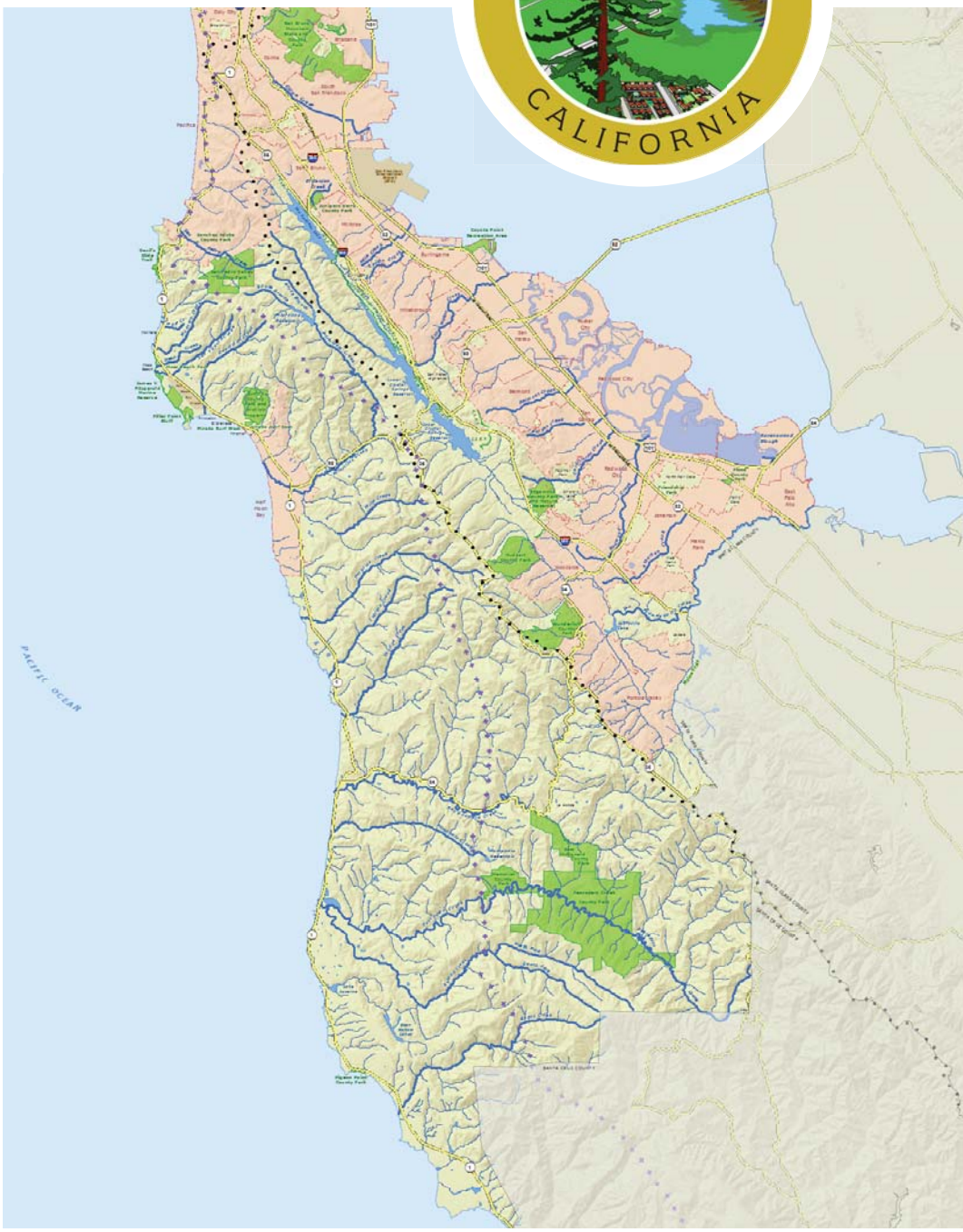
County of San Mateo
ROUTINE MAINTENANCE PROGRAM MANUAL



Horizon
WATER and ENVIRONMENT

October 2025

County of San Mateo

Routine Maintenance Program Manual

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Summary of 2025 Manual Revisions

The Routine Maintenance Program Manual has been revised to incorporate the following edits:

Chapter 6

- Clarified that fuel management activities may also occur along DPW roads in addition to County Parks (Section 6.2).
- Revised the herbicide use description based on updates to the County's Integrated Pest Management Program (IPMP) and standard operating procedures (Section 6.5).
- Revised the Bay Area Air Quality Management District to the Bay Area Air District (Section 6.6).

Chapter 9

- Revised Best Management Practice (BMP) BIO-10, Measures to Protect Nesting Marbled Murrelet to improve clarity.

Appendices

- Updated Appendix A to identify the location of synthetic geotextile filter fabric for vegetated rock slope protection and boulder revetments (BMP EC-13, Schematic 2, and Vegetated Rock Slope Protection Schematic, Sheet 2).

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Chapter 1
Introduction

1.1 Program Purpose and Background

The County of San Mateo (County) Department of Public Works (DPW) and Parks Department (Parks Department) are required to conduct routine maintenance activities to ensure that County facilities are properly functioning and operational. For the purposes of this Manual, these two departments will be referred to collectively as "the County" or "the Departments" unless otherwise specified or described individually. Historically, the County has developed guidance documents to describe basic maintenance needs and best management practices (BMPs). Past relevant documents include:

- County of San Mateo Watershed Protection Program Volume 1 Maintenance Standards (County of San Mateo, 2004, updated 2007)
- Decision-Making Guidelines for Vegetation Management, San Mateo County Parks (County of San Mateo, 2006)
- Trail Design and Management Guidelines from the San Mateo County 2001 Trails Plan (County of San Mateo 2001)
- Sediment Assessment of Roads and Trails within the Pescadero/Memorial/Sam McDonald County Park Complex, Pescadero Creek Watershed (Pacific Watershed Associates 2003)

To date, the County has developed, permitted, and conducted maintenance activities as individual discrete actions. The purpose of developing the San Mateo County Routine Maintenance Program (Maintenance Program) is to provide a more comprehensive and consistent approach to conducting routine maintenance activities. Administered as a program, versus a series of individual maintenance activities, the County will follow a consistent set of maintenance methods, BMPs, and impact avoidance approaches.

Administering routine maintenance programmatically also facilitates using longer-term regulatory permits from authorizing agencies. Historically, the County has experienced months and even years of permitting delays for routine maintenance projects. These delays in turn are costly and increase the flooding risk, failure, or accelerated erosion by keeping some facilities from operating at their intended level of function.

The purpose of this Manual is to describe the routine maintenance activities that comprise the Maintenance Program. This includes routine maintenance activities conducted at County roads, trails, campgrounds, picnic areas, marinas, bridges, culverts, and ditches.

This Manual also describes natural resources in the program area and specific conditions at several of the facilities where routine maintenance is expected. This Manual also provides guidance and practices to avoid and minimize potential environmental impacts during maintenance. The Manual describes impact mitigation approaches and monitoring and reporting activities. In addition, this Manual serves as a basis for the County to comply with the California Environmental Quality Act (CEQA), San Mateo County's Local Coastal Program (LCP), and other resource agency permitting requirements.

While the standard operating procedures and guidelines described in this Manual are intended to provide the Program with consistent approaches, the Maintenance Program is also envisioned to be flexible and subject to periodic updates to reflect improved understanding of resource conditions, maintenance technologies, adaptive management practices over time; and to accommodate new facilities that would require consistent or similar maintenance requirements. In the event that new facilities, activities, or maintenance technologies are incorporated in the Program, the Manual would be updated and resource agencies would be notified. This draft Manual has been submitted for review and comment to the following resource agencies: California Department of Fish and Wildlife (CDFW), National Marine Fisheries Service (NMFS), U.S. Fish and Wildlife Service (USFWS), San Francisco Bay Regional Water Quality Control Board (RWQCB), Central Coast RWQCB, and U.S. Army Corps of Engineers (USACE).

This document supersedes the County's Maintenance Standards and important elements of the standards, outcomes and BMPs have been incorporated and updated as needed. The Maintenance Standards were initially developed in 2001 to comply with provisions in the County's Stormwater Pollution Prevention Program NPDES permit focused on reducing erosion and sedimentation from County-owned lands. The Maintenance Standards document was then updated in 2007. Since then, the County's maintenance needs and BMP technologies and methods have evolved. During preparation of this Manual, the County has further reviewed and updated BMPs from the Maintenance Standards document, which are presented at the end of this Manual in Appendix A.

The Maintenance Program addresses routine maintenance activities countywide. Appendix B, Tables B-1 and B-2 and Figures B-1 through B-7 identify likely maintenance sites and activities expected to occur within the Program in the next 5-10 years. While the maintenance locations presented in Appendix B represent anticipated maintenance locations, not every site could be determined at the time of developing this Manual. The Program includes countywide maintenance activities that are consistent with those described in this Manual.

1.2 Program Objectives and Conservation Outcomes

1.2.1 Program Objectives

The objectives of the Maintenance Program include:

- Maintain the functional integrity and operational quality and capacity of County channels, stormwater facilities, roads, trails, and other recreational facilities.
- Prevent roadway flooding, reduce safety hazards, and minimize potential threats to the structural integrity of roadways, bridges, and stormwater and channel facilities within unincorporated San Mateo County.
- Repair and stabilize eroding streambanks and failing culverts in a timely manner to prevent larger-scale slope failures, avoid emergencies, and minimize sedimentation to downstream water bodies.
- Maintain vegetation around County facilities and infrastructure for preventative maintenance and for the purposes of protecting infrastructure and public safety, including: maintaining

visibility, reducing fire risk and hazards, and reducing the potential for unauthorized encampments

- Avoid and minimize potential impacts to the natural environment including sensitive areas within the Coastal Zone when conducting routine maintenance activities by incorporating detailed appraisals of habitat, species, and resource conditions while identifying and prioritizing maintenance needs and developing site-specific maintenance plans.
- Protect and enhance the natural environment at County facilities.
- Provide regulatory assurance to enable long-term permits with fewer delays and improved work planning and implementation.
- Develop mitigation approaches in a more strategic and integrative manner that targets areas in the County that could benefit from habitat enhancement, restoration, and/or preservation.

1.2.2 Conservation Outcomes

Conservation outcomes of the Maintenance Program, which were derived and modified from the original Maintenance Standards document, include:

- Reduce erosion-related impacts associated with construction and maintenance activities through careful planning combined with proper selection and implementation of erosion control measures.
- Reduce or minimize water velocities on County-maintained stream banks, ditches, slopes and other large disturbed areas by implementing BMPs that dissipate its erosive forces and protect water quality.
- Preserve and enhance air quality by implementing BMPs that reduce introduction of wind-borne dust and debris.
- Protect special-status species and their habitats by implementing BMPs that minimize impacts to water quality, provide erosion control and revegetation on disturbed soils, preserve and promote growth of native vegetation, discourage propagation of non-native plants, provide large woody debris for in-stream aquatic habitat.
- Reduce sedimentation by implementing BMPs that preserve topsoil and enhance water quality and in-stream habitat by reducing sedimentation.
- Implement BMPs that preserve native vegetation which thereby enhance habitat, discourage the growth of non-native and invasive species, reduce soil disturbances and surface erosion, and reduce risk of wildfire.
- Reuse native materials (soils and large woody debris) at routine maintenance sites to the extent possible.
- Remove invasive plant species at County parks and other County maintained areas.

- Provide safe public transportation corridors in areas subject to a variety of natural disasters while also protecting sensitive habitat.

1.3 Program Area and Maintenance Zones

Figure 1-1 presents the Maintenance Program area within San Mateo County, California. The Program area consists of two physiographic regions: (1) County areas draining to San Francisco Bay (Bayside); and (2) County areas draining to the Pacific Ocean (Coastside). The County is divided by the Santa Cruz Mountains and these physiographic regions reflect the principal drainage patterns and directions. Within these two regions, routine maintenance areas in the County are further located according to County maintained roads, trails, parks, and channels and stream courses. **Figures 1-2 through 1-6** provide additional sub-regional maps for the Bayside and Coastside maintenance areas.

Since 1980, the County has assumed responsibility for implementing the California State Coastal Act through administering its LCP. The LCP guides, reviews, and authorizes potential development in the coastal zone. The Coastal Zone Boundary shown in Figure 1-1 shows the portions of the County (along the Coastside) where the County's LCP applies.

Figure 1-4
North Coastside
of San Mateo County
Maintenance Area

Figure 1-2
North Bayside
of San Mateo County
Maintenance Area

Figure 1-5
Central Coastside of
San Mateo County
Maintenance Area

Figure 1-3
South Bayside
of San Mateo County
Maintenance Area

Figure 1-6
South Coast Side
of San Mateo County
Maintenance Area

Navigable Slough

San Bruno Creek

SAN FRANCISCO COUNTY

SANTA CLARA COUNTY

SANTA CRUZ COUNTY

PACIFIC OCEAN

San Francisco Bay

Detail Area

N

0 1.25 2.5 5
Miles

Hydrologic Features
- Major Creek
- Other Creeks and Drainages
- Lake / Pond
- Ocean / Bay

Transportation
- Highway / Major Road
- Airport

Administrative Areas
- County Park
- Incorporated City
- Unincorporated Area

Physical and Regulatory Boundaries
- Bayside / Coastside Watershed Boundary
- Coastal Development Zone Boundary
- Coverage Area of Detailed Figures

Figure 1-1

San Mateo County Maintenance Area

Horizon WATER and ENVIRONMENT

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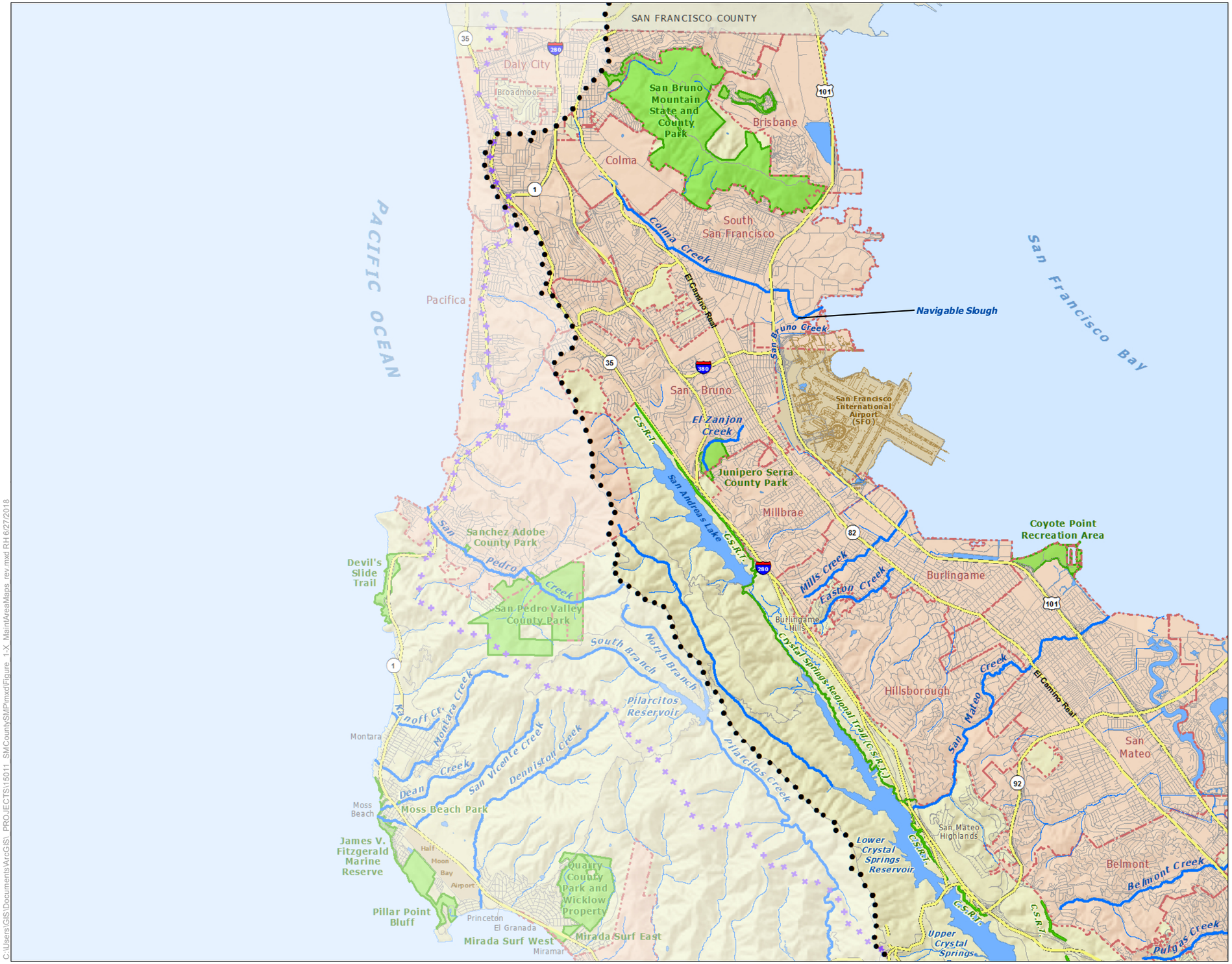
Figure 1-2

North Bayside of San Mateo County Maintenance Area



Hydrologic Features

- Major Creek
- Other Creeks and Drainages
- Lake / Pond
- Ocean / Bay

Admnistrative Areas

- County Park
- Colma — Incorporated City
- Montara — Unincorporated Area

Physical and Regulatory Boundaries

- Bayside / Coastside Watershed Boundary
- Coastal Development Zone Boundary

Transportation

- Highway / Major Road
- Street
- Airport

N

0 1 2 4 Miles

Horizon WATER and ENVIRONMENT

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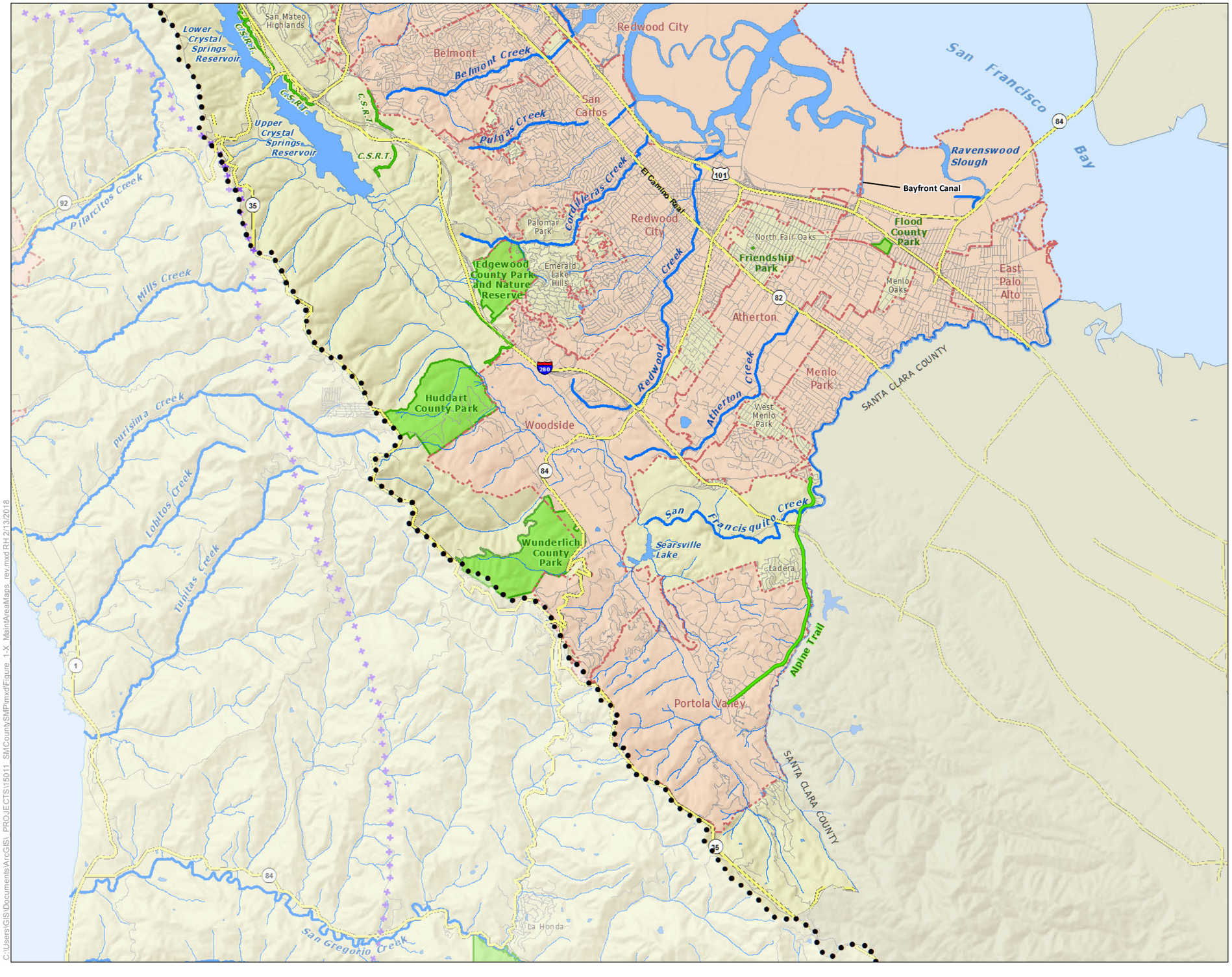
Figure 1-3

South Bay Side of San Mateo County Maintenance Area



Hydrologic Features

- Major Creek
- Other Creeks and Drainages
- Lake / Pond
- Ocean / Bay

Admnistrative Areas

- County Park
- Colma — Incorporated City
- Montara — Unincorporated Area

Physical and Regulatory Boundaries

- Bayside / Coastside Watershed Boundary
- Coastal Development Zone Boundary

Transportation

- Highway / Major Road
- Street
- Airport

N

0 1 2 4 Miles

Horizon WATER and ENVIRONMENT

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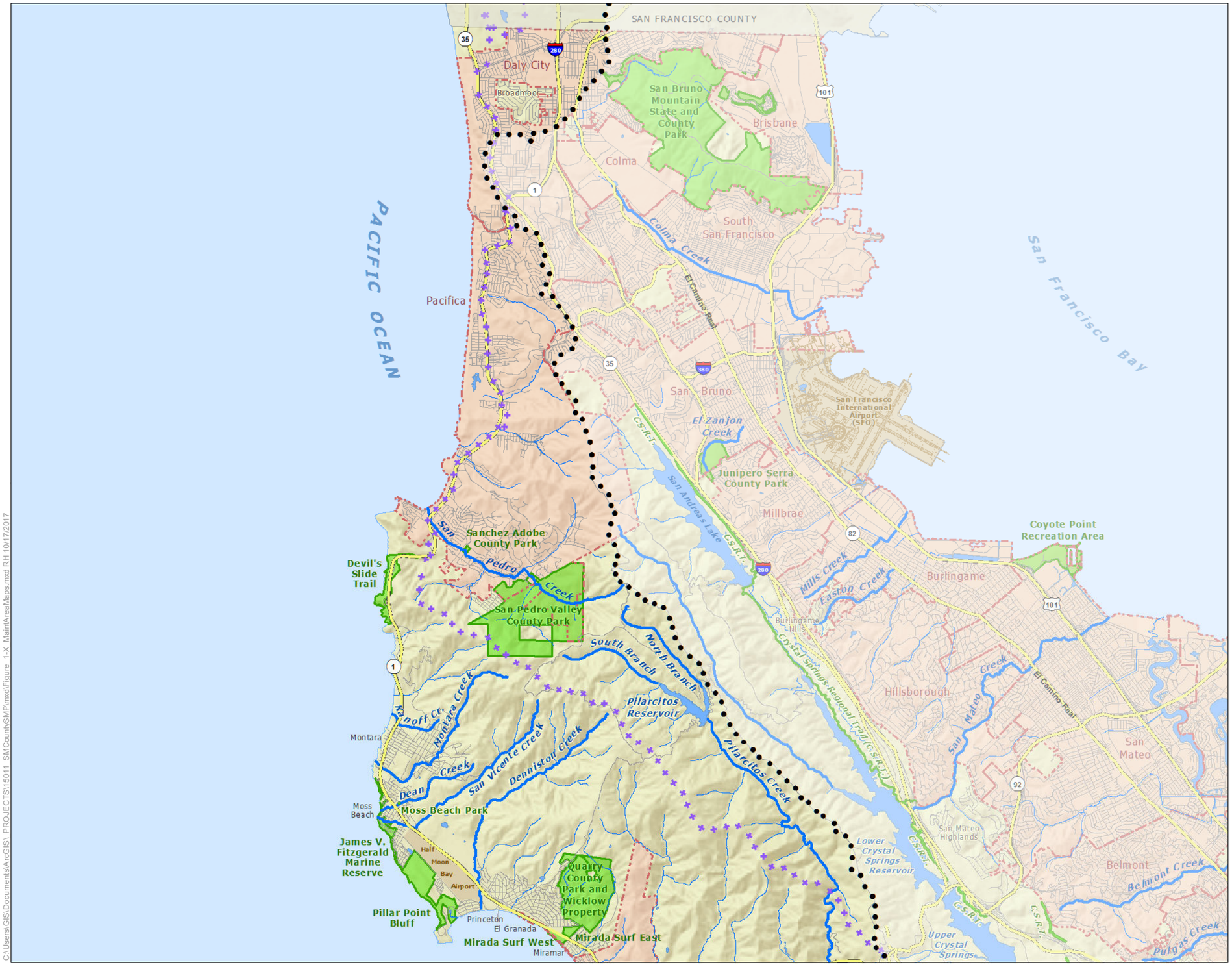
Figure 1-4

North Coast Side of San Mateo County Maintenance Area



Hydrologic Features

- Major Creek
- Other Creeks and Drainages
- Lake / Pond
- Ocean / Bay

Admnistrative Areas

- County Park
- Colma — Incorporated City
- Montara — Unincorporated Area

Physical and Regulatory Boundaries

- Bayside / Coastside Watershed Boundary
- Coastal Development Zone Boundary

Transportation

- Highway / Major Road
- Street
- Airport

N

0 1 2 4 Miles

Horizon WATER and ENVIRONMENT

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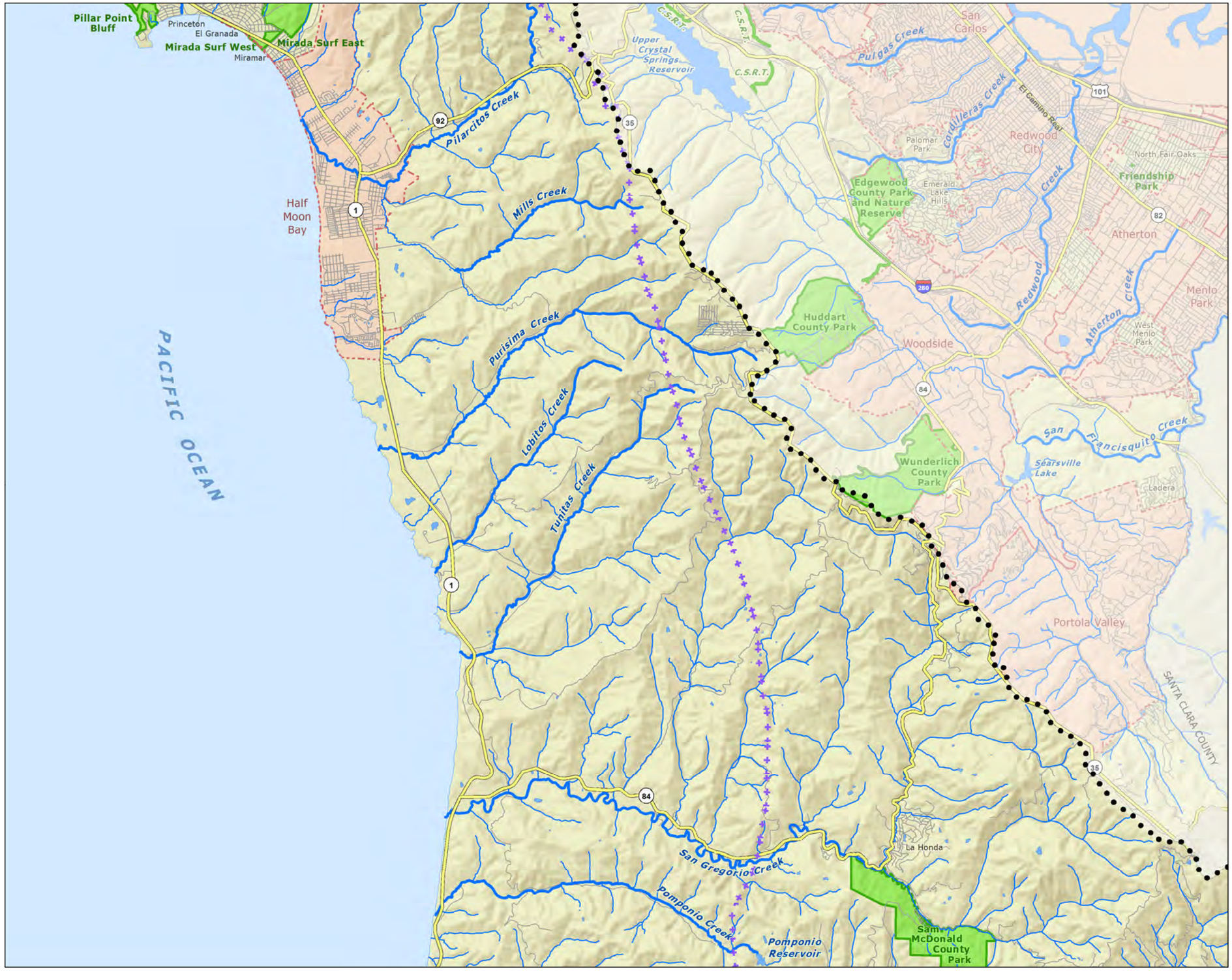
Figure 1-5

Central Coastside of San Mateo County Maintenance Area



Hydrologic Features

- Major Creek
- Other Creeks and Drainages
- Lake / Pond
- Ocean / Bay

Administrative Areas

- County Park
- Colma — Incorporated City
- Montara — Unincorporated Area

Physical and Regulatory Boundaries

- Bayside / Coastside Watershed Boundary
- Coastal Development Zone Boundary

Transportation

- Highway / Major Road
- Street
- Airport

N

0 1 2 4 Miles

Horizon WATER and ENVIRONMENT

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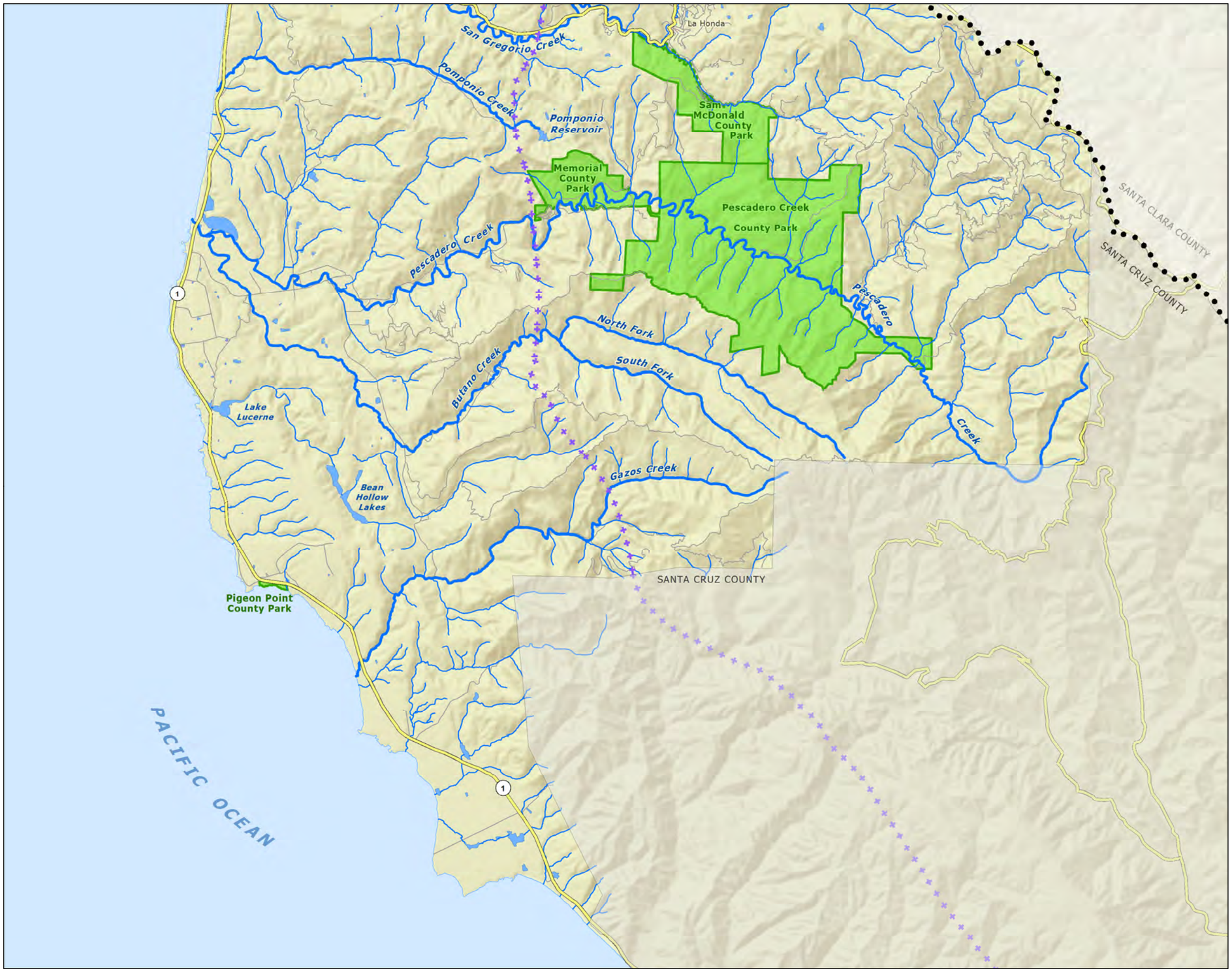
Figure 1-6

South Coastside of San Mateo County Maintenance Area



Hydrologic Features

- Major Creek
- Other Creeks and Drainages
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Administrative Areas

- County Park
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Physical and Regulatory Boundaries

- Bayside / Coastside Watershed Boundary
- Coastal Development Zone Boundary

Transportation

- Highway / Major Road
- Street
- Airport

N

0 1 2 4 Miles

Horizon WATER and ENVIRONMENT

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1.4 Summary of Program Activities

Table 1-1 provides a summary of maintenance activities that are covered by the Maintenance Program.

Table 1-1. Summary of Maintenance Activities Conducted at Program Facilities

Facility or Feature	Maintenance Activity
On-channel crossings	Culvert repair or replacement Sediment and debris removal
Bridges	Erosion protection at bridge abutments Apply protective paint coating Seal/repair cracks on bridge deck and concrete surfaces Repair or replacement of pedestrian bridge decking and/or abutments
Roadside ditch relief culverts	Culvert repair or replacement Sediment and debris removal
Flood control channels, drainages and creeks (engineered and non-engineered)	Sediment and debris removal Bank stabilization Downed tree management Vegetation management Tide gate maintenance and repair Diversion structure maintenance Spalled or cracked concrete repair Repair of existing rock slope protection along creek banks Floodwall maintenance (graffiti removal, localized vegetation management, and other minor repairs) Levee maintenance (repair damage from animals, in-kind repair of existing RSP, crack repair, repair slip-outs along levee face)
Roadside ditches and swales	Ditch or swale resurfacing Sediment and debris removal Vegetation management
Roads	Repaving and repair of damaged paved roads Street sweeping on paved roads Slip-out and slide repairs (including removal of slide material) Mowing, trimming, and pruning vegetation along County roads
Trails, campgrounds, picnic areas, and other County Parks features	Trail tread repair and re-grading Mowing, trimming, and pruning vegetation along trails Non-native vegetation removal (e.g. herbicide, grazing, mechanical) Fire fuel management Hazard tree trimming and removal

Facility or Feature	Maintenance Activity
Green infrastructure (GI)	Vegetation and thatch removal Light sediment and debris clearing and planting
Marina facilities including docks, sewer lines/tanks, water lines, launch ramp, and seawall revetment	Repair/replace damaged dock boxes and concrete Periodic sewer line/ejector tank cleaning Water line inspections Replace damaged floats, cleats and bumper striping Debris removal from launch ramp Seawall revetment repair and riprap replacement
Storm drain facilities (storm drain pipes, manholes, catch basins, trash capture devices, flap gates, pump stations, diversion structures)	Trash and debris clearing Flushing, and cleaning Repair and replacement of storm drain pipes, pumps, wet wells, and flap gates Pump station building and diversion structure maintenance

1.5 Program Exclusions

The focus of the Maintenance Program is routine and expected work activities. As such, the Program does not include emergency or unplanned repair work. The Program does not include maintenance projects that would alter the designed flood conveyance capacity of an existing engineered channel. Large construction projects and capital improvement projects (CIPs) are not considered routine maintenance and are not included in the Program.

Emergency maintenance actions are not included in the Program, nor addressed by Program CEQA compliance or permits and authorizations. A situation is considered an “emergency” if it is a sudden, unexpected occurrence involving a clear and imminent danger that demands immediate action to prevent or mitigate loss of or damage to life, health, property, or essential public services (Public Resources Code Section 21060.3). An emergency situation could involve activities that would otherwise be considered routine maintenance activity as described in this Manual but may need to occur at an unplanned time.

Although emergency situations are not covered by the permits authorizing the routine maintenance activities of the Program described in this Manual, the County makes every effort to follow the impact avoidance and minimization guidance provided in this Manual when implementing activities under emergency conditions.

1.6 Natural Resource Protection and Impact Avoidance

Various portions of the County have critical habitat for special-status species including but not limited to California red-legged frog, marbled murrelet, steelhead, and San Francisco garter snake. The County values these natural resources and aims to minimize impacts to these species and their habitats and other sensitive resources by implementing impact avoidance and minimization measures. Chapter 4 of this Manual, *Biological Resources*, describes the sensitive natural resources in the program area. Chapter 9, *Impact Avoidance and Minimization, BMPs, and Mitigation*, further describes the Program's approach to reduce potential environmental impacts and includes a comprehensive table that identifies BMPs for the Program. Detailed BMPs including those implemented for specific biological resources and cultural resources are presented in Chapter 9; erosion control and sediment and water quality control BMPs are described in more detail in Appendix A.

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Chapter 2
Regulatory Framework

This chapter describes environmental regulations and permitting processes that apply to the Maintenance Program. Before describing the relevant regulations and permits, this chapter begins by summarizing past maintenance activities conducted by the County and associated regulatory permits. This chapter continues by summarizing guidance received from regulatory agencies on how to structure the Maintenance Program. Regulatory agency representatives directed the County to develop a tiered program based on resource quality and sensitivity.

2.1 Program Background

2.1.1 Maintenance Activity and Permitting History

Since 2012, DPW has conducted routine maintenance at approximately 61 sites that were subject to regulatory permits, and the Parks Department has completed two projects that required regulatory permits. The types of maintenance activities completed by each County department and an overview of permits obtained within the last five years are summarized below.

Department of Public Works

As shown in **Table 2-1**, the majority of DPW's maintenance activities from 2012-2017 involved culvert replacement, a combination of both culvert replacement and slip-out repairs, and sediment removal from channels. Of the 39 culvert replacement sites, 27 were ditch relief/upland culverts and 12 were situated on or immediately adjacent to creeks. At sites where both culvert replacement and slip-out repairs were required, six of those were ditch relief/upland culverts and five were located on or immediately adjacent to creeks. Sediment removal work took place within five perennial creeks, five intermittent drainages, and Butano Creek which provides habitat for anadromous fish (e.g., steelhead and coho salmon). DPW also conducted included five bank stabilization projects, three of which were located in creekside areas under U.S. Army Corps of Engineers (USACE) jurisdiction, and two of which were in upland areas. Other minor routine maintenance activities conducted included one bridge repair project, two concrete box culvert repair projects, and two roadside drainage improvement projects.

Table 2-1. Maintenance Sites Addressed by DPW (2012-2017)

Routine Maintenance Repair Type	Number of Sites
Bridge Repair	1
Sediment removal from channels	10
Culvert Repair and Maintenance	2
Culvert Replacement	39
Culvert Replacement and Slip-out Repair	11
Slip-out/Bank Stabilization	5
Other Roadside Drainage Maintenance	2

To date, DPW has obtained regulatory permits for maintenance projects and activities on a case-by-case basis. In general, the types of routine maintenance activities that have required regulatory permits include sediment and debris removal within culverts and bridges, culvert replacements, creek bank stabilization work, and road slip-out repairs. For the maintenance repairs listed in Table 2-1 above, DPW generally developed permit applications by grouping sites by location (e.g., road or watershed). Since 2012, DPW has obtained the following number of permits from regulatory agencies:

- Six permits from USACE, five of which involved U.S. Fish and Wildlife Service (USFWS) consultation and one that involved National Marine Fisheries Service (NMFS) consultation
- Ten Lake or Streambed Alteration Agreements from California Department of Fish and Wildlife (CDFW)
- Seven 401 Water Quality Certifications and two Notices of Applicability under a General Waste Discharge Requirement (for activities outside of USACE's jurisdiction) from San Francisco Bay Regional Water Quality Control Board (RWQCB)
- Fifteen Coastal Development Permits obtained from the County's Planning Department for maintenance sites located within the Coastal Zone

Although emergency maintenance actions are not included in the Program, DPW conducted similar work at 27 emergency repair sites, some of which were within USACE and RWQCB's regulatory authority, during the 2012-2017 time period. Twelve of these locations required immediate attention in 2017 as a result of the severe storms that occurred in January and February. Such storms caused significant flooding, erosion, and damage to local roadways and required immediate attention to prevent complete failure of County roads and ensure safe access to County residents. Note that in 2014, the County had previously submitted permit applications for some of the 2017 emergency repair sites but at that time the sites were not considered emergency repairs. However, over the past several years since permit applications in 2014, conditions at those sites worsened and continued erosion resulted in loss of pavement along the edge of roadways. **Table 2-2** summarizes the types of emergency repairs addressed by DPW between 2012 and 2017.

Table 2-2. Emergency Repair Sites Addressed by DPW (2012-2017)

Repair Type	Number of Sites
Culvert Repair/Maintenance	4
Culvert Replacement	6
Culvert Replacement and Slip-out Repair	4
Slip-out and/or Bank Stabilization Repair	13

Parks Department

Within the last five years, the Parks Department has completed two creek projects that required regulatory permits from USACE, CDFW, and RWQCB. The majority of the Parks Department's past maintenance needs were in upland areas (outside of USACE and RWQCB jurisdiction) and typically focused on improving facilities that have outlived their useful life and were failing. One maintenance project involved removing two salmonid migration barriers from Pescadero Creek in Memorial County Park. This project involved removing an existing fish ladder and replacing it with two arched culverts to

enable adequate ford crossing over Pescadero Creek and to maintain access to campsites at Memorial Park. The project also entailed removal of a formerly used flashboard dam to allow passage of juvenile salmonids. Although this project is not a typical routine maintenance activity, replacing the fish ladder at Pescadero Creek with culverts served a dual purpose by both improving fish migration and roadway access for recreationists at Memorial County Park.

The second project involved replacing two failing culverts on Weiler Ranch Road in San Pedro County Park. The failing culverts were impeding emergency road access and increased sedimentation within San Pedro Creek, which provides spawning habitat for steelhead trout.

2.1.2 Anticipated Routine Maintenance Sites

DPW is responsible for maintaining over 300 miles of roadway and associated facilities including roadway shoulder areas, roadside ditches, ditch relief culverts, bridges, and LID-based stormwater facilities. DPW is also responsible for conducting vegetation management at two small municipal airports including the Half Moon Bay Airport and San Carlos Airport, and closed landfills including the Pescadero Landfill and Half Moon Bay Landfill. The Parks Department is responsible for maintaining various County park and trail facilities including those listed in **Table 2-3**, which are also shown in **Figures 1-2** through **1-6**.

Table 2-3. County Parks Covered in Routine Maintenance Program

Park / Trail	County Region	Location on Detailed Map	Community
San Bruno Mountain State and County Park	Bayside North	Figure 1-2	Brisbane/ Daly City/ South SF
Junipero Serra County Park	Bayside North	Figure 1-2	San Bruno
Coyote Point Recreation Area	Bayside North	Figure 1-2	San Mateo
Edgewood County Park and Preserve	Bayside South	Figure 1-3	Redwood City
Huddart Park	Bayside South	Figure 1-3	Woodside
Wunderlich County Park	Bayside South	Figure 1-3	Woodside
Flood County Park	Bayside South	Figure 1-3	Menlo Park
Sam McDonald County Park	Coastside South	Figures 1-5 and 1-6	Loma Mar
Pescadero Creek Park	Coastside South	Figure 1-6	Loma Mar
Tunitas Creek Beach	Coastside South		
San Pedro Valley Park and Pedro Point Headlands	Coastside North	Figure 1-4	Pacifica
Quarry County Park	Coastside North	Figure 1-4	Half Moon Bay
James V. Fitzgerald Marine Reserve	Coastside North	Figure 1-4	Moss Beach
Pillar Point Bluffs	Coastside North	Figure 1-4	Moss Beach
Memorial County Park	Coastside South	Figure 1-6	Loma Mar
Sanchez Adobe County Park	Coastside North	Figure 1-4	Pacifica

Pigeon Point County Park	Coastside South	Figure 1-6	South of Pescadero
Mirada Surf East County Park	Coastside North	Figure 1-5	Half Moon Bay
Mirada Surf West County Park	Coastside North	Figure 1-5	Half Moon Bay
Crystal Springs Regional Trail	Bayside North	Figure 1-2	San Mateo
Alpine Trail	South Bayside	Figure 1-3	Ladera
Devil's Slide Trail	Coastside North	Figure 1-4	Pacifica

Tables B-1 and B-2 in Appendix B, and Figures B-1 through B-7 identify sites that have either been maintained by the County in recent years or will likely require maintenance in the next 5-10 years. As shown in the tables, the majority of near-term maintenance activities involve vegetation management, repair or replacement of deteriorating culverts, bank stabilization, sediment removal, bridge maintenance, and trail maintenance. Although the Maintenance Program covers routine maintenance activities countywide, the sites and projects identified in Tables B-1 and B-2 provide a good basis to understand future maintenance activities that are expected to occur within the Program in the next 5-10 years. Appendix C includes detailed maps of recreational facilities that the Parks Department is responsible for maintaining. However, the sites listed in Tables B-1 and B-2 do not represent the entirety of possible maintenance locations as it is impossible to anticipate all maintenance locations at the time of developing this Manual. The Program includes countywide maintenance activities that are consistent with those described in this Manual.

2.1.3 Colma Creek Flood Control Channel Maintenance Project

In addition to the sites and projects identified in Appendix B, the County may also add maintenance of the Colma Creek flood control channel into the Maintenance Program in the future. In August 2017, the County obtained 5-year permits from CDFW, RWQCB and USACE for the Colma Creek Flood Control Channel Maintenance Project, which primarily involves removing localized sediment along the channel bed in a concrete lined portion of the channel and repairing or replacing degraded culverts and blocked culvert outfalls. These permits also cover other routine maintenance activities including vegetation management along channel banks and bed; repair or maintenance of concrete/hardened channel banks and bed; installation and maintenance of trash capture devices; removal of accumulated debris and blockages; installation and repair of fences on channel banks; repair of access roads; and graffiti removal. These maintenance activities at Colma Creek are consistent with the types of activities described in this Manual and included in the Maintenance Program. Although maintenance work conducted as part of the Colma Creek Flood Control Channel Maintenance Project currently operates under its own set of regulatory permits, there is a potential for this maintenance project to be incorporated into the Maintenance Program once the current Colma Creek maintenance permits expire in 2022. If these activities are incorporated into the Maintenance Program, the maintenance activities associated with Colma Creek would operate under the County-wide routine maintenance programmatic permits.

2.2 Regulatory Guidance for Program

Prior to the Maintenance Program, the County obtained permits for maintenance work on a case-by-case basis. Individual maintenance project permitting was very time consuming and resulted in permitting uncertainty and delays. In 2012, the County met with regulatory agency representatives to

discuss approaches for obtaining programmatic permits. The County met with staff from RWQCB, CDFW, USACE, USFWS, and National Oceanic Atmospheric Administration (NOAA). General topics discussed at these meetings included an overview of routine maintenance activities, mitigation approaches for impacts to species, and types of activities that should be omitted from the Program. Based on the 2012 meetings, the County received guidance from regulatory agencies on how best to proceed with developing the Maintenance Program to obtain long-term permits. Refer to Appendix D for detailed meeting notes and guidance received from the regulatory agencies. Since the 2012 meetings, the County met with staff from RWQCB, USACE, USFWS, and NOAA to introduce the Maintenance Program and Manual. The County also met separately with the USFWS in the summer of 2017 to discuss USFW's potential permitting approach based on the nature of the County's maintenance activities and presence of special-status species.

2.3 Tiered Approach Based on Activities and Resource Conditions

Regulatory agencies recommended that the County develop a tiered approach for addressing potential effects on federally listed species and habitats based on resource sensitivity at the maintenance site. The tiered approach will help the County and regulatory agency staff identify resource and site sensitivity and thereby prioritize impact avoidance and minimization measures and/or BMPs accordingly. See Appendix E for additional details regarding the tiered approach recommended by the regulatory agencies. The Maintenance Program includes the following three project tiers:

- **Tier 1 – No Impact.** Maintenance activities would occur in creek reaches inaccessible to federally listed fish or, for terrestrial special-status species other than birds, in areas where no suitable breeding habitat is present and there is no connectivity between the site and known or potential breeding habitat (so that non-breeding individuals can also be presumed to be absent). Because foraging or roosting birds could easily fly away before being impacted by maintenance activities, the implementation of maintenance activities in non-breeding habitat for special-status bird species is not expected to result in impacts on individuals that rise to the level of "take". This tier also includes maintenance activities that are not expected to result in any impacts on federally listed species (e.g., street sweeping, ditch maintenance and culvert repairs in areas where no wetland habitat is present). No compensatory habitat mitigation would be necessary for Tier 1 activities.

- **Tier 2 – Low Impact.** Maintenance activities would occur in areas where federally listed species are known to occur or could possibly occur, either because suitable breeding habitat is present or, for terrestrial species and fish, suitable non-breeding habitat is present and there is connectivity between the project site and suitable breeding habitat. However, for these activities, impacts on individuals can be avoided through implementation of avoidance and minimization measures (e.g., preconstruction surveys, exclusion of individuals from the project site, and/or implementation of non-disturbance buffers). Depending on the sensitivity of the work area and the likelihood that individuals could move into the work area after preconstruction surveys are conducted, some of these activities may require an on-site biological monitor to remain in Tier 2. For Tier 2 activities, "take" in the form of permanent loss of habitat should not occur, and therefore, no compensatory habitat mitigation would be necessary for Tier 2 activities.

- **Tier 3 – Moderate/High Impact.** Similar to Tier 2, maintenance activities would occur in areas where federally listed species are known to occur or could possibly occur, either because

suitable breeding habitat is present or suitable non-breeding habitat is present and there is connectivity between the project site and suitable breeding habitat. However, for Tier 3 activities, federally listed species cannot be effectively excluded from the maintenance site, preconstruction surveys could not definitively determine the presence or absence of the species, and/or "take" in the form of permanent loss of habitat cannot be avoided. Examples of Tier 3 sites might include culvert replacement projects in Coastside streams known for salmonid habitat or sediment removal projects in California red-legged frog habitat. For Tier 3 projects:

- During construction, these activities are expected to require implementation of standard BMPs and avoidance measures, and may require an on-site biologist.
- To offset any permanent impacts on sensitive species and/or habitat, compensatory mitigation may be needed. The mitigation ratio may vary depending on the magnitude of the impact and/or quality of habitat impacted.

More detailed descriptions of the Program's maintenance activities are provided in Chapters 5-8 and discussion of impact avoidance, minimization, and mitigation approaches are provided in Chapter 9.

2.4 Regulations and Agencies

Agencies with regulatory authority over maintenance activities include the USACE, USFWS, NMFS, State Historic Preservation Officer (SHPO), RWQCB Region 2 – San Francisco Bay and RWQCB Region 3 – Central Coast, and CDFW.

This chapter also describes compliance with CEQA and the National Environmental Policy Act (NEPA). Furthermore, this chapter describes compliance with the Coastal Development Act which was established by the California Coastal Commission, the McAteer-Petris Act which was established by San Francisco Bay Conservation and Development Commission (BCDC), and the County's LCP. The following sections describe the regulatory background for the County's routine maintenance activities; summarizes recently permitted maintenance activities; and describe each agency's regulatory authority and permitting process. **Table 2-4** summarizes maintenance activities as they are regulated by each agency.

Table 2-4. Regulatory Agency Jurisdiction by Maintenance Activity

Routine Maintenance Activity	USACE[1]	CDFW[2]	RWQCB[3]	USFWS[4]	NMFS[5]	BCDC[6]	Coastal Commission/ San Mateo County Planning and Building Department
Bank Stabilization and Slip-out/Slide Repairs	X	X	X	X	X		X
Sediment and Debris Removal	X	X	X	X	X	X	X
Vegetation Management							
Downed tree management	X	X	X	X	X	X	X

Routine Maintenance Activity	USACE[1]	CDFW[2]	RWQCB[3]	USFWS[4]	NMFS[5]	BCDC[6]	Coastal Commission/ San Mateo County Planning and Building Department
Trimming and Pruning		X	X	X		X	
Fire Fuel Management		X	X	X			
Mowing		X		X			
Herbicide Use		X		X		X	X
Roadside Ditch and Swale Cleaning/Resurfacing	X	X	X	X			X
Road and Trail Grading for Improved Drainage and Reduced Erosion		X	X	X		X	X
Culvert Repair or Replacement	X	X	X	X	X	X	X
Channel Maintenance							
Concrete Channel Repair	X	X	X	X	X	X	
Repair of Existing RSP Along Creek Banks	X	X	X	X	X	X	X
Tide Gate Maintenance	X	X	X	X	X	X	
Floodwall Maintenance		X	X	X		X	
Levee Maintenance	X	X	X	X	X	X	
Bridge Maintenance	X	X	X	X	X	X	X
GI Maintenance	X	X	X	X			X
Marina Maintenance (e.g., repair docks, sewer lines/tanks, water lines, launch ramps, and seawall revetment)	X		X	X	X	X	

Notes:

"X"denotes that regulatory authorization may be needed for the work activity.

1. Applies to work within Waters of the U.S. – generally below the Ordinary High Water Mark.
2. Only applies to work within areas subject to Fish and Game Code Section 1600 et seq.
3. Only applies to work within Waters of the State – generally below Top of Bank.
4. Only applies in species-specific areas and habitat protected under Endangered Species Act, Migratory Bird Treaty Act, and Bald and Golden Eagle Protection Act.
5. Only applies in specific areas for species and habitat protected under Endangered Species Act and Magnuson-Stevens Fishery Conservation and Management Act.
6. Only applies to work that involves new fill in the San Francisco Bay or activities that occur within the shoreline band (e.g., 100 feet landward from the shoreline around the Bay).

2.4.1 U.S. Army Corps of Engineers

Clean Water Act - Section 404

Section 404 of the Clean Water Act (CWA) prohibits the discharge of dredged and fill materials into waters of the United States (U.S.), including wetlands, without prior USACE authorization. "Discharge of dredged material" and "discharge of fill material" are defined in Title 33, Section 323.2 of the Code of Federal Regulations (33 Code of Federal Regulations [CFR] Section 323.2). "Waters of the U.S.," including "wetlands," are defined in 33 CFR Section 328.3. USACE jurisdiction in wetlands and other waters of the U.S. is briefly summarized below.

Wetlands

USACE regulates wetlands, which are defined as those areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. USACE jurisdiction extends to the limits of wetlands, which are delineated following the methodologies outlined in USACE's 1987 *Wetland Delineation Manual* and its 2008 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region*. Wetlands (both tidal and non-tidal) are present in many portions of the Program area where maintenance activities may occur.

Non-wetland "Other" Waters of the U.S.

In non-tidal waters without wetlands present, USACE jurisdiction extends to the ordinary high water mark (OHWM); when non-isolated wetlands are present, the jurisdiction extends beyond the OHWM to the boundary of those wetlands. In the Program area, non-tidal, non-wetland waters include creeks, channels, ditches, ponds, and lakes. These jurisdictional waters are categorized as "other" waters by the USACE.

Non-regulable Discharges of Dredge Material

As described in 33 CFR Section 323.2, "incidental fallback" is not considered a discharge of dredge material for the purposes of the CWA. While no regulatory definition of incidental fallback currently exists, in general, it refers to the small volumes of dredge material that become redeposited within waters of the U.S. during dredging or excavation activities. For instance, when using a clamshell dredge, some small portion of the sediment collected by the clamshell falls out of the clamshell and becomes redeposited within waters of the U.S.

As a result, the incidental fallback associated with excavating sediment from an earthen channel using long-reach excavators or similar equipment from a top-of-bank location or within the channel would not be regulated by USACE under CWA Section 404. This assumes that the removed sediment would not be stockpiled in the channel or within waters of the U.S. In contrast, equipment that moves dredged material from one place to another within waters of the U.S. before removal of the dredged material (for instance, a bulldozer) would be subject to regulation under CWA Section 404.

As described in 33 CFR Section 323.4, other discharges that are not subject to CWA Section 404 include normal farming, silviculture and ranching activities (e.g., plowing, seeding, minor drainage, and harvesting) for the purposes of food production, forest products or upland soil, and water conservation practices. In addition, emergency reconstruction of currently serviceable structures including dikes, dams, levees, groins, riprap, bridge abutments, and other transportation structures may be exempt from regulation under CWA Section 404. In order to qualify for this emergency reconstruction exemption, construction must occur within a reasonable period of time after the damage occurs. Other exemptions

include construction or maintenance of farm roads or forest roads where such roads are constructed and maintained in accordance with BMPs to assure that flow and circulation patterns and chemical and biological characteristics of waters of the U.S. are not impaired.

Clean Water Act Section 404 Regional General Permit

USACE will issue a Regional General Permit (RGP) for maintenance activities conducted under the Maintenance Program, under the authority of CWA Section 404 (33 U.S. Code [USC] Section 1344) and in accordance with provisions of "Regulatory Programs of the Corps of Engineers" (33 CFR Section 323.2[h]) for activities that are substantially similar in nature and cause only minimal individual and cumulative environmental impacts. The RGP will be valid for five (5) years from the date of issuance and may be renewed at USACE's discretion.

Compliance with additional regulations, including consultations with other federal and state agencies, may be required by USACE before its issuance of the RGP. These regulations may include the following:

- Federal Endangered Species Act (FESA)
- Fish and Wildlife Coordination Act (FWCA)
- Migratory Bird Treaty Act (MBTA)
- Bald and Golden Eagle Protection Act (BGEPA)
- Section 106 of the National Historic Preservation Act (NHPA)
- Section 401 of the CWA
- NEPA

USACE will initiate ESA and NHPA consultations with the appropriate federal agency partners as part of the RGP permit process. ESA compliance will be achieved through a Section 7 consultation process as requested by USACE with USFWS (as described below under the heading "Federal Endangered Species Act – Section 7 Consultation"). FWCA compliance will be achieved through an FWCA report prepared by USFWS. NHPA compliance (as described below under the heading "National Historic Preservation Act – Section 106") will be achieved through adherence to BMPs CUL-1 through CUL-6 (described in Chapter 9, Table 9-3). CWA Section 401 compliance will be completed through programmatic 401 Water Quality Certifications from the San Francisco Bay and Central Coast RWQCBs (as described in Section 2.4.4, under the heading "Clean Water Act Section 401".) NEPA compliance will be achieved by USACE's preparation of an Environmental Assessment (EA) as part of the RGP process. A finding of no significant impact (FONSI) is anticipated for the EA.

In April 2008, USEPA and USACE issued regulations governing compensatory mitigation for activities authorized by USACE permits (40 CFR Part 230, 33 CFR Parts 325 and 332). The 2008 "Mitigation Rule" adopted standards to improve the planning, implementation, and management of compensatory mitigation projects through several means:

- emphasizing a watershed approach in selecting locations for those projects;
- requiring measurable, enforceable ecological performance standards and regular monitoring;

- stipulating timing requirements for mitigation project implementation; and
- specifying the components of a complete compensatory mitigation plan (including assurances of long-term protection of compensation sites, financial assurances, and identification of the parties responsible for specific project tasks).

The Mitigation Rule advised that compensatory mitigation projects (i.e., permittee-responsible compensatory mitigation, mitigation banks, and in-lieu fee mitigation) require written mitigation plans with the following components: objectives; site selection criteria; site protection instruments (e.g., conservation easements); baseline information (for impact and compensation sites); credit determination methodology; mitigation work plan; maintenance plan; ecological performance standards; monitoring requirements; long-term management plan; adaptive management plan; and financial assurances. The County will provide compensatory mitigation for impacts to waters of the U.S. in accordance with the Mitigation Rule, as described in Chapter 9, *Impact Avoidance and Minimization, BMPs, and Mitigation*.

National Historic Preservation Act – Section 106

Section 106 of the NHPA of 1966, as amended, requires federal agencies to take into account the effects of their undertakings on cultural resources, including historic properties and historic and prehistoric archaeological sites. The NHPA authorizes the Secretary of the Interior to expand and maintain a National Register of Historic Places (NRHP), and the Secretary has established an Advisory Council on Historic Preservation (ACHP) as an independent federal entity. Section 106 of the NHPA requires federal agencies to afford the ACHP a reasonable opportunity to comment before licensing or approving the expenditure of funds on any undertaking that may affect properties listed, or eligible for listing, in the NRHP, and it requires federal agencies to coordinate with the State Historic Preservation Officer (SHPO) in the state where the proposed action will take place.

When issuing an RGP to the County to discharge fill into waters of the U.S. under the authority of CWA Section 404, USACE must comply with Section 106 of the NHPA because an RGP would be an undertaking by USACE as defined under Interim Guidance for Implementing Title 33, CFR Part 325, Appendix C, and under Title 36, CFR Part 800.16(y). Title 33, CFR Part 325, Appendix C establishes the procedures to be followed by USACE to fulfill NHPA requirements.

All earth-disturbing activities, such as sediment removal activities, that are conducted under the Maintenance Program within USACE jurisdiction will require compliance with Section 106 of the NHPA. USACE will ensure that the County meets its compliance requirements by conditioning the RGP to require the implementation of the relevant cultural resource avoidance measures and BMPs listed in Table 9-3 of Chapter 9. BMPs CUL-4, “Review Project Activities Involving Disturbance of Native Soil,” and CUL-6, “Address Discovery of Cultural Remains or Historic or Paleontological Artifacts Appropriately,” include several measures to avoid and minimize potential impacts to cultural and paleontological resources. These BMPs describe the protocol for notification and response actions if cultural resources are encountered.

Federal Endangered Species Act – Section 7 Consultation

The federal ESA was enacted in 1973 to protect plant and wildlife species as determined by USFWS and NMFS to be at risk of extinction. Species are protected through listing under the ESA as either threatened or endangered. An endangered species is at risk of extinction throughout all or a significant

portion of its range (ESA Section 3[6]). A threatened species is likely to become endangered within the foreseeable future (ESA Section 3[19]).

In Chapter 4 of this Manual, Table 4-1 lists special-status plants and Table 4-2 identifies special-status wildlife that may occur in the Maintenance Program area, including those that are recognized by federal and state agencies as threatened or endangered.

ESA Section 9 prohibits the "take" of any fish or wildlife species listed under the ESA as endangered. Take of threatened species is also prohibited under ESA Section 9 unless otherwise authorized by federal regulations. Take, as defined by the ESA, means "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." Harm is defined as "any act that kills or injures the species, including significant habitat modification." In addition, ESA Section 9 prohibits the "removal or reduction to possession" of any listed plant species "under federal jurisdiction" (i.e., on federal land).

The ESA includes three mechanisms that provide exceptions to the ESA Section 9 take prohibitions: ESA Section 7 consultation, ESA Section 10, and issuing ESA Section 4(d) rules. ESA Section 7 consultation is most relevant to the County's maintenance activities because it allows for take coverage of federal actions. This will be the mechanism by which incidental take coverage is obtained to conduct maintenance activities. ESA Section 7 provides a means for authorizing take of threatened and endangered species by federal agencies under certain circumstances, including actions that are conducted, permitted, or funded by a federal agency.

Under ESA Section 7, USACE will consult with USFWS and NMFS to ensure that the proposed federal action (which is USACE's issuance of the RGP) will not jeopardize the continued existence of endangered or threatened species or result in adverse modification of designated critical habitat. Because maintenance activities "may affect" listed species and designated critical habitat, the County will prepare Biological Assessments (BAs) for distribution to USFWS and NMFS by USACE, evaluating the nature and magnitude of the expected effects. Note that although the Manual evaluates the entire Maintenance Program as a whole, the BAs only address potential effects resulting directly or indirectly from maintenance activities necessitating coverage under the RGP, or resulting from activities (such as access through upland areas) that are interdependent or interrelated with the CWA Section 404-permitted activities. Based on coordination with USFWS and NMFS regarding the Maintenance Program, the following animal species will be evaluated in the BAs: green sturgeon (*Acipenser medirostris*), Central California Coastal steelhead (*Oncorhynchus mykiss*), Central California Coast coho salmon (*Oncorhynchus kisutch*), tidewater goby (*Eucyclogobius newberryi*), longfin smelt (*Spirinchus thaleichthys*), Mission blue butterfly (*Icaricia icarioides missionensis*), San Bruno elfin butterfly (*Incisalia mossii bayensis*), callippe silverspot butterfly (*Speyeria callippe callippe*), Bay checkerspot butterfly (*Euphydryas editha bayensis*), California tiger salamander (*Ambystoma californiense*), California red-legged frog (*Rana draytonii*), San Francisco garter snake (*Thamnophis sirtalis tetrataenia*), and marbled murrelet (*Brachyramphus marmoratus*).

Based on communication with the USFWS regarding the Maintenance Program, the County expects that USFWS will issue a project-specific biological opinion (BO) for the Program.

San Bruno Mountain Habitat Conservation Plan

The San Bruno Mountain Habitat Conservation Plan (HCP) and the ESA Section 10(a) permit were adopted in November 1982. The permit and HCP provides limited take coverage for mission blue butterfly, callippe silverspot butterfly, San Bruno elfin butterfly, and bay checkerspot butterfly in the City

of San Bruno, City of Brisbane, Daly City, South San Francisco, and San Mateo County. The 30-year permit was renewed in 2013. Over the past 33 years, the HCP serves as the implementation plan for managing and monitoring activities focused on protecting approximately 1,290 acres of land for the mission blue, callippe silverspot, and San Bruno elfin butterfly populations. Efforts have focused on controlling invasive plants including but not limited to blue gum eucalyptus, fennel, gorse, French broom, Bermuda broom, and Monterey Cypress. The Parks Department prepares and submits an annual report to USFWS that describes the status of covered species, adult butterfly monitoring results, and vegetation management activities carried out to support habitat improvements that benefit these three special-status species. Routine maintenance activities that occur within San Bruno Mountain are not covered by the HCP and therefore are addressed in this Manual.

2.4.2 U.S. Fish Wildlife Service

Migratory Bird Treaty Act

The MBTA (16 USC 703-712), administered by USFWS, implements four treaties between the U.S. and Canada, Mexico, Japan, and Russia, respectively, to manage and conserve migratory birds that cross national borders. The MBTA makes it unlawful in any manner, unless expressly authorized by permit in accordance with federal regulations, "to pursue, hunt, take, capture, or kill, possess, offer for sale, offer to barter, barter, offer to purchase, deliver for shipment, ship, export, import, cause to be shipped, exported, or imported, deliver for transportation, transport or cause to be transported, carry or cause to be carried, or receive for shipment, transportation, carriage, or export, any migratory bird, any part, nest, or egg of any such bird, or any product, whether manufactured, which consists, or is composed in whole or part, of any such bird or any nest, or egg thereof…" The definition of "take" is any act to "pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture or collect." (50 CFR Section 10.12). This includes most actions, direct and indirect, that can result in take or possession, whether it is temporary or permanent, of any protected species. Although harassment and habitat modification do not themselves constitute as take under the MBTA or the California Fish and Game Code (F&G Code), such actions that result in the direct loss of birds, nests, or eggs, including nest abandonment or failure, are considered take under such regulations. A list of migratory birds protected under the MBTA is available in 50 CFR Section 10.13. On December 8, 2004, the U.S. Congress passed the Migratory Bird Treaty Reform Act (Division E, Title I, Section 143 of the Consolidated Appropriations Act, 2005, PL 108–447), which excludes all migratory birds that are non-native or have been human-introduced to the U.S. or its territories. It defines a native migratory bird as a species present within the U.S. and its territories as a result of natural biological or ecological processes. USFWS published a list of the bird species excluded from the MBTA on March 15, 2005 (70 Federal Register 12710).

