI is based on evaluation criteria (i.e., ecological impact, invasive potential, distribution) to assign plants to an overall inventory category of high, moderate, or limited. The CIPI invasive species list for the BSA is based on the categories of species known to occur in the Northwest Region of California for the habitat types of Marine Systems, Freshwater and Estuarine Aquatic Systems, Bogs, Marshes, Riparian, and Bottomland habitat. The species fulfilling
these criteria are presented in Table 2.3.6-1. Not all these invasive plant species have been identified on site, but they have the potential to occur in the area.

Table 2.3.6-1 Invasive Plant Species Known to Occur in the Region and Habitats of the BSA

<table>
<thead>
<tr>
<th>Species</th>
<th>Common Names</th>
<th>Risk Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ailanthus altissima</td>
<td>tree-of-heaven, Chinese sumac</td>
<td>Moderate</td>
</tr>
<tr>
<td>Arundo donax</td>
<td>giant reed</td>
<td>High</td>
</tr>
<tr>
<td>Bromus diandrus</td>
<td>ripgut brome, great brome</td>
<td>Moderate</td>
</tr>
<tr>
<td>Bromus madritensis ssp. rubens</td>
<td>red brome, foxtail chess</td>
<td>High</td>
</tr>
<tr>
<td>Centaurea melitensis</td>
<td>Malta starthistle, tocalote</td>
<td>Moderate</td>
</tr>
<tr>
<td>Centaurea solstitialis</td>
<td>yellow starthistle</td>
<td>High</td>
</tr>
<tr>
<td>Cirsium vulgare</td>
<td>bull thistle</td>
<td>Moderate</td>
</tr>
<tr>
<td>Conium maculatum</td>
<td>poison-hemlock</td>
<td>Moderate</td>
</tr>
<tr>
<td>Delairea odorata</td>
<td>Cape-ivy, German ivy</td>
<td>High</td>
</tr>
<tr>
<td>Dipsacus fullonum</td>
<td>common teasel, wild teasel</td>
<td>Moderate</td>
</tr>
<tr>
<td>Dipsacus sativus</td>
<td>Fuller's teasel</td>
<td>Moderate</td>
</tr>
<tr>
<td>Egeria densa</td>
<td>Brazilian egeria, egeria</td>
<td>High</td>
</tr>
<tr>
<td>Eucalyptus globulus</td>
<td>blue gum, Tasmanian blue gum</td>
<td>Limited</td>
</tr>
<tr>
<td>Ficus carica</td>
<td>edible fig</td>
<td>Moderate</td>
</tr>
<tr>
<td>Geranium dissectum</td>
<td>cutleaf geranium</td>
<td>Limited</td>
</tr>
<tr>
<td>Hedera helix, H. canariensis</td>
<td>English ivy, Algerian ivy</td>
<td>High</td>
</tr>
<tr>
<td>Hypochaeris glabra</td>
<td>smooth cat's-ear</td>
<td>Limited</td>
</tr>
<tr>
<td>Hypochaeris radicata</td>
<td>common cat's-ear, rough cat's-ear</td>
<td>Moderate</td>
</tr>
<tr>
<td>Lepidium latifolium</td>
<td>perennial pepperweed, tall whitetop</td>
<td>High</td>
</tr>
<tr>
<td>Lolium multiflorum (Festuca perennis)</td>
<td>Italian ryegrass</td>
<td>Moderate</td>
</tr>
<tr>
<td>Ludwigia peploides</td>
<td>creeping waterprimrose, California waterprimrose</td>
<td>High</td>
</tr>
<tr>
<td>Lythrum hyssopifolium</td>
<td>hyssop loosestrife, grass poly</td>
<td>Limited</td>
</tr>
<tr>
<td>Mentha pulegium</td>
<td>pennyroyal, European pennyroyal</td>
<td>Moderate</td>
</tr>
<tr>
<td>Myoporum laetum</td>
<td>ngaio tree, false sandalwood</td>
<td>Moderate</td>
</tr>
<tr>
<td>Myriophyllum spicatum</td>
<td>spike watermilfoil</td>
<td>High</td>
</tr>
<tr>
<td>Potamogeton crispus</td>
<td>curly-leaved pondweed, curled pondweed</td>
<td>Moderate</td>
</tr>
<tr>
<td>Pyracantha angustifolia, crenulata, coccinea</td>
<td>narrowleaf firethorn, scarlet firethorn</td>
<td>Limited</td>
</tr>
</tbody>
</table>
Table 2.3.6-1 Invasive Plant Species Known to Occur in the Region and Habits of the BSA

<table>
<thead>
<tr>
<th>Species</th>
<th>Common Names</th>
<th>Risk Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ranunculus repens</td>
<td>creeping buttercup</td>
<td>Limited</td>
</tr>
<tr>
<td>Rubus armeniacus</td>
<td>Himalayan blackberry</td>
<td>High</td>
</tr>
<tr>
<td>Rumex acetosella</td>
<td>sheep sorrel</td>
<td>Moderate</td>
</tr>
<tr>
<td>Rumex crispus</td>
<td>curly dock</td>
<td>Limited</td>
</tr>
<tr>
<td>Saponaria officinalis</td>
<td>bouncing-bet, bouncing betty</td>
<td>Limited</td>
</tr>
<tr>
<td>Spartina densiflora</td>
<td>dense-flowered cordgrass, Chilean</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>cordgrass</td>
<td></td>
</tr>
<tr>
<td>Tamarix parviflora</td>
<td>smallflower tamarisk</td>
<td>High</td>
</tr>
<tr>
<td>Tamarix ramosissima, T.</td>
<td>saltcedar, tamarisk</td>
<td>High</td>
</tr>
<tr>
<td>gallica, T. chinensis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Torilis arvensis</td>
<td>hedgeparsley, spreading hedgeparsley</td>
<td>Moderate</td>
</tr>
<tr>
<td>Verbascum thapsus</td>
<td>common mullein, wooly mullein</td>
<td>Limited</td>
</tr>
</tbody>
</table>

Source: Cal-IPC 2016

2.3.6.3 ENVIRONMENTAL CONSEQUENCES

Alternative 1: No-Build Alternative

Under the No-Build Alternative, the proposed project would not be implemented. As with any major roadway, the No-Build Alternative would continue to contribute to the spread of invasive species in the BSA through ongoing use of State Route 1.

Alternative 2a: Three-span, Short Steel-truss Bridge, ABC, Longitudinal Move-in

Operational Impacts

The operation of the proposed project is expected to have a minimal effect on the distribution of invasive species within the BSA over the existing condition. Use of any roadway can result in further propagating these non-native species that have a competitive advantage over natives due to higher tolerance for roadway-related disturbances (e.g., exhaust, dust, increased wind exposure) and/or better suitability for habitats where the natural plant communities have been disrupted by human activity. However, the project is not expected to result in an increase in invasive wildlife species.
Construction Impacts

Alternative 2a would result in the disturbance of some areas where there are moderately invasive plant species such as Italian ryegrass and brome species found along the existing roadsides and work areas. Construction equipment and materials have the potential to introduce and/or spread new or existing invasive plant species into the BSA during project implementation. To avoid the spread/introduction of aquatic invasive species during dewatering, the dewatering equipment—including sheet piles, wall material, pumps, and plumbing—would be cleaned before and after use. If equipment and/or materials are used at both the culvert and Lagunitas Creek, they will be cleaned before being moved between the locations. Construction of the bridge would require removal of both native and invasive species to access the sides of the bridge. These areas of exposed soil may become more susceptible to the establishment and spread of invasive species. Improper removal and disposal of invasive plants and their seeds could contribute to the spread of invasive species.

The planned measures presented below in Section 2.3.6.4, Avoidance, Minimization, and/or Mitigation Measures, will help limit the spread of invasive species in the bridge construction footprint following construction and will comply with EO 13112 during this project. None of the species on the CIPI list of invasive species for the BSA are currently used by Caltrans for erosion control or landscaping.

Alternative 2b: Three-span, Short Steel-truss Bridge, Conventional (with Detour Bridge)

Operational Impacts

All direct and indirect impacts would be same as under Alternative 2a.

Construction Impacts

Construction impacts would be the same as under Alternative 2a, except a larger area of exposed soil would be made vulnerable to invasive species for the building of a temporary detour bridge. The 3-year construction period would substantially extend the opportunity for invasive species to become established before re-seeding with native plants would occur.

Alternative 3a: Three-span, Concrete Bridge, ABC, Longitudinal Move-in

Operational Impacts

All direct and indirect impacts would be same as under Alternative 2a.

Construction Impacts

Construction impacts would be the same as under Alternative 2a.
Alternative 4a: Full-span, Steel-truss Bridge, ABC, Longitudinal Move-in

Operational Impacts
All direct and indirect impacts would be same as under Alternative 2a.

Construction Impacts
Construction impacts would be the same as under Alternative 2a.

Alternative 4b: Full-span, Steel-truss Bridge, ABC, Transverse Slide-in

Operational Impacts
All direct and indirect impacts would be same as under Alternative 2a.

Construction Impacts
Construction impacts would be the same as under Alternative 2b, except the duration would be shorter, and therefore there would be a shorter time for invasive species to become established. A larger area of exposed soil needed for constructing Alternative 4b would expand the area vulnerable to invasive species.

2.3.6.4 AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES
The following measures are proposed to avoid and minimize project effects on natural plant communities related to the spread of invasive species:

- **AMM BIO-22: Replanting with native seed mix.** Prior to construction, Caltrans will include language in the bid solicitation package directing the contractor to use erosion and sediment control materials that are free of invasive species and to hydroseed all disturbed areas with a native seed mix after construction, where appropriate for the site conditions and where plants are likely to become established. (This planning plant will include consideration of this and AMMs BIO-1, -4, -5, and -14, and Mitigation Measure BIO-D.)

- **AMM BIO-23: Invasive species.** In compliance with EO 13112 and FHWA guidance, Caltrans will not use any invasive species for replanting efforts. Caltrans will direct the contractor to dispose of all terrestrial and aquatic invasive plant material at an approved location and to inspect equipment regularly for aquatic and terrestrial invasive plant material. All plant material brought onsite for construction will be certified as weed-free. The contractor will be required to inspect construction equipment for aquatic and terrestrial invasive plant material and seeds prior to construction, remove and dispose of aquatic and terrestrial invasive plants in the project footprint cautiously, and replant the site with fast-growing, non-invasive species. In areas of particular sensitivity (e.g., near drainages), extra precautions will be taken if aquatic invasive species are found in...
or next to the construction areas. These include the inspection and cleaning of construction equipment and eradication strategies to be implemented should an invasion occur.

2.4 Cumulative Impacts

This section provides information regarding past, present, and reasonably foreseeable development projects dating from 2005 onward which, together with the proposed Lagunitas Creek Bridge Project, could potentially have a substantial or considerable contribution to cumulative environmental impacts in the respective resource study area. While the past is generally represented by the current existing condition, this analysis reviews known projects that have resulted in recent changes in the previous 10 years. The reasonably foreseeable future is generally a 20-year timeframe.

Incremental impacts that may result from the Lagunitas Creek Bridge Project are considered in the context of the cumulative condition that exists from previous human actions and in light of other reasonably foreseeable future actions. The analysis proceeds as follows: (1) determine which resources would be significantly impacted by the project; (2) determine whether there is a detrimental cumulative condition within the context of impacts from past, present and other reasonably foreseeable future actions; and (3) determine whether, collectively, the proposed project and the foreseeable condition combine to result in a cumulative impact.

2.4.1 Regulatory Setting

Cumulative impacts are those that result from past, present, and reasonably foreseeable future actions, combined with the potential impacts of the proposed project. A cumulative effect assessment looks at the collective impacts posed by individual land use plans and projects. Cumulative impacts can result from individually minor but collectively substantial impacts taking place over a period of time.

Cumulative impacts to resources in the project area may result from residential, commercial, industrial, and highway development, as well as from agricultural development and the conversion to more intensive agricultural cultivation. These land use activities can degrade habitat and species diversity through consequences such as displacement and fragmentation of habitats and populations, alteration of hydrology, contamination, erosion, sedimentation, disruption of migration corridors, changes in water quality, and introduction or promotion of predators. They can also contribute to
potential community impacts identified for the project, such as changes in community character, traffic patterns, housing availability, and employment.

The California Environmental Quality Act Guidelines Section 15130 describes when a cumulative impact analysis is necessary and what elements are necessary for an adequate discussion of cumulative impacts. The definition of cumulative impacts under CEQA can be found in Section 15355 of the CEQA Guidelines. A definition of cumulative impacts under NEPA can be found in 40 CFR Section 1508.7 of the Council on Environmental Quality (CEQ) Regulations.

2.4.2 Resources Analyzed

The Interim Guidance: Questions and Answers Regarding the Consideration of Indirect and Cumulative Impacts in the NEPA Process Guidance for Preparers of Cumulative Impact Analyses (FHWA 2003) describes how the cumulative impact analysis should focus on (1) resources substantially impacted by the proposed project, or (2) resources currently in poor or declining health. The resources evaluated in this Draft EIR/EA that meet these criteria are:

- Visual/Aesthetics resources along the SR 1 corridor in the resource study area (which is eligible as a State Scenic Highway)
- Land Use/Coastal Zone
- Biological Environment: state and federally listed species and their critical habitats, state species of special concern, wetlands, and the riparian area of Lagunitas Creek

2.4.3 Resources with No Cumulative Impacts

If a proposed project would not result in a direct or indirect adverse effect on a resource, then it would not contribute to a cumulative impact on that resource, and does not need to be further evaluated. In the initial phases of the project, the following resources were determined not to have an adverse effect from the proposed project: Growth, Wild and Scenic Rivers, Farmlands/Timberlands, Environmental Justice, Cultural Resources, Energy, Paleontology, or Mineral Resources; therefore, these resources would not contribute to a cumulative impact. Through the evaluation in the preceding sections of Chapter 2 of this Draft EIR/EA, it was also determined that the proposed project would not result in adverse effects, and thus no cumulative impacts, on the following resources: Parks and Recreational Facilities, Community Impacts, Utilities/Emergency Services, Traffic and Transportation/Pedestrian and

Certain resources are not vulnerable to incremental/cumulative impacts. Examples include geologic and seismic hazards related to future developments in the EIR/EA resource study area. Geologic and seismic hazards are site-specific and relate to the type of building or structure proposed and soil composition and slope of a given site. None of the other planned projects in the vicinity would interact with the reconstructed bridge to increase the risk of geologic or seismic hazards, and therefore, no further cumulative impact analysis is warranted here.

### 2.4.4 Resource Study Areas

Table 2.4-1 lists all resource areas included in the cumulative analysis, as well as the resource study area that corresponds to the cumulative analysis for each resource (shown in Figure 2.4-1 for Visual/Aesthetics and Land Use/Coastal Zone and Figure 2.4-2 for Biological Environment). The resource study areas in the context of the cumulative analysis are different than the “study areas” defined in the preceding sections of this EIR/EA for analyzing the direct and indirect impacts to each resource area. That is because a cumulative impact analysis reviews the resources in the project vicinity as a whole rather than merely the potential range of direct and indirect impacts from the project.

**Table 2.4-1  Cumulative Impact Analysis by Resource Area**

<table>
<thead>
<tr>
<th>Resource Area</th>
<th>Inclusion in Cumulative Analysis</th>
<th>Resource Study Area (RSA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land Use/Coastal Zone</td>
<td>Yes</td>
<td>West Marin County: Coastal Zone (includes Tomales Bay)</td>
</tr>
<tr>
<td>Visual/Aesthetics</td>
<td>Yes</td>
<td>West Marin County –Unit II Coastal Zone (parks and open space)</td>
</tr>
<tr>
<td>Biological Environment</td>
<td>Yes</td>
<td>Local Watershed – Lagunitas Creek and Tomales Bay</td>
</tr>
</tbody>
</table>
FIGURE 2.4-2
Lagunitas Creek Watershed
Biological Resource Study Area
State Route 1 Lagunitas Creek Bridge Project
EA 0G642, MRN-1 Post Mile 28.4 – 28.6
ID: 04-13000350
Marin County, California
2.4.4.1 VISUAL/AESTHETICS
The resource study area for Visual/Aesthetics resources was established as the West Marin County – Tomales Bay Coastal Zone and Federal Land areas which contain the corridor for SR 1, north of the project footprint. More specifically, this resource study area spans and extends north of Lagunitas Creek and is located in an Federal and Coastal Zone areas surrounded by Tomales Bay State Park, the Golden Gate National Recreation Area (GGNRA), and Point Reyes National Seashore lands; therefore, vast amounts of open space provide a serene backdrop for travelers along SR 1 north and south of the project area. Lagunitas Creek is the main stem of the largest watershed in Marin County which empties into Tomales Bay. The landscape is characterized by flat alluvial plains defining the upper portion of Tomales Bay. The entire length of SR 1 in Marin County is scenic and listed as being eligible for designation as a State Scenic Highway.

2.4.4.2 LAND USE/COASTAL ZONE
The resource study area for Land Use/Coastal Zone is Marin County’s agriculture, open space and Coastal Zone for West Marin Unit II, which is shown on Figure 2.4-1, as limited to only the delineated Coastal Zones. The majority of the land is under federal or state ownership and therefore not open for development. The West Marin County/Tomales Bay Coastal Zone area was established for Land Use because the SR 1 corridor and the project site reside within a coastal zone area of high scenic quality and open space that provides a unique and naturally pristine visual experience for residents and travelers through this part of Marin County. The resource study area is subject to Marin County’s Local Coastal Program (LCP; Marin County 1981), which has strong land use protections for visual quality, open space, state and national recreation areas, and agriculture in this same coastal area of Marin.