All native bird species occurring in the Program area are protected by the MBTA. Maintenance activities, such as vegetation management, may require the removal of vegetation at work sites where migratory birds are nesting. The County provides environmental trainings focused on nesting birds and other sensitive species for their maintenance crew. Similarly, for this Maintenance Program, compliance with the MBTA will be met through implementation of BMPs BIO-1 and BIO-8 which require similar environmental awareness trainings on special-status species and nesting birds, and pre-activity surveys before any breeding-season maintenance activities are implemented. Compliance with these BMPs would ensure that take of migratory birds is avoided.

Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act of 1940 protects eagles from commercial exploitation and safeguards their continued survival in the U.S. This law provides for the protection of the bald eagle (*Haliaeetus leucocephalus*) (the national emblem) and the golden eagle (*Aquila chrysaetos*) by prohibiting, except under certain specified conditions, the taking, possession, and commerce of such birds. USFWS, which enforces the Bald and Golden Eagle Protection Act, can issue permits for the take of eagles under limited circumstances. However, no such permit will be needed for the County's maintenance activities, which will avoid any such impacts through implementation of BMPs BIO-8 and BIO-14.

Federal Endangered Species Act

As described in Section 2.4.1, Federal Endangered Species Act – Section 7 Consultation, the ESA protects plant and wildlife species determined by USFWS and NMFS to be at risk of extinction. USFWS is responsible for protection of listed plants and wildlife other than marine species and anadromous fishes, which are protected by the NMFS. Chapter 4, Section 4.2 describes listed species and critical habitat that may occur in the Program area.

Note that the USFWS issued a biological opinion for the continued implementation and amendment of the San Bruno Mountain Habitat Conservation Plan in 2006. Activities covered under the amendment include urban development, management and monitoring of preserve lands, operation and maintenance of Guadalupe Canyon Parkway, and operation and maintenance of State and County park facilities (e.g., trails and recreational facilities) within habitat protected for special-status species covered by the HCP. The BO does not apply to routine maintenance of existing utility infrastructure such as roadside culverts and vegetation management along trails and fire access roads. As such, the BO to be prepared for the Maintenance Program will cover routine maintenance activities planned within San Bruno Mountain.

As described in Section 2.4.1, USACE will consult with USFWS concerning potential effects of maintenance activities on the listed species and their habitat, including preparation of a BA describing these effects. A project-specific BO will likely be obtained for the Maintenance Program, which evaluates potential impacts on threatened and endangered wildlife species and their critical habitat.

2.4.3 National Marine Fisheries Service

Federal Endangered Species Act

For protected marine and aquatic fish species and habitat, the USACE may need to consult with NMFS. The federal consultation process between USACE and NMFS is similar to the process described above for USFWS, whereby NMFS evaluates potential impacts on threatened and endangered fish species and their critical habitat through preparation of a BO.

The Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act (MSA) establishes a national program to manage and conserve the fisheries of the U.S. through the development of Federal Fishery Management Plans (FMPs), and the federal regulation of domestic fisheries under those FMPs, within the 200-mile U.S. Exclusive Economic Zone. The 1996 amendments to the MSA established a new mandate for NMFS, regional fishery management councils, and other federal agencies to identify and protect important marine and anadromous fish habitat (Essential Fish Habitat or EFH), including

wetlands. The EFH provisions of the MSA support one of the Nation's overall marine resource management goals – maintaining sustainable fisheries. Federal action agencies which fund, permit, or carry out activities that may adversely affect EFH are required to consult with NMFS with respect to the potential effects of their actions on EFH. When NMFS concludes that an action may adversely affect EFH, NMFS is required to provide the action agency with conservation recommendations to protect EFH. In the event that the Maintenance Program could result in impacts to EFH, USACE will consult with NMFS.

2.4.4 Regional Water Quality Control Board

Porter-Cologne Water Quality Control Act

California's Porter-Cologne Water Quality Control Act (Porter-Cologne Act) was enacted in 1969, and together with the federal CWA, provides regulatory guidance to protect water quality and water resources. The Porter-Cologne Act established the State Water Resources Control Board (SWRCB) and divided California into nine regions, each overseen by a RWQCB. The Porter-Cologne Act established regulatory authority over "waters of the State," which are defined as "any surface water or groundwater, including saline waters, within the boundaries of the State" (California Water Code, Division 7, Section 13050). More specifically, the SWRCB and its nine RWQCBs have jurisdiction over the bed and banks of a stream channel, its riparian corridor, and its beneficial uses.

The Porter-Cologne Act also assigns responsibility for implementing CWA Sections 303, 401, and 402 to the SWRCB and RWQCBs. Under Section 303, the RWQCBs, in conjunction with USEPA, are responsible for developing and implementing Total Maximum Daily Loads (TMDLs) to address water quality impairments.

The Porter-Cologne Act requires the development and periodic review of water quality control plans (basin plans) for the protection of water quality in each of California's nine regions. A basin plan is unique to each region and must identify beneficial uses, establish water quality objectives for the reasonable protection of the beneficial uses, and establish a program of implementation for achieving the water quality objectives. To provide currency, basin plans must be updated every 3 years. The basin plans also must comply with Section 303 of the federal CWA, which requires states to establish their own water quality standards. Basin plans provide the technical basis for the RWQCBs to determine waste discharge requirements (WDRs), take enforcement actions, and evaluate grant proposals.

As described in Section 2.4.1, under the heading "Clean Water Act – Section 401," regulatory compliance for projects occurring within waters of the U.S. is met through water quality certification, granted by the RWQCBs. For projects occurring within Porter-Cologne Act jurisdiction (i.e., State jurisdiction) but outside waters of the U.S. (in streams, this is the area above the ordinary high water mark, or "isolated" waters such as wetlands), WDRs or waiver of WDRs are required. WDRs are issued by the RWQCB that has jurisdiction over the region in which the project will occur.

The San Francisco Bay RWQCB (Region 2) has jurisdictional authority over the majority of the County. The Central Coast RWQCB (Region 3) has jurisdictional authority over the southwestern portion of the County. All waters of the U.S. in the Program area also are considered waters of the State and thus are subject to RWQCB jurisdiction under the Porter-Cologne Act. Maintenance Program compliance with the Porter-Cologne Act will occur through establishment of WDRs, which will be combined with the CWA Section 401 Water Quality Certification, as described below.

Clean Water Act - Section 401

Under CWA Section 401, applicants for a federal license or permit to conduct activities that may result in the discharge of dredged or fill materials into surface waters of the U.S. (including wetlands) must obtain Section 401 Water Quality Certification so that any such discharge will comply with the applicable provisions of the CWA, including Sections 301, 302, 303, 306, and 307 and State water quality standards. Section 401 Water Quality Certification is issued by the State in which the discharge will originate or, if appropriate, from the interstate water pollution control agency with jurisdiction over affected waters at the point where the discharge will originate. Therefore, all projects that have a federal component and may affect state water quality (including projects that require federal agency approval, such as issuance of a CWA Section 404 permit) also must comply with CWA Section 401. The goal of CWA Section 401 is to include evaluation of water quality when considering activities associated with dredging or placement of fill materials into waters of the U.S.

The County will apply for two Section 401 Water Quality Certifications for maintenance activities affecting waters of the U.S. within the jurisdiction of both the San Francisco Bay RWQCB and Central Coast RWQCB.

Clean Water Act - Section 303 and the Total Maximum Daily Load Program

Under CWA Section 303(d), states are required to identify "impaired water bodies" (those that do not meet established water quality standards); identify the pollutants causing impairment; establish priority rankings for waters on the list; and develop a schedule for development of control plans to improve water quality. Each RWQCB must update the Section 303(d) list every 2 years. Water bodies are placed on the list when they have no further assimilative capacity for the identified pollutant, and the Section 303(d) list identifies priorities to develop pollution control plans for each listed water body and pollutant. The pollution control plans required by CWA Section 303(d) List are TMDLs.

CWA Section 303 is overseen by USEPA and is administered by the SWRCB and its nine RWQCBs. Once a TMDL is developed and approved by USEPA, the SWRCB, and the relevant RWQCB, the implementation plan (if included in the TMDL) can be enacted. The San Francisco Bay RWQCB has prepared, or is in the process of preparing, the following TMDLs that must be approved by USEPA before they can be implemented:

- San Francisco Bay Mercury – Approved by USEPA in 2008 and in implementation
- San Francisco Bay Polychlorinated Biphenyls (PCBs) – Approved by USEPA in 2010 and in implementation.
- Urban Creeks Pesticide Toxicity – Approved by USEPA in 2007 and in implementation.
- Pescadero and Butano Creeks Watershed Sediment – Adopted by USEPA in June 2019.
- San Gregorio Creek Sediment - Completion date was estimated for 2013.
- San Pedro Creek and Pacifica State Beach Bacteria – Approved in 2013 and in implementation.
- San Vicente Creek and Fitzgerald Marine Reserve Fecal Indicator Bacteria Project - The RWQCB approved delisting the Fitzgerald Marine Reserve and is awaiting confirmation from the State

Water Board. A Water Quality Improvement Plan was developed and approved by the RWQCB in 2017.

- Pillar Point Harbor Bacteria – Estimated for completion in 2019.
- San Francisquito Creek Sediment – Estimated for completion in 2018.
- San Francisco Bay Beaches Bacteria – Approved in 2016 and in implementation

The San Francisco Bay RWQCB implements and enforces TMDLs, primarily through the National Pollutant Discharge Elimination System (NPDES), the Basin Plan, Waste Discharge Requirements, and Water Quality Improvement Plans. Additional information on TMDLs is available at the San Francisco Bay RWQCB's website: www.swrcb.ca.gov/sanfranciscobay/water_issues/programs/TMDLs.

The Maintenance Program would not contribute mercury, methylmercury, PCBs, trash, bacteria, nutrients, sediment, or salinity to the San Francisco Bay or its tributaries; however, the Maintenance Program will comply with applicable requirements detailed in adopted TMDLs, and help achieve targets established in the Pescadero and Butano Creeks Watershed Sediment TMDL and the San Gregorio Creek Sediment TMDL.

Clean Water Act – Section 402

Under Clean Water Act, Section 402, the SWRCB regulates stormwater discharges from municipal separate storm sewer systems (MS4s) through its Municipal Stormwater Permitting Program (San Francisco Bay RWQCB 2015). Permits are issued under two phases, depending on the size of the urbanized area or municipality. Phase I MS4 permits are issued for medium (population between 100,000 and 250,000) and large (population of 250,000 or more) municipalities and are often issued to a group of co-permittees within a metropolitan area.

Several municipalities in the Program area, and the County of San Mateo, joined together to form the San Mateo Countywide Water Pollution Prevention Program (Santa Mateo Permittees) under Order R2-2015-0049, NPDES Permit No. CAS612008 (RWQCB 2015). The permit allows discharge of stormwater runoff from storm drains and watercourses and was renewed in November 2015 (RWQCB 2015). The MS4 permit requires permittees including the County to implement appropriate BMPs at road repair and/or maintenance sites to minimize debris and waste materials from entering surface waterways during road installation, repaving, or routine repair and maintenance activities of streets and roads. Specifically, pursuant to Provision C.2 of the Municipal Regional Stormwater Permit, the MS4 permit requires proper management of concrete slurry and wastewater; asphalt; pavement cutting; and other street, road, and sidewalk maintenance materials and wastewater to avoid discharge to storm drains from these types of work sites. The MS4 permit also requires sweeping and/or vacuuming to remove debris, concrete, or sediment residue from work areas after construction is completed.

Maintenance of sidewalks are outside the scope of this Maintenance Program and thus the County is required to comply with requirements in MS4 permit on a separate track. However, some activities outlined in Provision C.2 of the MS4 permit overlap with maintenance activities addressed in this Maintenance Program Manual including bridge maintenance, slip-out and slide repairs along rural roads, and culvert repair and replacement along roads. The BMPs described in the MS4 permit generally require that permittees prevent all debris and pollutants generated from maintenance activities at bridges, rural roads, and culverts from entering storm drains and water courses. The BMPs outlined in

Chapter 9 of this Manual are consistent with requirements in Provision C.2 of the MS4 permit. Note that when proposed maintenance activities are expected to result in impacts to waters of the state, as defined by the Porter-Cologne Act including areas above the ordinary high water mark on channel banks, then permittees are also required to comply with Section 401 of the CWA.

2.4.5 California Department of Fish and Wildlife

California Endangered Species Act

The California Endangered Species Act (CESA) is defined in F&G Code Section 2080 *et seq.* CESA was originally enacted in 1970 to designate wildlife, fish, and plants as "endangered" or "rare." In 1984, CESA was amended and species were reclassified as "endangered" or "threatened." As of January 1985, all "rare" wildlife species were reclassified as "threatened" and the term "rare" was eliminated from the code. The classification of "rare" was maintained for plants listed under the California Native Plant Protection Act (Sections 1900-1913), but those plants are subject only to the protections of that act and not CESA.

CESA states that all native species of fishes, amphibians, reptiles, birds, mammals, invertebrates, and plants, as well as their habitats that are threatened with extinction and those experiencing a significant decline that, if not halted, will lead to a threatened or endangered designation, will be protected or preserved. The CESA sets forth procedures by which individuals, organizations, or CDFW can submit petitions to the Fish and Game Commission requesting that a species, subspecies, or variety of plant or wildlife be added to, deleted from, or changed in status on the state lists of threatened or endangered species.

Like the federal ESA, the CESA also allows for incidental take of listed species. Take is defined under the F&G Code (Section 86) as to "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." The incidental take permit process is outlined in the CESA (F&G Code Section 2081). Section 2081(b) provides a means by which agencies or individuals may obtain authorization for incidental take of state-listed species. Take must be incidental to, and not the purpose of, an otherwise lawful activity. Requirements for an F&G Code Section 2081(b) permit include the identification of impacts on listed species; development of mitigation measures that minimize and fully mitigate impacts; development of a monitoring plan; and assurance of funding to implement mitigation and monitoring.

Chapter 4, Section 4.2 describes listed species and critical habitat that may occur in the Program area. State-listed plant species potentially occurring in the Program area include San Mateo thorn-mint (*Acanthomintha duttoni*), San Bruno Mountain manzanita (*Arctostaphylos imbricata*), Pacific manzanita (*Arctostaphylos pacifica*), Crystal Springs fountain thistle (*Cirsium fonintale* var. *fontinale*), San Mateo woolly sunflower (*Eriophyllum lanatum*), Butano Ridge cypress (*Hesperocyparis abramsiana* var. *butanoensis*), Marin western flax (*Hesperolinon congestum*), San Francisco lessingia (*Lessingia germanorum*), Point Reyes meadowfoam (*Limnanthes douglasii* ssp. *sulphurea*). White-rayed pentachaeta (*Pentachaeta bellidiflora*), San Francisco popcorn-flower (*Plagiobothrys diffusus*), Hickman's cinquefoil (*Potentilla hickmanii*), and two-fork clover (*Trifolium amoenum*). State-listed wildlife species potentially occurring in the Program area include California tiger salamander (*Ambystoma californiense*), San Francisco garter snake (*Thamnophis sirtalis tetrataenia*), marbled murrelet (*Brachyramphus marmoratus*), California Ridgway's rail (*Rallus obsoletus obsoletus*), bald eagle, bank swallow (*Riparia riparia*), and salt marsh harvest mouse (*Reithrodontomys raviventris*).

BMPs listed in Chapter 9 would avoid and minimize potential adverse effects on state-listed species. Note that the tiered approach described above in Section 2.3 does not apply to state-listed or fully protected species for CDFW. The identified maintenance sites in Tables B-1 and B-2 were evaluated for the potential for take under the CESA, which assumes implementation of BMPs.

Lake and Streambed Alteration Program

California's Lake and Streambed Alteration Program is regulated under F&G Code Section 1600 *et seq.* Under Section 1602, CDFW regulates projects that affect the flow, channel, or banks of rivers, streams, and lakes. F&G Code Section 1602 requires state or local governmental agencies, public utilities, and private individuals to notify CDFW and enter into a streambed or lakebed alteration agreement before construction of a project that will:

- substantially divert, obstruct, or change the natural flow or the bed, channel, or bank of any river, stream, or lake;
- substantially change or use any material from the bed, channel, or bank of any river, stream, or lake; or
- result in the disposal or deposition of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into any river, stream, or lake.

F&G Code Section 1602 may apply to any work undertaken within the 100-year floodplain of any body of water or its tributaries, including perennial, intermittent, and ephemeral rivers, streams, or lakes in the state. In general, however, this language is construed as applying to work within an active floodplain and/or associated riparian habitat of a wash, stream, or lake that provides benefit to fish and wildlife. F&G Code Section 1602 typically does not apply to drainages that lack a defined bed and banks, such as swales, or to wetlands, such as vernal pools.

CDFW has regulatory jurisdiction over the bed, bank, and channel of a stream, lake, or pond, as stated in F&G Code Sections 1600-1616. Under F&G Code Section 1602, CDFW administers the Lake and Streambed Alteration Program and may issue a Streambed Alteration Agreement (SAA) for projects within their jurisdiction. SAAs typically are issued through an application process (submittal of a notification package) and include restrictions on construction periods and locations, along with avoidance, minimization, and mitigation measures for potential impacts on habitat associated with waters of the State. Because CDFW has discretionary approval authority, it is a responsible agency under CEQA (see further discussion in Section 2.4.9, California Environmental Quality Act). As such, projects must fully comply with CEQA before CDFW can finalize a SAA.

All creeks, channels, and basins in the Program area, as well as associated riparian vegetation, are subject to CDFW jurisdiction under F&G Code Sections 1600-1616. Because maintenance activities will affect these areas, the County will submit an application to CDFW for the Maintenance Program, and CDFW is expected then to issue a SAA.

The County will request that CDFW issue a Routine Maintenance Agreement (RMA), which is a programmatic, long-term permitting mechanism under the Lake and Streambed Alteration Program. RMAs are commonly 5-year agreements and cover a set list of maintenance activities to maintain channel capacity, including sediment removal, trash and debris clearing, fallen tree removal, vegetation management, minor erosion repairs, herbicide applications, and minor bridge repairs. The applicant

must identify the watercourses where routine maintenance activities would occur, commit to impact avoidance and minimization measures for special-status species, and submit annual notification and maintenance reports to CDFW along with annual fees. The RMA application process is the same as the process for an SAA, with the addition of a completed Routine Maintenance form (Attachment D of the SAA notification form).

Migratory Bird Treaty Act

In California, the MBTA is regulated under F&G Code Sections 3503, 3503.5, and 3513. Section 3503 makes it unlawful to take, possess, or needlessly destroy the nests or eggs of any bird; Section 3503.5 makes it unlawful to take, possess, or destroy birds of prey or the nest or eggs of a bird of prey; Section 3503.5 prohibits the take, possession, or destruction of any nests, eggs, or birds in the orders of Falconiformes (New World vultures, hawks, eagles, ospreys, and falcons, among others) and Strigiformes (owls); and Section 3513 prohibits the take or possession of any migratory non-game bird or part thereof, as designated in the MBTA. As described in Section 2.4.2 above, disturbance that causes nest abandonment and/or loss of reproductive effort is considered take by CDFW.

All native bird species other than upland game birds such as quail, grouse, and turkeys in the Program area are protected by the F&G Code. Maintenance activities, such as vegetation management, may require the removal of vegetation in areas where migratory birds are nesting. Compliance with the F&G Code will be met through implementation of BMPs requiring pre-activity surveys before any breeding-season maintenance activities; BMPs will be implemented before maintenance activities begin so that take of migratory birds is avoided.

Fully Protected Species

Species that are fully protected from all forms of take are listed in F&G Code Section 3511 (birds), Section 5515 (fish), Section 4700 (mammals), and Section 5050 (amphibians). Fully Protected species may not be taken or possessed at any time and no licenses or permits may be issued for their take except for collecting these species for necessary scientific research and relocation of the bird species for the protection of livestock. In addition, recent legislation allows Natural Community Conservation Plans (NCCPs) to provide take authorization for fully protected species covered by an NCCP.

Native Plant Protection Act

The Native Plant Protection Act (F&G Code Sections 1900–1913) requires permits for collecting, transporting, or selling plant species that are designated rare or endangered by the Fish and Wildlife Commission. The California Native Plant Society has developed a set of lists of native plants in California, categorized according to rarity. Plants on List 1A, List 1B, and List 2 meet the definitions of F&G Code Section 1901 and F&G Code Sections 2060 and 2067 (CESA) as rare or endangered species.

Table 4-1 in Chapter 4 lists native, special-status plant species occurring or potentially occurring in the Program area. Program measures to avoid, minimize, and mitigate impacts to these species are identified in Chapter 9.

2.4.6 California Coastal Commission and San Mateo County Planning and Building Department

California Coastal Act and San Mateo County's Local Coastal Program

The California Coastal Act of 1976 requires new development (e.g., buildings, roads, pipe, and utility lines) that occur within the Coastal Zone to obtain a Coastal Development Permit from either the Coastal Commission or the local government. While the California Coastal Commission is the primary agency that issues these permits, once a local agency has a Local Coastal Program that has been certified by the Commission, that local agency takes over the responsibility for issuing Coastal Development Permits. In 1980, the San Mateo County Board of Supervisors and the California Coastal Commission approved the San Mateo County's Local Coastal Program. Development must comply with the policies in the Local Coastal Program. In 1981, the County's Planning and Building Development assumed responsibility for implementing the State Coastal Act in the unincorporated area of the County, including issuance of Coastal Development Permits.

All development planned in the Coastal Zone (shown in Figure 1-1) requires either issuance of a Coastal Development Permit or a Coastal Development Permit Exemption. Thus, under the Maintenance Program, maintenance activities that are planned within the Coastal Zone must either obtain a Coastal Development Permit or an exemption from these permit requirements.

2.4.7 San Francisco Bay Conservation and Development Commission (BCDC)

McAteer-Petris Act

The McAteer-Petris Act was enacted in 1965 and established the BCDC. At that time, BCDC was a temporary state agency tasked with preparing a plan for the long-term use of the Bay. In 1969, the McAteer-Petris Act was amended to make BCDC a permanent agency and to incorporate the policies of the San Francisco Bay Plan into state law. BCDC has permit authority over shoreline areas subject to tidal action up to the mean high tide line. This includes sloughs, tidelands, submerged lands, and marshlands lying between the mean high tide and 5 feet above mean sea level for areas with Bay frontage, and the shoreline band or 100 feet landward from the Bay shoreline. BCDC regulates filling, dredging, and changes in use in the Bay. The Bay Plan provides policy direction for BCDC's permit authority regarding placement of fill, extraction of materials, determining substantial changes in land use, water, or structures within its jurisdiction, protection of the Bay habitat and shoreline, and maximizing public access to the Bay.

BCDC is primarily concerned about the placement of new "fill" (generally defined as any material in or over the water surface, including pilings or structures placed on pilings) in the Bay. BCDC also regulates new development within 100 feet of the shoreline to ensure that maximum feasible public access to and along the Bay is provided. Maintenance activities that take place within 100 feet of the Bay shoreline fall under BCDC's jurisdiction. BCDC's jurisdiction applies to the easternmost portions of the County along the Bay shoreline including Coyote Point Park, which is managed by the County Parks Department. Prior to conducting these activities and, depending on the type of activities planned, the County would apply for either a regionwide permit or an administrative permit. Regionwide permits are appropriate for routine maintenance work whereas administrative permits are issued for activities that qualify as minor repairs or improvements.

2.4.8 National Environmental Policy Act (NEPA)

NEPA requires federal agencies to include in their decision-making process appropriate and careful consideration of all environmental effects of a proposed action and its possible alternatives. Documentation of the environmental impact analysis and efforts to avoid or minimize the adverse effects of proposed actions must be made available for public notice and review. This analysis is documented in either an EA with a FONSI or an EA with a finding that preparation of an Environmental Impact Statement is required. NEPA compliance will be addressed for the Maintenance Program by USACE through preparation of an EA as part of the RGP process. Issuance of a FONSI is anticipated.

2.4.9 California Environmental Quality Act (CEQA)

CEQA (Public Resource Code Section 21000 *et seq.*) is the cornerstone of environmental law and policy in California. CEQA requires public agencies to assess and publicly disclose the environmental implications of proposed actions through the preparation of appropriate documents. The primary objectives of CEQA include:

- ensuring that the potential environmental impacts of a project are disclosed to decision makers and the public;
- ensuring that environmental damage is avoided, reduced, or compensated for by the implementation of carefully designed mitigation measures;
- making the public aware of the reasons for an agency's approval of a project that is found to have significant, unavoidable, and unmitigable environmental impacts;
- fostering cooperation between agencies in the review of projects; and
- enhancing public involvement in the planning and review of projects that may affect local communities and their natural environment.

CEQA applies to discretionary activities proposed, implemented, or approved by California public agencies, including state, regional, county, and local agencies. The public agency with principal responsibility for carrying out or approving a project that may have a significant effect on the environment is the lead agency for CEQA compliance, and this agency is responsible for preparing the environmental documentation for that project.

For the Maintenance Program, San Mateo County will serve as lead agency for necessary environmental documents associated with the maintenance activities.

CEQA and the CEQA Guidelines provide guidance in evaluating impacts of projects on biological resources and determining which impacts will be significant. CEQA defines "significant effect on the environment" as "a substantial adverse change in the physical conditions which exist in the area affected by the proposed project." Under CEQA Guidelines Section 15065, a project's effects on biotic resources are deemed significant where the project would:

- "substantially reduce the habitat of a fish or wildlife species"
- "cause a fish or wildlife population to drop below self-sustaining levels"

- "threaten to eliminate a plant or animal community"
- "substantially reduce the number or restrict the range of a rare or endangered plant or animal"

In addition to species listed on the federal and state lists of protected species, Section 15380(b) of the State CEQA Guidelines provides that a species not listed on these lists may be considered rare if the species can be shown to meet certain specified criteria. CDFW has produced three lists (amphibians and reptiles, birds, and mammals) of "species of special concern" that serve as "watch lists." Species on these lists are of limited distribution or the extent of their habitats has been reduced substantially, such that threat to their populations may be imminent. Thus, their populations should be monitored. They may receive special attention during environmental review as potential rare species, but they do not have specific statutory protection.

Chapter 3
Physical Setting

This chapter presents the physical environmental setting of the Maintenance Program area. The physical setting in conjunction with the biological resources setting (Chapter 4) provide an important basis on how the maintenance activities (described in Chapters 5 through 8) may affect natural resources and what measures can be used to avoid and minimize potential environmental effects (described in Chapter 9).

3.1 Watersheds and Creeks

The Program Area consists of two physiographic regions: (1) County areas draining to San Francisco Bay (Bayside); and (2) County areas draining to the Pacific Ocean (Coastside). The County is divided by the Santa Cruz Mountains and these physiographic regions reflect the principal drainage patterns and directions to the bay or coast. For organizational purposes, these two regions are further subdivided into five smaller geographic areas as follows: (1) North Bayside; (2) South Bayside; (3) North Coastside; (4) Central Coastside; and (5) South Coastside. The subdivided program areas are shown in Figures 1-1 through 1-6. The main watersheds and creeks included in the Maintenance Program are shown in these maps and discussed below. Note that the Maintenance Program is limited to maintenance activities in unincorporated areas of the San Mateo County and County Parks.

3.1.1 North Bayside

The North Bayside region encompasses the area extending from the San Mateo/San Francisco county boundary south to the San Mateo Creek/Laurel Creek watershed boundary in the City of San Mateo, and the area east of Daly City and Pacifica to the San Francisco Bay (see Figure 1-2). The northern and eastern portions of this region occupying foothills and the bay plain are largely developed and include the cities of South San Francisco, San Bruno, Millbrae, Burlingame, Hillsborough, and San Mateo. Due to urbanization, most historic waterways have been significantly modified or culverted in this area. In the area west of Interstate-280 (I-280), upper watershed areas remain mostly undeveloped.

The topography of the North Bayside region includes the northern extent of the Santa Cruz Mountains, a series of moderate, northwest trending ridges and valleys that occupy or parallel the San Andreas Fault Zone, and the gentle plain along the San Francisco Bay margin (bay plain). San Bruno Mountain, a 4-mile long, northwest trending ridgeline in South San Francisco, is a prominent topographic feature in the northwest corner of San Mateo County. Colma Creek separates the Santa Cruz Mountains and San Bruno Mountain.

Major waterways in the North Bayside region include Colma Creek, San Bruno Creek, Mills Creek, Easton Creek, Sanchez Creek, and San Mateo Creek, as listed below in **Table 3-1**. In the upper watershed area, the valley topography along the San Andreas Fault Zone is home to the dammed San Andreas Lake and Lower Crystal Springs reservoirs.

Table 3-1. Major Watershed Areas and Surface Waters in the North Bayside Region

Hydrologic Unit Code (HUC) Cataloging Units	Names of HUCs	Major Waterbodies within the HUC
180500040904	Visitacion Valley – Frontal San Francisco Bay Estuaries	N/A
180500040903	Colma Creek-Frontal San Francisco Bay Estuaries	Colma Creek; San Bruno/El Zanjon Creek; Mills Creek; Easton Creek; Sanchez Creek
180500040901	San Mateo Creek, Frontal San Francisco Bay Estuaries	San Mateo Creek; San Andreas Lake; Lower Crystal Springs Reservoir
180500041001	San Francisco Bay Estuaries	San Francisco Bay

3.1.2 South Bayside

The South Bayside region covers the southeastern portion of San Mateo County, covering the area south of the San Mateo Creek/Laurel Creek watershed boundary in the City of San Mateo (roughly paralleling State Route [SR] 92) and extending east from Skyline Boulevard to San Francisco Bay (see Figure 1-3). The lowlands adjacent San Francisco Bay are highly developed and include the cities of San Mateo, Redwood City, Belmont, San Carlos, and Menlo Park. Residential and mixed urban development extend into the foothills of the Santa Cruz Mountains adjacent to either side of I-280. Due to this development, most creeks, drainages and water courses have been extensively modified and/or redirected in this area. The northwest portion of the upper watershed, west of I-280, remains largely undeveloped and holds the Upper Crystal Springs Reservoir.

Similar to the North Bayside region, topography of the South Bayside is defined by the Santa Cruz Mountains in the upper watershed area to the west and a relatively flat estuarine plain and the San Francisco Bay to the east. Major waterways in the South Bayside region include Belmont Creek, Pulgas Creek, Cordilleras Creek, Redwood Creek, Atherton Creek, and San Francisquito Creek, as listed below in **Table 3-2**. In addition, the San Francisco Bay shoreline supports an elaborate system of sloughs, estuarine marshes, and salt ponds. In the upper watershed area, the topography of the fault valley along the San Andreas Fault Zone holds the dammed Upper Crystal Springs Reservoir. The Upper and Lower Crystal Springs Reservoirs are separated by SR 92.

Table 3-2. Major Watershed Areas and Surface Waters in the South Bayside Region

Hydrologic Unit Code (HUC) Cataloging Units	Names of HUCs	Major Waterbodies within the HUC
180500040902	Cordileras Creek – Frontal San Francisco Bay Estuaries	Laurel Creek; Belmont Creek; Pulgas Creek; Cordilleras Creek; Redwood Creek; Atherton Creek
180500040901	San Mateo Creek, Frontal San Francisco Bay Estuaries	Upper Crystal Springs Reservoir
180500030404	San Francisquito Creek	San Francisquito Creek
180500041001	San Francisco Bay Estuaries	San Francisco Bay; Ravenswood Slough; other sloughs

3.1.3 North Coastside

The North Coastside region is a relatively narrow area along the Pacific coast extending from the San Francisco/San Mateo county border south to Half Moon Bay (see Figure 1-4). The Santa Cruz Mountains traverse the southeast portion of the region in a series of northwest trending ridgelines and valleys terminating at the Pacific Ocean. Montara Mountain is a prominent feature in the North Coastside region separating the Linda Mar community to the north, and Montara and Moss Beach to the south. Much of the coastal topography between Pacifica and Moss Beach is steep with watershed headlands dropping quickly to the coast. In the northern portion of Half Moon Bay, near Pillar Point, a broad and relatively flat coastal terrace begins and continues southward. Urban development associated with Daly City and Pacifica overlay the northern portion of the region, with many smaller communities (e.g., Montara, Moss Beach, El Granada, and Half Moon Bay) situated along the coastline to the south. The Northcoastside region supports a system of relatively small creeks, with San Pedro Creek, Montara Creek, San Vicente Creek, and Denniston Creek among the more prominent waterways. Major waterbodies are listed below in **Table 3-3**.

The James V. Fitzgerald Area of Special Biological Significance (ASBS) State Water Quality Protection Area and Fitzgerald Marine Reserve are located along the coast of Moss Beach in this region. ASBS are designated by the State Water Board as ocean areas requiring protection of species or biological communities to the extent that alteration of natural water quality is undesirable. The James Fitzgerald ASBS extends from 4th Street in Montara south to the Pillar Point breakwater. The Marine Reserve is within the boundary of the ASBS, a 5.5-mile band of shoreline, which was designated for protection by the State Water Resources Control Board due to the diversity of habitat and marine life found within this coastline band. In 1972, the State Water Board adopted the California Ocean Plan (revised and adopted in 2009) which prohibits the discharge of waste to designated ASBS. In 2012, however, the County of San Mateo was included in the State Water Board's General Exception to the California Ocean Plan with Special Protections (Resolution No. 2012-0012). These exceptions to the Ocean Plan are allowed where the State Water Board determines that the exception will not compromise protected ocean waters for beneficial use and where the public interest will be served.

Table 3-3. Major Watershed Areas and Surface Waters in the North Coastside Region

Hydrologic Unit Code (HUC) Cataloging Units	Names of HUCs	Major Waterbodies within the HUC
180500060204	San Pedro Creek-Frontal Pacific Ocean	San Pedro Creek
180500060205	Denniston Creek – Frontal Pacific Ocean	Kanoff Creek; Montara Creek; Dean Creek; San Vicente Creek; Denniston Creek

3.1.4 Central Coastside

The Central Coastside region extends nearly 25 miles from the southern flanks of Montara Mountain south to the Pomponio Creek Watershed, and the Pacific Ocean east to Skyline Boulevard (see Figure 1-5). The Santa Cruz Mountains define the topography in this region. The steep mountain slopes transition into gradually sloped coastal terraces along the northern portion of the region near Half Moon Bay. Development in this region is less than in the North Coastside region due the presence of several open space preserves (e.g., Purisima Creek Redwoods, El Corte de Madera Creek, La Honda Creek) and the steep topography. However, coastal terraces and alluvial valleys support fairly widespread farming and livestock grazing outside of the open space preserves. Many small creeks drain the western hillslopes of

the Santa Cruz Mountains, the largest include Pilarcitos Creek, Purisima Creek, Lobitos Creek, and Tunitas Creek, and San Gregorio Creek (see **Table 3-4**).

Table 3-4. Major Watershed Areas and Surface Waters in the Central Coastside Region

Hydrologic Unit Code (HUC) Cataloging Units	Names of HUCs	Major Waterbodies within the HUC
180500060201	Arroyo Leon	Pilarcitos Creek; Pomponio Creek; Pilarcitos Reservoir; Pomponio Creek
180500060206	Purisima Creek – Frontal Pacific Ocean	Purisima Creek; Lobitos Creek; Tunitas Creek
180500060203	San Gregorio Creek	San Gregorio Creek
180500060202	La Honda Creek	La Honda Creek; Alpine Creek

3.1.5 South Coastside

The South Coastside region encompasses the southwest portion of the County from the Pescadero Creek Watershed south to the boundary with Santa Cruz County, and Skyline Boulevard west to the Pacific Ocean (see Figure 1-6). The Santa Cruz Mountains traverse the majority of the South Coast region. Nearing the coastline, the topography becomes more gradual. Urban development is very minimal throughout this region. State and County parkland and open space preserves help preserve most of the South Coast region as natural lands. The lower alluvial valleys and more gradually sloped coastal areas support some farming and ranching practices. Major waterbodies in this region include Pescadero Creek, Butano Creek, and Gazos Creek (see **Table 3-5**). Several impoundments (e.g., Lake Lucerne and Bean Hollow Lakes) are located in the lower watershed areas, as well as Pescadero Marsh, a large brackish marsh at the mouth of Pescadero and Butano Creek.

Table 3-5. Major Watershed Areas and Surface Waters in the South Coastside Region

Hydrologic Unit Code (HUC) Cataloging Units	Names of HUCs	Major Waterbodies within the HUC
180500060101	Upper Pescadero Creek	Pescadero Creek
180500060103	Lower Pescadero Creek	Pescadero Creek; Pescadero Marsh
180500060102	Butano Creek	Butano Creek; Butano Marsh
180500060303	Gazos Creek – Frontal Año Nuevo Bay	Gazos Creek; Lake Lucerne; Bean Hollow Lakes

3.2 Geology and Soils

Geologic conditions throughout the County are driven by tectonic movements along the San Andreas Fault Zone. Tectonic forces along this right-lateral strike-slip fault zone result in tremendous sheer stress and block faulting between the San Andreas and Hayward fault zones. Deformation and uplift of the restraining fault blocks created the Santa Cruz Mountains and East Bay Hills, while releasing or dropping blocks resulted in the San Francisco Bay Basin between the two ranges. Local cycles of uplift, strike-slip

motion, and resulting erosion in addition to coastal processes on the Coastside and estuarine processes on the Bayside, occurring over thousands of years formed the landscapes of today.

3.2.1 North Bayside

Geology of the North Bayside region is characterized by Franciscan Complex sandstone, shale, or conglomerate rock in the mountainous areas in the northern (San Bruno Mountain) and southwestern (Santa Cruz Mountains) portions of the region (Wagner et al. 1991). Bands of northwest trending Quaternary continental and marine deposits and Merced Formation marine sandstone separate the mountain belts. In the southern portion of the region, quaternary-aged alluvium extends eastward from the hillslopes of the Santa Cruz Mountains. Much of the San Francisco Bay shoreline consists of artificial fill, particularly around the San Francisco International Airport and Redwood City (Wagner et al. 1991).

Since the North Bayside region includes the cities of Daly City, Brisbane, South San Francisco, San Bruno, Millbrae, Burlingame, Hillsborough, and San Mateo, most soils are classified as Urban land-Orthents (Natural Resources Conservation Service [NRCS] 2016). More mountainous areas consist of a combination of Barnabe, Candlestick, and Candlestick-Kron-Buriburi complexes. Theses soils are generally 10 to 40 inches thick and vary from gravelly sandy loam to fine sandy loam to loam (NRCS 2016). These soil units possess a moderately high to high susceptibility to erosion by wind and moderate erosion by water.

In the Santa Cruz Mountains and upper watershed areas near Lower Crystal Springs Reservoir, several loams begin to occur more commonly along upland slopes, including Alambique sandy loam, Fagan loam, Los Gatos loam, Maymen gravelly loam, and Zeni-Zeni variant gravelly loams (NRCS 2016). These units generally range in depth from 20 to 40 inches and overlie paralithic or lithic bedrock. Many of these soils exhibit high to very high runoff and are extremely susceptible to wind erosion and moderately susceptible to water erosion. Serpentine soils underlie a small area north of SR-92 and east of I-280 near the Crystal Springs Reservoirs (McCarten 1986). These soils are relatively rare and support a unique, endemic diversity of plant and wildlife species.

Within the upper and middle watershed areas, Los Gatos loam is commonly found along drainages and creek channels (e.g., San Mateo Creek, Easton Creek, and Mills Creek). This unit is comprised of residuum weathered from sedimentary rock. Los Gatos loam generally occurs as loam to gravelly loam 24 to 39 inches thick above bedrock (NRCS 2016). This unit is well drained with very high runoff. Los Gatos loam is highly susceptible to erosion by wind and moderately susceptible to erosion by water.

3.2.2 South Bayside

Geology of the South Bayside region follows a general pattern of bands of northwest trending geologic units, getting younger in age moving from west to east. The upper watershed areas near Upper Crystal Springs Reservoir are underlain by Franciscan Complex sandstone, shale, conglomerate, or chert (Wagner et al. 1991). A narrow band of unnamed Eocene marine rocks extends southward from the Upper Crystal Springs Reservoir. Several small pockets of ultramafic rock can be seen near the Crystal Springs Reservoirs and Pulgas Ridge as well as Edgewood Park (McCarten 1986). Pilo-Pleistocene non-marine deposits of sand and gravel fill the rift valley along the San Andreas Fault. Older Quaternary alluvium extrudes from the foothills and transition area from the mountains to the estuarine plain with younger alluvium observed along the southern portion of the foothills near the cities of Menlo Park and Palo Alto (Wagner et al. 1991). Near Foster City, the San Francisco Bay shoreline consists of artificial fill with intertidal deposits-peaty mud moving southward.

Similar to the North Bayside region, the South Bayside is widely urbanized with mostly Urban land-Orthents soils east of I-280. Most of the upper watershed areas and upper- to middle- drainages, such as San Francisquito Creek, contain Los Gatos loam or other loamy soils (NRCS 2016). The undeveloped shoreline areas, salt marshes, and sloughs consist of alluvium from mixed sources. These units are typically very deep (i.e., over 80 inches to a restrictive layer), consist of fine clays, very poorly drained, and exhibit low to moderately susceptibility to erosion by water (NRCS 2016).

3.2.3 North Coastside

Geology of the North Coastside region is generally characterized as a series of parallel bands of northwest trending geologic units often separated by well identified faults. Moving north to south, underlying units consist of: Quaternary continental and marine deposits and Merced Formation–marine sandstone north of the San Andreas Fault; Franciscan Complex greenstone, sandstone, shale, or conglomerate north of the Pilarcitos Fault; Locatelli Formation – marine sandstone and conglomerate south of the Pilarcitos Fault; Cretaceous quartz diorite under Montara Mountain; Monterey Formation – marine shale and sandstone adjacent Half Moon Bay; and Quaternary terrace deposits along the Pacific coastline (Wagner et al. 1991). Major surface drainages frequently contain younger alluvium (e.g., San Pedro Creek, Montara Creek, San Vicente Creek, and Denniston Creek).

The northern portion of the North Coast region is mostly urban, developed lands (i.e., Daly City and Pacifica) underlain by Urban land-Orthents soil units. North of Montara Mountain, the hillslopes and mountain areas directly adjacent to Pacifica consist of variants of Barnabe and Barnabe-Candlestick complex, Candlestck-Kron-Buriburi complex, and Candlestick loam (NRCS 2016). These soil units generally range in depth from 16 to 40 inches above bedrock and possess a moderately high to high susceptibility to erosion by wind and moderate erosion by water. South of the Pilarcitos Fault and Pilarcitos Canyon, most of the hillslopes are composed of Miramar coarse sandy loam or Scarper-Miramar complex (NRCS 2016). Soils typically range from 19 to 41 inches above paralithic bedrock and are coarse sandy loam to sandy clay loam in texture. These units are generally well drained with high to very high runoff moderately susceptible to wind and water erosion.

Alluvium can be found in the mid- and lower creek drainages. These loamy soils are moderately susceptible to rill erosion by water and moderate to highly susceptible to wind erosion. Loamy soils also underlay the coastal terrace area near Half Moon Bay, e.g., Denison loams (loam, clay loam; coarse sandy loam), Farallone loam (loam, course sandy loam, loamy course sand), and Elkhorn sandy loam (sandy loam). The coastline supports a combination of rock outcrops or beaches of fine to coarse sand.

3.2.4 Central Coastside

Underlying geology of the Central Coastside region is directly tied to marine deposition to the west and differing rate of movement, faulting, and folding along the San Andreas, Pilarcitos, and La Honda faults. Locatelli Formation (marine sandstone and conglomerate) underlie the upper watershed area of Pilarcitos Creek and Pilarcitos Canyon. East of Pilarcitos Fault near the Crystal Springs Reservoirs, the rock type shifts to Franciscan Complex sandstone, shale, or conglomerate with intertwined fingers of greenstone. South and west of the Upper Crystal Springs Reservoir, the mountainous area is underlain with marine sedimentary rock units, including Butano Sandstone and younger Lambert Shale, San Lorenzo Formation, and small pockets of Vaqueros Sandstone (Wagner et al. 1991). Miocene-aged basalt flows (i.e., Mindego Basalt) interlace marine sedimentary rocks in the southeast portion of the region. Continuing west toward the Pacific coastline, west of La Honda Fault, younger, Pliocene-age marine sandstone and siltstone of the Purisima Formation make up the western flanks of the Santa Cruz

Mountains. West of the foothills of the Santa Cruz Mountains, broad, flat coastal terraces, which originated as ancient beaches uplifted during the Pleistocene, lie adjacent to Highway 1 near Half Moon Bay. Holocene landslide deposits can be seen sporadically throughout the younger marine sedimentary units, with alluvium deposited in valley drainages.

Soils throughout the Central Coastside region are predominantly fine sandy loam to loam to gravelly loam, but may contain higher ratios of fine material lower in the watershed (NRCS 2016). Soils generally derive from sandstone, shale, or alluvium and overlay weathered bedrock with soil thickness varying from 20 to 60 inches, depending on elevation and slope. These soils are typically well drained and moderately susceptible to erosion by wind and water.

3.2.5 South Coastside

The South Coastside region is located in the Santa Cruz Mountains, an area of active tectonic deformation characterized by steep hillside terrains, frequent earthquakes, and fractured and weathered bedrock. Numerous periods of extensive folding, faulting, volcanism, deposition, and erosive forces yield a complex arrangement of underlying geologic units throughout the South Coastside region. The northwest trending San Andreas fault zone (near the eastern boundary of the region) and San Gregorio fault zone (near western boundary of the region), as well as the inactive, west trending Butano Fault and Zayante-Vergeles fault zone, reveals major fracture zones between fault blocks (Wagner et al. 1991). This continuing cycle of asymmetrical rotation, deformation, and uplift exposed underlying marine sedimentary layers to the effects of erosion. Varying rates of erosion and uplift, and continued marine deposition over the course of many epochs resulted in an intricate array of geologic units throughout this region. The basement rocks in the South Coastside region and Pescadero-Butano Watershed consist of the Great Valley Complex (on the Pigeon Point Block) west of the San Gregorio fault zone and the Salinian Complex (on the La Honda Block) east of the San Gregorio fault zone.

Of note, approximately one-quarter of the Pescadero-Butano Creek watershed is underlain by Purisima Foundation, which has a very low slake durability[1] especially upon drying and rewetting and easily separates, altering channels or gullies that are underlain by this formation (RWQCB 2018). Much of the mountainous, upper watershed area is underlain with loam, or sandy loam to gravelly sandy loam (e.g., Hugo and Josephine sandy loam or Butano loam) (NRCS 2016). In general, soils overlie weathered bedrock and range in depth from 24 to 49 inches. These soils are typically well drained and moderately susceptible to erosion by water and high to very highly susceptible to erosion by wind.

3.3 Hydrologic and Geomorphic Conditions

The Program area exhibits a Mediterranean climate with mild, wet winters and warm, dry summers. Regional climatic conditions are moderated by a cooler, moist marine layer from the Pacific Ocean with precipitation patterns influence by the orographic effects of the relatively steep Santa Cruz Mountains. Average annual precipitation patterns in the Program area may range from 22-29 inches of precipitation along the Pacific coast, 42-50 inches in the upper watershed areas, and 15-20 inches on the San Francisco Bay shoreline (Western Regional Climate Center 2018). In additional to influencing

[1] Slake durability measures the resistance of a rock to weakening and disintegration when exposed to a standard cycle of drying and wetting and can be used to evaluate the weathering resistance of the rock.

precipitation patterns, the mountain topography creates a physical divide between and directs runoff and surface flows to either the ocean coastline or bay shoreline.

Within the individual watersheds, a range of sedimentary processes naturally occur as materials move from higher to lower elevations. Sediments can be stored in place, eroded (i.e., mobilized into movement downslope or downstream), transported, or deposited. In general, sediment source areas are more typically found in upslope and watershed headwater areas. Sediment is typically transported downstream into mid-watershed locations where it is variably stored or further transported downstream. Lower watershed areas are typically more depositional in receiving sediment loads from the watershed upstream. Though these general tendencies exist, at any given time, at any location in a watershed, sediment can be variably eroded, transported, deposited, or stored in relative quiescence. This simplified model generally describes most major drainages in the Program Area with the Santa Cruz Mountains and San Bruno Mountain acting as the primary source areas; the canyons and upper alluvial fans serving as transport zones; and the lower alluvial fans, valley bottoms, and coastal and bay plains functioning as depositional zones.

As introduced above, there are several physical and biological conditions that influence erosion and sediment processes in a watershed, including: geologic structure, tectonism, and properties; topography and slope; climate and precipitation; soils and vegetation; and the hydrologic conditions of infiltration, runoff, and streamflow.

In addition to these physical influences, land modifications, built structures, and land use practices further influence erosion and sediment processes. The intensification of land uses through agricultural cultivation, grazing, fire management, mining, recreation, roads, or residential and commercial development may significantly increase erosion. For example, urbanization may lead to considerable changes in impervious surface area thereby reducing infiltration, intensifying runoff and streamflow volume and velocity, amplifying sediment delivery to streams and in-channel bed/bank erosion and transport, and increasing downstream sediment yield. Or, with more agricultural land uses, soil and/or vegetation disturbance may increase erosion and sediment delivery may occur without the large increases in streamflows observed with urbanization. In such cases, increased erosion may lead to localized net channel aggradation due to inadequate streamflow to transport material downstream.

The main anthropogenic sources of erosion and increase in sediment loading to surface waters in the Program area include: legacy grazing and agricultural practices; historic timber harvesting; and construction of both paved and unpaved roads. Changes to vegetative cover and land use can lead to channel incision and disconnected floodplains, shallow landslides, slumps, gullying, and increased surface erosion. Roadways can contribute large amounts of sediment to waterways through the increase of runoff rate or volume; alteration of local drainage patterns; destabilization of steep hillslopes; interception and redirection of groundwater to surface features, thereby increasing runoff volume; unstable fill or road surface (unpaved); and inadequately sized or designed road crossings resulting in overtopping or diversion of flows. More specifically, this Maintenance Program aims to reduce road-related sedimentation and meet the requirements of both the Pescadero and Butano Creek Watersheds TMDL and San Gregorio Watershed TMDL by properly maintaining and sizing roadside culverts; addressing slip-outs, bank repairs, and deteriorated culverts in a timely manner; retaining large woody debris where possible in channels; and installing energy dissipation for culvert outlets. These maintenance activities are described in detail throughout Chapters 5 through 8 of this manual. In addition, as described in Chapter 9, implementation of various sediment and erosion control BMPs

during maintenance activities would reduce sedimentation in the Pescadero, Butano, and San Gregorio watersheds.

3.4 Channel Types

Maintenance activities primarily occur in three general channel types: unmodified, natural channels; modified earthen channels; or road and bridge culverts. General descriptions of each channel type are provided below.

3.4.1 Natural Channels

Most channels in the Program area consist of unmodified, natural creeks and drainage channels with earthen banks and beds. These are open channels but may pass under roadways via corrugated metal, high density polyurethane (HDPE), or concrete culverts or under elevated bridges. **Figure 3-1**, Photo 1 shows a typical natural channel passing underneath an elevated bridge. Typical maintenance needs along natural channels include bank stabilization and slip-out repairs as shown in Figure 3-1, Photo 2, which shows a recent slip-out that occurred along Gazos Creek. Some instream sediment and/or emergent vegetation removal may also take place in natural channels, particularly at road crossings or other constriction points where conveyance capacity has been impaired. Program maintenance activities that occur adjacent to or in natural channels a include but are not limited to: Butano Creek, Alpine Creek, Montara Creek, Tunitas Creek, Pescadero Creek, Lower Bear Gulch, and Gazos Creek.

3.4.2 Modified Earthen Channels

Modified earthen channels include roadside drainage ditches and creeks with concrete or hardened banks and/or bed. Roadside drainage ditches typically run parallel to paved roadways and are generally trapezoidal, u-shaped or v-shaped with little-to-no sinuosity to increase channel conveyance capacity (see Figure 3-1, Photos 3 and 4). Depending on the location, these channels may collect overland flow from adjacent roadways/impermeable surfaces or upslope areas or convey flows from natural channels upstream. Modified earthen channels direct flow downstream to other natural receiving water bodies, modified channels, or other stormwater infrastructure through open channels or corrugated metal, HDPE, or concrete culverts. Figure 3-1, Photo 5 shows a typical modified earthen channel with hardened banks including sack concrete located downstream of an urban road crossing. Typical maintenance activities in or along these facilities include vegetation management (e.g., mowing, localized application of herbicides for invasive plant control, and emergent vegetation removal) and sediment removal at upstream and downstream of road crossings and culvert intakes/outfalls. Some modified earthen channels may contain grade control structures (e.g., rock weirs adjacent to Farallone Avenue) or sediment catchment areas that require periodic maintenance. Examples of modified earthen channels include roadside ditches along Farallone Avenue and Cloverdale Road, and Belmont Creek at Old County Road and Industrial Road.

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Photo 1. Pescadero Creek at the upstream side of Pescadero Creek Road bridge near Cloverdale Road. (April 2017)

Photo 2. Gazos Creek in Pescadero. Photo shows a recent slip-out that occurred along Gazos Creek Road. (April 2017)

Photo 3. LID ditch along Farallone Avenue in Montara (May 2015)

Photo 4. Earthen ditch adjacent to Cloverdale Road in Pescadero. (April 2017)

Figure 3-1 (1 of 2)
Channel Types in the Program Area

Photo 5. Belmont Creek downstream from Old County Road in Belmont, an example of a modified earthen channel (May 2015)

Photo 6. Upstream side of George Street bridge where substantial sediment accumulation has occurred and is blocking the culvert (April 2017)

Photo 7. A concrete box culvert section of San Mateo Creek near Crystal Springs Road near its intersection with Polhemus Road (May 2017)

Photo 8. Culvert near George Street bridge that drains to Montara Creek. (April 2017)

Figure 3-1 (2 of 2)
Channel Types in the Program Area

3.4.3 Road and Bridge Culverts

Concrete box culverts are typically found at road or bridge crossings in developed or residential areas. These concrete box culverts are generally constructed with concrete faces, aprons, and wingwalls (see Figure 3-1, Photos 6 and 7). The concrete faces, wingwalls, and sides increase bank stability while the concrete bed allow for efficient maintenance to restore conveyance capacity. In addition, the increased strength of the culverts help protect integrity of the adjacent roadway. Examples of concrete box culverts include crossings at Crystal Springs Road near Polhemus Road where it crosses San Mateo Creek as shown in Figure 3-1, Photo 7.

The County also owns and maintains many corrugated metal pipe (CMP), high-density polyethylene (HDPE) pipe, and reinforced concrete pipe (RCP) culverts including some that route drainage from local collectors or ditches to creeks. Some larger culverts are present along natural creeks and convey creek flows underneath roads or bridges. Example roadside culverts that drain into adjacent creeks include several along Tunitas Creek Road, Alpine Road, and George Street (see Figure 3-1, Photos 8).

3.5 Water Quality

The Clean Water Act (CWA) is the primary federal law that protects the quality of the nation's surface waters, including lakes, rivers, and coastal wetlands. Under CWA Section 303(d), states are required to identify "impaired water bodies" (those that do not meet established water quality standards), identify the pollutants causing the impairment, establish priority rankings for waters on the list, and develop a schedule for developing control plans to improve water quality. Impaired waterbodies in the Program Area identified on the CWA Section 303(d) list (SWRCB 2017) are shown in **Table 3-6**.

Table 3-6. Clean Water Act Section 303(d) List of Impaired Waterbodies in the Program Area

Waterbody	Pollutant	Total Maximum Daily Load (TMDL) Completed
North Bayside		
San Francisco Bay, Lower	Chlordane	Estimated (Est.) by 2013
	DDT (Dichlorodiphenyltri chloroethane)	Est. 2013
	Dieldrin	Est. 2013
	Dioxin compounds (including 2,3,7,8-TCDD)	Est. 2019
	Furan Compounds	Est. 2019
	Invasive Species	Est. 2019
	Mercury	Completed 2008
	PCBs (Polychlorinated biphenyls)	Completed 2008
	Trash	Addressed under NPDES MS4 permit
Colma Creek	Trash	Addressed under NPDES MS4 permit
San Mateo Creek	Diazinon	Addressed under *Urban Creeks Pesticide Toxicity TMDL* (2007)
	Trash	Addressed under NPDES MS4 permit
San Mateo Creek, Lower	Sediment Toxicity	Est. 2029

Waterbody	Pollutant	Total Maximum Daily Load (TMDL) Completed
South Bayside		
San Francisco Bay, Lower	See *North Bayside* above.	
Marina Lagoon	Indicator Bacteria	Addressed under *San Francisco Bay Beaches Bacteria TMDL* (2016)
Laurel Creek	Diazinon	Addressed under *Urban Creeks Pesticide Toxicity TMDL* (2007)
San Francisquito Creek	Diazinon	Addressed under *Urban Creeks Pesticide Toxicity TMDL* (2007)
	Sedimentation/Siltation	In progress; Est. 2018
	Trash	Addressed under NPDES MS4 permit
North Coastside		
Pacific Ocean at Pacifica State/Linda Mar Beach	Indicator Bacteria	Completed 2013
San Pedro Creek	Indicator Bacteria	Completed 2013
Pacific Ocean at Fitzgerald Marine Reserve	Indicator Bacteria	Approved for delisting by RWCQB in 2016; awaiting confirmation from State Board
Pilarcitos Lake	Mercury	Est. 2029
San Vicente Creek	Indicator Bacteria	Addressed under *Water Quality Improvement Plan* (2011)
Pacific Ocean at Pillar Point	Mercury	Est. 2019
Pacific Ocean at Pillar Point Beach	Indicator Bacteria	Est. 2019
Pacific Ocean at Venice Beach	Indicator Bacteria	Est. 2019
Central Coastside		
San Gregorio Creek	Indicator Bacteria	Est. 2019
	Sedimentation/Siltation	Est. 2013
Pomponio Creek	Indicator Bacteria	Est. 2019
South Coastside		
Pescadero Creek	Sedimentation/Siltation	In progress; Est. 2018
Butano Creek	Sedimentation/Siltation	In progress; Est. 2018

Source: SWRCB 2017

The Porter–Cologne Water Quality Control Act (known as the Porter–Cologne Act) established the State Water Resources Control Board (SWRCB) and divided the state into nine regions, each overseen by its own Regional Water Quality Control Board (RWQCB). The SWRCB is the primary state agency responsible for protecting the quality of the state's surface water and groundwater supplies; however, much of the SWRCB's daily implementation authority is delegated to the nine RWQCBs. In general, the SWRCB manages water rights and regulates statewide water quality, whereas RWQCBs focus on water quality within their respective regions.

The Porter–Cologne Act requires that the RWQCB develop water quality control plans (also known as Basin Plans) that designate beneficial uses of California's major surface-water bodies and groundwater basins and establish specific narrative and numerical water quality objectives for those waters. Beneficial uses represent the services and qualities of a waterbody (i.e., the reasons that the waterbody is considered valuable). Water quality objectives reflect the standards necessary to protect and support those beneficial uses. Basin Plan standards are primarily implemented by regulating waste discharges so that water quality objectives are met. Under the Porter–Cologne Act, Basin Plans must be updated every three years. The Program Area is mostly located in the San Francisco Bay RWQCB's jurisdiction, though the area from Gazos Creek and south is within the Central Coast RWQCB's jurisdiction. The Water Quality Control Plan (Basin Plan) for the San Francisco Bay lists the following beneficial uses for waterbodies (or watersheds) in the Program Area, as presented in **Table 3-7**.

Table 3-7. Designated Beneficial Uses of Surface Waters Potentially Affected by Maintenance Activities

Creek	AGR	MUN	FRSH	IND	COMM	SHELL	COLD	EST	MAR	MIGR	RARE	SPAWN	WARM	WILD	REC-1	REC-2	NAV
Bayside North																	
Lower San Francisco Bay				E	E	E		E		E	E	E		E	E	E	E
Colma Creek													E	E	E	E	
Easton Creek													E	E	E	E	
San Mateo Creek			E				E			E	E	E	E	E	E	E	
Polhemus Creek							E						E	E	E	E	
Lower Crystal Springs Reservoir		E					E				E	E	E	E	E*	E	
Upper Crystal Springs Reservoir		E					E				E	E	E	E	E*	E	
San Andreas Creek			E				E						E	E	E	E	
Bayside South																	
Colma Creek													E	E	E	E	
Smith Slough								E			E			E	E	E	
Cordilleras Creek													E	E	E	E	
Redwood Creek													E	E	E	E	
Arroyo Ojo de Agua													E	E	E	E	
San Francisquito Creek							E			E		E	E	E	E	E	
Los Trancos Creek							E			E	E	E	E	E	E	E	
Bear Creek							E			E	E	E	E	E	E	E	
West Union Creek							E			E	E	E	E	E	E	E	
Searsville Lake	E						E					E	E	E	E	E	
Alambique Creek							E						E	E	E	E	
Sausal Creek							E						E	E	E	E	

Creek	AGR	MUN	FRSH	IND	COMM	SHELL	COLD	EST	MAR	MIGR	RARE	SPAWN	WARM	WILD	REC-1	REC-2	NAV
North Coastside																	
Pacific Ocean (San Mateo, San Francisco Counties				E	E	E			E	E	E	E		E	E[1]	E	E
San Pedro Creek		E					E			E	E	E	E	E	E	E	
Denniston Creek	E	E					E			E	E	E	E	E	E	E	
San Vicente Creek	E	E					E			E	E	E	E	E	E	E	
Central Coastside																	
Arroyo de en Medio							E						E	E	E	E	
Lobitos Creek	E						E			E	E	E		E	E	E	
Tunitas Creek	E	E					E			E	E	E	E	E	E	E	
San Gregorio Creek	E						E			E	E	E	E	E	E	E	
La Honda Creek							E			E	E	E	E	E	E	E	
Mindego Creek							E				E	E	E	E	E	E	
Alpine Creek							E			E	E	E	E	E	E	E	
Pomponio Creek	E						E			E	E	E	E	E	E	E	
South Coastside																	
Pescadero Creek	E	E					E			E	E	E	E	E	E	E	
Tarwater Creek							E			E	E	E	E	E	E	E	
Peters Creek							E				E	E	E	E	E	E	
Lambert Creek							E				E	E	E	E	E	E	
Slate Creek							E				E	E	E	E	E	E	
Butano Creek							E			E	E		E	E	E	E	
Gazos Creek	E	E	E		E		E			E		E	E	E	E	E	

Notes:

E = Existing Beneficial Use: Indicates an existing beneficial use actually attained in the surface or ground water.

AGR = agricultural supply ; MUN= municipal and domestic water supply; FRSH = freshwater replenishment; IND = industrial service supply; COMM = commercial and sport fishing; SHELL = shellfish harvesting; COLD = cold freshwater habitat; EST = estuarine habitat; MAR = marine habitat; MIGR = fish migration; RARE = preservation of rare and endangered species; SPAWN = fish spawning; WARM = warm freshwater habitat; WILD = wildlife habitat; REC-1 = water contact recreation; REC-2= noncontact water recreation; NAV = navigation.

[1]REC-1 applies within a zone bounded by the shoreline and a distance of 1,000 feet from the shoreline or the 30-foot depth contour, whichever is further from the shoreline. This distance is consistent with the applicability of water-contact standards in the Water Quality Plan for the Ocean Waters of California.

3.5.1 Sedimentation/Siltation

San Francisquito Creek (South Bayside), San Gregorio Creek (Central Coastside), Pescadero Creek (South Coastside), and Butano Creek (South Coastside) are currently identified by federal and state regulatory agencies as being impaired by excessive sediment (SWRCB 2017). Sediment sources remain unidentified but frequent sources can often be attributed to agricultural practices (grazing, crop production, and dairies are the primary sources) and land development activities (including residential/commercial development resulting in hydromodification, stream channelization, and reduced floodplain connectivity). The San Francisco Bay RWQCB is currently developing a Total Maximum Daily Load (TMDL) and implementation plan to address sediment impact in the affected watersheds. A draft TMDL for the Pescadero-Butano Watershed was developed in 2018. As shown in Table 3-6, a TMDL and implementation plan that addresses sedimentation issues in San Francisquito Creek and San Gregorio

Creek will also be prepared. The Maintenance Program would help address sedimentation issues throughout the County and particularly help achieve sediment reduction targets related to roadways in the Pescadero-Butano Watershed Sediment TMDL and similarly in the San Francisquito Creek and San Gregorio Creek watersheds.

3.5.2 Pathogen Levels

Pathogens are microorganisms that cause diseases in other organisms. Bacteria are the primary indicator organisms of pathogens, particularly for the detection of waterborne diseases. Waterborne diseases threaten the health of recreational users of waters and wildlife. Pathogenic organisms are contained within fecal waste of warm-blooded animals (e.g., humans, livestock, pets) and are a common source of waterborne diseases. Fecal contamination can be detected by bacterial indicators, such as total coliforms, fecal coliforms, *Escherichia coli* (*E. coli*), and fecal enterococci. High concentrations of these indicator can degrade water quality for human consumption, recreation, and wildlife use and may pose potential health risks to people who come in direct contact with contaminated waters. Marina Lagoon (South Bayside), the Pacific Ocean (North Coastside), San Pedro Creek (North Coastside), San Vicente Creek (North Coastside), and Pomponio Creek (Central Coastside) have been identified by federal and state agencies as being impaired by pathogens (SWRCB 2017). As shown in Table 3-6, TMDLs were completed for Marina Lagoon and San Pedro Creek. The San Francisco Bay RWQCB approved delisting the Fitzgerald Marine Reserve and is awaiting confirmation from the State Board. A Water Quality Improvement Plan was developed and approved by the San Francisco Regional Board (May 11, 2017) to address indicator bacteria in San Vicente Creek in place of a TMDL. The San Francisco Bay RWQCB is currently developing separate TMDLs and implementation plans to address pathogen levels at Pillar Point Harbor and Pomponio Creek; those TMDLs are estimated to be completed by 2019. Trash

Extensive urbanization of many portions of the Program Area has resulted in an increase of trash and debris transported to the lower reaches of many drainages. Trash is a significant pollutant that adversely affects beneficial uses, including but not limited to uses that support aquatic life, wildlife, and public health. Illegally dumped and discarded trash from urban areas often makes its way into surface waters via runoff and stormwater systems. Accumulated trash can foster favorable conditions for pathogens. Waterbodies in the Program Area with trash listed as a pollutant of concern include Lower San Francisco Bay, Colma Creek, San Mateo Creek, and San Francisquito Creek.

The SWRCB regulates stormwater discharges from urban stormwater runoff and Municipal Separate Storm Sewer System (MS4s) through its Municipal Storm Water Permitting Program. County-wide municipal stormwater permits are issued under Phase I MS4 permits (for medium or large population municipalities or for co-permittees within a metropolitan area). In November 2015, the San Francisco Bay RWQCB re-issued these county-wide municipal stormwater permits as one Municipal Regional Stormwater NPDES Permit (Order No. R2-2015-0049, NPDES Permit No. CAS612008) to regulate stormwater discharges from municipalities and local agencies in Alameda, Contra Costa, San Mateo, and Santa Clara counties, and the cities of Fairfield, Suisun City, and Vallejo. Under the Phase I MS4 permit, the County effectively targets and manages trash within surface water bodies by reducing the volume of debris and material that enters waterways during storm events and through in-channel trash removal operations.

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Chapter 4
Biological Resources

4.1 Natural Communities and Habitats

The topography of San Mateo County is extremely varied, with elevations ranging from sea level to 2,572 feet atop the Santa Cruz Mountains (County of San Mateo 1986). As described in Chapter 1, the County is generally divided by the Santa Cruz Mountains into a "Bayside" (east of the mountain ridges and bordering San Francisco Bay [Bay]) and a "Coastside" (west of the mountain ridges and bordering the Pacific Ocean). The Coastside is divided by the Coastal Zone Boundary; within the Coastal Zone, provisions of San Mateo County's Local Coastal Program apply. To facilitate characterization of the biological resources present, or potentially present, within the Program area (defined as all County parks and unincorporated areas maintained by the County), we have further divided the County into subwatersheds[1] (**Figure 4-1**).

Vegetation communities and habitats within the Program area are shaped by the ecological forces at work in the region. Topography, soil, climate, the frequency of natural disturbance, and human management are all factors that affect the type and pattern of communities present. Overall, San Mateo County is characterized by dry, mild summers and moist, cool winters. However, temperatures are strongly influenced by the San Francisco Bay to the east, the Pacific Ocean to the west, and the Santa Cruz Mountains, which results in a variety of microclimates. The Coastside experiences a marine climate, characterized by cool, foggy summers and relatively wet winters while the Bayside is generally more warm and sunny.

This manual provides a regional and programmatic characterization of the Program area. Project-level analysis of biological resources present in the areas of specific maintenance activities cannot be conducted at this time because the maintenance manual is designed for all activities that may occur in the Program area rather than discrete maintenance sites. Mapping of habitats within the Program area was conducted using the CALVEG data provided by the U.S. Forest Service (2014). The CALVEG classification system was used for vegetation typing and cross-walked to the California Wildlife Habitat Relationship System (CWHR; Meyer and Laudenslayer 1988). **Figure 4-2** shows the CALVEG habitat mapping, which has a minimum mapping unit of 2.5 acres. The CALVEG mapping captures general habitat conditions at a map scale unit larger than what would be appropriate for individual project-level analysis because habitat features smaller than 2.5 acres are not included. Field surveys would be necessary to accurately delineate habitats at a specific maintenance site.