Land uses within the immediate project vicinity are primarily rural residential and agricultural, but also include areas of commercial uses that cater to tourists visiting the Point Reyes National Seashore. The local character and land use of the project site and its vicinity are defined primarily by the town of Point Reyes Station, which is a rural community centered on SR 1, just north of the Lagunitas Creek Bridge. Because Point Reyes Station serves as a tourist destination, weekend activity transforms the rural community into a bustling commercial center catering to large groups of cyclists, recreationalists, motorcyclists, and tourists (traveling by automobiles, RVs and campers).
Defining characteristics of the area immediately surrounding Lagunitas Creek in the project area are the riparian vegetation on the creek’s banks, the overhead utility infrastructure, and the neighboring buildings. A dense thicket of willow (*Salix* spp.) occurs primarily along the northern bank of Lagunitas Creek. Mixed willow thickets are also present along the dispersed wetland areas that parallel SR 1 along the edge of the roadway. Red willow (*Salix laevigata*), box elder (*Acer negundo*), California buckeye (*Aesculus californica*), and coast live oak (*Quercus agrifolia*) were also observed in this area, with abundant arroyo willow (*Salix lasiolepis*) in the subcanopy.

Overhead utilities include a combination of power and telecommunication cables strung on separate poles above and immediately west of the bridge. The neighboring buildings to the south of the bridge are one- to two-story residential structures, with the building immediately southwest of the bridge in use as a law office. To the north is a one-story commercial building housing the Point Reyes Animal Hospital that also includes one residential unit attached to the same building.

To the west of the bridge is Whitehouse Pool Park, which is accessed just north of the bridge as well as from other points from within Point Reyes Station and further west along Lagunitas Creek.

### 2.4.4.3 BIOLOGICAL ENVIRONMENT

The resource study area for Biological Environment resources is the local watershed of Lagunitas Creek and Tomales Bay and associated wetlands. This resource study area was estimated to support the species population that would potentially be affected by the project. The project site along SR 1 crosses Lagunitas Creek near its transition into the Giacomini Wetlands and Tomales Bay. The Lagunitas Creek watershed was established as the resource study area for Biological resources as it drains 107 square miles of west central Marin County and is the largest watershed in the county. Biological resources within this watershed have similar environmental and hydrological characteristics and support the same wetland and riparian natural communities and threatened and endangered species habitats in this coastal setting as the proposed project site (BSA). Lagunitas Creek terminates in Tomales Bay west of Point Reyes Station after it flows through the Giacomini Wetlands preserve and the Tomales Bay Ecological Reserve.

The Lagunitas Creek watershed provides habitat for numerous fish and wildlife species, including state and federal endangered species. At the project location, the surrounding riparian habitat is degraded by residential and commercial development.
surrounding the bridge site, but is relatively intact surrounding the culvert north of the bridge. The area surrounding the project is also host to a wide diversity of vegetation communities, including riparian trees, coastal wetlands, and grasslands, and consists predominantly of un-developed agricultural lands used to graze cattle and protected open space managed by the GGNRA and the National Park Service (NPS). Also, two environmentally sensitive habitat areas (ESHAs), defined as sensitive habitats in the California Coastal Act, are located within the resource study area and include wetlands and riparian vegetation. In addition to various animals and migratory and resident bird species known to occur in the biological resource study area, Lagunitas Creek also has a relatively diverse aquatic ecosystem and supports many aquatic species such as coho salmon, tidewater goby, steelhead, and the California freshwater shrimp.

2.4.5 Historical Context/Current Status
Marin County has zoned much of West Marin as agriculture or open space. For the Visual/Aesthetics, Land Use/Coastal Zone, and Biological Environment resource study areas, past development in the West Marin County area is limited and in general involves small to minor improvements to residential or commercial structures already developed in the Point Reyes Station community, and minor maintenance activities or improvements to bridges or roadways in the area. The largest past project approved in this area was the Giacomini Wetland Restoration project at the mouth of Lagunitas Creek where it empties into Tomales Bay, completed in 2008, which will improve the health and water quality of Lagunitas Creek. The Marin Countywide Plan (Marin County 2007) is very restrictive regarding development along the coast, limiting the number of projects approved historically. Restrictions to development are imposed by the Marin County LCP and through the California Coastal Commission, where applicable. The LCP and the California Coastal Act (CCA) regulate the use of land, water-oriented (watershed) development, and biological and restoration plans in this area. Through its coastal development permitting process, the LCP and Coastal Commission limit activities and development that would diminish coastal resources and would require mitigation for any substantial adverse effects that cannot be avoided. As a result, the health of coastal resources in this area is relatively high. Although not officially designated, the entire length of SR 1 in West Marin is eligible as a State Scenic Highway due to the high intact integrity of visual features in the surrounding landscape, which includes rural residential, agriculture, and open space.

The Lagunitas Creek watershed and floodplain are considered a sensitive natural area, because the creek empties into Tomales Bay, supports various protected plant and
animal species, is lined with wetlands, and is largely undeveloped. While past agricultural development in the resource study area has constrained the flow channel of the creek, the riparian vegetation is mature and abundant. Although sensitive, Lagunitas Creek is a 303(d) impaired water body according to the U.S. Environmental Protection Agency because of nutrient, pathogen, and sediment pollution into the waterway (Regional Water Quality Control Board [RWQCB] 2012). Water bodies designated as 303(d) are water bodies that do not meet water quality objectives and are impaired to the point that they do not support their beneficial uses, which for Lagunitas Creek is cold freshwater habitat for fish and wildlife protection and propagation (RWQCB 2012). Efforts are underway to improve the health and water quality in the watershed through voluntary efforts and sediment reduction programs, which in turn will protect the health of biological resources within the Lagunitas Creek watershed.

The following sections provide information regarding past, present, and reasonably foreseeable development projects dating from 2005 onward, which—together with the proposed project—could potentially make a considerable contribution to cumulative environmental impacts. For this cumulative impacts analysis, Caltrans evaluated the effects of recent projects (known within the last 10 years in consultation with Marin County planners and the Lagunitas Creek Bridge stakeholder group, among other institutions) and those pending or proposed in the project vicinity. The proposed project is evaluated in the context of the various cumulative projects listed below to identify (1) whether the combined effects from the proposed project and other actions are cumulatively significant, and (2) if a cumulatively significant impact is found to exist, whether the Lagunitas Creek Bridge Project would make an incremental contribution to that impact that is cumulatively considerable.

Figure 2.4-3 and Table 2.4-2 identify the various past, present, and reasonably foreseeable private and public development projects that lie within the resource study areas that comprise the context via which the proposed project’s Land Use/Coastal Zone, Visual/Aesthetics, and Biological Environment resource cumulative impacts are evaluated. Reasonably foreseeable future projects are those that are likely to occur in the future as verified by adopted plans, or have a completed environmental review, and would add to the cumulative impact on a particular resource. The horizon of 20 years, or through 2035, was established as the range for projects to be searched. Relevant projects in the vicinity were identified by searching capital improvement plans in Marin County, Caltrans’ Standard Tracking and Exchange Vehicle for Environmental Systems (STEVE) database, and the Farallones National Marine
Figure 2.4-3
Other Planned Projects within the Lagunitas Creek Bridge Resource Study Areas

State Route 1 Lagunitas Creek Bridge Project
EA0G642, MRN-1 Post Mile 28.4 – 28.6
ID: 04-13000350
Marin County, California

*All projects listed are within the visual, land use and biological resources study areas.
### Table 2.4-2 Cumulative Projects: Past, Present, and Reasonably Foreseeable Projects in the Vicinity of the Lagunitas Creek Bridge Project

<table>
<thead>
<tr>
<th>Map ID</th>
<th>Project Name/ Sponsor</th>
<th>Location</th>
<th>Characteristics</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bonded Wearing Course Overlay/ Caltrans</td>
<td>State Route (SR) 1 post mile (PM) 31.2</td>
<td>New pavement</td>
<td>Under environmental review phase.</td>
</tr>
<tr>
<td>2</td>
<td>SR 1 Reconstruct Slip with Retaining Wall/ Caltrans</td>
<td>SR 1 PM 31.2</td>
<td>Stabilize Roadway Slopes with cast-in-drilled-hole piles</td>
<td>Under environmental review phase.</td>
</tr>
<tr>
<td>3</td>
<td>Olema Unnamed Tributary Culvert Replacement/Caltrans</td>
<td>SR 1 PM 24.7</td>
<td>Replace tributary crossing on SR 1 with bottomless culvert and improve shoulder</td>
<td>NEPA and CEQA documentation complete. Anticipate construction to initiate in 2017, improvement in 2018.</td>
</tr>
<tr>
<td>4</td>
<td>SR 1 Center Line Rumble Strips/ Caltrans</td>
<td>SR 1 PM 3.1 – 50.5</td>
<td>Install centerline rumble strips</td>
<td>Under environmental review phase.</td>
</tr>
<tr>
<td>5</td>
<td>Millerton Gulch Bridge Scour Mitigation/ Caltrans</td>
<td>SR 1 PM: 33.4</td>
<td>Repair damaged embankment and construct retaining wall.</td>
<td>Under environmental review phase.</td>
</tr>
<tr>
<td>6</td>
<td>Tomales Bay Vessel Management Plan and Mooring Program/ Greater Farallones National Marine Sanctuary (National Marine Fisheries Service [NMFS])</td>
<td>Tomales Bay</td>
<td>Plan to improve water quality, protect wildlife and habitat, protect public health and ensure recreational opportunities in Tomales Bay. It also implements the mandates and regulations re: vessel sewage discharge, impacts from moorings, derelict or deserted vessels, introduction of invasive species, disturbance of wildlife, and discharges of oil, fuel, and vessel maintenance products.</td>
<td>Completed NEPA and CEQA review and adopted plan. Implementing mooring program since August 10, 2016.</td>
</tr>
<tr>
<td>7</td>
<td>Lagunitas Creek Floodplain and Riparian Enhancement Design/ Coastal Conservancy</td>
<td>Lagunitas Creek Floodplain</td>
<td>Restoration of coho salmon rearing habitat along a one mile reach of Lagunitas Creek floodplain near the community of Olema in Marin County. This project will facilitate the restoration of hydrologically connected floodplains and redwood forests with high quality aquatic habitat that is essential to sensitive populations of coho salmon, steelhead, and endangered California freshwater shrimp.</td>
<td>Funded May 2016 to produce design plans, prepare permit applications and provide environmental compliance for restoration of floodplain. Restoration of coho habitat in Lagunitas Creek is identified as a core priority by the NMFS and the California Department of Fish and Wildlife in their respective coho recovery plans.</td>
</tr>
</tbody>
</table>
Table 2.4-2  Cumulative Projects: Past, Present, and Reasonably Foreseeable Projects in the Vicinity of the Lagunitas Creek Bridge Project

<table>
<thead>
<tr>
<th>Map ID</th>
<th>Project Name/ Sponsor</th>
<th>Location</th>
<th>Characteristics</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>West Marin –Safe Routes to School Plan for Point Reyes Station/ Marin County</td>
<td>Point Reyes Station Business District</td>
<td>Plan to identify pedestrian and bicycle improvements for routes to schools, including shoulders, crosswalk, install curbs and signage.</td>
<td>Planning efforts will be implemented as funds are available.</td>
</tr>
<tr>
<td>9</td>
<td>Federal Lands Access Program/ National Park Service</td>
<td>Sir Francis Drake Blvd. from Pierce Point Road to the Point Reyes Lighthouse</td>
<td>Resurfacing project on Sir Francis Drake Blvd</td>
<td>Funded for summer 2016.</td>
</tr>
<tr>
<td>10</td>
<td>Federal-Aid Bridge Replacement Project/ Marin County</td>
<td>Sir Francis Drake Blvd. east of SR 1 by 0.5 mile</td>
<td>Replace aging bridge over Olema Creek just before the creek merges into Lagunitas Creek at mouth of Tomales Bay.</td>
<td>No environmental review yet. Construction anticipated in 2019.</td>
</tr>
</tbody>
</table>

Notes:

- Map ID refers to the numbered labels on Figure 2.4-3 showing the location of each project.
- Sources:
  - Tomales Bay Vessel Management Plan (Greater Farallones National Marine Sanctuary and California State Lands Commission, 2013)
  - Lagunitas Creek Floodplain and Riparian Enhancement Design (Coastal Conservancy, 2016).

Sanctuary website, as well as consulting with Marin County Planning Department planners and the NPS (Lagunitas Creek Bridge Stakeholder Working Group, 2016).

While some management plans may extend over 20 years, the majority of the projects located in the West Marin County resource study areas would be implemented within the next 10 years.

2.4.6 Proposed Project Impacts

2.4.6.1 Land Use/Coastal Zone, Visual/Aesthetics, and Biological Environment

Land Use/Coastal Zone. Vast areas of West Marin are under federal or state ownership or farmland preserves and therefore not subject to development. For land
use, the proposed project would not result in any impacts that would be inconsistent with any state and regional transportation plans and policies or local land use policies. The exception to this is the proposed project’s inconsistency with the Marin County LCP (Marin County 1981), which governs development impacts on resources within the Coastal Zone. The project area is located in Unit II of the Coastal Zone of Marin County, which is covered by the Marin County LCP.

The CCA and Marin County LCP contain policies that protect visual resources.

Under the Coastal Act Section 30251: “The scenic and visual qualities of coastal areas shall be considered and protected as a resource of public importance. Permitted development shall be sited and designed to protect views to and along the ocean and scenic coastal areas, to minimize the alteration of natural land forms, to be visually compatible with the character of surrounding areas, and, where feasible, to restore and enhance visual quality in visually degraded areas. New development in highly scenic areas such as those designated in the California Coastline Preservation and Recreation Plan prepared by the Department of Parks and Recreation and by local government shall be subordinate to the character of its setting.

Under the Marin County LCP, the following policies apply to visual resources:

Recreation and Visitor-Serving Facilities. Private recreational and visitor serving development. “Point Reyes Station. Development shall be located out of the most environmentally sensitive areas of the site and shall minimize visual impacts on Highway 1 and other public viewing points. Structures shall be limited in height to that which is compatible with the character of the surrounding area. The site is particularly sensitive visually and must be developed with careful attention to visual factors.”

Policy 139 states: Tomales Bay and adjacent lands in the Unit II Coastal Zone form a scenic panorama of unusual beauty and contrast. The magnificent visual character of Unit II lands is a major attraction to the many tourists who visit the area, as well as to the people who live there. New development in sensitive visual areas, such as along the shoreline of Tomales Bay and on the open rolling grasslands east of the Bay, has the potential for significant adverse visual impacts unless very carefully sited and designed.”

Alternatives 4a or 4b, involving construction of a full-span, steel-truss bridge, would be inconsistent with the Marin County LCP with respect to visual resources/scenic quality within the Coastal Zone. These Build Alternatives, which would have a
moderately high visual change (adverse effect) compared to the moderate or low visual change of the other alternatives, and thus would not comply with the policy regarding view protection, which prohibits development that would significantly degrade the scenic qualities of major views and vista points. The bridge structure to span Lagunitas Creek under Alternatives 4a or 4b would include steel trusses on the sides that are at least twice as tall as the existing bridge trusses, and would also include horizontal connecting beams over the roadway that would introduce a new element into the existing landscape setting, which would adversely affect the scenic character of the entry into Point Reyes Station. The visual impact of Alternatives 4a and 4b would be adverse because they would be out of scale with surrounding development and therefore are inconsistent with Coastal Act Section 30251 and the LCP. All remaining Build Alternatives along with the No-Build Alternative would be consistent with the Marin County LCP.

The resource study area contains plentiful parks and open spaces including Point Reyes Seashore, GGNRA, and Tomales Bay, with multiple entities managing these resources for long-term sustainable ecosystem protection, namely NPS, Greater Farallones National Marine Sanctuary, and the California Coastal Conservancy, as well as regulatory permitting agencies and the County of Marin. Each of the project Build Alternatives would require acquisition of a small sliver of property from the County Park adjacent and parallel to SR 1 in order to provide safe pedestrian access between the bridge, the Park trailhead just north of the bridge, and the town of Point Reyes Station. While this is an acquisition of parklands that would permanently remove some vegetation along SR 1 and temporarily affect use of the park during construction, the result would be safer access to and from the park trailhead. This would provide an incremental benefit to the recreational resource and access to open space lands.

**Visual/Aesthetics.** The summary of project effects presented in Section 2.1.6, Visual/Aesthetics, of this Draft EIR/EA indicates that the overall visual effect of the project in terms of visual resource change, viewer response, and overall visual impacts would be considered moderate or low for most of the Build Alternatives. However, the exception is that with the implementation of Alternative 4a or 4b, full-span steel-truss bridge, the increase in scale and addition of new horizontal elements into the visual setting would constitute an overall adverse visual effect. The remaining Build Alternatives would have more moderate visual effects, and the No-Build would have no effect on visual resources.
Biological Environment. This project occurs in an environmentally sensitive area, and would require environmental permits prior to construction. The bridge replacement project, under all Build Alternatives, would impact state and federally listed species and their critical habitats, state species of special concern, wetlands, and the riparian area of Lagunitas Creek. Federally and state listed species that could potentially be impacted by this project include the endangered California freshwater shrimp (*Syncaris pacifica*) and the Central California Coast coho salmon (*Oncorhynchus kisutch*). Federally listed species that could potentially be impacted by this project include the federally threatened California red-legged frog (*Rana draytonii*), Central California Coast DPS steelhead (*Oncorhynchus mykiss*), Chinook salmon (*Oncorhynchus tshawytscha*), and northern spotted owl (*Strix occidentalis caurina*), as well as the federally endangered tidewater goby (*Eucyclogobius newberryi*) and Myrtle’s silverspot butterfly (*Speyeria zerene myrtleae*).

Avoidance and minimization, and if necessary, compensatory measures, would be required and regulated through several permits. Permits required for this project include a Biological Opinion from the U.S. Fish and Wildlife Service, a Coastal Development Permit from the California Coastal Commission, a Lake and Streambed Alteration Agreement and Incidental Take Permit from the California Department of Fish and Wildlife, a 404 permit from the U.S. Army Corps of Engineers, and a 401 water quality certification from the San Francisco Bay Regional Water Quality Control Board. Additional regulatory partners engaged in the planning process include the National Park Service, State Lands Commission, Marin County Parks and Open Space District, the Greater Farallones National Marine Sanctuary, and the United States Coast Guard. Through these permits, the project would avoid long-term adverse effects on special-status species.

From a hydrological standpoint, the existing Lagunitas Creek watershed water flows can vary dramatically from year to year and can result in water levels overtopping creek banks during 100-year flood events. Alternatives with piers in the Lagunitas Creek channel would result in instream hydrological conditions almost identical to existing conditions, while designs with the full span (no piers in the channel) result in slightly greater overall flow beneath the bridge during 100-year flow events and slightly increased shear velocities along the bend, banks, and bridge abutments. During normal flows, and at bank-full flow, there is no measurable change in hydrology measured as stream velocity or shear stress due to any of the bridge replacement alternatives. Alternatives 4a and 4b, full-span, steel-truss bridge, would result in eliminating two existing piers in the creek, and thus would result in a slightly
larger and less inhibited channel flow, which would benefit Lagunitas Creek aquatic habitat by allowing higher flood flows to pass uninhibited through the bridge structure. Alternatives 2a, 2b, and 3a would not provide the same benefit to floodplain and hydrology of Lagunitas Creek, but would not result in detrimental impacts, either. The special-status aquatic species listed above would be adversely affected by the replacement bridge because all the Build Alternatives are wider and have a larger overall footprint in aquatic habitat compared to the existing bridge. Alternatives 4a and 4b, full-span, steel-truss bridge, would increase available habitats by eliminating two existing piers in the creek.

The construction activities for culvert extension may require a water diversion system and dewatering of the construction area. These temporary activities may adversely affect individual California red-legged frogs, since potential breeding habitat may be present near the culvert. Additionally, the bridge replacement would require constructing cofferdams and dewatering inside the cofferdams for pier construction and removal of existing piers. This process may involve fish relocation which would result in the potential take of protected species. These are short-term impacts under Alternatives 2a, 3a and 4a. However, Alternatives 2b and 4b would result in additional disturbance east of the existing bridge to accommodate a detour bridge or the construction of the new bridge before sliding it into final location.

Grading, clearing, and grubbing of upland areas from both the culvert extension and bridge replacement could result in indirect impacts to aquatic habitat from increased erosion, sedimentation, and solar radiation, thus adversely impacting Lagunitas Creek. These indirect impacts would be avoided and minimized through implementation of the general AMMs, including implementation of erosion control, construction site BMPs, and the stormwater pollution prevention plan as discussed in more detail in Section 2.3.5, Threatened and Endangered Species. In addition, hydroseeding and wetland and riparian plantings would reduce erosion, sedimentation, and solar radiation in the longer term. Shading vegetation would be replanted in disturbed areas including along the creek banks. Instream habitat enhancement would provide enhanced habitat and refuge from high velocity stream flow. Each of the alternatives would affect sensitive aquatic species (through siltation, relocation and potentially individual takes), but the effects would be relatively short-term, with the exception of Alternative 2b which would require 3 years to construct, with each year involving periods of in-water work. This would result in an incremental adverse effect during these periods, although not jeopardize the health of any of the identified protected or sensitive species.
2.4.7 Reasonably Foreseeable Projects

Reasonably foreseeable future and present projects (see Table 2.4-1 and Figure 2.4-3) were reviewed to determine whether they would have elements that would be considered to contribute to a cumulative impact with respect to inconsistency with policies related to land use or the Coastal Zone, or would substantially diminish the scenic quality of the SR 1 corridor in the West Marin County resource study areas. The same evaluation was used to determine whether there are reasonably foreseeable projects which, when combined with the proposed project, would have a cumulative impact that would diminish the overall health of a biological resource in the Lagunitas Creek watershed area. Reasonably foreseeable projects are those that are under or are pending environmental review or are awaiting funding/construction.

Reasonably foreseeable future and present projects in the resource study area would result in incremental beneficial impacts on land use, open space and park resources, such as the Federal Lands Access Program project to resurface Sir Francis Drake Boulevard, the Federal-Aid Bridge Replacement Project to replace the bridge over Olema Creek, and the West Marin–Safe Routes to School Plan for Point Reyes Station/Marin County. Each of these projects would improve safe accessibility which benefits open space and park users. While all Lagunitas Creek Bridge Build Alternatives would result in acquiring park land, none of the other reasonably foreseeable future and present projects require acquisition of park lands; rather, some are improving or adding to existing resources, such as the Giacomini Wetland Restoration Project and the Tomales Bay Vessel Management Plan and Mooring Program. Therefore, these other proposed projects would have no adverse impact on the land use or scenic quality of existing park and recreational facilities, but rather would have beneficial impacts.

Reasonably foreseeable future and present projects in the West Marin County – Tomales Bay resource study area were reviewed to determine if they would have elements that would be inconsistent with the Marin County LCP with respect to visual resources/scenic quality and/or influence the status of SR 1 as eligible to be nominated as a scenic highway. Most projects would not be visually discernible in the project vicinity once completed, or they would enhance the Coastal Zone within the study areas, such as the Lagunitas Creek Floodplain and Riparian Enhancement Design project and the Giacomini Wetland Restoration Project. Therefore, these other proposed (or recently completed) projects would have no impact on the view protection/scenic quality policies of the Marin County LCP.
Reasonably foreseeable future and present projects in the local watershed of Lagunitas Creek resource study area were reviewed to determine if they have elements that would have an adverse effect with respect to biological resources. Reasonably foreseeable and planned projects include the Olema Unnamed Tributary Culvert Replacement project, which has undergone NEPA and CEQA review; the Tomales Bay Vessel Management Plan and Mooring Program, which has also undergone NEPA and CEQA review and is under construction; the SR 1 Center Line Rumble Strips project which has undergone CEQA and NEPA review and California Coastal Commission permit approval, which will enhance fish passage at various creek locations; and the Lagunitas Creek Floodplain and Riparian Enhancement Design project, which will restore hydrologically connected floodplains to enhance aquatic habitats for sensitive populations of coho salmon, steelhead, and freshwater shrimp (Table 2.4-2). Other planned projects include the replacement of the Olema Creek bridge which is located along Sir Francis Drake Boulevard west of the project site. Although this project has not yet undergone environmental review, it will be subject to Caltrans’ NEPA and CEQA review in order to identify and mitigate potential project impacts to sensitive biological resources. Lastly, the Giacomini Wetland Restoration Project underwent environmental review and construction was completed in 2008. Although construction may have resulted in short-term disturbance of sensitive habitats, this project has enhanced the biological resources in the resource study area through wetland restoration and water quality enhancement activities, and continues to do so through active monitoring and management.

As stated above, Lagunitas Creek supports many threatened and endangered aquatic species. The reasonably foreseeable and planned projects (Table 2.4-2 and Figure 2.4-3) would each have short-term indirect impacts on water quality from potential spills from equipment, and from earth movement resulting in potential sedimentation in stormwater and streams. However, some of these projects (e.g., the Lagunitas Creek Floodplain and Riparian Enhancement Design project) are environmental restoration projects that are specifically designed to improve water quality (beneficial effects), while others (e.g., road and bridge improvements) would avoid or minimize impacts through BMPs, regulatory oversight, and/or permitting. Therefore these projects would not result in adverse impacts on the health of the threatened and endangered aquatic species or their critical habitat areas.
2.4.8 Cumulative Impacts Determinations

Visual/Aesthetic Resources. Cumulative impacts on the scenic quality and visual resources of the West Marin County – Tomales Bay area would not result from the Lagunitas Creek Bridge project in combination with other planned and proposed projects because most projects are not visually discernible in the project area or would enhance the visual quality of the existing open space, park, and recreational facilities.

The cumulative discussion for visual/aesthetic resources concludes that the proposed project in combination with these other proposed projects would have no direct or indirect cumulative impact on the visual and scenic quality of SR 1 as eligible to be a scenic highway, or on the resource study area surrounding the Lagunitas Creek vicinity, or on the view protection/scenic quality policies of the California Coastal Act or Marin County LCP. No mitigation measures are necessary.

Land Use and Coastal Zone Resources. For the same reasons stated above, the cumulative discussion for land use and Coastal Zone resources concludes that the proposed project in combination with other planned and proposed projects would have no cumulative direct or indirect impact on the land use/coastal policies of the Marin County LCP. No mitigation measures are necessary.

Biological Environment Resources. Cumulative impacts on coastal wetlands could result from past, current, and reasonably foreseeable future projects in the region, including periodic maintenance and replacement of culverts and bridges, and associated installation of hardscape and erosion protection measures along waterway banks throughout the region. These projects will all undergo (or have undergone) separate environmental review, and will require separate environmental permits. Measures are incorporated to address the avoidance and minimization of ecological impacts for these individual projects as part of the environmental review and regulatory/resource agency permit acquisition process. Implementation of measures to avoid and minimize impacts to wetlands and waters designed into the Lagunitas Creek Bridge Project, as well as proposed onsite restoration by Caltrans, would also address this project’s contribution to cumulative impacts to coastal wetlands. It is possible that the Lagunitas Creek Bridge Project, the Olema Creek bridge replacement, and the Lagunitas Creek Floodplain and Riparian Enhancement Design project could overlap in construction periods within the same water source, raising the potential for cumulative impacts. However, both projects would require extensive involvement and oversight from both the NMFS and CDFW, whose objective is to
protect aquatic resources, especially special-status aquatic species. Avoidance and minimization measures would be incorporated as conditions of regulatory permits for these projects, and therefore incremental cumulative impacts are not anticipated.

The aquatic species in the study area are healthier with increasing enhancements to the critical habitat. Measures to address construction impacts on the proposed project and other reasonably foreseeable future actions would continue to add enhancements to counter the negligible cumulative impacts on special-status species or protected habitats, such as coastal wetlands or critical habitats. Species potentially disturbed by construction activities will have adequate refuge away from the bridge replacement and culvert extension project area given the undeveloped nature of the landscape. Caltrans will restore the site to its pre-project condition as much as practicable, and will install additional habitat enhancement features (Caltrans 2017).

The cumulative discussion for biological resources of the potential impacts on the Lagunitas Creek Local Watershed concludes that the proposed project in combination with the other planned and proposed projects would have negligible cumulative impact on the biological environment resources within the biological resource study area, and incorporated measures to address adverse effects are included in each project with oversight of federal and state regulatory agencies. No further mitigation measures are necessary.
Chapter 3  California Environmental Quality Act Evaluation

3.1 Determining Significance under CEQA

The proposed project is a joint project by the California Department of Transportation (Caltrans) and the Federal Highway Administration (FHWA) and is subject to state and federal environmental review requirements. Project documentation, therefore, has been prepared in compliance with both the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA). FHWA’s responsibility for environmental review, consultation, and any other action required in accordance with NEPA and other applicable federal laws for this project is being, or has been, carried-out by Caltrans under its assumption of responsibility pursuant to 23 United States Code (USC) 327. Caltrans is the lead agency under CEQA and NEPA.

One of the primary differences between NEPA and CEQA is the way significance is determined. Under NEPA, significance is used to determine whether an Environmental Impact Statement (EIS), or a lower level of documentation, will be required. NEPA requires that an EIS be prepared when the proposed federal action (project) as a whole has the potential to “significantly affect the quality of the human environment.” The determination of significance is based on context and intensity. Some impacts determined to be significant under CEQA may not be of sufficient magnitude to be determined significant under NEPA. Under NEPA, once a decision is made regarding the need for an EIS, it is the magnitude of the impact that is evaluated and no judgment of its individual significance is deemed important for the text. NEPA does not require that a determination of significant impacts be stated in the environmental documents.

CEQA, on the other hand, does require Caltrans to identify each “significant effect on the environment” resulting from the project and ways to mitigate each significant effect. If the project may have a significant effect on any environmental resource, then an Environmental Impact Report (EIR) must be prepared. Each and every significant effect on the environment must be disclosed in the EIR and mitigated if feasible. In addition, the CEQA Guidelines list a number of mandatory findings of significance, which also require the preparation of an EIR. There are no types of actions under NEPA that parallel the findings of mandatory significance of CEQA. This chapter discusses the effects of this project and CEQA significance.
3.2 Effects of the Build Alternatives

The CEQA Environmental Significance Checklist (Appendix A) identifies the physical environmental effects that might be affected by implementation of the proposed Build Alternatives. The findings for the CEQA Checklist were determined in consultation with the technical studies prepared for this project, as listed in Appendix E, List of Technical Studies. The evaluation of environmental impacts provided in this section and in Appendix A is based on the environmental impact questions contained in Appendix G of the CEQA Guidelines. The CEQA impact levels include potentially significant impact, less-than-significant impact with mitigation, less-than-significant impact, and no impact. In many cases, background studies performed in connection with the Build Alternatives indicate no significant impact.

3.2.1 No Effects

As part of the scoping and environmental analysis conducted for the Build Alternatives, the following resource areas were considered but found to have no impact and were not analyzed further: wild and scenic rivers, growth, and agricultural resources (including farmlands/timberlands) and tribal cultural resources. Refer to the beginning of Chapter 2 for a more detailed description of these resource areas.

In addition, no impact was found when the Build Alternatives were evaluated for the following environmental resources:

3.2.1.1 Biological Resources
The project would have no effect on the following federally listed species, due to lack of suitable habitat, as described in Table 2.3.5-1: Marin western flax, showy rancheria clover, Tiburon paintbrush, Myrtle’s silverspot butterfly, northern spotted owl, longfin smelt, and western snowy plover.

3.2.1.2 Mineral Resources
The Build Alternatives would not intrude on local or statewide valuable minerals. As stated in Section 2.2.3, Geology, there are no mineral resources that have a significant mining value in the project area.

3.2.1.3 Population and Housing During Operation
The Build Alternatives would not induce population or employment growth in the project area, given that the proposed bridge would not increase roadway capacity or provide new points of access. Project implementation would not permanently displace
existing residents or housing, nor would it necessitate construction of replacement housing elsewhere. The project would have no impact on population or housing.

3.2.1.4  RECREATION DURING OPERATION
During operation of the Build Alternatives, the trailhead at State Route (SR) 1 would be accessible to the public. Therefore, the project would have no permanent impact on recreation.

3.2.1.5  HAZARDS AND HAZARDOUS MATERIALS
Wildland fires are a seasonal hazard in northern California and represent more than half the fires occurring in the unincorporated areas. According to the California Department of Forestry and Fire Protection (CAL FIRE) map of Marin County Fire Hazard Severity Zones in State Responsibility Area (CAL FIRE 2007), the project area is not located in a region identified as a high or very high fire hazard severity zone. Consequently, there is a low to no risk of wildland fire associated with the project.

3.2.1.6  TRANSPORTATION AND TRAFFIC DURING OPERATION
As discussed in Section 2.1.5, all Build Alternatives would improve permanent safety conditions by incorporating current seismic standards and Americans with Disabilities Act (ADA) requirements; this would also improve accessibility for motor vehicles, bicyclists, and pedestrians. The Build Alternatives would not conflict with any applicable plans, ordinances, or policies establishing measures of effectiveness for the circulation system. There would be no impact on transportation operations.

3.2.1.7  UTILITIES AND SERVICE SYSTEMS DURING OPERATION
As discussed in Section 2.1.4, Utilities and Emergency Services, the Build Alternatives would not create a demand for additional water or wastewater treatment, or other utilities. Also, they would upgrade existing storm drainage facilities to meet water quality standards. The project would not increase roadway capacity or open new points of access for development potential and, therefore, would not be a trigger for future development that would place an increased demand on existing utilities and service systems. There would be no impacts on utilities and service systems during operation.

3.2.1.8  PUBLIC SERVICES DURING OPERATION
Operation of the Build Alternatives would not permanently increase population, job opportunities, or alter the circulation system. Thus, the Build Alternatives would not affect the ability of fire fighters, the sheriff’s department, or other emergency services
to maintain acceptable service ratios, response times, or other performance objectives. As discussed in Section 2.1.2.1, Community Character and Cohesion, project operation would not impact schools, libraries, community centers, social services, or recreational opportunities in the project vicinity.

### 3.2.1.9 AIR QUALITY DURING OPERATION
The proposed project is exempt from regional and project-level conformity determination per 40 Code of Federal Regulations 93.126, and an operations and construction air quality analysis was not required. The Build Alternatives would also not result in changes in operational criteria pollutant emissions, and therefore would not impact emissions of ozone precursors, carbon monoxide (CO), and particulate matter (PM). This project has been determined to generate minimal air quality impacts for Federal Clean Air Act criteria pollutants and has not been linked with any special mobile source air toxic concerns. As such, this project, during operation, would not result in changes in traffic volumes, vehicle mix, basic project location, or any other factor that would cause an increase in mobile source air toxic impacts of the project compared to the No-Build Alternative.

### 3.2.1.10 NOISE DURING OPERATION
An analysis of noise impacts from operation of the project is not required. All Build Alternative are projects that will not result in a substantial vertical or horizontal realignment of the roadway and will not increase the capacity of the roadway. The operation of the proposed project would have no change on noise.

### 3.2.2 Less than Significant Effects of the Build Alternatives
The CEQA Checklist identified the following items as “less than significant.” These items include resource areas where the Build Alternatives would have a less-than-significant effect before mitigation and with the implementation of the avoidance and minimization measures identified in the relevant sections of Chapter 2.0, Affected Environment, Environmental Consequences, and Avoidance, Minimization, and/or Mitigation Measures.

#### 3.2.2.1 AIR QUALITY DURING CONSTRUCTION
The Build Alternatives would temporarily increase the amount of CO, PM$_{10}$, PM$_{2.5}$, reactive organic gas, nitrogen oxide, and sulfur oxide emissions related to the construction of this project under each Build Alternative. These emissions are presented in Table 2.2.6-5, in the Air Quality section of Chapter 2. The total emissions would vary by each Build Alternative, but, in general, all emissions would
be less than the Bay Area Air Quality Management District thresholds of significance, with the exception of nitrogen oxide.

To address emissions from construction activities, equipment and vehicles would comply with federal, state, and local regulations (such as, California Air Resources Board’s [ARB’s] On-Road Heavy-Duty Diesel Vehicles [In-Use] Regulation—Truck and Bus Regulation), which would further minimize and reduce construction-related emissions. They would also comply with Caltrans Standard Specification Section 14, “Environmental Stewardship,” which addresses the contractor’s responsibility on many items of concern, such as air pollution. Section 14-9.02 includes specifications relating to controlling air pollution by complying with air pollution control rules, regulations, ordinances, and statutes provided in Government Code Section 11017 (Public Contract Code §10231). Section 14-11.04 is directed at controlling dust. The construction period is temporary (less than 3 years), so these emissions are considered to be less than significant. However, in addition to meeting ARB and Caltrans Standard Specification Section 14 for emissions management, AMM AQ-1 will be incorporated into the project during construction, as applicable, to reduce the temporary construction impacts (such as fugitive dust) associated with the Build Alternatives.