Twenty-two habitats/land uses were identified within the Program area (see Figure 4-2). These habitats have been grouped into nine general categories: aquatic/wetland, beaches/dunes/coastlines, forest/woodland, riparian, scrub/shrubland, grasslands, urban, cropland, and barren. The function and composition of each type of community is described below. Descriptions of the animals typically occurring in each community focus primarily on common (i.e., non-special-status) species. The potential occurrence of special-status species in the Program area is described in detail in Section 4.2, Special-Status Plant and Animal Species. Vegetation descriptions are based on the following resources: Holland's

[1] Hydrologic Unit Code (HUC) – 12, as defined by the U.S. Geological Survey (USGS). HUC 4 represents the subregion level, delineating large river basins; HUC 8 maps the subbasin level, analogous to medium-sized river basins; and HUC 12 is a more local sub-watershed level that captures tributary systems.

system of classification (Holland 1986), the *California Manual of Vegetation* (Sawyer et al. 2009), and CALVEG Zone 6 descriptions.

4.1.1 Aquatic and Wetland Communities

Aquatic and wetland communities are periodically to perennially saturated or inundated. These communities provide many important environmental functions, such as recycling nutrients, purifying water, attenuating floods, and recharging groundwater. In addition, they serve as habitat for many aquatic species. Aquatic and wetland communities present in the Program area are lacustrine, saline emergent wetland, wet meadow, and Bay margin.

Lacustrine (Pond, Lake, Reservoir)

Lacustrine habitats contain standing water such that the area is flooded. These habitats form from inland depressions where small ponds may form, or from dammed stream and river channels. Ponds, lakes, and reservoirs are all lacustrine habitats. There are 10 major reservoirs and lakes in San Mateo County (Crystal Springs Reservoir, San Andreas Lake, Pilarcitos Lake, Bean Hollow Lake, Searsville Lake, Lake Lucerne, Green Oaks Reservoir, Pomponio Reservoir, Lake Elizabeth, and Coastways Ranch Lake). All of these were originally natural lakes or depressions, and have been artificially expanded to increase their storage capacity (San Mateo County 1986). There are also many smaller man-made impoundments that store water throughout the County, especially on the Coastside.

Ponds may be perennially flooded, or they may be only seasonally flooded such that vegetation grows over the area during the dry season. When flooded, duckweeds (*Lemna* spp.) may occur on the surface waters, as well as rooted plants with floating leaves, such as water lily (*Nymphaea* sp.) and smartweed (*Persicaria* sp.). Submerged plants are limited to areas where light can penetrate the water, and may include algae and pondweeds (*Potamogeton* spp.). Phytoplankton (photosynthesizing microscopic organisms) occur in the open water.

Reservoirs influence the biological resources present in reaches both above and below them; they alter downstream hydrology by reducing spring runoff events and dampening flood peaks and frequency, and they retain sediment, preventing natural sediment dispersal throughout the watershed. However, they also provide habitat for a variety of wildlife species. Common resident birds that occur at reservoirs throughout the watershed include water birds such as the double-crested cormorant (*Phalacrocorax auritus*), great egret (*Ardea alba*), and mallard (*Anas platyrhynchos*). Numerous species of wintering ducks, such as the northern shoveler (*Anas clypeata*), lesser scaup (*Aythya affinis*), and bufflehead (*Bucephala clangula*) are also present, and shorebirds, such as the spotted sandpiper (*Actitis macularius*), forage and roost at the edges of lacustrine habitats during migration and winter. Gulls exhibit movements between reservoirs, where they bathe, and foraging and roosting areas on the coast and at the Bay, and ospreys (*Pandion haliaetus*) and terns (*Sterna* spp.) forage for fish in a number of the reservoirs. Fish species known to occur in Crystal Springs Reservoir include native fishes such as the rainbow trout (*Oncorhynchus mykiss*), Sacramento sucker (*Catostomus occidentalis*), tule perch (*Hysterocarpus traskii*), and various species of sculpin (*Cottus* spp.) (City and County of San Francisco 2010). Non-native bass (*Micropterus* sp.) have also been introduced to the reservoir. Amphibian species that breed in lacustrine habitats throughout the County include the Sierran chorus frog (*Pseudacris sierra),* American bullfrog (*Lithobates catesbeianus*), and western toad (*Anaxyrus boreas*), and the California red-legged frog (*Rana draytonii*) breeds more sparingly in such habitats. Western pond turtles (*Actinemys marmorata*) are also present in lacustrine habitats.

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Figure 4-1: Vicinity Map
San Mateo County Maintenance Manual (3715-01)
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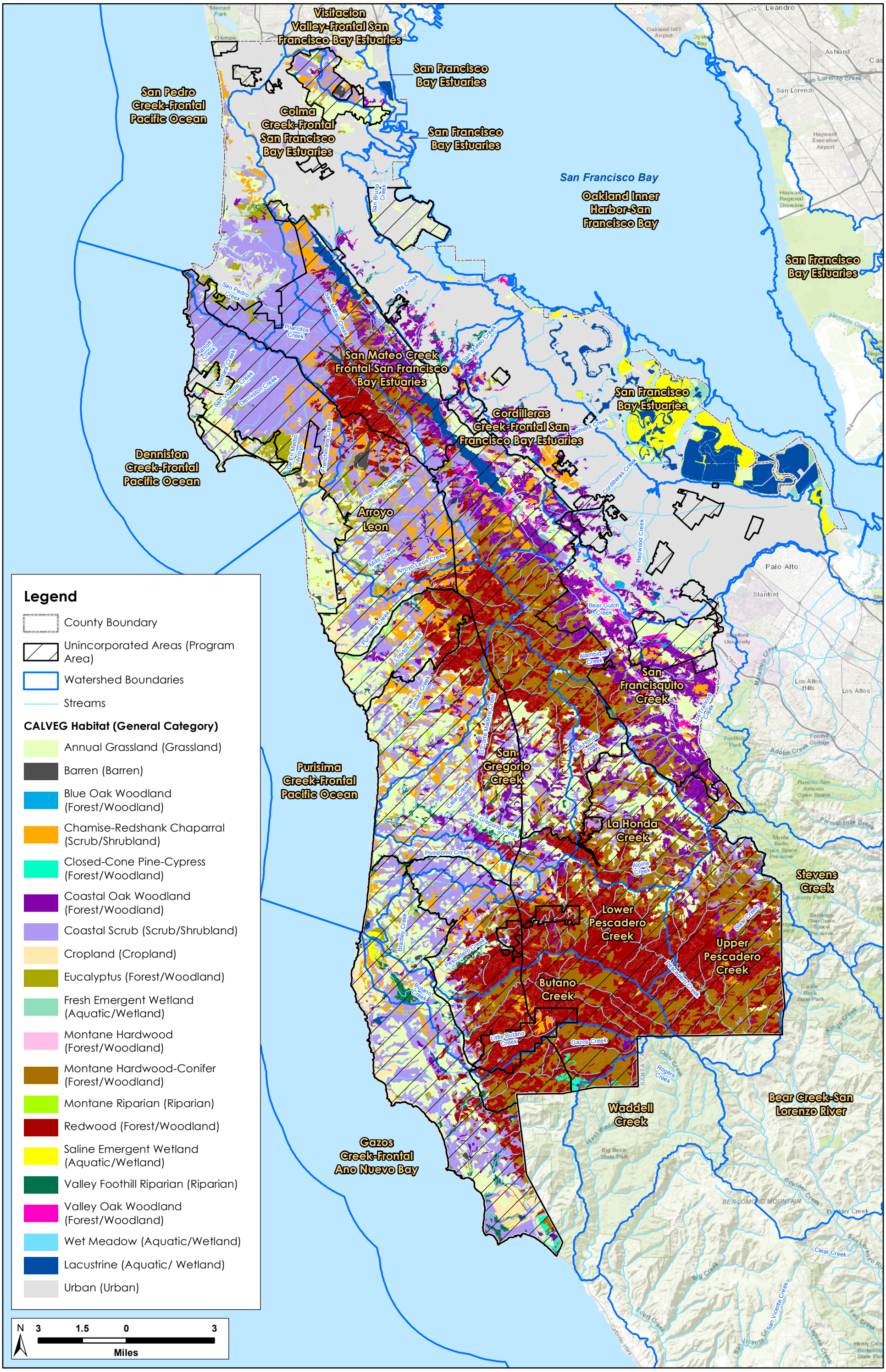

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Figure 4-2: Vegetation Communities Map

San Mateo County Maintenance Manual (3715-01)

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Freshwater Emergent Wetlands

Freshwater emergent wetlands can be located in terrestrial habitats or in association with aquatic habitats. This habitat type is not included in the CALVEG mapping shown on Figure 4-2 because of the relatively small scale of the areas it occupies. It is described here because of the unique species this habitat type supports. Freshwater wetlands typically occur in basins, depressions, or areas with poorly drained or periodically saturated soils. They can exist for long periods in stable systems, such as the edges of lakes and rivers, or they can arise and disappear more frequently depending on the erosional and depositional nature of the localized area. A common example of this is the active nature of a dynamic stream channel that can remove wetland vegetation from scouring flows or prolonged flooding. Alternatively, these same dynamic environments can create new low-lying areas for wetland vegetation establishment from the same type of scour. Silt accumulation or sediment deposition may raise the soil elevation and consequently slowly erase wetland features.

Freshwater emergent wetland plant community composition generally reflects the extent of soil saturation in that concentric patterns to the vegetation are often discernible. In the lowest elevations of a wetland, water would be present the longest and thus the plant species that tolerate the most ponding and soil saturation will grow in these low areas. Cattails (*Typha* spp.), spikerush (*Eleocharis* spp.), and tules (*Schoenoplectus acutus*) are common species that prefer the ponded or long periods with saturated soil conditions. The upper margins and higher wetland elevations support plants with a tolerance for mesic sites but do not require long periods of saturated soil. Typical plants in the upper margin can include tall flat sedge (*Cyperus eragrostis*), Baltic rush (*Juncus balticus*), or even saltgrass (*Distichlis spicata*) in alkaline sites.

Freshwater marshes provide habitat for numerous bird species including ducks, gulls, terns, herons, egrets, and other waterbirds. The sora (*Porzana carolina*) and Virginia rail (*Rallus limicola*) forage in freshwater marshes in the Program area during migration and in winter. American coots (*Fulica americana*), common moorhens (*Gallinula chloropus*), pied-billed grebes (*Podilymbus podiceps*), and several species of ducks breed in freshwater wetlands, channels, and ponds in and around emergent vegetation. Passerine species that breed in freshwater marshes include the marsh wren (*Cistothorus palustris*), song sparrow (*Melospiza melodia*), common yellowthroat (*Geothlypis trichas*), and red-winged blackbird (*Agelaius phoeniceus*). Amphibians such as the native Sierran chorus frog, western toad, and California red-legged frog, as well as the non-native American bullfrog, also are present in this habitat.

Wildlife use of seasonal wetlands in the Program area depends largely on the duration and depth of ponding, the extent of open water, and the structure and type of emergent vegetation. Seasonal wetlands that do not provide deep water are used primarily for winter and spring foraging by waterbirds, such as shorebirds, ducks, and geese. Song sparrows and red-winged blackbirds nest in vegetation in those seasonal wetlands that support taller, denser vegetation and a variety of finches, sparrows, and other birds use this vegetation for cover and foraging habitat. Seasonal wetlands that provide standing water for at least several months support successful breeding by western toads and Sierran chorus frogs, while seasonal wetland swales that do not provide sufficient ponding provide only foraging habitat and moist refugia for these amphibians. Common garter snakes (*Thamnophis sirtalis*), including the San Francisco garter snake (*Thamnophis sirtalis tetrataenia*) in localized areas, and western terrestrial garter snakes (*Thamnophis elegans*) forage in these wetlands for amphibian larvae.

Saline Emergent Wetland

Saline waters in wetland settings occur along the Pacific Ocean coastline. Saline emergent wetlands are located above the intertidal areas with sand or mudflats and below the areas that receive no tidal influence. They are sheltered from wave action. Within the Program area, the largest saline emergent wetland is the Pescadero Marsh Natural Preserve. This coastal wetland complex contains tidal estuary and brackish marsh habitats. Characteristic plants of saline emergent wetlands occur in zones governed by elevation, as a result of its influence on inundation duration/frequency and salinity, and include pickleweed (*Salicornia pacifica*), marsh jaumea (*Jaumea carnosa*), brass buttons (*Cotula coronopifolia*), gumplant (*Grindelia hirsutula*), and alkali bulrush (*Bolboschoenus maritimus*).

Saline emergent wetlands support high densities of several wildlife species. Shorebirds, swallows, herons, egrets, blackbirds, and other avian species roost and forage, often in large numbers, in saline emergent wetlands in the Program area, but most do not breed in these areas. Shorebirds are most abundant in the salt marsh habitat during the nonbreeding season. Common species include the western sandpiper (*Calidris mauri*), least sandpiper (*Calidris minutilla*), dunlin (*Calidris alpina*), willet (*Catoptrophorus semipalmatus*), marbled godwit (*Limosa fedora*), long-billed (*Limnodromus scolopaceus*) and short-billed dowitcher (*Limnodromus griseus*), and black-bellied plover (*Pluvialis squatarola*). The California vole (*Microtus californicus*) is often the most common small mammal species found in saline emergent wetlands.

Wet Meadow

Wet meadows are moist grasslands that often exist in swales, valleys, or alluvial fans; frequently, the larger and more extensive examples occur in transition areas between grassland and freshwater wetlands. The length of time that water is present is a major determining factor of what grows in the meadows, and water is often present for the majority of the growing season. The water that influences the meadow does not percolate quickly because of the saturated and low permeability soils or the presence of shallow bedrock. Water drainage is typically through very slow overland flows over nearly level terrain. Sedges (*Carex* spp.) and rushes (*Juncus* spp.) are characteristic species.

Wet meadows are often too wet to provide suitable habitat for small mammals; however, larger mammals such as deer may feed in this habitat. Amphibians and reptiles are common in wet meadows, including the Sierran chorus frog, bullfrog, and western terrestrial garter snake. Waterfowl, such as the mallard, frequent streams flowing through these communities, and red-winged blackbirds and song sparrows nest in wet meadows with tall vegetation.

Rivers and Streams

Rivers and streams are not included in CALVEG mapping layers; however, they are shown in Figure 4-2 as blue line features. Rivers and streams are aquatic features that convey water downslope and as a result, topographic position is a driver of the channel's characteristics. Rivers and streams on steep slopes convey water in narrow channels at fast speeds, typically have rocky bottoms, and can be episodic and flashy with flows in response to precipitation events. On gentle or gradual slopes, rivers and streams tend to occur as wider channels with slower moving water, have fine textured bottoms, and are more likely to produce longer or continuous, perennial flows. Channels often are associated with riparian communities and pass through all types of upland plant communities. Rivers and streams commonly support wetland features, and lacustrine features may be associated with rivers and streams, particularly when channels are impounded. Vegetation in river and stream habitats is more likely

associated with wetlands and riparian features than the streams themselves. Aquatic vegetation such as algae may grow on stream beds and in slower moving waters duckweeds may be present.

A number of fish use the creek and stream channels in the Program area, including several native species such as the threespine stickleback (*Gasterosteus aculeatus*), Sacramento sucker, prickly sculpin (*Cottus asper*), California roach (*Lavinia symmetricus*), and steelhead (*Oncorhynchus mykiss*) (Leidy et al. 2005, Anderson 1995). In addition, a number of non-native fishes have been introduced to the Program area, including the brown bullhead (*Ameiurus nebulosus*), mosquitofish (*Gambusia affinis*), largemouth bass (*Micropterus salmoides*), and bluegill (*Lepomis macrochirus*) (Leidy 2007).

Amphibians such as the western toad, Sierran chorus frog, and bullfrog are present in creeks and stream channels in the Program area. The native western pond turtle is present in low numbers in some reaches of these streams, as are several species of non-native turtles that have been released locally from captivity, such as red-eared sliders (*Trachemys scripta*) and painted turtles (*Chrysemys picta*). Waterbirds, such as the mallard, green heron (*Butorides virescens*), great egret, and belted kingfisher (*Ceryle alcyon*), forage in these waters, and insectivorous birds, as well as bats such as the Yuma myotis (*Myotis yumanensis*) and big brown bat (*Eptesicus fuscus*), forage aerially on insects over rivers and streams.

Bay Margin

Bay margin habitat (synonymous with intertidal wetlands) occurs along the eastern side of San Mateo County at the edge of San Francisco Bay. This habitat type is very limited in the Program area due to the limited extent of County parks and unincorporated areas along the edge of the Bay. Although this habitat type is not included in the CALVEG mapping shown on Figure 4-2 because of the relatively small scale of the areas it occupies, it has been included as a separate category here due to the unique species this habitat type supports. Bay margin habitat includes vegetation along the shoreline of San Francisco Bay and consists of tidal marsh, brackish marsh, and unvegetated mudflats. Inland, influences from freshwater stream flows affect the water chemistry, resulting in a transition along the bay from freshwater to brackish to saline. In brackish and freshwater areas, the Bay margin may be dominated by California bulrush (*Schoenoplectus californicus*), alkali bulrush, cattails, and perennial pepperweed (*Lepidium latifolium*). The vegetation can transition to salt marsh species such as Pacific cordgrass (*Spartina foliosa*), pickleweed (*Salicornia* spp.), and marsh gumplant (*Grindelia stricta*) in areas with higher salinity. Alkali heath (*Frankenia salina*) can also occur. Diked areas may be present due to flood control measures and other human intervention such that muted tidal salt marsh dominated by pickleweed, saltgrass, marsh jaumea, and other halophytes (species that grow in waters of high salinity) may occur in some areas. In addition, extensive open water and salt pannes (open salt flat areas in the upper intertidal zone that lack vegetation) may be present. In San Mateo County, Bay margin habitat typically occurs east of Highway 101. In the Program area, this habitat occurs in the San Francisco Bay Estuaries Watershed, in limited areas such as at Coyote Point Recreation Area, around San Francisco International Airport, and at the edge of the Cordilleras Creek-Frontal San Francisco Bay Estuaries Watershed in a small unincorporated area near Redwood City, west of Flood Slough.

The mudflat substrate of Bay margin habitats is composed primarily of fine-grained silts and clays that support an extensive community of diatoms, worms, and shellfish, as well as algal flora. Inundated mudflats provide foraging habitat for many species of fishes, as well as for wading birds. Crustaceans, mollusks, and other invertebrates live on or just below the surface of the mud, and during the daily high tides, fish move over the mudflats to feed on these invertebrates. As the tide recedes and the flats emerge, the fish retreat to subtidal areas while large numbers of birds, primarily shorebirds, leave their

high-tide roosts and feed on the flats. These mudflats are a key reason for the importance of the Bay Area to West Coast shorebird populations, with an average of 67 percent of all the shorebirds on the West Coast of the United States using San Francisco Bay wetlands (Page et al. 1999). Gulls and some dabbling ducks forage on the exposed mudflats as well. Although the largest numbers of shorebirds forage on the broad flats along the edge of the Bay at low tide, some shorebirds, gulls, and large waders (e.g., herons and egrets) feed on the exposed flats along sloughs and channels.

Tidal marsh habitat supports wildlife species similar to those described for saline emergent wetlands above, as well as several species that are endemic to the Bay. In areas where broader tidal marsh habitat exists, the state and federally endangered California Ridgway's rail (*Rallus obsoletus obsoletus*) nests in cordgrass, dense stands of pickleweed, and marsh gumplant in tidal marsh habitats in San Mateo County (H. T. Harvey & Associates 1991, Olofson Environmental, Inc. 2011, California Natural Diversity Database [CNDDB] 2015). This species is found in the lower marsh zone where numerous small tidal channels are present. Alameda song sparrows (*Melospiza melodia pusillula*) and Bryant's savannah sparrows (*Passerculus sandwichensis alaudinus*) also nest in tidal marshes. Alameda song sparrows prefer dense herbaceous vegetation wherever it occurs throughout the marsh, while savannah sparrows nest in shorter vegetation such as pickleweed and high transitional marshes in upland ecotones. The state and federally endangered salt marsh harvest mouse (*Reithrodontomys raviventris*) has been recorded in tidal marshes throughout much of the region (H. T. Harvey & Associates 1991, CNDDB 2015). This species is dependent on dense vegetative cover, usually in the form of pickleweed and other salt-dependent or salt-tolerant vegetation in both tidal and diked salt marshes. The salt marsh wandering shrew (*Sorex vagrans halicoetes*) is also likely to occur in salt marsh habitat within the Program area.

However, salt marsh habitat is not well developed in the limited unincorporated areas and County parks in the Program area. Rather, it exists only as narrow remnant strips or small patches along the Bay shoreline around San Francisco International Airport and Coyote Point, and at the edge of a small unincorporated parcel north of Highway 101 in Redwood City. These narrow strips and small patches provide low-quality salt marsh habitat, and the potential for occurrence of salt marsh-specialist wildlife species in the Program area is thus low.

Non-tidal/diked salt marshes in the Program area provide roosting and foraging habitat for shorebirds such as the black-necked stilt (*Himantopus mexicanus*), American avocet (*Recurvirostra americana*), western sandpiper, and least sandpiper, as well as ducks such as the green-winged teal (*Anas crecca*), northern pintail (*Anas acuta*), mallard, and gadwall (*Anas strepera*).

House mice (*Mus musculus*) and California voles are common in diked salt marshes, particularly in the pickleweed-dominated high marsh and the peripheral halophyte zone, where the western harvest mouse (*Reithrodontomys megalotis*) also occurs. Deer mice (*Peromyscus maniculatus*), shrews, and rats are also common in these marshes. Due to their salinity, amphibians are generally absent from this habitat. However, reptiles such as the gopher snake (*Pituophis catenifer*) forage in this habitat.

Open water tidal sloughs in the Program area support many of the same species found within the tidal marsh habitat. Shorebirds forage in the sloughs and on mudflats along the Bay edge during low tide, and other birds, including waterfowl, egrets, and rails, use the open water habitats during both low and high tide. In addition, the sloughs provide habitat for numerous fish species, including the longfin smelt (*Spirinchus thaleichthys*), leopard shark (*Triakis semifasciata*), bat ray (*Myliobatus californica*), English sole (*Parophrys vetulus*), and starry flounder (*Platichthys stellatus*), and the vegetated edges of sloughs

may provide foraging habitat and protection from predators and water currents for juvenile steelhead as they move from freshwater to the ocean.

4.1.2 Beaches, Dunes, and Coastlines

Beaches, dunes, and coastlines, also known as coastal strand, are found along the Pacific coast of the Program area. Because these areas are often small, occurring in a narrow coastal band, and larger bare dune systems have been included as barren lands by CALVEG mapping, this habitat type is not depicted in Figure 4-2. However, beaches, dunes, and coastlines have been included as a separate category here because of the importance of the habitat and the unique species it supports.

Beaches and dunes are sandy areas that often support only limited vegetation because moving sands inhibit plant establishment. Stabilized dunes support coastal vegetation, generally consisting of perennial plant species. Where vegetation occurs, plant species are adapted to tolerate salt spray from the neighboring ocean. A mixture of native and non-native plants inhabit beach and dune communities. Characteristic native dune plants include emergent shrubs such as beach blue lupine (*Lupinus chamissonis*), bush lupine (*Lupinus arboreus*), beach sagewort (*Artemisia pycnocephala*), coyote brush (*Baccharis pilularis*), and California goldenbush (*Ericameria ericoides*) that grow above low mats of sand verbenas (*Abronia* spp.) and beach bur (*Ambrosia chamissonis*). Other plants that occur in dune settings are beach strawberry (*Fragaria chiloensis*), seaside daisy (*Erigeron glaucus*), lizard tail (*Eriophyllum staechadifolium*), marsh gumplant, and American dune grass (*Elymus mollis*). Non-native plants include European beachgrass (*Ammophila arenaria*), sea rocket (*Cakile edentula*), sea fig (*Carpobrotus chilensis*) and New Zealand spinach (*Tetragonia tetragonioides*). Rocky coastlines, both where natural rock occurs and in areas where riprap has been added for shoreline stabilization, typically do not support terrestrial plants, though a variety of algae and seaweed may occur in such areas.

Beaches, dunes, and rocky coastlines provide foraging habitat for a variety of waterbirds, such as the black oystercatcher (*Haematopus bachmani*), surfbird (*Aphriza virgata*), sanderling (*Calidris alba*), and ruddy turnstone (*Arenaria interpres*), that prey on the mussels, crabs, and other crustaceans stranded on the intertidal rocks at low tide. At high tide, the numerous species of fish, such as herring (*Clupea pallasii*) and sculpins, which are found in the kelp beds, attract foraging seabirds and waterfowl, including gulls, pelicans, terns, mergansers, and grebes. Broader, undisturbed beaches may provide nesting sites for western snowy plovers (*Charadrius alexandrinus nivosus*) and roosting and foraging sites for a wide variety of gull and shorebird species. In addition, beaches and rocky coastlines provide haul-out sites for harbor seals (*Phoca vitulina richardii*) and California sea lions (*Zalophus californianus*).

4.1.3 Forest/Woodland Communities

In the Program area, forest/woodland communities are represented by blue oak woodland, closed-cone pine-cypress, coastal oak woodland, eucalyptus, montane hardwood, montane hardwood-conifer, redwood, and valley oak woodland. Forested communities in the Program area are structurally similar and support dense stands of mature trees that form overlapping canopies. These communities can be distinguished by the relative abundance of different tree species, which is largely controlled by moisture gradients and soil characteristics. Woodland communities differ from forests in having more open canopies. They generally occur in the transition zone between forests and scrub or grassland communities.

Due to the similarity in wildlife species that occur in forest and woodland communities, the general wildlife species that occur in these communities are presented here. The following sections describe the floristic characteristics of each forest or woodland type. In the Program area, forests and woodlands produce mast crops that are an important food source for many birds and mammals, including the western scrub-jay (*Aphelocoma californica*) Steller's jay (*Cyanocitta stelleri*), acorn woodpecker (*Melanerpes formicivorus*), California quail (*Callipepla californica*), mule deer (*Odocoileus hemionus*), and western gray squirrel (*Sciurus griseus*). Hollow trees and logs provide denning sites for mammals such as the coyote (*Canis latrans*) and striped skunk (*Mephitis mephitis*), while cavities in mature trees are used by cavity-dwelling species such as the acorn woodpecker, northern flicker (*Colaptes auratus*), great horned owl (*Bubo virginianus*), raccoon (*Procyon lotor*), and bats such as Yuma myotis. In addition, raptors such as the red-tailed hawk (*Buteo jamaicensis*) construct nests in the upper canopy of mature trees. San Francisco dusky-footed woodrats (*Neotoma fuscipes annectens*) occur in many of these habitats, and the deer mouse and California mouse (*Peromyscus californicus*) nest and forage here as well. Common amphibians and reptiles include the California slender salamander (*Batrachoseps attenuatus*), western fence lizard (*Sceloporus occidentalis*), gopher snake, southern alligator lizard (*Elgaria multicarinata*), and common kingsnake (*Lampropeltis getula*).

Blue Oak Woodland

Blue oak woodland may occur as scattered trees in a savannah-like setting with an open canopy, or as a closed canopy woodland. The dominant tree species is blue oak (*Quercus douglasii*), but this habitat can occur alongside and intergrade with other oak woodland types, commonly valley oak (*Quercus lobata*) or coast live oak (*Quercus agrifolia*). Scattered shrubs, such as poison oak (*Toxicodendron diversilobum*), manzanita (*Arctostaphylos* spp.), buckeye (*Aesculus californica*), and coffeeberry (*Frangula californica*), may occur in this woodland in small numbers and are often associated with rock outcrops. In the open spaces and savannah like areas within blue oak woodlands, the understory is typically dominated by grasses. Non-native annual grasses are common and can include wild oats (*Avena* spp.) and bromes (*Bromus* spp.). Filarees (*Erodium* spp.) are common non-native forbs. Native herbaceous species may include needlegrasses (*Stipa* spp.) and common fiddleneck (*Amsinckia intermedia*).

Closed-Cone Pine-Cypress

Closed-cone pine-cypress habitat is composed of forest or woodland communities dominated by evergreen needle-leaved trees. The habitat is fire dependent because the cones on the pine trees only open and release seed following fires. This habitat is typically dominated by one species of closed-cone pine or cypress and rarely contains both. Associate shrub layers also vary, depending on the composition of the dominant tree canopy. The closed-cone pine-cypress habitat may be nearly pure stands of cypress (*Heperocyparis* spp.) in the central coast region with salal (*Gaultheria shallon*) and rhododendron (*Rhododendron* spp.) in the understory. Other stands may contain knobcone pine (*Pinus attenuata*), ponderosa pine (*Pinus ponderosa*), and manzanita. Pines that typically dominate in this habitat include knobcone pine, Monterey pine (*Pinus radiata*), and beach pine (*Pinus contorta*). The shrub understory associated with knobcone pine can include chaparral species such as chamise (*Adenostoma fasciculatum*), ceanothus (*Ceanothus* spp.), leather oak (*Quercus durata*), and manzanita. Monterey pine stands can include coast live oak, knobcone pine, and madrone (*Arbutus menziesii*) in the tree canopy. The understory includes California coffeeberry, poison oak, California huckleberry (*Vaccinium ovatum*), and woolyleaf manzanita (*Arctostaphylos tomentosa*). Beach pine stands can include salal, bearberry manzanita (*Arctostaphylos uva-ursi*), California wax myrtle (*Morella californica*), and wavyleaf silktassel (*Garrya elliptica*). Closed-cone pine-cypress habitats can appear as islands of forest in the midst of chaparral habitats and tend to occur in a mosaic and patchy pattern. The habitat can occur on rocky and

infertile soils, and even on serpentine soils. Along coastal areas, the trees may be windswept and stunted. This habitat occurs in southern San Mateo County.

Coastal Oak Woodland

Coastal oak woodland is a variable habitat that consists of an oak canopy that may be composed of deciduous or evergreen oaks. Occasionally, this habitat also contains conifer species. Depending on site moisture characteristics, the woodland canopy tends to be closed on moister sites and open and widely spaced on drier sites. As with the overstory, the understory composition varies. In the moist and closed canopy settings, the understory contains shade tolerant shrubs, ferns, and herbs. In the more open settings, grassland species occur. In the Central Coast, coast live oak trees tend to be the dominate canopy species. In the moister sites, the co-occurring trees in the canopy include California bay (*Umbellularia californica*), madrone, tanoak (*Notholithocarpus densiflorus*), and canyon live oak (*Quercus chrysolepis*). At drier sites, the co-occurring trees include valley oak, blue oak, and gray pine (*Pinus sabiniana*). In the closed canopy woodlands where shade is a factor, the understory can include California blackberry (*Rubus ursinus*), snowberry (*Symphoricarpos albus*), toyon (*Heteromeles arbutifolia*), brackenfern (*Pteridium aquilinum*), California polypody (*Polypodium californicum*), miner's lettuce (*Claytonia parviflora*), and fiesta flower (*Pholistoma auritum*). Where the coastal oak woodland intergrades with chaparral and coastal scrub, the understory may contain California sagebrush (*Artemisia californica*), sticky monkeyflower (*Mimulus aurantiacus*), or coyote brush. In the drier woodlands where the canopy is open and the habitat resembles savannah, the understory includes grassland species. The woodland habitat is common on foothills and valleys in San Mateo County.

Eucalyptus

Eucalyptus habitats are forest and woodlands that are often dominated by a single species of non-native eucalyptus (*Eucalyptus* spp.), or if multiple species are present, they are often all eucalyptus species. This overstory varies from dense stands with a closed canopy to scattered trees with an open canopy. The most common tree species is blue gum (*Eucalyptus globulus*), with red gum (*Eucalyptus camaldulensis*) being the second most common species. These habitats are typically a result of plantings, which has resulted in the variability of the canopy cover. Plantings may have been done in rows, for example to form windbreaks, or in groves. Seeds from eucalyptus trees may also become established outside the original planting area and encroach into native habitats. It is common for eucalyptus to establish along riparian corridors. The understory in eucalyptus groves or plantings contains weedy grasses and forbs and may include bromes, mustards (*Brassica* spp.), and cheeseweed (*Malva parviflora*). Eucalyptus tree and leaf litter may accumulate to such an extent that the physical size and plant chemical composition of the litter can discourage understory plant growth. Where eucalyptus trees occur as small groves in surrounding native habitat, the understory composition may include coastal sagebrush, chamise, manzanita, buckwheat, toyon, and other annual species. Eucalyptus woodland occurs scattered throughout San Mateo County.

Montane Hardwood

Montane hardwood habitat is a forest and woodland community type that is dominated by hardwood trees such as oaks and California bay. Canopy cover varies from open to closed, but individual tree canopies rarely overlap. Hardwood trees are the dominant character of the woodland while the shrub and herbaceous layers are sparse. In the Coast Range, the dominant trees are canyon live oaks, which can even form pure stands. Additional species that can occur at middle elevations include Douglas fir (*Pseudotsuga menziesii*), tanoak, Pacific madrone, and California bay. At lower elevations, gray pine, valley oak, and coast live oak may occur. Common understory shrub species include manzanita and

poison oak with a sparse herb layer present. This habitat type is located in the southern and eastern portions of San Mateo County near the borders of Santa Cruz and Santa Clara Counties.

Montane Hardwood-Conifer

Montane hardwood-conifer is a habitat type that contains both hardwoods and conifers in a closed canopy forest setting. Characteristically, this habitat contains a mixture of small stands, either pure conifer stands or small pure broadleaf tree stands. Common trees are ponderosa pine, Douglas fir, tanoak, Pacific madrone, coast live oak, big leaf maple (*Acer macrophyllum*), incense cedar (*Calocedrus decurrens*), and redwood (*Sequoia sempervirens*). This habitat represents a transition between conifer forests and montane hardwood. It may also occur as a transition zone between other habitats, including chaparral and other open woodlands. Montane hardwood-conifer forest occurs in the Outer Coast range in inland portions of the range, often at redwood forest margins.

Redwood

Redwood is a composite habitat name for a variety of conifer species that grow in the coastal influence zone. The majority of redwood forests are second growth. Old growth redwood forest may occur, but these are very rare. Redwood habitats are largely restricted to areas of coastal influence with relatively stable temperatures and summer coastal fog. The tree composition often includes redwood as the dominant species with a mixture of other conifer species, including Douglas fir. In more inland locations, Douglas fir can be the dominant species with tanoak and madrone as associates. San Mateo County is located near the southern end of the distribution of the redwood community, and therefore the associates can also include California bay, Oregon ash (*Fraxinus latifolia*), and big-leaf maple. The understory contains shrubs such as sword fern (*Polystichum californicum*), rhododendron, salmonberry (*Rubus spectabilis*), poison oak, western thimbleberry (*Rubus parviflorus*), and broom (*Cytisus* spp., *Genista* spp., and *Spartium* spp.). Over time, the conifer overstory becomes uniform such that the stand height and tree size normalizes, however, in early stages the canopy can be multilayered. In San Mateo County, the habitat occurs in the southern and eastern parts of the county.

4.1.4 Riparian Communities

Riparian communities occur at the interfaces between terrestrial and aquatic communities. In California, riparian habitats generally support exceptionally rich animal communities even though they occupy a limited amount of the land cover. The importance of riparian areas in San Mateo County far exceeds their minor proportion of the total acreage because of their prominent location within the landscape and the intricate linkages between terrestrial and aquatic communities (Gregory et al. 1991). The presence of at least seasonal (and often year-round) water and abundant invertebrates provide foraging opportunities for many species, and the diverse habitat structure provides cover and nesting opportunities. In the Program area, riparian communities are represented by montane riparian and valley foothill riparian habitats.

Due to the similarity in wildlife species that occur in riparian communities, the general wildlife species that occur are presented here. Discussion of the floristic characteristics of each riparian type follow. The maturity and structural diversity of the riparian habitats in the County support a high diversity and density of vertebrate species, particularly birds. The wider, more mature riparian corridors provide suitable foraging and breeding habitat for several functional groups of birds including insectivores (e.g., warblers, flycatchers), seed-eaters (e.g., finches), raptors, and cavity-nesters (e.g., swallows and woodpeckers) in addition to a variety of common amphibians, reptiles, and mammals. Among the numerous species of birds that use the riparian habitats for breeding are the Pacific-slope flycatcher

(*Empidonax difficilis*), black-headed grosbeak (*Pheucticus melanocephalus*), warbling vireo (*Vireo gilvus*), and yellow warbler (*Dendroica petechia*). Raptors such as red-shouldered hawks (*Buteo lineatus*) and Cooper's hawks (*Accipiter cooperii*) nest within riparian corridors and forage in adjacent habitats. Riparian habitats are also used heavily by migrants, including a variety of passerines, and wintering birds.

Several species of reptiles and amphibians occur in riparian corridors within the County. Leaf litter, downed tree branches, and fallen logs provide cover for the arboreal salamander (*Aneides lugubris*), California newt (*Taricha torosa*), and Sierran chorus frog among others. Several lizards may also occur here, including the western fence lizard, western skink (*Eumeces skiltonianus*), and southern alligator lizard. Mammals such as the ornate shrew (*Sorex ornatus*), California vole, Audubon's cottontail (*Sylvilagus audubonii*), San Francisco dusky-footed woodrat, and raccoon also use these riparian habitats.

Montane Riparian

Montane riparian habitat is a structurally diverse and typically narrow community that follows streams and drainages. Water in the streams may be perennial or ephemeral. In addition to streams, riparian habitat may surround ponds, seeps, and wet meadows and often the transition between riparian habitat and the surrounding non-riparian habitats, such as chaparral, montane hardwood, montane hardwood conifer, or wet meadows, can be dramatic. The vegetation can be dense with broadleaved, deciduous trees. This habitat includes typical riparian dependent trees like willows (*Salix* spp.), Fremont cottonwood (*Populus fremontii*), and Oregon ash. California bay and big leaf maple may also occur.

Valley Foothill Riparian

Valley foothill riparian habitats are forest and woodland communities dominated by Fremont cottonwood, sycamore, and valley oak in the tallest tree canopy layer. A lower subcanopy can occur that includes species such as white alder (*Alnus rhombifolia*), boxelder (*Acer negundo*), and Oregon ash. Below the subcanopy, is a shrub layer that can include wild rose (*Rosa californica*), California blackberry, poison oak, and willow. Understory herbs include grasses, miners lettuce (*Claytonia perfoliata*), Douglas sagewort (*Artemisia douglasiana*), poison hemlock (*Conium maculatum*), hoary nettle (*Urtica dioica*), rushes, and sedges. Valley foothill riparian habitat can be so dense and littered with debris that it is impenetrable. This habitat occurs along stream courses and rivers throughout San Mateo County.

4.1.5 Scrub/Shrubland Communities

Scrub/shrubland communities are characterized by shrub-dominated landscapes, with few to no trees, and are composed primarily of drought tolerant species. Although structurally similar, these communities can be distinguished based on different suites of dominant shrub species as described below. In the Program area, scrub/shrubland communities are represented by chamise-redshank chaparral and coastal scrub habitats.

Due to the similarity in wildlife species that occur in scrub/shrubland communities, the general wildlife species that occur are presented here. Discussion of the floristic characteristics of each scrub/shrubland community follow. Because chamise-redshank chaparral and coastal scrub communities are typically dry and provide relatively low and homogeneous structure, wildlife species diversity in these areas is often low. Nevertheless, a number of animal species occur. Mammals that use chaparral and coastal scrub habitats for cover include the coyote, bobcat (*Lynx rufus*), and brush rabbit (*Sylvilagus bachmani*), among others. Nests of San Francisco dusky-footed woodrats are often present where oaks and/or

poison oak are mixed with coyote brush scrub. Bird species that nest in these habitats include the California thrasher (*Toxostoma redivivum*), California towhee (*Melozone crissalis*), spotted towhee (*Pipilo maculatus*), California quail (*Callipepla californica*), wrentit (*Chamaea fasciata*), lesser goldfinch (*Carduelis psaltria*), and Anna's hummingbird (*Calypte anna*). Reptiles that occur here include the gopher snake, western rattlesnake (*Crotalus viridis*), southern alligator lizard, striped racer (*Masticophis lateralis*), and western fence lizard. Amphibians are usually absent or scarce due to the dry conditions.

Chamise-Redshank Chaparral

Chamise-redshank chaparral is a scrub or shrubland habitat that is dominated by chamise or redshank (*Adenostoma sparsifolium*). However, only chamise occurs at the latitudes present in San Mateo County, not redshank. In this habitat, the canopy is composed of shrubs, trees rarely occur, and the shrub canopy may overlap and intertwine to such a degree that it is impenetrable. Stands are nearly purely chamise. Additional shrubs that may occur at lower elevations include toyon and poison oak. At higher elevations, the mixture of shrubs may include ceanothus, manzanita, scrub oak, and sumac (*Rhus* spp.). Annuals and short-lived shrubs can occur in young stands, but are often crowded and shaded out by larger shrubs. The short-lived shrubs that occur early on include buckwheat (*Eriogonum* spp.), deerweed (*Acmispon glaber*), and ceanothus. In San Mateo County, this habitat occurs on slopes and ridges with thin soils and may occur on serpentine sites.

Coastal Scrub

Coastal scrub is typically composed of low growing to moderate sized shrubs that occur in the narrow coastal zone in San Mateo County. Although precipitation is often limited, because of the high humidity and moderate temperatures typical of the coastal environment in which it is found, this community rarely experiences drought stress typical of inland habitats with similar levels of rainfall. Coastal scrub differs from the chamise-redshank chaparral community in that many of the shrubs have softer leaves with flexible branches. Shrub structure within the community can differ, and often depends on the degree of coastal influence. Along the coast, shrubs may be prostrate while further inland they may be several feet tall. The habitat supports a shrub overstory and an herbaceous, grassy understory. There are two types of coastal scrub, based upon the dominant species composition, which may occur in the Program area. One type is dominated by lupines, bush lupine or many-colored lupine (*Lupinus variicolor*), and occurs on exposed sites adjacent to the ocean. The second type has coyote brush scrub as the dominant overstory shrub. Other common shrub species include blue blossom ceanothus (*Ceanothus thyrsiflorus*), California sagebrush, western hazelnut (*Cordylus cornuta*), coffeeberry, salal, sticky monkeyflower, blackberry, poison oak, and wooly sunflower (*Eriophyllum lanatum*). In the herb understory, bracken fern (*Pteridium aquilinum*) and sword fern are dominant and other associates include cowparsnip (*Heracleum maximum*), Indian paintbrush (*Castilleja* spp.), yerba buena (*Clinopodium douglasii*), and California oatgrass (*Danthonia californica*). Coastal scrub can be associated with coastal dunes and coastal prairie at lower elevations, or with montane hardwood and chamise chaparral at higher elevations. Coastal scrub habitat occurs on slopes, stabilized coastal dunes, and terraces.

4.1.6 Grasslands

Grassland communities are dominated by grasses and may also contain a diverse set of forbs. These communities provide many important environmental functions for soil stabilization, increasing water infiltrations, and nutrient cycling. In addition, grasslands serve as habitat for many special-status species. In the Program area, both annual and perennial grasslands occur. Although the perennial grassland habitat type is not included in the CALVEG mapping shown on Figure 4-2 due to the small scale of the

area it occupies, it has been included as a separate category here due to the unique species this habitat type supports. Annual grasslands typically contain non-native grasses as the dominant species while perennial grasslands are dominated by native, long-lived species.

Annual Grassland

Annual grassland habitat occurs on flat plains and rolling hills. It is an open community composed mainly of annual plant species. Grasses begin to grow during the cool late fall and early winter months and by summer much of the biomass, although standing, is dead. Introduced annual grasses are dominant and include wild oats, soft chess, ripgut brome, Italian ryegrass, and foxtail brome. The forb community may include broadleaf filaree (*Erodium botrys*), redstem filaree (*Erodium cicutarium*), turkey mullein (*Croton setiger*), yellow star-thistle (*Centaurea solstitialis*), bur clover (*Medicago polymorpha*), prickly lettuce (*Lactuca serriola*), yarrow (*Achillea millefolium*), common fiddleneck, clarkias (*Clarkia* spp.), blue-eyed grass (*Sisyrinchium bellum*), soap plant (*Chlorogalum pomeridianum*), and California poppy (*Eschscholzia californica*). Perennial bunch grasses can be found in this habitat as well and can include needlegrasses, California oatgrass, Idaho fescue (*Festuca idahoensis*), one-sided bluegrass (*Poa secunda*), and melic grasses (*Melica* spp.). Relic coastal prairies will often have native perennial bunch grasses as a significant portion of the vegetation. Vernal pools may occur in depressions in annual grassland habitats. Annual grasslands may be found throughout the Program area in lower and middle elevations.

In the more highly urbanized portions of the Program area, especially east of the Santa Cruz Mountain ridges, wildlife use of grasslands is limited by human disturbance, extent of the habitat in a specific area, abundance of non-native and invasive species, and isolation of grassland habitat remnants from more extensive grasslands. As a result, some of the wildlife species associated with extensive grasslands, such as grasshopper sparrows (*Ammodramus savannarum*), breeding Bryant's savannah sparrows, and western meadowlarks (*Sturnella neglecta*) are absent from small patches of grassland within the urban matrix that occupies most of the Bayside portion of the County. In more rural areas, large expanses of grassy open space provide higher-quality habitat for these grassland-associated wildlife species.

California ground squirrels (*Spermophilus beecheyi*), where they are present, are an important component of these grassland communities, providing a prey base for diurnal raptors and terrestrial predators. The burrows of California ground squirrels also provide refugia for several special-status wildlife species, such as the burrowing owl (*Athene cunicularia*) and the California tiger salamander (*Ambystoma californiense*). Other rodent species that are likely present in grassland habitats include the California vole, valley pocket gopher (*Thomomys bottae*), and deer mouse (*Peromyscus maniculatus*). Diurnal raptors such as red-tailed hawks, northern harriers (*Circus cyaneus*), white-tailed kites (*Elanus leucurus*), and American kestrels (*Falco sparverius*) forage for these small mammals over grasslands during the day, and at night nocturnal raptors, such as barn owls (*Tyto alba*), forage for nocturnal rodents including deer mice. Loggerhead shrikes (*Lanius ludovicianus*) forage in grassland habitats for insects and other prey. Mammals such as the coyote, American badger (*Taxidea taxus*), black-tailed jackrabbit (*Lepus californicus*), and striped skunk utilize grassland habitats in the Program area for foraging, and open grassland habitat with bare ground is important foraging habitat for the pallid bat (*Antrozous pallidus*) and Brazilian free-tailed bat (*Tadarida brasiliensis*). Reptiles such as western fence lizards, southern alligator lizards, western skinks, western terrestrial garter snakes, gopher snakes, racers, western rattlesnakes, and common kingsnakes (*Lampropeltis getula*) also frequent grasslands.

Perennial Grassland

Perennial grasslands are typically dominated by native species. Perennial grasslands of two main types occur in San Mateo County, coastal prairie and serpentine bunchgrass grassland. Although they are

unmapped in the Program area by CALVEG, they are important native communities. Perennial grassland land communities may be identified in areas that are mapped as annual grassland by CALVEG.

Coastal Prairie

Coastal prairies occur on marine terraces near the coast and have a dense herbaceous layer with grasses as a significant portion of the vegetation, including Pacific reedgrass (*Calamagrostis nutkaensis*), California oatgrass, tufted hairgrass (*Deschampsia cespitosa*), and red fescue (*Festuca rubra*). Wildflowers and native forbs are a component and include California seapink (*Armeria maritima*), goldfields (*Lasthenia* spp.), and clovers (*Trifolium* spp.). The coastal prairie that is in the Program area is a set of fragmented relicts along the coast. Several special-status plant species may occur in coastal prairie, such as Blasdale's bent grass (*Agrostis blasdalei*), San Francisco popcorn-flower (*Plagiobothrys diffusus*), and Choris' popcorn-flower (*Plagiobothrys chorisianus* var. *chorisianus*) (see Section 4.2.1, Special-Status Plant Species, below).

The general vegetation structure of coastal prairie habitat is similar to that of non-native grassland habitat; however, native plant species are more common, which increases its value to wildlife. Consequently, wildlife species composition, particularly among certain insects, is more diverse in this habitat than in non-native grasslands.

Serpentine

In San Mateo County, there are four main areas of serpentine habitats, which have been fragmented by urban development and highways. These areas include Edgewood Park, The Triangle, Crystal Springs Reservoir, and Pulgas Ridge (McCarten 1993). The serpentine habitats in San Mateo County are largely serpentine bunchgrass grasslands, but serpentine chaparral, serpentine wildflower fields, serpentine seeps, and serpentine barrens also occur. The largest extent of contiguous serpentine habitat in San Mateo County is approximately 300 acres and is located in Edgewood Park (Cordilleras Creek and San Mateo Creek Frontal San Francisco Bay Estuaries watersheds). The Triangle (San Mateo Creek Frontal San Francisco Bay Estuaries watershed) is approximately 75 acres, Pulgas Ridge (Cordilleras Creek watershed) is approximately 300 acres, and Crystal Springs Reservoir (San Mateo Creek Frontal San Francisco Bay Estuaries watershed) is approximately 400 acres (McCarten 1993). Serpentine endemic species and serpentine habitats are restricted to two watersheds in the county: Cordilleras Creek and San Mateo Creek Frontal San Francisco Bay Estuaries.

Serpentine grasslands are restricted to serpentine soils. They are open and dominated by perennial bunchgrass such as needlegrasses and melic grasses. Notably, non-native annual grasses are less abundant than in the annual grassland community. The soils have extremely high levels of iron and magnesium, making them inhospitable for plants. Serpentine soils can also contain other metals such as chromium, cobalt or nickel that can cause plant toxicity. In addition, the nitrogen and water-holding capacity of the soils may also be low, making the soils less fertile. However, a unique group of vascular plant species, which can tolerate the relatively low calcium to magnesium ratio, has evolved in response to these conditions. As a result, serpentine grasslands generally support native plant communities, including rare plants, such as the federally listed San Mateo thorn mint (*Acanthomintha duttoni*) and fountain thistle (*Cirsium fonintale* var. *fontinale*), as well as Marin western flax (*Hesperolinon congestum*) and Crystal Springs lessingia (*Lessingia arachnoidea*) (see also Section 4.2.1, *Special-Status Plant Species* below). In turn, several invertebrate species, including the federally threatened Bay checkerspot butterfly (*Euphydryas editha bayensis*), which was extirpated from the Program area but recently reintroduced to Edgewood County Park and San Bruno Mountain State and County Park, depend on serpentine grasslands because their host food plants are found primarily in this habitat. Bird

species that occur most abundantly in serpentine grassland habitats in the Program area include the grasshopper sparrow, horned lark (*Eremophila alpestris*), and rock wren (*Salpinctes obsoletus*). These species are well adapted to the patchy distribution of bunchgrass vegetation in serpentine habitats.

4.1.7 Urban

The urban land cover type is described as a developed habitat. It encompasses variable developed communities, including buildings and residences; streets with sidewalks and parking lots; and lawns, parks, and planting strips. Urban habitat is common in established towns, cities, and population centers; however, it can also occur in suburban and rural settings.

Urban habitats differ widely in the amount and types of plant species that they support. Some are fully developed areas barren of vegetation, such as portions of landfills or wastewater treatment plants, or completely paved, high-density urban housing. Other areas, although not "natural", are largely vegetated, ranging from rural residential to golf courses to urban parks. Golf courses, urban parks, and suburban gardens are typically landscaped with ornamental vegetation, whereas rural residential development areas may be planted in agricultural or ornamental plant species, or may remain in a relatively natural state dominated by oak woodland or annual grassland habitat.

Although special-status plant species typically do not occur in urban areas, it is possible that small, vestigial populations of special-status plant species could occur in several areas shown as "urban" on Figure 2-1, especially in locations where the surrounding natural habitat is relatively intact. This is particularly the case in the Cordilleras Creek-Frontal San Francisco Bay Estuaries and San Mateo Creek Frontal San Francisco Bay Estuaries watersheds, where chaparral habitat surrounds development. In these two watersheds, portions are underlain by ultramafic bedrock and support serpentine habitats.

Urban habitats typically support a suite of relatively common wildlife species that are tolerant of periodic human disturbance. Some of the most abundant species in developed habitats, such as the European starling (*Sturnus vulgaris*), rock pigeon (*Columba livia*), house sparrow (*Passer domesticus*), Virginia opossum (*Didelphis virginiana*), house mouse (*Mus musculus*), eastern gray squirrel (*Sciurus carolinensis*), fox squirrel (*Sciurus niger*), Norway rat (*Rattus norvegicus*), and black rat (*Rattus rattus*) are non-native species that are well adapted to the cover, nesting/denning, and foraging conditions provided by developed areas. In addition, a number of native species have adapted to these conditions. Native bird species commonly found in urban habitats in the Program area include the house finch (*Carpodacus mexicanus*), northern mockingbird (*Mimus polyglottos*), Anna's hummingbird, and California towhee (*Pipilo crissalis*). Native mammals such as the deer mouse (*Peromyscus maniculatus*), raccoon (*Procyon lotor*), and striped skunk (*Mephitis mephitis*) utilize these developed areas heavily as well.

Many bridges and other structures in the Program area provide important nesting and roosting sites for some species of birds and bats. Bats such as the Yuma myotis, Brazilian free-tailed bat, and big brown bat may roost in bridges, structures, unoccupied buildings, and/or large trees throughout the Program area. Birds such as the black phoebe (*Sayornis nigricans*), cliff swallow (*Petrochelidon pyrrhonota*), barn swallow (*Hirundo rustica*), northern rough-winged swallow (*Stelgidopteryx serripennis*), and white-throated swift (*Aeronautes saxatilis*) also use bridges and other structures in the Program area for nesting.

4.1.8 Cropland

Cropland is an agricultural use area that includes diverse plant cover as a result of the diversity of crops that are grown in the Program area. Annual crops are common but perennial crops also occur. Vegetation height can vary from tall cornfields to short strawberry fields. Annual crops may include several rotations throughout the year. Often croplands occur on flat landforms or gently rolling hills. In flat areas, the ground has often been levelled previously. Irrigated farming or dryland farming may occur. In San Mateo County, cropland can occur in coastal areas and are often associated with developed areas with farms and rural residential housing.

Intensively cultivated agricultural lands in the Program area support relatively few wildlife species due to the frequent disturbance associated with farming, the low stature of the crops produced in most of these areas, and the lack of structural diversity in the vegetation. Rodent control is practiced throughout many of the agricultural fields where crops are grown, reducing the abundance of small mammals and the suitability of these fields as foraging habitat for raptors and larger mammals that prey on smaller mammals. Nevertheless, the infrequency of human presence and heterogeneity of habitats in some agricultural areas results in fairly heavy wildlife use, at least by some species. California ground squirrel and valley pocket gopher burrows occur along margins of croplands within the Program area, and raptors such as red-tailed hawks, American kestrels, and white-tailed kites forage at the edges of fields. Gopher snakes, racers, and western fence lizards are among the reptiles that forage at the edges of agricultural lands.

4.1.9 Barren

Barren areas have exposed surfaces such as bedrock, cliffs, interior sandy or gypsum areas, or other similar unvegetated or very sparsely vegetated areas. Urban areas are not mapped as barren while quarries and open pit mine sites are included. In the Program area, large barren areas are located in Arroyo Leon and are associated with the Vulcan Pilarcitos Quarry and the Ox Mountain landfill. Other bare areas in the Program area include fallow fields or fields with diminutive crops so that aerial image interpretations would define it as barren. This is the case in the barren locations surrounding the Half Moon Bay Golf Links in the Purisima Creek-Frontal Pacific Ocean watershed. In barren sites, overall plant cover is extremely limited as is native plant cover.

Barren habitat provides few resources to wildlife species. Although some species associated with adjacent habitats likely forage on the bare soil to some extent, and snakes and lizards may bask on these surfaces, use of this habitat by wildlife is expected to be limited.

4.2 Special-Status Plant and Animal Species

For the purpose of this manual, special-status species have been defined as described below. Impacts on these species are regulated by some of the federal, state, and local laws and ordinances described in Chapter 2, *Regulatory Framework*. “Special-status” plants are considered plant species that are:

- Listed under the FESA as threatened, endangered, proposed threatened, proposed endangered, or a candidate species
- Listed under the CESA as threatened, endangered, rare, or a candidate species
- Listed by the California Native Plant Society (CNPS) as California Rare Plant Rank (CRPR) 1A, 1B, 2A, 2B, 3, or 4.

The CNPS, a non-governmental conservation organization, has developed CRPRs for plant species of concern in California in the CNPS Inventory of Rare and Endangered Plants. The CRPRs include lichens, vascular, and non-vascular plants, and are defined as follows:

- CRPR 1A Plants considered extinct.
- CRPR 1B Plants rare, threatened, or endangered in California and elsewhere.
- CRPR 2A Plants considered extinct in California but more common elsewhere.
- CRPR 2B Plants rare, threatened, or endangered in California but more common elsewhere.
- CRPR 3 Plants about which more information is needed - review list.
- CRPR 4 Plants of limited distribution-watch list.

The CRPRs are further described by the following threat code extensions:

- .1—seriously endangered in California;
- .2—fairly endangered in California;
- .3—not very endangered in California.

"Special-status" animals are considered animal species that are:

- Listed under the FESA as threatened, endangered, proposed threatened, proposed endangered, or a candidate species
- Listed under the CESA as threatened, endangered, or a candidate threatened or endangered species
- Designated by CDFW as a California species of special concern
- Listed in the California Fish and Game Code as a fully protected species (birds at §3511, mammals at §4700, reptiles and amphibians at §5050, and fish at §5515).

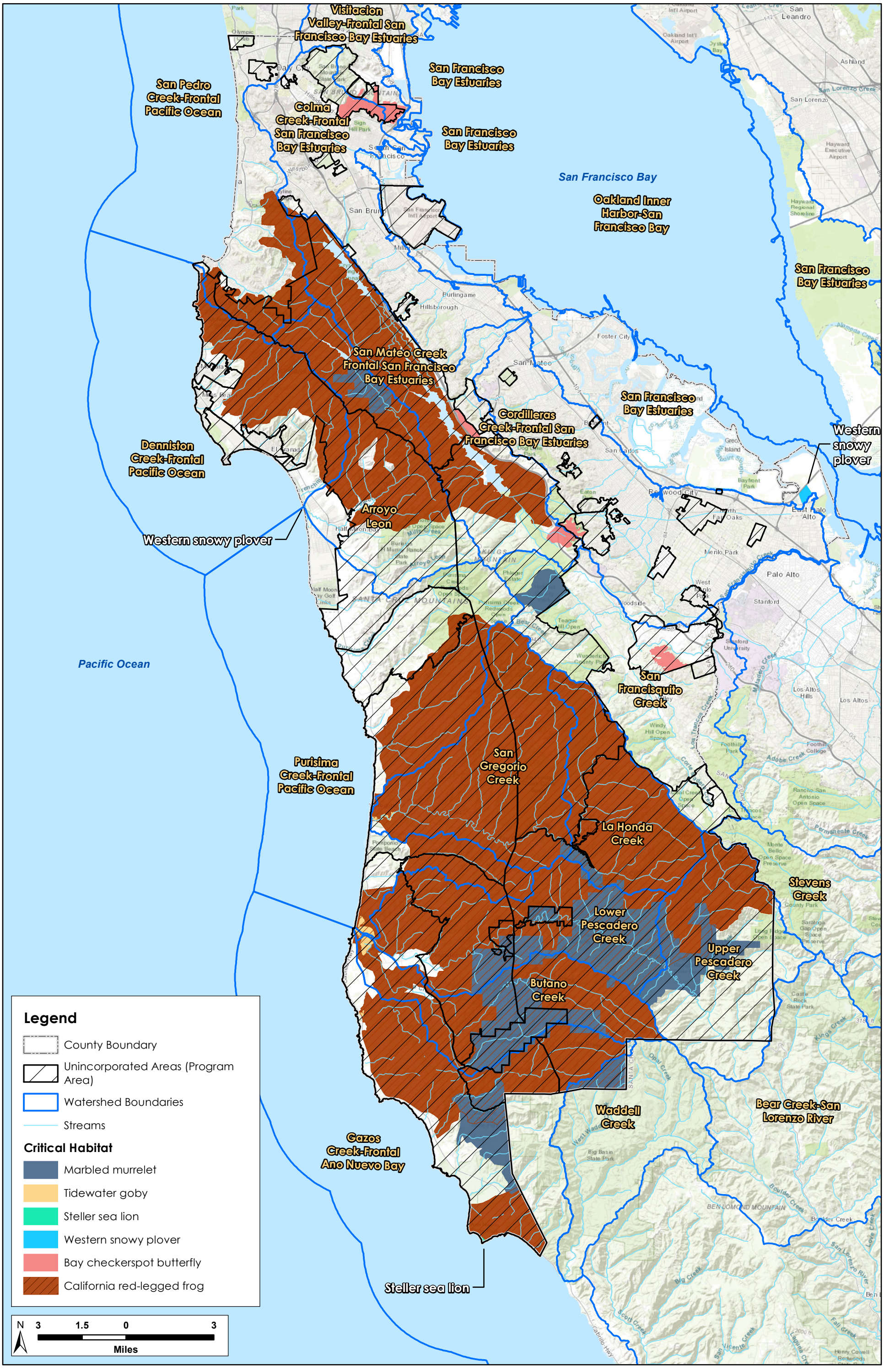
4.2.1 Special-Status Plants

A list of 96 special-status plant species known or thought to have potential for occurrence in San Mateo County was compiled using CNPS lists (CNPS 2015) and CNDDB records (CNDDB 2015). Although the CNPS is not a regulatory agency and plants on these lists have no formal regulatory protection, plants appearing as CRPR 1B or 2 are, in general, considered to meet CEQA's Section 15380 criteria, and adverse effects on these species may be considered significant. Impacts on plants that are listed by the CNPS as CRPR 3 or 4 are also considered during CEQA review, although because these species are typically not as rare as CRPR 1B or 2, impacts on them are less frequently considered significant. Therefore, potential maintenance activity impacts on special-status plants listed as CRPR 3 or 4 were determined to not rise to the level of significance under CEQA because of the limited work areas and habitat impacts resulting from maintenance activities. Maintenance activities would typically occur in specific areas associated with existing infrastructure and along roadsides/trail sides. As such, work areas would typically occur in narrow strips for impact areas and access. Special-status plants are not expected to be concentrated in discrete polygons associated with roadside disturbance. Rather, they would be expected to occur in larger dispersed areas, with population areas that are patchily distributed in the landscape, so that limited activities in any one location (such as along roadsides) could at most affect only a very small proportion of a species' populations. Because Rank 3 and 4 plants are more abundant and widespread than special-status plants in Rank 1 or 2, the likelihood of project activities causing a significant impact to Rank 3 or 4 plants is considered to be very low.

Therefore, CRPR 3 and 4 species are not analyzed further; however, a list of these species is provided in Appendix F. **Table 4-1** identifies the remaining 66 special-status plant species that are federally or state endangered, or CRPR 1 or 2 species, and that are known to occur or may occur in San Mateo County. Their distribution, legal status, general habitat requirements, and known occurrences in the Program area are also provided. In addition, Table 4-1 identifies the specific watersheds where impacts on each species could occur as a result of maintenance activities.

4.2.2 Special-Status Animals

Table 4-2 identifies 51 special-status wildlife species that are known to occur or may occur in the County and characterizes their potential to occur in the Program area. Their distribution, legal status, general habitat requirements, and known occurrences in the Program area are also provided. Detailed descriptions of special-status wildlife species known to occur in the County are provided in Appendix G. Designated critical habitat within the Program area is shown in **Figure 4-3**. **Table 4-3** identifies the specific watersheds within which County maintenance activities could potentially impact each species. Detailed information concerning special-status species that may be adversely affected by maintenance activities is provided following Table 4-3. Special-status species such as whales that are present in oceanic waters immediately off the coast, but not in coastline areas where Program activities may occur, are not included.



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Ecological Consultants

Figure 4-3: Critical Habitats Map

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Table 4-1. Special-Status Plant Species and Their Potential to Occur in the Program Area

(Plants have either been determined to be present (P) or suitable habitat (S) is known to occur in the watershed.)

Common Name (Scientific Name)	Status	Habitat Association	San Francisco Bay Estuaries	Visitacion Valley-Frontal San Francisco Bay Estuaries	Colma Creek-Frontal San Francisco Bay Estuaries	San Pedro Creek-Frontal Pacific Ocean	Denniston Creek-Frontal Pacific Ocean	Arroyo Leon	San Mateo Creek-Frontal San Francisco Bay Estuaries	Cordilleras Creek-Frontal San Francisco Bay Estuaries	San Francisquito Creek	La Honda Creek	San Gregorio Creek	Purisima Creek-Frontal Pacific Ocean	Lower Pescadero Creek	Upper Pescadero Creek	Butano Creek	Gazos Creek-Frontal Ano Nuevo Bay	Waddell Creek
Federal or State Endangered, Rare, or Threatened Species																			
San Mateo thorn-mint (*Acanthomintha duttonii*)	FE, SE, CRPR 1B.1	Serpentine in grassland or chaparral							P	P[1]									
San Bruno Mountain manzanita (*Arctostaphylos imbricata*)	SE, CRPR 1B.1	Rocky sites in chaparral or coastal scrub		P	P														
Pacific manzanita (*Arctostaphylos pacifica*)	SE, CRPR 1B.2	chaparral, coastal scrub		P	S														
Robust spineflower (*Chorizanthe robusta* var. *robusta*)	FE, CRPR 1B.1	Sandy or gravelly areas in coastal chaparral, openings in woodlands, coastal scrub, coastal grassland	Presumed extirpated from San Mateo County																
Crystal Springs fountain thistle *(Cirsium fontinale* var. *fontinale)*	FE, SE, CRPR 1B.1	*Serpentine seeps*							P	P									

Common Name (Scientific Name)	Status	Habitat Association	San Francisco Bay Estuaries	Visitacion Valley-Frontal San Francisco Bay Estuaries	Colma Creek-Frontal San Francisco Bay Estuaries	San Pedro Creek-Frontal Pacific Ocean	Denniston Creek-Frontal Pacific Ocean	Arroyo Leon	San Mateo Creek-Frontal San Francisco Bay Estuaries	Cordilleras Creek-Frontal San Francisco Bay Estuaries	San Francisquito Creek	La Honda Creek	San Gregorio Creek	Purisima Creek-Frontal Pacific Ocean	Lower Pescadero Creek	Upper Pescadero Creek	Butano Creek	Gazos Creek-Frontal Ano Nuevo Bay	Waddell Creek
San Mateo woolly sunflower (*Eriophyllum latilobum*)	FE, SE, CRPR 1B.1	Often on serpentine in montane hardwood, oak woodlands							P		S	S		S	S	S			
Butano Ridge cypress (*Hesperocyparis abramsiana* var. *butanoensis*)	FE, SE, CRPR 1B.2	Sandstone derived soils in closed cone conifer, Montane hardwood													S	S	P	S	S
Marin western flax (*Hesperolinon congestum*)	FT, ST, CRPR 1B.1	Serpentine in grassland or chaparral							P	P[1]									
San Francisco lessingia (*Lessingia germanorum*)	FE, SE, CRPR 1B.1	Remnant dunes in coastal scrub			P														
Coast yellow leptosiphon (*Leptosiphon croceus*)	SC, CRPR 1B.1	Coastal scrub on bluffs, coastal grassland				S[3]	P						S	S	S		S	S[3]	
Point Reyes meadowfoam (*Limnanthes douglasii* ssp. *sulphurea*)	SE, CRPR 1B.2	Coastal grassland, freshwater wetlands, vernal pools															P		

Common Name (Scientific Name)	Status	Habitat Association	San Francisco Bay Estuaries	Visitacion Valley-Frontal San Francisco Bay Estuaries	Colma Creek-Frontal San Francisco Bay Estuaries	San Pedro Creek-Frontal Pacific Ocean	Denniston Creek-Frontal Pacific Ocean	Arroyo Leon	San Mateo Creek-Frontal San Francisco Bay Estuaries	Cordilleras Creek-Frontal San Francisco Bay Estuaries	San Francisquito Creek	La Honda Creek	San Gregorio Creek	Purisima Creek-Frontal Pacific Ocean	Lower Pescadero Creek	Upper Pescadero Creek	Butano Creek	Gazos Creek-Frontal Ano Nuevo Bay	Waddell Creek
Dudley's lousewort (*Pedicularis dudleyi*)	SR, CRPR 1B.2	Coastal chaparral, montane hardwood, montane hardwood conifer, oak woodlands, grassland				S	S	S	S		S	S	S	S	P	P	S	S	S
White-rayed Pentachaeta (*Pentachaeta bellidiflora*)	FE, SE, CRPR 1B.1	Oak woodlands, montane hardwood, often on serpentine in grassland		S					P	S									
San Francisco popcorn-flower (*Plagiobothrys diffusus*)	SE, CRPR 1B.1	Coastal grassland			P	S	S						S	S				P	
Hickman's cinquefoil (*Potentilla hickmanii*)	FE, SE, CRPR 1B.1	Bluffs in coastal scrub, closed on conifer, freshwater wetlands, wet meadows				S	P	S					S	S	S		S	S	
Two-fork clover (*Trifolium amoenum*)	SE, CRPR 1B.1	Bluffs in coastal scrub and sometimes on serpentine in grassland			S				S		S								

Common Name (Scientific Name)	Status	Habitat Association	San Francisco Bay Estuaries	Visitacion Valley-Frontal San Francisco Bay Estuaries	Colma Creek-Frontal San Francisco Bay Estuaries	San Pedro Creek-Frontal Pacific Ocean	Denniston Creek-Frontal Pacific Ocean	Arroyo Leon	San Mateo Creek-Frontal San Francisco Bay Estuaries	Cordilleras Creek-Frontal San Francisco Bay Estuaries	San Francisquito Creek	La Honda Creek	San Gregorio Creek	Purisima Creek-Frontal Pacific Ocean	Lower Pescadero Creek	Upper Pescadero Creek	Butano Creek	Gazos Creek-Frontal Ano Nuevo Bay	Waddell Creek
CNPS Plants																			
Blasdale's bent grass (*Agrostis blasdalei*)	CRPR 1B.2	Bluffs in coastal scrub and coastal grassland				S	P						S	S	S		S	P	
Franciscan onion (*Allium peninsulare* var. *franciscanum*)	CRPR 1B.2	Volcanic or clay soils, often on serpentine, in grassland, oak woodlands, or montane hardwood			S			S	P	P	P								
Bent-flowered fiddleneck (*Amsinckia lunaris*)	CRPR 1B.2	Grassland, bluffs in coastal scrub, montane hardwood, oak woodlands		S	S	S	S	S	P	S	S	S	S	S	S	S	S	S	
Anderson's manzanita (*Arctostaphylos andersonii*)	CRPR 1B.2	Openings or edges in redwood, chaparral, montane hardwood		P	S			S	S		S	S	S	S	S	P	P	S	S
Montara manzanita (*Arctostaphylos montaraensis*)	CRPR 1B.2	Coastal chaparral or coastal scrub		P	S	P	P	P	S										

Common Name (Scientific Name)	Status	Habitat Association	San Francisco Bay Estuaries	Visitacion Valley-Frontal San Francisco Bay Estuaries	Colma Creek-Frontal San Francisco Bay Estuaries	San Pedro Creek-Frontal Pacific Ocean	Denniston Creek-Frontal Pacific Ocean	Arroyo Leon	San Mateo Creek-Frontal San Francisco Bay Estuaries	Cordilleras Creek-Frontal San Francisco Bay Estuaries	San Francisquito Creek	La Honda Creek	San Gregorio Creek	Purisima Creek-Frontal Pacific Ocean	Lower Pescadero Creek	Upper Pescadero Creek	Butano Creek	Gazos Creek-Frontal Ano Nuevo Bay	Waddell Creek
Kings Mountain manzanita (*Arctostaphylos regismontana*)	CRPR 1B.2	Granitic or sandstone derived soils in montane hardwood, chaparral, redwood					S	S	S	P[1]	P	P	P	S	S	S	S	S	S
Coastal marsh milk-vetch (*Astragalus pycnostachyus* var. *pycnostachyus*)	CRPR 1B.2	Salt marsh, coastal scrub, coastal grassland, saline wetlands	S				S	S[2]					S	P	S		S	S	
Round-leaved filaree (*California macrophylla*)	CRPR 1B.2	Clay soil in grassland, oak woodland, or montane hardwood													S[4]		S		
Congdon's tarplant (*Centromadia parryi* ssp. *congdonii*)	CRPR 1B.1	Bay margin	S							S									
Pappose tarplant (*Centromadia parryi* ssp. *parryi*)	CRPR 1B.2	coastal scrub, coastal grassland, bay margin, saline wetlands	S			P[1]	S	S						S	S		S	S	
Point Reyes bird's-beak (*Chloropyron maritimum* ssp. *palustre*)	CRPR 1B.2	Bay margin	Presumed extirpated from San Mateo County																

Common Name (Scientific Name)	Status	Habitat Association	San Francisco Bay Estuaries	Visitacion Valley-Frontal San Francisco Bay Estuaries	Colma Creek-Frontal San Francisco Bay Estuaries	San Pedro Creek-Frontal Pacific Ocean	Denniston Creek-Frontal Pacific Ocean	Arroyo Leon	San Mateo Creek-Frontal San Francisco Bay Estuaries	Cordilleras Creek-Frontal San Francisco Bay Estuaries	San Francisquito Creek	La Honda Creek	San Gregorio Creek	Purisima Creek-Frontal Pacific Ocean	Lower Pescadero Creek	Upper Pescadero Creek	Butano Creek	Gazos Creek-Frontal Ano Nuevo Bay	Waddell Creek
San Francisco Bay spineflower (*Chorizanthe cuspidata* var. *cuspidata*)	CRPR 1B.2	Sandy areas in coastal scrub, coastal grassland		S	P[1]	P[1]													
Franciscan thistle (*Cirsium andrewsii*)	CRPR 1B.2	Sometimes on serpentine in coastal scrub, coastal grassland, montane				S	P											S	
San Francisco collinsia (*Collinsia multicolor*)	CRPR 1B.2	Sometimes on serpentine in closed cone coniferous forest, coastal scrub		S	S	S	S	S	P[1]	P[1]			S	S	S		S	S	
Western leatherwood (*Dirca occidentalis*)	CRPR 1B.2	Moist areas in closed cone pine, chaparral, oak woodland, montane hardwood, riparian forest, redwood				P	S	P	P	P	P	P	P						
Sand-loving wallflower (*Erysimum ammophilum*)	CRPR 1B.2	Sandy and openings in coastal chaparral or coastal scrub																S	

Common Name (Scientific Name)	Status	Habitat Association	San Francisco Bay Estuaries	Visitacion Valley-Frontal San Francisco Bay Estuaries	Colma Creek-Frontal San Francisco Bay Estuaries	San Pedro Creek-Frontal Pacific Ocean	Denniston Creek-Frontal Pacific Ocean	Arroyo Leon	San Mateo Creek-Frontal San Francisco Bay Estuaries	Cordilleras Creek-Frontal San Francisco Bay Estuaries	San Francisquito Creek	La Honda Creek	San Gregorio Creek	Purisima Creek-Frontal Pacific Ocean	Lower Pescadero Creek	Upper Pescadero Creek	Butano Creek	Gazos Creek-Frontal Ano Nuevo Bay	Waddell Creek
Minute pocket moss (*Fissidens pauperculus)*	CRPR 1B.2	Damp coastal soil in redwood forest							S		S	S	S	S	P	S	P	S	
Hillsborough chocolate lily (*Fritillaria biflora* var. *ineziana*)	CRPR 1B.1	Serpentine in grassland and oak woodland			S				P										
Marin checker lily (*Fritillaria lanceolata* var. *tristulis*)	CRPR 1B.1	Coastal grassland, bluffs and coastal scrub				S	S	S											
Fragrant fritillary (*Fritillaria liliacea*)	CRPR 1B.2	Often serpentine in grassland, coastal scrub, oak woodland, montane hardwood						S	P	P	S							P	
Toren's grimmia (*Grimmia torenii*)	CRPR 1B.3	Rocky in chaparral, oak woodland, montane hardwood conifer					S	S	S		S	S	S	S	S	S	S	P	
Diablo Helianthella (*Helianthella castanea*)	CRPR 1B.2	Montane hardwood, chaparral, oak woodland, coastal scrub, grassland		P	S														

Common Name (Scientific Name)	Status	Habitat Association	San Francisco Bay Estuaries	Visitacion Valley-Frontal San Francisco Bay Estuaries	Colma Creek-Frontal San Francisco Bay Estuaries	San Pedro Creek-Frontal Pacific Ocean	Denniston Creek-Frontal Pacific Ocean	Arroyo Leon	San Mateo Creek-Frontal San Francisco Bay Estuaries	Cordilleras Creek-Frontal San Francisco Bay Estuaries	San Francisquito Creek	La Honda Creek	San Gregorio Creek	Purisima Creek-Frontal Pacific Ocean	Lower Pescadero Creek	Upper Pescadero Creek	Butano Creek	Gazos Creek-Frontal Ano Nuevo Bay	Waddell Creek
Congested-headed hayfield tarplant (*Hemizonia congesta* ssp. *congesta*)	CRPR 1B.2	Grassland	Presumed extirpated from San Mateo County																
Short-leaved evax (*Hesperevax sparsiflora* var. *brevifolia*)	CRPR 1B.2	Coastal grassland, sandy areas in coastal scrub		S	S	S	S	S	P				S	S	S		S	S	
Water star-grass (*Heteranthera dubia*)	CRPR 2B.2	Alkaline freshwater wetlands	S	S	S														
Kellogg's Horkelia (*Horkelia cuneata* var. *sericea*)	CRPR 1B.1	Openings in closed cone coniferous forest, open in coastal chap, coastal grassland, coastal scrub			P[1]	S	P	P	S				S	S	S		S	S	
Point Reyes Horkelia (*Horkelia marinensis*)	CRPR 1B.2	Sandy areas in coastal scrub or coastal grasslands			S[1]	S	S	S	S[1]				S	S	S		S	S	
Perennial goldfields (*Lasthenia californica* ssp. *macrantha*)	CRPR 1B.2	Coastal scrub on bluffs				S	P	S[2]						P[1]	P		P	P	
Legenere (*Legenere limosa*)	1B.1	Vernal pools in grassland									S								

Common Name (Scientific Name)	Status	Habitat Association	San Francisco Bay Estuaries	Visitacion Valley-Frontal San Francisco Bay Estuaries	Colma Creek-Frontal San Francisco Bay Estuaries	San Pedro Creek-Frontal Pacific Ocean	Denniston Creek-Frontal Pacific Ocean	Arroyo Leon	San Mateo Creek-Frontal San Francisco Bay Estuaries	Cordilleras Creek-Frontal San Francisco Bay Estuaries	San Francisquito Creek	La Honda Creek	San Gregorio Creek	Purisima Creek-Frontal Pacific Ocean	Lower Pescadero Creek	Upper Pescadero Creek	Butano Creek	Gazos Creek-Frontal Ano Nuevo Bay	Waddell Creek
Rose leptosiphon (*Leptosiphon rosaceus*)	CRPR 1B.1	Coastal scrub on bluffs				P[1]	P						S	S	S		S	S[3]	
Crystal Springs lessingia (*Lessingia arachnoidea*)	CRPR 1B.2	Serpentine in oak woodland, coastal scrub, grassland							P	S									
Coast lily (*Lilium maritimum*)	CRPR 1B.1	Montane hardwood, closed cone conifer forest, coastal grassland, coastal scrub, freshwater wetlands, redwood	Presumed extirpated from San Mateo County																
Ornduff's meadowfoam (*Limnanthes douglasii* ssp. *ornduffii*)	1B.1	Wet meadows in cropland					P						S	S	S		S	S	
Indian Valley bush-mallow (*Malacothamnus aboriginum*)	CRPR 1B.2	Rocky areas in chaparral, oak woodland						S	S				S	S					
Arcuate bush-mallow (*Malacothamnus arcuatus*)	CRPR 1B.2	Chaparral, oak woodland			S		S	S	S	P	S	S	S	S	S	P	S		S

Common Name (Scientific Name)	Status	Habitat Association	San Francisco Bay Estuaries	Visitacion Valley-Frontal San Francisco Bay Estuaries	Colma Creek-Frontal San Francisco Bay Estuaries	San Pedro Creek-Frontal Pacific Ocean	Denniston Creek-Frontal Pacific Ocean	Arroyo Leon	San Mateo Creek-Frontal San Francisco Bay Estuaries	Cordilleras Creek-Frontal San Francisco Bay Estuaries	San Francisquito Creek	La Honda Creek	San Gregorio Creek	Purisima Creek-Frontal Pacific Ocean	Lower Pescadero Creek	Upper Pescadero Creek	Butano Creek	Gazos Creek-Frontal Ano Nuevo Bay	Waddell Creek
Davidson's bush-mallow (*Malacothamnus davidsonii*)	CRPR 1B.2	Chaparral, oak woodland, coastal scrub, riparian woodland			S			S	S	S	S								
Hall's bush-mallow (*Malacothamnus hallii*)	CRPR 1B.2	Chaparral, coastal scrub			S			S	S	S	S								
Marsh Microseris (*Microseris paludosa*)	CRPR 1B.2	Closed-cone pine, oak woodland, coastal scrub, grassland															S[3]	P	
Woodland woollythreads (*Monolopia gracilens*)	CRPR 1B.2	Serpentine areas in montane hardwood openings, chaparral openings, oak woodland, redwood openings, grassland					S	S	P	P	P	S	S	P	S	S	S	S	
Kellman's bristle moss (*Orthotrichum kellmanii*)	CRPR 1B.2	Sandstone or carbonate substrates in chaparral, oak woodland						S	S		S	S	S	S	S	S	P	P	

Common Name (Scientific Name)	Status	Habitat Association	San Francisco Bay Estuaries	Visitacion Valley-Frontal San Francisco Bay Estuaries	Colma Creek-Frontal San Francisco Bay Estuaries	San Pedro Creek-Frontal Pacific Ocean	Denniston Creek-Frontal Pacific Ocean	Arroyo Leon	San Mateo Creek-Frontal San Francisco Bay Estuaries	Cordilleras Creek-Frontal San Francisco Bay Estuaries	San Francisquito Creek	La Honda Creek	San Gregorio Creek	Purisima Creek-Frontal Pacific Ocean	Lower Pescadero Creek	Upper Pescadero Creek	Butano Creek	Gazos Creek-Frontal Ano Nuevo Bay	Waddell Creek
Monterey pine (*Pinus radiata*)	CRPR 1B.1	Closed cone pine, montane hardwood conifer, only known from Ano Nuevo																P	
White-flowered rein orchid (*Piperia candida*)	CRPR 1B.2	Sometimes on serpentine in montane hardwood conifer, redwood, montane hardwood							S		S	S	S	S	S	S	S	S	S
Choris' popcorn-flower (*Plagiobothrys chorisianus* var. *chorisianus*)	CRPR 1B.2	Moist areas in chaparral, coastal grassland, coastal scrub		S	S	S	S	P	P	S	S[4]	S	P	P	S	P	P	P	
Oregon Polemonium (*Polemonium carneum*)	CRPR 2B.2	Openings in coastal scrub, coastal grassland, montane hardwood conifer				S	S	P	P				S	S	S		S	S	
San Francisco campion (*Silene verecunda* ssp. *verecunda*)	CRPR 1B.2	Sandy areas in coastal scrub, grassland, chaparral		P	P	S	P	S	S	P[1]	S	S	S	S	S	S	S	S	

Common Name (Scientific Name)	Status	Habitat Association	San Francisco Bay Estuaries	Visitacion Valley-Frontal San Francisco Bay Estuaries	Colma Creek-Frontal San Francisco Bay Estuaries	San Pedro Creek-Frontal Pacific Ocean	Denniston Creek-Frontal Pacific Ocean	Arroyo Leon	San Mateo Creek-Frontal San Francisco Bay Estuaries	Cordilleras Creek-Frontal San Francisco Bay Estuaries	San Francisquito Creek	La Honda Creek	San Gregorio Creek	Purisima Creek-Frontal Pacific Ocean	Lower Pescadero Creek	Upper Pescadero Creek	Butano Creek	Gazos Creek-Frontal Ano Nuevo Bay	Waddell Creek
Santa Cruz Microseris (*Stebbinsoseris decipiens*)	CRPR 1B.2	Open areas and sometimes serpentine in coastal scrub, closed cone pine, coastal grassland, montane hardwood																P	
Slender-leaved pondweed (*Stuckenia filiformis ssp. alpina*)	CRPR 2B.2	Freshwater wetlands, Riparian																S	
Saline clover (*Trifolium hydrophilum*)	CRPR 1B.2	Vernal pools in grassland, bay margin	S[4]																
San Francisco owl's-clover (*Triphysaria floribunda*)	CRPR 1B.2	Often serpentine in coastal grassland, coastal scrub	S	S[3]	S[3]				S										
Coastal triquetrella (*Triquetrella californica*)	CRPR 1B.2	Bluffs in coastal scrub		P	P	P	S	S	S				S	S	S		S	S	

Common Name (Scientific Name)	Status	Habitat Association	San Francisco Bay Estuaries	Visitacion Valley-Frontal San Francisco Bay Estuaries	Colma Creek-Frontal San Francisco Bay Estuaries	San Pedro Creek-Frontal Pacific Ocean	Denniston Creek-Frontal Pacific Ocean	Arroyo Leon	San Mateo Creek-Frontal San Francisco Bay Estuaries	Cordilleras Creek-Frontal San Francisco Bay Estuaries	San Francisquito Creek	La Honda Creek	San Gregorio Creek	Purisima Creek-Frontal Pacific Ocean	Lower Pescadero Creek	Upper Pescadero Creek	Butano Creek	Gazos Creek-Frontal Ano Nuevo Bay	Waddell Creek
Status Codes:																			
E = Endangered																			
T = Threatened																			
SR = State Rare																			
SC = State Candidate																			
CNPS List 1B = Plants rare, threatened, or endangered in California and elsewhere																			
CNPS List 2B = Plants rare, threatened, or endangered in California, but more common elsewhere																			
0.1 = seriously threatened in California																			
0.2 = moderately threatened in California																			
P = Plant record is known from the watershed																			
S = Suitable habitat is present in watershed																			
[1] Known from the watershed, but the occurrence is outside of the unincorporated county areas. Suitable habitat may occur in unincorporated areas in the watershed.																			
[2] Suitable habitat occurs in the watershed, but that habitat is outside of the unincorporated county areas.																			
[3] The known occurrences presumed extirpated, but suitable habitat remains.																			
[4] From historic occurrence, but area is outside unincorporated areas of the county. Unknown if extant.																			

Table 4-2. Special-Status Animal Species with Potential to Occur in the Program Area

Name	*Status	Habitat	Potential for Occurrence in Program Area
Federal or State Endangered, Rare, or Threatened Species			
Bay checkerspot butterfly (*Euphydryas editha bayensis*)	FT	Native grasslands on serpentine soils. Larval host plants are *Plantago erecta* and/or *Castilleja* sp.	**Present.** Through much of the 1990s, this species was known to occur at two locations in San Mateo County (Jasper Ridge Biological Preserve and Edgewood Park, which is within the Program area). However, it was last recorded at Jasper Ridge in 1997 and at Edgewood Park in 2002 (Weiss 2002). Reintroduction efforts at Edgewood Park, which began in 2007, has been moderately successful. Although almost 800 adults were spotted in 2014, numbers in subsequent years have declined with only 78 adult observed in 2016 (Creekside Science 2016). The species was also reintroduced to San Bruno Mountain in 2017 (Creekside Science 2018). Designated critical habitat includes four units in San Mateo County (i.e., Unit 1, San Bruno Mountain; Unit 2 Pulgas Ridge; Unit 3 Edgewood Park/Triangle; and Unit 4 Jasper Ridge).
Mission blue butterfly (*Icaricia icarioides missionensis*)	FE	Coastal chaparral and coastal grasslands. Larval host plant are *Lupinus* spp.	**Present.** Remaining populations of the Mission blue butterfly are found in only a few locations around the San Francisco Bay area, including the Skyline ridges and San Bruno Mountain in San Mateo County.
San Bruno elfin butterfly (*Callophrys mossii bayensis*)	FE	Coastal mountains near San Francisco Bay in the fog-belt of steep, north-facing slopes. Larval food plant is *Sedum spathulifolium*.	**Present.** All known locations are restricted to San Mateo County, where several populations are known from San Bruno Mountain, Milagra Ridge, the San Francisco Peninsula Watershed, and Montara Mountain.
Callippe silverspot butterfly (*Speyeria callippe callippe*)	FE	Grasslands of the northern San Francisco Bay region. Larval host plant is *Viola pedunculata*.	**Present.** Callippe silverspot butterflies are restricted to populations at Cordelia Hills in Solano County and San Bruno Mountain in San Mateo County (USFWS 2009).
Myrtle's silverspot butterfly (*Speyeria zerene myrtleae*)	FE	Coastal dune and prairie habitat. Larval host plants are violets, typically *Viola adunca*.	**Absent.** Although the historical distribution of this species included San Mateo County, its current extant range is believed to be restricted to the region within or near the Point Reyes National Seashore (USFWS 1998b).
Monarch butterfly (*Danaus plexippus plexippus*)	FC	Overwinter along the Pacific coastline of California and move inland in the spring to reproduce. During the breeding season, require milkweed (*Asclepias* spp.) plants upon which to rear their larvae.	**May be Present.** In the Program area, monarch butterflies occur primarily as migrating individuals in the fall and spring. The CNDDB includes 15 fall/winter site records along the San Mateo coast south of Pescadero State Beach. However, no occurrences have been recorded in the County since 1998 (CNDDB 2015).

Name	*Status	Habitat	Potential for Occurrence in Program Area
Green sturgeon (*Acipenser medirostris*)	FT, CSSC	Spawns in large river systems such as the Sacramento River; forages in nearshore oceanic waters, bays, and estuaries.	**Absent as Breeder.** Known to occur in the Bay, though it apparently occurs only as a rare, nonbreeding visitor to the South Bay. May occur in the Program area in tidal waters along the Bay edge at San Francisco International Airport and Coyote Point Recreation Area, albeit infrequently and in low numbers, if at all. All tidally influenced areas of the Bay, up to the elevation of mean higher high water, have been designated as critical habitat for this species (NMFS 2009).
Central California Coast Coho salmon *(Oncorhynchus kisutch)*	FE, SE	Open ocean, estuaries, and rivers.	**Present.** Central California Coast Coho salmon have recently been recorded spawning in the southwestern portion of the Program area in Pescadero Creek (POST 2018). However, no Coho have been recorded in Gazos Creek during annual monitoring since 2008 (Smith 2013 as cited in CDFW 2015). The species was historically collected from San Mateo Creek (Leidy 2007) and may have been present in the San Francisquito Creek watershed (Leidy et al. 2005). However, it has been extirpated from all San Mateo County streams flowing to the Bay (Leidy 2007). Designated critical habitat occurs in the Program area and includes all accessible reaches of all rivers including estuarine areas and tributaries between Punta Gorda and the San Lorenzo River (inclusive) in California.
Central California Coast steelhead (*Oncorhynchus mykiss)*	FT	Cool streams with suitable spawning habitat and conditions allowing migration between spawning and marine habitats.	**Present.** In the Program area, steelhead are known to occur in Pilarcitos Creek, San Gregorio Creek, Pescadero Creek, San Francisquito Creek, San Mateo Creek, Denniston Creek, Frenchman's Creek, Arroyo Leon, Mills Creek, Apanolio Creek, Los Trancos Creek, Gazos Creek , San Pedro Creek, Purisima Creek, Lobitos Creek, Tunitas Creek, Dry Creek, El Corte de Madera, Bogess Creek, Harrington Creek, La Honda Creek, Langley Creek, Alpine Creek, Mindego Creek, Rogers Gulch, Pomponio Creek, Bradley Creek, Little Butano Creek, Butano Creek, Honsinger Creek, Weeks Creek, McCormick Creek, Tarwater Creek, Peters Creek, Evans Evans, Bear Creek, Lambert Creek, Slate Creek, Oil Creek, Little Boulder Creek, Waterman Creek, Gazos Creek, Old Womans Creek, Whitehouse Creek, Año Nuevo Creek, and Elliot Creek (Spence et al. 2008, CEMAR 2008) and could potentially occur in other coastal streams. Designated critical habitat includes all river reaches and estuarine areas accessible to listed steelhead in coastal river basins from the Russian River to Aptos Creek, California (inclusive), and the drainages of San Francisco and San Pablo Bays (NMFS 2000, 2005; see **Figure 4-4**).

Name	*Status	Habitat	Potential for Occurrence in Program Area
Longfin smelt (*Spirinchus thaleichthys*)	ST, FC	Spawns in fresh water in the upper end of the San Francisco Bay; occurs year-round in the South Bay.	**Absent as Breeder.** In the Program area, smelt may be present in the tidal waters around San Francisco International Airport and Coyote Point Recreation Area (Bayside), but the species is not expected to spawn in the Program area.
Tidewater goby (*Eucyclogobius newberryi*)	FE, CSSC	Brackish water habitats along coast, fairly still but not stagnant water and high oxygen levels.	**Present.** The species has been recorded in the lower mouths of creeks along the southern portion of the San Mateo County coast north to San Gregorio Creek (Coastside). However, an apparently natural gap in the species' distribution along the California coast occurs north of San Gregorio Creek to the San Francisco Bay (USFWS 2005). Critical habitat has been designated and four critical habitat units occur in the Program area.
California red-legged frog (*Rana draytonii*)	FT, CSSC	Streams, freshwater pools, and ponds with emergent or overhanging vegetation.	**Present.** Red-legged frogs may be present in suitable habitat throughout San Mateo County. Red-legged frog critical habitat units SNM-1 and SNM-2 are located in the Program area.
California tiger salamander (*Ambystoma californiense*)	FT, ST	Vernal or temporary pools in annual grasslands or open woodlands.	**May be Present.** Southeastern San Mateo County represents the northernmost limit of the species' range on the San Francisco peninsula. The last recorded occurrence in San Mateo County was located in the *Palo Alto*, *California* U.S. Geological Survey 7.5-minute quadrangle just west of San Francisquito Creek in 2002 (CNDDB 2015).
San Francisco garter snake (*Thamnophis sirtalis tetrataenia*)	FE, SP	Prefer densely vegetated freshwater habitats. May use upland burrows for aestivation.	**Present.** The San Francisco garter snake is restricted to the San Francisco peninsula from just north of the San Francisco–San Mateo County line south to approximately the San Mateo–Santa Cruz County line. An intergrade zone composed of hybrids between the San Francisco garter snake and red-sided garter snake (*Thamnophis sirtalis sirtalis*) occurs from Palo Alto north to the Pulgas region near Upper Crystal Springs Reservoir (Barry 1994).
Marbled murrelet (*Brachyramphus marmoratus*)	FT, SE (nesting)	Requires dense, mature forests of redwood and Douglas-fir for breeding.	**Present.** In San Mateo County, the marbled murrelet is restricted to old-growth redwood forests, where it breeds, and to coastal waters, where it forages (SAS 2001, Cornell Lab of Ornithology 2015). Four marbled murrelet critical habitat units are present in San Mateo County (CA-12, CA-13, CA14a, and CA14b).
Western snowy plover (*Charadrius alexandrinus nivosus*)	FT, CSSC	Sandy beaches on marine and estuarine shores and salt pannes in San Francisco Bay saline managed ponds.	**Present.** In the Program area, the western snowy plover is restricted to broader coastal beaches (SAS 2001, Cornell Lab of Ornithology 2015). Two critical habitat units are present in the Program area, CA 16 (Half Moon Bay) and CA 17 (Waddell Creek Beach) in the Gazos Creek-Frontal Ano Nuevo Bay subwatershed, and suitable habitat may be present at Tunitas Creek Beach.

Name	*Status	Habitat	Potential for Occurrence in Program Area
California least tern (*Sterna antillarum browni*)	FE, SE, SP	Nests along the coast on bare or sparsely vegetated, flat substrates. In San Francisco Bay, nests primarily on an old airport runway. Forages for fish in open waters.	**Absent as Breeder.** The species does not nest in the Program area, but small numbers of foraging least terns occur as occasional foragers over open water habitat at the edge of the Bay in the Program area off the shoreline of the Coyote Point Recreation Area and the San Francisco International Airport (rarely in open waters along the ocean coastline).
California Ridgway's rail (*Rallus obsoletus obsoletus*)	FE, SE, SP	Salt marsh habitat dominated by pickleweed and cordgrass.	**Present.** Suitable breeding and foraging habitat is present along the Bay, and the species is resident in salt marsh habitat in San Mateo County, particularly where broader areas of well-developed tidal salt marsh are present (CNDDB 2015). However, within the Program area, suitable marsh habitat is found only along the shoreline of the San Francisco International Airport, where the species was detected in 2012 (H. T. Harvey & Associates 2012). Even there, suitable habitat is very limited.
California black rail (*Laterallus jamaicensis coturniculus*)	ST, SP	Breeds in fresh, brackish, and tidal salt marsh.	**Absent as Breeder.** Occurs in the South Bay primarily as a scarce winter visitor. However, the species has recently been recorded during the breeding season in Triangle Marsh along Coyote Slough over 7 miles east of the planning area (Laurie Hall pers. com.), and along lower and mid-Alviso Slough (groups.yahoo.com/group/south-bay-birds), indicating that this species may nest in some areas in the South Bay. The species has been recorded in San Mateo County at the Ravenswood Open Space (Cornell Lab of Ornithology 2015), and suitable habitat for nonbreeding California black rails is present within tidal salt marsh throughout much of the bayside portion of the County. However, within the Program area, suitable nonbreeding habitat is present only within a small flood zone at Ravenswood Slough and along the shoreline of the San Francisco International Airport, and even there, suitable habitat is very limited. Thus, California black rails are expected to occur rarely, if at all, in the Program area.
Bald eagle (*Haliaeetus leucocephalus*)	SE, SP	Occurs mainly along seacoasts, rivers, and lakes; nests in tall trees or in cliffs, occasionally on electrical towers. Feeds mostly on fish.	**Present.** In the Program area, the bald eagle occurs primarily as a migrant and winter visitor and is rare during the summer months (Cornell Lab of Ornithology 2015). However, a pair has successfully nested at Crystal Springs Reservoir in 2013, 2014, and 2015.
Bank swallow (*Riparia riparia*)	ST (nesting)	Colonial nester on vertical banks or cliffs with fine-textured soils near water.	**Present.** Bank swallows occur as rare migrants along the coast and South Bay, although they could occur anywhere in the Program area. As breeders, they are very rare in the Program area, with the only known extant breeding colony occurring at Point Ano Nuevo (CNDDB 2015); however, suitable habitat may also be present at Tunitas Creek Beach.

Name	*Status	Habitat	Potential for Occurrence in Program Area
Salt marsh harvest mouse (*Reithrodontomys raviventris*)	FE, SE, SP	Salt marsh habitat dominated by common pickleweed.	**Present.** Numerous detections of this species have been recorded in salt marsh habitat along the Bay. However, suitable habitat in the Program area is very limited. Tidal salt marsh along the Bay shoreline near the San Francisco International Airport may support this species, although the very narrow, fragmented nature of tidal marsh at that location may preclude the presence of this species, and no detections of the species have been recorded there. The species may also occur immediately adjacent to the Program area in an unnamed channel west of Flood Slough.
Townsend's big-eared bat (*Corynorhinus townsendii*)	SC, CSSC	Roosts in caves and mine tunnels, and occasionally in deep crevices in trees such as redwoods or in abandoned buildings, in a variety of habitats.	**Present.** This species is a rare resident in the coastal region of the Program area, potentially roosting in old mines, caves, very large cavities in redwood trees, and barns and abandoned buildings in the Santa Cruz Mountains. It has been extirpated from the flat bayside lands of the eastern portion of the Program area.
California Species of Special Concern			
Foothill yellow-legged frog (*Rana boylii*)	CSSC, SC	Partially shaded shallow streams and riffles with a rocky substrate. Occurs in a variety of habitats in coast ranges.	**May be Present.** Suitable habitat for the foothill yellow-legged frog is present in the Program area. However, there is only one recorded occurrence of the species in San Mateo County in recent history, in 1999 at Pescadero Creek County Park (CNDDB). Species is likely rare, if it occurs at all, in the Program area.
California giant salamander (*Dicamptodon ensatus*)	CSSC	Moist forests and riparian zones in or near clear, cold streams or seeps.	**Present.** Suitable habitat for the California giant salamander is present in the Program area, primarily on the Coastside, and the species is known to occur in Memorial and Pescadero County Parks.
Western pond turtle (*Actinemys marmorata*)	CSSC	Permanent or nearly permanent water in a variety of habitats.	**Present.** Creeks, lakes, ponds, and freshwater marshes in the Program area provide suitable habitat for the western pond turtle, which has been documented in the Program area at San Francisquito Creek and Crystal Springs Reservoir (CNDDB 2015).
Black skimmer (*Rynchops niger*)	CSSC (nesting)	Nests on abandoned levees and islands in saline managed ponds and marshes.	**Present.** In San Mateo County, the black skimmer occurs primarily in the Redwood Shores/Menlo Park area, where it is known to have nested in managed ponds. It also occurs as an occasional migrant on the coast in the Program area (such as around Coyote Point Recreation Area), but is very rare there (SAS 2001, Cornell Lab of Ornithology 2015).
Northern harrier *(Circus cyaneus*)	CSSC (nesting)	Nests in marshes and moist fields, forages over open areas.	**Present.** In the Program area, during the breeding season the northern harrier occurs primarily along the coast (in marshes and grasslands) and in tidal marshes of South San Francisco Bay (SAS 2001, Cornell Lab of Ornithology 2015).

Name	*Status	Habitat	Potential for Occurrence in Program Area
Short-eared owl (*Asio flammeus*)	CSSC (nesting)	Nests on ground in tall emergent vegetation or grasses, forages over a variety of open habitats.	**Absent as Breeder.** In the Program area, the short-eared owl occurs primarily from October to March, with most records confined to coastal marshes, grasslands, and fallow fields and to tidal marshes of South San Francisco Bay (SAS 2001, Cornell Lab of Ornithology 2015).
Long-eared owl (*Asio otus*)	CSSC (nesting)	Riparian bottomlands with tall, dense willows and cottonwood stands (also dense live oak and California Bay along upland streams); forages primarily in adjacent open areas.	**Present.** The long-eared owl occurs throughout the Program area in appropriate habitat, but it is relatively rare and very secretive (SAS 2001, Cornell Lab of Ornithology 2015).
Burrowing owl (*Athene cunicularia*)	CSSC	Open grasslands and ruderal habitats with suitable burrows, usually those made by California ground squirrels.	**Present.** In the Program area, the burrowing owl occurs as a rare winter visitor to more extensive grasslands along the coast and elsewhere. A statewide survey conducted between 1991 and 1993 indicated that breeding owls had nearly been extirpated from San Mateo County where only one to two known breeding pairs remained (DeSante et al. 2007). Recent records in the Program area are all of wintering birds or migrants (CNDDB 2015).
Vaux's swift (*Chaetura vauxi*)	CSSC (nesting)	Nests in snags in coastal coniferous forests or, occasionally, in chimneys; forages aerially.	**Present.** In the Program area, the Vaux's swift breeds in mature redwood forests during the breeding season (SAS 2001). It could potentially breed elsewhere, as it occasionally nests in chimneys, as it has been known to do in adjacent Santa Clara County (Rottenborn 2007). This species can occur throughout the Program area during spring and fall migration (Cornell Lab of Ornithology 2015).
Black swift (*Cypseloides niger*)	CSSC (nesting)	Nest on cliffs and coastal bluffs; forage aerially for insects.	**Present.** In the Program area, the black swift occurs primarily along the coast and coastal ranges, although it can occur anywhere (Cornell Lab of Ornithology 2015). It is a rare breeder in the Program area; the only known breeding location is at Anõ Nuevo State Park (SAS 2001).
Olive-sided flycatcher (*Contopus cooperi*)	CSSC (nesting)	Breeds in mature forests with open canopies, along forest edges in more densely vegetated areas, in recently burned forest habitats, and in selectively harvested landscapes (Altman and Sallabanks 2000, Robertson and Hutto 2007).	**Present.** The olive-sided flycatcher breeds in montane and coastal forests and woodlands in the Program area being absent from the highly developed South Bay (SAS 2001). During spring and fall migration, it can occur anywhere in the Program area (Cornell Lab of Ornithology 2015).
Purple martin (*Progne* subis)	CSSC (nesting)	Nest in abandoned woodpecker holes.	**Present.** Purple martins occur in San Mateo County as rare migrants along the coast and very rare and local breeders along the ridgeline of the Santa Cruz Mountains (SAS 2001, Rana Creek Habitat Restoration 2002, Cornell Lab of Ornithology 2015).

Name	*Status	Habitat	Potential for Occurrence in Program Area
Loggerhead shrike (*Lanius ludovicianus*)	CSSC (nesting)	Nests in tall shrubs and dense trees; forages in grasslands, marshes, and ruderal habitats.	**Present.** Grassland, ruderal, and marsh communities throughout the Program area provide suitable nesting and foraging habitat for this species. However, it occurs primarily as a migrant and wintering visitor along the coastal and San Francisco Bay lowlands, and is generally absent from the crest of the Santa Cruz Mountains. It is a rare breeder in the Program area. The few known recent nesting records from San Mateo County are all from the San Francisco Bay lowlands, though outside the Program area (SAS 2001, Cornell Lab of Ornithology 2015).
Yellow warbler (*Setophaga petechia*)	CSSC (nesting)	Nests in riparian woodlands.	**Present.** Riparian woodlands in the Program area provide suitable nesting and foraging habitat for this species, which occurs in suitable habitat throughout the County (Cornel lab of Ornithology 2015). However, the species is a rare and local breeder in such riparian habitat, being particularly scarce along the coast.
San Francisco common yellowthroat (*Geothlypis trichas sinuosa*)	CSSC	Nests in herbaceous vegetation, usually in wetlands or moist floodplains.	**Present.** Taller salt, brackish, and freshwater marsh habitat, as well as willow riparian habitat and even dense weedy vegetation in mesic coastal habitats at scattered locations throughout much of the Program area provide suitable breeding and foraging habitat for this species.
Tricolored blackbird (*Agelaius tricolor*)	CSSC (nesting colony)	Nests near fresh water in dense emergent vegetation.	**Present.** In the Program area, the tricolored blackbird occurs primarily along the coastal lowlands and in the San Francisco Bay lowlands. It occurs less frequently along the ridgeline of the Santa Cruz Mountains. It is an uncommon to common migrant and wintering visitor and a very rare breeder (SAS 2001, Cornell Lab of Ornithology 2015).
Alameda song sparrow (*Melospiza melodia pusillula*)	CSSC	Nests in salt marsh, primarily in marsh gumplant and cordgrass along channels.	**Present.** In San Mateo County, this species occurs only in salt marshes along San Francisco Bay (Chan and Spautz 2008).
Grasshopper sparrow (*Ammodramus savannarum*)	CSSC (nesting)	Breeds and forages in grasslands, meadows, fallow fields, and pastures.	**Present.** Breeding grasshopper sparrows occur in relatively low numbers in extensive grasslands throughout San Mateo County (SAS 2001, Cornell Lab of Ornithology 2015, Unitt 2008).
Bryant's savannah sparrow (*Passerculus sandwichensis alaudinus*)	CSSC	Nests in pickleweed dominant salt marsh and adjacent ruderal habitat.	**Present.** High marsh habitat in bayside and coastal lowlands, as well as more extensive grasslands in the Santa Cruz Mountains, provides suitable breeding and foraging habitat for this species.
San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*)	CSSC	Nests in a variety of habitats including riparian areas, oak woodlands, and scrub.	**Present.** Woodlands, scrub, and ruderal habitats throughout the Program area provide suitable nesting and foraging habitat for this species.

Name	*Status	Habitat	Potential for Occurrence in Program Area
Salt marsh wandering shrew (*Sorex vagrans halicoetes*)	CSSC	Medium-high marsh 6-8 feet above sea level with abundant driftwood and common pickleweed.	**May be Present.** This species is likely present in broader salt and brackish marshes along the Bay, although its distribution is poorly known. There is a low probability of occurrence in the Program area owing to the fragmented nature of salt marsh habitat around San Francisco International Airport and Coyote Point Recreation Area.
Pallid bat (*Antrozous pallidus*)	CSSC	Forages over many habitats; roosts in caves, rock outcrops, buildings, and hollow trees.	**Present.** Occurs sporadically throughout open areas and along roads of the Pacific coastal regions and the Santa Cruz Mountains within the Program area. This species is not expected to occur on the flat bayside lands of the eastern portion of the Program area but likely occurs occasionally at the edges of developed areas in the foothills immediately west of the low elevation bayside areas.
Western red bat (*Lasiurus blossevillii*)	CSSC	Roosts in foliage in forest or woodlands, especially in or near riparian habitat.	**Absent as Breeder.** Occurs as a migrant and winter resident, but does not breed in the Program area. Small numbers may roost in foliage in trees virtually anywhere in the Program area, but are expected to roost primarily in riparian areas.
American badger (*Taxidea taxus*)	CSSC	Burrows in grasslands and occasionally in infrequently disked agricultural areas.	**Present.** Badgers may occur in low numbers throughout open areas of the Pacific coastal regions and the Santa Cruz Mountains within the Program area. This species is not expected to occur on the flat bayside lands of the eastern portion of the Program area.
State Fully Protected Species			
White-tailed kite (*Elanus leucurus*)	SP	Nests in tall shrubs and trees, forages in grasslands, marshes, and ruderal habitats.	**Present.** Marshes and grasslands within the Program area provide suitable breeding and foraging habitat.
American peregrine falcon (*Falco peregrinus anatum*)	SP	Forages in many habitats; nests on cliffs and tall bridges and buildings.	**Present.** American peregrine falcons may forage in suitable habitat throughout the Program area. Recently, the species has been documented nesting along the Devil's Slide Coastal Trail, and it is possible that it may nest on bridges and cliffs elsewhere in the Program area.
Golden eagle (*Aquila chrysaetos*)	SP	Breeds on cliffs or in large trees (rarely on electrical towers), forages in open areas.	**Present.** In the Program area, the golden eagle is an uncommon to rare permanent resident (Cornell Lab of Ornithology 2015). It occurs sparingly in grasslands throughout the County, primarily as a nonbreeder, although a few pairs nest there (SAS 2001).
Ringtail (*Bassariscus astutus*)	SP	Cavities in rock outcrops and talus slopes, as well as hollows in trees, logs, and snags that occur in riparian habitats and dense woodlands, usually in close proximity to water.	**May be Present.** Suitable habitat is present in portions of the Program area with dense woodlands and/or rocky outcroppings, primarily in the less developed western portion of the Program area.

***Status Codes:**

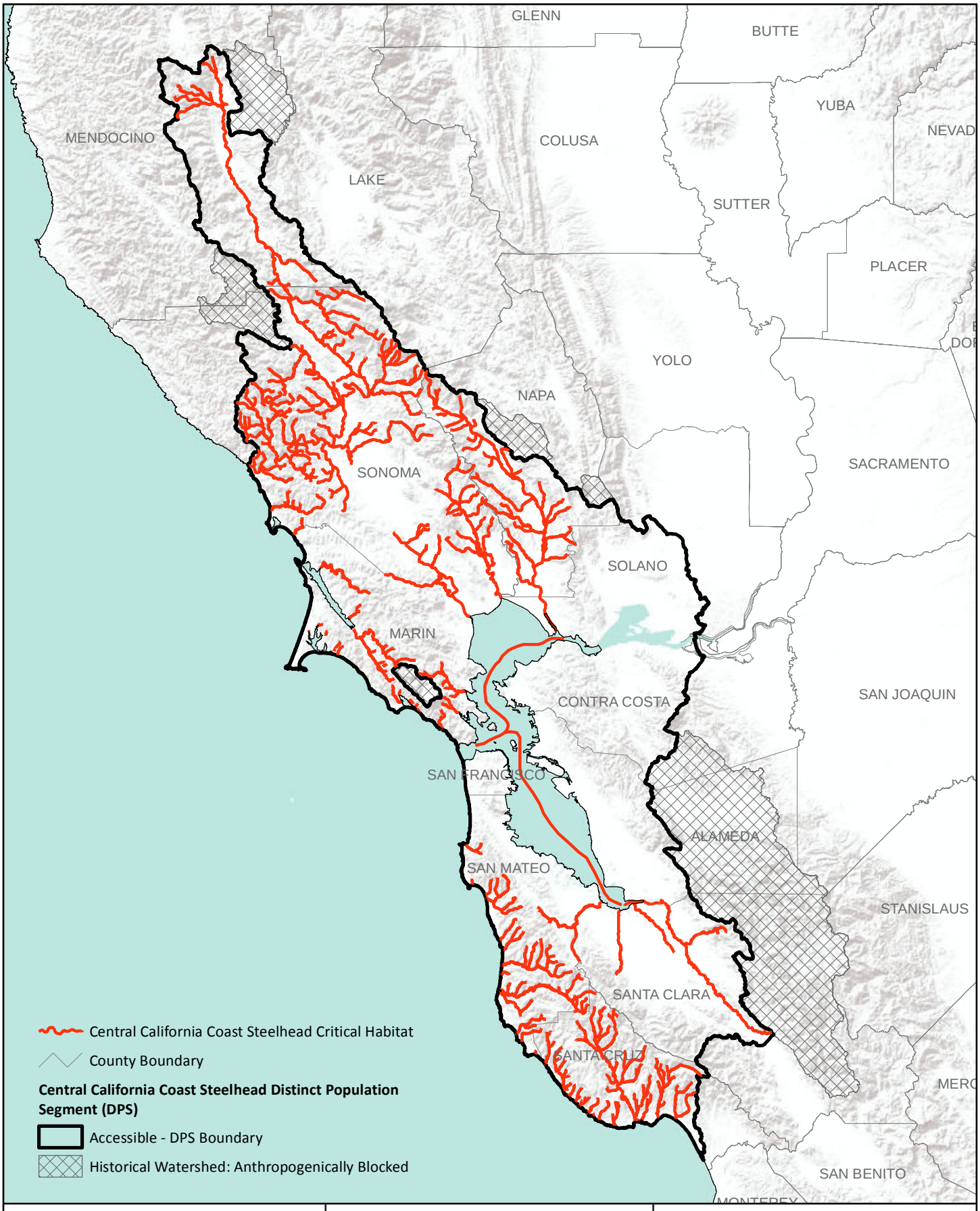
Federal and State Codes: E = Endangered; T = Threatened; C = Candidate; SC = Species of Concern (Federal); Species of Special Concern (State); FD = Federally Delisted; SD = State Delisted; SP = California Fully Protected species

Table 4-3. Special-Status Animals and Their Potential to Occur in the Program Area by Watershed

Common Name	San Francisco Bay Estuaries	Visitacion Valley-Frontal San Francisco	Colma Creek-Frontal San Francisco Bay	San Pedro Creek-[illegible]	Denniston Creek-Frontal Pacific Ocean	Arroyo Leon	San Mateo Creek Frontal San Francisco	Cordilleras Creek-Frontal San Francisco	San Francisquito Creek	La Honda Creek	San Gregorio Creek	Purisima Creek-Frontal Pacific Ocean	Lower Pescadero Creek	Upper Pescadero Creek	Butano Creek	Gazos Creek-Frontal Ano Nuevo Bay	Waddell Creek
Federal or State Endangered, Rare, or Threatened Species																	
Bay checkerspot butterfly		X	X				X	X									
Mission blue butterfly		X	X	X			X										
San Bruno elfin butterfly		X	X	X	X	X	X										
Callippe silverspot butterfly		X	X														
Myrtle's silverspot butterfly	Extirpated																
Monarch butterfly (winter roosts)				X	X							X				X	
Green sturgeon	X																
Central California Coast Coho salmon												X	X	X		X	
Central California Coast steelhead	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X
Longfin smelt	X																
Tidewater goby											X		X		X	X	
California red-legged frog	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
California tiger salamander									X								
San Francisco garter snake	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Marbled murrelet (nesting)						X			X			X	X	X	X	X	X
Western snowy plover					X	X					X	X	X			X	
California least tern	X																

Common Name	San Francisco Bay Estuaries	Visitacion Valley-Frontal San Francisco	Colma Creek-Frontal San Francisco Bay	San Pedro Creek-	Denniston Creek-Frontal Pacific Ocean	Arroyo Leon	San Mateo Creek Frontal San Francisco	Cordilleras Creek-Frontal San Francisco	San Francisquito Creek	La Honda Creek	San Gregorio Creek	Purisima Creek-Frontal Pacific Ocean	Lower Pescadero Creek	Upper Pescadero Creek	Butano Creek	Gazos Creek-Frontal Ano Nuevo Bay	Waddell Creek
California Ridgway's rail	X																
California black rail	X																
Bald eagle (nesting)			X			X	X										
Bank swallow (nesting)																X	
Salt marsh harvest mouse	X																
Townsend's big-eared bat			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
California Species of Special Concern																	
Foothill yellow-legged frog													X				
California giant salamander	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Western pond turtle			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Black skimmer	X			X	X							X				X	
Northern harrier	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Short-eared owl	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Long-eared owl	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Burrowing owl	X	X	X	X	X			X	X	X	X	X				X	
Vaux's swift	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Black swift		X	X				X		X	X				X		X	X
Olive-sided flycatcher	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Purple martin			X	X	X	X	X		X	X	X	X	X	X	X	X	X
Loggerhead shrike	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Yellow warbler	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
San Francisco common yellowthroat	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	x
Tricolored blackbird	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Alameda song sparrow	X																

Common Name	San Francisco Bay Estuaries	Visitacion Valley-Frontal San Francisco	Colma Creek-Frontal San Francisco Bay	San Pedro Creek-	Denniston Creek-Frontal Pacific Ocean	Arroyo Leon	San Mateo Creek Frontal San Francisco	Cordilleras Creek-Frontal San Francisco	San Francisquito Creek	La Honda Creek	San Gregorio Creek	Purisima Creek-Frontal Pacific Ocean	Lower Pescadero Creek	Upper Pescadero Creek	Butano Creek	Gazos Creek-Frontal Ano Nuevo Bay	Waddell Creek
Grasshopper sparrow			X	X	X	X	X		X	X	X	X	X	X	X	X	X
Bryant's savannah sparrow	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
San Francisco dusky-footed woodrat		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Salt marsh wandering shrew	X																
Pallid bat			X	X	X	X	X		X	X	X	X	X	X	X	X	X
Western red bat	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
American badger				X	X	X	X		X	X	X	X	X	X	X	X	X
State Fully Protected Species																	
White-tailed kite	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
American peregrine falcon	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Golden eagle	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Ringtail				X	X	X	X		X	X	X	X	X	X	X	X	X



Source: NMFS 2005

0 50 Miles

Figure 4-4
Central California Coast Steelhead Critical Habitat

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4.3 Invasive Wildlife and Plants, and Noxious Weeds

For over two centuries, people have brought non-native plants and wildlife into the region, either accidentally (e.g., as stowaways in cargo shipments) or intentionally (e.g., imported for food, ornament, sport, or as pets), and many of these species have now been introduced into the wild. Such species that cause harm and, once established, spread quickly from their point of introduction are often called "invasive" species.

Invasive species affect native species and habitats in several ways, including by altering nutrient cycles and hydrologic cycles; by creating changes in sediment deposition and erosion; by dominating habitats and displacing native species; by competing with native species for resources, by preying on native species, by transmitting diseases, and by hybridizing with native species (Bossard et al. 2000). In California, approximately 3 percent of the plant species growing in the wild are considered invasive, but they inhabit a much greater proportion of the landscape (California Invasive Plant Council 2014). Their effects on natural communities also may lead to direct effects on human activities, such as clogging waterways and water delivery systems, weakening flood protection structures, damaging crops, and diminishing sport fish populations (CDFG 2008).

Invasive species present complex management issues because they can continue to spread and invade new areas even when they are no longer being actively introduced. Common characteristics of invasive plant species that allow them to outcompete native vegetation and establish more quickly on newly exposed substrates (e.g., eroding river banks, wildfire scars, and flood-scoured floodplains and bars) include the following:

- More than one seed dispersal mechanism with prodigious quantities of seed production
- Longer season of viable seed release, dispersal, and germination potential
- Dormant seed or rhizome viability over many years
- Greater range of tolerance of inundation, scour, or dry season soil moisture deficits
- Fast growth rates, stump sprouting, and fast recovery from top removal

4.3.1 Invasive Plants

Plant pests are defined by law, regulation, and technical organizations, and are regulated by many different sources, including the California Department of Food and Agriculture (CDFA) and the United States Department of Agriculture (USDA). The CDFA (2012) uses an action-oriented pest-rating system. The rating assigned to a pest by the CDFA does not necessarily mean that one with a low rating is not a problem; rather the rating system is meant to prioritize response by the CDFA and county agricultural commissioners. The California Invasive Plant Council (Cal-IPC) has developed a list of plant pests specific to California wildlands, based on information submitted by land managers, botanists, and researchers throughout the state and on published sources. The term "noxious weed" is used by government agencies for non-native plants that have been defined as pests by law or regulation.

The following CDFA designations reflect the importance of the pest:

A – A pest of known economic or environmental detriment and is either not known to be established in California or it is present in a limited distribution that allows for the possibility of eradication or successful containment

B – A pest of known economic or environmental detriment and, if present in California, it is of limited distribution

C – A pest of known economic or environmental detriment and, if present in California it is usually widespread

The Cal-IPC (2015) ranks invasive plants across the state based on the level of ecological impact in California as follows:

High – Species has severe ecological impacts on physical processes, plant and animal communities, and vegetation structure

Moderate – Species have substantial and apparent ecological impacts on physical processes, plant and animal communities, and vegetation structure

Limited – Species are invasive but their ecological impacts are minor on a statewide level or there was not enough information to justify a higher score

The Cal-IPC state list of highly invasive species was screened for species that are known to occur in San Mateo County. The major invasive plant species of the county are defined as the 31 species below. **Table 4-4** provides the list of these species.

Table 4-4. Invasive Weeds in San Mateo County with a High Cal-IPC Rating

Common Name	Scientific Name	Life Form
Barbed goatgrass	*Aegilops triuncialis*	Annual grass
European beachgrass	*Ammophila arenaria*	Perennial grass
Giant reed	*Arundo donax*	Perennial grass
Red brome	*Bromus madritensis ssp. rubens*	Annual grass
Cheatgrass	*Bromus tectorum*	Annual grass
Iceplant	*Carpobrotus edulis*	Perennial herb
Yellow star thistle	*Centaurea solstitialis*	Annual herb
Jubata grass	*Cortaderia jubata*	Perennial grass
Pampas grass	*Cortaderia selloana*	Perennial grass
Scotch broom	*Cytisus scoparius*	Shrub
Cape ivy	*Delairea odorata*	Perennial herb
Brazilian waterweed	*Egeria densa*	Perennial herb
Common water hyacinth	*Eichhornia crassipes*	Perennial herb
Medusa head	*Elymus caput-medusae*	Annual grass
Fennel	*Foeniculum vulgare*	Perennial herb

Common Name	Scientific Name	Life Form
French broom	*Genista monspessulana*	Shrub
Canary ivy	*Hedera canariensis*	Vine
English ivy	*Hedera helix*	Vine, Shrub
Perennial pepperweed	*Lepidium latifolium*	Perennial herb
Six petal water primrose	*Ludwigia hexapetala*	Perennial herb
Floating water primrose	*Ludwigia peploides*	Perennial herb
Purple loosestrife	*Lythrum salicaria*	Perennial herb
Parrot feather watermilfoil	*Myriophyllum aquaticum*	Perennial herb (aquatic)
Spike watermilfoil	*Myriophyllum spicatum*	Perennial herb
Himalayan blackberry	*Rubus armeniacus*	Shrub
Smooth cordgrass	*Spartina alterniflora*	Perennial grass
Denseflower cordgrass	*Spartina densiflora*	Perennial grass
Spanish broom	*Spartium junceum*	Shrub
Smallflower tamarisk	*Tamarix parviflora*	Tree, Shrub
Saltcedar	*Tamarix ramosissima*	Tree, Shrub
Common gorse	*Ulex europaeus*	Shrub

The DPW and the Parks Department are part of the San Mateo County Weed Management Area (WMA). The WMA is a regional coalition of agencies, private landowners, the agricultural industry, and environmental organizations concerned about the proliferation of invasive plant species in the county. The WMA promotes and coordinates efforts to prevent the introduction, establishment, and spread of noxious weeds.

4.3.2 Invasive Wildlife

As described above, the introduction of non-native wildlife species can be detrimental to native species assemblages. Non-native wildlife species distribution and abundance in the Program area is poorly known, but species known to occur include bullfrogs, crayfish (*Pacifastacus leniusculus* and *Procambarus clarkii*), red-eared sliders (*Trachemys scripta elegans*), red fox (*Vulpes vulpes*), and New Zealand mud snail (*Potamopyrgus antipodarum*). A few of the more common introduced/invasive wildlife and fish species present, or with a high potential to be introduced, are discussed below.

Mosquitofish (*Gambusia affinis*) have been introduced throughout the world, including San Mateo County, to control mosquito populations. Such introductions have been shown to have negative effects on amphibians in experimental studies, including decreased survival of larval treefrogs (Goodsell and Kats 1999) and California newts (Gamradt and Kats 1996), as well as tail injury, reduced metamorph size, and altered activity patterns of larval California red-legged frogs (Lawler et al. 1999).

Largemouth bass (*Micropterus salmoides*) were first introduced into California at Lake Cuyamaca (San Diego County) in 1891 and are now found throughout California (CDFW 2017). Two subspecies are recognized, the northern subspecies *M. s. salmoides*, and the Florida subspecies *M. s. floridanus*. Research suggests that the introduction of largemouth bass can negatively affect populations of small native fishes and ranid frogs, including California red-legged frogs, through predation (Hayes and Jennings 1986, Global Species Database 2017).

The American bullfrog has been accidentally and intentionally introduced (e.g., for food in the 1920s by commercial frog farmers) throughout the world and is now established throughout most of the western United States, including the Program area (California Herps 2015). Their large size, mobility, generalized eating habits (their prey includes native amphibians as well as other aquatic and riparian vertebrates [Graber 1996]), and aggressive behavior have made bullfrogs extremely successful invaders and a threat to biodiversity (AmphibiaWeb 2008).

It has been suggested that where western pond turtles and non-native turtles co-occur there may be a negative impact on the western pond turtles (particularly by red-eared sliders) through competition and possibly the introduction of disease (Spinks et al 2003; Thomson et al. 2010). Spinks et al. (2003) observed that, where they co-occur, the larger red-eared sliders seem to dominate the more desirable basking spots (secluded areas with floating or protruding woody debris), whereas western pond turtles are more scattered and bask on the lesser desirable open banks. They attributed this to the ability of the larger red-eared sliders to displace western pond turtles from the more desirable basking spots. The extent to which non-native turtles impact the western pond turtle population has not been specifically studied, but it can be assumed that larger non-native turtles, specifically red-eared sliders, probably outcompete the smaller western pond turtle for resources required by both species.

Non-native species such as feral house cats (*Felis felis*), red foxes, and Norway rats (*Rattus norvegicus*), and muskrats (*Ondatra zibethicus*) are known to occur in the Program area and are significant predators of native birds.

Domestic pigs were introduced to California in the 1700s. Since that time, domestic pigs have occasionally escaped, becoming feral. In addition, in the 1920s, the European wild boar was introduced into California, which resulted in a wild boar/feral domestic pig hybrid (Waithman 2001). Rooting by wild pigs can cause a variety of damage, including the destruction of crops and pastures and damage to livestock watering holes.

The New Zealand mud snail was recently (2014) confirmed to occur in the Program area in Pilarcitos Creek (U.S. Geological Survey 2015a). New Zealand mud snails, which reproduce rapidly and can crowd out native insects that aquatic wildlife depend upon for survival, were first discovered in California in 2000 in the Owens River in Mono County (CDFG 2008). New Zealand mud snail colonies disrupt the base of the food chain by consuming algae and competing with native bottom-dwelling invertebrates. A population decline of invertebrates can follow their introduction. With a decrease in food availability, fish populations can decline as well. New Zealand mud snails can grow as large as one-quarter inch but are often much smaller and are parthenogenic (i.e., able to start a new population with only one snail). They have the potential for extraordinary population densities — up to nearly 1 million snails per square meter and comprising up to 95 percent of the invertebrate biomass of a river. It is believed that populations in New Zealand are kept in check naturally by a native parasite. In North America, however, native stream communities can be altered because the snail has no natural predators or parasites, and its populations have flourished where they have been introduced. It is not believed they can be eradicated once established (CDFG 2008).

4.3.3 Phytophthora

Phytophthora is a highly contagious plant pathogen that encompasses more than 100 described species worldwide and threatens plant nurseries, agriculture, and natural ecosystems (Brasier 2008). It is a fungus-like water mold in the kingdom Straminopila, and it is more closely related to diatoms and brown algae than to fungi. Many species of *Phytophthora* are native to California and do not pose a threat to

the health of native plants; however, several recently introduced exotic species can have serious effects on native trees, shrubs, and other plants. Disease symptoms depend on the species of *Phytophthora* and the host plant but can include stem cankers (necrotic lesions found in the bark), branch dieback, dead leaves, wilting of apical shoots, blight (a water-soaked appearance progressing to brown/black spots and lesions), and root rot. Many of these symptoms can be caused by other pathogens or other mechanisms, such as frost or sunburn, and thus are difficult to diagnose reliably. The pathogen is easily transmitted through soil and water, and some species are known to be airborne; however, planting infected live plants is a primary pathway for spreading the infection. Eradication over large areas is currently considered impossible because of the organism's persistence in soil (Swiecki and Bernhardt 2014).

In California, introduced *Phytophthora* species have affected a number of plant communities in a variety of soils and climates (Swiecki and Bernhardt 2014). *P. ramorum* is responsible for sudden oak death, a disease that has killed millions of tanoak and several oak species (*Quercus* spp.) in at least 15 counties in California. Other highly destructive exotic *Phytophthora* species in California woodlands and forests include *P. cinnamomi*, *P. cactorum*, *P. nemorosa*, *P. tentaculat*a, *P. cambivora*, and *P. alni*. Accurate and early detection of *Phytophthora* is critical to managing and preventing its spread. Current field testing methods involve baiting techniques and genetic analysis, which require laboratory expertise and multiple weeks of processing time.

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Chapter 5
Culvert, Channel, Bridge, and Flood Control Facility Maintenance

This Chapter identifies and describes Maintenance Program activities at culverts, channels, bridges, and other flood control facilities.

5.1 Culvert, Storm Drainage, Channel, and Bridge Maintenance

5.1.1 Culvert Repair or Replacement

The County owns and maintains many culverts at roads and trail crossings, which commonly require routine repair or replacement due to material deterioration, damaged headwalls, or eroding outlets. Sediment removal at culverts is described below in Section 5.3. At several locations throughout the County, culverts are severely damaged, blocked, buried, or otherwise not functioning properly. Causes of failures may include improper sizing, misalignment, and/or the age of materials. Culvert failure or deterioration typically reduces hydraulic capacity due to flow obstruction and blocking, sediment accumulation, or other debris that collects as a result of the damaged or failed culvert. Failure may also lead to increased erosion downstream of the culvert where concentrated flows may become more erosive. This can be particularly problematic if the erosive flows are directed immediately towards a stream bank. At road or trail crossings where either inadequately sized or poorly designed culverts exist, a large storm event could also damage or overwhelm the facility and cause scouring beneath the roadway and culvert itself. Culvert failures and deterioration have been indicated as a contributing factor to the sedimentation issues in Coastside channels including those observed in the Pescadero-Butano and San Gregorio Creek watersheds, which are listed as impaired for sediment in the CWA Section 303(d) List.

Repair or replacement of existing culverts comprised of corrugated metal pipe (CMP), reinforced concrete pipe (RCP) or high-density polyethylene (HDPE) pipe, generally will occur within the same footprint as the original culvert. In some locations, however, culverts were either inadequately sized or designed and need to be properly sized or re-aligned to improve fish passage along creeks, to reduce future culvert failures by addressing improper sizing issues, and to reduce existing erosion at the repair site, thus improving water quality and meeting TMDL requirements. Where feasible, the County would replace culverts with new ones that are designed and constructed to accommodate the 100-year flow. Repair of an existing culvert consists of replacing a segment of detached pipe, applying a layer of concrete to the invert of the culvert where the majority of deterioration occurs, installing a liner inside the existing pipe, or adding a flume at the end of a pipe, or other erosion protection treatment, such as rock dissipators, to prevent or reduce erosion at the culvert outfall. Culvert repair work may also involve repair of deteriorated headwalls at the inlet or outlet side of culverts. Repair work typically occurs when the site is dry and when rain is not forecasted within the next 72 hours.

For a typical culvert replacement, existing pipe (CMP, RCP or HDPE) is replaced with HDPE or CMP pipe sized for adequate capacity. As stated above, culverts are typically sized to convey the 100-year design flow per agency and County requirements. Culvert replacement typically entails trenching, removing the existing culvert, replacing it, backfilling the trench and compacting the soil or fill material, and repaving if the culvert is at a road crossing. Depending on the site, this activity may also involve slip-lining,

stabilizing the area beneath a culvert, or installing flumes or other energy dissipaters at culvert outlets. Recently, the County utilized a new trenchless solution referred to as centrifugally cast concrete pipe, which utilizes a spincaster to apply thin coats of cementitious material to the inside of failing culverts. This method creates a new waterproof pipe that adheres to the original pipe and is proven to be successful in extending the life of existing pipes without the need for trenching and excavation activities typically required for traditional culvert replacement work. The slope and gradient of replacement culverts that are discharging to a ditch, creek, or channel are aligned with the receiving water course to maintain stream course continuity and to avoid washout or erosion of the stream bed, stream banks, and/or other earthen material. In addition, the County strives to install culverts at or below grade, as site conditions allow. However, along some of the steeper coastal roads, this is not always feasible. Typically, surface disturbance is limited to less than 5 linear feet from the culvert inlet and outlet. Depending on where the culvert replacement takes place, equipment is generally operated from the roadway, roadway shoulders, or trail. To the extent possible, staging of equipment and materials also occurs within the roadway right-of-way above and outside of active channels.

As examples of this work, since 2012, the County has replaced deteriorated culverts in several County areas including the Emerald Lake Hills area on the Bayside, and Tunitas Road, Alpine Road, Lobitos Cut-off Road, Etheldore Street, Play Bowl Drive, and Cloverdale Road on the Coastside of the county. **Figure 5-1**, Photos 1 and 2 show degraded CMP culverts that require replacement along Pigeon Point Road and Alpine Road on the Coastside of the county. Other photos presented in Figure 5-1 show other culverts, bridges, ditches and other facilities typically maintained by the County. Appendix C includes maps that show where culvert repair and replacement activities occur within County parks. Appendix H includes maintenance characterization sheets for sites in need of culvert replacement as well.

This Manual and the Maintenance Program's supporting permits and authorizations address routine repair and replacement of standard culverts generally 60 inches or less in diameter within the County's jurisdiction. Typically, each culvert repair or replacement site would be between 25 to 60 feet in length. Culvert repair and replacement work activities on non-fish bearing streams would be limited to 150 linear feet per site and the estimated maximum work area would be approximately 750 square feet. Culvert repair and replacement activities on fish-bearing streams are limited to 100 feet per site and the estimated maximum work area would be approximately 500 square feet in area. For the purposes of the Maintenance Program's CEQA analysis, the County anticipates conducting up to 28 culvert replacement projects per year.

Culvert Replacement Material

The County will evaluate culvert replacement material on a site-by-site basis to determine whether replacing pipes with metal instead of plastic is appropriate. This assessment will be based on a combination of factors including, but not limited to: fire hazard risk, review of fuel model data layers, whether the culvert is on developed land and types of adjacent land uses, and whether the culvert is on an evacuation route or an important route for emergency egress/ingress. Fire risk conditions are highly variable across the County, including some moister coastal areas of lower risk and drier interior grassland hillslope areas of higher risk.

The assessment process will first include reviewing the California Department of Forestry and Fire Protection (CAL FIRE) fire hazard severity zone (FHSZ) maps[1] to determine if the site is located within a very high, high, or moderate FHSZ.

Second, the County will review the San Mateo County Fuel Model data layer and technical report, which was recently completed in 2021. This data layer is a 5-meter spatial resolution fuel model data layer that provides a fine scale map of fuel conditions on the landscape and is a required input for fire behavior and fire spread models. Table 6 of the Vegetation to Fuel Model Crosswalk Report (2021)[2], copied below, summarizes the 22 fuel models assigned in San Mateo County by acreage. These fuel models were assigned based on 34 lifeform classes which were based on data describing vegetation types, absolute vegetative cover, level of ladder fuel density, and canopy height. The lifeform classes were developed and mapped following the collection of LiDAR data and 2018 high resolution imagery collections. Example lifeform classes within the County include coastal scrub, redwood, herbaceous, evergreen hardwood, developed, paved roads, other paved surfaces, among others. In addition, the fuel model assignments were updated to account for burn severity data collected after the 2020 CZU lightning complex fire. In general, in very high or high FHSZs and/or in areas that have a high or very high fuel load model assignment (e.g., fuel models TU5, TL5, SH7, SH5 per Table 6 below), culverts should be replaced with metal pipes.

Third, the County will evaluate whether the culvert maintenance site is on developed land using the County's San Mateo Countywide Fine Scale Vegetation Map[3] and associated GIS layers, and review surrounding land uses (e.g., agricultural, open space, urban, waterways etc.). Higher density development is typically located along the flatter areas along the Bay margin and along the coastline. In general, these urban areas primarily consist of impervious surfaces and thus have a low risk for wildfire. In addition, greater amounts of impervious surfaces in developed areas decrease infiltration and increase the volume and velocity of stream flows. Plastic pipes may have less hydraulic friction and can convey greater discharge with smaller diameter pipes. Plastic pipes also have a longer lifespan, typically lasting 20 years longer than metal pipes and are cheaper than metal pipes to install and maintain. For these reasons, plastic culverts may be more appropriate in specific locations. In general, if a site is in a developed area and has low to moderate FHSZ, plastic pipe is likely the more appropriate culvert material that should be utilized.