### 3.2.2.2 Biological Resources: Riparian Habitat, Special-status Plant Species, Myrtle’s Silverspot Butterfly, Special-status Mammals, Migratory Birds, and Invasive Species

Biological resources within the biological study area (BSA) were evaluated to determine if the proposed project would result in significant impacts to special-status wildlife species and critical habitat. Impacts on biological resources are the same for all the Build Alternatives, with the exceptions of duration of impacts and night-time work. Alternative 2b would result in a longer duration of construction and associated impacts on biological resources and Alternatives 2a, 3a, 4a, and 4b may result in more night-time work, which may have stronger impacts on nocturnal animals.

Natural communities of special concern that are known to occur within the BSA and project footprint include: wetlands and waters of the U.S. and State under U.S. Army Corps of Engineers (USACE) and Regional Water Quality Control Board (RWQCB) jurisdiction, Environmentally Sensitive Habitat Areas (ESHAs) under California Coastal Commission jurisdiction; riparian trees under California Department of Fish and Wildlife (CDFW) jurisdiction; Essential Fish Habitat under National Marine
Fisheries Service (NMFS) jurisdiction, and endangered species critical habitats under USFWS and NMFS jurisdiction.

While the riparian, wetland and aquatic habitats are interdependent, the analysis found that the project alternatives would result in a less than significant impact on the riparian habitat and ESHAs. Table 3.2-1 demonstrates that less than 0.85 acre of riparian trees would be affected by any of the Build Alternatives (culvert extension and Alternatives), and much of this area would be via trimming rather than removal. However, with implementation of AMM BIO-4, Caltrans will coordinate further with the CDFW, Coastal Commission, NMFS, and RWQCB to determine the mitigation ratio for native and non-native riparian tree replacement, for a less than significant impact on the riparian vegetation.

<table>
<thead>
<tr>
<th>Type of Effect</th>
<th>Culvert Extension</th>
<th>Alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Riparian Tree Canopy</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Permanent (acre)</td>
<td>0.04</td>
<td>0</td>
</tr>
<tr>
<td>Temporary (acre)</td>
<td>0.08</td>
<td>0</td>
</tr>
</tbody>
</table>

All Build Alternatives would result in increased bridge surface area compared to the existing bridge, and a resulting increase of shaded area under the bridge. This area would be permanently affected by the diminished sunlight under the proposed bridge. However, the riparian vegetation is expected to persist, even if the species represented, or species ratios, change. The riparian habitat will provide a similar ecological function. Therefore, this is considered a less than significant impact.

All Build Alternatives would affect Central California Coast (CCC) ESHA, composed of riparian vegetation, wetlands, and other waters. All bridge replacement alternatives would have permanent and temporary tree impacts (see Table 3.2-1). Temporary impacts include vegetation trimming or removal of non-woody vegetation for less than a year, primarily associated with staging access (Alternatives 2a, 3a, 4a, and 4b), and the temporary water diversion of Lagunitas Creek. Permanent impacts would be associated with riparian tree removal and non-woody vegetation removal associated with Alternatives 2b and 4b (construction of bridge east of existing bridge), and construction of new bridge piers (Alternatives 2a, 2b, and 3a); these
impacts would extend over the course of 5 years or more before revegetation would restore to provide current shade and habitat value. Species-specific AMMs BIO-1 through BIO-5, BIO-14, and BIO-22, described in Section 2.3.1, Natural Communities, will be implemented to avoid and minimize effects to ESHAs.

For the Myrtle’s silverspot butterfly (MSB), Caltrans concluded that this project would have no effect, pursuant to Section 7 of the federal Endangered Species Act (FESA). The project is outside of the range of this species and the BSA does not support larval host plants for this species. However, because they are known to exist nearby, specific avoidance and minimization measures (AMMs) to minimize the potential for impacts to MSB habitat (AMMs BIO-12 through BIO-14) are included in Section 2.3.5.

Given the lack of special-status plant species found within the BSA, none of the Build Alternatives would result in direct or indirect impacts to these species. Caltrans will implement AMM BIO-6 to further minimize the possibility of impacts to special-status plant species for a no impact determination.

For special-status mammals and migratory birds, there would be some loss of potential roosting and other habitat, but the surrounding area is forested and offers substantial alternative roosting options. The project would have less than significant impacts on mammals and migratory birds; additional direct impacts to special-status mammal species in the BSA and project footprint would be avoided with the implementation of AMMs BIO-7 through BIO-10.

3.2.2.3 CULTURAL RESOURCES
No archaeological, historical, or traditional cultural resources are known to be present within the cultural resources Area of Potential Effects (APE). Therefore, cultural resources are unlikely to be encountered during construction of the Build Alternatives. However, the possibility that previously unknown resources would be discovered during construction cannot be ruled out but constitutes a low probability. AMM CULT-1 will be implemented if inadvertent discovery of archaeological resources occurs. The possibility of discovering cultural resources is the same for each Build Alternative. The proposed project would have a less than significant impact on cultural resources.

3.2.2.4 GEOLOGY AND SOILS
As discussed in Section 2.2.3, Geology/Soils/Seismic/Topography, all Build Alternatives are located within the San Andreas Fault Zone. Although surface rupture
in the project area is unlikely, there is a high risk of violent ground shaking and liquefaction that could cause bridge damage or failure. There is also the risk of seismically induced landslides or creek bank failures in the project vicinity. During construction of all Build Alternatives, soil movement could occur as a result of the instability of newly cut slopes and settlement of fill soil. All Build Alternatives could expose people or structures to potential impacts, including the risk of loss, injury, or death, involving strong seismic ground shaking, liquefaction, or landslides.

The bridge design and the construction work would be performed in compliance with Caltrans’ Seismic Design Criteria (Caltrans 2013), and Caltrans Standard Specifications (Caltrans 2015a). Additionally, Caltrans will be required to develop a Caltrans’ Final Seismic Design Recommendations Memorandum and Final Foundation Report for this project. Complying with these reports, memoranda, and specifications will minimize the identified design and construction impacts to be less than significant.

3.2.2.5 HAZARDS AND HAZARDOUS MATERIALS
As discussed in Section 2.2.5, none of the Build Alternatives would create impacts related to hazards and hazardous materials during operation. However, during construction, all Build Alternatives would create the potential for the environment, workers, and neighbors to be exposed to hazards and hazardous materials during demolition of the existing bridge, earth-moving activities, and bridge construction. The following could occur under all Build Alternatives:

- Creation of a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials
- Creation of 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
- Creation of hazardous emissions or waste within 0.25 mile of Papermill Creek Children’s Corner preschool (approximately 1,100 feet northwest of the project area)
- Interference with an adopted emergency response plan or evacuation plan

AMMs have been incorporated into all of the Build Alternatives to minimize exposure of workers, neighbors, and the environment to hazardous substances, and
provide an emergency response plan. AMMs HAZ-1 through HAZ-5, in addition to TRANS-2 (emergency service access provisions), will be implemented prior to demolition and construction. These include: 1) inspecting and testing bridge structures, roadside soils, and creek sediments; 2) removal and disposal of any hazardous materials identified; and 3) installation of sediment screens around piers. During demolition and construction, suspended sediments in the creek would be monitored. The construction contractor would comply with all federal, state, and local regulations regarding management of hazardous wastes and materials that are handled or generated during project construction. Measures and standard best management practices (BMPs) include the planning for and implementation of a health and safety plan and procedures. The implementation of these measures would avoid and minimize impacts to hazards and hazardous materials, resulting in a less than significant impact.

### 3.2.2.6 Hydrology and Water Quality

As discussed in Sections 2.2.1, Hydrology and Floodplain, and 2.2.2, Water Quality and Stormwater Runoff, all Build Alternatives would place the proposed bridge at the same or relatively similar horizontal and vertical alignments as the existing bridge, but the bridge would be wider. The widening of the bridge and the bridge approach area would increase the impervious surface area. However, the added impervious area would be insignificant compared to the Lagunitas Creek watershed at the project location and would not change the peak 100-year flow. The project lies within a 100-year flood zone, as shown on the Federal Emergency Management Agency’s (FEMA’s) Flood Insurance Rate Map 06041C0233D, which was updated May 4, 2009. The proposed project would not increase the dangers associated with the effects of a 100-year flood.

Additional impervious surface, resulting from the new bridge and roadway shoulder extension, would result in an increased amount of stormwater run-off. The additional flow would have the potential to transport an increased amount of sediment and pollutants to Lagunitas Creek. Permanent stormwater treatment measures would be constructed to minimize these effects. Standard BMPs, as outlined in Section 2.2.2, would minimize the project’s impacts to water quality. The preferred BMP is bioretention, which may be designed as either a basin or swale configuration that removes pollutants by vegetated filtration and infiltration through the soil. The Build Alternative would not result in a measurable change in groundwater recharge.
The project would not change land use and therefore no new pollutants would be introduced to the stormwater. Also, the drainage pattern of the stream would not be substantially altered.

During project operation, heavy metals associated with vehicle tire and brake wear, oil and grease, and exhaust would create pollution in transportation corridors. Although this is not a new condition, project design incorporated stormwater drainage systems to manage and avoid pollutants from the roadway into the creek flows, resulting in a less than significant impact. The following potential impacts could occur under all Build Alternatives:

- Build Alternatives would have the potential to violate water quality standards or waste discharge requirements during improperly handled materials during construction.

- Build Alternatives would have the potential to substantially degrade water quality.

Demolition of the existing bridge structure would require debris containment, stockpiling, and hauling of material away from the water channel. Rainfall could carry newly exposed soils into adjacent waterways, resulting in increased sedimentation and potential effects to water quality, such as an increase in turbidity. In compliance with the Construction General Permit and the Caltrans Stormwater Management Plan (SWMP), the proposed project is required to develop and implement a stormwater pollution prevention plan (SWPPP). The SWPPP would require construction BMPs to avoid or minimize stormwater and water quality effects to surface water, groundwater, and domestic water supplies.

AMMs WATER-1 through WATER-3, which include compliance with the RWQCB, preparation of a SWPPP, and incorporation of BMPs and water treatment measures for construction and operation, would avoid or minimize effects for a less than significant impact on hydrology and water quality.

### 3.2.2.7 Recreation During Construction

During construction of the proposed project, the public would not have access to the trailhead located at SR 1. Park users would continue to have access to the recreational facilities in the Whitehouse Pool Park via the trailhead located at Third Street and C Street in Point Reyes Station. This trailhead is on Golden Gate National Recreation Area property, and meanders between the Golden Gate National Recreation Area and Whitehouse Pool Park. Because most park users are locals who use the trail to reach
Point Reyes Station from south of Lagunitas Creek, there would likely be an increase in the use of the trailhead at Third Street and C Street by locals during project construction. Also, kayakers and other aquatic recreational users would only be able to access the creek via the Third Street and C Street trailhead. These impacts are minor, and the Build Alternatives would have a less than significant impact on the use of existing regional and local parks. AMMs PARKS-1 through -4 would provide notice (via signs and other measures) of trail and creek closures to park users prior to construction, resulting in no long-term impacts on recreational resources.

3.2.2.8 TRANSPORTATION AND TRAFFIC DURING CONSTRUCTION
During construction of all Build Alternatives with a duration of approximately a year (with use of accelerated bridge construction methods), there would be a reduction in vehicle speeds over the existing bridge. However, traffic would flow and minimal congestion or delays would occur outside of typical weekend tourist traffic. Alternative 2b, which includes a detour bridge may have periods of delayed traffic but these are not expected to impact high traffic volume periods.

The following impacts could occur during construction of the Build Alternatives:

- Alternatives 2a, 3a, 4a, and 4b would require a 7-day to 3-week period of full bridge closure, involving lengthy detours for all users (motorized and non-motorized) and inadequate emergency access.

- A full bridge closure with Alternatives 2a, 3a, 4a, and 4b would interfere with an applicable congestion management program, including but not limited to level of service standards and travel demand measures or other standards established by the county congestion management agency for designated roads or highways.

AMMs TRANS-1, TRANS-2, and TRANS-3 would be coordinated with Marin County Public Works Department, Marin Transit, School transportation, trucker Associations, and the emergency service providers to avoid or minimize the accessibility impacts associated with bridge closure to be less than significant.

3.2.2.9 UTILITIES AND SERVICE SYSTEMS DURING CONSTRUCTION
During construction, all Build Alternatives would require temporary relocation of electrical utility, telephone, and water lines, which could result in temporary, short-term disruptions in service. As discussed in Section 2.2.5, Hazardous Waste/Materials, concrete would be recycled to minimize the amount of solid waste disposal associated with project demolition activities at the Redwood Landfill and
Recycling Center. Additionally, the project would comply with federal, state, and local statutes and regulations related to all waste disposal.

AMMs UTIL-1 and -2 would avoid or minimize the impacts of roadway closures on local emergency services and utility providers. Also, AMM HAZ-4 would minimize impacts to solid waste disposal facilities, resulting in a less than significant impact on utilities and service systems.

### 3.2.2.10 Paleontological Resources

Although there is an unlikely potential for unanticipated paleontological resources to be discovered during construction, such discovery cannot be ruled out. Only closed excavation (that is, augering or pile driving) would potentially reach paleontologically sensitive sediment. If fossils are encountered this way, the encounter would not be considered an impact on paleontological resources because the fossils would not be recoverable. Therefore, all of the Build Alternatives would have a less than significant impact on paleontological resources.

### 3.2.2.11 Public Services

Construction of Alternative 2b would create minor delays in traffic for up to 3 years on weekends and during occasional periods when traffic would be restricted to one lane. During construction of Alternatives 2a, 3a, 4a, and 4b, there would be minor traffic delays for up to 1 year and a 7-day to 3-week period of full bridge closure.

During periods of traffic delay or bridge closure, the Build Alternatives would adversely affect police and fire fighter service ratios and emergency response times. During bridge closure under Alternatives 2a, 3a, and 4a, access to schools, parks, and other public facilities and social services would be impaired.

AMMs COMM-1, TRANS-1, TRANS-2, UTIL-2, and UTIL-3 would implement a construction management plan, tailored to the alternative selected, that includes provisions for emergency service providers and community facilities to avoid or minimize impacts to public services and emergency response times for a less than significant impact.

### 3.2.3 Significant Environmental Effects of the Build Alternatives

This subsection identifies significant impacts that would result from implementation of the Build Alternatives. Impacts under CEQA would be avoided or minimized through implementation of standard conditions (i.e., measures that would apply to most Caltrans projects and are not intended to address unusual impacts or conditions),
3.2.3.1 BIOLOGICAL RESOURCES

The proposed project would not result in significant impacts to biological resources after avoidance, minimization and mitigation measures are implemented.

Wetlands

For wetlands and waters of the U.S. and State, all Build Alternatives would result in significant permanent, direct impacts to protected jurisdictional wetlands resulting from road widening and extension of the culvert north of the bridge, as well as permanent, direct impacts to other waters of the U.S. and State due to construction of new bridge piers and removal of existing piers. Temporary, direct impacts to both wetlands and waters would occur as a result of construction staging and access (see Table 3.2-2, Potential Impacts to Wetlands and Waters of the U.S. and States), albeit in a small area of impact. To address this, Caltrans will implement AMMs BIO-1 through BIO-5, as well as Mitigation Measure BIO-A (compensatory mitigation for jurisdictional water features) to minimize and mitigate impacts to jurisdictional wetlands. AMMs will include the reseeding and restoration of all disturbed areas of wetland and other waters of the U.S. and State within the project footprint. Additionally, habitat enhancements, such as large in-stream woody debris, are planned during streambank reconstruction within other waters of the U.S. and State. Offsite restoration efforts to offset project impacts to wetlands and other waters of the U.S., if needed, will be coordinated with the relevant agency(ies) during the design phase of this project. With avoidance measures and mitigation measures, impacts to wetlands would be less than significant.

<table>
<thead>
<tr>
<th>Project Element</th>
<th>Permanent Impacts (acre)</th>
<th>Temporary Impacts (acre)</th>
<th>Total Impacts (acre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Culvert extension</td>
<td>&lt;0.01*</td>
<td>&lt;0.02</td>
<td>&lt;0.02 acre</td>
</tr>
<tr>
<td><strong>Bridge Replacement Project Alternative</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alternative 1 – No-Build</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 3.2-2 Potential Impacts to Wetlands and Waters of the U.S. and State
Table 3.2-2 Potential Impacts to Wetlands and Waters of the U.S. and State

<table>
<thead>
<tr>
<th>Project Element</th>
<th>Permanent Impacts (acre)</th>
<th>Temporary Impacts (acre)</th>
<th>Total Impacts (acre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alternative 2a—Three-span, short steel truss bridge, ABC, longitudinal move-in</td>
<td>0</td>
<td>&lt;0.01*</td>
<td>&lt;0.01*</td>
</tr>
<tr>
<td>Alternative 2b—Three-span, short steel truss bridge, conventional (with detour bridge)</td>
<td>0</td>
<td>&lt;0.01*</td>
<td>&lt;0.01*</td>
</tr>
<tr>
<td>Alternative 3a—Three-span, concrete bridge, ABC, longitudinal move-in</td>
<td>0</td>
<td>&lt;0.01*</td>
<td>&lt;0.01*</td>
</tr>
<tr>
<td>Alternative 4a—Full-span, steel truss bridge, ABC, longitudinal move-in</td>
<td>0</td>
<td>0.01*</td>
<td>0.01*</td>
</tr>
<tr>
<td>Alternative 4b—Full-span, steel truss bridge, ABC, transverse slide-in</td>
<td>0</td>
<td>0.01*</td>
<td>0.01*</td>
</tr>
</tbody>
</table>

Note:
* Impact area rounded to 0.01 acre.

Grading, clearing, and grubbing of upland areas could result in indirect, temporary impacts from increased erosion and sedimentation, and have adverse impacts to wetlands and Lagunitas Creek. These indirect impacts would be avoided during construction through implementation of the AMM WATER-1 through 3, such as the use of silt fences or fiber rolls. In addition, implementation of hydroseeding and planting wetland and riparian plantings, following ground-disturbing activities, would reduce erosion and sedimentation from the upland areas post-construction, for a less than significant impact.

Aquatic Habitat and Federally Endangered California Freshwater Shrimp,
Federally and State Threatened CCC Coho Salmon, Federally Threatened CCC Steelhead,
Federally Endangered Tidewater Goby, and Federally Threatened California Red-Legged Frog

The project BSA includes aquatic habitat that supports the state and federally endangered California freshwater shrimp (CFS), the federally and state threatened CCC coho salmon, federally threatened CCC steelhead, federally endangered tidewater goby, and federally threatened California red-legged frog (CRLF). Pursuant to Section 7 of FESA, Caltrans has concluded that this project would result in significant direct and indirect impacts to these species from the proposed bridge replacement construction. There would be temporary impacts due to disruptions of habitat through removing and trimming riparian vegetation around construction areas, installation of cofferdams to build new piers and remove existing piers, and construction activities for extending the culvert that would temporarily remove
habitat for CRLF. Additionally, during operation the replacement bridge would permanently add shading to Lagunitas Creek. However, the additional shading compared to existing conditions would be minimal as riparian vegetation currently provides shade in the areas on both sides of the bridge.

As required under the FESA and the California Endangered Species Act, Caltrans will implement AMMs and mitigation measures for biological resources (see Appendix F) to compensate for impacts to affected species and their habitats. These measures include restricting construction activities within aquatic habitat to times that avoid breeding seasons and other times when these species are most likely to be affected. Mitigation measures will provide habitat improvement onsite or off, in accordance with regulatory agency guidance, to compensate for permanent project effects, resulting in a less than significant impact. Critical habitats for CCC coho, CCC steelhead, and tidewater goby are present within the bridge footprint (see Figure 2.3.5-1 in Section 2.3.5, Threatened and Endangered Species). Alternatives 2a, 2b, and 3a would result in permanent and temporary impacts to tidewater goby habitat, CCC coho, and CCC steelhead critical habitat because of construction of new bridge piers. All Build Alternatives would cast additional shading on the creek and streambank, which could alter vegetation composition which would have significant direct effects to, and could adversely modify, CRLF, tidewater goby, and steelhead species, as well as to coho salmon critical habitat.

The bridge replacement would have temporary direct and permanent impacts on the Lagunitas Creek aquatic habitat. These impacts would be the same for the tidewater goby, Chinook salmon, steelhead, coho salmon, CRLF, and CFS. Temporary, direct impacts result from the dewatering inside the coffer dams, construction areas for removal of the existing bridge structure, and construction access areas. Permanent impacts would result from placement of piers in the stream.

The culvert extension would affect CRLF upland and aquatic breeding habitat and federally designated coho salmon habitat due to vegetation trimming and removal, as well as a potential water diversion. The water diversion and other culvert construction related activities may affect individual CRLF but not coho individuals.

Project-related impacts to critical habitat are minor, because of the small area affected (less than 0.1 acre of permanent impacts) and the proposed AMMs. Through Mitigation Measure BIO-B Caltrans will work closely with CDFW, USFWS, and NMFS to confirm all impacts from the final project designs are fully mitigated for
CCC ESU Coho Salmon, Chinook Salmon, and Steelhead such that the impacts result in less than significant impacts. Areas of suitable habitat would not decrease for these species or species abundance as a result of the proposed project.

**Species of Special Concern: Tomales Roach and Western Pond Turtle**

Species of Special Concern under CDFW jurisdiction that inhabit Lagunitas Creek include the Tomales roach (*Lavinia symmetricus*) and the western pond turtle (*Actinemys marmorata*). The CRLF is also a Species of Concern under CDFW; however, it is discussed in the section above because it is a federally threatened species. The proposed project would result in significant direct and indirect impacts on the Tomales roach and the western pond turtle and their respective habitats within the project footprint and may result in the disturbance of individuals during construction activities. AMMs and Mitigation Measures for California freshwater shrimp and threatened and endangered fish species including screens on intake pumps and a dewatering and species rescue plan. These measures would contribute to minimizing construction impacts to Tomales roach. Instream and bank restoration following construction would recreate affected habitat during the final phase of the project, up to and including replacement of basking log habitat (large in-stream wood debris) (see Mitigation Measure BIO-A). This measure would also require the Caltrans Biologist to develop the detailed instream habitat enhancement in coordination with CDFW, to restore Tomales roach and western pond turtle habitat. Restoration of temporary impacts during construction, along with measures developed to avoid take of protected aquatic species, would result in less than significant impacts to Tomales roach and western pond turtle.

### 3.2.3.2 Noise

All Build Alternatives would increase noise levels in the project area from construction activities. Construction phases of the project include clearing and grubbing, earthwork, demolition, excavation, vibratory pile driving or augering piles, grading, concrete work, utility installation, structure work, and paving. Operation of heavy construction equipment and arrival and departure of heavy-duty trucks would also cause construction noise in the study area. The noise model results indicate that demolition of the existing bridge structure and vibratory pile driving associated with the installation of the new bridge structure would generate the highest noise levels during construction; these construction activities would result in noise levels that are substantially higher than the existing ambient noise levels in the project area and would affect nearby sensitive receptors.
A receptor located as close as 20 feet away from proposed project construction areas could experience noise as high as 103 dBA $L_{\text{max}}$ and 96 dBA $L_{\text{eq}}$ during vibratory pile-driving operations. Noise levels in other parts of the property would be lower because sound drops off at the rate of 6 dBA per doubling of distance. Construction noise levels during demolition would be in the range of 82 to 92 dBA $L_{\text{eq}}$ at closest receptors. This is significantly higher than ambient noise levels (up to 96 dBA $L_{\text{eq}}$ during construction as compared to the existing maximum 58 dBA $L_{\text{eq}}$ ambient noise level). Alternatives 2a, 3a, 4a, and 4b would have similar noise impacts that would last up to 12 months and that could occur during both daytime and nighttime hours. Alternative 2b’s noise impacts would be similar to those of the other Build Alternatives, except that they would occur over 36 months and would allow work to be restricted to daytime hours, reducing noise effects on adjacent properties during evening hours. With the implementation of AMM NOISE-1 and Mitigation Measure NOISE-A, construction noise from augering or vibratory pile driving temporary impacts from construction noise would be reduced, but may not be able to reduce to less than significant. However, this would result in short-term temporary impacts, that would discontinue with the completion of construction.

### 3.2.4 Unavoidable Significant Environmental Effects

#### 3.2.4.1 VISUAL/AESTHETICS RESOURCES

The summary of project effects presented in Section 2.1.6, Visual/Aesthetics, of this Draft EIR/EA indicates that the project, in terms of visual resource change, viewer response, and overall visual impacts, would have moderate or low impacts for most of the Build Alternatives. However, with Alternatives 4a and 4b, full-span steel truss bridge, the addition of new horizontal elements into the visual setting would constitute an overall significant visual impact. The remaining Build Alternatives would have more moderate visual impacts, and the No-Build Alternative would have no impact on visual resources.

As described in Section 2.1.6, Visual/Aesthetics, Alternatives 2a, 2b, and 3a would minimally change the visual character and scenic quality of the project site and would have a less than significant impact. However, Alternatives 4a and 4b would have a moderate to high level of impact to visual character due to their scale in the context of project surroundings. The steel truss for Alternative 4a and 4b would increase the visual scale and the addition of new horizontal elements into the visual setting, which would constitute an overall significant and unavoidable adverse visual effect. These Build Alternatives would not comply with the policies regarding view protection (such as the Coastal Act Section 30251 and Marin County Local Coastal Program.
[LCP] Policy 139), which prohibit development that would significantly degrade the scenic qualities of major views and vista points. The remaining Build Alternatives would have more moderate visual effects and would not conflict with the Coastal Act.

In addition, construction of all of the Build Alternatives has the potential to create visual impacts associated with vegetation removal, construction lighting, and staging of construction equipment.

AMMs VISUAL-1 through VISUAL-5 will be implemented and will reduce significant impacts to visual resources to less than significant for Alternatives 2a, 2b, and 3a. However, Alternatives 4a and 4b would create unavoidable significant impacts. The significance of these impact would not be reduced to a less than significant impact even after implementation of AMMs VISUAL-1 through VISUAL-5; therefore, there is a mandatory finding of significance under CEQA because the project would degrade the quality of the environment and result in significant impacts on human beings from a visual quality standpoint.

3.2.4.2 LAND USE AND PLANNING
As discussed in Section 2.1.4, Community Impacts, Alternatives 2a, 3a, 4a, and 4b would temporarily divide an established community during the 2- to 3-week bridge closure, but this would result in a less than significant impact with the implementation of AMMs COMM-1 and TRANS-1 through TRANS-5.

Alternatives 4a or 4b, involving construction of a full-span, steel truss bridge, would be inconsistent with the Marin County LCP (Marin County 1981) with respect to visual resources/scenic quality within the Coastal Zone. As discussed above under Aesthetics/Visual Resources, these Build Alternatives would not comply with the policies regarding view protection (such as the Coastal Act Section 30251 and Marin County LCP Policy 139), which prohibit development that would significantly degrade the scenic qualities of major views and vista points. Alternatives 4a and 4b would conflict with the Point Reyes Station Community Plan (Marin County 2001) Policy HR-1.3 and Marin County LCP – Unit 2, New Development and Land Use Policy 3a, because the height and bulk of the proposed bridge would not be compatible with the scale and character of the surrounding community. Despite mitigation, the impact of Alternatives 4a and 4b would remain significant because these alternatives would be out of scale with surrounding development and therefore would be inconsistent with Coastal Act Section 30251 and the LCP. All remaining Build Alternatives and the No-Build Alternative would be consistent with the Marin County LCP.
Even after implementation of AMMs LAND USE-1 and LAND USE-3, the project would result in an unavoidable adverse degradation of the environment and a significant impact on human beings from a scenic resource standpoint.

None of the Build Alternatives would conflict with any applicable habitat conservation plan or natural community conservation plan.

3.2.5 Climate Change

Climate change refers to long-term changes in temperature, precipitation, wind patterns, and other elements of the earth's climate system. An ever-increasing body of scientific research attributes these climatological changes to greenhouse gas (GHG) emissions, particularly those generated from the production and use of fossil fuels.

While climate change has been a concern for several decades, the establishment of the Intergovernmental Panel on Climate Change (IPCC) by the United Nations and World Meteorological Organization in 1988 has led to increased efforts devoted to GHG emissions reduction and climate change research and policy. These efforts are primarily concerned with the emissions of GHGs generated by human activity, including carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), tetrafluoromethane, hexafluoroethane, sulfur hexafluoride (SF6), HFC-23 (fluoroform), HFC-134a (1,1,1,2-tetrafluoroethane), and HFC-152a (difluoroethane).

In the U.S., the main source of GHG emissions is electricity generation, followed by transportation. In California, however, transportation sources (including passenger cars, light-duty trucks, other trucks, buses, and motorcycles) make up the largest source of GHG-emitting sources. The dominant GHG emitted is CO2, mostly from fossil fuel combustion.

Two terms are typically used when discussing how we address the impacts of climate change: “greenhouse gas mitigation” and “adaptation.” “Greenhouse gas mitigation” is a term for reducing GHG emissions to reduce or “mitigate” the impacts of climate change. “Adaptation” refers to planning for and responding to impacts resulting from climate change (such as adjusting transportation design standards to withstand more intense storms and higher sea levels).

1 http://climatechange.transportation.org/ghg_mitigation/
3.2.5.1 REGULATORY SETTING
This section outlines federal and state efforts to comprehensively reduce GHG emissions from transportation sources.

Federal
Although climate change and GHG reduction are concerns at the federal level, to date no national standards have been established for nationwide mobile-source GHG-reduction targets, nor have any regulations or legislation been enacted specifically to address climate change and reduction of GHG emissions at the project level.

NEPA (42 USC Part 4332) requires federal agencies to assess the environmental effects of their proposed actions prior to making a decision on the action or project.

The Council on Environmental Quality released final guidance (August 1, 2016) for federal agencies on how to consider the impacts of their actions on global climate change in their NEPA reviews. This final guidance advises agencies to consider both the effects of a proposed action on climate change, as indicated by its estimated GHG emissions, and the effects of climate change on a proposed action, within the existing NEPA regulatory framework. The final guidance applies to proposed federal agency actions that are subject to NEPA analysis.

FHWA supports the approach that climate change considerations should be integrated throughout the transportation decision-making process, from planning through project development and delivery. Addressing climate change mitigation and adaptation up front in the planning process will assist in decision-making and improve efficiency at the program level, and will inform the analysis and stewardship needs of project-level decision-making. Climate change considerations can be integrated into many planning factors, such as supporting economic vitality and global efficiency, increasing safety and mobility, enhancing the environment, promoting energy conservation, and improving the quality of life. The four strategies that FHWA outlines to lessen climate change impacts correlate with efforts that the state is undertaking to deal with transportation and climate change: improved transportation system efficiency, cleaner fuels, cleaner vehicles, and a reduction in travel activity.

Climate change and its associated effects are being addressed through various efforts at the federal level to improve fuel economy and energy efficiency:

- The Energy Policy Act of 1992 (EPACT92, 102nd Congress H.R.776.ENR): This law was passed by Congress and set goals, created mandates, and amended utility
laws to increase clean energy use and improve overall energy efficiency in the United States. EPACT92 consists of 27 titles detailing various measures designed to lessen the nation's dependence on imported energy, provide incentives for clean and renewable energy, and promote energy conservation in buildings. Title III of EPACT92 addresses alternative fuels. It gave the U.S. Department of Energy administrative power to regulate the minimum number of light-duty alternative-fuel vehicles required in certain federal fleets beginning in fiscal year 1993. The primary goal of the program is to cut petroleum use in the United States by 2.5 billion gallons per year by 2020.

- Energy Policy Act of 2005 (109th Congress H.R.6 [2005–2006]): This law sets forth an energy research and development program covering: (1) energy efficiency; (2) renewable energy; (3) oil and gas; (4) coal; (5) Indian energy; (6) nuclear matters and security; (7) vehicles and motor fuels, including ethanol; (8) hydrogen; (9) electricity; (10) energy tax incentives; (11) hydropower and geothermal energy; and (12) climate change technology.


- Executive Order (EO) 13514, Federal Leadership in Environmental, Energy, and Economic Performance, 74 Federal Register 52117 (October 8, 2009): This EO set sustainability goals for federal agencies and focuses on making improvements in their environmental, energy, and economic performance. It instituted as policy of the United States that federal agencies measure, report, and reduce their GHG emissions from direct and indirect activities.

- EO 13653, Preparing the United States for the Impacts of Climate Change, 78 Federal Register 66817 (November 6, 2013): This EO builds on the previously released (and since revoked) EO I3514 Federal Leadership in Environmental Energy, and Economics Performance to establish direction for federal agencies on how to improve on climate preparedness and resilience strategies.
Chapter 3 California Environmental Quality Act Evaluation

- President Obama’s Climate Action Plan, June 2013: President Obama announced a comprehensive plan for action to cut carbon pollution, prepare the nation for the impacts of climate change, and lead international efforts to address climate change as a global challenge. The Plan builds on the work of the 13 U.S. Global Change Research Program (USGCRP) member agencies, the USGCRP National Climate Assessment program, and the Interagency Climate Change Adaptation Task Force.

- EO 13693, Planning for Federal Sustainability, 80 Federal Register 15869 (March 2015). This EO reaffirms the policy of the United States that federal agencies measure, report, and reduce their GHG emissions from direct and indirect activities. It sets sustainability goals for all agencies to promote energy conservation, efficiency, and management by reducing energy consumption and GHG emissions. It builds on the adaptation and resiliency goals in EO 13693 to ensure agency operations and facilities prepare for impacts of climate change. This EO revokes EO 13514.

The U.S. Environmental Protection Agency’s (USEPA’s) authority to regulate GHG emissions stems from the U.S. Supreme Court decision in Massachusetts v. EPA (2007). The Supreme Court ruled that GHGs meet the definition of air pollutants under the existing Clean Air Act and must be regulated if these gases could be reasonably anticipated to endanger public health or welfare. Responding to the Court’s ruling, USEPA finalized an endangerment finding in December 2009. Based on scientific evidence, it found that six GHGs constitute a threat to public health and welfare. Thus, it is the Supreme Court’s interpretation of the existing Act and USEPA’s assessment of the scientific evidence that form the basis for USEPA’s regulatory actions.

USEPA in conjunction with the National Highway Traffic Safety Administration (NHTSA) issued the first of a series of GHG emission standards for new cars and light-duty vehicles in April 2010 and significantly increased the fuel economy of all new passenger cars and light trucks sold in the United States. The standards required these vehicles to meet an average fuel economy of 34.1 miles per gallon by 2016. In August 2012, the federal government adopted the second rule that increases fuel economy for the fleet of passenger cars, light-duty trucks, and medium-duty passenger vehicles for model years 2017 and beyond to average fuel economy of 54.5 miles per gallon by 2025. Because NHTSA cannot set standards beyond model

year 2021 due to statutory obligations and the rules’ long timeframe, a mid-term evaluation is included in the rule. The Mid-Term Evaluation is the overarching process by which NHTSA, USEPA, and ARB will decide on CAFE and GHG emissions standard stringency for model years 2022–2025. NHTSA has not formally adopted standards for model years 2022 through 2025.

NHTSA and USEPA issued a Final Rule for “Phase 2” for medium- and heavy-duty vehicles to improve fuel efficiency and cut carbon pollution in October 2016. The agencies estimate that the standards will save up to 2 billion barrels of oil and reduce CO₂ emissions by up to 1.1 billion metric tons over the lifetimes of model year 2018–2027 vehicles.

State
With the passage of legislation, including State Senate and Assembly bills and EOs, California has been innovative and proactive in addressing GHG emissions and climate change.

- Assembly Bill 1493, Pavley Vehicular Emissions: Greenhouse Gases, 2002: This bill requires the ARB to develop and implement regulations to reduce automobile and light truck GHG emissions. These stricter emissions standards were designed to apply to automobiles and light trucks beginning with the 2009 model year.

- Executive Order S-3-05 (June 1, 2005): The goal of this EO is to reduce California’s GHG emissions to: (1) year 2000 levels by 2010, (2) year 1990 levels by 2020, and (3) 80 percent below year 1990 levels by 2050. This goal was further reinforced with the passage of Assembly Bill 32 (AB 32) in 2006 and Senate Bill 32 (SB 32) in 2016.