In addition, areas along riparian corridors would also be less flammable due to the presence of water. Coastal areas have a higher likelihood for fog and moist conditions during the summer months. In particularly moist areas, metal culverts are at greater risk for material fatigue/failure due to rust, therefore, plastic culverts would likely be preferred in these locations. The County will also consider the presence of special-status species and sensitive habitat in these areas. Although metal pipes do not melt in fires, they do rust, break, and crack at high pressure points requiring more frequent replacement. More frequent replacement would result in recurring disturbance and additional impacts to vegetation,

[1] https://osfm.fire.ca.gov/divisions/community-wildfire-preparedness-and-mitigation/wildland-hazards-building-codes/fire-hazard-severity-zones-maps/
[2] Digital Mapping Solutions, Tukman Geospatial, LLC and Wildland Res Mgt. Technical Report: Vegetation to Fuel Model Crosswalk. Prepared for Golden Gate National Parks Conservancy. Available at: https://tukmangeospatial.egnyte.com/dl/Sv27a43z0l. Accessed April 25, 2022.
[3] An interactive web map version of the San Mateo Countywide Fine Scale Vegetation Map is available at: https://parksconservancy.maps.arcgis.com/apps/webappviewer/index.html?id=021b7c7ea5a04575a5b61386a824a08e

special-status species, and water quality.

Table 6. Acreage of fuel model assigned in San Mateo County based on lifeform and sorted by percent.

Fuel Model	Description	Acres	Percent
TU5	Very High Load, Dry Climate Timber-Shrub	48,153	16%
NB1	Urban/Developed	44,247	15%
SH2	Moderate Load Dry Climate Shrub	43,803	14%
GR2	Low Load, Dry Climate Grass	33,858	11%
NB8	Open Water	20,101	7%
TU1	Low Load Dry Climate Timber-Grass-Shrub	20,838	7%
TL1	Low Load Compact Conifer Litter	18,700	6%
TL5	High Load Conifer Litter	14,555	5%
GR1	Short, Sparse Dry Climate Grass	11,995	4%
SH7	Very High Load, Dry Climate Shrub	12,138	4%
TL8	Long-Needle Litter	7,999	3%
NB9	Bare Ground	7,073	2%
SH5	High Load, Dry Climate Shrub	6,920	2%
NB3	Agricultural	3,191	1%
GS2	Moderate Load, Dry Climate Grass-Shrub	2,503	1%
SH1	Low Load Dry Climate Shrub	1,905	1%
TL3	Moderate Load Conifer Litter	2,162	1%
TL6	Moderate Load Broadleaf Litter	2,489	1%
GR4	Moderate Load, Dry Climate Grass	1,059	0.30%
GS1	Low Load, Dry Climate Grass-Shrub	799	0.30%
TL2	Low Load Broadleaf Litter	332	0.10%
TU4	Dwarf Conifer With Understory	15	0.01%

Lastly, the County will also assess the specific location of the culvert and determine if the culvert is situated on an emergency ingress/egress for residents or businesses or on an identified evacuation route. If the culvert is determined to be on an emergency ingress/egress or an identified evacuation route, metal material may be more appropriate to avoid the potential collapse of the route during a fire and protect public safety. Culverts along smaller trails in moderate FHSZs may be appropriately replaced with plastic pipe.

Appendix K shows the Countywide GIS layers and methodology described above that would be utilized by staff when determining when plastic vs. metal pipe is appropriate at a given site.

5.1.2 Culvert and Other Storm Drainage Facilities Clearing and Inspections

The County is responsible for clearing clogged culvert inlets, culvert outfalls, flap gates, diversion structures, storm drains, manholes, catch basins, and other storm drainage facilities in unincorporated areas of the County. Routine culvert and storm drain cleaning improves water quality by preventing overflows and reducing pollutant, trash, and debris loads in the storm drain system and discharged to receiving waters. In general, storm drainage facilities in unincorporated areas are inspected annually in the fall prior to the rainy season and throughout the rainy season during the County's routine patrols to evaluate their operational performance and maintenance needs. As a routine maintenance activity, County culverts and storm drains are typically cleaned during the fall. Other trash capture devices on storm drains and catch basin devices are inspected, cleaned, and maintained routinely throughout the year.

Routine maintenance also includes cleaning existing culverts that cross County roads and trails. Like storm drains, these are typically inspected on an annual basis and cleared of debris as necessary. If clearing debris from culverts cannot be accomplished by hand, Vac-Con trucks are used. These are vehicles equipped with a vacuum system that uses hoses to extract material without excavation.

Stormwater diversion structures would be maintained under the Maintenance Program. Maintenance would typically include repairing damage after large storms and erosion control protection. The County would also maintain diversion structures free from blockages by clearing debris, trash, and sediment**.**

Pump stations are also checked routinely, including both dry season and wet season inspections, to confirm they are in operational condition. Repairs and maintenance are conducted as necessary, and involve removal of trash and debris at pump station wells using pool nets and sometimes Vac-Con trucks.

In addition, where fallen trees and large woody debris have accumulated at culvert inlets or outfalls, the County is responsible for removing the trees and woody debris. This type of work is typically conducted on an as-needed basis at County parks and other culverts maintained by the Public Works Department; this activity is described in more detail in Chapter 6, *Vegetation Management*.

5.1.3 Channel Maintenance

Concrete Channel Repair

This activity includes repairing damaged or failed sections of concrete channel walls and beds. Minor damage such as crumbling, cracking, spalling, or chipping, would be repaired using grout. Larger-scale repair work may require concrete patching or reforming of the channel wall. Such work would be conducted when channel flows are at its lowest or completely dry, and when rain is not in the 72-hour forecast. In addition, periodic cleaning of weep holes (small holes in the channel's concrete walls that drain excess water) may be necessary to prevent blockage and allow for water to drain. Because swallows or other migratory birds frequently nest in these holes, to avoid impacts on migratory birds, weep hole cleaning within 50 feet of active nests would occur outside of the typical breeding season for birds.

Repair of Existing Channel Rock Slope Protection

The placement of rock slope protection along creek banks reduces the potential for erosion to occur. Where rock slope protection is already present, the County would conduct in-kind repairs by replacing the missing or damaged rocks. This work would be conducted to ensure rock slope protection is operating as intended and to prevent or minimize bank erosion.

Tide Gate Maintenance

DPW is responsible for maintaining a tide gate at the outlet San Bruno Creek in the Bayside. Tide gates prevent the tide from flowing upstream into the channel but allow water to flow out of the channel into the bay or estuary when water levels in the channel are high. They also protect creeks and adjacent land uses from storm surges and high-tides. If not properly maintained, debris blockages at the tide gate could result in backwatering effects and flooding upstream. The County removes accumulated debris and trash at the tide gate to reduce the risk of flooding. The flaps on tide gates are also replaced on an as-needed basis. Tide gates require periodic repainting for corrosion protection and replacement. For the purposes of this Maintenance Program, the County only anticipates replacing the flap gates one

time over the next 5-10 years. The estimated maximum work length and area of this activity would be 150 LF and 15,000 square feet, respectively.

Floodwall and Levee Maintenance

Sheetpile floodwalls along County maintained channels would also be routinely maintained by DPW. The floodwalls would be visually inspected on a quarterly basis. If observed damage threatens the integrity of the structure, minor repairs would be completed to return the floodwalls to the as-built design. Typical floodwall maintenance work may entail graffiti removal, removal of some vegetation to allow visual inspection of the floodwall, removing rust, adding protective coatings, replacing rubber gaskets or seals at access gates, and other periodic repairs to prevent or correct erosion near the floodwalls.

Maintenance of levees along flood control channels is necessary to maintain the structural integrity of the levee. Levees that would potentially require maintenance under the RMP include earthen engineered sections of the Colma Creek flood control channel (from Utah Avenue to the mouth of the creek in South San Francisco) and a section of San Francisquito Creek (between Highway 101 upstream to Euclid Avenue in East Palo Alto). Such activities involve filling in burrow holes for rodent control, which is done site-specifically at each burrow hole. Open burrows are then filled with earth material and compacted for a smooth finish with the surrounding land surface. Other activities include replacement of fallen rocks, repairing cracks, and repairing slip-outs along the face to prevent erosion. Slip-out repairs would be conducted using similar methods as outlined in Section 7.5, Roadway Slip-out and Slide Repairs. The County anticipates that slip-out repairs along channel levees would occur no more than two times per year. The estimated maximum work length and area at each repair site would be 150 LF and 3,000 square feet, respectively.

5.1.4 Bridge Maintenance

Bridge maintenance involves conducting erosion protection improvements at the base of bridge abutments, repairing guard railings and the decking on bridges, sealing joints, patching up cracks on the bridge exterior, removing and re-applying paint, conducting general surface and deck treatments, reinforcing steel with galvanic protection, and clearing debris. Maintenance of County bridges maintained by DPW would be conducted in accordance with Caltrans' *Preventative Maintenance Program Guidelines for Local Agencies* dated 2/27/2006. Maintenance of Parks Department bridges (mostly pedestrian bridges) typically involves repair or replacement of damaged wood railings, decks, wood surface boards, or repair of abutments.

These routine maintenance activities typically occur between June 15 and October 15. If the lower portion of a bridge requires maintenance, dewatering may be required to gain access. The estimated in-water maximum work length and area at a bridge maintenance site would be 150 LF and 1,500 square feet, respectively. Sediment removal beneath bridges is also a routine activity and is described below in Section 5.3. Refer to Figure 5-1, Photo 3, for an example of a bridge with a culvert inside that is maintained by the County. Figure 5-1, Photo 4 shows the Cloverdale Bridge where erosion improvements are needed at the base of the bridge abutment to address scouring issues.

5.2 Roadside Ditch and Swale Maintenance

Roadside ditches, including V-ditches, trapezoidal ditches, and segmental ditches, collect stormwater runoff from the adjacent road surface to a relief point or facility, such as a ditch relief culvert. Ditches and swales are maintained to reduce flooding by providing runoff carrying capacity; prevent erosion and

scouring of the ditch, channel, and adjacent roadway/shoulder and slopes; and reduce the delivery of pollutants to stormwater and the watershed downstream.

This manual covers maintenance of roadside ditches/swales, typically inboard ditches, along County roads or trails. In many cases, inboard ditches convey flow to a ditch relief culvert that then conveys flows to the outer edge of a road and/or creek or tributary. Figure 5-1, Photos 7 and 13 through 17, show various types of roadside ditches maintained by the County. Maintenance activities conducted for unpaved ditches, swales, and paved ditches are described further below. For the purposes of CEQA, the County typically conducts these maintenance activities for an estimated 66 days per year.

5.2.1 Unpaved Ditches and Swales

Unpaved roadside ditches/swales are typically cleaned annually during the late summer or early autumn months (August through October). Ditch cleaning is conducted when debris and vegetation have reduced the capacity of a ditch/swale by 25-30 percent. **Figure 5-2** shows conceptual cross-sections of County-maintained ditches and what 30 percent loss capacity looks like. If cleaning is necessary during the rainy season, hand tools are used to preserve their capacity. Unpaved ditches are cleaned to a depth that matches the existing grade to maintain a continuous slope for runoff to flow to the nearest outlet. Ditch and swale maintenance often requires vegetation removal through use of a Ditch Master and hand tools. A Ditch Master is a truck-mounted tool that uses a horizontal rotating auger to remove sediment and debris. Where mechanical ditch clearing is not required and a Ditch Master is not used, low grasses are typically preserved within the ditches to provide water quality filtering functions, capture sediment and other pollutants from stormwater, and to reduce scour by lowering the velocity of the ditch flow. An example photo of an unpaved ditch/swale that requires ongoing vegetation and sediment clearing is shown in Figure 5-1, Photo 8. Overhanging tree branches are typically trimmed and hauled off-site.

Where roadside ditches have eroded below the existing grade, maintenance staff typically regrade these areas with gravel rock and/or soil to match the previous ditch surface.

Ditches may also be retrofitted with low impact development (LID) enhancements such as ditch widening, reducing slope, incorporation of weirs to promote infiltration and residence time, addition of native vegetation and grasses to reduce velocities and to promote filtration, and addition of biofiltration soils. Along Farallone Street in Montara (Coastside of the County), turf-reinforcing mats and weirs were installed within an adjacent ditch to reduce erosion while improving runoff infiltration to the soil below (see Figure 5-1, Photo 10). Turf mats and weirs were added due to the steepness of the ditch and because it was actively eroding.

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Photo 1. Deteriorated corrugated metal pipe (CMP) culvert located at Pigeon Point Road that requires replacement. (March 2007)

Photo 2. Deteriorated CMP culvert on Alpine Creek that requires replacement. (August 2016)

Photo 3. George Street bridge. Sediment and vegetation removal needed in the future. Bridge could also benefit from paint removal. (December 2010)

Photo 4. Pescadero Creek Road bridge near Cloverdale Road that requires routine maintenance including scour and erosion protection improvements at the base of the abutments. (April 2017)

Photo 5. Sediment removal needed at the San Bruno Creek and Walnut Street crossing. (February 2018)

Photo 6. Sediment with vegetation growing on top of it in Belmont Creek at Old County Road. (September 2011)

Figure 5-1. San Mateo County Facilities – Culverts, Bridges, Ditches and Swales

Photo 7. Paved ditch downstream of Farallone Avenue and Kanoff Street in Montara. Ditch is routinely maintained with a Vac-Con truck. (May 2015)

Photo 8. LID enhancements consisting of turf reinforcement mat, native grass sod, and rock check-dams that were recently installed along Farallone Avenue in Montara. (May 2015)

Photo 9. Concrete box culvert at Cloverdale Road and Butano Cutoff Road in Pescadero. Potential need for sediment and vegetation removal in the future. (May 2015)

Photo 10. Concrete box culvert at Crystal Springs Road (near Polhemus Road) on San Mateo Creek. Potential maintenance needs include concrete patching of middle culvert wall. (May 2015)

Photo 11. Bioretention swale along Carlos Street in Moss Beach that requires periodic vegetation removal, light sediment clearing, and planting. (March 2018)

Photo 12. Bioretention swale at the Fitzgerald Marine Reserve parking lot, which requires periodic vegetation removal, light sediment clearing and revegetation. (January 2016)

Figure 5-1. San Mateo County Facilities – Culverts, Bridges, Ditches and Swales

Photo 13. Example of an inboard unpaved ditch along Gazos Creek Road. (December 2019)

Photo 14. Another example of an inboard unpaved ditch along Gazos Creek Road. (December 2019)

Photo 15. Example of an inboard unpaved ditch along Bean Hollow Road. (December 2019)

Photo 16. Example of an unpaved ditch and roadside culvert along Pescadero Creek Road and entrance to Sam McDonald Park. (December 2019)

Photo 17. Example of an unpaved ditch along Alpine Road. (December 2019)

Photo 18. Example of a paved ditch along Occidental Way in the Emerald Hills neighborhood. (May 2015)

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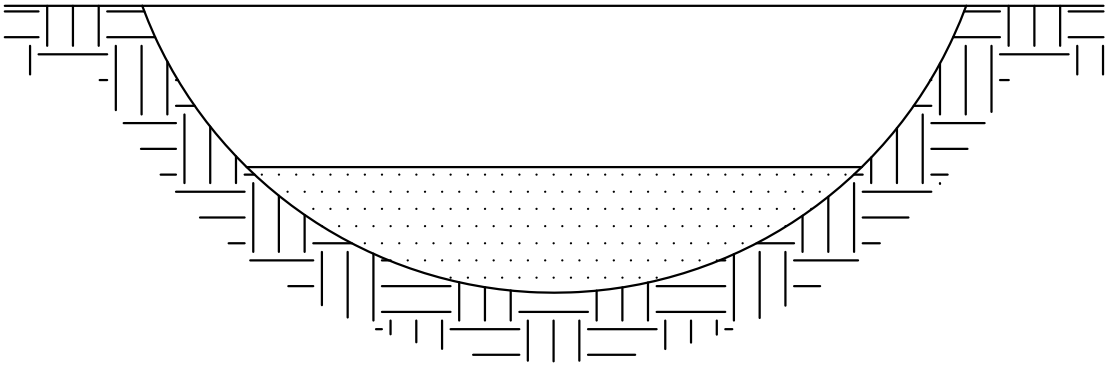
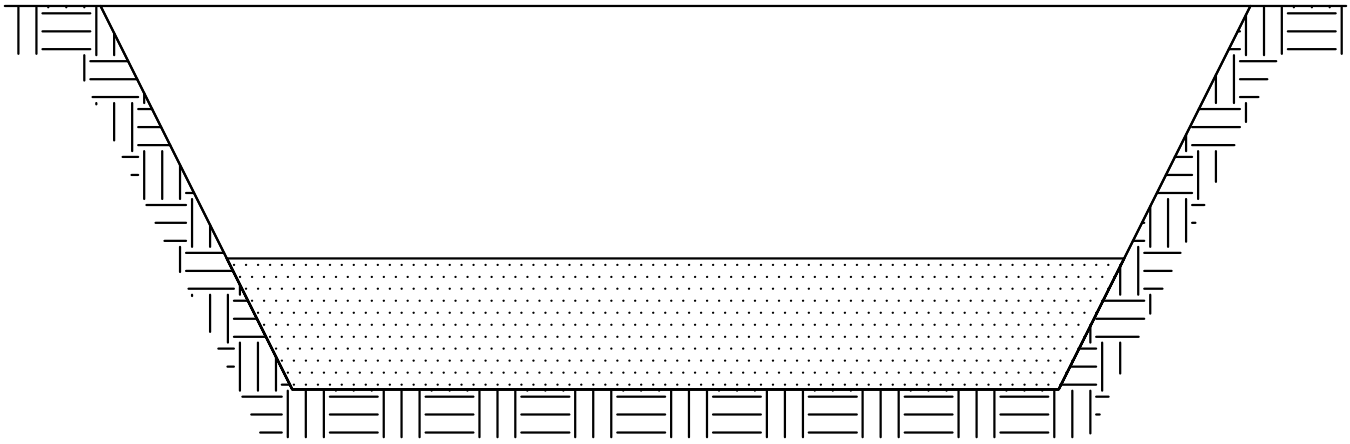
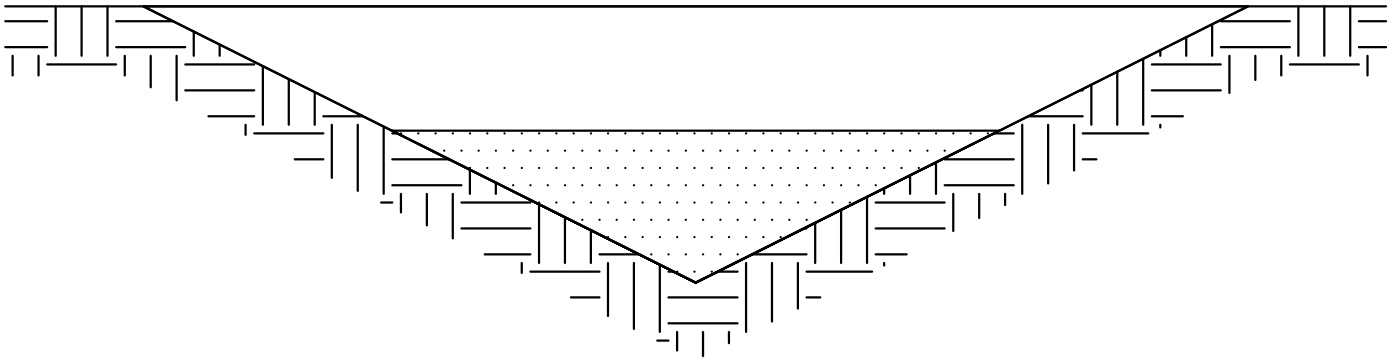


A. Typical cross-section schematic of a segmental ditch depicting 30% loss of capacity.



B. Typical cross-section schematic of a trapezoidal ditch depicting 30% loss of capacity.



C. Typical cross-section schematic of a v-ditch depicting 30% loss of capacity.

Horizon WATER and ENVIRONMENT

Source: County of San Mateo 2020

Figure 5-2
Example Cross-Sections of Ditches with 30% Capacity Loss

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5.2.2 Paved Ditches

Paved ditches are also cleaned annually where necessary to preserve drainage capacity. Methods to remove debris, trash, or sediment include vacuum cleaning, mechanical cleaning by either ditch witch or back hoe, and manual cleaning with hand tools. Removed spoils are hauled and disposed of in an area where they will not be discharged into a water body or drainage facility. Some paved ditches in areas such as Montara typically require clearing of sediment and vegetation through use of Vac-Con trucks (refer to Figure 5-1, Photo 7).

5.3 Maintenance of Green Infrastructure

The County has installed several green infrastructure (GI) features in recent years to promote infiltration and improve water quality. In 2011 through 2014, using Proposition 84 grant funds from the State Water Resources Control Board (SWRCB), the County installed vegetated swales, a bioretention facility, and a green parking lot at Fitzgerald Marine Reserve through the Fitzgerald ASBS Pollution Reduction Program. GI roadside swales and bioretention areas require periodic maintenance to maintain infiltration capacity beneath the GI feature. Maintenance activities that occur at GI sites include trash removal, storm drain inlet and outlet cleaning, weed removal, light sediment clearing, and replanting vegetation on an as-needed basis. Example photos of bioretention facilities that are maintained by the County are shown in Figure 5-1, Photos 11 and 12. As shown in Table B-2, the County is responsible for managing several GI sites on the Coastside. These are all sites that were constructed using Proposition 84 grant funds from the SWRCB (between 2011 and 2014).

Note that the County is now required to implement green infrastructure pursuant to the Municipal Regional Stormwater NPDES Permit for Phase I municipalities and agencies in the San Francisco Bay area (Order R2-2015-0049), also known as the Municipal Regional Permit (MRP). Since 2009, the MRP has required that new development and redevelopment projects on private and public property that exceed certain size thresholds to prevent impacts on water quality by incorporating site design, pollutant source control, stormwater treatment and flow control measures. In the current MRP (dated November 19, 2015), permittees are required to develop and implement long-term GI Plans for inclusion of GI measures in storm drain infrastructure on public and private lands, including streets, roads, storm drains parking lots, building roofs and other elements. The County Board of Supervisors recently approved the County's GI Plan in September 2019 (County of San Mateo 2019). For clarification, maintenance of GI constructed after 2015 will be covered under the MRP and not this Maintenance Program.

5.4 Sediment Removal

Accumulated sediment in County channels, creeks, culverts, storm drains, and beneath bridges reduces capacity for the channel or facility to safely convey streamflow. Accumulated sediment can also divert or direct flows into streambanks and other structures causing erosion or increasing the risk of flooding. To alleviate increased flood risks associated with sediment accumulation, the County may remove excess sediment from channels and road crossing structures (e.g., bridges and culverts) and other facilities within County right-of-way or on County land. Sediment removal occurs in both engineered channels (e.g., concrete box culverts) and natural creeks and is limited to the as-built channel design. The following sections describe sediment removal activities for each facility type in more detail. Chapter 9 describes impact avoidance and minimization measures that are conducted to reduce potential effects due to sediment removal activities.

5.4.1 Sediment Removal from Channels

Sediment removal from channels is conducted when sediment or debris has reduced channel capacity to the extent that overbank flooding could occur and flooding could damage property or substantially threaten public safety.

Sediment removal activities typically occur at focused localized sites that experience sediment deposition or blockages. For this Maintenance Program, sediment removal activities are limited to focused localized sites that are 500 feet in length or less with an estimated maximum work area of 3,750 square feet. The total annual sediment limit for all sediment removal projects in the Program, including in-channel and culverts and crossings would not exceed 1,500 linear feet (LF). The program is limited to removal of no more than 500 cubic yards of sediment from a channel site. However, the amount of sediment removed from a site is typically less than 100 cubic yards; the average annual amount of sediment removed for the Program would be approximately 750 cubic yards or less. Per guidance from NMFS, the annual total sediment removed for the Program would not exceed 1,500 cubic yards. The maximum number of sediment removal projects in a given year is 10. However, on average, the County anticipates conducting 5 channel sediment removal projects per year. If mechanized sediment removal is necessary, the County may use an excavator or backhoe from the top of bank or road. Work generally occurs under dry channel conditions. However, if maintenance is necessary where water is in the channel, dewatering would be conducted through use of cofferdams or a clean water bypass. Dewatering limits for the Program would not exceed 2,500 feet in length for all sediment removal projects.

Removed sediment may be off-hauled to another County facility and stored for future use for local projects. Removed sediment from urban watersheds is tested prior to removal and disposed of at an appropriate facility.

A Vac-Con truck is typically used to extract sediment that has accumulated within channels beneath smaller bridges or within culverts. Silt fencing, wattles, or turbidity curtains are placed across the culvert outlet or at the downstream end of a bridge to contain or filter out any sediment-laden water from leaving the maintenance area. Prior to vacuum flushing, a small pit may need to be excavated at the culvert or bridge location to allow the flush water to collect. A Vac-Con hose is then placed in this pit and vacuums out the water and sediment from the culvert as it is being flushed. All materials are immediately vacuumed up and stored in the Vac-Con truck tank to be deposited off-site in a contained area.

5.4.2 Sediment Removal from Culverts and Crossings

As described above, the County is responsible for clearing sediment from smaller ditch relief culverts as well as larger on-channel culverts at road crossings and trails. This work is necessary when culvert outfalls are blocked with debris or sediment and conveyance capacity is reduced by 30 percent or more or sediment or debris deposits are actively causing scour erosion of streambanks supporting bridges or other public facilities like roads. At these creek and road crossings, the County Department of Public Works is typically limited to working within the width of the road right-of-way (100 feet or less). In addition, these activities would be limited to 150 LF or less per site and would have an estimated maximum work area of 1,125 square feet. Similar to the description above for channels, sediment removal work typically occurs during the dry season.

For culverts, removing sediment may simply require digging out sediment by hand. For larger culverts or

where hand removal is infeasible, the vacuum flushing technique described above is employed, or mechanized sediment removal occurs using small push loaders and excavators. If water is present where mechanized sediment removal work is required, the County dewaters the channel at the upstream and downstream end.

5.5 Creek Bank Stabilization

Creek bank stabilization involves the repair and stabilization of eroded or eroding banks. Bank stabilization activities take place on an as-needed basis, based on the risk for flooding, erosion, or bank failure. In some instances, creek bank stabilization work needed coincides with road embankments particularly in narrow canyons such as Gazos Creek Road, Alpine Road and Tunitas Creek Road. **Figure 5-3** includes photos of past bank failures in the County that are in need of repair, some of which include sites addressed through the County's 2017 emergency permits. As described in Chapter 2, over the past five years, the County completed thirteen emergency bank stabilization/slip-outs. For a given site, the work distance along the streambank is typically 25-100 feet. For the purposes of the Maintenance Program, the total work distance will not exceed 150 feet per site. The estimated maximum work area of a bank stabilization site would be 3,000 square feet. In average hydrologic years (based on average seasonal precipitation), the total annual work distance will not exceed 750 feet (for all sites). Following a wet hydrologic year or period, the total annual work distance along streambanks will not exceed 1,500 feet (for all sites). This work would typically occur between June 15 and October 15 when channels are at their driest. Repair of road slip-outs is considered a different maintenance activity as it is directly related to a destabilized road embankment as well. The repair of road slip-outs is described in Section 7.3.

During particularly wet years, such as El Niño type winter seasons, when high stream flows are sustained and earthen bank materials become saturated, the possibility of bank failure increases. Therefore, the number of bank stabilization projects required in any given year will vary depending on weather and hydrologic conditions.

In general, the cause for a particular bank failure will result from the overall hydrologic conditions and flows in the watershed, but will also very much depend upon site-specific hydraulic, soil, geomorphic, and other conditions that may promote bank instability. Often times, after storm events, bank failures occur at channel bends where bank slopes are overly saturated. Prior to initiating bank stabilization repair work, the County's civil engineer will inspect the creek banks. In addressing an eroded or destabilized streambank, the County strives to use earthen and biotechnical bank stabilization solutions to minimize adverse environmental effects. If a bank repair is necessary, the County will consider site-specific conditions to develop the most appropriate treatment that provides stability and also minimizes long-term environmental impacts. To guide the bank treatment design, the County will: (1) assess the type of bank failure that occurred (sheered slope, undercut bank, rotational slump, culvert failure, etc.); (2) evaluate how the type of bank failure that occurred was related to site specific conditions; (3) evaluate hydraulic conditions (bank height, bank slope, water surface elevations, shear stress, etc.); (4) evaluate bank materials (soil type, strength, saturation conditions, etc.) and (5) assess geomorphic conditions (instream features, location related to channel bend, confluence, confined banks, etc.); and (6) assess property and land use conditions adjacent to the repair site (including easement width, access, and any other constraints that may limit a sustainable stable design). Based on this site-specific assessment of forcing factors and site constraints an appropriate bank treatment plan will be developed, with preference given to biotechnical treatment solutions.

Examples of biotechnical treatments the County may use include brush layering; brush packing; live staking; use of native materials like large woody debris to anchor a streambank; soil and grass covered revetments; or log, rootwad and biorevetments. Brief descriptions of these biotechnical treatments are provided below. Appendix A includes conceptual plans of these treatments and additional information and guidance related to installing these treatments.

- **Brush layering** is a technique used to stabilize shallow slope failures or rebuild slopes which incorporates willows and other types of branches with soil backfill. Live brush layers function as horizontal drains and provide tensile strength and natural revegetation. This technique may include use of geogrids or fabric soil wraps and riprap or other structural toe support. See BMP EC-1 in Appendix A for additional information.

- **Brush Packing** is a biotechnical gully and slump repair technique used to repair large rills, gullies, and small slumps on slopes. This technique involves layering cuttings or branches of rootable plant species between successive lifts of soil fill. This method should be used in conjunction with slope scaling or slope grading activities where rills, and gullies are removed by re-grading. This method can be implemented by hand. See BMP EC-2 in Appendix A for additional information.

- **Live Staking** involves inserting live, vegetative cuttings into the ground in a manner that allows the cutting (stake) to take root and grow. Live staking can be applied in areas to repair small slips and slumps, to reinforce or enhance stream banks, and to anchor and enhance the effectiveness of wattles, fascines, straw logs and other erosion control materials. This method can also be used in combination with vegetated riprap installations. See BMP EC-3 in Appendix A for additional information.

- **Native Material Stabilization** utilizes native materials (large woody debris, vegetation, etc.) to stabilize streambanks. This method is appropriate adjacent to water bodies, on shallow slope failures, and in any location where native revegetation and/or natural construction materials and finishes are needed.

- **Soil and Grass Covered Revetment** involves placing a layer of soil (typically 1-2 feet) thick on top of a revetment down to the base flow elevation, and then seeding the soil.

- **Log, Root Wad, and Biorevetments** involve placing logs, rootwads, and boulders in selective areas in and on streambanks. These provide effective streambank erosion control in higher velocity streams, and trap sediment between components, support restoration of slope vegetation and distribute flow velocities. This method is effective on meandering streams with out-of-bank flow conditions. Depending on site conditions, this solution can create instream structures which may help improve fish rearing and spawning habitat. See BMP-EC-13 in Appendix A for additional information.

In the event that biotechnical approaches described above are determined unsuitable (i.e., steep slope, limited right-of-way width), the County may consider hardscape engineered solutions (e.g., riprap, concrete, shot-crete, solider pile retaining walls, slope soil nailing[4]) based on site conditions and what is

[4] Soil nailing is an earth retention technique that involves using grouted tension-resisting steel elements (nails) followed by application of reinforced shot-crete facing or a flexible reinforcing mesh that holds the soil face beneath the head plates.

required in accordance with Fischenich's *Stability Thresholds for Stream Restoration Materials* (2001).[5] **Table 5-1** lists permissible shear stress levels for various bank treatment options.

If a biotechnical bank stabilization approach is not feasible, up to one hardscaped project will be conducted each year. For all hardscaped engineered solutions, the County will provide justification on the selected stabilizing approach to regulatory agencies. Approaches may include structural fixes such as soldier pile retaining walls with concrete or wood laggings or slope soil nailing, both of which would typically be installed above the ordinary high water mark and fronted by vegetated boulder revetments or habitat features at the toe of the slope (see Figure 5-3, photos 7 and 8). See BMP EC-13 in Appendix A for additional information on slope and bank stabilization techniques.

Equipment used for bank stabilization activities may include extending arm excavators, small bulldozers, front-end loaders, and dump trucks. Staging of equipment and materials for repair activities will occur on adjacent access roads or roadway shoulders. Access roads and other previously disturbed areas will also be used for staging soil and bank stabilization materials. To the extent feasible, equipment is operated from top of bank and work is completed during the dry summer months when creek flows are low or absent.

When bank stabilization projects occur, banks will be recontoured to match the adjacent bank slope and return to the pre-failed condition. Stabilized banks will be flush with the existing bank slope, and only limited new material may protrude from the bank. If rock slope protection is used, it shall not be grouted or mortared. The interstitial spaces between rocks will be backfilled with clean native soils or imported fill and planted with trees, shrubs, or other vegetation to minimize habitat loss. Gabions and sacked concrete will not be used in bank stabilization and other in-stream applications.

[5] Fischenich, J.C. (2001) Stability Thresholds for Stream Restoration Materials, EMRRP Technical Notes Collection (ERDC TN-EMRRP-SR-29), U.S. Army Engineer Research and Development Center, U.S. Army Corps of Engineers, Vicksburg, MS

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Photo 1. Example slope failure above unnamed tributary to Alpine Creek. This site was addressed in the County's 2017 emergency permit application. (March 2017)

Photo 2. Bank failure along Lower Bear Gulch Road and adjacent to Clear Creek, an intermittent tributary to San Gregorio Creek. (February 2016)

Figure 5-3. Example Creek Bank and Road Embankment Stabilization Sites

Photo 3. Example slope failure along Gazos Creek and Gazos Creek Road. This site was addressed in the County's 2017 emergency permit application. (March 2017)

Photo 4. Completed bank stabilization site along Gazos Creek and Gazos Creek Road.

Figure 5-3. Example Creek Bank and Road Embankment Stabilization Sites

Photo 5. Example of soil nailing at a bank stabilization site along Alpine Road. (September 2014)

Photo 6. Example of a retaining wall at a bank stabilization site along Alpine Road. (October 2014)

Figure 5-3. Example Creek Bank and Road Embankment Stabilization Sites

Photo 7. Example of a solider pile wall fronted with rock, rootwads, and vegetation following installation at Los Trancos Rd. (November 2017)

Photo 8. Example of a solider pile wall with grown-in vegetation at Los Trancos Rd. (March 2018)

Figure 5-3. Example Creek Bank and Road Embankment Stabilization Sites

Boundary Category	Boundary Type	Permissible Shear Stress (lb/sq ft)	Permissible Velocity (ft/sec)	Citation(s)
Soils	Fine colloidal sand	0.02 - 0.03	1.5	A
	Sandy loam (noncolloidal)	0.03 - 0.04	1.75	A
	Alluvial silt (noncolloidal)	0.045 - 0.05	2	A
	Silty loam (noncolloidal)	0.045 - 0.05	1.75 – 2.25	A
	Firm loam	0.075	2.5	A
	Fine gravels	0.075	2.5	A
	Stiff clay	0.26	3 – 4.5	A, F
	Alluvial silt (colloidal)	0.26	3.75	A
	Graded loam to cobbles	0.38	3.75	A
	Graded silts to cobbles	0.43	4	A
	Shales and hardpan	0.67	6	A
Gravel/Cobble	1-in.	0.33	2.5 – 5	A
	2-in.	0.67	3 – 6	A
	6-in.	2.0	4 – 7.5	A
	12-in.	4.0	5.5 – 12	A
Vegetation	Class A turf	3.7	6 – 8	E, N
	Class B turf	2.1	4 - 7	E, N
	Class C turf	1.0	3.5	E, N
	Long native grasses	1.2 – 1.7	4 – 6	G, H, L, N
	Short native and bunch grass	0.7 - 0.95	3 – 4	G, H, L, N
	Reed plantings	0.1-0.6	N/A	E, N
	Hardwood tree plantings	0.41-2.5	N/A	E, N
Temporary Degradable RECPs	Jute net	0.45	1 – 2.5	E, H, M
	Straw with net	1.5 – 1.65	1 – 3	E, H, M
	Coconut fiber with net	2.25	3 – 4	E, M
	Fiberglass roving	2.00	2.5 – 7	E, H, M
Non-Degradable RECPs	Unvegetated	3.00	5 – 7	E, G, M
	Partially established	4.0-6.0	7.5 – 15	E, G, M
	Fully vegetated	8.00	8 – 21	F, L, M
Riprap	6 – in. d_{50}	2.5	5 – 10	H
	9 – in. d_{50}	3.8	7 – 11	H
	12 – in. d_{50}	5.1	10 – 13	H
	18 – in. d_{50}	7.6	12 – 16	H
	24 – in. d_{50}	10.1	14 – 18	E
Soil Bioengineering	Wattles	0.2 – 1.0	3	C, I, J, N
	Reed fascine	0.6-1.25	5	E
	Coir roll	3 - 5	8	E, M, N
	Vegetated coir mat	4 - 8	9.5	E, M, N
	Live brush mattress (initial)	0.4 – 4.1	4	B, E, I
	Live brush mattress (grown)	3.90-8.2	12	B, C, E, I, N
	Brush layering (initial/grown)	0.4 – 6.25	12	E, I, N
	Live fascine	1.25-3.10	6 – 8	C, E, I, J
	Live willow stakes	2.10-3.10	3 – 10	E, N, O
Hard Surfacing	Gabions	10	14 – 19	D
	Concrete	12.5	>18	H

[1] Ranges of values generally reflect multiple sources of data or different testing conditions.

A. Chang, H.H. (1988).
B. Florineth. (1982)
C. Gerstgraser, C. (1998).
D. Goff, K. (1999).
E. Gray, D.H., and Sotir, R.B. (1996).
F. Julien, P.Y. (1995).
G. Kouwen, N.; Li, R. M.; and Simons, D.B., (1980).
H. Norman, J. N. (1975).
I. Schiechtl, H. M. and R. Stern. (1996).
J. Schoklitsch, A. (1937).
K. Sprague, C.J. (1999).
L. Temple, D.M. (1980).
M. TXDOT (1999)
N. Data from Author (2001)
O. USACE (1997).

Table 5-1. Table from Fischenich (2001) provides permissible shear stress and velocity for various channel lining materials.

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Chapter 6
Vegetation Management

This Chapter describes the specific types of vegetation management activities that are conducted routinely through the Maintenance Program. The primary vegetation management activities include mowing, mastication, trimming and pruning, tree removal, hand weeding, herbicide application, grazing for vegetation management, and fallen tree removal. The County undertakes these types of vegetation management activities routinely and relatively consistently from year to year. The work locations may change yearly, but the type of work remains consistent. Some work locations are also routinely repeated each year. Some facilities may require annual vegetation maintenance while others do not. This largely depends on the type of vegetation in, or adjacent to, the road, trail, channel, or other facility and other environmental factors including the degree of solar input and soil and moisture conditions.

Vegetation management is conducted by the County to maintain the operational functions of County facilities or to fulfill various goals of the County such as habitat enhancement or fire fuel reduction. More specifically, the goals of routine vegetation management include:

- Maintaining operational function and conveyance capacity at County flood control facilities including pruning, thinning, or removing vegetation (or vegetative debris) at County channels, culverts, and bridges;
- Maintaining operational function at County roads including preserving sight distances and clearances for motorists to reduce safety hazards;
- Reducing or eliminating invasive or exotic weeds at County facilities, and preserving and maintaining surfaces and other structures within the County right-of-way;
- Maintaining defensible space around County facilities, along County fire roads and trails, and along County Park boundaries to maintain fire breaks, and reduce fire fuel loads, fire risk, and hazards;
- Minimizing public safety hazards resulting from damaged, decaying, toxic, overgrown, and/or destabilized vegetation (i.e. by removing hazard trees, nuisance vegetation);
- Maintaining open space along County fire roads and trails to ensure sufficient clearance for both staff and recreationists; and
- Practicing good stewardship of the County's natural resources by implementing ecologically appropriate practices and BMPs.

6.1 Mowing

The County routinely mows ruderal vegetation that grows along County roads, trails and/or fire access roads to reduce fire hazards and public safety hazards. Example types of vegetation that grow along roads and trails include fennel (*Foeniculum vulgare*), poison hemlock (*Conium maculatum*), wild radish (*Raphanus raphanistrum subsp. sativus*), and teasel (*Dipsacus*). These plants typically form monocultures along roadside shoulders. The County routinely conducts environmental training sessions focused on

construction best management practices (BMPs), nesting birds, and sensitive species for both Parks Department and DPW maintenance staff. DPW also maintains a list of County roads that are located in areas where there is potential for special-status species to occur and require pre-construction biological resources surveys before mowing. Mowing activities that occur along these facilities are described further below.

6.1.1 Mowing along County Roads

The County's Road Maintenance Division is responsible for mowing roadside vegetation (e.g., grasses, vines, and brush) throughout the year to maintain sight distances for motorists and to reduce fire safety hazards. Where space is available, flail and boom mowers are used. Where space is limited, hand-held tools such as a weed-whacker are used. Weed-whackers are also used in rocky areas and areas with sensitive habitat. Prior to operating flail mowers, hand-held tools are typically used at culvert markers and utilities that are obscured by vegetation. In general, mowing is performed as close to the ground surface as possible. Mowers are not allowed to dislodge rock or soils or to uproot plants. Where the ground surface is uneven, mowers are set to a height of not less than 4 inches above the highest surface. Mowing is typically completed in one to three passes, with each pass mowing a strip of 3 to 4 feet in width (County of San Mateo, 2004 – Section 8.21).

6.1.2 Mowing in Parks along Trails/Fire Access Roads and Other Recreational Areas

Mowing is conducted extensively in several County Parks to control growth of non-native plants, to maintain fire breaks and reduce fuel loads, and to maintain trails, and other highly used recreational areas. Where there is sufficient space, larger mowing equipment including high wheeled mowers, flail mowers, and Tiger boom mowers, are used. Hand tools such as weed whackers are used along trails and, if space is available, larger mowing equipment is used. Meadows and former ball parks are mowed to reduce fire hazard risk, reduce invasive species, improve habitat, to retain meadows and grasslands, and reduce tick exposure to recreationists.

As summarized in Appendix B (Table B-2 and Figures B-1 through B-7), the County conducts mowing at most of its parks including Coyote Point Recreation Area, Huddart Park, Edgewood Park, Junipero Serra Park, San Bruno Mountain State and County Park, San Pedro Valley Park, Wunderlich, Sam McDonald, Memorial, Pescadero Creek, Quarry Park, among others. **Figure 6-1** shows an area that routinely gets mowed in Pescadero Creek County Park.

6.1.3 Timing of Mowing Activities

Mowing activities occur at various times of the year with the goal of mowing efficiently but also avoiding the presence of sensitive biological resources. The amount and timing of mowing activities also depends on the amount of rain received in a given year. For the purposes of the CEQA analysis, mowing activities are expected to occur up to 90 days per year. Prior to performing any mowing, the County considers the following potential effects and identifies BMPs that would avoid and minimize impacts to sensitive species (see Chapter 9, *Impact Avoidance and Minimization, BMPs and Mitigation*) and maximize effectiveness in controlling non-native plant growth:

- Inadvertent damage to sensitive species and ground nesting birds;
- Timing of mowing to maximize weed control effectiveness; and

- Reducing potential for transport of invasive plants, plant diseases to other areas and at parks (County of San Mateo, 2006 – Section 5.7).

6.2 Fuel Management and Maintenance of Fire Breaks

Managing fuel load and fire hazards is one of the top priorities of the County. The County routinely coordinates with California Department of Forestry and Fire and other fire departments in San Mateo County through their participation in the Fire Safe Council San Mateo County to identify and prioritize fuel management needs. Determining the degree of fire hazard for a particular area is dependent upon at least three factors: degree of human use and occupancy of the wildland area, the level of and ability of public services to respond to fires, and the natural setting of the wildland areas. Assessing fire hazard severity takes into account weather factors, slope characteristics, and the type and quantity of flammable vegetation within a given area. The potential fuel load per acre is dependent upon the height of vegetation as well as the composite density of the given fuel type(s) in a given area, such as volume of ground fuels, surface fuels, and aerial (canopy fuels) per acre.

Fuel management activities include a range of activities such as physical removal of undergrowth and secondary tree growth, and removal of non-native plants. For the Maintenance Program, typical fuel management activities conducted by the County include selective tree thinning and selective removal of undergrowth of non-native plants. The County is responsible for maintaining defensible space around County facilities, County fire roads and trails, and along County Park boundaries where adjacent private properties could be at risk. In order to establish or maintain fuel breaks and remove ladder fuels around these facilities and areas, the defensible space would be maintained to a 100-foot wide buffer. Where dead, decaying, or fallen trees present a fire hazard to trails and park facilities, removal should occur within a 200-foot buffer around facilities and structures. As described above in Section 6.1, mowing is typically conducted to maintain existing fire breaks. Other vegetation removal methods may involve use of herbicides, physical removal using work crews, burn piling, or grazing. Refer to Sections 6.3 through 6.7, below, for discussion about what these fuel management activities entail.

Fuel management activities are currently conducted at the following parks: Huddart, Wunderlich, Memorial, Sam McDonald, Pescadero Creek Park, Junipero Serra, San Bruno Mountain State and County Park, San Pedro Valley, Edgewood, Coyote Point, Fitzgerald Marine Reserve, Pillar Point, Sanchez Adobe, Pigeon Point, Mirada Surf East and West County Parks, and Quarry County parks and future fuel management is planned for acquisitions such as Pedro Point Headlands. Fuel management activities also occur along Crystal Springs Trail, Alpine Trail, and Devil's Slide Trail. Depending on the park, vegetation management activities could entail removing large trunk material, cutting back brush and ladder fuels from roadway edges, and chipping logs smaller than 6 inches diameter at breast height (DBH) and spreading the chips on-site. Larger diameter trees are typically chopped into segments and stacked alongside the fire road/trail for pick-up at a later time. Tree and vegetation trimming also occurs around campsites and picnic areas where open flames are permitted (e.g., Huddart, Junipero Serra, Memorial, Sam McDonald, San Bruno Mountain, and Pescadero Creek County parks). Fuel management activities (mowing and tree thinning or removal) may occur along County roads and County road medians to reduce fire hazards.

Photo 1. Vegetation that has recently been weed whacked along Stage Road in Pescadero. (May 2015)

Photo 2. Example area that underwent hazardous tree removal in La Honda Creek (near Entrada Way). Photo shows mass of soil and redwood roots in middle portion of channel. (May 2015)

Photo 3. Meadow near Hoffman Creek Trail in Pescadero Creek County Park that routinely gets mowed. (May 2015)

Photo 4. Towne Fire Road in Pescadero Creek County Park where fuel management activities occur. (May 2015)

Photo 5. Fuel management area in Quarry County Park in Half Moon Bay. (May 2015)

Photo 6. County staff conducting vegetation trimming and weed whacking activities along Weiler Ranch Trail in San Pedro Valley Park. (May 2015)

6.3 Trimming and Pruning

Trimming and pruning trees and shrubs are routine activities necessary to provide access to County facilities (e.g., roads and trails), improve visibility to inspect County facilities, protect infrastructure, and maintain the designed hydraulic capacity of flood control facilities. More specifically, the DPW's road maintenance crew trims trees to maintain the safety of vehicle traffic and pedestrians under the following circumstances:

- To maintain line of sight clearance (usually 4 feet at intersections)
- To maintain a 14-foot height clearance for vehicles and a 7-foot height clearance for pedestrians
- To address a dangerous situation such as cracked or broken overhanging limbs

In the event that a tree requires removal to satisfy the above conditions, then the County will remove the tree. However, the County will always first try and trim the tree to satisfy the visibility and safety requirements identified above. Tree removal is further described in Section 6.4 below.

In areas where trees are located on private property but encroach the County's right-of-way, the County's Road Services Division will typically notify the property owner. If a property owner has not addressed the problem 10 days after receipt of notice, the County's maintenance crew will move forward with trimming work. However, if the trees are considered an immediate hazard, the County may trim and/or remove a tree and then notify the property owner.

As previously mentioned, the County Parks Department also conducts vegetation trimming along trails and fire roads (50 feet on either side), and within 100 feet of County Parks Department facilities including campsites and picnic areas where open flame is permitted. The Parks Department coordinates with California Department of Transportation and Pacific Gas and Electric to maintain their rights-of-way within Wunderlich, Edgewood, Huddart, Sam McDonald, and San Bruno Mountain State and County Parks and Crystal Springs Trail. These activities are conducted for fire fuel reduction purposes and to facilitate emergency ingress/egress to maintain line of sight clearance (usually 4 feet at intersections), to maintain a 14-foot height clearance for vehicles and a 7-foot height clearance for pedestrians, to address a dangerous situation such as cracked or broken overhanging limbs, to remove diseased trees that pose falling hazard. Hand tools or mechanized equipment are used. Once work is completed, trimmed matter (limbs, vines, brush, etc.) is hauled and disposed of at an off-site location. Trimmed plant material that is free of exotic or invasive plant species may be chipped and re-used elsewhere on County lands for other uses. However, in areas that are within a Sudden Oak Death (SOD) zone of infestation, the Parks Department leaves chipped material on-site and does not re-use it elsewhere in the County. The County follows avoidance and minimization measures outlined in BMP BIO-16 (see Chapter 9, *Impact Avoidance and Minimization, BMPs and Mitigation*) to minimize spread of SOD to areas outside of an infested zone.

6.4 Tree Removal

Mature, healthy, native and non-native trees may be removed if the tree is creating a public safety hazard along or near County maintained facilities and the situation cannot be fixed by trimming or pruning. Discussion regarding removal of fallen trees is described below in Section 6.7, *Downed Tree Management*.

For the same reasons described above in Section 6.3, the County's Road Maintenance crew shall remove trees in the County right-of-way to maintain the safety of vehicle traffic and pedestrians. If trimming is not sufficient, the County may remove trees to maintain line of sight clearance and appropriate height clearances for vehicles and pedestrians, and to minimize risks of potential hazards to the public. If a tree is dead or dying, the County's Roads Services Division staff will evaluate tree health and recommend whether an arborist's report is necessary. A tree is considered a hazard if it meets the "extreme" or "high" risk characteristics as defined by the International Society of Arboriculture and may include dead or dying trees, dead parts of live trees, or unstable live trees (due to structural defects or other factors) that are within striking distance of people or property (a target) that have the potential to cause death, injury, or substantial property damage. In the professional judgment of the County's maintenance staff, a hazard tree may have a high likelihood to fall within the coming year (due to storm, high wind, natural decay, or other causes) and the falling of that tree could pose a direct hazard to people, roads, or other infrastructure and County facilities.

Within County parks, identifying and removing hazardous trees is conducted on a continual basis. Tree removal may also be required for equipment access to perform repairs at culverts, bridges, bank stabilization, and slip-out sites. When assessing hazardous trees, staff take into consideration visitor frequency. In general, hazard trees in areas where human uses are expected to be low (e.g., in the interior portion of a forest community far away from any trails), mature and damaged trees are left as is. However, hazard trees in high human use areas such as major trails, trailheads, picnic areas, campgrounds, and parking lots, are annually assessed for impending hazard. As noted above, hazardous trees (dead, decaying or fallen trees) within 200 feet of park facilities and structures are considered for removal if they present a fire hazard; this buffer also applies when evaluating potential public safety hazards to park users. The 200-foot buffer was established by the County Parks' arborist and generally assumes that fallen trees have the potential to pose a safety hazard to structures within an area of three times the height of a tree as branches or parts of the tree can get thrown upon ground impact. While the 200-foot buffer is appropriate for most County Parks, some trees (e.g. redwoods) may exceed 100 feet in height; thus, the Parks Department may survey a broader area for potentially hazardous trees in certain parks. Hazard ranking criteria that are commonly used by a qualified professional (e.g., fire scientist, registered professional forester, or certified arborist) to assess the severity of a hazardous tree include:

- High probability of failure
- Observed poor health
- Evidence of significant die-back
- Problematic tree structure
- Root damage
- Visible cankers and/or rot
- Observed or suspected disease or pest infestations
- Probability of striking a target (e.g., human or structure)
- Live crown ratio

Due to the presence of California Oak Mortality Disease in most County Parks (e.g., along Crystal Springs Regional Trail) minimizing the spread of trees infected with this disease is a priority of County Parks staff. The Parks Department leaves all SOD- infested material in place and does not transport it out of the county. All equipment used between different County Parks is thoroughly cleaned to avoid inadvertent transmission of SOD. In Chapter 9, BMP BIO-16 in Table 9-3 provides guidance on minimizing spread of SOD within County Parks.

6.5 Herbicide Application

As of 2010, both DPW and Parks Department along with other County departments operate within the framework of the Integrated Pest Management (IPM) Policy (Resolution No. 070851 [2010], Resolution No. 072099 [2012]) which emphasizes non-pesticide alternatives on County owned or managed land where feasible and otherwise considering application of the least toxic pesticides to the maximum extent practicable. Under the IPM policy, both County departments and their contractors are required to develop and maintain an active IPM plan that covers areas where limited amounts of pesticides are used. This plan should track pesticide use and evaluate pest control activities performed.

Consistent with the County's IPM policy, the Maintenance Program uses an integrated approach of chemical and mechanical methods to manage vegetation along trails, roads, and on County lands. Herbicides are used in conjunction with physical mowing, trimming, pruning, and grazing methods (described above and below, respectively) to control weeds and other non-native plant growth and help to reduce fire hazards and prevent re-sprouting of removed trees. The County's maintenance staff routinely participate in trainings led by the San Mateo County Water Pollution Prevention Program's (SMCWPPP) Parks Maintenance and IPM Workgroup to keep up-to-date on regulatory requirements and best practices for applying this integrated vegetation management approach.

DPW and Parks coordinate with the County Agriculture/Weights and Measures Department (Agriculture Department) on invasive plant management issues. The departments regularly coordinate on management of invasive plants such as fertile capeweed and jubata. DPW and Parks also participate in the San Mateo County Weed Management Area, a weed management program in San Mateo County comprised of members from the county, state and local agencies, and other interested organizations and landowners focused on preventing, suppressing and eradicating non-native and invasive plants.

6.5.1 Herbicide Application along County Roads and Other DPW- Managed Property

In March 2012, the County passed Resolution No. 071857 that eliminated roadside broadcast herbicide spraying throughout the County with the exception of San Carlos and Half Moon Bay airports, and limited spot spraying in certain areas for invasive weed control purposes. Herbicide application is allowable along some County roads to control invasive weeds on any paved concrete surface and up to 3 feet beyond the edge of the paved or concrete surface. Targeted spot spraying is the primary method of herbicide application along County roads and within County parks. This work is only performed by or with the supervision of a certified pesticide applicator in accordance with California Department of Pesticide Regulation and according to labeled instructions (County of San Mateo, 2004 – Section 8.21).

Herbicide application, if deemed necessary, is only conducted when the climate is dry and when wind speeds do not exceed 7 miles per hour. Herbicides are not used in or adjacent to any fish-bearing stream, lake, pond or other water bodies known to support California red-legged frog (see Chapter 9). Near other water bodies, herbicide use is limited to controlling excessive growth of non-native plant species and in accordance with the buffers specified on product labels.

6.5.2 Herbicide Application within County Parks

County Parks have several non-native plant species, some of which have become problematic and require herbicide application to control them. The Parks Department conducts limited herbicide treatment in open space areas within their parks. For example, at San Bruno Mountain State and County Park, targeted herbicide applications are the most ecologically sensitive technique for managing

multiple invasive plant species in rare butterfly habitat. Limited herbicide treatments are applied in various County parks with the goals of habitat enhancement, fire fuel reduction, or maintenance of trails and infrastructure.

All applications of herbicides on Parks Department lands are applied in accordance with the Agricultural Commissioner's recommendations, U.S. Environmental Protection Agency (USEPA) guidelines, California Department of Pesticide Regulation guidelines, and in accordance with label directions. A qualified herbicide applicator with a valid Qualified Applicator's License (QAL) and staff with experience applying herbicides in natural settings are contracted to conduct this work with a Park representative's oversight. Herbicides are used in selective areas and applied only as targeted treatments to the pest species (not broadcast sprayed). The type of herbicide used on Parks Department lands varies depending on the targeted plant species to be treated and specific location .

The timing for herbicide application varies based on the targeted plant species and type of herbicide used. Some non-native species are better controlled in spring time (e.g., Cape ivy/German ivy, English ivy, Australian fireweed, iceplant). To control most non-native plants in the County, herbicides are typically applied based on plant phenology and timed to be most effective.

6.5.3 Compliance with Pesticide Injunctions Concerning Special-Status Species

Both DPW and the Parks Department use herbicides in accordance with two Court-ordered injunctions. In 2006, a Court-ordered injunction resolved a case against USEPA by the Center for Biological Diversity that involved the California red-legged frog. This injunction put in place buffer areas around certain red-legged frog habitats and disallowed use of certain pesticides within those habitats and buffer zones in certain portions of the County[1]. The 2006 injunction generally applies to invasive plant species and noxious weed control but does not apply if the following conditions are met:

- Pesticide is being used for the purposes of controlling state-designated invasive species and noxious weeds under a program administered by a public entity; and
- The pesticide is not used within 15 feet of aquatic breeding critical habitat or non-breeding aquatic critical habitat within critical habitat areas, or within 15 feet of aquatic features within non-critical habitat sections subject to the injunction; and
- Application is limited to localized spot treatment using hand-held devices; and
- Precipitation is not occurring or forecast to occur within 24 hours; and
- Pesticide is being applied by a certified applicator or person working under the direct supervision of a certified applicator; and
- If using 2,4-D or triclopyr, you are using only the amine formulations.

In 2010, another Court-ordered injunction went into effect restricting the use of pesticides in San Mateo County (California Biological Diversity v. USEPA [No. C 07-02794 JCS (N.D. Cal)]). In May 2010, the U.S.

[1] A map of San Mateo County depicting California red-legged frog habitats subject to the 2006 injunction is available online at: www.epa.gov/sites/production/files/2015-07/documents/sanmateo-jj.pdf

District Court for the Northern District of California issued an Order and Stipulated Injunction that established interim protective measures for 11 federally listed threatened or endangered species[2] until the USEPA has completed its review and any necessary consultation with USFWS regarding the potential effects of a pesticide active ingredient to the subject species. The interim protective measures are no-use buffer zones (shown on the San Francisco Bay Area – Interim Pesticide Use Limitations interactive map[3]) adjacent to certain features within certain geographic areas in the eight Bay Area counties (including San Mateo). These buffer zones are different depending on the species at issue and the pesticide being used. Note that there is an exception to these no-use buffer zones for invasive species management. Per this exception, no-use buffers shown on the interactive map for the San Francisco Bay Area are reduced to 20 feet for aquatic and non-aquatic uses to control state- or federally-designated invasive species and noxious weeds when such a program is administered by public entities such as the County. Under this exception, herbicide application must be:

- limited to localized spot treatments using hand-held devices;
- overseen by a certified applicator;
- not made when precipitation is occurring or is forecast to occur within 24 hours after application; and
- for 2,4-D, only the amine formulation can be used.

In areas of San Mateo County that provide habitat for California red-legged frog and other special-status species covered by the two injunctions, DPW and the Parks Department limit herbicide application on invasive plants and noxious weeds in accordance with the exceptions to the injunctions and comply with the above-described conditions. For example, DPW maintains a 20-foot buffer around aquatic habitat when applying herbicide for jubata growth control on County-maintained properties.

6.6 Burn Piles

Burn piles are collected vegetation debris that are assembled and burned as a vegetation management approach. For the County, burn piles are comprised of shrubby understory material and depending on available space, have dimensions of approximately 4 feet x 4 feet x 6 feet. The mass of each burn pile would be limited to 750 pounds/pile of woody debris. Burn piling is not a common or frequent vegetation management approach by the County in recent years. However, the Parks Department may have a need to conduct pile burning at certain County Parks such as Edgewood County Park, San Bruno Mountain State and County Park, San Pedro Valley Park, Huddart Park, Wunderlich County Park, Sam McDonald County Park, Memorial County Park, and Pescadero Creek County Park in order to maintain fuel breaks and reduce vegetation density along park boundaries.

If burn piles are needed, maintenance crews would begin creating piles at the end of fire season (generally between October to the beginning of January). The material will then be left to dry out for 30

[2] Species identified in the lawsuit include Alameda whipsnake, bay checkerspot butterfly, California clapper rail, California freshwater shrimp, California tiger salamander, delta smelt, salt marsh harvest mouse, San Francisco garter snake, San Joaquin kit fox, tidewater goby, and valley elderberry longhorn beetle.
[3] Available online at: www.epa.gov/endangered-species/san-francisco-bay-area-map-tool-identify-interim-pesticide-use-limitations.

days before burning material that is 3 inches in diameter and smaller. Piles are typically burned before mid-June before peak wildfire season. Piles are extinguished at the end of each day. For the purposes of this program, burn piles would be limited to 33 piles per acre for fuel break maintenance on up to 20 acres per year.

The burn pile vegetation management method is considered as an alternative to mechanical trimming and pruning. Under the proposed program, the County will coordinate with CAL FIRE to conduct this activity and obtain appropriate burn permits from the Bay Area Air District.

6.7 Grazing

Livestock grazing would be conducted to control growth of herbaceous weeds, brush, and non-native plants; and for fuel management purposes on County lands. DPW conducts annual goat grazing at the Pescadero Landfill (Bean Hollow Road) and Half Moon Bay Landfill, both of which are closed. Grazing entails use of livestock to provide non-targeted weed control in a particular area. Range ecologists would be consulted to help determine the correct livestock stocking and appropriate grazing levels for targeted areas. For example, the Parks Department plan to use cattle for grazing purposes on some park lands since goats and sheep tend to eat host plans for some special-status species (e.g., butterflies at San Bruno Mountain State and County Park).

Before grazing commences and consistent with the tiering approach described in Section 9.1, a biologist will evaluate a targeted area to be grazed to identify sensitive resources including special-status plants, wildlife, and wetlands. In addition to implementing all applicable BMPs (see Chapter 9), vegetation may be fenced off as a protective measure, and grazing will be excluded from channels and other water sources. Once protective fencing has been installed, small herds are put on parcels for a set amount of time. Grazing is typically done in late spring or early summer. In the future, grazing may be conducted more frequently at San Bruno Mountain for vegetation management purposes and to enhance host plant populations for butterflies.

6.8 Downed Tree Management

The County will remove fallen trees in urban or high-use park settings if the fallen tree presents a safety or hazard risk. The County may also saw or chip the downed tree in place if the tree is deemed as a potential hazard and located in a low-use rangeland or watershed setting. If the fallen tree does not present a safety or hazard risk, the County may leave it in place.

When downed trees occur along stream courses, the County recognizes that the downed tree may be a resource to provide habitat functions. Along a stream course, the downed tree will be evaluated for its potential to cause or increase erosion, flooding, bank failure, or negatively impact a facility such as a bridge or culvert. Within channels, downed trees may also be removed if channel capacity is significantly limited or if the tree is creating unacceptably high hydraulic roughness in the channel such that flows are diverted and thereby cause heightened erosion or flooding risk. If such erosion or flooding risks are unlikely, then the County will seek opportunities to maintain the downed tree as a habitat feature. The following discussion describes the County's process in determining whether downed trees should be preserved, repositioned, or removed and/or reused elsewhere in the County.

6.8.1 Downed Tree Preservation and/or Repositioning

If such erosion, flooding, conveyance capacity, or other hydraulic constraints do not exist at the site, then the downed tree may provide an opportunity to be used as a large woody debris (LWD) restoration feature along the stream. County staff considers several issues to minimize flood risks and improve habitat in relation to downed trees, including:

- What is the type and age of the downed tree?
- Does the tree under review provide significant channel shading or other instream habitat complexity benefits (if submerged in the channel), such as fish refugia or foraging areas?
- What is the degree of blockage across the channel contributed by the downed tree, or by other factors?
- Where is the tree located in the channel and how is it positioned to flow currents?
- How secure is the tree across (or in) the channel?
- Can the downed tree be repositioned, adjusted, or modified (before consideration of removal) to provide the necessary conveyance capacity?
- What upstream and downstream conditions might influence or be influenced by the tree?

The rationale to retain downed trees is based on addressing the issues above and requires the oversight and guidance of a biologist or arborist that is familiar with the vegetation in the area and is knowledgeable of channel conditions. If, based on the questions above, preservation of the downed tree is an option, the County may employ the following preservation methods:

(1) **Leave the downed tree in place** and monitor it in case conditions change that trigger the need for additional management actions;

(2) **Limb downed tree branches.** This method is appropriate if the downed tree provides habitat functions but does not significantly decrease flood capacity or alter streamflow. If the downed tree has overhanging branches that are perpendicular to flow or has branches that could collect debris, those branches should be trimmed but the majority of the tree shall be left in place;

(3) **Cut downed tree into smaller pieces.** If the downed tree is in a position that does not immediately trigger the need for repositioning or removal, but could pose a threat in the future or a portion of the tree impedes flow or could catch debris, the tree may be cut into shorter lengths or specific portions of the tree may be removed.

Depending on the position of a downed tree, repositioning a downed tree could be used as an option to improve flood conveyance or instream habitat benefits. Methods used to reposition a downed tree may involve securing the wood in a specific place to create instream habitat such as inducing a scour pool for use by salmonids. If necessary, the repositioned wood will be cabled or anchored in place to the banks or some other method with input from regulatory agencies. The root masses of downed trees will be retained to the extent feasible. Hand tools are typically used and, on occasion, larger mechanical equipment may be required. The County typically leaves LWD in natural creeks situated in rural areas (e.g., Pescadero Creek) where there are minimal risks to nearby infrastructure. By leaving LWD in natural creeks that provide actual or potential spawning habitat for anadromous salmonids, the County will help

meet LWD loading targets for both redwood channels and hardwood channels, which are outlined in the draft Pescadero-Butano Watershed Sediment TMDL and Habitat Enhancement Plan (RWQCB 2018).

6.8.2 Downed Tree Removal and Reuse

In the event that a downed tree cannot be retained on-site, some downed trees may be removed and re-used elsewhere in the County. To the extent feasible, redwood and Douglas-fir trees fallen from County property shall be protected and retrieved for use in bank stabilization and/or habitat enhancement projects. Redwood, Douglas-fir and other LWD (typically trees over 10 inches in diameter, 10 feet in length, and any large stumps) within the County's right-of-way or on any County parcel are addressed in the following manner:

- Maintenance Supervisors shall arrange to have the material hauled to a Road Maintenance Division or Parks Department's corporation yard for potential reuse.

- The site may require stabilization and/or erosion control treatment after the material is removed. District Maintenance Supervisors shall notify their Manager of any special materials that will be required to stabilize the site (e.g., erosion control blankets, hydroseeding, etc.).

- The Parks Department and DPW staff aim to retain as much of the tree stump/stem as possible (i.e., approximately 12 feet) that falls from County right-of-way. Staff aim to position the stump so that it does not block traffic and so that County equipment can retrieve it later.

6.9 Invasive Plant Removal

The County removes invasive plants on both properties managed by DPW and the Parks Department. Example properties that DPW manages include County-owned property in Pescadero and the Half Moon Bay Airport for controlling jubata growth, and the closed Pescadero and Half Moon Bay landfills to prevent establishment of woody vegetation and to reduce fire hazards. Similarly, and as described above, the Parks Department conducts invasive plant removal activities across most County parks to fulfill habitat enhancement goals, reduce fire hazards, and maintain park infrastructure and access. Methods used to remove invasive plants include a combination of hand removal, mechanical methods, herbicide application, and grazing. For discussion about herbicide use, see Section 6.5 above; for discussion of grazing, see Section 6.6 above. Mechanical methods involve equipment such as chainsaws, bladed weed-eaters, string trimmers, masticators, mowers, and excavators with a mower extension.

Chapter 7
Road and Trail Maintenance

This chapter identifies and describes Maintenance Program activities at County roads and trails.

7.1 Paved Road Surface Maintenance Activities

7.1.1 Paved Road Surface Activities

DPW is responsible for maintaining County paved road surfaces. Primary road maintenance activities include repairing potholes, repairing roadway base, repaving, gravel replenishment, extending pavement edges, paving graveled shoulder, sealing cracks, chip and slurry seal, resurfacing, and adding pavement marking and traffic control features. These activities are conducted to ensure a safe roadway surface for motorists and to prevent further roadway deterioration or failure. Most patching and resurfacing activities occur between April and October. Potholes are repaired shortly after they occur to prevent accidents, vehicle damage and other traffic safety hazards.

Paved road surface maintenance activities may require removing asphalt using either manual or mechanical methods. The County aims to avoid creating excess dust when breaking and/or removing asphalt or concrete. Where sawcutting methods are applied, the County's maintenance staff are required to vacuum debris immediately after operations are used. All used asphalt materials are typically stockpiled in a secure area protected from rainfall and runoff and subsequently recycled.

For repaving work, the elevation of the finished edge of paved roadway should meet or exceed the elevation of adjoining shoulder areas. Base materials are typically replaced where required to bring the finished road surface to grade with adjoining materials. Where possible, base materials are compacted to 95 percent minimum relative compaction where compaction testing is possible. Pavement striping and markings are also replaced where removed or damaged; this work is completed during the dry season.