- Assembly Bill 32, Chapter 488, 2006: Núñez and Pavley, The Global Warming Solutions Act of 2006: AB 32 codified the 2020 GHG emissions reduction goals as outlined in EO S-3-05, while further mandating that ARB create a scoping plan and implement rules to achieve “real, quantifiable, cost-effective reductions of greenhouse gases.” The Legislature also intended that the statewide GHG-emissions limit continue in existence and be used to maintain and continue reductions in emissions of GHGs beyond 2020 (Health and Safety Code Section 38551(b)). The law requires ARB to adopt rules and regulations in an open public process to achieve the maximum technologically feasible and cost-effective GHG reductions.
• Executive Order S-20-06 (October 18, 2006): This order establishes the responsibilities and roles of the Secretary of the California Environmental Protection Agency (Cal/EPA) and state agencies with regard to climate change.

• Executive Order S-01-07 (January 18, 2007): This order sets forth the low carbon fuel standard (LCFS) for California. Under this EO, the carbon intensity of California’s transportation fuels is to be reduced by at least 10 percent by the year 2020. ARB re-adopted the LCFS regulation in September 2015, and the changes went into effect on January 1, 2016. The program establishes a strong framework to promote the low-carbon fuel adoption necessary to achieve the Governor's 2030 and 2050 GHG reduction goals.

• Senate Bill 97, Chapter 185, 2007, Greenhouse Gas Emissions: This bill requires the Governor's Office of Planning and Research to develop recommended amendments to the CEQA Guidelines for addressing GHG emissions. The amendments became effective on March 18, 2010.

• Senate Bill 375, Chapter 728, 2008, Sustainable Communities and Climate Protection: This bill requires ARB to set regional emissions reduction targets for passenger vehicles. The metropolitan planning organization for each region must then develop a “Sustainable Communities Strategy” that integrates transportation, land-use, and housing policies to plan how it will achieve the emissions target for its region.

• Senate Bill 391, Chapter 585, 2009, California Transportation Plan: This bill requires the State’s long-range transportation plan to meet California’s climate change goals under AB 32.

• Executive Order B-16-12 (March 2012) orders State entities under the direction of the Governor, including ARB, the California Energy Commission, and the Public Utilities Commission, to support the rapid commercialization of zero emission vehicles. It directs these entities to achieve various benchmarks related to zero emission vehicles.

• Executive Order B-30-15 (April 2015) establishes an interim statewide GHG emission reduction target of 40 percent below 1990 levels by 2030 in order to ensure California meets its target of reducing GHG emissions to 80 percent below 1990 levels by 2050. It further orders all state agencies with jurisdiction over sources of GHG emissions to implement measures, pursuant to statutory
authority, to achieve reductions of GHG emissions to meet the 2030 and 2050 GHG emissions reductions targets. It also directs ARB to update the Climate Change Scoping Plan to express the 2030 target in terms of million metric tons of carbon dioxide equivalent (MMTCO2e). Finally, it requires the Natural Resources Agency to update the state’s climate adaptation strategy, Safeguarding California, every 3 years, and to ensure that its provisions are fully implemented.

- Senate Bill 32, Chapter 249, 2016: SB 32 codifies the GHG reduction targets established in EO B-30-15 to achieve a mid-range goal of 40 percent below 1990 levels by 2030.

### 3.2.5.2 ENVIRONMENTAL SETTING

In 2006, the Legislature passed the California Global Warming Solutions Act of 2006 (AB 32), which created a comprehensive, multi-year program to reduce GHG emissions in California. AB 32 required ARB to develop a Scoping Plan that describes the approach California will take to achieve the goal of reducing GHG emissions to 1990 levels by 2020. The Scoping Plan was first approved by ARB in 2008 and must be updated every 5 years. ARB approved the First Update to the Climate Change Scoping Plan on May 22, 2014. ARB is moving forward with a discussion draft of an updated Scoping Plan that will reflect the 2030 target established in EO B-30-15 and SB 32.

The AB 32 Scoping Plan and the subsequent updates contain the main strategies California will use to reduce GHG emissions. As part of its supporting documentation for the Draft Scoping Plan, ARB released the GHG inventory for California.³ ARB is responsible for maintaining and updating California's GHG Inventory per California Health and Safety Code Section 39607.4. The associated forecast/projection is an estimate of the emissions anticipated to occur in the year 2020 if none of the foreseeable measures included in the Scoping Plan were implemented.

An emissions projection estimates future emissions based on current emissions, anticipated regulatory implementation, and other technological, social, economic, and behavioral patterns. The projected 2020 emissions provided in Figure 3-1 represent a business-as-usual (BAU) scenario assuming none of the Scoping Plan measures are implemented. The 2020 BAU emissions estimate assists ARB in demonstrating progress toward meeting the 2020 goal of 431 MMTCO2e.⁴ The 2016 edition of the

---

³ 2016 Edition of the GHG Emission Inventory Released (June 2016): [https://www.arb.ca.gov/cc/inventory/data/data.htm](https://www.arb.ca.gov/cc/inventory/data/data.htm).

⁴ The revised target using Global Warming Potentials from the IPCC Forth Assessment Report.
GHG emissions inventory (released June 2016) found total California emissions of 441.5 MMTCO$_2$e, showing progress towards meeting the AB 32 goals.

The 2020 BAU emissions projection was revisited in support of the First Update to the Scoping Plan (2014). This projection accounts for updates to the economic forecasts of fuel and energy demand as well as other factors. It also accounts for the effects of the 2008 economic recession and the projected recovery. The total emissions projected in the 2020 BAU scenario include reductions anticipated from Pavley I and the Renewable Electricity Standard (30 MMTCO$_2$e total). With these reductions in the baseline, estimated 2020 statewide BAU emissions are 509 MMTCO$_2$e.

**Figure 3-1  2020 Business as Usual (BAU) Emissions Projection 2014 Edition**

 GHG emissions for transportation projects can be divided into those produced during operations and those produced during construction.

**Operational Emissions**

The purpose of the project is to provide a safe, seismically stable crossing of Lagunitas Creek on SR 1 because the existing bridge does not meet current safety and seismic design standards. The project would not increase roadway capacity so would not increase in GHG emissions during operation, but there would likely be long-term GHG benefits from improved operation and safety.
Construction Emissions
Construction GHG emissions would result from material processing, onsite construction equipment, and traffic delays due to construction. These emissions would be produced at different levels throughout the construction phase; their frequency and occurrence can be reduced through innovations in plans and specifications and by implementing better traffic management during construction phases.

In addition, with innovations such as longer pavement lives, improved traffic management plans, and changes in materials, the GHG emissions produced during construction can be offset to some degree by longer intervals between maintenance and rehabilitation activities.

Because construction activities are short-term, the GHG emissions resulting from construction activities would not result in long-term adverse effects. However, implementation of Caltrans Standard Specifications, such as complying with ARB and local air district rules, ordinances, and regulations, and use of construction best management practices, would also result in reducing GHG emissions from construction activities.

CEQA Conclusion
While the project would result in a slight increase in GHG emissions during construction, it is anticipated that the project would not result in any increase in operational GHG emissions. While it is Caltrans’ determination that in the absence of further regulatory or scientific information related to GHG emissions and CEQA significance, it is too speculative to make a significance determination regarding the project’s direct impact and its contribution on the cumulative scale to climate change, Caltrans is firmly committed to implementing measures to help reduce GHG emissions. These measures are outlined in the following section.

3.2.6 Greenhouse Gas Reduction Strategies
3.2.6.1 Statewide Efforts
In an effort to further the vision of California’s GHG reduction targets outlined an AB 32 and SB 32, Governor Brown identified key climate change strategy pillars (concepts). These pillars highlight the idea that several major areas of the California economy need to reduce emissions to meet the 2030 GHG emissions target. These pillars are (1) reducing today’s petroleum use in cars and trucks by up to 50 percent; (2) increasing from one-third to 50 percent the State’s electricity derived from renewable sources; (3) doubling the energy efficiency savings achieved at existing
buildings and making heating fuels cleaner; (4) reducing the release of methane, black carbon, and other short-lived climate pollutants; (5) managing farm and rangelands, forests, and wetlands so they can store carbon; and (6) periodically updating the state's climate adaptation strategy, Safeguarding California (Figure 3-2).

**Figure 3-2 The Governor's Climate Change Pillars: 2030 Greenhouse Gas Reduction Goals**

The transportation sector is integral to the people and economy of California. To achieve GHG emission reduction goals, it is vital that the State builds upon past successes in reducing criteria and toxic air pollutants from transportation and goods movement activities. GHG emission reductions will come from cleaner vehicle technologies, lower-carbon fuels, and reduction of vehicle miles traveled. One of Governor Brown's key pillars sets the ambitious goal of reducing today's petroleum use in cars and trucks by up to 50 percent by 2030.

Governor Brown called for support to manage natural and working lands, including forests, rangelands, farms, wetlands, and soils, so they can store carbon. These lands have the ability to remove carbon dioxide from the atmosphere through biological processes, and to then sequester carbon in above- and below-ground matter.
Caltrans Activities
Caltrans continues to be involved on the Governor’s Climate Action Team as the ARB works to implement EOs S-3-05 and S-01-07 and help achieve the targets set forth in AB 32. EO B-30-15, issued in April 2015, and SB 32 (2016) set a new interim target to cut GHG emissions to 40 percent below 1990 levels by 2030. The following major initiatives are under way at Caltrans to help meet these targets.

California Transportation Plan (CTP 2040)
The California Transportation Plan (CTP; Caltrans 2016) is a statewide, long-range transportation plan to meet our future mobility needs and reduce GHG emissions. The CTP defines performance-based goals, policies, and strategies to achieve the collective vision for California’s future statewide, integrated, multimodal transportation system. It serves as an umbrella document for all of the other statewide transportation planning documents.

SB 391 (Liu 2009) requires the CTP to meet California’s climate change goals under AB 32. Accordingly, the CTP 2040 identifies the statewide transportation system needed to achieve maximum feasible GHG emission reductions while meeting the state’s transportation needs. While metropolitan planning organizations have primary responsibility for identifying land use patterns to help reduce GHG emissions, CTP 2040 identifies additional strategies in pricing, transportation alternatives, mode shift, and operational efficiency.

Caltrans Strategic Management Plan
The Strategic Management Plan, released in 2015, creates a performance-based framework to preserve the environment and reduce GHG emissions, among other goals. Specific performance targets in the plan that will help to reduce GHG emissions include:

- Increasing percentage of non-auto mode share
- Reducing vehicle miles traveled per capita
- Reducing Caltrans’ internal operational (buildings, facilities, and fuel) GHG emissions

Funding and Technical Assistance Programs
In addition to developing plans and performance targets to reduce GHG emissions, Caltrans also administers several funding and technical assistance programs that have
GHG-reduction benefits. These include the Bicycle Transportation Program, Safe Routes to School, Transportation Enhancement Funds, and Transit Planning Grants. A more extensive description of these programs can be found in Caltrans Activities to Address Climate Change (2013).

Caltrans Director’s Policy 30 Climate Change (June 22, 2012) is intended to establish a department policy that will ensure coordinated efforts to incorporate climate change into departmental decisions and activities.

Caltrans Activities to Address Climate Change (April 2013) provides a comprehensive overview of activities undertaken by Caltrans statewide to reduce GHG emissions resulting from agency operations.

3.2.6.2 PROJECT-LEVEL GHG REDUCTION STRATEGIES
The following measures have also been incorporated into the project to reduce GHG emissions and associated climate change impacts from the project:

1. In accordance with Caltrans Standard Specifications, Section 14-9, the contractor must comply with all local Air Pollution Control District's rules, ordinances, and regulations for air quality restrictions.

2. Per Caltrans’ Standard Specifications, the contractor must comply with all Bay Area Air Quality Management District and ARB rules, ordinances, and regulations for air quality reductions (Caltrans 2015b). These requirements are described in AMM AQ-1 in Section 2.2.6.

3. All construction equipment shall be maintained and properly tuned in accordance with manufacturer’s specifications.

4. Idling times shall be minimized by either shutting equipment off when not in use or reducing the maximum idling time to 5 minutes, as required by 13 California Code of Regulations 2485.

5. To the extent feasible, construction traffic will be scheduled and routed to reduce congestion and related climate change impacts caused by idling vehicles along local roads during peak travel times.

6. Environmentally sensitive areas or their equivalent will be established near sensitive receptors. Within these areas, construction activities involving the

---

5 http://www.dot.ca.gov/hq/tpp/offices/orip/climate_change/projects_and_studies.shtml
extended idling of diesel equipment or vehicles will be prohibited, to the extent feasible.

3.2.6.3 ADAPTATION STRATEGIES

“Adaptation strategies” refer to how Caltrans and others can plan for the effects of climate change on the state’s transportation infrastructure and strengthen or protect the facilities from damage. Climate change is expected to produce increased variability in precipitation, rising temperatures, rising sea levels, variability in storm surges and their intensity, and the frequency and intensity of wildfires. These changes may affect the transportation infrastructure in various ways, such as damage to roadbeds from longer periods of intense heat; increasing storm damage from flooding and erosion; and inundation from rising sea levels. These effects will vary by location and may, in the most extreme cases, require that a facility be relocated or redesigned. These types of impacts to the transportation infrastructure may also have economic and strategic ramifications.

Federal Efforts

At the federal level, the Climate Change Adaptation Task Force, co-chaired by the CEQ, the Office of Science and Technology Policy, and the National Oceanic and Atmospheric Administration, released its interagency task force progress report on October 28, 2011, outlining the federal government's progress in expanding and strengthening the nation's capacity to better understand, prepare for, and respond to extreme events and other climate change impacts. The report provides an update on actions in key areas of federal adaptation, including: building resilience in local communities, safeguarding critical natural resources such as fresh water, and providing accessible climate information and tools to help decision-makers manage climate risks.

In February 2013, federal agencies released their first-ever Climate Change Adaptation Plans, outlining strategies to reduce the vulnerability of federal programs, assets, and investments to the impacts of climate change, such as sea-level rise (SLR) or more frequent or severe extreme weather. Agency plans highlight actions to plan for and address these impacts in their programs and operations.

President Obama signed EO 13653 on November 1, 2013, to direct federal agencies to take a series of steps to make it easier for American communities to strengthen their resilience to extreme weather and prepare for other impacts of climate change. The EO instructs agencies to modernize federal programs to support climate-resilient investments; plan for climate change-related risks to federal facilities, operations, and
programs; and provide the information, data, and tools that state, local, and private-sector leaders need to make smart decisions to improve preparedness and resilience.

On December 15, 2014, FHWA issued Order 5520 (Transportation System Preparedness and Resilience to Climate Change and Extreme Weather Events). This directive established FHWA policy to strive to identify the risks of climate change and extreme weather events to current and planned transportation systems. The FHWA will work to integrate consideration of these risks into its planning, operations, policies, and programs in order to promote preparedness and resilience; safeguard federal investments; and ensure the safety, reliability, and sustainability of the nation’s transportation systems.

State Efforts

On November 14, 2008, California Governor Arnold Schwarzenegger signed EO S-13-08, which directed a number of state agencies to address California’s vulnerability to sea-level rise caused by climate change. This EO set in motion several agencies and actions to address the concern of SLR and directed all state agencies planning to construct projects in areas vulnerable to future SLR to consider a range of SLR scenarios for the years 2050 and 2100, assess project vulnerability, and, to the extent feasible, reduce expected risks and increase resiliency to SLR. SLR estimates should also be used in conjunction with information on local uplift and subsidence, coastal erosion rates, predicted higher high water levels, and storm surge and storm wave data.

Governor Schwarzenegger also requested the National Academy of Sciences to prepare an assessment report to recommend how California should plan for future SLR. The final report, Sea-Level Rise for the Coasts of California, Oregon, and Washington (Sea-Level Rise Assessment Report) was released in June 2012 and included relative SLR projections for the three states, taking into account coastal erosion rates, tidal impacts, El Niño and La Niña events, storm surge and land subsidence rates, and the range of uncertainty in selected SLR projections. It provided a synthesis of existing information on projected SLR impacts to state infrastructure (such as roads, public facilities, and beaches), natural areas, and coastal and marine ecosystems, and a discussion of future research needs regarding SLR.

In response to EO-S-13-08, the California Natural Resources Agency, in coordination with local, regional, state, federal, and public and private entities, developed The California Climate Adaptation Strategy (December 2009), which summarized the best available science on climate change impacts to California, assessed California's
vulnerability to the identified impacts, and outlined solutions that can be implemented within and across state agencies to promote resiliency. The adaptation strategy was updated and rebranded in 2014 as Safeguarding California: Reducing Climate Risk (Safeguarding California Plan).

Governor Jerry Brown enhanced the overall adaptation planning effort by signing EO B-30-15 in April 2015, requiring state agencies to factor climate change into all planning and investment decisions. In March 2016, sector-specific Implementation Action Plans that demonstrate how state agencies are implementing EO B-30-15 were added to the Safeguarding California Plan. This effort represents a multi-agency, cross-sector approach to addressing adaptation to climate change-related events statewide.

EO S-13-08 also gave rise to the State of California Sea-Level Rise Interim Guidance Document (SLR Guidance), produced by the Coastal and Ocean Working Group of the California Climate Action Team, of which Caltrans is a member. First published in 2010, the document provided “guidance for incorporating sea-level rise (SLR) projections into planning and decision making for projects in California,” specifically, “information and recommendations to enhance consistency across agencies in their development of approaches to SLR.” The March 2013 update finalizes the SLR Guidance by incorporating findings of the National Academy’s 2012 final Sea-Level Rise Assessment Report; the policy recommendations remain the same as those in the 2010 interim SLR Guidance. The guidance will be updated as necessary in the future to reflect the latest scientific understanding of how the climate is changing and how this change may affect the rates of SLR.

Climate change adaptation for transportation infrastructure involves long-term planning and risk management to address vulnerabilities in the transportation system from increased precipitation and flooding; the increased frequency and intensity of storms and wildfires; rising temperatures; and rising sea levels. Caltrans is actively engaged in in working towards identifying these risks throughout the state and will work to incorporate this information into all planning and investment decisions as directed in EO B-30-15.