7.1.2 Street Sweeping

Other paved road maintenance activities conducted by DPW include street sweeping to remove soil, organic material, dust and debris from County roads. This work is performed to keep sediment from entering the storm drain system and local waterways, and to provide a safe roadway surface for the public. Where pavement flushing is required, used water is typically collected by vacuum trucks or diverted to temporary settling basins to ensure that sediment and other pollutants are not transported into receiving waters.

7.1.3 Shoulders and Turnouts

The County is responsible for maintaining shoulders within the County's right of way to provide a smooth transition from the edge of pavement to the shoulder surface where sufficient widths exist. Shoulders are typically maintained within a distance of 3 feet beyond the edge of pavement. New surfaces and shoulders adjacent to newly surfaced roads are graded to conform to the road surface elevation.

7.2 Unpaved Road Surface Maintenance Activities

As with paved road surfaces, the County is responsible for repairing and maintaining unpaved roadway surfaces in unincorporated San Mateo County. Such work is conducted to prevent further roadway deterioration, provide a safe roadway for public travel, and to minimize adverse water quality effects from erosion and sedimentation to nearby water bodies. In general, unpaved roads, particularly in steeper areas are susceptible to rapid erosion if not maintained properly. Conducting routine maintenance on unpaved roads to reduce and prevent erosion in watershed lands is an important step in reducing downstream sediment impacts. Unpaved service roads, including Park roads and flood control facility access roads, are maintained to provide year-round access for inspections and emergency response purposes. Examples of unpaved roads that are maintained by DPW include two miles of the upper portion of Gazos Creek Road. The Parks Department maintains over 100 miles of unpaved roads throughout the County.

Depending on roadway conditions, unpaved road surface activities may involve re-grading the road to its existing grade or original cut, repair of rolling dips, filling ruts, relocating road surface materials that have moved due to erosion, or re-establishing turn around areas for emergency vehicles. In Appendix A, BMP EC-12 provides more construction details on how to implement rolling dips. As described in Chapter 5, drainage pathways (e.g., culverts) are monitored and repaired or cleaned as needed to minimize both damage to road surface and potential sedimentation effects on nearby water bodies.

Unpaved roads are inspected at the end of the rainy season and any hazardous conditions noted during these inspections are scheduled for repair prior to the next rainy season. As authorized by the County Board of Supervisors, unpaved County roads are closed to the public during the winter months. This closure generally coincides with the rainy season (approximately November 1 through April 30). To the extent feasible, maintenance of unpaved access roads would occur during the dry season in accordance with BMP GEN-16 but in the event that road maintenance work needs to occur during wet weather or within close proximity to a water body, sediment and water quality control BMPs would be implemented to control runoff and sedimentation (see BMPs SC-1 through SC-6 in Table 9-2 of Chapter 9).

7.3 Trail Maintenance and Repair

The Parks Department is responsible for maintaining numerous trails throughout the County to ensure public safety of recreationists and to ensure adequate access for emergency vehicles, maintenance, and patrol services. Trails that also function as fire roads are maintained as well to ensure they sufficiently function as a fire break. Prior to the heavy trail use season (typically spring and summer), maintenance staff conduct regular inventories of all County trails. During these inventories, maintenance crews make note of trail conditions (e.g., drainage and surface conditions) and potential need for other maintenance activities like vegetation clearing (County of San Mateo, 2004 – see Section 8.9). The following discussion describes tread repair and re-grading activities and other maintenance activities that take place at trails. Refer to Chapter 6, *Vegetation Management*, for discussion about vegetation trimming and pruning activities that occur along trails.

7.3.1 Trail Tread Repair and Re-Grading

Trail surfaces (tread) commonly wear down in areas where a particular trail has been heavily used and thus tread repair or re-grading work is often necessary. Trails are typically composed of a mixture of

clay, silt, sand, and occasionally decomposed drain rock. Tread repair involves adding the proper soil type to the problem area and re-compacting the soils. For example, some trail sections may require a sandier soil mix for proper infiltration and drainage purposes, while other areas may benefit from more silt or clay to increase soil cohesion. In instances where re-grading is necessary to address problematic sections of a trail, the fire road/trail may be graded back to the original cut and ruts will be filled in as needed. Trail earthen materials moved by erosion and washed into drainage ditches may require returning the earthen materials to the restructured trail. Other trail maintenance activities include repairing water bars, rolling dips, and drainage ditches to prevent or reduce erosion and downstream sedimentation issues in nearby channels and creeks. These maintenance activities will help the Parks Department meet general objectives of the adopted TMDL for the Pescadero-Butano Watershed Sediment TMDL and draft San Gregorio Creek Sediment TMDL aimed at reducing sediment delivery to channels. Refer to the maps in Appendix C to see where trail maintenance activities occur within County parks.

In problematic areas, particularly those on steep slopes and switchbacks, the County may need to construct new rolling dips. The rolling dip configuration is a series of rolls and out-sloped dips that create small drainage divides and segments along a trail. Segmenting a trail with such drainage divides and improves drainage minimizes the ability of rainfall and other water to pond or to collect and flow down the trail at erosive velocity. Rolling dips are typically located every 5-15 feet, depending on topography. In steeper areas, rolling dips are more frequent along a trail to reduce flow velocities and water ponding. Although the rolling dip creates a depression or swale, the surface is slightly domed and outsloped so that water can flow off the trail and into adjacent vegetation. These dips are built at an angle of 45 to 60 degrees from the trail centerline and have a positive grade of at least 2 percent.

In some instances, due to severe erosion or the presence of a landslide, short segments of a trail may require rerouting. Where rerouting a trail segment exceeds 50 feet in length, trail planning and construction is performed in accordance with Section 1.0, “Trails and Land Use Compatibility,” of the 2001 San Mateo County Trails Plan (County of San Mateo, 2004 – see Section 10.22).

7.3.2 Other Trail Maintenance Activities

Other trail maintenance work conducted by the County including Park rangers, Maintenance Division, and sometimes the Trail Center and its volunteers, involve signage repair and installation, graffiti removal, and structure repairs. Trail repairs are prioritized and completed based on the periodic inventory described above.

7.4 Roadway Slip-out and Slide Repairs

DPW is responsible for repairing slip-out/slide repairs along County roads. Slope failures on the cut slope side of a roadway are typically referred to as “slides,” whereas slope failures on the fill side are typically referred to as “slip-outs.” Such repairs are performed on an as-needed basis to prevent additional failure of supporting soils or structures, and to reduce the potential hazard of falling debris. In some instances, the base of the roadway slide occurs along a stream course whose streambank has eroded. The streambank failure may be a consequence (non-cause) of the upslope larger slide surface; or the streambank failure may be the driving cause of the slide that affects the hillslope and roadway above. If the roadway slide involves a streambank, then the bank stabilization activities will follow the description provided in Section 5.4.

During (and after) the rainy season, when soils are saturated, the possibility of roadway slip-outs and landslides increases. Thus, the number of slip-out and slide repairs in any given year will vary depending on weather conditions. In the late winter and spring months following a particularly wet season, roadway slip-outs and slides are more numerous and require more repair maintenance.

In San Mateo County, slip-out/slide repairs have been commonly needed in areas where soils underlying roadways are already unstable and erosive(e.g., Los Trancos Woods) and where roadways are located in steep, narrow canyons where the right-of-way width is limited (e.g., Alpine Road). The cause for a particular slope failure depends on site-specific details like soil type, hydrologic and drainage conditions (e.g., presence of culverts) which may contribute to slope instability, slope steepness, and a prior history of mass movement along the hillslope. As an example, the Los Trancos Woods area is situated within the State of California Alquist-Priolo Special Studies Zone for the San Andreas fault zone and is also identified as being within an earthquake-induced landslide hazard zone. Recently, the County addressed a slip-out repair by installing a concrete retaining wall along Ramona Road. Before initiating repair work, the County typically retains a qualified civil engineer to assess the slope conditions supporting a particular road. Similar to evaluating creek bank stabilization causes and issues; to address slip-outs and slides, the County will evaluate the cause of the instability and first aim to use earthen and biotechnical solutions to minimize adverse environmental effects. However, depending on the severity of the road slip-out/slide, construction of retaining wall systems including solider pile walls, placement of riprap, concrete, or shot-crete or slope soil nailing are sometimes necessary.

Equipment used for slip-out/slide repair activities may include extending arm excavators, small bulldozers, front-end loaders, and dump trucks. Staging for repair activities will generally occur on adjacent road shoulder or the road itself. If available and depending on the maintenance site, other previously disturbed areas will also be used for staging soil and riprap.

As an example, in 2013, the County repaired two road slip-outs (one 35 feet long and the other 350 feet long) along Alpine Road north of the Joaquin Road intersection, within the community of Los Trancos. One slip-out resulted in near vertical drops adjacent to the road and diminished the stability of the road. The second slip-out consisted of two adjacent areas of failed roadside embankments that resulted in substantial loss of the embankment. While the County seeks to implement biotechnical solutions, these repairs required hardened solutions due to the steepness of the slope failures.

On the Coastside of the County, continuing sea-level rise over the longer-term will increase the risk of coastal flooding and contribute to shoreline retreat (County of San Mateo 2015). This could result in more slip-out/slide repairs along County roads west of Highway 1 and terminating on bluffs in coastal communities such as Montara, Moss Beach, Pillar Point, and Miramar. As necessary, the County will address these repairs only in areas above mean high tide by using the same equipment and methods described in the discussion above.

Chapter 8
Coyote Point Marina Maintenance Activities

This chapter identifies and describes Maintenance Program activities at the Coyote Point Marina, which is located in the city of San Mateo. This chapter was developed based on information presented in the County's *Coyote Point Marina Concept Plan for Dock Reconfiguration and Replacement* (County of San Mateo 2007).

8.1 Marina Maintenance Activities

The Parks Department is responsible for conducting routine maintenance activities at the Coyote Point Marina, which lies approximately six miles southeast of San Francisco International Airport. The marina has 565 berths, a Harbormaster's Office, Yacht Club, fuel dock, a three-lane boat ramp, and a pump out facility. The marina also has a restroom facility and designated recreational areas open to the public (County of San Mateo 2007).

The existing marina docks were installed between 1976 and 2014, and since 1987, maintenance dredging has been conducted in two of the basins. The following section describes typical routine maintenance activities that occur at Coyote Point Marina.

8.1.1 Pump Out Facility Maintenance

The pump out facility is available to boaters for removing sewage from boats. The County is responsible for cleaning out the ejector tank and sewer line as needed and collecting annual pump out readings. Preventative maintenance includes the following:

- Regular checks of the belt tension
- Annually grease motor grease fittings
- Check all pipes and fittings regularly for leakage
- Change the hose every 1-2 years
- Change the separator band and abutment every 1-2 years
- Change pump oil every three years

The pump station is dye-tested quarterly for leakage by the California Department of Boating and Waterways.

8.1.2 Dock Maintenance

Routine dock maintenance entails replacing damaged cleats, bumper striping, broken gussets, dock flotations, and gusset covers along the dock perimeters. Dock boxes are also inspected and periodically repaired and replaced. Repair activities may involve replacing rusty screws, bolts, and rotted plywood. On several docks, the concrete dock surface is cracked or has gaps between the concrete blocks. The County is responsible for sealing the gaps through either concrete spalling or replacing the dock blocks, depending on the nature and location of the cracking. The estimated maximum work area for conducting in-water dock maintenance activities would be 50 linear feet and such work would primarily be limited to replacing dock flotations.

The electrical infrastructure on the docks requires maintenance including replacing defective/worn wiring, outlets, circuit breakers, light fixtures and bulbs.

8.1.3 Water Lines

County staff periodically inspects the dock water lines and valves to ensure they are functioning properly. The backwater preventer device is also inspected to ensure its operating correctly. Plumbing maintenance includes replacing defective/worn pipes, spigots, backflow preventers and other fixtures as needed.

8.1.4 Boat Launch Ramp Maintenance

At the boat launch ramps, the County is responsible for replacing damaged floats, cleats and bumper striping. The County also removes debris present in the launch ramp lanes.

8.1.5 Channel Entrance and Breakwater Maintenance

In the channel entrance area that leads to open water, the County inspects the channel entrance pilings, day markers, entrance lights, and range lights. As needed, the County replaces bulbs and repair the pilings by cleaning and wrapping the piles with a plastic pile wrap. No pile driving activities would occur under the Maintenance Program. Other activities that occur in the channel entrance and breakwater include removing hazardous logs and driftwood present and re-rocking the berm along the shoreline where rocks have fallen or sloughed away in order to prevent and minimize erosion. On an annual basis, the County also measures the depth of the channel entrance/breakwater to determine the need for future dredging the channel entrance area.

Prior to conducting in-water maintenance activities to the north of the channel entrance, particularly the jetty forming the north boundary of the marina, the County will consider the need to conduct eelgrass surveys. The County last completed eelgrass surveys at Coyote Point Marina on March 8, 2017 to support their USACE and BCDC maintenance dredging permits. The County surveyed a potential eelgrass patch to the southeast of the approach channel near the County's dredging area (Haley and Aldrich 2017 and included as **Appendix J**). Based on the March 2017 survey, two specimens were observed but upon further assessment by a local aquatic ecologist, were not identified as eelgrass. The 2009 survey referenced in Appendix J indicates that another potential eelgrass patch exists to the north of the jetty that forms the northern boundary of Coyote Point Marina. In the event that the County plans to conduct maintenance activities near the potential eelgrass patch along the shoreline north of the jetty (identified as "potential eel grass patch #1" in Haley Aldrich 2017 [Appendix J]), an eelgrass survey would be conducted per BMP BIO-25 (described in Chapter 9, Table 9-3). Survey results would be provided to appropriate permitting agencies (including CDFW) prior to commencing maintenance work in this area.

Chapter 9
Impact Avoidance and Minimization, BMPs, and Mitigation

The Chapter begins by describing the County's general approach to conducting maintenance activities in accordance with the tiered approach described in Chapter 2 followed by a summary of conditions that would trigger maintenance activities. The Chapter then describes impact minimization measures and work limits and BMPs that would be implemented prior to and/or during maintenance activities to further avoid or reduce potential impacts. The Chapter concludes by describing how residual impacts of the Maintenance Program would be mitigated.

9.1 Using Impact Tier Categories to Classify Potential Effect

As described in Section 2.3, the County has a tiered approach to address potential effects on federally listed species and habitats. The tiered approach considers past occurrences or observations of species at or near the site, the general or regional suitability for species and habitats around the site, and the specific resource conditions at the maintenance site to support potential species and habitats. This approach is intended to help both County and regulatory agency staff identify resource and site sensitivity and thereby prioritize impact avoidance and minimization measures and/or BMPs and mitigation needs. The tiering classification may vary from species to species at each maintenance location depending upon site specific conditions. To evaluate resource sensitivity at maintenance sites, the County undertakes the following process:

- Identify the type of maintenance activity that is needed and confirm the specific location where maintenance work is planned to occur.

- Conduct a desktop audit to evaluate whether suitable habitat for special-status species is present. A qualified biologist will examine Tables B-1 and B-2 in Appendix B to determine if the maintenance site and activity are listed, and if so, review the preliminary tiering determination classification. If a maintenance site has not been listed in Tables B-1 or B-2, a desktop audit will then be conducted to evaluate whether suitable habitat for special-status species is present. Additional resources reviewed may include, but are not limited to, aerial photographs of the vicinity, U.S. Geological Survey (USGS) topographic maps, CNDDB records, critical habitat layers, USFWS National Wetland Inventory Maps, data obtained by the County during previous maintenance activities at the site, and species data compiled by the California Native Plant Society, the National Audubon Society, or other public interest groups. If determined to be necessary, the qualified biologist will visit the site and confirm presence or lack of sensitive habitat or special-status species occurrence.

- Based on the desktop audit and site visit (if conducted), confirm the tiering classification listed in Tables B-1 and B-2 or, if the site is not already listed, classify the maintenance activity at the site according to one of the following tiers:

    - **Tier 1 (No Impact)** – If the biologist determines that maintenance activities would occur in creek reaches inaccessible to federally listed fish or, for federally listed terrestrial species other than birds, in areas where no suitable breeding habitat is present and there is no

connectivity between the site and known or potential breeding habitat (so that non-breeding individuals can also be presumed to be absent). Because foraging or roosting birds could easily fly away before being impacted by maintenance activities, the implementation of project activities in non-breeding habitat for federally listed bird species is not expected to result in impacts on individuals that rise to the level of "take".

- **Tier 2 (Low Impact)** – If the biologist determines that one or more federally or state listed species are known to occur or could possibly occur on-site either because (1) suitable breeding habitat is present, or (2) for terrestrial species and fish, suitable non-breeding habitat is present and there is connectivity between the maintenance site and suitable breeding habitat; but that implementation of BMPs (e.g., pre-construction surveys, exclusion of individuals from the site, and/or implementation of non-disturbance buffers around active nests of federally listed birds) would avoid direct impacts on individuals. Depending on the sensitivity of the work area and the likelihood that individuals may move into the work area after the pre-construction surveys are completed, some of these activities may require an on-site biological monitor. For Tier 2 activities, "take" in the form of permanent loss of habitat should not occur, and therefore, no compensatory habitat mitigation would be necessary for Tier 2 activities.

- **Tier 3 (Moderate/High Impact)** – If the biologist determines that (1) federally listed species may occur on site either because suitable breeding habitat is present or suitable non-breeding habitat with connectivity between the maintenance site and suitable breeding habitat is present; and (2) that federally listed species cannot be effectively excluded from the work area, preconstruction surveys could not definitively determine the presence or absence of the species, and/or "take" in the form of permanent loss of habitat cannot be avoided. An example Tier 3 project might include culvert replacement activities on the Coastside streams known for salmonid habitat or culvert maintenance activities. For these types of activities, the County anticipates that BMPs, avoidance measures and on-site biologist would be needed to minimize construction-related effects. Compensatory mitigation may be needed to offset permanent effects on sensitive species and/or habitat.

Knowing which tier is applicable to routine maintenance activity sites helps guide the maintenance planning and impact avoidance approach. It is important to note that the tiering level of a site may be adjusted due to changes in site conditions, type of activity, level of impact, etc.

9.2 Maintenance Triggering Criteria

Maintenance activities are conducted only when determined to be necessary. On an annual basis, the County DPW and Parks will conduct site inspections throughout the County to evaluate maintenance needs. The triggers described below will be used by County staff during annual inspections and site evaluations to identify which sites have exceeded the thresholds identified by the triggers and may need maintenance. The County will then prioritize maintenance activities according to the degree in which the identified site exceeds the maintenance triggers. Sites that exceed the triggers in a greater or more intense manner will be identified as higher priorities.

In addition, the County DPW is in the process of developing a culvert inventory and assessment program that involves GIS mapping and detailed inventory of existing culverts, followed by routine site visits to

document existing culvert conditions. The inventory will be performed in the field by trained Roads Department staff who will collect GPS coordinates, photos, and both static (i.e., pipe size, material) and dynamic attributes (i.e., condition, sediment accumulation, erosion). Dynamic attributes will include conditions with set parameter ranges that align with the maintenance triggers included below (i.e., capacity, level of sediment accumulation). The database will be queried annually to assist in the prioritization process. A potential maintenance site can be prioritized based on the severity of conditions, natural resource sensitivity, or weighted for other priorities such as location within a TMDL watershed. This program is anticipated to be fully developed and underway by the start of the Maintenance Program in 2020. Maintenance triggers for culverts described below in Section 9.2.1 will be incorporated into the culvert inventory and assessment program. Likewise, for consistency, this Manual will be updated with additional inventory details once the program has been piloted.

This Section describes observed conditions that would trigger the need for maintenance work. The discussion below is organized by facility type.

9.2.1 Maintenance Triggers for Culverts, Storm Drainage, Channels and Bridges

The following maintenance criteria are used to evaluate and determine when maintenance actions are required at County culverts, bridges, and channels. Maintenance of these facilities are prioritized particularly if the degraded facility is potentially contributing to sedimentation and erosion issues in channels impaired by sediment or other water pollutants in the County.

- **Repair or Replacement of Existing Culvert**: This work is conducted when an existing culvert has been crushed or otherwise damaged and cannot operate properly; is at risk of future failure or deterioration (e.g., bottom of a CMP culvert is beginning to rust); is clogged with debris, sediment and/or vegetation and cannot provide adequate conveyance capacity; or has been dislodged, moved, or positioned in such a way that the culvert cannot function properly and/or in relation to conveyance. A culvert repair or replacement project may be prioritized based on factors such as whether the damaged culvert is causing other adverse effects like roadway flooding (due to a clogged culvert), increased erosion downstream of a culvert, undermining a streambank or causing other erosion, or contributing large amounts of sediment to nearby creeks.

- **Clearing Culverts and other Storm Drainage Facilities**: This work is necessary when culvert inlets, culvert outfalls, flap gates, diversion structures, storm drains, manholes, catch basins or other storm drainage facilities are noticeably clogged with debris and at least 30 percent of their conveyance area is impacted or reduced.

- **Trash Capture and Catch Basin Devices:** Trash capture device clearing is necessary when a substantial volume of trash has accumulated such that flows are backing up from the device and drainage and conveyance are impeded. Trash capture devices should be inspected at least once per year and in high trash generation areas, such devices should be inspected at least two times per year. If any such device is plugged, has a blinded screen, or is greater than 50 percent full of trash, the maintenance frequency should be increased so that the device is neither plugged nor half full of trash at the next maintenance event.

  The connector pipe screens or insert filters of catch basins should be cleaned when the following conditions have been observed during inspections: storm drain floods during storm events; small device screen is plugged or blinded with leaves, plastic bags or other debris which

likely causes overflow or bypass; small device screen is greater than 50 percent full of trash; or flows are observed bypassing small device.

- **Pump Station Inspections:** Pump stations are routinely inspected to ensure they are in operational condition, particularly prior to forecasted periods of rain. Repairs and modifications are conducted as needed by County personnel.

- **Channel Maintenance**:

  - **Concrete Repair:** Concrete repair work is only necessary when cracks are observed in the concrete bed and banks of flood control channels.

  - **Tide Gate Servicing:** Debris clearing occurs at these facilities when debris accumulation is observed behind a tide gate, such that the tide gate cannot operate properly and its ability to convey flows freely is impeded. The flaps on tide gates are also replaced on an as-needed basis. Tide gates may also require periodic repainting for corrosion protection and replacement.

  - **Repair of Existing Rock Slope Protection:** This work is necessary where rocks have fallen or shifted at existing bank stabilization sites or below existing culvert outfalls, and require repair or replacement to ensure rock slope protection is operating as intended (e.g. to prevent or minimize bank erosion).

  - **Floodwall and Levee Maintenance:** Floodwalls and levees are visually inspected on a regular basis to ensure their structural integrity is maintained. Repairs, graffiti removal, and vegetation removal are conducted as needed at floodwalls to return the facility to the as-built condition. Levee maintenance is necessary when open burrows, fallen rocks, cracks, or slip-outs have damaged the structural integrity of the levee and there is a chance of levee failure or erosion.

  - **Trash Removal.** Trash removal is generally conducted using a Vac-Con or hand tools. Spot removal of large heavy items such as shopping carts, mattresses, TVs, or tires from channels occurs on an as-needed basis.

- **Bridge Maintenance**: In general, DPW's bridge maintenance would be conducted in accordance with Caltrans' *Preventative Maintenance Program Guidelines for Local Agencies*. Minor DPW bridge maintenance activities are necessary when the protective paint coating has chipped off or cracks on the exterior have noticeably worsened. Erosion protection improvements at the base of a bridge under DPW's maintenance responsibility are necessary when scour damage begins to undermine the structural stability of bridge wingwalls and/or abutments. Maintenance along DPW bridge decks is necessary when damage or cracks on the surface have magnified to the degree that the damaged bridge could represent a public safety hazard. With respect to County Parks' bridges (most of which are pedestrian bridges), repair or replacement of wood railings or surface boards may be necessary if damage is evident. Abutment and pedestrian bridge deck repairs or replacement may also be required if damage is evident. Debris clearing is also necessary when the capacity beneath the bridge has been reduced by 30 percent or more due to debris build-up.

- **Sediment Removal from Culverts**: This work is necessary when culvert outfalls are blocked with debris or sediment and conveyance capacity is reduced by 30 percent or more.

- **Sediment Removal from Channels and Bridges**: This work is necessary when sediment or debris has reduced channel capacity to the extent that the likelihood of overbank flow is significantly increased, and flooding could damage property or substantially threaten public safety. This work is also necessary when sediment or debris deposits are evidently causing scour erosion of streambanks supporting bridges or other public facilities like roads.

- **Bank Stabilization:** This work is necessary when bank failure has occurred and the bank must be repaired to re-establish the banks of a creek or flood control channel, protect the channel's flood conveyance capacity, and prevent additional sediment input to the channel. This work is also necessary when bank erosion or failure poses a threat to existing infrastructure (e.g., utilities, roads). This work is necessary if persistent bank erosion is occurring, leading to excess sediment loading and/or damage to riparian vegetation.

- **Downed Tree Management:** Management of downed trees may be appropriate if it has been determined that the downed tree has potential to increase erosion, flooding, bank failure, or negative impacts to public infrastructure (e.g., bridges, culverts, roads). If such risks are unlikely, the County will explore options for preserving and/or repositioning the tree along the channel. If erosion and/or flooding risks are likely to occur, the County will consider removing or reusing the tree elsewhere in the County.

9.2.2 Maintenance Triggers for Roads, Roadside Ditches, Swales, and Green Infrastructure

Maintenance activities are conducted only when determined to be necessary. The following maintenance criteria are applied to evaluate and determine when maintenance actions are required at County roads, roadside ditches, and swales:

- **Paved Road Surface Maintenance Activities:** Paved road maintenance activities (e.g., pothole repairs) occur shortly after the road safety hazard occurs and on a routine basis for preventative maintenance purposes to prevent accidents, vehicle damage and other traffic safety hazards. Minor road repairs that entail patching cracks and resurfacing are prioritized based on severity of traffic safety hazards, level of road use, and typically conducted outside of the rainy season (between April and October).

- **Unpaved Road Surface Maintenance Activities:** This work is necessary when a road surface has deteriorated or failed due to erosion or stormwater flows, has contributed sediment and subsequent adverse water quality and/or hydrology impacts, or led to erosion nearby. These activities are also prioritized by severity of traffic safety hazards and level of use.

- **Roadway Slip-out/Slide Repairs**: Slide repair is necessary when slope failures have occurred on the cut slope side of a roadway; a slip-out repair is necessary when slope failure has occurred on the fill side. This work is necessary when the roadway slip-out/slide poses a threat to existing roads or other facilities like utilities, or public safety. This work is also necessary when the roadway slip-out/slide has contributed sediment to nearby drainage, channel, or other waterbodies.

- **Vegetation and Fuel Management Along Roads:** Mowing, trimming and pruning of vegetation along County roads is necessary to maintain appropriate line of sight clearance (usually 4 feet at an intersection), to maintain a 14-foot height clearance for vehicles, and to maintain a 7-foot height clearance for pedestrians. This work is necessary when overhanging limbs or trees pose a public safety hazard for motorists.

- **Cleaning and Repair at Unpaved Roadside Ditches and Swales**: Roadside ditch/swale cleaning is necessary when debris and vegetation have reduced the capacity of ditches/swales by 25-30 percent. Figure 5-2 shows conceptual cross-sections of v-ditches, trapezoidal ditches and segmental ditches with a loss of 30 percent capacity. Filling of ditches/swales is necessary where the ditches have eroded to depths below the existing grade.

- **Paved Ditch Cleaning**: This work is necessary when drainage capacity has been substantially reduced, by at least 30 percent.

- **Sediment and Debris Clearing and Vegetation Management of Green Infrastructure (GI)**: Trash and weed removal occurs during annual inspections and on as-needed basis. Light sediment clearing occurs when capacity of the GI site has been reduced; facility or structure is not functioning as designed, or as otherwise specified in site-specific operation and maintenance guidance documents. For bioretention facilities, maintenance typically occurs when there is greater than 2 inches of accumulated sediment, reduced infiltration, clogged inlet or outlet, or when sediment is covering vegetation. As described in Section 5.3, this Maintenance Program only covers maintenance of GI features installed prior to 2015 using Proposition 84 grant funds from the SWRCB. GI features installed post-2015 are covered under the MRP.

9.2.3 Maintenance Triggers for County Landfills and County Airports

Maintenance activities are conducted only when determined to be necessary. The following maintenance criteria are applied to evaluate and determine when maintenance actions are required at closed landfills (e.g., the Pescadero Landfill and Half Moon Bay Landfill) and County-owned airports (e.g., Half Moon Bay Airport and San Carlos Airport):

- **Vegetation Management at Closed Landfills**: Livestock grazing is conducted at the Pescadero Landfill and Half Moon Bay Landfill, both of which are closed, on an annual basis to control growth of non-targeted weeds. Herbicide application is used at the Pescadero Landfill and adjacent County-owned parcels to control invasive species (i.e., jubata grass growth).

- **Vegetation Management at County Airports**: Jubata grass growth is managed around the Half Moon Bay Airport runways through a combination of mechanical methods and herbicide application. Limited herbicide application and mechanical removal of invasive weeds is also conducted at the San Carlos Airport. The County aims to control and stop seedling growth as a preventative measure to avoid obstructing of lighting or signage at these airports. Additionally, if an airplane deviates from the paved runway, this vegetation needs to be maintained in order to allow safe landing.

9.2.4 Maintenance Triggers for Parks and Trails/Fire Access Roads

Maintenance activities are conducted only when determined to be necessary. The following maintenance criteria are applied to evaluate and determine when maintenance actions are required at County Parks and trails/fire access roads:

- **Trail/Fire Access Road Tread Repair:** This work is necessary when trail/road tread has worn down and ruts are evident, thus requiring addition of the proper type of soil or surface material and/or re-compaction. The need for trail tread repair work is determined during periodic inventories that are conducted.

- **Other Trail Maintenance and Repairs**: Repair of signs and other structures is conducted when damaged.

- **Vegetation and Fuel Management and Maintenance of Fire Breaks Along Trails/Fire Access Roads and other Recreational Facilities**: The County will inspect trails, campgrounds, picnic areas, and other recreational amenities annually and, based on the assessment, will develop a fuel management work plan to be implemented during the following work season. Vegetation thinning or pruning along trails is typically necessary when shrubs or trees are overhanging or encroaching on the trail or campground. In order to establish or maintain fuel breaks and remove ladder fuels along trails, around facilities, or along park boundaries where adjacent private properties could be at risk, the defensible space should be maintained to a 100-foot wide buffer. Where dead, decaying, or fallen trees present a hazard to trails and park facilities, removal should occur within 200 feet of park facilities. Mowing is needed when overgrown weeds and other grasses encroach the trail or other recreational facility. Tree removal is necessary if a particular tree has created a public safety hazard along or near County maintained facilities and the situation cannot be fixed by limbing or pruning.

- **Burn Piles**: Burn piling may need to be conducted by County Parks to maintain fuel breaks and reduce vegetation density along some park boundaries (e.g. Edgewood County Park). This method may be more appropriate over mechanical or hand removal methods for efficiency purposes.

- **Herbicide Application within County Parks:** While herbicide application is used in limited amounts for controlling non-native plants in County Parks, in some cases, herbicide application is more appropriate over mechanical or hand removal methods due to access or efficiency purposes.

9.2.5 Maintenance Triggers for Coyote Point Marina and Other Shoreline Activities

Maintenance activities at Coyote Point Marina are only conducted when necessary. The following maintenance criteria are applied to evaluate and determine when maintenance actions are required at Coyote Point Marina:

- **Pump Out Facility Maintenance**: Preventative maintenance inspections of the pump out facility occur on an annual basis to ensure capacity for continued use in removing sewage from boats. Preventative maintenance typically includes checking the belt tension, greasing the motor grease fittings, checking pipes for leakage, changing the pump hose every 1-2 years, changing the separator band and abutment every 1-2 years, and changing the pump oil every three years.

- **Dock Maintenance**: Routine dock maintenance only occurs when the cleats, bumper striping, gussets and covers along the dock perimeters are damaged and need replacement. Maintenance may be conducted if Parks staff observe rusty screws, bolts, rotted plywood, and/or gaps in the concrete blocks comprising the docks which could represent a public safety hazard.

- **Water Lines:** Upon periodic inspections of dock water lines, the County repairs these lines if a malfunction is observed.

- **Boat Launch Ramp:** Maintenance at boat launches are only conducted if damaged floats, cleats and bumper striping are observed. Large debris present in the launch ramp lanes is also removed for safety purposes.

- **Channel Entrance and Breakwater Maintenance**: Upon inspection, entrance pilings are repaired with plastic pile wrap when deterioration is observed and light bulbs of entrance lights are replaced once they have reached the end of their useful life. Hazardous logs and driftwood are removed if observed in the channel entrance, and rocking on the berms are repaired with new rocks where rocks have fallen.

9.3 Impact Minimization and Work Limits

The following measures are implemented to avoid and minimize impacts resulting from maintenance activities conducted at the County facilities described in Section 9.2, above.

9.3.1 Impact Minimization

- The County implements impact minimization measures or Best Management Practices (BMPs). BMPs are operational or procedural practices, and structural or engineered controls which are implemented to protect natural resources. BMPs presented at the end of this Chapter are an integral part of the Maintenance Program and are implemented to protect and enhance existing habitat and also protect maintenance workers and the community from equipment hazards.

- Appropriate BMPs are selected, specific to the maintenance activity, site, and potential resources affected, after County staff have reviewed the project and selected the Tier category that applies for the specific activity at the site.

9.3.2 Work Length and Size Limits

- **Culvert Repair/Replacement**. As described in Chapter 5, the installation or replacement of culverts is limited to 60-inch size diameter culverts or smaller to convey adequate flow (i.e., 100-year flow where feasible). Typically, each site would be between 25 to 60 feet in length. Work activities on non-fish bearing streams would be limited to 150 feet in length per site and 1,500 linear feet for all such culvert repair/replacement projects in a year. The estimated maximum work area of a culvert repair or replacement site on a non-fish bearing stream would be 750 square feet. Culvert repair and replacement activities on fish-bearing streams are limited to 100 feet per site and one such project per year. The estimated maximum work area of a culvert repair or replacement site on a fish-bearing stream would be 500 square feet.

- **Channel Maintenance.** These activities are limited to:

- **Concrete Repair.** Minor patching and repair of concrete channel walls and beds.

- **Repair of Existing Channel Rock Slope Protection.** These activities are limited to conducting in-kind repairs by replacing the immediately missing or damaged rocks at existing bank stabilization sites and below exiting culvert outfalls.

- **Tide Gate Maintenance.** These activities are limited to clearing debris blockages where necessary and replacing the flaps on tide gates once over the course of the Maintenance Program. The estimated maximum work length and area of flap gate replacement would be 150 LF and 15,000 square feet, respectively.

- **Floodwall and Levee Maintenance.** For purposes of the Maintenance Program, floodwall maintenance and repair activities would be minor (e.g. graffiti removal) and conducted to return the floodwalls to its as-built design. Levee maintenance would be limited to minor repair of existing levees to maintain structure integrity (i.e., filling in burrows, replacing fallen rocks, repairing cracks, and repairing slip-outs). The County anticipates that slip-out repairs along channel levees would occur no more than two times per year. The estimated maximum work length and area at each repair site would be 150 LF and 3,000 square feet, respectively.

- **Bridge Maintenance.** For purposes of the Maintenance Program, bridge maintenance and repair activities would occur within the bridge footprint or immediately adjacent area, within 25 feet upstream or 25 feet downstream of the bridge. The total annual channel work limits associated with bridge maintenance would be 500 linear feet [LF]. The estimated in-water maximum work length and area at a bridge maintenance site would be 150 LF and 1,500 square feet, respectively.

- **Roadside and Trail Ditch and Swale Clearing.** This work would be limited to minor debris and sediment removal from ditches and swales in order to restore original capacity.

- **Maintenance of GI Sites.** This work would be limited to minor maintenance activities including trash, debris and sediment clearing; replanting of vegetation; cleaning storm drainage inlets and outlets; and as-needed repairs after large storms.

- **Sediment Removal at Culverts and Crossings**. At creek and road crossings, work activities would be limited to 150 LF or less per work site and have an estimated maximum work area of 1,125 square feet. The County is typically limited to working within the width of the County's road right-of-way (100-foot width or less). The total annual work limit for all sediment removal activities, including at channel sites as noted below would be 1,500 LF. Dewatering limits would be limited 750 LF per site with a total annual limit of 2,500 LF for all sediment removal projects including at channel sites as noted below.

- **Sediment Removal in Channels**. For the purposes of the Maintenance Program, sediment removal activities shall be limited to focused localized sites that are 500 feet in length or less per site. The estimated maximum work area of each site would be 3,750 square feet. The total annual sediment limit for all sediment removal projects in the Program, including culvert, crossings, or in channel locations would not exceed 1,500 LF. The average annual amount of sediment removed for the Program would be approximately 750 cubic yards or less. The annual total sediment removed for the Program would not exceed 1,500 cubic yards. If maintenance is

necessary when there is water within the channel, dewatering would be conducted through the use of cofferdams or a clean water bypass. Dewatering limits for the Program would not exceed 2,500 feet in length for all sediment removal projects.

- **Creek Bank Stabilization / Slip-out and Slide Repairs**. Since 2012, the County has completed five bank stabilization and/or slip-out repairs and 11 slip-out repairs where culvert replacement was required as well. As described in Chapter 2, the County has also completed 13 emergency bank stabilization/slip-outs and 4 slip-out repairs in combination with culvert replacement work. The total work distance along streambanks are typically 25-100 feet per maintenance site. For purposes of the Maintenance Program, the total work distance will not exceed 150 feet per site and the estimated work area of a bank stabilization site would be 3,000 square feet. In average hydrologic years (based on average seasonal precipitation), the total annual work distance will not exceed 750 feet (for all sites). Following a wet hydrologic year or period, the total annual work distance along streambanks will not exceed 1,500 feet (for all sites). In all cases, access, staging, and project construction will be conducted to minimize impacts on existing riparian vegetation.

- **Vegetation Management.** Vegetation management activities (e.g., mowing, trimming, pruning, and fuel management) are generally limited to the County's right of way along County roads, along County trails/fire access roads (50 feet on either side), and within 100 feet of County Parks Department facilities (such as campsites and picnic areas)**.** Removal of hazardous trees are limited to 200 feet of park facilities including trails. Herbicide use is limited to spot spraying in certain areas for invasive weed control purposes. Herbicides are not used in or adjacent to any fish-bearing stream, lake, pond or other water bodies known to support California red-legged frog. If used in areas that provide habitat for California red-legged frog and other special-status species, the County maintains a 20-foot buffer around aquatic habitat in compliance with two Court-ordered injunctions and uses formulations for use near water.

- **Burn Piles.** This work primarily occurs along County Park boundaries. The mass of each burn pile would be limited to 750 pounds/pile of woody debris and would be limited to a maximum of 33 burn piles/acre and 20 acres/year for fuel break maintenance.

- **Downed Tree Management.** This work occurs when a downed tree is significantly decreasing flood conveyance capacity or obstructing or deflecting streamflow causing bank erosion (particularly where infrastructure or adjacent properties are at risk), or where there's an opportunity to improve habitat value for fish and wildlife. The County considers these factors when determining whether a downed tree should be preserved, repositioned, or removed from the site and/or reused off-site. Resource agencies are typically notified at least 14 days prior to performing any LWD management/removal work.

- **Marina Maintenance.** These activities would be limited to minor repair and debris removal activities and would not require dredging. The estimated maximum work length for conducting in-water dock maintenance activities would be 50 LF and such work would primarily be limited to replacing dock flotations.

9.4 Best Management Practices

The general maintenance measures in **Table 9-1**, presented at the end of this chapter, typically apply to all maintenance practices. Others, such as erosion control measures, sediment and water quality control measures, and dewatering BMP are tailored for specific maintenance activities and reflect current recommended practices. These BMPs are summarized in Table 9-1, and more fully described in Appendix A (July 2018). Many of these were adopted from the County's original Maintenance Standards, which have been superseded by this document. **Table 9-2** identifies BMPs that should be implemented for cultural resource protection, as appropriate to the maintenance site. **Table 9-3** includes BMPs that are implemented for specific biological resources and habitat protection, as appropriate to the maintenance site. The BMPs in Appendix A and Tables 9-1 through 9-3, and this manual as a whole, are intended to be a living document that will be periodically updated to reflect new BMP technologies and maintenance techniques.

9.5 Mitigation Opportunities

This Section outlines and describes mitigation options available for offsetting the Maintenance Program's residual impacts on wetlands, waters, riparian resources, and federally and state listed species. Once the Program is operating under regulatory approvals and permits, annual mitigation will be provided as necessary to address any residual impacts that require compensatory action. Maintenance activities will be notified annually with mitigation needs also identified. The following discussion is intended to provide a context and basis for a variety of mitigation approaches that may be utilized.

9.5.1 Summary of Impacts to Wetlands, Waters, and Riparian Resources and the Federally or State Listed Species They Support

Tables B-1 and B-2 in Appendix B provide a representative overview of the types of maintenance projects that may be needed in the Program's first 5-10 years. The maintenance characterization sheets included in Appendix H, depict how routine maintenance activities for a given year typically involve vegetation and sediment removal at County roads, bridges and culvert crossings; bank stabilization and slip-out repairs along County roads near creeks and waterways; replacement of degraded culverts; bridge maintenance; trail maintenance; and marina maintenance activities. The maintenance characterization sheets in Appendix H provide more details about the types of issues at typical repair sites (e.g., bridges, culvert replacement, bank stabilization/slip-outs). As part of each annual notification, the County will prepare additional maintenance characterization sheets for sites planned for maintenance in a given year and not already addressed in Appendix H. Characterization sheets included in Appendix H will also be updated as maintenance needs may evolve over time.

Sediment removal, bank stabilization or slip-out repairs along creeks, bridge maintenance, and culvert repair/replacement activities may result in temporary and/or permanent impacts on wetlands and waters of the U.S. and/or state, as well as the federally and state listed species they support.

Impacts from bank stabilization and culvert repair or replacement projects can result in the permanent loss of vegetation and reduction in open channel areas. Use of rock to support culvert outfalls or bank repairs may result in fill of waters of the U.S. and therefore require mitigation for resulting impacts, including loss of habitat for federally or state listed species. Additional residual impacts will likely occur

as temporary impacts due to the time gap between when maintenance activities occur and when the restoration or mitigation actions are implemented.

9.5.2 Timing of Mitigation

Under the Maintenance Program, at the beginning of each year, the County would prepare an annual notification report summarizing all proposed maintenance activities for a given year. The tiering approach described earlier in the Chapter and in Chapter 2 would be applied to classify the types of impacts to federally or state listed species anticipated to occur at each maintenance site.

As discussed in Chapter 10, the notification report will summarize anticipated impacts on wetlands and waters of the U.S. and state, riparian resources, and federally and state listed species. The annual report will describe avoidance and minimization measures, BMPs, and mitigation that would be implemented to offset the Program's permanent impacts to wetlands/waters, riparian resources, and special-status species. Compensatory mitigation for impacts to waters of the U.S. would be provided in accordance with the "Mitigation Rule," which was established by the USEPA and USACE in 2008. Since then, the USACE published *Guidelines for Preparing a Compensatory Mitigation Plan*[1], Attachment 12501.6 – SPD Mitigation Ratio Checklist[2], and *2501-SPD Regulatory Program Standard Operating Procedure for Determination of Mitigation Ratios*[3] (2017). The County will provide compensatory mitigation for impacts on waters of the U.S. in accordance with the Mitigation Rule and the USACE's guidelines for preparing compensatory mitigation plans and determining mitigation ratios and Attachment 12501.6 – SPD Mitigation Ratio Checklist.

The County will provide compensatory mitigation for impacts on waters of the U.S. in accordance with the Mitigation Rule and the USACE's guidelines for preparing compensatory mitigation plans and determining mitigation ratios and Attachment 12501.6 – SPD Mitigation Ratio Checklist.

In addition, compensatory mitigation amounts will take into account potential effects on beneficial uses established in the San Francisco Bay and Central Coast RWQCBS' basin plans. Compensatory mitigation for impacts to wetlands will also take into account the California Wetlands Conservation Policy (Executive Order W-59-93). Objectives of this policy include:

1. To ensure no overall net loss and long-term net gain in the quantity, quality and permanence of wetlands acreage and values in California in a manner that fosters creativity, stewardship and respect for private property.

2. To reduce procedural complexity in the administration of State and Federal wetlands conservation programs.

[1] U.S. Army Corps of Engineers (USACE). 2010. Guidelines for Preparing a Compensatory Mitigation Plan. Last Revised October 7. Available: www.sac.usace.army.mil/Portals/43/docs/regulatory/Guidelines_for_Preparing_a_Compensatory_Mitigation_Plan f.pdf

[2] USACE. 2013. Attachment 12501.6 – SPD Mitigation Ratio Checklist. Available: www.spd.usace.army.mil/Missions/Regulatory/Public-Notices-and-References/Article/487060/12501-spd/.

[3] USACE. 2017. *2501-SPD Regulatory Program Standard Operating Procedure for Determination of Mitigation Ratios*. Available: www.spd.usace.army.mil/Portals/13/docs/regulatory/qmsref/ratio/12501-SPD.pdf

3. To encourage partnerships to make restoration, landowner incentive programs, and cooperative planning efforts the primary focus of wetlands conservation.

9.5.3 On-Site Mitigation Approach

For routine maintenance activities that take place outside of tidal wetland/other waters habitat within the USACE and/or RWQCB's jurisdiction, the preferred mitigation approach is on-site mitigation. The County will evaluate on-site mitigation opportunities to address impacts in the immediate vicinity of the maintenance project area. On-site and in-kind mitigation for impacts to wetlands and aquatic habitat would occur at a ratio of 1.5:1 (or 1.5 acres of wetlands/other waters will be restored/created for every 1 acre of wetlands/other waters permanently impacted by the County's maintenance activities).

The general on-site mitigation approach is to restore the type of habitat that is impacted by maintenance activities in the same project vicinity or stream reach where the disturbance has occurred. This approach not only compensates for the specific jurisdictional habitat that is impacted, it also results in restoration or enhancement of habitat for any special-status species that may be affected by the maintenance activity, thus compensating for impacts on those species as well.

If riparian habitats are affected, then the mitigation strategy is to re-establish riparian habitat on-site. This could involve planting riparian vegetation, removing non-native plants, or enhancing this type of habitat along or near the impacted site. Another on-site or off-site mitigation approach involves geomorphic stabilization and restoration of the channel bed. This type of activity may be suitable when the current active channel has severely eroded and incised deep into its bed, cutting the channel off from adjacent bench or floodplain areas, generating significant sediment loads carried downstream, and potentially undermining infrastructure. The County is currently partnering with the San Mateo RCD on such a project that will address past channel bed incision at the Cloverdale Road bridge crossing at Butano Creek while also stabilizing and enhancing the channel bed in a manner that will improve habitat for special-status fish species, water quality, and floodplain connectivity. For on-site riparian and wetland mitigation projects, the County would restore, preserve, and manage riparian and wetland habitats or substantially improve the quality of highly degraded riparian habitats at a ratio of 1.5:1 (or 1.5 acres of riparian habitat will be restored/created for every 1 acre of riparian habitat impacted by proposed maintenance activities).

For creek bank stabilization projects, the County would seek to implement biotechnical solutions, as conditions allow, to avoid or minimize the potential hardening of creek banks. By implementing biotechnical solutions such as vegetated rock slope protection or vegetated soil lifts, such projects may be self-mitigating.

Past On-Site Mitigation Examples

As an example, the County recently conducted bank stabilization work along Los Trancos Creek and Alpine Road in Portola Valley. The County used biotechnical slope stabilization techniques by installing live willow stakes and rock to stabilize the creek bank at the base of a newly installed retaining wall. While on-site willow plantings were self-mitigating for this project, additional off-site mitigation was required to offset residual permanent impacts of the new retaining wall.

To compensate for wetland impacts associated with the Colma Creek Flood Control Channel Wall Repair Project and subsequent concrete channel repair work completed at Spruce Avenue bridge, the County monitored and enhanced salt marsh habitat at four mitigation sites near the mouth of Colma Creek. Three of these sites were established in 2006 for a prior project on Colma Creek involving floodwall

construction between San Mateo Avenue and Produce Avenue and were continually monitored; the fourth site was established for work conducted at the Spruce Avenue bridge. As part of these mitigation efforts, the County planted native plants and removed invasive plants and trash at these sites. Three of the sites have been monitored by the County since 2006 and the fourth site has been monitored since 2011. Two of the mitigation sites have met established success criteria.

9.5.4 Off-Site Mitigation Approach

Off-site mitigation can provide opportunities for in-kind mitigation that aligns with the functions and values of natural resources that are potentially impacted by the maintenance program but is done at a different location than where the maintenance occurs. The general approach is to conduct off-site mitigation within the same watershed or general region as where the maintenance activities occur. This type of mitigation is similar to the on-site option in that the focus is to provide in-kind habitat enhancement or restoration, stream function improvement, water quality benefits, or overall watershed health improvements that offset maintenance impacts or reduce the need for maintenance. This could involve planting riparian vegetation, removing non-native plants, or enhancing habitat in offsite locations which share similar qualities or conditions to the routine maintenance site. For off-site mitigation approaches, the County will acquire, preserve, enhance, and manage lands that provide similar ecological functions and values to the riparian or wetland habitat impacted by program maintenance activities at a ratio of 3:1 (or 3 acres of riparian or wetland habitat will be acquired, preserved, and enhanced for every 1 acre of riparian or wetland habitat impacted by the County's maintenance activities).

Off-Site Mitigation Example

As an example of this type of mitigation, for the recent Butano Creek at Pescadero Creek Road Sediment Removal Project, the County enhanced 0.33 acre of riparian habitat at an off-site location (adjacent to the closed Pescadero Landfill off Bean Hollow Road). The mitigation site is located on County-owned property, near the maintenance site approximately 0.6 mi away, but not directly on-site. The mitigation project included restoring an erosive gully that was sending an excessive amount of sediment downstream to the Pescadero Butano Marsh. The County also enhanced riparian wetland habitat by removing invasive plants and planting native willow trees, shrubs and wetland species. Erosion control measures and repairs were conducted to reduce the active erosion at this site. This example demonstrates how an off-site mitigation project can be identified which also addresses longer-term sustainability approaches. The maintenance project was needed due to sedimentation occurring beneath a bridge crossing. The mitigation project addresses reducing erosion and sedimentation in the watershed. So, in this case, the nature of the maintenance project and the mitigation project are aligned, so that the mitigation project will improve overall watershed conditions.

Potential Off-Site Mitigation Options

The following Section describes potential off-site mitigation options throughout the County.

In 2015, the Parks Department conducted a pilot restoration project at the mouth of San Vicente Creek in Moss Beach which flows through Fitzgerald Marine Reserve and into the Pacific Ocean. This pilot project, referred to as phase I of the San Vicente Creek Enhancement Project, focused on enhancing 0.5 acres along San Vicente Creek by removing invasive plants including cape ivy and ice plant, and replanting native vegetation. The overall acreage of the greater San Vicente Creek Enhancement Project is approximately 3.5 acres. While this pilot project did not provide mitigation credit for a specific project, the Parks Department has received mitigation funds to restore a 0.3-acre portion of the overall San

Vicente Creek Enhancement Project area as mitigation credit for the Surfer's Beach project which is needed to comply with a Coastal Development Permit Amendment (No. 1-98-057-A3). Portions of the overall San Vicente Creek Enhancement Project have been partially funded through mitigation funds for other projects including a development adjacent to Mirada Surf West and project activities at the Half Moon Bay Airport. Similarly, future restoration efforts at the San Vicente Creek Enhancement Project could serve as a mitigation option for future maintenance activities that occur in the Coastside through this Maintenance Program.

Additionally, the Parks Department recently completed sediment reduction projects at the Keystone Creek and Hardwood Creek crossings on Old Haul Road in Pescadero Creek Park. Treatment of the Harwood Creek and the Keystone Creek crossing sites involved replacing an undersized 36-inch diameter culvert, installing a new ditch relief culvert and excavating about 2,500 cy of residual fill material at each crossing. The work at Hardwood Creek and Keystone Creek was completed in 2018.The Parks Department plans to conduct another sediment reduction project at the Dark Gulch, a tributary to Pescadero Creek. The Dark Gulch project is the largest of these sites and involves excavating about 35,000 cubic yards of material, and would address episodic sediment delivery into the mainstem of Pescadero Creek. This site is a large actively failing crib log crossing with fill up to 65 feet in depth. The work at Dark Gulch is currently in the design phase, anticipated to be complete in 2020, and will undergo a separate CEQA process. Similarly, the Parks Department is planning to complete four other high priority erosion and sediment reduction projects along Old Haul Road within Pescadero Creek Park. While these sediment reduction projects would undergo separate CEQA and permitting processes from the Maintenance Program, these beneficial projects may provide compensatory mitigation for residual impacts associated with the Maintenance Program. These projects would also help meet the goals and requirements identified in the Butano-Pescadero Watershed Sediment TMDL.

The Parks Department has conducted and plans on conducting invasive plant and tree removal on Park lands, which may provide mitigation credit for the Maintenance Program. The Parks Department spearheads a volunteer program called Parks Stewardship Corps, a program that gets volunteers and park staff working together at different County parks on a weekly basis. The Parks Stewardship Corps typically leads workdays focused on removing invasive weeds and installing native species. The Parks Stewardship Corps plans on conducting invasive plant removal and planting pickleweed and gum plants at Coyote Point Marina. In addition, within the last few years, the Parks Stewardship Corps Program removed a large amount of invasive plants at the Colma Creek headwaters and replanted the area with approximately 700 native plant species. Note that while this area is within the San Bruno Mountain HCP planning area, these efforts were not completed to satisfy mitigation requirements. These recent invasive plant removal and native planting efforts may satisfy mitigation requirements for the first year's maintenance projects under this Program.

Other off-site mitigation options include gully repair and large woody debris implementation projects, including felling of hazard trees into creek channel to enhance habitat in the Pescadero-Butano Creek watershed (and other salmonid streams), invasive plant removal at Quarry Park in Half Moon Bay, and creek restoration in Junipero Serra County Park. In particular, the Department would like to remove concrete from El Zanjon Creek, which would provide mitigation credit for maintenance activities conducted on the Bayside of the County.

9.5.5 Conservation Easements and Deed Restrictions

Establishing conservation easements or deed restrictions are another option for providing off-site mitigation. As an example, the County plans to provide off-site habitat mitigation for impacts to the

California red-legged frog and San Francisco garter snake from the Butano Creek Sediment Removal Project by establishing a conservation management area (0.56 acre) to preserve and manage off-site conservation lands that provide habitat for these two species. The conservation area is located on County-owned land to the south of Pescadero Creek Road between the County's corporation yard and land formerly used as a County landfill. This conservation area is approximately 0.6 miles from the maintenance site. Future management of the conservation area will include maintaining aquatic habitat including management of invasive species (i.e., bullfrogs and invasive plant species such as jubata grass), surveying hydrology and vegetation, and monitoring for presence of California red-legged frog and San Francisco garter snake.

The County is considering expansion of the conservation area on adjacent County-owned land that would conserve a mosaic of habitats suitable for these species such that the overall conservation area could be as much as 55 acres. By establishing a restricted covenant deed on this land, the conservation area provides opportunities for the County to "bank" mitigation for these species by managing larger patches of habitat than are needed as mitigation for any particular year's activities and debiting mitigation requirements on an annual basis from the total mitigation provided.

9.5.6 Partner with Local Watershed Organizations

An additional opportunity to provide mitigation for routine maintenance activities is found through partnering with local San Mateo County based watershed, stewardship, or non-profit organizations that lead or coordinate habitat restoration or watershed improvement projects. The County can assist such organizations through funding projects that improve water quality and restore habitats and ecosystem projects in San Mateo County. In so doing, the County can provide locally based mitigation to offset impacts associated with routine maintenance activities.

For example, the County partnered with the California Native Plant Society (CNPS) on the Heart of the Mountain Program, a stewardship program focused on restoring native plant communities in the Colma Creek headwaters area. The program was initiated by CNPS in 2001 and funded through multiple grants up to 2004. In 2003, the County Parks Department also received Proposition 12 grant funds to support continuing volunteer efforts started by CNPS to restore the headwaters on San Bruno Mountain. Between 2004 and 2008, the primary improvements involved clearing invasive weeds including 50 large and 100 small eucalyptus and cypress trees, removal of invasive plants (e.g., English and Cape ivy, and Himalayan blackberry), erosion control improvements along a 500-foot Section of the creek channel, mulch spreading, and planting of native riparian, coastal scrub and grassland plant communities (Watershed Project 2008). Volunteers helped with various planting of native plants and invasive weed removal. The County could partner with CNPS on a similar effort as this stewardship program to provide mitigation credit for the overall Maintenance Program.

The San Mateo County Resource Conservation District (RCD) is a special district created by the community that addresses specific resource management needs such as fire protection, conservation of open space, floodplain restoration, erosion control, and flood management. The County has successfully partnered with the San Mateo County RCD on several past projects to improve watershed conditions. One project currently under development is the Butano Channel Creek Channel Reconnection and Resilience Project. This particular project involves dredging roughly 8,000 feet of the historic Butano Creek channel (45,000 cubic yards of sediment) and re-using dredged material to fill historic man-made pits in effort to restore Pescadero Marsh Natural Reserve. The project will not only reduce flooding of Pescadero Creek Road but is also expected to improve fish passage and habitat for protected species including coho salmon, steelhead, California red-legged frog, and San Francisco garter snake.

The San Mateo RCD leads the Rural Roads Program and participates in the Integrated Watershed Restoration Program (IWRP). The Rural Roads Program was initiated to reduce excessive sedimentation from roads. Sediment from roads can degrade fish habitat, impact bank stability and the stream's conveyance capacity, and adversely affect water quality. Through the Rural Roads Program, the San Mateo RCD has conducted road assessments and developed strategies to improve roads and work with landowners and managers to ensure proper maintenance of rural roads. The IWRP is a partnership of the RCDs of Santa Cruz, Monterey, and San Mateo Counties with the California State Coastal Conservancy. The IWRP facilitates high priority conservation projects through coordination of resource agencies with funding and permitting authorities, and helps resource agencies at the local, federal and state level meet legal mandates through voluntary conservation projects on private and public lands. Example projects that have been completed in San Mateo County through the IWRP include gauging streamflow in Pescadero, Butano and San Gregorio creeks; removal of fish barriers for migrating salmon and steelhead; enhanced habitat complexity features in critical stream reaches; and restoration of Pescadero and San Gregorio lagoons (San Mateo RCD 2017). Into the future, the County will have more opportunities to help fund efforts such as the Butano Creek Channel Reconnection and Resilience Project, the Rural Roads Program, or IWRP. Funding such projects and programs can provide several watershed benefits and is an effective and appropriate mitigation approach to offset potential impacts of the routine maintenance program.

9.5.7 Mitigation Banks

Another suitable option to mitigate the Maintenance Program's impacts on wetlands and waters of the U.S. is to purchase mitigation credits from the a wetland mitigation bank. This option was recently pursued to provide mitigation for the County's Colma Creek Flood Control Channel Maintenance Project, which involves sediment removal and culvert repair and replacement work in the cities of Colma and South San Francisco. The USACE recommended and preferred that the County purchase wetland mitigation credits at a 1:1 ratio from the San Francisco Bay Wetland Mitigation Bank versus implementing other on-site or off-site mitigation options led by the County. Note that the San Francisco Bay Wetland Mitigation Bank's service area is limited to serving projects that result in impacts on tidal habitat on the County's Bayside only. The San Francisco Bay Wetland Mitigation Bank is also in its final phase of credit release and may not have credits available once the Maintenance Program is operating. As there are currently no other wetland mitigation banks in San Mateo County, the appropriate mitigation ratio for purchase of wetland mitigation credits will be determined through coordination with the owner of any bank that is approved int eh future, as well as with the USACE and RWQCB.

Depending on the Program's potential impacts on specific special-status species, the County may also purchase compensatory credits from other mitigation banks that provide additional types of habitat that serve San Mateo County. For example, mitigation bank options that provide credits for California red-legged frog include:

- Sparling Ranch Conservation Bank
- Mountain House Conservation Bank
- North Bay Highlands Conservation Bank
- Ohlone Preserve Conservation Bank
- Ourson Ridge Conservation Bank

9.5.8 Compensatory Mitigation for Loss of Habitat for Federally or State-listed Species

As previously described, routine maintenance activities could result in loss of habitat supporting special-status species such as the California red-legged frog, California tiger salamander, and San Francisco garter snake. Compensation for the long-term loss of habitat for such species would occur via options described above, including: restoration, enhancement, and/or management of suitable habitat on County lands (either existing lands or lands that are already acquired); financial contribution to local County based watershed, stewardship, or non-profit organizations that lead or coordinate habitat restoration or watershed improvement projects; or purchasing credits from a USFWS-approved conservation bank. Compensatory mitigation for permanent loss of breeding habitat for California red-legged frog, California tiger salamander, and San Francisco garter snake will be provided at a ratio of up to 3:1. Compensatory mitigation for long-term loss of upland dispersal or refugial habitat for these species will be provided at a ratio of 2:1, on an acreage basis.

9.5.9 Mitigation Monitoring

For any mitigation efforts that the County will undertake in support of the Maintenance Program, they will ensure adequate monitoring to document that the mitigation is operational and successfully providing the functions and valued needed to offset potential Program impacts. For County-led on-site and off-site mitigation projects, the County will be responsible to monitor such projects for a period of 3-5 years depending upon the type of mitigation project. For watershed partnering mitigation projects in which the County serves as a partner funding the mitigation through an agency such as the San Mateo RCD, it's anticipated that the local partner (i.e., RCD) will monitor and provide reporting on the site for 3-5 years. While it's the watershed partner's responsibility to monitor site conditions, it will be the County's responsibility to communicate monitoring results annually as part of the County Maintenance Program's reporting process. The annual notification and reporting actions are described in Chapter 10 in more detail. Specific details describing the monitoring responsibilities of the County will be included in each year's annual notification and summary report of routine maintenance conducted.

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Table 9-1. Maintenance Program Best Management Practices

BMP Number	BMP Title	BMP Description
General Avoidance and Minimization Measures		
GEN-1	Staging and Access	▪ Staging, access, and parking areas will be located outside of sensitive habitats to the extent feasible. ▪ Staging areas will be located 30 feet from the top of bank (or as far as feasibly possible) or on the outboard side of levees. ▪ Vegetation removal shall be limited to the minimum amount necessary to provide access.
GEN-2	Minimize Area of Disturbance and Site Maintenance	▪ Areas of disturbance will be limited to the smallest footprint necessary and a single access pathway, where feasible. For maintenance activities near waterways or other sensitive habitat, the designated work area shall be clearly identified in the field using highly visible material, and work will not be conducted outside this area. ▪ Keep excavated soil and materials on the site where they will not collect into the street or get transported to storm drains or nearby water bodies by rainfall or runoff in order to avoid deleterious effects to fish, wildlife, and beneficial uses. ▪ Transfer excavated materials to dump trucks on the site, not in the street.
GEN-3	Construction Entrances and Perimeter	▪ Establish and maintain effective perimeter controls and stabilize all construction entrances and exits to sufficiently control erosion and sediment discharges from site and tracking off site. ▪ Sweep or vacuum any street tracking immediately and secure sediment source to prevent further tracking. Never hose down streets to clean up tracking. ▪ When in-channel work is required, where available use existing ingress or egress points or perform work from the top of the stream banks.
GEN-4	Salvage/Reuse of Plant and Woody Material	▪ Large wood or weed-free topsoil displaced by project activities may be stockpiled for use during site restoration. Native vegetation displaced by project activities will be stockpiled if it would be useful during site restoration. ▪ Stockpiled material shall not be placed over riparian or wetland vegetation. Stockpiled material shall not be placed in areas where it could enter the stream, riparian or wetland areas. ▪ To the extent feasible, all other woody material that is not re-usable should be disposed at a composting facility.
GEN-5	Non-Hazardous Materials	▪ Berm and cover stockpiles of sand, dirt or other construction material with tarps when rain is forecast or if not actively being used within 14 days.
GEN-6	Hazardous Materials Storage/ Disposal	▪ Label all hazardous materials and hazardous wastes (such as pesticides, paints, thinners, solvents, fuel, oil, and antifreeze) in accordance with city, county, state, and federal regulations. ▪ Store hazardous materials and wastes in watertight containers, store in appropriate secondary containment, and cover them at the end of every workday or during wet weather or when rain is forecast. ▪ Follow manufacturer's application instructions for hazardous materials and be careful not to use more than necessary. Do not apply chemicals outdoors when rain is forecast within 24 hours. ▪ Arrange for appropriate disposal of all hazardous wastes.

BMP Number	BMP Title	BMP Description
GEN-7	Spill Prevention and Control	• Keep spill cleanup materials (rags, absorbents, etc.) available at the construction site at all times. • Inspect vehicles and equipment frequently for and repair leaks promptly. On-site monitor should insect beneath all vehicles that have been parked more than 15 minutes before they leave the work area. Use drip pans to catch leaks until repairs are made. • Clean up spills or leaks immediately and dispose of cleanup materials properly. • Do not hose down surfaces where fluids have spilled. Use dry cleanup methods (absorbent materials, cat litter, and/or rags). • Sweep up spilled dry materials immediately. Do not try to wash them away with water or bury them. If water must be used, the Contractor shall collect the water and spilled fluids and dispose of it as hazardous waste. • Clean up spills on dirt areas by digging up and properly disposing of contaminated soil. • Small spills (less than 18 inches in diameter) including small quantities of oil, gasoline, paint or other materials should be controlled by the first responder (maintenance staff) and do not necessarily require an emergency response team. Medium spills (greater than 18 inches but less than 6 feet in diameter) are typically controlled by the first responder (maintenance staff) but police or fire department HAZMAT teams may be called based on conditions. Report significant spills (larger than 6 feet in diameter and any "running" spill) immediately. You are required by law to report all significant releases of hazardous materials, including oil. To report a spill, contact the San Mateo County Environmental Health Services Division, or other emergency office (e.g., local fire or police department) as warranted, immediately and document the spill using the spill documentation form . Alternatively, 1) dial 911, the local emergency response number, 2) the National Response Center at (800) 424-8802; or 2) call the Governor's Office of Emergency Services Warning Center, (800) 852-7550 (24 hours). As appropriate, contact other agencies including California Occupational Safety and Health Administration or the Regional Water Quality Control Board. All chemical spills shall be reported as soon as possible to the emergency site contact.
GEN-8	Waste Management	Cover waste disposal containers securely at the end of every workday and during wet weather. ▪ Check waste disposal containers frequently for leaks and to make sure they are not overfilled. Never hose down a dumpster on the construction site. ▪ Ensure that portable toilets have a secondary containment plan (e.g., a containment pan). ▪ Clean or replace portable toilets and inspect them frequently for leaks and spills. ▪ Dispose of all wastes and debris properly. Recycle materials and wastes that can be recycled (such as asphalt, concrete, aggregate base materials, wood, gyp board, pipe, etc.) ▪ Dispose of liquid residues from paints, thinners, solvents, glues, and cleaning fluids as hazardous waste.
GEN-9	Vehicle Maintenance and Parking	▪ Designate an area, fitted with appropriate BMPs, for vehicle and equipment parking and storage. ▪ Perform major maintenance, repair jobs, and vehicle and equipment washing off site. ▪ Conduct vehicle and equipment cleaning at County corporation yards and ensure that rinse water does not run into gutters, streets, storm drains, or surface waters.

BMP Number	BMP Title	BMP Description
		▪ If refueling or vehicle maintenance must be done on-site, work in a bermed area (e.g., sandbags, gravel bags, compost socks, or other barrier material) at least 150 feet away from creek channels, away from storm drains and over a drip pan big enough to collect fluids. ▪ Refuel vehicles at least 150 feet away from the active stream channel. ▪ Keep an ample supply of spill clean-up materials near fueling, vehicle maintenance and hazardous materials/hazardous waste storage areas. Inventory clean-up materials monthly and restock as needed. ▪ Post proper fueling and spill clean-up instructions at fueling areas. Never leave the area while equipment is being filled. ▪ Recycle or dispose of fluids as hazardous waste. ▪ Do not clean vehicle or equipment on-site using soaps, solvents, degreasers, steam cleaning equipment, etc. ▪ Perform vehicle and mobile equipment steam cleaning, pressure washing or degreasing only over a containment designed to collect any generated wash water. Collect wash water and discharge to sewer via an oil water separator. Do not pour wash water down storm drains or sewers connected to septic systems.
GEN -10	Equipment Maintenance & Fueling	▪ A separate area should be designated for equipment maintenance and fueling, away from any slopes, watercourses, or drainage facilities. ▪ Equipment should not be stored in areas that will potentially drain to watercourses or drainage facilities. If equipment must be stored in areas with the potential to generate runoff, drip pans, berms, gravel bags, or absorbent booms should be employed to contain any leaks or spills. ▪ Equipment should be inspected daily for leaks or damage and promptly repaired. ▪ Fueling and maintenance of vehicles should take place at least 65 feet away from waterways. ▪ In the event of a spill, follow procedures outlined in BMP GEN-7.
GEN-11	Paving and Asphalt Work	▪ Avoid paving and seal coating in wet weather or when rain is in the forecast, to prevent materials that have not cured from contacting stormwater runoff. ▪ Cover storm drain inlets and manholes when applying seal coat, tack coat, slurry seal or fog seal; and when saw cutting asphalt or concrete. ▪ Collect and recycle or appropriate dispose of excess abrasive gravel or sand. Do not sweep this material into gutters. ▪ Do not use water to wash down fresh asphalt concrete pavement. ▪ Use filter fabric, catch basin inlet filters, or gravel bags to keep slurry out of the storm drain system. ▪ Shovel, absorb or vacuum saw-cut slurry and dispose of all waste as soon as work is complete in one location or at the end of the workday. ▪ If sawcut slurry enters a catch basin, clean it up immediately.
GEN-12	Concrete, Grout and Mortar Application	▪ Store concrete, grout, and mortar away from storm drains or waterways, and on pallets under cover to protect them from rain, runoff and wind. ▪ Wash out concrete equipment/trucks offsite or in a designated washout area, where the water will flow into a temporary waste pit, and in a manner that will prevent leaching into the underlying soil or onto surrounding areas. Let concrete harden and dispose of as garbage.

BMP Number	BMP Title	BMP Description
		▪ When washing exposed aggregate, prevent wash water from entering storm drains. Block any inlets and vacuum gutters, hose wash water onto dirt areas, or drain onto a bermed surface to be pumped and disposed of properly.
GEN-13	Exclude Concrete from Channel	▪ For maintenance activities that involve concrete pouring, the County shall ensure that poured concrete be excluded from the wetted channel for a period of 30 days after it is poured. During that time, the poured concrete shall be kept moist, and runoff from the concrete shall not be allowed to enter a stream. Containment structures should be installed to control the placement of wet concrete and to prevent it from entering the channel outside of those structures. ▪ Commercial sealants may be applied to the poured concrete surface where difficulty in excluding water flow for a long period may occur. If sealant is used, water shall be excluded from the site until the sealant is dry. ▪ No dry concrete shall be placed on the banks or in a location where it could be carried into the channel by wind or runoff.
GEN-14	Concrete Washout Facilities	▪ Concrete washout facilities should be established for maintenance activities that require on-site preparation and use of Portland cement concrete, asphalt concrete or cement mortar, establish concrete washout facilities. These facilities capture wash water, concrete and aggregate flushed from concrete mixers, chutes, etc. Concrete washouts may be contained settling basins dug into the ground, raised and contained structures, trailers, etc. They are also applicable for projects that require equipment washouts. ▪ An appropriate area for the washout must be identified at least 50 feet away from watercourses and storm drains in case of accidental breaching. The storage capacity of the basin must be sized correctly for the job. <u>Construction Guidelines:</u> ▪ The location of the concrete washout should be clearly labeled and all employees should be educated about proper concrete disposal. ▪ Avoid mixing excess amounts of fresh concrete or cement mortar on-site. ▪ Wash out concrete mixers only in designated washout areas where the water will flow into temporary sealed basins or onto stockpiles of aggregate base or sand. Use as little water as possible to reduce hardening and evaporation time of waste products. ▪ Construct a basin large enough to contain all liquid and waste concrete materials generated during washout procedures. A minimum basin size is 9 feet x 9 feet and 2 feet deep. Plastic liner materials shall be a minimum of 60-mil polyethylene sheeting free of holes and defects. ▪ Recycle washout by pumping back into mixers for reuse when possible. <u>BMP Maintenance:</u> ▪ The concrete washout should be checked frequently to ensure proper use and effectiveness. ▪ At 75 percent capacity, the washout must be cleaned or new facilities must be constructed and ready for use. <u>BMP Removal:</u> ▪ The hardened concrete and materials related to the washout must be broken up, removed, and disposed of in accordance to local regulations. ▪ Area disturbed by the concrete washout must be repaired.

BMP Number	BMP Title	BMP Description
GEN-15	Painting and Paint Removal	▪ Never clean brushes or rise paint containers into a street, gutter, storm drain, or stream. ▪ For water-based paints, paint out brushes to the extent possible, and rinse into a drain that goes to the sanitary sewer. Never pour paint down a storm drain. ▪ For oil-based paints, paint out brushes to the extent possible and clean with thinner or solvent in a proper container. Filter and reuse thinners and solvents. Dispose of excess liquids as hazardous waste. ▪ Paint chips and dust from non-hazardous dry stripping and sand blasting may be swept up or collected in plastic drop cloths and disposed of as trash. ▪ Chemical paint stripping residue and chips and dust from marine paints or paints containing lead, mercury, or tributyltin must be disposed of as hazardous waste. Lead based paint removal requires a state-certified contractor.
GEN-16	Timing of Work	▪ In general, routine maintenance and construction activities that take place in sensitive habitat and/or in channels below ordinary high water will be conducted during the dry season (June 15 through October 15). Maintenance activities that are in upland areas and that would not affect streams may occur during low rainfall years at times when there is no predicted rainfall (chance of precipitation is less than 30 percent chance of rain). Activities that are subject to permit requirements will be conducted during the period authorized by the permits.
GEN-17	Maintain Traffic Flow	▪ To the extent feasible, work shall be staged and conducted in a manner that maintains two-way traffic flow on roadways in the vicinity of the work site. ▪ Heavy equipment and haul traffic shall be prohibited in residential areas to the greatest extent feasible. When no other route to and from the site is available, heavy equipment and haul traffic through residential areas shall be restricted to the hours of 8 a.m. to 5:30 p.m., Monday through Friday. ▪ If heavy equipment or hauling is required beyond the hours above, the County or their contractor would provide notice to adjacent property owners 48 hours in advance of such activities.
GEN-18	Traffic Control and Public Safety	▪ In the event that work activities require the temporary closure of any traffic lanes, the County shall implement measures to guide traffic (such as signage and flaggers), safeguard construction workers, provide safe passage of vehicles, and minimize traffic impacts through the duration of work activities. The County also shall notify local emergency service providers regarding any planned lane closures. ▪ For any other work within or near the roadway that could pose a hazard to the public, the County shall install/implement appropriate measures, such as fences, barriers, flagging, guards, and/or signs, to give adequate warning and provide protection from the potentially dangerous condition. ▪ For work activities along or near roadways with sidewalks and bike lanes, the County shall implement measures to ensure the safe passage of pedestrians and bicyclists around the work site. ▪ Where work is proposed at a recreational park or trail, warning signs will be posted several feet beyond the limits of work. Signs will also be posted if trails will be temporarily closed. ▪ Public transit access and routes will be maintained in the vicinity of the work site. If public transit will be affected by temporary road closures and require detours, affected transit authorities will be consulted and kept informed of project activities.

BMP Number	BMP Title	BMP Description
GEN-19	Dust Management Controls	The County will implement the Bay Area Air District (BAAD) Basic Dust Control Measures. Current measures stipulated by the BAAD Guidelines include the following: 1. All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day. 2. All haul trucks transporting soil, sand, or other loose material off-site shall be covered. 3. All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited. 4. All vehicle speeds on unpaved roads shall be limited to 15 mph. 5. All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used. 6. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points. 7. All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified visible emissions evaluator.
GEN-20	Firearms	No firearms (except for federal, State, or local law enforcement officers and security personnel) will be permitted at the project site to avoid harassment, killing or injuring of wildlife.
GEN-21	Domestic Animals	No animals (e.g., dogs or cats) can be brought to the project site to avoid harassment, killing or injuring of wildlife.
GEN-22	Site Stabilization	Earthwork will be completed as quickly as possible, and where practical, site restoration will occur immediately following maintenance. If site restoration involves planting, such activities may commence in late fall or early winter during the onset of rainy season. Bare soil surfaces resulting from maintenance and/or construction activities shall be covered with suitable erosion controls (seed or plant vegetation, fabrics, hydroseeding, mulch, etc.): ▪ Within 12 hours of any break in work unless project activities will resume within 7 days. ▪ No later than 3 days following the disturbance during the rainy season (approximately October through April). ▪ No later than 7 days following the disturbance during the dry season (approximately May through September).Every effort shall be made to immediately cover bare soil surfaces resulting from maintenance and/or construction activities prior to storms. Revegetation activities will include only local plant materials native to the San Francisco Peninsula region.
GEN-23	Fire Prevention	1. All earthmoving and portable equipment with internal combustion engines will be equipped with spark arrestors. 2. During the high fire danger period (April 1–December 1), work crews will: ▪ Have appropriate fire suppression equipment available at the work site. ▪ Keep flammable materials, including flammable vegetation slash, at least 10 feet away from any equipment that could produce a spark, fire, or flame.

BMP Number	BMP Title	BMP Description
		▪ Not use portable tools powered by gasoline-fueled internal combustion engines within 25 feet of any flammable materials unless a round-point shovel or fire extinguisher is within immediate reach of the work crew (no more 25 feet away from the work area).
GEN-24	Investigation of Utility Line Locations	An evaluation of the locations of utility lines that could be affected by maintenance activities will be conducted annually as part of the preparation of the Annual Notification. Utilities will be avoided as much as possible. For maintenance areas with the potential for effects on utility services, the following measures will be implemented: 1. Utility excavation or encroachment permits will be required from the appropriate agencies. These permits include measures to minimize utility disruption. The County and its contractors will comply with permit conditions. Such conditions will be included in construction contract specifications. 2. Utility locations will be verified through a field survey (potholing) and use of the Underground Service Alert services. 3. Detailed specifications will be prepared as part of the design plans to include procedures for the excavation, support, and/or fill of areas around utility cables and pipelines. All affected utility services will be notified of the County's maintenance plans and schedule. Arrangements will be made with these entities regarding protection, relocation, or temporary disconnection of services. 4. Residents and businesses in the project area will be notified of planned utility service disruption 2 to 4 days in advance, in conformance with state standards. 5. Disconnected cables and lines will be reconnected promptly.
GEN-25	Retention of Tree Stumps / Rootwads	▪ Objects embedded/anchored in the bank, such as tree stumps, shall not be removed if removal could result in release of sediment into the channel. Stumps and rootwads that potentially serve as basking sites or that encourage pool formation should be left in place whenever possible. Protruding objects that could capture additional debris and result in obstruction of the channel (e.g. the branches and trunk of a downed tree) may be trimmed. If an embedded object must be removed to prevent a debris jam, turbidity control practices shall be used, and the bank shall be reseeded, re-vegetated and/or mulched following removal.
GEN-26	Decontamination of Project Equipment and Vehicles	▪ Equipment, boots and waders used for in-water maintenance activities will be decontaminated prior to entering and exiting the maintenance site and/or between each use in different water bodies to avoid the introduction and transfer of organisms between water bodies. Methods to be employed may include: drying, using a hot water soak, or freezing, as appropriate to the type of gear or equipment. The County shall begin the decontamination process by thoroughly scrubbing equipment, paying close attention to small crevices such as boot laces, seams, net corners, etc., with a stiff-bristled brush to remove all organisms. To decontaminate by drying, the County shall allow equipment to dry thoroughly (i.e., until there is a complete absence of water), preferably in the sun, for a minimum of 48 hours. To decontaminate using a hot water soak, the County shall immerse equipment in 140°F or hotter water and soak for a minimum of 5 minutes. To decontaminate by freezing, the County shall place equipment in a freezer 32°F or colder for a minimum of 8 hours. Repeat decontamination is required only if the equipment/clothing is removed from the site, used within a different waterbody, and returned to the project site.

BMP Number	BMP Title	BMP Description
		▪ Vehicles, watercraft, and other maintenance equipment used for in-water maintenance activities that are too large to immerse in a hot water bath shall be decontaminated by pressure washing with hot water (minimum of 140°F at the point of contact or 155°F at the nozzle or by using other effective techniques). Watercraft engines and all areas that could contain standing water (e.g., live wells, bilges, etc.) shall be flushed for a minimum of 10 minutes. Following the hot water wash, vehicles, watercraft and equipment shall be dried as thoroughly as possible. ▪ A bleach solution shall be used to decontaminate vehicles, watercraft and other maintenance gear and equipment at a designated location where runoff can be contained and not allowed to enter streams or other sensitive habitat areas.
GEN-27	Vegetation and Tree Removal	▪ The disturbance or removal of vegetation shall not exceed the minimum necessary to complete maintenance activities. The use of bulldozers, backhoes, or other heavy equipment to remove vegetation along stream banks shall be avoided wherever feasible. ▪ The County may remove up to two non-hazardous trees greater than 12 inches in diameter per year from natural channels below ordinary high water if the trees are restricting the capacity of the channel, causing erosion or flooding, or limiting access to perform maintenance work. Trees will be cut at ground level and the root mass left in place to maintain bank stability. No non-hazardous trees greater than 36 inches in diameter will be removed under this program. This measure does not apply to trees considered a hazard as defined by the International Society of Arboriculture, which may include dead or dying trees, dead parts of live trees, or unstable live trees (due to structural defects or other factors) that are within striking distance of people or property (a target) that have the potential to cause death, injury, or substantial property damage. ▪ Removed vegetation shall be placed directly into a disposal vehicle and removed from the site, and shall not be permitted to remain onsite overnight. However, if removed vegetation will be used onsite for erosion control or slash and will not be moved or disturbed, it may be stockpiled onsite for longer than an overnight. Stockpiled vegetation shall not be piled on the ground unless it is later transferred, piece by piece, under the direct supervision of the biological monitor or qualified biologist.
GEN-28	Herbicide Application	▪ Herbicide application shall only be conducted when the climate is dry and when wind speeds do not exceed 7 miles per hour. Herbicides shall not be used in or adjacent to any fish-bearing stream, lake, pond or other water bodies supporting suitable habitat for California red-legged frog or other listed species.
Erosion Control Measures		
EC-1	Brush Layering	Brush layering is a technique used to stabilize shallow slope failures or rebuild fill slopes with live brush cuttings (usually willows or other types of branches) with soil backfill or soil lifts. Live brush layers act as horizontal drains and improve slope stability by providing tensile strength and natural revegetation. Brush layering may include the use of fabric soil wraps, large vegetated boulder revetments, or other structural toe support. Synthetic geogrids can only be used with prior agency approval. For a more detailed description of this BMP, refer to Appendix A.
EC-2	Brush Packing	Brush packing is a biotechnical gully and slump repair technique. Brush packing utilizes alternating layers of live branch cuttings (from rootable plant species) and soil to repair large rills, gullies, and slumps. The brush packing technique is more

BMP Number	BMP Title	BMP Description
		appropriate for the repair of gullies on slopes, and it can be implemented with hand labor. For a more detailed description of this BMP, refer to Appendix A.
EC-3	Live Staking	Live staking involves the insertion of live, vegetative cuttings into the ground in a manner that allows the cutting (stake) to take root and grow. This BMP is used to reduce the potential for soil to become water borne, to reduce water velocity and erosive forces, and to aid in habitat protection. Poles used in willow walls and vegetated boulder revetments may be a structural application. Sprigs may be used in individual planting spots along a streambank. For a more detailed description of this BMP, refer to Appendix A.
EC-4	Live Pole Drain	Live pole drains are a biotechnical technique intended to drain excess moisture away from an unstable site. Plants (typically willows) are used to construct bundles which will sprout and grow, with the moisture continuing to drain from the lower end. The bundles are placed in shallow trenches in a manner that they intersect and collect excessive slope moisture. See Appendix A for additional description about this BMP.
EC-5	Wattles/ Fascines	Wattles and fascines are live branch cuttings, usually willows, bound together into long, tubular bundles used to stabilize slopes and stream banks. Both wattles and live fascines are true biotechnical practices. The live branches and live stakes provide the biological element while the stems, rope ties and wedge-shaped wooden stakes all combine to provide the structural elements. Fascines differ from wattles in that the branch cuttings all point in the same direction in fascines, where they may point in either direction in wattles. Wattles are typically aligned on contour, where fascines are angled slightly upslope and thus tend to produce more vigorous growth. For a more detailed description of this BMP, refer to Appendix A.
EC-6	Hand Seeding	Hand seeding is broadcasting grass seed on disturbed or bare soil areas by hand or a hand seeding device. This BMP is used to reduce the potential for soil to become water or air borne, reduce erosion after vegetation establishment, provide for vegetative buffers and aid in habitat protection. Seeding with appropriate seed mixes also helps discourage colonization by non-native and invasive plant species. For a more detailed description of this BMP, refer to Appendix A.
EC-7	Hydroseeding	Hydroseeding is broadcasting grass seed, tackifier, wood fiber mulch and water on disturbed areas using a hydroseeding machine. This BMP is used to reduce the potential for soil becoming water or air borne, to reduce erosion after vegetation is established, provide vegetative buffers and to aid in habitat protection. Seeding with appropriate seed mixes will also help discourage colonization by non-native and invasive plant species. Hydroseeding may be used after soil disturbance is completed at construction/maintenance sites and/or on bare slopes. For a more detailed description of this BMP, refer to Appendix A.
EC-8	Mulching	Mulching is the application of rice or sterile straw, wood chips, leaf litter, redwood duff, or other suitable materials on the soil surface applied manually or by machine. This BMP is used to reduce the potential for soil becoming water or air borne, and to encourage vegetation establishment. This BMP is used to protect the soil surface and to protect newly seeded areas. For a more detailed description of this BMP, refer to Appendix A.
EC-9	Vegetative Buffer	A vegetative buffer is a strip of vegetation adjacent to sensitive areas, ditches, pavement and water bodies. This BMP prevents soil from becoming water borne and may help restore shallow slope failures by trapping soil and debris. For a more detailed description of this BMP, refer to Appendix A.
EC-10	Erosion Control Blankets & Mats	Erosion control blankets and mats are installed to protect the prepared soil surface of a steep slope. This BMP may be used at maintenance sites to provide stabilization/protection on steep slopes or stream banks. Erosion control blankets and mats

BMP Number	BMP Title	BMP Description
		are available in a variety of materials including jute, excelsior, blanket material, straw, wood fiber blanket, coconut fiber blanket, coconut fiber mesh, and straw coconut fiber blanket. Material selection should be based on the size of area, slope, surface conditions, revegetation plans, and channel velocity. Coir fabric/netting is a geo-textile product made from coconut fibers loosely woven into a fabric usually packaged in roll form. This fabric can be used to provide a reduction in water velocity/erosive forces and/or habitat protection and topsoil stabilization. Erosion control blankets and mats may be used in combination with seeding and/or vegetation. For a more detailed description of this BMP, refer to Appendix A.
EC-11	Surface Roughening	Surface roughening is a technique for roughening a bare soil surface with furrows running across the slope, stair stepping, or tracking with construction equipment. Surface roughening is intended to aid the establishment of vegetative cover from seed, to reduce runoff velocity and increase infiltration, and to reduce erosion and provide for sediment trapping. This BMP is typically applied on slopes steeper than 3:1. For a more detailed description of this BMP, refer to Appendix A.
EC-12	Rolling Dip	Rolling dips are ridges or ridge-and-channels constructed diagonally across a sloping road or utility right-of-way that is subject to erosion to limit the accumulation of erosive volumes of water on roads by diverting surface runoff at designated intervals. Rolling dips are appropriate to use on low and moderate grades and on both high or low traffic roads. For a more detailed description of this BMP, refer to Appendix A.
EC-13	Slope or Bank Stabilization	Where biotechnical methods are unsuitable for stabilizing streambanks due to site specific conditions such as steep slopes or limited right-of-way width, hardened engineered solutions such as rock slope protection, solider pile walls, retaining walls, or slope soil nailing may be utilized along a failed portion of slope to provide a buttress against additional failure. To the extent feasible, this BMP should be combined with biotechnical solutions through installation of vegetated rock slope protection. Refer to Appendix A for a more detailed description of this BMP.
EC-14	Energy Dissipator	An energy dissipator is a structure designed to control erosion at the outlet of a channel or conduit by reducing the velocity of flow and dissipating the energy. This BMP is recommended at the outlet of any new or replacement drainage culvert, which are points of high erosion potential. Energy dissipators are effective in absorbing the impact of flow and reducing the velocity to non-erosive levels. For a more detailed description of this BMP, refer to Appendix A.
Sediment/Water Quality Control Measures		
SC-1	Gravel Bags	Gravel bags can be used to keep water away from work areas and unstable slopes or for constructing cofferdams and clean water bypasses. This BMP is also typically used at construction or maintenance sites to protect storm drain outlets, gutters, ditches, and drainage courses. For a more detailed description of this BMP, refer to Appendix A.
SC-2	Silt Fence	A silt fence is a temporary sediment barrier consisting of fabric stretched across and attached to supporting posts and entrenched into soil. This BMP is generally used for perimeter protection (around construction/maintenance sites, stockpile areas). It may also be installed perpendicular to the flow direction to slow or stop water and to allow perimeter filtration, settling of soil particles, and to reduce water velocity. For a more detailed description of this BMP, refer to Appendix A.
SC-3	Straw Log, Straw Roll, Coir Log	Straw rolls/logs or coir logs may be used for temporary soil stockpile protection; protection of storm drains, gutters, and drainage courses; temporary check dams; bank or slope stabilization; and streambank toe protection. Alternatives to straw rolls/logs and coir logs include compostable filter socks/berms comprised of natural fibers and other bio-based materials. For a more detailed description of this BMP, refer to Appendix A.

BMP Number	BMP Title	BMP Description
SC-4	Inlet Protection	Storm drain inlets can be protected through installation of temporary barriers such as silt fences, gravel bags, and other proprietary barriers like geotextile inserts, biofilter bags, or compost socks. These barriers are intended to prevent and reduce the sediment discharged into storm drains by ponding runoff and allowing sediment to settle out. For a more detailed description of this BMP, refer to Appendix A.
SC-5	Stormwater Separation Systems	Stormwater separation systems are engineered devices installed in storm drain facilities to remove solids, grease and other pollutants. These may be installed where deep structures allow for their placement and maintenance, or where sufficient quantities of pollutant materials require regular removal in order for the storm drains to operate correctly. For a more detailed description of this BMP, refer to Appendix A.
SC-6	Diversion Berm	A diversion berm is a temporary ridge of compacted soil or aggregate base material, or contiguous bag berm constructed at the top or base of a disturbed slope. It may also consist of asphalt concrete or "cutback" at the top of a disturbed slope. This BMP is intended to direct stormwater runoff away from an unstable slope. For a more detailed description of this BMP, refer to Appendix A.
SC-7	Silt Curtain	The County shall install silt curtains or other appropriate silt filtering devices around excavation sites to prevent heavily silted water from impacting areas around the work site. The silt curtain or silt filtering device shall be maintained throughout all phases of excavation.
SC-8	Turbidity Monitoring	During in-water maintenance activities, the County will monitor turbidity levels up and downstream of the maintenance work area prior to conducting maintenance. The County will maintain a log of turbidity data and ensure that activities do not result in increases in turbidity of the stream of more than 20 percent of upstream sampling locations, as measured visually or by nephelometric turbidity units (NTU). Work will be halted if turbidity/siltation levels exceed 20 percent of upstream sampling levels and CDFW will be contacted for further guidance to ensure activities do not harm aquatic life.
Dewatering Measure		
DW-1	Channel Dewatering	• When in-water construction is unavoidable, streamflow shall be diverted around work areas by either installing cofferdams and/or clean water bypass systems. A cofferdam is a temporary structure built into a waterway to enclose a construction area and reduce sediment pollution from construction work in or adjacent to water. A clean water bypass is typically used for short-term diversion of small amounts of water over short distances to enable dewatering of a maintenance site. Depending on site conditions, these systems may be either gravity driven or require use of a pump to divert water around a construction area. For a more detailed description of this BMP, refer to Appendix A. • No dewatering will be conducted at sites with recent document occurrences of coho salmon within the past 5 years.
Sediment Testing and Disposal Measure		
ST-1	Testing and Disposal of Sediment	Depending on the location of the sediment removal site and upstream and adjacent land uses, the County will test the sediment prior to removal to determine suitability for disposal or reuse based on its chemical qualities. The test results and proposed disposal or reuse locations will be submitted to the RWQCB for review and approval. Samples will be analyzed according to the Beneficial Reuse of Dredged Materials: Sediment Screening and Testing Guidelines (RWQCB 2000), as appropriate for the proposed disposal or reuse site. The results will be compared against federal and state environmental screening levels (ESLs) for protection of human health, groundwater quality, and terrestrial receptors. If hazardous levels of

BMP Number	BMP Title	BMP Description
		contaminants (as defined by federal and state regulations) are present, the material will be taken to a permitted hazardous waste facility.

Sources: San Mateo Countywide Water Pollution Prevention Program, 2014; County of San Mateo, 2004 and 2013.

Table 9-2. Cultural Resources Best Management Practices

BMP Number	BMP Title	BMP Description
CUL-1	Review Cultural Resources Sensitivity Map Data and County Baseline Maps to Determine if the Work Area Has Been Subject to a Previous Cultural Resource Study	During the early phases of Annual Work Plan development, the County will review the Cultural Sensitivity Map Data and County Baseline Maps (Appendix I) for all locations where ground-disturbing activities are proposed where excavation would be required beyond the facility's as-built design or otherwise reach previously undisturbed soils beyond existing engineered depths or extent. If the foregoing conditions are not applicable to the maintenance activity being performed, only BMPs CUL-4 and CUL-5 will be required. Based on the location of projects, and whether or not excavation or ground disturbance will occur beyond existing engineered depths or extent, BMPs CUL-2 through CUL-4 shall be implemented as follows: ▪ High Sensitivity: BMPs CUL-2, CUL-3, and CUL-4 ▪ Moderate Sensitivity: BMP CUL-2 and CUL-3 ▪ Low Sensitivity: BMPs CUL-2 through CUL-4 not required ▪ Unknown Sensitivity: BMP CUL-2 and CUL-3 ▪ BMPs CUL-5 and CUL-6 are applicable to all ground-disturbing activities in natural channels or native soils, regardless of the sensitivity level of the work area.
CUL-2	Record Search and Field Inventory for Highly or Moderately Sensitive Areas (Sensitivity Ratings 3-5), and Areas of Unknown Sensitivity	▪ The County will retain a qualified cultural resources specialist to conduct a review and evaluation of locations that involve soil disturbance/excavation in natural channels or native soils identified as Highly to Moderately Sensitive to determine the potential for these activities to affect significant cultural resources. ▪ The initial evaluation will be based on a review of archival information provided by the Northwest Information Center (NWIC) of the California Historical Resources Information System in regard to the project area based on a 0.25-mile search radius. This initial archival review will be completed by the professional archaeologist who will be able to view confidential site location data and literature to arrive at a preliminary sensitivity determination. ▪ It is recommended that the County conduct a review of the Sacred Lands Inventory of the Native American Heritage Commission (NAHC) and due diligence outreach with individuals identified by the NAHC and/or local historical societies or groups. This outreach would involve sending a letter with a request for pertinent information about cultural resources within the project area and to identify any concerns. This outreach is in addition to notification under PRC 21080.3.1 (i.e., CUL-3), and may be appropriate for projects that would not otherwise require Assembly Bill 52 notification. Such outreach is also encouraged under Section 106 implementing regulations at 36 CFR 800.4(a)(3) for identification of historic properties. ▪ The qualified archaeologist will conduct field inventory of the project area to determine the presence/absence of surface cultural materials. The results, along with any mitigation and/or management recommendations, will be presented to the County in an appropriate report format that includes any necessary maps, figures, and correspondence with interested parties. The report will also include a summary of the records search and archival research data, and pertinent geoarchaeological overviews and studies, and regional research designs, as appropriate. ▪ A summary table indicating appropriate management actions (e.g., monitoring during construction, presence/absence testing for subsurface resources, and data recovery) will be developed for each project work area reviewed.

BMP Number	BMP Title	BMP Description
		▪ The maintenance activities will be implemented to avoid significant impacts to cultural resources, if possible. **EXCEPTIONS**: After the NWIC record search and NAHC sacred lands search have been conducted, the qualified archaeologist may determine that a field review is not necessary under the following circumstances: ▪ Locales that have previously been subject to cultural resource studies where no previously identified cultural resources or historical resources were documented. ▪ Locales that have previously been subject to cultural resources studies, but identified cultural resources have been determined by a qualified archaeologist/resource specialist as not eligible for listing in the California Register of Historical Resources (CRHR) or the National Register of Historic Places (NRHP). ▪ A short report would be required to document the decision not to conduct a field study.
CUL-3	Consult with Native American Tribes	▪ The County, as the lead CEQA agency, has notified Native American tribes about the Maintenance Program according to PRC 21080.3.1 (also referred to as Assembly Bill 52); *only Native American tribes that have previously requested notification from the County pursuant to PRC 21080.3.1(b) require notification*. For tribes that request consultation under PRC 21080.3.1(b)(2), the County will consult with those tribes pursuant to PRC 21080.3.2 for projects in areas of high, moderate, and unknown sensitivity.
CUL-4	Construction Monitoring	▪ The County will retain a qualified archaeologist to be present on-site during ground-disturbing activities within areas identified as highly sensitive for cultural areas, unless the qualified archaeologist determines otherwise after the field inventory conducted under CUL-2. Similarly, after conducting the field study under CUL-2, the qualified archaeologist may determine that areas originally identified as moderately sensitive for cultural resources warrant monitoring during construction. The reasons for conducting monitoring in areas initially considered of moderate sensitivity would be discussed in the inventory report. ▪ The qualified archaeologist will have the authority to stop work if cultural resources are discovered. ▪ If any cultural resources are discovered during construction monitoring, BMP CUL-6 would be implemented as appropriate.
CUL-5	Conduct Pre-Maintenance Educational Training	At the beginning of each maintenance season, and in concert with implementing BMP BIO-1, as well as before conducting activities subject to BMP CUL-2 through CUL-4, all maintenance personnel will participate in an educational training session conducted by a qualified cultural resources specialist. This training will include instruction on how to identify historic and prehistoric resources that may be encountered, and will describe the appropriate protocol to be followed if resources are discovered during maintenance work.
CUL-6	Address Discovery of Cultural Remains or Historic or Paleontological Artifacts Appropriately	Unanticipated discoveries of cultural and paleontological resources may occur during maintenance construction activities. Examples of cultural remains are obsidian and chert flaked-stone tools (e.g., projectile points, knives, scrapers) or significant areas of tool-making debris; culturally darkened soil (“midden”) containing heat-affected rocks, artifacts, or shellfish remains; stone milling equipment (e.g., mortars, pestles, handstones, or milling slabs); and battered stone tools, such as hammerstones and pitted stones. Historic-period artifacts may include stone, concrete, or adobe footings and walls; filled wells or privies; and deposits of metal, glass, and/or ceramic refuse. Paleontological artifacts are fossilized remains of plants and animals. Work will be restricted or stopped in areas where remains or artifacts are found until proper protocols are met.

		Protocol for treatment of prehistoric or historic cultural resources: 1. Work at the location of the find will halt immediately within 50 feet of the find. A "no work" zone will be established utilizing appropriate flagging to delineate the boundary of this zone, which will measure at least 50 feet in all directions from the find. 2. The County will retain the services of a consulting archaeologist, who will visit the discovery site as soon as practicable and perform minor hand excavation to describe the archaeological or paleontological resources present and assess the amount of disturbance. 3. The consulting archaeologist will provide to the County and USACE, at a minimum, written and digital-photographic documentation of all observed materials, utilizing the CRHR and NRHP guidelines for evaluating archaeological resources. Based on the assessment, the County and USACE will identify the CEQA and Section 106 cultural resources compliance procedures to be implemented. 4. If the consulting archaeologist determines that the find appears not to meet the CRHR or NRHP criteria of significance, and a USACE archaeologist concurs with the consulting archaeologist's conclusions, construction may continue while monitored by the consulting archaeologist. The authorized maintenance work will resume at the discovery site only after the County has retained a consulting archaeologist to monitor and the Maintenance Manager has received notification from USACE allowing work to continue. 5. If the find appears significant, avoidance of additional impacts is the preferred alternative. The consulting archaeologist will determine if adverse impacts to the resources can be avoided. 6. Where avoidance is not practical (e.g., maintenance activities cannot be deferred or must be completed to satisfy the Maintenance Program objective), the County will develop an action plan (also known as a data recovery plan) and submit it to USACE within 48 hours of determining that maintenance activities cannot be deferred. The action plan will be submitted by email to the appropriate archeological/cultural resources contact at the USACE. The action plan is equivalent to a data recovery plan. It will be prepared in accordance with the current professional standards and state guidelines for reporting the results of the work, and will describe the services of a Native American consultant and a proposal for curation of cultural materials recovered from a non-grave context. 7. The recovery effort will be documented in a report prepared by the consulting archaeologist in accordance with current archaeological standards. Any non-grave artifacts will be placed with an appropriate repository. 8. In the event of discovery of human remains (or if a find consists of bones suspected to be human), the field crew supervisor will take immediate steps to secure and protect such remains from vandalism during periods when work crews are absent.) 9. The maintenance crew supervisor will immediately notify the San Mateo County Coroner and provide any information that identifies the remains as Native American. If the remains are determined to be those of a prehistoric Native American or a Native American from the ethnographic period, the Coroner will contact NAHC within 24 hours of being notified about the remains. NAHC will designate and notify a Most Likely Descendant (MLD) within 24 hours. The MLD will have 24 hours to consult and provide recommendations for the treatment or disposition, with proper dignity, of the human remains and grave goods. 10. Preservation in situ is the preferred option for human remains. Human remains will be preserved in situ if continuation of the maintenance work, as determined by the consulting archaeologist and MLD, will not cause further damage to the remains. The remains and artifacts will be documented, the find location carefully backfilled (with protective geo-fabric if desirable), and the information recorded in County Maintenance Program files.

BMP Number	BMP Title	BMP Description
		11. If human remains or cultural items are exposed during maintenance that cannot be protected from further damage, they will be exhumed by the consulting archaeologist at the discretion of the MLD and reburied, with the concurrence of the MLD, in a place mutually agreed upon by all parties. <u>Protocol for treatment of paleontological resources:</u> 1. Work at the location of the find will halt immediately within 50 feet of the find. A "no work" zone will be established utilizing appropriate flagging to delineate the boundary of this zone, which will measure at least 50 feet in all directions from the find. 2. The County shall retain the services of a consulting paleontologist. The consulting paleontologist will meet the Society for Vertebrate Paleontology's criteria for a qualified professional paleontologist (Society of Vertebrate Paleontology 2010). 3. The consulting paleontologist shall visit the discovery site as soon as practicable and perform minor hand-excavation to describe the paleontological resources present and assess the amount of disturbance. The consulting paleontologist will follow the Society for Vertebrate Paleontology's guidelines (2010) for treatment of the artifact. Treatment may include preparation and recovery of fossil materials for an appropriate museum or university collection, and may include preparation of a report describing the finds. The County will be responsible for ensuring that the consulting paleontologist's recommendations for treatment are implemented.

Table 9-3. Biological Resources Best Management Practices

BMP Number	BMP Title	BMP Description
BIO-1	Environmental Awareness Training	Prior to commencing maintenance activities in a given year, all participating maintenance personnel will attend a worker environmental awareness training program. The training will include a brief review of special-status species, sensitive habitats, and other sensitive resources that may exist in the project area, including field identification, habitat requirements, and the legal status and protection of each relevant species, as well as locations of sensitive biological resources. The training will include materials concerning the following topics: sensitive resources, resource avoidance, permit conditions, and possible consequences for violations of State or Federal environmental laws. The training will cover the maintenance activity's conservation measures, environmental permits, and regulatory compliance requirements, as well as the roles and authority of the monitors and biologist(s). It will include printed material and an oral training session by a qualified biologist.
BIO-2	Minimize Injury or Mortality of Fish and Amphibian Species during Dewatering	Prior to dewatering a construction site, all reasonable efforts shall be made to capture and relocate native fish and amphibian species if necessary to avoid direct mortality and minimize take. Streams that support a sensitive species (e.g., steelhead, California red-legged frog) will require a relocation effort led by a qualified biologist (see also BMPs BIO- 3 through BIO-5). The following measures are consistent with those defined as *reasonable and prudent* by NMFS for projects concerning several central California Evolutionarily Significant Units for coho salmon and steelhead trout. ▪ Fish relocation activities will be performed only by qualified fisheries biologists that have experience with fish capture and handling. ▪ Perform relocation activities during morning periods when air temperatures are coolest. ▪ Periodically measure air and water temperatures. Cease activities when water temperatures exceed temperatures allowed by CDFW and NMFS. ▪ Capture methods may include fish landing nets, dip nets, buckets and by hand. ▪ Exclude fish from re-entering work area by blocking the stream channel above and below the work area with fine-meshed net or screens. Mesh will be no greater than 1/8 inch (3.1mm). The bottom edge of net or screen will be completely secured to the channel bed to prevent fish from re-entering work area. Exclusion screening will be placed in areas of low water velocity to minimize impingement of fish. Screens will be checked periodically and cleaned of debris to permit free flow of water. ▪ Prior to capturing fish, the qualified biologist will determine the most appropriate release location(s). Captured aquatic life shall be released immediately in the closest suitable body of water adjacent to the work site, taking into consideration the following when selecting release site(s): A. Similar water temperature as capture location B. Ample habitat for captured fish C. Low likelihood of fish re-entering work site or becoming impinged on exclusion net or screen. D. Avoid areas with large concentrations of potential predators in immediate vicinity. ▪ Minimize handling of salmonids. However, when handling is necessary, always wet hands or nets prior to touching fish.

BMP Number	BMP Title	BMP Description
		▪ Temporarily hold fish in cool, shaded, aerated water in a container with a lid or in a live–car (i.e., a net enclosure that can be placed in a pond to temporarily hold the fish). ▪ If fish are held in a container, provide aeration with a battery-powered external bubbler. Protect fish from jostling and noise and do not remove fish from this container until time of release. ▪ Place a thermometer in holding containers and, if necessary, periodically conduct partial water changes to maintain a stable water temperature. If water temperature reaches or exceeds those allowed by CDFW and NMFS, fish should be released and rescue operations ceased. ▪ Avoid overcrowding in containers. Have at least two containers and segregate young-of-year fish from larger age-classes to avoid predation. Place larger amphibians, such as Pacific giant salamanders, in container with larger fish. ▪ If fish are abundant, periodically cease capture, and release fish at predetermined locations. ▪ Visually identify species and estimate year-classes of fish at time of release. ▪ Count and record the number of fish captured. Avoid anesthetizing or measuring fish. ▪ Submit reports of fish relocation activities to CDFW and NMFS in a timely fashion. ▪ If feasible, plan on performing initial fish relocation efforts several days prior to the start of construction. This provides the fisheries biologist an opportunity to return to the work area and perform additional passes immediately prior to construction. In many instances, additional fish will be captured that eluded the previous day's efforts. The biological monitor or qualified biologist shall check daily for stranded aquatic life as the water level in the dewatering area drops. ▪ If mortality during relocation exceeds the amount authorized by the applicable permits or, if no amount is specified, 5 percent, stop efforts and immediately contact the appropriate agencies (CDFW and NMFS).
BIO-3	California Red-legged Frog Protection Measures	If suitable habitat for California red-legged frog is determined to exist in or around the work area where maintenance activities are planned to occur, the County will implement applicable protection measures as follows: ▪ No more than twenty-four (24) hours prior to the date of initial ground disturbance or mowing, a pre-activity survey for the California red-legged frog will be conducted by a qualified biologist at the work site. The survey will consist of walking the work area limits to ascertain the possible presence of the species. The qualified biologist will investigate all potential areas that could be used by the California red-legged frog for feeding, breeding, sheltering, movement, and other essential behaviors. This includes an adequate examination of mammal burrows, such as those of California ground squirrels (*Spermophilus beecheyi*) or gophers (*Thomomys bottae*). If any adults, subadults, juveniles, tadpoles, or eggs are found, the qualified biologist will contact the USFWS to determine if moving any of the individuals is appropriate. If the USFWS approves moving animals, the biologist and USFWS will identify a suitable relocation site, and the County will ensure the qualified biologist is given sufficient time to move the animals from the work site before ground disturbance is initiated. Only qualified biologists will capture, handle, and monitor the California red-legged frog. ▪ To minimize harassment, injury, death, and harm to individual California red-legged frogs, one of the following two measures will be implemented. 1. An approved, qualified biologist(s) will be on-site during all activities that may result in take of the California red-legged frog, as determined by the biologist taking into account all information gathered during the desktop audit of the site as well as the preconstruction survey. Qualified biologists must be approved by the USFWS.

BMP Number	BMP Title	BMP Description
		or 2. Prior to pre-activity surveys, personnel will enclose the work area with an exclusion fence with a minimum height above grade of 42 inches. The bottom of the fence will either be buried a minimum of six inches below ground or otherwise secured in a manner approved by the USFWS and will remain in place during all maintenance activities in order to prevent California red-legged frogs from entering the work area. Escape ramps, funnels, or other features that allow animals to exit the work area, but which will prohibit the entry of such animals, will be provided in the exclusion fencing. A qualified biologist will conduct a pre-activity survey of the fence installation area immediately prior to (i.e., the day of) the commencement of installation and will be on-hand to monitor fence installation. The exclusion fencing will be inspected daily by maintenance personnel and maintained for the duration of maintenance implementation. ▪ The qualified biologist(s) will be given the authority to freely communicate verbally, by telephone, electronic mail, or in writing at any time with maintenance personnel, any other person(s) at the work area, otherwise associated with the maintenance work, the USFWS, the CDFW, or their designated agents. The qualified biologist will have oversight over implementation of all the conservation measures in this programmatic biological opinion, and will have the authority and responsibility to stop work activities if they determine any of the associated requirements are not being fulfilled. If the qualified biologist(s) exercises this authority, the USFWS will be notified by telephone and electronic mail within twenty-four (24) hours. The USFWS contact is the Coast Bay Foothills Division Chief of the Endangered Species Program at the Sacramento Fish and Wildlife Office at telephone (916) 414-6600. ▪ The County will minimize adverse impacts to the California red-legged frog by limiting, to the maximum extent possible, the number of access routes, ground disturbance area, equipment staging, storage, parking, and stockpile areas. Prior to initiating maintenance work that involve ground-disturbing activities, equipment staging areas, site access routes, sediment removal and transportation equipment and personnel parking areas, debris storage areas, and any other areas that may be disturbed will be identified, surveyed by the qualified biologist, and clearly identified with fencing. The fencing will be inspected by the qualified biologist and maintained daily until the last day that equipment is at the site. ▪ To the extent practicable, ground-disturbing activities will be avoided from October through April because that is the time period when California red-legged frogs are most likely to be moving through upland areas. When ground-disturbing activities must take place between November 1 and March 31, the County will ensure that daily monitoring by the qualified biologist is completed for the California red-legged frog. ▪ If egg masses are present and work cannot be postponed until after hatching, a buffer of vegetation at least 10 feet in diameter shall be left around any egg masses found. Staff will keep a record of any sites where egg masses are found and will conduct vegetation removal at these sites between June 15 and October 15. Staff shall avoid entering the channel to avoid dislodging egg masses. Activities shall be performed from the banks. ▪ To minimize harassment, injury, death, and harm in the form of temporary habitat disturbances, all maintenance-related vehicle traffic will be restricted to established roads, sediment removal and access areas, equipment staging, storage, parking, and stockpile areas. These areas will be included in pre-activity surveys and, to the maximum extent possible, established in locations disturbed by previous activities to prevent further adverse impacts. Maintenance-

BMP Number	BMP Title	BMP Description
		related vehicles will observe a 20-mile per hour speed limit within work areas, except on County roads, and State and Federal highways. Off-road traffic outside of designated and fenced work areas will be prohibited. ▪ When a California red-legged frog is encountered in the work area, all activities which have the potential to result in the harassment, injury, or death of the individual will be immediately halted. The qualified biologist will then assess the situation in order to select a course of action that will avoid or minimize adverse impacts to the animal. To the maximum extent possible, contact with the frog will be avoided and the individual will be allowed to move out of the potentially hazardous situation to a secure location on its own volition. This procedure applies to situations where a California red-legged frog is encountered while it is moving to another location. It does not apply to animals that are uncovered or otherwise exposed or in areas where there is not sufficient adjacent habitat to support the species should the individual move away from the hazardous location. ▪ California red-legged frogs that are in danger will be relocated and released by the qualified biologist outside the work area within the same riparian area or watershed. If relocation of the individual outside the work area is not feasible (i.e., there are too many individuals observed per day), the biologist will relocate the animals to a USFWS preapproved location. Prior to the initial ground disturbance, the County will obtain approval of the relocation protocol from the USFWS in the event that a California red-legged frog is encountered and needs to be moved away from the work site. Under no circumstances will a California red-legged frog be released on a site unless the written permission of the landowner has been obtained by the County. The qualified biologist will limit the duration of the handling and captivity of the California red-legged frog to the minimum amount of time necessary to complete the task. If the animal must be held in captivity, it will be kept in a cool, dark, moist, aerated environment, such as a clean and disinfected bucket or plastic container with a damp sponge. ▪ The County will immediately notify the USFWS once the California red-legged frog and the site is secure. The USFWS contact for this situation is the Coast Bay Foothills Division Chief of the Endangered Species Program by email and at telephone (916) 414-6600. ▪ A litter control program will be instituted at each activity site. All workers will ensure their food scraps, paper wrappers, food containers, cans, bottles, and other trash are deposited in covered or closed trash containers. The trash containers will be removed from the site at the end of each working day. ▪ The County will comply with all herbicide application requirements mandated by the USEPA and stipulated injunctions pertaining to California red-legged frog. For example, herbicides will be limited for controlling state-designated invasive species and noxious weeds, will not be used within 15 feet of aquatic breeding critical habitat or non-breeding aquatic critical habitat areas or within 15 feet of aquatic features within non-critical habitat sections subject to the 2006 Court-ordered injunction; precipitation is not occurring or forecast to occur within 24 hours; herbicide is limited to localized spot treatment using hand-held devices; and herbicide will be applied by a certified applicator or person working under the direct supervision of a certified applicator. ▪ For on-site storage of pipes, conduits and other materials that could provide shelter for California red-legged frogs, materials will be securely capped prior to storage or an open-top trailer will be used to elevate the materials above ground. This is intended to reduce the potential for animals to climb into the conduits and other materials. ▪ To the maximum extent practicable, no maintenance activities will occur during rain events or within 24-hours following a rain event. Prior to maintenance activities resuming, a qualified biologist will inspect the work area and all

BMP Number	BMP Title	BMP Description
		equipment/materials for the presence of California red-legged frogs. The animals will be allowed to move away from the work site of their own volition or moved by the qualified biologist. ▪ To the maximum extent practicable, night-time construction activities will be minimized or avoided by the County. Because dusk and dawn are often the times when the California red-legged frog most actively moving and foraging, to the maximum extent practicable, earthmoving and other project activities will cease no less than 30 minutes before sunset and will not begin again prior to 30 minutes after sunrise. Except when necessary for driver or pedestrian safety, to the maximum extent practicable, artificial lighting at a work site will be prohibited during the hours of darkness. ▪ Plastic monofilament netting (erosion control matting), loosely woven netting, or similar material in any form will not be used at the project site because California red-legged frogs can become entangled and trapped in them. Any such material found on site will be immediately removed by the qualified biologist, maintenance personnel, or County contractors. Materials utilizing fixed weaves (strands cannot move), polypropylene, polymer or other synthetic materials will not be used. ▪ Trenches or pits one (1) foot or deeper that are going to be left unfilled for more than forty-eight (48) hours will be securely covered with boards or other material to prevent the California red-legged frog from falling into them. If this is not possible, the County will ensure wooden ramps or other structures of suitable surface that provide adequate footing for the California red-legged frog are placed in the trench or pit to allow for their unaided escape. Auger holes or fence post holes that are greater than 0.10 inch in diameter will be immediately filled or securely covered so they do not become pitfall traps for the California red-legged frog. The qualified biologist will inspect the trenches, pits, or holes prior to their being filled to ensure there are no California red-legged frogs in them. The trench, pit, or hole also will be examined by the qualified biologist each workday morning at least one hour prior to initiation of work and in the late afternoon no more than one hour after work has ceased to ascertain whether any individuals have become trapped. If the escape ramps fail to allow the animal to escape, the qualified biologist will remove and transport it to a safe location, or contact the USFWS for guidance.
BIO-4	California Tiger Salamander Protection Measures	In the limited area in which the California tiger salamander might occur (i.e., in the vicinity of Alpine Trail), the measures described for California red-legged frog above will be implemented for California tiger salamander as well. In addition, the CDFW will be included in any agency coordination, as well as the USFWS, for issues involving the salamander.
BIO-5	San Francisco Garter Snake Protection Measures	In areas within one mile of a documented occurrence of the San Francisco garter snake, onsite habitat shall be evaluated by a qualified biologist or biological monitor for the potential to support this species. If suitable habitat for San Francisco garter snake is determined to exist in or around the work area where ground disturbing activities or mowing are planned to occur, the following measures will be followed: ▪ To the extent feasible, maintenance activities should be conducted from April through October during the dry season when these semi-aquatic species are less likely to be found in a work area. ▪ Prior to implementation of maintenance work, the County will submit to the USFWS and CDFW for its review and approval the qualifications of proposed wildlife biologist(s) who will perform pre-activity surveys and on-site monitoring. ▪ To avoid harassment, injury, death, and harm to individual San Francisco garter snakes, immediately prior to (i.e., the day of) the initiation of maintenance activities that have potential for take of the San Francisco garter snake, a USFWS

BMP Number	BMP Title	BMP Description
		and CDFW-approved biologist will conduct daytime surveys throughout the project site. The approved biologist will be present during initial ground-disturbing activities (i.e., clearing and grubbing) within 250 ft of the work area to monitor for individual garter snakes. The biologist will also be present during any other maintenance activities that could potentially result in take, as determined by the biologist taking into account all information gathered during the desktop audit of the site as well as the preconstruction survey. If a San Francisco garter snake is observed within the maintenance work area, either during the pre-activity survey or at any time, activities that could potentially harm the individual will cease and the USFWS and CDFW will be contacted immediately. Work will not re-commence without written approval from CDFW. The on-site biologist will be the contact for any employee or contractor who might inadvertently kill or injure a garter snake or anyone who finds a dead, injured, or entrapped San Francisco garter snake. The on-site biologist shall possess a working cellular telephone whose number shall be provided to the USFWS and CDFW. ▪ For vegetation removal on berms or other sites with suitable San Francisco garter snake habitat, vegetation shall be cut down to 3 inches by hand tools (weedwhacker, etc.). Once the ground is visible, a visual survey for San Francisco garter snakes shall be conducted. If no sensitive species are found in the area, removal of vegetation may continue by mowing or mechanized equipment very slowly with a biological monitor walking in front of the equipment to observe. ▪ Maintenance-related vehicles will observe a 20 mile per hour speed limit while in the work area. ▪ San Francisco garter snakes may be attracted to structures that provide cavities such as pipes; therefore, all pipes, culverts, or similar structures that are stored at the site for one or more overnight periods will be either securely capped prior to storage or thoroughly inspected by the on-site biologist and/or the maintenance foreman/manager before the pipe is buried, capped, or otherwise used or moved. If a San Francisco garter snake is discovered inside a pipe, the biologist (or a member of the maintenance crew, if the biologist is not on-site) will watch the individual until it has moved out of the maintenance work area. ▪ A litter control program will be instituted at each activity site. All workers will ensure their food scraps, paper wrappers, food containers, cans, bottles, and other trash are deposited in covered or closed trash containers. The trash containers will be removed from the site at the end of each working day.
BIO-6	Measures to Protect the Foothill Yellow-legged Frog, California Giant Salamander, Santa Cruz Black Salamander, and Western Pond Turtle	In areas within one mile of documented foothill yellow-legged frog, California giant salamander, Santa Cruz black salamander, or western pond turtle occurrences, or where suitable habitat for one or more of these species is determined to exist in or around the work area where ground disturbing activities or mowing are planned to occur, the County will implement applicable protection measures as follows: ▪ The qualified biologist will conduct a special-status species survey on each morning of and within 48 hours prior to the scheduled work commencing. 1. If no foothill yellow-legged frog, California giant Salamander, Santa Cruz black salamander, or western pond turtle is found, the work may proceed. 2. If eggs or larvae of the foothill yellow-legged frog, California giant salamander, Santa Cruz black salamander, are found, the qualified biologist will establish a buffer around the location of the eggs/larvae and work may proceed outside of the buffer zone. No work will occur within the buffer zone. Work within the buffer zone will be rescheduled until the time that eggs have hatched and/or larvae have metamorphosed, or the Permittee shall contact CDFW to develop site appropriate avoidance and minimization measures.

BMP Number	BMP Title	BMP Description
		3. If an active western pond turtle nest is detected within the activity area, a 10-foot buffer zone around the nest will be established and maintained during the breeding and nesting season (April 1 – August 31). The buffer zone will remain in place until the young have left the nest, as determined by a qualified biologist. 4. If adult or non-larval juvenile foothill yellow-legged frogs, California giant salamanders, Santa Cruz black salamanders, or western pond turtles are found, one of the following two procedures will be implemented: a. If, in the opinion of the qualified biologist, capture and removal of the individual to a safe place outside of the work area is less likely to result in adverse effects than leaving the individual in place and rescheduling the work (e.g., if the species could potentially hide and be missed during a follow-up survey), the individual will be captured and relocated by a qualified biologist to suitable habitat at least 100 meters away and work may proceed. b. If, in the opinion of the qualified biologist, the individual is likely to leave the work area on its own, and work can be feasibly rescheduled, a buffer will be established around the location of the individual(s) and work may proceed outside of the buffer zone. No work will occur within the buffer zone until the turtle has left the work area. Work within the buffer zone will be rescheduled if necessary.
BIO-7	Check for Wildlife in Pipes/Construction Materials	For maintenance activities that involve pipes or culverts, the County will visually check all sections of pipe for the presence of wildlife sheltering within them prior to moving any pipe or culvert sections that have been stored on the site overnight, or the pipes will have the ends capped while stored on site so as to prevent wildlife from entering. After attachment of the pipe/culvert sections to one another, the exposed end(s) of the pipe/culvert will be capped at the end of each day during construction to prevent wildlife from entering and being trapped within the pipeline/culvert.
BIO-8	Minimize Impacts on Dusky-footed Woodrat Nests	If suitable habitat for San Francisco dusky-footed woodrat is determined to exist in the work area, the following measure will be followed: ▪ No more than two weeks prior to the beginning of ground disturbance or other routine maintenance activities that could disturb woodrat nests, a qualified biologist will survey the work areas scheduled for maintenance. If any dusky-footed woodrat nests are found, the nests shall be flagged and construction fencing or flagging that will not impede the movement of the SFDW shall be placed around the nest to create a 10-foot buffer (where feasible). If the nest is located adjacent to a road or trail, the nest shall be clearly flagged so equipment/truck drivers accessing sites can see the nest. If a dusky-footed woodrat nest is identified in a work area, the following measure will be implemented by the County. ▪ The County will avoid physical disturbance of the nest if feasible. Ideally, a minimum 10-foot buffer should be maintained between maintenance construction activities and each nest to avoid disturbance. In some situations, a smaller buffer may be allowed if in the opinion of a qualified biologist removing the nest would be a greater impact than that anticipated as a result of maintenance activities. ▪ If a dusky-footed woodrat nest cannot be avoided and the nest is located in urban or bayside areas where woodrat populations are small and isolated from larger populations, the County will consult with CDFW regarding the appropriate measures to minimize impacts.

BMP Number	BMP Title	BMP Description
		▪ If a dusky-footed woodrat nest cannot be avoided and the nest is located in more rural or natural areas and/or where woodrat populations are large and have connectivity to large populations, one of the following two relocation measures will be implemented by the County: 1. If the woodrat nest site and the proposed relocation area are connected by suitable dispersal habitat for the woodrat, as determined by a qualified biologist, the following relocation methodology will be used: Prior to the beginning of construction activities, a qualified biologist will disturb the woodrat nest to the degree that all woodrats leave the nest and seek refuge outside of the maintenance activity area. Relocations efforts will avoid the nesting season (February - July) to the maximum extent feasible. Disturbance of the woodrat nest will be initiated no earlier than one hour before dusk to minimize the exposure of woodrats to diurnal predators. Subsequently, the biologist will dismantle and relocate the nest material by hand. All material from dismantled nests will be placed in a pile, preferably against a log or tree trunk, in suitable habitat located at least 20 feet from, but otherwise as close as possible to, the original nest locations, to provide material for woodrats to construct new nests. During the deconstruction process, the biologist will attempt to assess if there are juveniles in the nest. If immobile juveniles are observed, the deconstruction process will be discontinued until a time when the biologist believes the juveniles will be fully mobile. A 10-foot wide no-disturbance buffer will be established around the nest until the juveniles are mobile. The nest may be dismantled once the biologist has determined that adverse impacts on the juveniles would not occur. All disturbances to woodrat nests will be documented in a construction monitoring report and submitted to CDFW. 2. If a qualified biologist determines that the woodrat relocation area is separated from the nest site by major impediments, or a complete barrier, to woodrat movement, trapping for woodrats will be conducted prior to relocation of nest material. Prior to the start of nest relocation activities, artificial pine box shelters will be placed at each of the sites selected for relocation of nest materials. The dimensions of the artificial shelters will be approximately 8” long x 8” wide x 6” high. Each shelter will include two interior chambers connected by an opening. At the relocation sites, the artificial pine box shelters will provide basement structures for the relocated woodrat nest materials, allowing woodrats to enter, use, and modify the relocated nests. A qualified biologist will set two traps around each of the woodrat nests to be relocated. Traps will be set within one hour prior to sunset, and baited with a mixture of peanut butter, oats, and apples. Traps will also be equipped with cotton bedding and covered with cardboard. The traps will be checked the following morning, within one-and-a-half hours of sunrise. If a woodrat is captured it will be placed in a quiet area while its nest material is relocated; the animal will then be released at the relocated nest. If no woodrats are captured after the first night, the biologist will set the traps for one additional evening to increase the probability of capturing the animal and ensuring a safe relocation. If no woodrats are captured at a given house after two nights, it will be assumed that the house is not currently occupied. 3. Trapping will only be conducted outside the breeding season, which for woodrats is from February through the end of July. If a litter of young is found or suspected while dismantling a nest for relocation, the nest material will be replaced, any trapped woodrats will be returned to the nest, and the nest will be left alone for 2 to 3 weeks,

BMP Number	BMP Title	BMP Description
		after which time the nest would be rechecked to verify that the young are capable of independent survival, as determined by the lead woodrat biologist, before proceeding with nest dismantling.
BIO-9	Measures to Protect Nesting Migratory Birds	▪ To the extent possible, conduct vegetation removal activities prior to nesting bird season (February 1 through August 31). ▪ For maintenance activities or tree removal that are scheduled to occur between February 1 and August 31, a qualified biologist will survey the work area and a minimum of 300 feet surrounding the work area for raptor nests and 100 feet for nests of non-raptors. This survey will occur no more than three days prior to starting work. If a lapse in maintenance-related work of 7 days or longer occurs, another focused survey will be conducted before maintenance work can be reinitiated. ▪ If nesting birds are found, a no-work buffer will be established around the nest and maintained until the young have fledged. A qualified biologist will identify an appropriate buffer based on a site specific-evaluation. Typical appropriate buffers are 300 feet for raptors, herons, and egrets (though larger for bald and golden eagles, as discussed in BIO-14); 100 feet for non-raptors nesting on trees, shrubs and structures, and 25 feet for ground-nesting non-raptors. ▪ The boundary of each buffer zone will be marked with fencing, flagging, or other easily identifiable marking if work will occur immediately outside the buffer zone. ▪ Install physical barriers to nesting where appropriate (e.g., install netting over entryways to cavities, bridge ledges, culverts) and check regularly for any trapped birds. Work will not commence within the buffer until fledglings are fully mobile and no longer reliant upon the nest or parental care for survival. ▪ No trees or shrubs shall be disturbed that contain active bird nests until all eggs have hatched, and young have fully fledged (are no longer being fed by the adults and have completely left the nest site). To avoid potential impacts to tree or shrub-nesting birds, any project-specific trimming or pruning of trees or shrubs shall be conducted during the time period of September 1 to February 14 unless a preconstruction nesting bird survey has been conducted by a qualified biologist. No habitat removal or modification shall occur within the Ecologically Sensitive Area fenced nest zone even if the nest continues to be active beyond the typical nesting season for the species, until the young have fully fledged and will no longer be adversely affected by the project. ▪ Within areas subject to CDFW regulation under Section 1600 of the Fish and Game Code, nesting bird protection measures required as conditions of the Streambed Alteration Agreement will be implemented.
BIO-10	Measures to Protect Nesting Marbled Murrelet	▪ If habitat trees are present within ¼- mile of the project site, Permittee may proceed with the following conditions: – Work within the ¼-mile buffer shall be confined to the period of September 15 to October 15. ▪ If activities cannot be performed during this window and would thus occur during the marbled murrelet breeding season (March 25 to September 15): – For sites with suitable marbled murrelet nesting trees are present within 300 feet of the project area or if a marbled murrelet nest is detected, Permittee shall consult with CDFW before proceeding. – If habitat trees are present within ¼- mile of the project site but are greater than 300 feet from the work area, seasonal disturbance minimization buffers as listed the USFWS document, Estimation of the Effects of Auditory and Visual Disturbance to Northern Spotted Owls and Marbled Murrelets in Northwestern California (updated

BMP Number	BMP Title	BMP Description
		2020) shall be followed. Permittee shall measure ambient noise and estimate construction activity noise to calculate seasonal buffer widths using that reference. Alternatively, if protocol-level surveys are conducted and do not indicate that the habitat is occupied by marbled murrelet, seasonal and distance work restrictions may be lifted with written approval from CDFW. Protocol level survey procedures and information can be found at: A-Revised-Protocol-for-Surveying-MAMU-in-Forests-2024-1.pdf
BIO-11	Non-native Aquatic Plant Removal	Any aquatic non-native plants found while performing maintenance activities will be disposed of properly and will not be placed back into the tributaries where work is being conducted or any other drainages, creeks, or streams.
BIO-12	Measures to Protect Special-Status Butterflies	If suitable habitat for Bay checkerspot, Mission blue, San Bruno elfin, or Callippe silverspot butterflies is determined to exist in or around the work area where ground disturbing activities are planned to occur, the County will implement applicable protection measures as follows: ▪ Areas supporting larval host plants for the Bay checkerspot, Mission blue, San Bruno elfin, or Callippe silverspot will be identified by a qualified biologist and protected from disturbance by establishing buffer zones around individual plants or populations. The size of the buffer will be determined by a qualified botanist; the actual distance will depend on the plant species potentially affected and the type of disturbance. If impacts on larval host plants of federally listed butterflies are unavoidable and are within occupied or potentially occupied habitats, then the County will stop work in the vicinity of the host plant(s) and consult with the USFWS. ▪ No herbicide will be applied to the buffer area, and to the extent feasible, maintenance personnel and equipment will not operate within such areas. If, based on a review of current CNDDB records or the latest information available from the Xerces Society (https://xerces.org/state-of-the-monarch-butterfly-overwintering-sites-in-california/) historically or currently occupied overwintering habitat for the monarch butterfly is determined to exist in or adjacent to the work area where ground disturbing activities are planned to occur, the County will implement applicable protection measures as follows: ▪ Areas supporting overwintering habitat for the monarch butterfly will be identified by a qualified biologist and maintenance activities during fall and winter months when monarch butterflies are present will be avoided to the extent practicable. ▪ Historically or currently occupied trees/groves will be protected from disturbance by the establishment of a 100-foot buffer zone around the tree/grove. The buffer will be measured from the outside edge of the dripline of the monarch grove. If maintenance activities within 100 feet of a historically or currently occupied tree/grove are unavoidable, the County will prepare and implement an impact minimization plan in consultation with the USFWS. ▪ No herbicides or pesticides will be applied to the buffer area, and to the extent feasible, maintenance personnel and equipment will not operate within such areas.

BMP Number	BMP Title	BMP Description
BIO-13	Measures to Protect the California Ridgway's Rail	If suitable breeding habitat for California Ridgway's rails is determined to exist in or around the work area where maintenance activities are planned to occur, the County will implement applicable protection measures as follows: ▪ If work will occur during the Ridgway's rail breeding season (February 1 through August 31), the County will conduct pre-activity surveys for the Ridgway's rail in the late winter and early spring of the year maintenance activities are scheduled to occur. Surveys will be conducted per the current USFWS protocol. ▪ If the surveys confirm there are no breeding rails within 700 feet of the project area, or the area where heavy equipment, ground disturbance, or vegetation removal would occur, work activities may proceed during the breeding season. ▪ If surveys identify the presence of breeding rails, no maintenance activities will occur within 700 feet of occupied nesting habitat during the breeding season (February 1 to August 31). For work occurring within 300 feet of potential nonbreeding habitat for California Ridgway's rails which provides habitat that occasional nonbreeding California Ridgway's rails may use for foraging or cover, or other identified suitable California Ridgway's rail habitat locations, the County will implement applicable protection measures as follows: ▪ Prior to the initiation of work each day, if suitable habitat occurs within the immediate work area, a qualified biologist will conduct a preconstruction survey of all suitable habitat that may be directly or indirectly impacted by the day's activities (work area, access routes, staging areas). Specific habitat areas are vegetated areas of cordgrass (*Spartina* spp.), marsh gumplant (*Grindelia* spp.), pickleweed (*Salicornia pacifica*), alkali heath, (*Frankenia* sp.), and other high marsh vegetation, brackish marsh reaches of creek with heavy accumulations of bulrush thatch (old stands), and high water refugia habitat that may include annual grasses, and shrubs immediately adjacent to channels. ▪ If during the initial daily survey or during work activities a Ridgway's rail is observed within or immediately adjacent to the work area (50 feet), initiation of work will be delayed until the Ridgway's rail leaves the work area. ▪ Mowing using heavy equipment (e.g., tractors, boom mowers, or rider mowers) will not be conducted in habitat areas or within 50 feet of habitat areas. If mowing with hand equipment is necessary within 50 feet of habitat areas, an on-site monitor will observe the area in front of the mower from a safe vantage point while it is in operation. If Ridgway's rails are detected within the area to be mown, the mowing will stop until the individual(s) have left the work area. ▪ If visual observation cannot confirm the Ridgway's rail(s) left the work area, then it is assumed that the individual(s) remains in the work area and the work will not resume until the area has been thoroughly surveyed (and absence confirmed) or the USFWS has been contacted for guidance.
BIO-14	Measures to Protect Bat Colonies	▪ If high-quality habitat for roosting bats (i.e., large trees with cavities of sufficient size to support roosting bats, or buildings providing suitable roost sites, as determined by a qualified bat biologist) is present within 100 feet of a maintenance site, a qualified bat biologist will conduct a survey to look for evidence of bat use within two weeks prior to the onset of work activities. If evidence of bat occupancy is observed, or if high-quality roost sites are present in areas where evidence of bat use might not be detectable (such as a tree cavity), an evening survey and/or nocturnal acoustic survey may be necessary to determine if a bat colony is present and to identify the specific location of the bat colony.