The project is located within the Coastal Zone and direct impacts on transportation facilities resulting from projected SLR may be expected. Therefore, further analysis of adaptation strategies for SLR following the planning guidelines is required for the
proposed project, as described below and in Section 2.2.1, Hydrology and Floodplain, and the supporting Sea-Level Rise Impact Study Technical Report (WRECO 2016).

3.2.6.4 ADAPTATION TO SEA-LEVEL RISE
It is estimated that sea levels will rise 14 inches by 2050 and 55 inches by 2100 (Caltrans 2011). In project vicinity, SLR will propagate from Tomales Bay upstream to Lagunitas Creek, causing lowlands around Lagunitas Creek to be more vulnerable to flooding (Marin County 2015). The proposed bridge elevation will be sufficient to accommodate SLR through the year 2100 under average conditions but not during significant storm events (i.e., 100-year storm event) (WRECO 2016).

Figure 3-3 is a visualization conducted at the Cal-Adapt website, showing the potential extent of flooding at sea-level rise of approximately 59 inches (150 centimeters).

---

6 http://cal-adapt.org/sealevel/.
Figure 3-3  Potential Sea-Level Rise at Project Location

3.3  Mitigation Measures for Significant Impacts Under CEQA

The only resources for which there would be significant impacts is biological resources and noise during construction for a few receptors nearest the project. The following measures would reduce the impact, but periods of construction noise may not be able to be mitigated.

3.3.1 Biological Mitigation Measures

Mitigation Measure BIO-A: Compensatory mitigation for jurisdictional water features. Caltrans will implement onsite mitigation prior to project completion, which will consist of habitat enhancements such as large in-stream woody debris that are planned during stream bank reconstruction within other waters of the U.S. and
State. Offsite enhancement efforts to offset project impacts to wetlands and other waters of the U.S., if needed, may consist of funding to mitigation banks and will be coordinated during the design phase of this project. This will require the Caltrans Biologist to develop the detailed instream habitat enhancement in coordination with CDFW, to restore Tomales Roach and Western Pond Turtle habitat.

**Mitigation Measure BIO-B: CCC coho mitigation.** Caltrans will enhance the streambed within the BSA by placing large woody debris along the banks of Lagunitas Creek within the BSA. The habitat mitigation planting plan will be designed to mitigate permanent impacts at a 3:1 ratio and would be implemented within a year of completion of construction. Caltrans will work closely with CDFW, USFWS, and NMFS during the permitting phase of the project to determine appropriate onsite and, if needed, offsite mitigation to confirm all impacts from the final project designs are fully mitigated.

**Mitigation Measure BIO-C: Potential California red-legged frog (CRLF) compensatory measure.** Caltrans has the option to mitigate for permanent impacts to the California red-legged frog by funding approved mitigation bank for the project’s USFWS Service Area, at a ratio of 3:1, or mitigating onsite. Funding will be provided before the completion of construction. The final determinations of habitat impacts and required compensatory mitigation from the culvert extension and bridge replacement as well as mitigation location will be refined during Section 7 formal consultation with USFWS.

**Mitigation Measure BIO-D: Habitat enhancement for California freshwater shrimp (CFS).** Caltrans or its contractor will incorporate the preferred habitat substrate vegetation for California freshwater shrimp, California blackberry (*Rubus ursinus*), into the onsite Habitat Mitigation Planting Plan to recreate beneficial habitat for this species and compensate for temporary habitat impacts. The Habitat Mitigation Planting Plan will be designed to mitigate permanent impacts at a 3:1 ratio. The Habitat Mitigation Planting Plan would be implemented within 1 year of completion of construction within the BSA. Plantings will be monitored for a minimum of 1 year, with replanting as necessary within that year.

### 3.3.2 Noise Mitigation Measures

**Mitigation Measure NOISE-A: Reduce construction noise from augering or vibratory pile driving with temporary barriers.** During construction, Caltrans or its contractor will implement a measure or measures such as the ones described below
to reduce construction noise from augering or vibratory pile driving on the adjacent property owners.

Options to abate construction noise in the source-to-receiver noise path include using temporary enclosures around stationary equipment, temporary barriers, and noise curtains. Other strategies include effectively using temporary earth mounds as barriers, creating buffer zones between equipment and residences, or using existing structures as barriers. The effectiveness of the temporary barrier can vary depending on its material and placement. The barrier is usually most effective if positioned either close to the noise source or close to the receptor.
Chapter 4 Comments and Coordination

4.1 Introduction

Early and continuing coordination with the general public and public agencies is an essential part of the environmental process. It helps planners determine the necessary scope of environmental documentation and the level of analysis required, and to identify potential impacts and avoidance, minimization, and/or mitigation measures and related environmental requirements. Agency consultation and public participation for this project have been accomplished through a variety of formal and informal methods, including interagency coordination meetings, public scoping meetings, and a Stakeholder Working Group (SWG).

This chapter summarizes the results of Caltrans’ efforts to fully identify, address, and resolve project-related issues through early and continuing coordination.

4.2 Scoping Process

4.2.1 Notice of Preparation

A Notice of Preparation (NOP) was submitted to the California State Clearinghouse on March 6, 2015 (Appendix L). A letter announcing the NOP was mailed to the following California agencies: West Marin Chamber of Commerce, Marin Transit, County of Marin, Transportation Authority of Marin, Marin Municipal Water District, County of Marin Public Works, County of Marin Community Development Agency, Association of Bay Area Governments, California Highway Patrol, California Native American Heritage Commission, Regional Water Quality Control Board, and State Water Resources Control Board. The letter announcing the NOP was also mailed to responsible and trustee California and federal agencies. These announcements started the 30-day scoping process, which was later extended to 60 days upon public request through resubmittal of the Notice of Completion to the California State Clearinghouse.

Additional flyers announcing the NOP were posted in Point Reyes Station at the Point Reyes Station Post Office, Palace Market, KWMR Radio Station, Perry’s Delicatessen, Inverness Library (located in Inverness), and two Community Post Boards (located adjacent to Old Western Saloon, Inc., and the Grandi Building). A display advertisement announcing the scoping period and the public open house scoping meeting was posted in the Marin Independent Journal on Friday, March 6,
Chapter 4 Comments and Coordination

2015, and Monday, March 9, 2015, and in the *Point Reyes Light* newspaper on Thursday, March 12, 2015, and Thursday, March 19, 2015.

**4.2.2 Scoping Meeting**

A public scoping meeting was held at the West Marin Elementary School in Point Reyes Station on March 19, 2015, from 7:00 p.m. to 9:00 p.m. The scoping meeting was organized in an open house format, where Caltrans representatives staffed various informational stations that showed several bridge type options, including a retrofit option. A total of 42 members of the public attended the scoping meeting. Additionally, informational stations displayed environmental topics of concern, construction phases, and other potential impacts to the proposed project.

Caltrans received a total of 63 comment submittals during the scoping period. Comments came from six regulatory agencies, six private organizations or non-profit groups, and 51 members of the public (the Scoping Report is available online at [http://www.dot.ca.gov/dist4/lagunitas creekbridge/](http://www.dot.ca.gov/dist4/lagunitas creekbridge/)). Agency letters in response to the scoping notification were received from the California Lands Commission, North Marin Water District (NMWD), Inverness Public Utilities District (IPUD), Marin County Fire Department, California Office of Planning and Research, Regional Water Quality Control Board (RWQCB), California Coastal Commission, and the California Transportation Commission (CTC). Each entity provided comments consistent with their regulatory role and responsibility.

Comment themes from the scoping comments included the following:

- Provide more information on the structural vulnerabilities and investigate retrofitting the existing bridge.
- Maintain the current character (e.g., color) and scale of the bridge.
- Keep the construction period short to minimize impacts on traffic and effects on tourism and the business community.
- Minimize construction and the bridge design effects on the sensitive wetland and riparian habitats surrounding Lagunitas Creek and the species they support.
- Minimize impacts on adjacent property owners.
- Conduct a safety analysis of the intersection of State Route 1 with Sir Francis Drake Boulevard and Sir Francis Drake Boulevard with Bear Valley Road.
- Plan for the changes associated with sea level rise over time.
After reviewing comments and issues, Caltrans followed up with a second informational meeting on October 14, 2015, to address some of the issues raised during the scoping period. In addition to an open house format with presentation boards, the informational meeting included a presentation that provided an overview of the project, a summary of issues heard during the scoping process, updates on information gathered (such as information on sea level rise), and a review of build alternatives, retrofit feasibility, and the accelerated bridge construction (ABC) methods under consideration. A considerable period of the meeting was dedicated to the ABC method, as this addressed the public’s most vocal concern: the fear that a three-year construction period would result in difficult economic impacts to the rural community, which is dependent on tourism and frequent commerce deliveries via State Route 1 and the Lagunitas Creek Bridge in and out of Point Reyes Station and vicinity. The ABC method is an expedited construction method requiring less than one year, with the trade-off that there would be an absolute closure of the bridge crossing for a two- to three-week period.

4.3 Consultation and Coordination with Public Agencies

Consultation with several agencies occurred during the environmental evaluation process. The following federal, state, regional, and local agencies were consulted during preparation of the Environmental Impact Report/Environmental Assessment (EIR/EA) and technical reports. A list of meetings conducted thus far with local elected officials and public agency staff members is provided in Table 4-1.

<table>
<thead>
<tr>
<th>Organization(s)</th>
<th>Date</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>California Coastal Commission</td>
<td>26-Apr-15</td>
<td>Interagency scoping field meeting at project site to discuss project alternatives.</td>
</tr>
<tr>
<td></td>
<td>13-Jan-17</td>
<td>Interagency meeting at Caltrans office to discuss project alternatives, anticipated impacts, and potential compensatory mitigation options.</td>
</tr>
<tr>
<td>California Department of Fish and Wildlife (CDFW)</td>
<td>26-Apr-15</td>
<td>Interagency scoping field meeting at project site to discuss project alternatives.</td>
</tr>
<tr>
<td></td>
<td>19-May-16</td>
<td>CDFW site visit with Caltrans to confirm permitting.</td>
</tr>
<tr>
<td></td>
<td>7-Jul-16</td>
<td>Section 4(f) resource discussion</td>
</tr>
<tr>
<td></td>
<td>13-Jan-17</td>
<td>Interagency meeting at Caltrans’ office to discuss project alternatives, anticipated impacts, and potential compensatory mitigation options.</td>
</tr>
<tr>
<td>Interagency and Public</td>
<td>19-Mar-15</td>
<td>Public scoping meeting.</td>
</tr>
</tbody>
</table>
### Table 4-1 Agency Coordination Meetings and Contacts

<table>
<thead>
<tr>
<th>Organization(s)</th>
<th>Date</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marin County</td>
<td>25-Apr-16</td>
<td>Section 4(f) resource discussion</td>
</tr>
<tr>
<td></td>
<td>7-Jul-16</td>
<td>Reviewed project and detour route with Marin County and discussed possible measures to minimize harm.</td>
</tr>
<tr>
<td></td>
<td>19-Jul-16</td>
<td>Section 4(f) resource discussion</td>
</tr>
<tr>
<td>National Marine Fisheries Service (NMFS)</td>
<td>26-Apr-15</td>
<td>Interagency scoping field meeting at project site to discuss project alternatives.</td>
</tr>
<tr>
<td></td>
<td>13-Jan-17</td>
<td>Interagency meeting at Caltrans office to discuss project alternatives, anticipated impacts, and potential compensatory mitigation options.</td>
</tr>
<tr>
<td>Native American Consultation</td>
<td>30-Mar-16</td>
<td>Letter to Federated Indians of Graton Rancheria requesting input.</td>
</tr>
<tr>
<td>Point Reyes National Seashore, National Parks Service (NPS)</td>
<td>9-Sep-15</td>
<td>Discussion of existing public access areas and NPS plans for future educational and public access areas relative to the project.</td>
</tr>
<tr>
<td></td>
<td>11-Aug-15</td>
<td>Meeting to discuss potential Western pond turtle presence and conduct visual surveys.</td>
</tr>
<tr>
<td></td>
<td>7-Jul-16</td>
<td>Section 4(f) resource discussion</td>
</tr>
<tr>
<td>Regional Water Quality Control Board (RWQCB)</td>
<td>26-Apr-15</td>
<td>Interagency scoping field meeting at project site to discuss project alternatives.</td>
</tr>
<tr>
<td></td>
<td>1-Sep-16</td>
<td>Discussion regarding the RWQCB’s concern regarding potential “aggradation” that may create fish passage barrier.</td>
</tr>
<tr>
<td></td>
<td>13-Jan-17</td>
<td>Interagency meeting at Caltrans office to discuss project alternatives, anticipated impacts, and potential compensatory mitigation options.</td>
</tr>
<tr>
<td>State Historic Preservation Officer (SHPO)</td>
<td>27-Sep-16</td>
<td>Letter to SHPO to initiate consultation</td>
</tr>
<tr>
<td></td>
<td>27-Oct-16</td>
<td>Letter from SHPO with concurrence that the three properties within the APE are not eligible.</td>
</tr>
<tr>
<td>Tribal Historic Preservation Officer (THPO)</td>
<td>10-May-16</td>
<td>Inquiring about tribal engagement and input.</td>
</tr>
<tr>
<td>U.S. Army Corps of Engineers (USACE)</td>
<td>25-Apr-15</td>
<td>Interagency scoping field meeting at project site to discuss project alternatives.</td>
</tr>
<tr>
<td></td>
<td>13-Jan-17</td>
<td>Interagency meeting at Caltrans office to discuss project alternatives, anticipated impacts, and potential compensatory mitigation options.</td>
</tr>
</tbody>
</table>
Table 4-1 Agency Coordination Meetings and Contacts

<table>
<thead>
<tr>
<th>Organization(s)</th>
<th>Date</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. Fish and Wildlife Service (USFWS)</td>
<td>17-Mar-15</td>
<td>Initial request for technical assistance to John Cleckler of the USFWS.</td>
</tr>
<tr>
<td></td>
<td>13-Aug-15</td>
<td>Field visit with USFWS and Caltrans; discussed project scope, timeline, and occurrence of federally listed species.</td>
</tr>
<tr>
<td></td>
<td>13-Jan-17</td>
<td>Interagency meeting at Caltrans office to discuss project alternatives, anticipated impacts, and potential compensatory mitigation options.</td>
</tr>
</tbody>
</table>

4.3.1 U.S. Army Corps of Engineers

A Section 404 permit is necessary when a project will result in discharge of fill material into waters of the U.S. The proposed project would result in permanent and temporary impacts to wetland and water features within the project area as discussed in Section 2.3, Biological Environment. Therefore, a Section 404 permit would be required for the proposed project. Caltrans will obtain a Section 404 Nationwide Permit pursuant to Section 404 of the Clean Water Act for the proposed project.

Caltrans coordination with USACE has included site visits to the project area, discussion of project plan and alternatives, and updates regarding project alternatives and considerations.

4.3.2 National Marine Fisheries Service

Caltrans initiates consultation with NMFS when a project has the potential to affect a federally listed anadromous fish species or adversely affect designated critical habitat. Because the project has the potential to affect habitat for Chinook salmon, federally threatened steelhead, and federally endangered coho salmon, Caltrans will conduct Section 7 consultation with NMFS.

Caltrans coordination with NMFS has included an initial site visit and assessment, discussions regarding mitigation, and updates regarding project alternatives and considerations.

4.3.3 U.S. Fish and Wildlife Service

Caltrans initiates consultation with the USFWS when a project has the potential to affect a federally listed species, as discussed in Section 2.3, Biological Environment. Formal consultation with USFWS under the federal Endangered Species Act will be
initiated with the submission of a Biological Assessment when Caltrans has selected a preferred alternative.

Caltrans will obtain a Biological Opinion pursuant to Section 7 of the federal Endangered Species Act from USFWS prior to project approval, and an incidental take statement will be obtained for the proposed project.

Caltrans coordination with USFWS has included discussion and correspondence regarding the proposed project and alternatives, technical assistance regarding species to consider in the analysis, mitigation for project impacts, and updates on project alternatives and considerations.

4.3.4 California Department of Fish and Wildlife
Sections 1600 to 1607 of the California Fish and Game Code require any agency that proposes a project that will substantially divert or obstruct the natural flow of or substantially change the bed or bank of a river, stream, or lake to notify CDFW before beginning construction. If CDFW determines that the project may substantially and adversely affect fish or wildlife resources, a Lake or Streambed Alteration Agreement would be required. Caltrans will obtain a Lake and Streambed Alteration Agreement pursuant to Section 1602 of California’s Fish and Game Code.

As discussed in Section 2.3, Biological Environment, CDFW will be consulted for effects to California freshwater shrimp, Central California Coast Evolutionary Significant Unit coho salmon, and northern spotted owl. CDFW issues an Incidental Take Permit for species listed as candidate, threatened, or endangered under CESA when the following criteria are met: the authorized take is incidental to an otherwise lawful activity, impacts are minimized and fully mitigated, adequate funding is provided to implement the required minimization and mitigation measures and to monitor compliance, issuance of the permit will not jeopardize the continued existence of the listed species, and the measures to minimize and fully mitigate are roughly proportional in extent to the impact, maintain the applicant’s objectives, and may be successfully implemented by the applicant.

Caltrans has held several coordination meetings with CDFW to discuss the proposed project, project alternatives, fish passage assessment requirements, and updates on project alternatives and considerations.
4.3.5 California Coastal Commission
Caltrans has held three SWG meetings with representation from the California Coastal Commission to discuss plans for the proposed project, the alternatives analysis process, and permitting issues and to receive updates on project alternatives and considerations. Table 4-1 provides a list of these meetings. Additionally, Caltrans coordination with the Coastal Commission has included an initial site visit and assessment, discussions regarding mitigation, and updates regarding project alternatives and considerations.

4.3.6 Native American Consultation
Caltrans submitted a request to the Native American Heritage Commission (NAHC) on March 30, 2016, for a search of the Sacred Lands file to determine if known cultural sites are located within or near the project Area of Potential Effects (APE) and for a list of interested Native American groups and individuals who might have information or concerns about the proposed project area. The NAHC responded with a letter dated April 11, 2016, stating that their files showed no recorded resources within the project APE (see Section 2.1.7, Cultural Resources). The letter also included the name and address of an interested Native American individual, Mr. Greg Sarri, Chairperson for the Federated Indians of Graton Rancheria (FIGR). Caltrans prepared and sent letters to Mr. Sarris on March 30, 2016. No response has been received. On May 10, 2016, Ms. Buffy McQuillen, Tribal Historic Preservation Officer (THPO) for FIGR, was contacted by email to follow up on any comments FIGR might have on the project. A copy of the letter sent to Mr. Sarris was attached. The letter was followed by a phone call to Ms. McQuillen on June 13, 2016, with the requested information.

Native American consultation for this project is ongoing and consistent with the requirements of Section 106 and AB 52. Caltrans regularly updates the Tribes on the project’s status, and Tribal representatives have participated in and monitored all archaeological subsurface investigations. Tribes have been invited to review and comment on archaeological technical studies and have been provided final copies of all archaeological reports.

4.3.7 State Historic Preservation Officer
Caltrans sent a letter to the SHPO on September 27, 2016, to initiate consultation regarding the proposed project. The letter transmitted the Historic Properties Survey Report, Historic Resource Evaluation Report, and an Archaeological Survey Report for the proposed undertaking and requested concurrence on eligibility determinations.
for historic and archaeological properties to be considered eligible for the National Register of Historic Places. On October 27, 2016, SHPO concurred that properties within the APE are not eligible.

### 4.3.8 Regional Water Quality Control Board

Because the proposed project would require a Section 404 permit from USACE (federal agency), a 401 Water Quality Certification from the RWQCB will also be required. Caltrans will apply for this certification.

Caltrans coordination with the RWQCB has included an initial site visit and assessment, discussions regarding fish passage and mitigation, and updates regarding project alternatives and considerations.

### 4.3.9 Marin County

Caltrans has held several coordination meetings with Marin County, as listed in Table 4-1. Coordination discussions included Section 4(f) consultation, the detour route, and the Transportation Management Plan. Caltrans will obtain several environmental approvals, including a Section 4(f) letter of concurrence and temporary construction easement from Marin County.

### 4.4 Public Participation

#### 4.4.1 Stakeholder Working Group

To continue to incorporate community input in developing and refining the range of alternatives, Caltrans worked with Marin County Supervisor Steve Kinsey’s office to identify representatives to form a SWG to provide Caltrans with community input. Caltrans requested that the representatives be known and trusted spokespersons for existing community groups that represent a range of community interests, including businesses and tourism, farming and property ownership, safety and public services, community aesthetics, and environmental interests. The nature of the project only required a small number of meetings to inform about the engineering and environmental constraints and range of aesthetic options and to provide opportunities for comment on comparative data for each of the alternatives. Therefore, the representatives were only committing to three or four meetings of up to 2 hours each, spanning 4 months.

Supervisor Kinsey’s office sought participants and provided Caltrans with most of the representatives for the SWG; further interviews were conducted during which additional representatives were identified to complete the full range of interests. The
following participants from interested organizations and groups were identified for the SWG:

- Coastal Commission, Shannon Fiala
- Point Reyes Village Association, Chuck Eckart
- Business Community, Amanda Eischstaedt
- Marin Department of Public Works, Dan Dawson
- Marin County Planning and Parks, Curtis Havel
- Mainstreet Moms, Cathleen Dorinson
- Emergency Services, Randy Engler
- Farming Community, Lynn Stray
- National Parks Service/National Seashore, Brannon Ketcham

Caltrans conducted preliminary interviews with potential individual SWG members to make sure each could commit and understood the roles and expectations of engagement. Each member represented an interest or a resource entity that may be directly affected by the project. Members that represented community interests, such as the Point Reyes Village Association, Business Community, Mainstreet Moms, and Farming Community, were liaisons between the community and Caltrans. SWG meetings were closed to the public; however, meeting summaries are posted online on Caltrans’ Lagunitas Creek Bridge Project website (http://www.dot.ca.gov/dist4/lagunitascreekbridge/).

Three SWG meetings were held from January through April 2016. The informal roundtable forum allowed the 12-member SWG (9 members identified above and 3 members from Caltrans) to review project details with project staff, ask questions, and understand elements of flexibility in the design. Caltrans provided project details to help the members understand and compare the alternatives, explore the trade-offs between the two construction methods, and understand environmental considerations (both construction and operational impacts), potential mitigation measures, and costs associated with each alternative.

To facilitate the SWG members in acting as liaisons with the broader community, similar information as that discussed in the SWG meetings was condensed into two newsletters (March 2016 and June 2016) that were distributed to the public via postal service and web postings. The newsletters provided technical context to help facilitate the SWG’s discussions with the public, where members gathered qualitative
information to discuss at SWG meetings and to help prepare the public to better understand the trade-offs between the alternatives.

4.4.2 Notice of Availability of the Draft Environmental Document
A Notice of Availability (NOA) was circulated to the project mailing list and to the various parties listed on the distribution list (see Chapter 6.0, Distribution List). Additionally, a newsletter with the NOA inserted was distributed to a wide area a minimum of 5 miles around the project. The notice provided information on the project, including a summary of the proposed improvements, where the environmental document can be reviewed, the address to where comments can be sent, and the close of the comment period.

4.4.3 Public Meeting
Information on this EIR/EA will be presented at the upcoming Public Meeting; for information about the Public Meeting refer to the General Information About This Document section, following the cover page.

The Public Meeting solicits comments and input from the public and agencies on the environmental analyses and conclusions presented in the Draft EIR/EA document. Comments will be taken into consideration for preparation of the Final EIR/EA document.
Chapter 5  List of Preparers

The following California Department of Transportation staff and consultants contributed to the preparation of this Draft Environmental Impact Report/Environmental Assessment.

CALIFORNIA DEPARTMENT OF TRANSPORTATION
Program/Project Management
Wajahat Nyaz, Project Manager
Prakash Sivagnanasundaram, Project Manager
Joy Lee, Project Manager

Environmental Analysis
Eric DeNardo, Branch Chief
Stefan Galvez-Abadia, Office Chief
Jamie LeDent, NEPA Review
Brian Gassner, Peer Review

Design North Counties—State Highway Operations and Protection Program
Manny Cayula, Office Chief
Emarnan Pongpairoj, Project Engineer
Ghulam Popal, Branch Chief

Cultural Resource Studies
Lindsay Hartman, Archeologist
Charles Palmer, Historian

Biological Sciences and Permits
Christopher Pincetich, Biologist

Water Quality
Brian Rowley, Water Quality Specialist

Landscape Architecture
Joaquin Pedrin, Landscape Architect (Visual Impact Assessment)

Environmental Engineering
Ray Boyer, Branch Chief (Hazardous Materials and Waste)
Shiang Yang, Branch Chief (Air Quality, Noise)
Chapter 5 List of Preparers

**Geotechnical Design West**
Anna Sojourner, Engineering Geologist

**Engineering Services, Hydraulics**
Joseph Peterson, P.E., Office Chief

**CH2M**
Dash Antel, Graphic Design Technician
Chris Archer, GIS Specialist
Holly Barbare, Biologist
Bryan Bell, Technical Editor
Loren Bloomberg, Senior Transportation Engineer
Rudy Calderón, Environmental Planner
Maria Elena Conserva, Environmental Scientist
Clarice Ericsson, Publications Technician
Shannon Gonzales, GIS Specialist
Mark Greenig, Senior Environmental Planner
Clint Helton, Archeologist
Lynne Hosley, Senior Biologist
Jodi Ketelsen, Senior Environmental Planner
Jasmin Mejia, Environmental Planner
Loretta Meyer, Senior Environmental Planner
Marynell Nolan-Wheatley, Cultural Resources Planner
Erika Powell, Water Quality and Hydrology
David Rasmussen, Biologist
Robert Rodland, Environmental Planner
Yassaman Sarvian, Environmental Planner
Lisa Valdez, Transportation Engineer
Brett Weiland, Environmental Planner
Jeanette Weisman, Biologist
Kyle Winslow, Hydrologist

**ICF INTERNATIONAL**
Dave Buehler, Principal (Noise)
Shannon Hatcher, Manager (Air Quality)

**NORTHGATE**
Nancy Hendrickson, Principal
Dennis Laduzinsky, Principal
Chapter 5 List of Preparers

Ted Splitter, Principal Geologist (Hazardous Materials and Waste)
Kevin Torres, Senior Scientist (Geology and Soils)

WRECO CONSULTANTS
Analette Ochoa, Senior Associate
Andrew Chin, Senior Associate
Chris Sewell, Senior Associate
Chapter 6 Distribution List

This Draft Environmental Impact Report/Environmental Assessment was distributed to the following federal, state, and regional responsible and trustee agencies and elected officials. Agencies with an asterisk (*) will receive notification via the California State Clearinghouse.

In addition to the following list, local officials, stakeholders, community groups, businesses, and interested persons were notified of the availability of this document and public meetings as described in Chapter 4.0, Comments and Coordination. Furthermore, all property owners/occupants near the project area received a project mailer informing them of the availability of this Draft EIR/EA, and property owners adjacent to the project site received a hardcopy of the document.

**Federal Agencies**

- National Marine Fisheries Service
  - West Coast Region, Protected Resources Division
  - 777 Sonoma Avenue, Room 325
  - Santa Rosa, CA 95404

- U.S. Army Corps of Engineers, San Francisco District
  - 1455 Market Street, 16th Floor
  - San Francisco, CA 94103-1398

- U.S. Department of Agriculture
  - Natural Resources Conservation Service
  - 5401 Old Redwood Highway, Suite 100
  - Petaluma, CA 94954

- U.S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office
  - 2800 Cottage Way
  - Sacramento, CA 95825

- NOAA Greater Farallones National Marin Sanctuary
  - 991 Marine Drive, The Presidio
  - San Francisco, CA 94129

**State Agencies**

- California Air Resources Board*, CEQA Coordinator
  - 1001 “I” Street
  - Sacramento, CA 95814

- California Coastal Commission*
  - 45 Fremont Street, Suite 2000
  - San Francisco, CA 94105-2219

- California State Coastal Conservancy
  - 1330 Broadway, 13th floor
  - Oakland, CA 94612-2530

- California Department of Parks and Recreation*
  - 1416 9th Street
  - Sacramento, CA 95814

- California Department of Parks and Recreation
  - Bay Area District
  - 845 Casa Grande Rd
  - Petaluma, CA 94954
Chapter 6 Distribution List

California Natural Resources Agency
Department of Conservation, Division of Land Resource Protection*
801 K Street, MS 18-01
Sacramento, CA 95814

California State Lands Commission
100 Howe Ave
Sacramento, CA 95825
Wildlife Conservation Board c/o CDFW
1416 9th Street, Room 1266
Sacramento, CA 95814

California Highway Patrol*
Special Projects Section
P.O. Box 942898
Sacramento, CA 92298

California Office of Emergency Services (Cal EMA)*
3650 Schriever Avenue
Mather, CA 95655

California Public Utilities Commission*
505 Van Ness Avenue
San Francisco, CA 94102
Native American Heritage Commission
1550 Harbor Blvd., Suite 100
West Sacramento, CA 95691

State Historic Preservation Officer
Office of Historic Preservation*
1725 23rd Street, Suite 100
Sacramento, CA 95816

State Clearinghouse
1400 Tenth Street
PO Box 3044
Sacramento, CA 95812-3044

Regional and Local Agencies

Central Valley Flood Protection Board*
3310 El Camino Ave, Room 151
Sacramento, CA 95821

Bay Area Air Quality Management District
375 Beale Street
San Francisco, CA 94105

San Francisco Bay RWQCB, Region 2*
1515 Clay Street, Suite 1400
Oakland, CA 94612

California Department of Fish and Wildlife, Region 3*
7329 Silverado Trail
Napa, CA 94558

Marin County Community Development Agency
Environmental Health Services
3501 Civic Center Drive, Suite 236
San Rafael, CA 94903

Marin County Community Development Agency Planning Division
3501 Civic Center Drive, Suite 308
San Rafael, CA 94903

Marin County Open Space District
3501 Civic Center Dr.
San Rafael, CA 94903

Marin County Libraries
Point Reyes Library
11431 State Route One
Point Reyes Station CA 94956

Inverness Library
15 Park Ave
Inverness CA 94937
State Route 1 Lagunitas Creek Bridge Project
Draft Environmental Impact Report/Environmental Assessment 04-0G642

Chapter 6 Distribution List

Petaluma Public Library
100 Fairgrounds Drive
Petaluma, CA 94952

Elected Officials

The Honorable Dianne Feinstein
United States Senate
One Post Street, Suite 2450
San Francisco, CA 94104

The Honorable Kamala D. Harris
United States Senate
50 United Nations Plaza, Suite 5584
San Francisco, CA 94102

The Honorable Jared Huffman
United States House of Representatives, 2nd District
999 Fifth Avenue, Suite 290
San Rafael, CA 94901

The Honorable Marc Levine
California State Assembly, 10th District
3501 Civic Center Drive, Suite 412
San Rafael, CA 94903

The Honorable Mike McGuire
California State Senate, 2nd District
3501 Civic Center Drive Suite 425
San Rafael, CA 94903

Supervisor Damon Connolly
Marin County Board of Supervisors, 1st District
3501 Civic Center Drive Room 329
San Rafael, CA 94903

Supervisor Katie Rice
Marin County Board of Supervisors, 2nd District
3501 Civic Center Drive Room 329
San Rafael, CA 94903

Supervisor Kate Sears
Marin County Board of Supervisors, 3rd District
3501 Civic Center Drive Room 329
San Rafael, CA 94903

Supervisor Dennis Rodoni
Marin County Board of Supervisors, 4th District
3501 Civic Center Drive Room 329
San Rafael, CA 94903

Supervisor Judy Arnold
Marin County Board of Supervisors, 5th District
3501 Civic Center Drive Room 329
San Rafael, CA 94903
Chapter 7  References List

Summary


1.0  Proposed Project


2.0  Affected Environment, Environmental Consequences, and Avoidance, Minimization, and/or Mitigation Measures


2.1  Human Environment

2.1.1  Land Use

Association of Bay Area Governments (ABAG) and Metropolitan Transportation Commission (MTC). 2013. *Plan Bay Area: Regional Transportation Plan and Sustainable Communities Strategy for the San Francisco Bay Area 2013 to 2040*. Available online: http://files.mtc.ca.gov/pdf/Plan_Bay_Area_FINAL/Plan_Bay_Area.pdf.
Chapter 7 References List


2.1.2 Community Impacts


2.1.3 Parks and Recreational Facilities


2.1.4 Utilities and Emergency Services


2.1.5 Traffic and Transportation/Pedestrian and Bicycle Facilities


Chapter 7 References List


2.1.6 Visual/Aesthetics


__________. 2017b. California Scenic Highway Mapping System. Available online:  


2.1.7 Cultural Resources


2.2 Physical Environment

2.2.1 Hydrology and Floodplain


__________. 2014. *Flood Insurance Study for Marin County, California and Incorporated Areas*. Flood Insurance Study Number 06041CV001B and 06041CV002B. March 17.


__________. 2016b. Location Hydraulic Study Report for Lagunitas Creek Bridge on State Route 1 Replacement Project. July.

2.2.2 Water Quality and Storm Water Runoff


San Francisco Bay Regional Water Quality Control Board (RWQCB). 2012. “Category 5 2012 California 303(d) List of Water Quality Limited Segments.” Available online:

__________.2014. Resolution No. R2-2014-00027. Available online:


2.2.3 Geology/Soils/Seismic/Topography


_________. 2016a. Revised Seismic Design Recommendations. Memorandum from Hossain Salimi, Senior Materials and Research Engineer, Division of Engineering Services, Geotechnical Services – MS-5, Office of Geotechnical
Design-West, to Ghulam Popal, District Branch Chief, Office of Design SHOPP. December 7.


California Department of Mines and Geology. 1974. State of California Special Studies Zones, Inverness Quadrangle (Official Map). Available online:


Marin County. 2007. Marin Countywide Plan. Available online:

. 2016. “MarinMap Map Viewer” Web page. Available online:
http://www.marinmap.org/Html5Viewer/Index.html?viewer=mmdataviewer&


Sojourner, A. 2016. *CEQA Information for Proposed Bridge on Lagunitas Creek*. Memorandum to Eric DeNardo, Branch Chief, Office of Environmental Analysis, California Department of Transportation District 4, from A. Sojourner, Division of Engineering Services, California Department of Transportation District 4. April 19.


2.2.4 Paleontology


2.2.5 Hazardous Waste/Materials


__________. 2016b. *Certified Sanborn® Map Report, Lagunitas Creek Bridge, Post Mile 28.5 State Route 1, Point Reyes Station, California*. May 11.


San Francisco Bay Regional Water Quality Control Board (RWQCB). 2007. *Water Quality Monitoring and Bioassessment in Nine San Francisco Bay Region Watersheds: Walker Creek, Lagunitas Creek, San Leandro Creek, Wildcat Creek/San Pablo Creek, Suisun Creek, Arroyo Las Positas, Pescadero Creek/Butano Creek, San Gregorio Creek, and Stevens Creek/Permanente Creek*. Surface Water Ambient Monitoring Program (SWAMP). Oakland, CA.

### 2.2.6 Air Quality


Yang, Shiang. 2016. Email message from Shiang Yang, P.E., Acting District Branch Chief, California Department of Transportation District 4, to Jasmin Mejia of CH2M regarding construction emissions modeling results for the Lagunitas Creek Bridge Replacement Project. July 15.

### 2.2.7 Noise


2.3 Biology

2.3.1 Natural Communities


2.3.2 Wetlands and Waters of the U.S.


2.3.3 Plant Species


### 2.3.4 Animal Species


### 2.3.5 Threatened and Endangered Species


### 2.3.6 Invasive Species


### 2.4 Cumulative Impacts


Chapter 7 References List


3.0 CEQA Evaluation


__________. 2013a. Caltrans Activities to Address Climate Change.


Liu, Senator Carol. 2009. California Senate Bill 391: California Transportation Plan. An act to amend Sections 65072 and 65073 of, and to add Sections 14000.6, 65071, 65072.1, and 65072.2 to, the Government Code, relating to transportation planning. February 26.