BMP Number	BMP Title	BMP Description
		▪ If no active maternity colony or non-breeding bat roost is located, project work can continue as planned. ▪ If an active maternity colony or non-breeding bat roost is located, the project work will be redesigned to avoid disturbance of the roosts, if feasible. ▪ If an active maternity colony is located, and the project cannot be redesigned to avoid removal or disturbance of the occupied tree or structure, disturbance will not take place during the maternity season (March 15 – July 31), and a disturbance-free buffer zone (determined by a qualified bat biologist) will be observed during this period. ▪ If an active non-breeding bat roost is located, and the project cannot be redesigned to avoid removal or disturbance of the occupied tree or structure, the individuals will be safely evicted between August 1 and October 15 or between February 15 and March 15 (as determined by a Memorandum of Understanding with CDFW). Bats may be evicted through exclusion after notifying CDFW. Trees with roosts that need to be removed will first be disturbed at dusk, just prior to removal that same evening, to allow bats to escape during the darker hours.
BIO-15	Nesting Bald Eagle and Golden Eagle Avoidance	In areas within 0.5 mile of known bald or golden eagle nesting areas, the following measures will be implemented: ▪ To the extent feasible, conduct vegetation removal activities prior to the nesting season (January 15 through August 1). ▪ For maintenance activities or tree removal that are scheduled to occur between January 15 and August 1, a qualified biologist will survey the work area and a minimum 0.5 mile surrounding the work area for eagle nests. This survey will occur no more than seven days prior to starting work. ▪ No maintenance activities will occur within a 0.5-mile viewshed buffer zone (areas that can be seen by an eagle on the nest), around any active eagle nest during the breeding season, unless a qualified biologist determines late in the season that nesting activity has been completed for the year. No breeding-season maintenance activities will occur within 0.25 mile of the nest site a, regardless of whether or not those activities can be seen from the nest, while nesting activity is occurring.
BIO-16	Avoid Special-Status Plant Species	For projects located in areas where special-status plants have been identified as potentially occurring (see Table 4-1), a qualified biologist will assess habitat suitability for the potential occurrence of special-status plant species within the work area. If determined to be warranted, a qualified botanist will conduct appropriately timed surveys for the focal plant species in accordance with CDFW's special-status plant survey methodology. If a special-status species is observed in or near the project site, the County will follow the measures below as well as any additional measures that might be contained in the forthcoming Biological Opinion issued by the USFWS for the Maintenance Program. ▪ If discovered, the population size and occupied area of special-status plant populations identified during the field survey, and with potential to be impacted, will be estimated. A "population" will be defined as the group of individuals of a species present within a 0.10-mile radius. In addition, the population will be photographed and flagged to maximize avoidance, as well as to estimate the percentage of the population affected. If feasible, the project shall be redesigned or modified to avoid direct and indirect impacts on special-status plant species. ▪ Special-status plants to be avoided will be protected from disturbance by installing environmentally sensitive area fencing (orange construction barrier fencing or a suitable alternative). Protective fencing will be installed under the direction of a qualified biologist as necessary to protect the plant and its habitat; where feasible, the environmentally sensitive area fencing will be installed at least 50 ft from the edge of the population. The location of the fencing will be

BMP Number	BMP Title	BMP Description
		shown on the maintenance design drawings and marked in the field with stakes and/or flagging. The design specifications will contain clear language that prohibits maintenance-relate activities, vehicle operation, material and equipment storage, and other surface disturbing activities within the fenced environmentally sensitive area. For non-ground disturbing vegetation management activities conducted using only hand-held equipment, the non-disturbance buffer may be reduced to a minimum of 3 feet and flagging of the population may be used in place of environmentally sensitive fencing. ▪ Vegetation management activities in sensitive plant areas will be conducted under the guidance of a qualified botanist. These activities will be timed following the blooming periods of potentially occurring listed species. ▪ If any impacts to individual state-listed plants are unavoidable, or if more than 5 percent of a population of a federally listed plant species or species with California Rare Plant Ranks of 1 or 2 would be impacted, then the County will stop work in the vicinity of the plant(s) and consult with the appropriate regulatory agencies. ▪ If impacts to state or federally listed plants are unavoidable and less than 5 percent of a population would be impacted, prior to any ground-disturbing activities the County will preserve the seedbank within the impact area by removing and retaining the topsoil prior to the implementation of maintenance activities. Following completion of the maintenance activity, the County will monitor the impact area for two years. Any non-native invasive plant species occurring within this area during the monitoring period will be removed under the supervision of a qualified biologist. ▪ If appropriately timed focused botanical surveys cannot be conducted prior to maintenance activities in areas identified by a qualified biologist as potentially supporting listed plants, then the County will assume presence of the plant species in question.
BIO-17	Sudden Oak Death Controls	▪ Before entering maintenance sites located in areas infested with *Phytophthora*, field workers will receive training that includes information on *Phytophthora* pathogens and how to prevent the spread of these and other soil-borne organisms by following approved phytosanitary procedures. ▪ The exterior and interior of all vehicles, construction equipment, and tools should be clean and free of debris, soil and mud (including mud on tires, treads, wheel wells and undercarriage) prior to arrival at a new job site, especially during the wet season. ▪ Work shoes should be kept clean by inspecting shoe soles and removing mud, debris and soil off treads before moving to a new job site. ▪ Do not collect or transport host plants from an infested or quarantined area. ▪ Vehicles should stay on established roads whenever possible. ▪ To minimize the potential for spreading potentially contaminated soil and time required for decontamination, if possible, avoid vehicle traffic and field work when soils are wet enough to stick readily to shoes, tools, equipment and tires. ▪ Delivered nursery plants that will be held before planting will be transferred to cleaned and sanitized raised benches and maintained in accordance with the "Guidelines to Minimize *Phytophthora* Pathogens for holding (non-production) nurseries at restoration sites, Section 3." ▪ A portion of purchased nursery plants will be tested for *Phytophthora* using the pear-baiting methodology in which pear baits are placed in soil samples, water samples and root samples of nursery purchased plants. Incubation

BMP Number	BMP Title	BMP Description
		temperatures with diurnal fluctuations from 21 degrees Celsius to 27 degrees Celsius are generally suitable for detecting *Phytophthora* species using pear baits. If dark lesions appear on pears, the sample likely has *Phytophthora* inoculum. For additional information for the pear-baiting methodology, see: phytosphere.com/BMPsnursery/test3_2bait.htm ▪ Nursery plants will be transported on or in vehicles or equipment that have been cleaned before loading the stock. ▪ Nursery stock will not be placed on the soil or other potentially contaminated surfaces until they are placed at their specific planting sites. ▪ Minimize unnecessary movement of soil and plant material within a planting area, especially from higher to lower risk areas. ▪ On-site or off-site collection of plant materials, including seed and cuttings for direct planting, will be conducted in a phytosanitary manner. ▪ Only uncontaminated water or water that has been effectively treated to remove or kill *Phytophthora* should be used for rinsing or irrigating plant material.
BIO-18	Invasive Plant Control	▪ In order to minimize the spread of invasive plants, all equipment (including personal gear) will be cleaned of soil, seeds, and plant material prior to arriving on the project site to prevent introduction of undesirable plant species. ▪ Prior to implementation of Program activities at a given site, the proposed staging area, as well as any areas to be graded, will be surveyed for the presence of invasive weed species. Invasive weed species occurring within locations of construction clearing and grubbing shall be flagged for removal by the biological monitor or qualified biologist. Any invasive weeds with a Cal-IPC rating of "moderate" or "high" found within the survey area will be removed and disposed of in a sanitary landfill, incinerated off-site, or disposed in a high-temperature composting facility that can compost using methods known to kill weed seeds, taking care to prevent any seed dispersal during the process by bagging material or covering trucks transporting such material from the site. ▪ Suitable onsite disposal areas should be identified to prevent the spread of weed seeds. Invasive plant material should be rendered nonviable (partially decomposed, very slimy or brittle) when being treated onsite. Maintenance staff shall desiccate or decompose invasive plant material until it is nonviable. Depending on the type of plant, disposed plant material can be left out in the open as long as roots are not in contact with moist soil, or can be covered with a tarp to prevent material from blowing or washing away. Permittee shall monitor all sites where invasive plant material is disposed onsite and treat any newly emerged invasive plants. Invasive plant material removed during work activities shall be bagged and appropriately incinerated or disposed of in a landfill or permitted composting facility. ▪ No invasive plants shall be planted at maintenance work areas. Prohibited exotic plant species include those identified in the California Invasive Plant Council's Inventory Database, which is accessible at: https://www.cal-ipc.org/plants/inventory/.
BIO-19	Restore Channel Features	▪ Following completion of bank stabilization activities, any temporary modifications to the low-flow channels will be reversed so that the channel is contoured to facilitate fish passage at least as well following the activity as it did prior to the stabilization activity.

BMP Number	BMP Title	BMP Description
BIO-20	Avoidance of Mammal Pupping Sites	▪ Work within 250 feet of an active harbor seal or sea lion haul out will be conducted outside of the pupping season (i.e., June – February).
BIO-21	General Wildlife Protection Measures	▪ If any wildlife is encountered during project activities, said wildlife shall be allowed to leave the area unharmed and on their own volition, except in cases where relocation by a qualified biologist is permitted by conditions below.
BIO-22	Measures to Protect Nesting Western Snowy Plover	▪ To the extent feasible, maintenance activities within 600 feet of suitable snowy plover breeding habitat will occur outside the plover breeding season of March 1 through September 14. ▪ If maintenance activities are scheduled to occur within 600 feet of suitable snowy plover breeding habitat during the nesting season (March 1 through September 14), a pre-activity survey will be conducted by a qualified biologist within 7 days prior to the start of the activity to determine whether active nests are present. ▪ If an active snowy plover nest is detected within 600 feet of maintenance areas, the qualified biologist, in coordination with USFWS personnel, will determine an appropriate buffer that should remain free from new activities (i.e., those that were not ongoing when the nest was established). The buffer will be determined taking into account visual barriers (such as dunes) between the activities and the nest and the level and proximity of human activity around the nest when it was established. The buffer will remain in place until the nest is no longer active. ▪ If broods of unfledged snowy plover young are present, no maintenance activities will occur within 300 feet (or as otherwise determined by a qualified biologist in coordination with the USFWS) of a brood.
BIO-23	Burn Pile Measures	▪ The County would coordinate burn pile activities with CAL FIRE. ▪ Burning will only occur on days when danger of wildfire is low (e.g., it will not occur on windy days or in very hot, dry conditions). ▪ No burn piles will be located within 200 feet of known occurrences of special-status plants, suitable habitat for special-status butterflies and their hostplants, or high-quality aquatic or wetland habitat for the California red-legged frog, California tiger salamander, or San Francisco garter snake. ▪ Prior to the initiation of burning, the burn pile will be physically disturbed (e.g., with a stick or shovel) to encourage any animals taking refuge within the pile to move out of the pile.
BIO-24	Pathogen Control	▪ In order to minimize the spread of plant and animal pathogens, all equipment (including personal gear such as boots) will be cleaned of soil, seeds, and plant material prior to arriving on a maintenance site. All organic matter will be removed from nets, traps, boots, vehicle tires and all other surfaces that have come into contact with water or potentially contaminated sediments. ▪ Equipment, including maintenance equipment and field gear used to capture and relocate special-status species such as frogs, will be disinfected after exiting one aquatic habitat and before entering the next aquatic habitat, unless the waters are hydrologically connected to one another. Cleaning equipment in the immediate vicinity of aquatic habitats will be avoided (e.g., clean in an area at least 100 feet from aquatic features).

BMP Number	BMP Title	BMP Description
		▪ Boots, nets, gloves, and any other equipment used to handle amphibians or aquatic organisms will be scrubbed with a bleach solution (0.5 to 1.0 cup per 1.0 gallon of water), Quat-128™ (1:60), or a 3 to 6 percent sodium hypochlorite solution and thoroughly rinsed clean with water between maintenance sites. Care will be taken so that all traces of the disinfectant are removed before entering the next aquatic habitat. ▪ When working at sites with known or suspected disease problems, disposable gloves will be worn and changed between handling each animal. Gloves will be wetted with water from the site or distilled water prior to handling any amphibians. Gloves will be removed by turning inside out with hands cleaned using a hand cleaner and water rinse to minimize cross-contamination.
BIO-25	Eelgrass Surveys at Coyote Point Marina	In the event that the County plans to conduct in-water maintenance activities to the north of the jetty forming the northern boundary of Coyote Point Marina (identified as "potential eel grass patch #1 in Appendix J), the County will retain a biologist to conduct an eelgrass survey in this area. Survey results would be provided to CDFW and other appropriate permitting agencies prior to commencing maintenance work in this area.

Chapter 10
Program Administration and Reporting

This chapter describes how the Maintenance Program will be implemented and administered by the County. Routine maintenance activities including removal of sediment and vegetation in channels; clearing debris and sediment from culverts and ditches; culvert replacement; bank stabilization and slip-out repairs; managing vegetation along County roads, trails, channels, and other recreational facilities; bridge maintenance; and marina maintenance represent the majority of the County's maintenance work. All maintenance activities utilize the programmatic impact avoidance, minimization, and mitigation approach described in Chapter 9 of this Manual.

10.1 Annual Maintenance Work Plan Notification

In general, maintenance activities take place on an annual cycle, as shown in **Figure 10-1**, depending on whether they are non-ground disturbing activities and/or away from wetlands and channels (Figure 10-1a), or ground-disturbing activities near wetlands and channels (Figure 10-1b).

Figure 10-1a. Timeline for maintenance activities that are non-ground disturbing

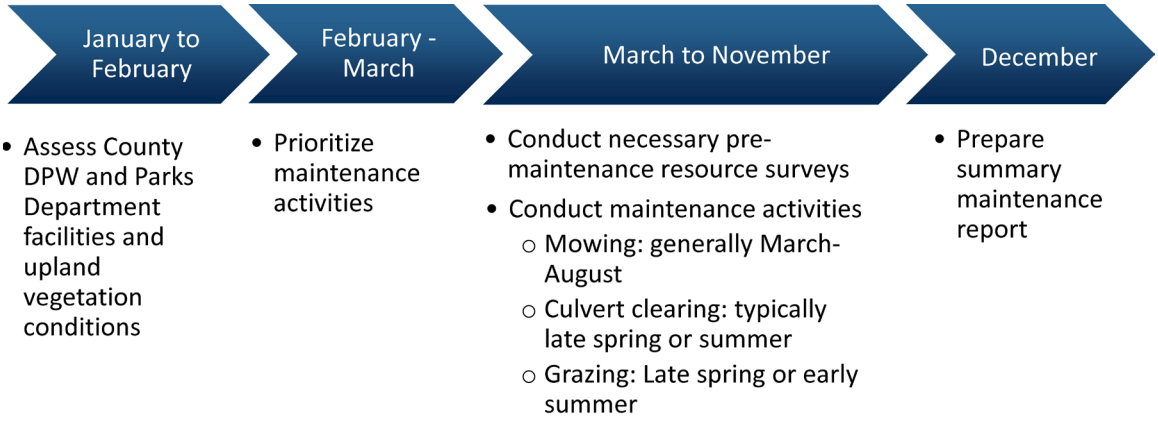
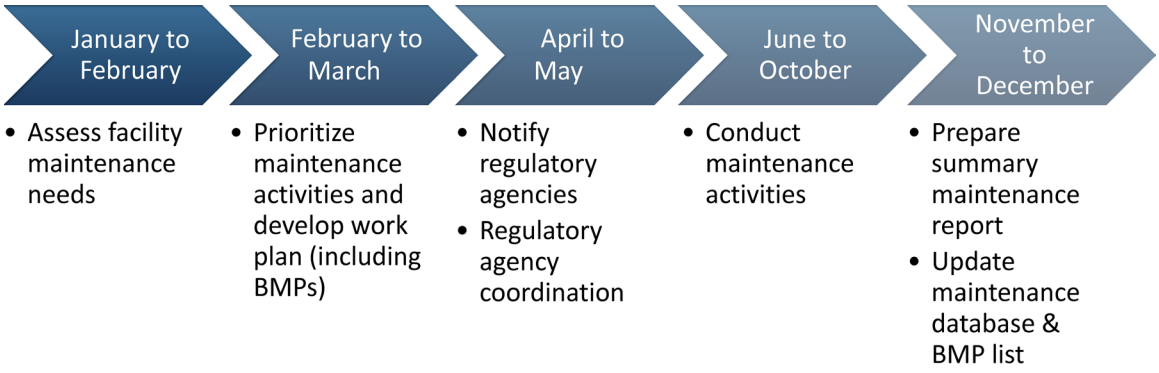


Figure 10-1b. Timeline for maintenance activities that are ground disturbing



10.1.1 Non-ground-disturbing Activities

The majority of maintenance activities that do not involve ground disturbance in upland areas such as mowing, grazing, and vegetation trimming along County roads, trails, and around County Parks Department facilities, will follow the timeline shown in Figure 10-1a. Depending on the targeted invasive plant species, limited herbicide application (above OHWM) occurs at various times of the year. For example, oxalis is treated November through January, whereas other non-native plants are targeted between the spring and early fall season. Other minor maintenance activities such as removing trash and debris from culverts, minor maintenance work that takes place at bridges and marinas (above OHWM), trail maintenance, or any other non-ground-disturbing activities may occur year-round, although the bulk of maintenance activities take place in the spring and summer season (Figure 10-1a). For vegetation management and fire fuel reduction activities, typically a reconnaissance evaluation will be conducted annually in the winter months. Vegetation thinning and removal of dead branches or understory are best conducted in spring, once the primary wet months are over and before the drier conditions in the summer, when the maintenance activities themselves can be a source of fire ignition.

10.1.2 Ground-disturbing Activities

For maintenance activities that involve ground disturbance near wetlands or other jurisdictional waters, such as sediment removal from creeks/channels, culvert replacement, and bank stabilization or slip-out repairs; the County will conduct a maintenance evaluation at each facility during January and February (as shown in Figure 10-1b). During the assessment for sites in which a facility characterization sheet has been developed, those characterization sheets (provided in Appendix H) will be referenced in the field, reviewed for accuracy, and updated as appropriate. New facility characterization sheets summarizing biological resources conditions, water quality, and maintenance needs will be prepared for those sites in which no characterization sheet has been developed.

The history of past maintenance activities and specific resource conditions at individual facilities will be reviewed as maintenance tasks are identified and prioritized. During February to March, an annual maintenance work plan will be developed for ground-disturbing activities based on the assessment and prioritization process.

The number of maintenance activities prioritized for the annual work plan will be dependent on factors such as the climatic and hydrologic conditions in the preceding years. Projects marked as low priority and not included in the current year's work plan will be noted for inspection and reassessment during the next annual work cycle. As appropriate, regulatory agencies would be notified of the planned ground-disturbing maintenance activities in March/April. The work window for ground-disturbing maintenance work that takes place in sensitive habitat and/or in channels below the ordinary high water mark would be between June 15 and October 15.

For some ground-disturbing activities, potential constraints will be identified that might complicate maintenance activities. For example, narrow access, the presence of infrastructure such as pipelines or road crossings, the presence of threatened or endangered species, and structural facility issues could all influence the maintenance approach. The annual maintenance work plan for ground-disturbing activities will identify specific treatment approaches conceptual plans and/or design plans for each treatment that will be implemented. A summary description of design treatments selected, construction equipment to be used, access and staging, and discussion of why the treatment was selected will be provided. Details including the linear feet of channel to be disturbed, linear feet of the replacement culvert, length of the

bank repair, and volume of sediment to be removed will be provided. In addition, the acres of waters of the U.S. and waters of the state will be described.

Following identification of the treatment approach for ground-disturbing maintenance activities, the County's biologist will determine the tiering category for each project according to the definitions described in Section 2.3. These tiering categories will help guide the County in determining appropriate impact avoidance measures and activity-specific BMPs (listed in Chapter 9, Tables 9-2, 9-3, and 9-4). Note that all projects (both non-ground-disturbing activities and ground-disturbing projects) will utilize appropriate program-wide BMPs for impact avoidance and minimization as identified in Chapter 9. The tiering categories will also assist the County in determining which maintenance activities will require an on-site biologist during construction and which will require compensatory mitigation. This tiering approach will guide development of the mitigation plan described below in Sectioná10.2.

The County will oversee the Maintenance Program throughout all steps of the above-described work cycle. Continuity in oversight and attention will enable the program to run effectively. A designated staff person from the County will serve as the Maintenance Program manager. The Maintenance Program manager's primary responsibility will be to supervise and guide the Maintenance Program. A key responsibility for the maintenance manager will be to provide communication and coordination between the two County departments and the relevant regulatory agencies throughout all steps of the work cycle. The Program will be administered to be consistent with the objectives and activities described in this Manual.

10.2 Develop Mitigation Plan

In parallel with developing the annual project work plan, the County will develop the annual mitigation plan for maintenance activities considered as "Tier 3". The mitigation plan will describe the on-site and/or off-site planned mitigation activities, mitigation banks to be utilized, and projects led by local partners (e.g., San Mateo County RCD) to which the County will contribute funds. The mitigation plan will include the following types of information:

- A description of on-site habitat restoration or enhancement activities planned for the coming year including the locations, lengths, areas, and other project details;
- A description of off-site habitat restoration or enhancement activities that are led by the County;
- A description of habitat restoration and enhancement projects led by local watershed organizations that the County will help fund, including:
    - A description of each off-site restoration project, including its name, the project partners, project cost, length and area of mitigating activities;
    - A description of how these off-site watershed projects will address watershed processes and functions that will provide suitable mitigation for the year's maintenance activities;
    - Schedule for implementing mitigation project activities;

  - A statement describing the status of permit approvals necessary to perform project (if applicable); and
  - A mitigation and reporting plan.
- A description of the mitigation bank, its location, and the types and amount of credits that will be purchased.

Permitting agencies will have the opportunity to review and comment on the proposed annual mitigation plan. The annual mitigation plans will be consistent with the mitigation approaches outlined above and in Chapter 9.

10.3 Agency Notification

By April 30 of each year, the County will notify the relevant regulatory agencies that have jurisdictional authority over or oversight of the year's planned maintenance projects that are occurring in channels, creeks, or other facilities that involve ground-disturbing activities. The relevant regulatory agencies will be provided with information describing proposed maintenance activities, locations, natural resource conditions, and any other key resource issues. The notification package will describe which ground-disturbing maintenance activities will result in impacts on temporary and permanent impacts on wetlands or waters of the U.S. and state. It will also describe in detail the County's proposal for providing compensatory mitigation for those impacts and may include one or more options outlined in Chapter 9. If requested, the County will host a tour of the identified maintenance sites. Following regulatory review and coordination, maintenance activities will be implemented between June 15 and October 15, with summary reporting activities occurring in the late fall as described below.

For maintenance projects that will affect fish passage, the County will notify NMFS about such projects in the notification report for the year prior to construction and include preliminary design concepts. The County would coordinate with NMFS throughout the design process to ensure that these maintenance projects meet applicable NMFS criteria.

10.4 Project Implementation

Once the County receives a notice to proceed from the relevant regulatory agencies, regulated maintenance activities may be initiated. Ground disturbing maintenance work in channels and creeks or sensitive habitats would take place after June 15. All maintenance activities will be conducted in accordance with the project description, program-wide and activity-specific BMPs, and terms of the maintenance permits. This includes conducting any necessary pre-activity surveys for fish, wildlife, and other resources, if activities may affect these resources. An on-site project supervisor trained in using the Maintenance Manual will oversee and guide all maintenance activities and ensure that the proper maintenance principles and avoidance and minimization approaches, as described in Chapter 9, are employed.

As described above, some vegetation management activities must take place early in the work season (e.g., mowing, tree trimming and pruning), before the fuel is too dry and the fire ignition risk increases. Most fuel and vegetation management activities (including weed and brush control) that are not subject to regulatory approvals may be conducted as early as April/May. As previously described, herbicide application occurs at various times of the year depending on plant phenology and is timed to be most

effective. For some plants above OHWM, herbicide application occurs during the spring and for others, it occurs during the fall or early winter. As previously described, other minor maintenance activities that occur above OHWM may occur during both spring and fall.

During implementation of maintenance activities, if an issue arises that requires a different treatment or approach than that described in the notification package, the Maintenance Program manager will send an updated notification to the relevant agencies with this project change. If maintenance activities near waters of the U.S./State need to occur after September 30, the County will submit a winterization plan to relevant regulatory agencies. The winterization plan will describe how maintenance activities will be stabilized to prevent pollutant release and erosion during the rainy season and provide more detail regarding additional dewatering and diversion systems that may be required beyond the dry season.

When projects are implemented, data will be collected at the project site before, during, and immediately after project implementation or as required by regulatory permits or the protocols described in this manual. Data collected may include before, during, and after photographs; quantification of material removed (for sediment removal projects) or placed (for any bank stabilization projects); the length and area of vegetation maintenance activities (e.g., herbicide application, tree trimming); and the location or occurrence of any sensitive species or other resources encountered at the site during pre-activity surveys or project implementation. Monitoring data will be collected shortly after the completion of maintenance activities at each site.

10.5 Annual Maintenance Summary Report

At the conclusion of the maintenance season (generally after October 15 and before January 31), the County will prepare and submit to the relevant regulatory agencies an annual summary report describing the work plan status and confirm which projects were completed. The report will comply with permitting requirements issued by the relevant regulatory agencies and may include the following information:

- Description of the extent to which the work plan was completed during the maintenance season (i.e., projects that were and were not implemented) and, for any projects that were not implemented, a brief explanation of why, and whether the project will be incorporated into the next year's work plan or placed on a watch list;
- Statement of whether activities were conducted according to the project description and, if not, how the actual project varied from the project description;
- Site photographs taken before and after project completion;
- A record, if applicable, of how much sediment and vegetation was removed and the number of acres affected;
- A record, if applicable, of how much material was disposed of off-site, the disposal locations, and the approximate footprint area affected;
- Description of whether any special-status species or other sensitive resources were encountered during construction and, if so, what impact avoidance steps were taken in response;
- A brief description of site monitoring activities;
- Any lessons learned from that year's activities, including treatments that were not effective, administrative difficulties, and proposed steps to facilitate the process and

- Recommended updates (if any) to the program BMPs.

The annual report will also include status reporting on the program's mitigation activities, including the submittal of follow up monitoring reports. Topics to be addressed in the monitoring reports are addressed in Chapter 9, Section 9.5.7.

At the end of the annual work cycle, the County will update its maintenance tracking database and the BMP list (Tables 9-2, 9-3, and 9-4), as appropriate, to include any updates or changes made over the recent work cycle. By doing so, development of the next year's work plan will be built on updated information across the Maintenance Program area.

Chapter 11
Acronyms and Abbreviations

ACHP	Advisory Council on Historic Preservation
BA	Biological Assessment
BAAD	Bay Area Air District
BGEPA	Bald and Golden Eagle Protection Act
BCDC	San Francisco Bay Conservation and Development Commission
BMP	best management practice
BO	Biological Opinion
Cal-IPC	California Invasive Plant Council
CCR	California Code of Regulations
CDFA	California Department of Food and Agriculture
CDFG	California Department of Fish and Game (former)
CDFW	California Department of Fish and Wildlife (since 2012)
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CHRIS	California Historic Resources Information System
CIP	Capital Improvement Project
CMP	corrugated metal pipe
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CRPR	California Rare Plant Rank
CWA	Clean Water Act
CWHR	California Wildlife Habitat Relationship System
DPW	San Mateo County Department of Public Works
EA	Environmental Assessment
EFH	essential fish habitat
F&G Code	California Fish and Game Code
FESA	Federal Endangered Species Act
FWCA	Fish and Wildlife Coordination Act
HUC	Hydrologic Unit Code

I-280	Interstate 280
IPM	Integrated Pest Management
LCP	Local Coastal Program
LID	low impact development
LWD	large woody debris
Maintenance Program	San Mateo County Routine Maintenance Program
Manual	San Mateo County Routine Maintenance Program Manual
MBTA	Migratory Bird Treaty Act
MLD	most likely descendant
MSA	Magnuson-Stevens Fishery Conservation and Management Act
NAHC	Native American Heritage Commission
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resource Conservation Service
NRHP	National Register of Historic Places
NWIC	Northwest Information System
OHWM	ordinary high water mark
PCB	Polychlorinated Biphenyls
Porter-Cologne Act	Porter-Cologne Water Quality Control Act
Program	San Mateo County Routine Maintenance Program
QAL	Qualified Applicator's License
RCD	Resource Conservation District
RGP	Regional General Permit
RMA	Routine Maintenance Agreement
RWQCB	California Regional Water Quality Control Board
SAA	Streambed Alteration Agreement
SHPO	State Historic Preservation Officer
SMCWPPP	San Mateo Countywide Water Pollution Prevention Program
SR	State Route
SWRCB	State Water Resources Control Board

TMDL	total maximum daily load
U.S.	United States
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WMA	Weed Management Area
WDR	Waste Discharge Requirement

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Chapter 12
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Chapter 1 Introduction

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Chapter 10 Program Administration and Reporting

No references cited.

Appendix A

Routine Maintenance BMPs (updated 2025)

BMPs

BEST MANAGEMENT PRACTICES

BMP #	BMP Title
EC-1	Brush Layering
EC-2	Brush Packing
EC-3	Live Staking
EC-4	Live Pole Drain
EC-5	Wattles/Fascines
EC-6	Hand Seeding
EC-7	Hydroseeding
EC-8	Mulching
EC-9	Vegetative Buffer
EC-10	Erosion Control Blankets & Mats
EC-11	Surface Roughening
EC-12	Rolling Dip
EC-13	Slope or Bank Stabilization
EC-14	Energy Dissipator
SC-1	Sandbags and Gravel Bags
SC-2	Silt Fence
SC-3	Straw Log, Straw Roll, Coir Log
SC-4	Inlet Protection
SC-5	Stormwater Separation Systems
SC-6	Diversion Berm
DW-1	Channel Dewatering

BMP: EC-1

BRUSH LAYERING

DESCRIPTION

Brush layering is a technique used in stabilizing shallow slope failures or rebuilding fill slopes with live brush cuttings (usually willows or other types of branches with soil backfill or soil lifts. Live brush layers act as horizontal drains, improve slope stability by providing tensile strength and natural revegetation. Brush layering may include the use of fabric soil wraps, large vegetated boulder revetments, or other structural toe support. Examples of native species from San Mateo County that may potentially be used for brush layering are listed in **Table 1**.

Table 1. Native plant species for use in brush layering.

Scientific Name	**Common Name**
Salix lasiolepis	arroyo willow
Salix exigua	sandbar willow
Salix laevigata	red willow
Salix lasiandra	Pacific willow
Alnus rhombifolia	white alder
Alnus rubra	red alder
Populus fremontii	Fremont cottonwood
Populus trichocarpa	black cottonwood

APPLICATIONS

This technique is used for repairing steep slopes, slumps or stream banks above stream-forming flow conditions. It's useful in restoring eroded stream banks on outside bends where laying back the bank is not feasible and can be placed on slopes up to 1:1 or steeper with additional geotechnical analysis. Brush layering can help dry wet sites with seeps through transpiration. The willow brush helps reduce near bank stream velocities.

Brush layering involves relatively simple construction. Among the ground stabilizing techniques, the brushlayer has an immediate impact, its protective and stabilizing effect extending into lower soil horizons. At extreme sites where erosion, deposition, and rockfall are particular hazards, brush layers and the original vegetation that develops with them gradually eliminate these problems. Fast establishment of a stable soil-root complex is possible. Relatively short and spreading branches of the scrub willows growing in mountainous regions can be used. Simultaneous brush layering construction during fill operations is possible. It is one of the best techniques for revegetating and stabilizing streambanks and slopes. Living and non-living brush layers along

streambanks also provide valuable fish habitat.

LIMITATIONS

- Not suitable for the stabilization of deep, organic topsoil layers.
- Live materials should be harvested and constructed during the dormancy stage of plant growth.
- Drainage areas should be relatively small (generally less than 2,000 acres). If used on larger stream systems, additional toe protection and analysis will be required.
- Stream system should not be degrading (downcutting) or the structure can be undermined.
- The system must be built during low flow conditions. May need to divert water around the site and/or dewater during construction.
- Live cuttings should be taken no earlier than the end of August and kept moist until the rainy season.
- Willows require nearly full sun conditions to be vigorous. Not to be used in heavy shade. Check to see if willows are growing in the area to confirm if this technique can be used.
- In-stream construction requires permits from regulatory agencies.

CONSTRUCTION GUIDELINES

1. Choose a technique such as key trenching, rock toe, retaining wall, root wads, coir logs, or buried toe rock to secure the toe of the slope. Boulder toe protection should be installed if toe scour is a concern. Toe depth should be several feet below the thalweg of the streambed. Width of lifts will vary by site; however, a minimum width of 4 feet should be used for adequate fabric and brush layer depth.

2. Beginning at the bankfull elevation, place 8 to 12 live branch cuttings per linear foot on top of the rock filled fabric lift with growing tips at right angles to the streamflow. Live willow cuttings should be 4 feet in length or longer. Place a few inches of select fill around willow between fabric lifts to ensure good soil contact with willow. Water in willow.

3. Cover this layer of cuttings with fabric leaving an overhang. Place a 12 to 24-inch layer of soil suitable for plant growth (in compacted 6” lifts) on top of the fabric. Wrap the overhanging portion of fabric over the compacted soil to encapsulate the soil in a wrap. Pull and tighten fabric toward slope and stake in place. The thickness of lifts will vary by soil type, stream shear stress, and velocity. Generally, 12-inch thick lifts are more stable than thicker lifts but are more expensive to build. Lifts typically range from 12-inch to 30-inch with 18-inch lifts being most common.

4. Continue this process with alternating layers of cuttings and compacted lifts wrapped in fabric until the bank is restored to its original height or meets desired grade.

5. Several fabric options can be used for creating the wraps. Coir twine mats (outside) with a high tensile strength can be used in conjunction with coir erosion control blanket (inside) with a dense weave to prevent soil migration through the blanket. At sites where capital improvements are in jeopardy or higher shear stresses and velocities are calculated, synthetic geotextile materials (geogrids) may only be used with prior agency approval. Willow roots will grow through the geogrid layers creating a dense matrix of willow roots bonding the structure into a single mass.

BMP MAINTENANCE

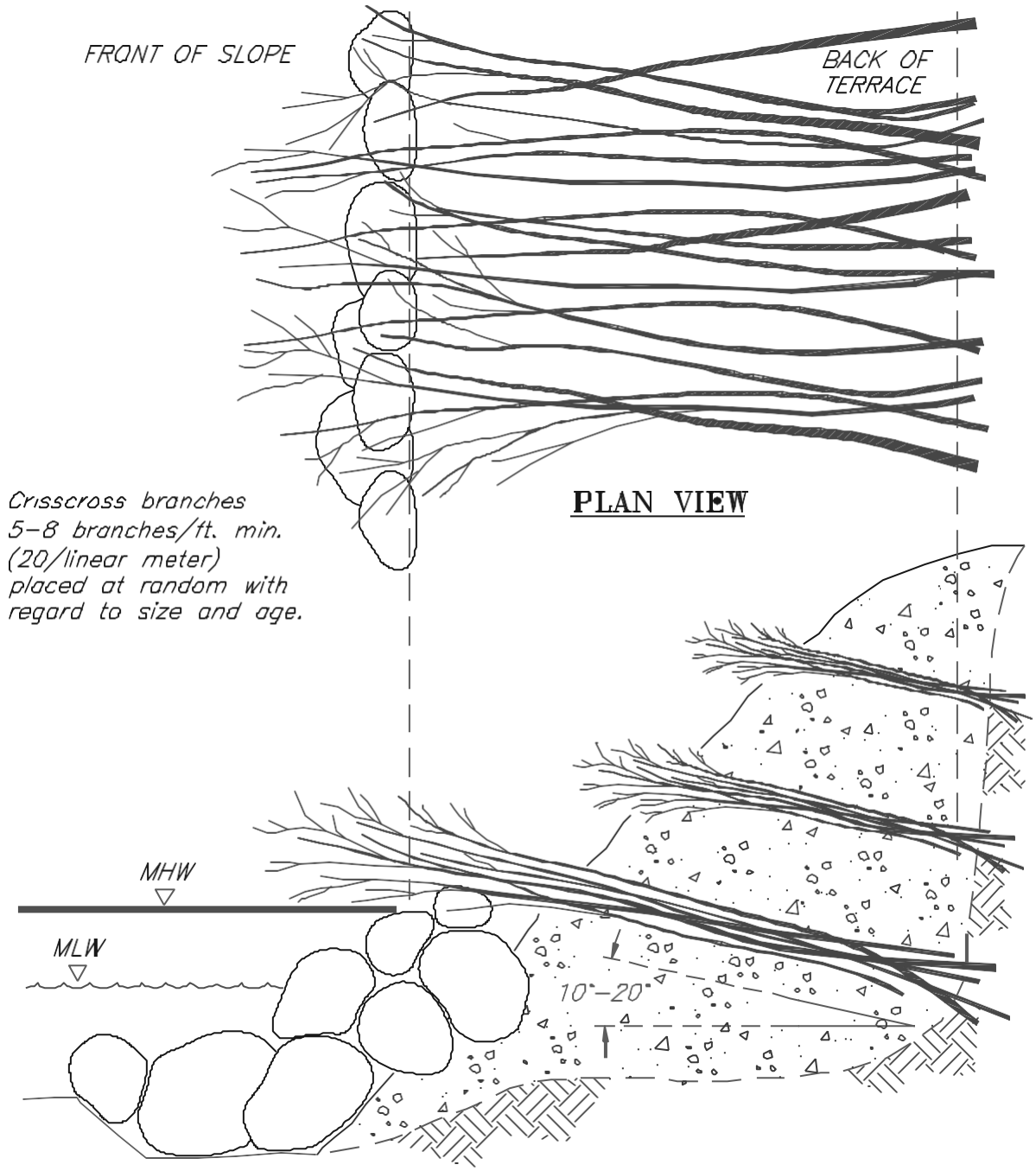
- Keep soil and live cuttings moist by overhead irrigation until the rainy season begins.
- Keep livestock away from the live cuttings. If possible, protect from deer for the first year after installing the live cuttings.
- No maintenance of brushlayers should be required if materials are placed at appropriate depths.
- Fill slopes should be periodically inspected and any failures corrected immediately.

MATERIALS

Materials include branches and cuttings of deciduous woody plants capable of producing adventitious roots, most appropriately willow. Live brushlayer materials can be stored in containers under shade until installation. For best results, soak willow for at least 24 hours, or up to 30 days. Willows may be bundled and soaked in a stream near the project site.

BMP REMOVAL

- Not required.



NOTES:

1. Tilt branches down into the slope 10°–20° min.
2. Brushlayering may be constructed with non–compacted or compacted backfill without damage to the brush layer.
3. Branches irrespective of length, should protrude 8–18in. (0.20–0.50 meters) beyond the face of the slope.

BRUSHLAYERING WITH ROCK TOE PROTECTION

© 1999 JOHN McCULLAH

FILE: BRLAY–RT

BMP: EC-2

BRUSH PACKING

DESCRIPTION

Brush packing is a biotechnical gully and slump repair technique. Brush packing utilizes alternating layers of live branch cuttings (from rootable plant species) and soil to repair large rills, gullies, and slumps. The brush packing technique is more appropriate for the repair of gullies on slopes, and it can be implemented with hand labor.

Brush mattresses employ the same principles that are typically used on road slipouts and bioengineered streambank stabilization projects.

APPLICATIONS

Since brush packing involves refilling the gully with soil between successive layers of branches, this practice is not recommended for gully repair in drainages or ephemeral stream channels. The slope and gully must have soil material available with which to fill the slumps and gullies. Brush packing should be used in conjunction with slope scaling or slope grading activities where rills, gullies, and other channels are removed by re-grading.

LIMITATIONS

- Not suitable for the stabilization of deep, organic topsoil layers.
- Live materials should be harvested and constructed during the dormancy stage of plant growth.
- Permits may be required for installation along streambanks.
- Usually requires manual labor to fill and regrade slope.

CONSTRUCTION GUIDELINES

1) It is imperative to treat any source of concentrated flows or other causes of gulling before performing brush packing treatments. Cut branches to a length which corresponds to the depth of the gully. Branches should extend the entire depth of the rill or gully, with tips protruding from the slope face when grading is complete. Branch cuttings shall be a mixture of younger wood and older wood, from 6-50 mm (¼-2 inches) diameter.
2) Fill the bottom of the rill, gully, or slump with soil, approximately 12 inches, and shape and compact the soil terrace such that it dips into the slope. Place branch cuttings, 3-8 inches thick, in a crisscross or overlapping configuration. The growing tips shall protrude 6-12 inches from the slope face, with the basal ends dipping back into the slope. It is important that the basal ends of the branches are lower than the branch tips. Live stakes may be driven through the soil-branch layers for extra stabilization.

3) Continue re-grading the slope and cover the brush layer with a 150-300 mm (6-12 inch) layer of soil. Compact to ensure good soil contact with the branch cuttings. Then continue brush packing and soil layering until the gully is filled and the slope is re-graded. The final installation should match the existing slope with the in-field section slightly higher to ensure that runoff collection and channelization does not occur.
4) Seed and mulch the slope. Shallow slopes, generally 3:1 or flatter, may be seeded and mulched by hand. Steeper slopes should have seed applied hydraulically and the mulch shall be anchored with tackifier or other approved methods.

BMP MAINTENANCE

- Conduct regular inspection and maintenance, particularly during the first year.
- Immediately correct and repair failures of fill or drainage structures.

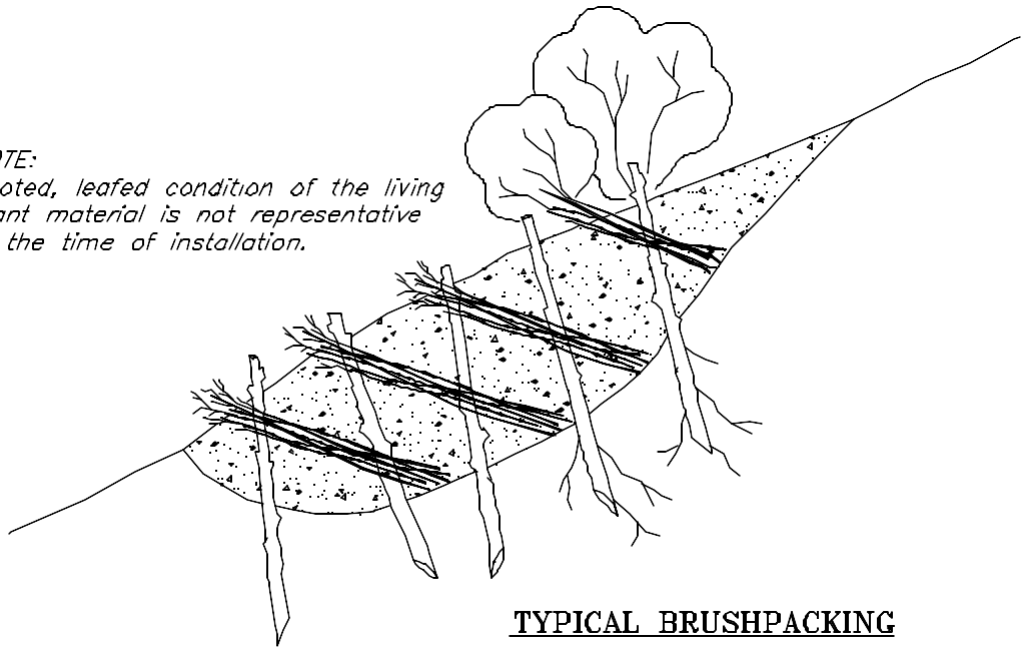
MATERIALS

- Live materials needed include branches and cuttings of deciduous woody plants capable of producing adventitious roots, most appropriately willow. Straw or other mulch can be mixed with soil to help fill in the gully.
- Coir netting or erosion control blanket material can be wrapped around the soil layers to protect the slope face (see Brush Layering BMP).
- Polypropylene geogrids can be incorporated into the soil layers if additional strength and durability are desired.

BMP REMOVAL

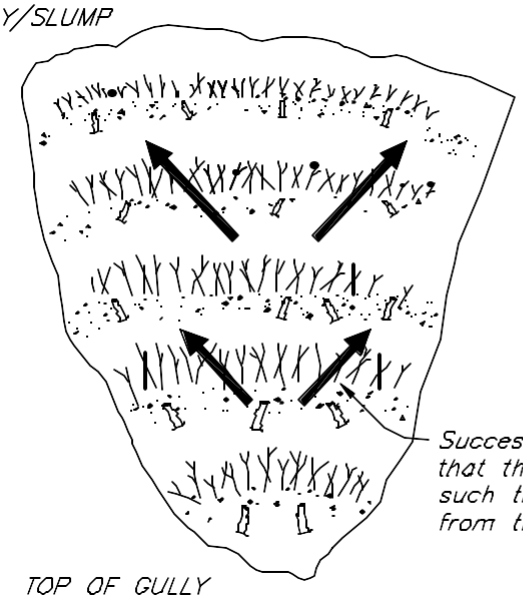
Not required.

NOTE:
Rooted, leafed condition of the living plant material is not representative of the time of installation.



TYPICAL BRUSHPACKING

BOTTOM OF GULLY/SLUMP



Successful brushpacking requires that the gully be filled convex such that runoff drains away from the center.

TOP OF GULLY

PLAN VIEW

© 2000 JOHNMcCULLAH

FILE: BRSHPSGR

BMP: EC-3

LIVE STAKING

DESCRIPTION

Live staking involves the insertion of live, vegetative cuttings into the ground in a manner that allows the cutting (stake) to take root and grow. This BMP is used to reduce the potential for soil to become water borne, to reduce water velocity and erosive forces, and to aid in habitat protection. Poles used in willow walls and vegetated boulder revetments may be a structural application. Sprigs may be used in individual planting spots along a streambank.

Applications

This BMP may be used to repair small slips and slumps, to reinforce or enhance stream banks, and to anchor and enhance the effectiveness of wattles, fascines, straw logs and other erosion control materials. It may also be used in conjunction with approved biostabilization installations such as vegetated boulder revetments.

LIMITATIONS

Do not use this BMP under the following conditions:

- where vegetation growth will interfere with maintenance or facility access.
- where vegetation growth will create safety issues.
- for immediate soil stabilization results.

CONSTRUCTION GUIDELINES

1) Live staking must be implemented during the dormancy period of chosen plant species, late fall to winter (October through January is ideal in Northern Coastal California). If native willows or cottonwood are not found in the vicinity, live staking may not be a good option.
2) Hardwood cuttings are generally divided into three categories: Sprigs (or stakes) that are 0.75 to 1.5 inches in diameter and 36 to 48 inches long; Poles that are 1.5 to 3 inches in diameter and 5 to 8 feet long; and Branch Cuttings or Weavers which are no thinner than ½ inch and 6 to 12 feet long depending on the application (wattles, layering, willow wall revetments).
3) Don’t allow stakes to dry out. Soak all cuttings in water for a minimum of 24 hours. Soaking significantly increases the survival rate of the cuttings; however, they must be planted the same day they are removed from water.
4) Use an iron stake or bar to make a pilot hole in firm soil. Plant the stakes butt-ends into the ground, with the leaf bud scars or emerging buds always pointing up. Be careful not to damage the buds, strip the bark or split the stake during

installation. Plant stakes at random in the most suitable places at a rate of 2-5 cuttings/square yard. Do not plant the stakes in rows or at regular intervals.

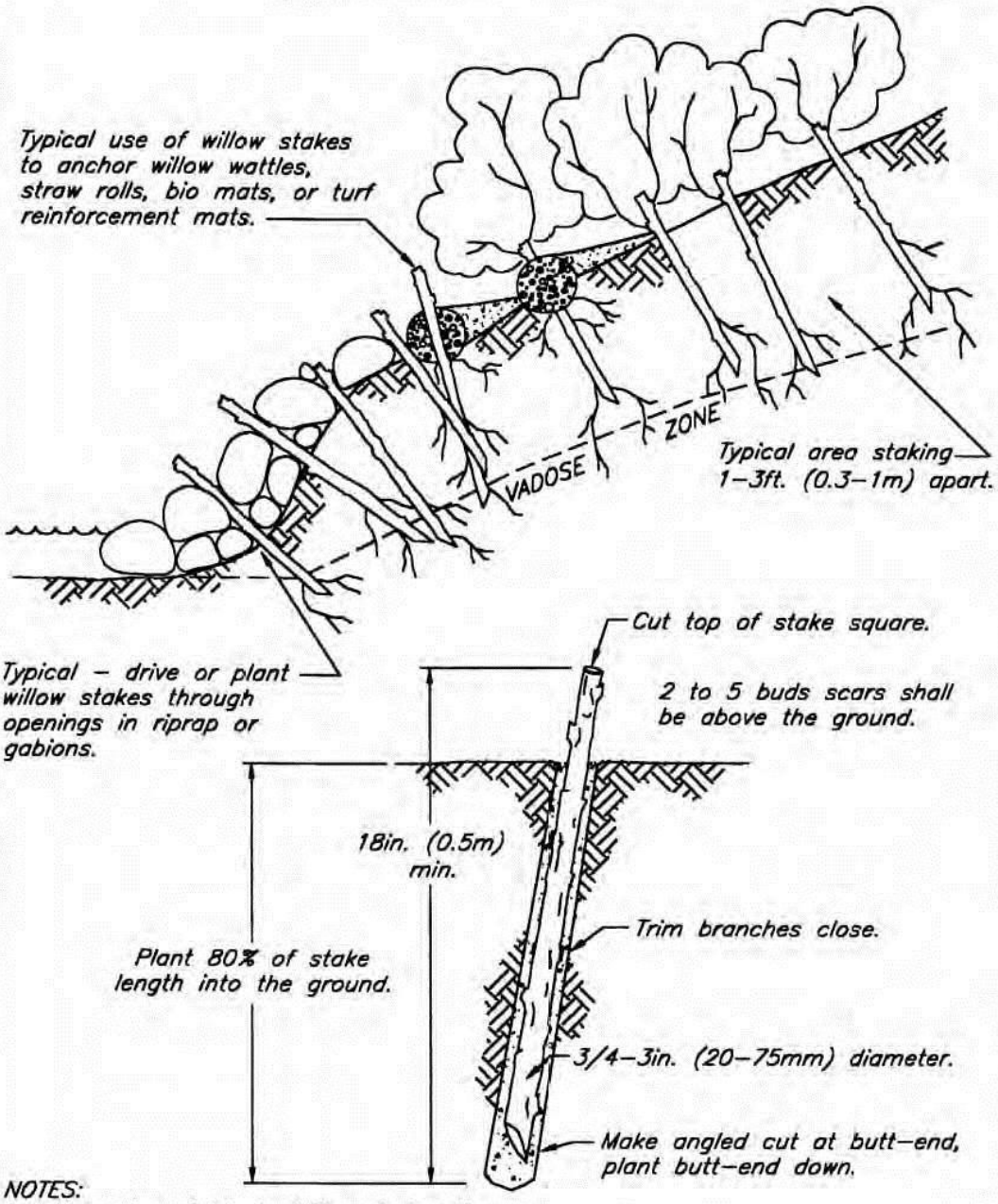
5) Set the stake as deep as possible into the soil, preferably with 80 percent of its length into the soil and in contact with mid-summer moist soils. The stake should protrude only to a maximum of one-quarter its length above the ground level to prevent it from drying. Stakes should be cut so that cutting extends above competing herbaceous vegetation. At least 2 buds and/or bud scars shall be above the ground after planting. It is essential to have good contact between the stake and soil for roots to sprout. Tamp the soil around the cutting. Do not fertilize.

BMP MAINTENANCE

- Periodic inspection, repair and maintenance will be done in accordance with permit requirements. If no permits are required, vegetation will be monitored for the first two years or until the vegetation is established.
- Staked area may need to be watered during summer months.

BMP REMOVAL

- BMP removal is not necessary.



NOTES:

1. Harvest and plant stakes during the dormant season.
2. Use healthy, straight and live wood at least 1 year old.
3. Make clean cuts and do not damage stakes or split ends during installation, use a pilot bar in firm soils.
4. Soak cuttings for 24 hours (min.) prior to installation.
5. Tamp the soil around the stake.

LIVE STAKING AND JOINT PLANTING

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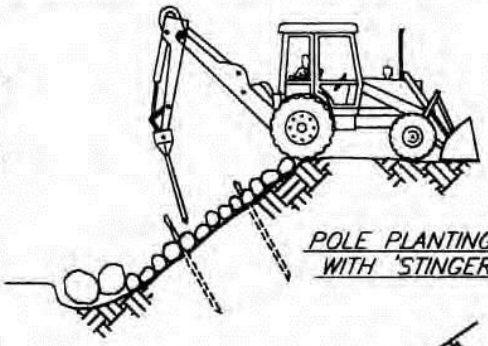
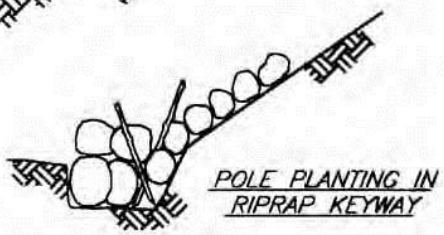
FILE: LVSTJTPL

CONSTRUCTION TECHNIQUES

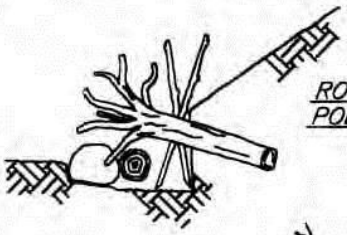
Plant poles deeply during construction of biotechnical streambank work.



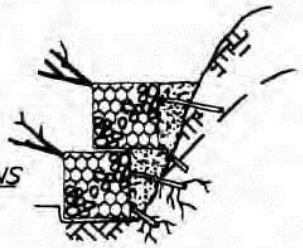
POLE PLANTING WITH 'STINGER'



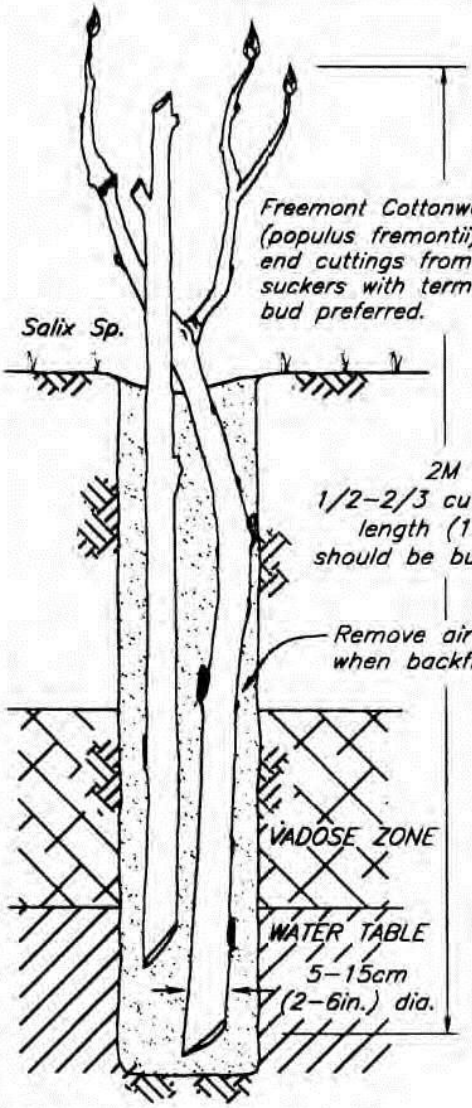
POLE PLANTING IN RIPRAP KEYWAY



ROOTWAD WITH POLE PLANTING



VEGETATED GABIONS WITH POLES



NOTES:

1. *Pole cuttings of willow or cottonwood are longer and have a larger diameter than branch cuttings or live stakes.*
2. *Larger diameter cuttings have a greater supply of stored energy (stored photosynthesis) than smaller diameter cuttings.*
3. *Pole cuttings are better suited for highly erodible areas and sites with fluctuating water levels.*
4. *The pole cuttings should extend through the vadose zone and into the permanent water table. At least 1/2 to 2/3 of the pole should be below the ground, at least 1.0m (3 ft.), and long enough to emerge above adjacent vegetation.*
5. *"Muddying" – filling the hole with water and then soil to make a mud slurry can remove air pockets.*

POLE PLANTING

© 2000 JOHN McCULLAH

POLEPLNT

BMP: EC-4

LIVE POLE DRAIN

DESCRIPTION

A live pole drain is a biotechnical and reclamation technique intended to drain excess moisture away from an unstable site. Plants are used to construct the bundles (willow), which will sprout and grow, with the moisture continuing to drain from the lower end. The bundles of cuttings are usually placed in shallow trenches in a manner that they intersect and collect excessive slope moisture. That excess water is then allowed to drain onto a stabilized area.

APPLICATIONS

This BMP may be used on unstable slopes, landslide repairs, and small slumping gullies.

LIMITATIONS

- Live pole drains are not effective in larger, well defined channels with concentrated flows, as the pole drains will simply plug the channel and cause more erosion as the channel adjusts to maintain capacity.
- Installation should be conducted at times of the year when weather conditions are cool and moist and the plant material is dormant.

CONSTRUCTION GUIDELINES

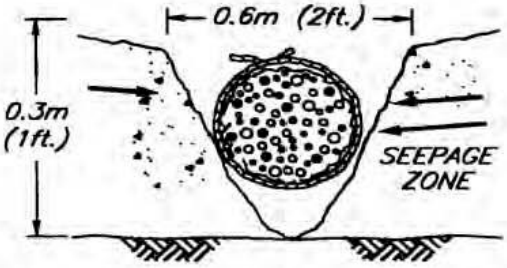
1) Install the drains in the areas of seepage, either by excavating a shallow trench or utilizing an existing drainage gully, so the drains intercept and control the excess moisture. Use wattle/fascine techniques to construct the bundles. The bundles should be tied tightly with twine or rope. Place the bundle of cuttings in the trench. Construct side drains as needed. Key the bundles into each other by jamming the ends firmly together.
2) Use construction stakes and/or live stakes to hold the fascines in place. Insert the stakes adjacent to the rope ties for additional support. Stake the pole drains at 3 to 6-foot intervals. Lightly backfill the bundles with native soil. Some twigs and branches should be left above the ground as the willow material requires some sunlight exposure to grow.

BMP MAINTENANCE

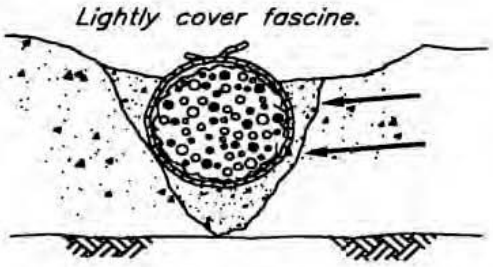
- Conduct regular inspections and maintenance, particularly during the first year.
- Immediately correct failures of fill or drainage structures.

BMP REMOVAL

- BMP removal is not necessary.



Excavate a shallow trench or utilize existing "seepage gully" (small<2ft.^{2}).



Place bundle of cuttings (fascine) in the trench and lightly backfill with native material.

NOTES:

1. Live pole drain is a biotechnical/reclamation technique which drains excess moisture from the site and provides an initial cover of woody vegetation.
2. The cuttings used to form the fascines are intended to sprout and grow while the excess moisture continues to drain from the lower end.
3. The key to successful live pole drain construction is to establish the drains in the area of seepage so they provide a controlled alternative for excess moisture to escape.

LIVE POLE DRAIN

© 2000 JOHN McCULLAH

FILE: LIVEPOLE

BMP: EC-5

WATTLES/FASCINES

DESCRIPTION

Wattles and fascines are live branch cuttings, usually willows, bound together into long, tubular bundles used to stabilize slopes and stream banks. Both wattles and live fascines are true biotechnical practices. The live branches and live stakes provide the biological element while the stems, rope ties and wedge shaped wooden stakes all combine to provide the structural elements. Fascines differ from wattles in that the branch cuttings all point in the same direction in fascines, where they may point in either direction in wattles. Wattles are typically aligned on contour, where fascines are angled slightly upslope and thus tend to produce more vigorous growth.

APPLICATIONS

Wattles/fascines may be used for long slopes, road fills, road cuts, gullies or slumped areas, eroded slopes or eroding stream banks. May be used to repair small earth slips and slumps or to protect slopes from shallow slides 1-2 feet deep. Wattles/fascines may be used to stabilize entire cut or fill slopes or localized gully areas of slopes, or may be installed on newly built slopes or as a remedial action on existing slopes. This technique is useful on slopes requiring other planting materials such as woody vegetation, transplants and grasses. Wattles/fascines enhance conditions for natural invasion and the establishment of other plants from the surrounding plant community.

LIMITATIONS

- Always perform plant material harvest and installation during the dormant season, late fall through early spring.
- Where increased infiltration may cause slope failures, use fascines instead of wattles to ensure positive drainage.

CONSTRUCTION GUIDELINES

1) Pre-soak wattles/fascines for 24 hours, or installed on the same day they are harvested and prepared. Wattles/fascines must be stored in the shade and under cover, preferably in water. Use site reconnaissance to identify species and site conditions on adjacent sites and compare their conditions to the construction site. Planting will be more successful as the soil, site conditions, and species selected match stable and vegetated nearby sites.

2) Tie cuttings together to form bundles, tapered at each end, 6-30 feet in length, depending on site conditions or limitations in handling. The completed bundles should be 6-12 inches in diameter. Stagger the cuttings in the bundles so that the tips are evenly distributed throughout the length of the bundle.
3) Compress and tightly tie wattle/fascine bundles with rope or twine of sufficient strength and durability. Bundles shall be tied 12-15 inches apart.
4) General Installation Guidelines:

Slope (H:V)	Slope Length Between Wattles/Fascines (feet)
1:1 to 1.5:1	3-4
1.5:1 to 2:1	4-5
2:1 to 2.5:1	5-6
2.5:1 to 4:1	6-8
3.5:1 to 4:1	8-12
4.5:1 to 5:1	10-20

5) Perform any slope repairs prior to wattle/fascine installation.
6) Beginning at the base of the slope, dig a trench on contour. The trench shall be shallow, about ½ the diameter of the wattle. The trench width will vary from 12-18 inches depending on the slope angle. Place the wattles immediately after trenching to reduce desiccation of the exposed soil. Wattles shall be staked firmly in place with one row of construction stakes on the downhill side of the wattling, not more than 3 feet apart. The second row of stakes shall be placed through the wattles, near the ties, at not more than 5 feet apart. Overlap the tapered ends of adjacent wattles so the overall wattle thickness of the wattle is uniform. Two stakes shall be used at each bundle overlap such that a stake may be driven between the last two ties of each wattle.
7) Live stakes, if specified, are generally installed on the downslope side of the bundle. Drive the live stakes below and against the bundle between the previously installed construction stakes. Backfill wattles with soil from the slope or trench above. The backfill shall be worked into the wattle interstices and compacted behind and below the bundle by walking on and working from its wattling terrace.
8) Repeat the proceeding steps to the top of the slope. Place moist soil along the sides of the live bundle. The top of the bundle should be slightly visible when the installation is completed. Plant the slope as specified.

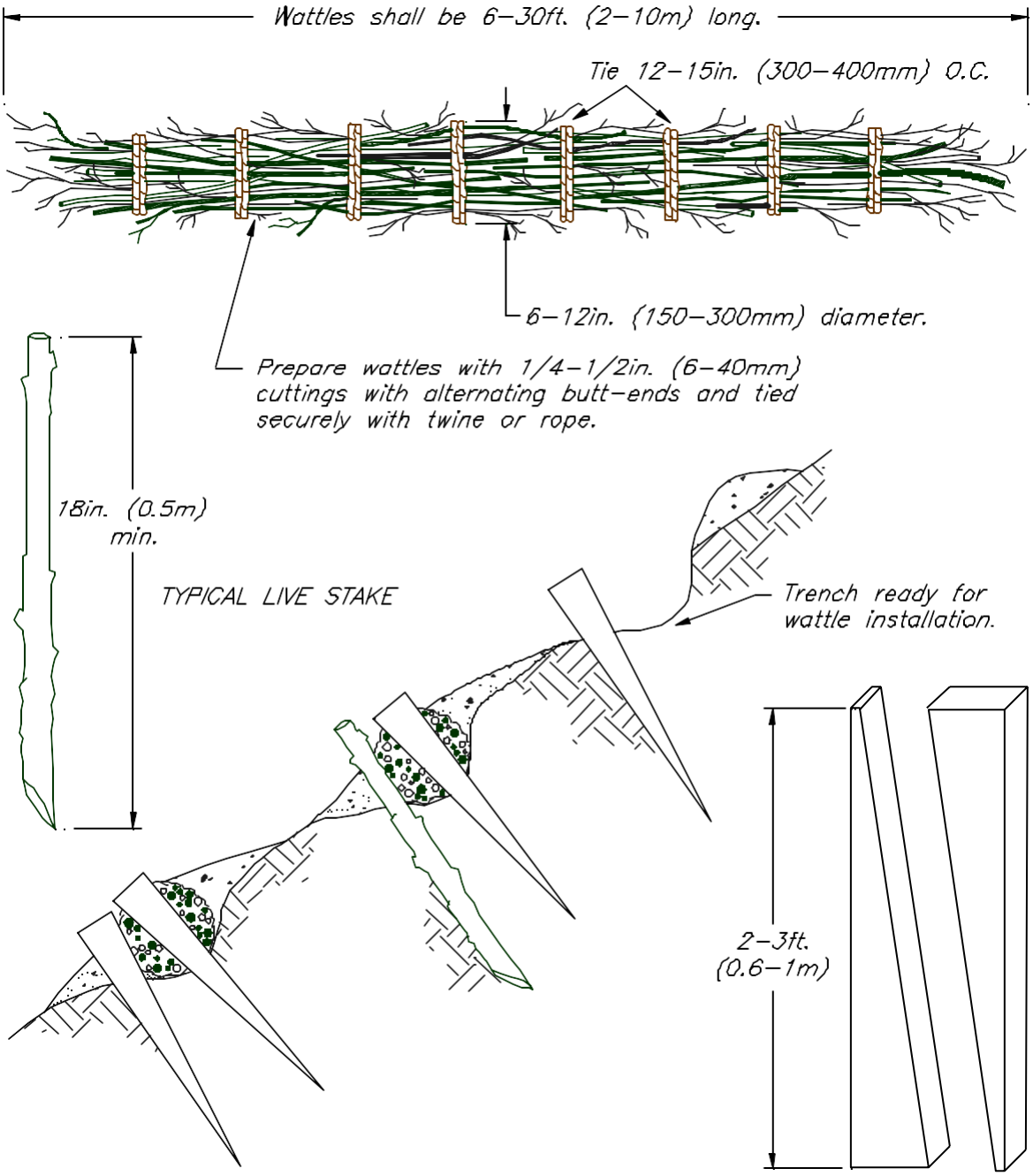
9) Seed and mulch slope, if specified. Shallow slopes, generally 3:1 or flatter may be seeded and mulched by hand. Steeper slopes can have seed applied hydraulically and the mulch should be anchored with tackifier or other approved methods.

BMP MAINTENANCE

- Regular inspection and maintenance of wattle installations should be conducted, particularly during the first year.
- Staked area may need to be watered during summer months.
- Rills and gullies around or under wattles shall be repaired immediately.

BMP REMOVAL

- BMP removal is not necessary.



NOTES:

1. Harvest and install wattles during dormant season or favorable conditions
2. Install wattles on slope contours.
3. All work proceeds from the bottom of the slope to the top.
4. Fill or partially cover wattle with soil from slope or trench above.
5 Compact and work soil into completed wattles.

WATTLE

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FILE: WATTLE2

BMP: EC-6

HAND SEEDING

DESCRIPTION

Hand seeding is broadcasting grass seed on disturbed or bare soil areas by hand or a hand seeding device. This BMP is used to reduce the potential for soil to become water or air borne, reduce erosion after vegetation establishment, provide for vegetative buffers and aid in habitat protection. Seeding with appropriate seed mixes also helps discourage colonization by non-native and invasive plant species.

APPLICATIONS

Hand seeding is encouraged whenever possible to aid in controlling erosion on construction or maintenance sites. Seeding shall be applied to areas intended to be left dormant for a year or more, such as soil berms.

LIMITATIONS

- After hand seeding, mulch the area and/or install erosion control blankets or mats.
- Schedule seeding to fit the germination timing for the specific grasses to be used. Typically, this is October and November for cool season California grasses. If seed is applied earlier, increase the seed and mulch quantities.

CONSTRUCTION GUIDELINES

1) Select seed mixes appropriate to the season and site conditions. Permit conditions and/or sensitive locations may require special seed mixes. Avoid the use of tall growing flashy fuel types or types with known allelopathy such as annual rye grass. When possible, consider use of native perennials. However, in some instances, sterile species such as a wheat grass hybrid or barley may be appropriate to ensure the site is restored in a timely manner.
2) Grade as needed and feasible to permit the use of equipment for seedbed preparation.
3) Grade and scarify the site as needed and feasible to permit good seed to soil contact. See BMP Surface Roughening and Soil Tracking. Commercial fertilizers are seldom recommended as they can leach into the stream and the high nitrogen promotes broadleaf weed growth over native perennial growth. In areas where there is no longer topsoil, consider amending the soil with mycorrhizal inoculants and/or mature screened compost.
4) Install needed erosion control practices, such as sediment basins, diversion dikes and channels, prior to seeding. Divert concentrated flows away from seeded areas.

5) Surface roughening: If the area has been recently loosened or disturbed, no further roughening is required. When the area is compacted, crusted or hardened the soil shall be loosened with raking or harrowing.
6) Spread seed uniformly and according to manufacturer's recommendations.
7) Straw mulch, erosion control blankets or mulch and tackifiers/soil binders should be applied over the seeded areas.

BMP MAINTENANCE

- Inspect during seed establishment period. Re-see, due to mortality, as necessary. Areas which fail to establish cover adequate to prevent sheet and rill erosion will be reseeded as soon as such areas are identified. Spot seeding can be done on small areas to fill in bare spots where grass did not grow properly.

BMP REMOVAL

BMP removal should not be necessary.

BMP: EC-7

HYDROSEEDING

DESCRIPTION

Hydroseeding is broadcasting grass seed, tackifier, wood fiber mulch and water on disturbed areas using a hydroseeding machine. This BMP is used to reduce the potential for soil becoming water or air borne, to reduce erosion after vegetation is established, provide vegetative buffers and to aid in habitat protection. Seeding with appropriate seed mixes will also help discourage colonization by non-native and invasive plant species.

APPLICATIONS

Hydroseeding may be used after soil disturbance is completed at construction sites and/or on bare slopes.

LIMITATIONS

- Hydroseeding should not be used on streambanks or in areas subject to scour.
- Schedule seeding to fit the germination timing for the specific grasses to be used. Typically, this is October and November for cool season California grasses. If seed is applied earlier, increase the seed and mulch quantities.

CONSTRUCTION GUIDELINES

- Select seed mixes appropriate to the season and site conditions. Permit conditions and/or sensitive locations may require special seed mixes. Avoid the use of tall growing flashy fuel types or types with known allelopathy[1] such as annual rye grass. Consider native perennials whenever possible. Commercial fertilizers are seldom recommended as they can leach into the stream, and the high nitrogen promotes broadleaf weed growth over native perennial growth. In areas where there is no longer topsoil, consider amending the soil with mycorrhizal inoculants and/or mature screened compost.
- Install needed erosion control practices, such as sediment basins, diversion dikes and channels, prior to hydroseeding. Divert concentrated flows away from hydroseeded areas.
- Surface roughening: If the area has been recently loosened or disturbed, no further roughening is required. When the area is compacted, crusted or hardened the soil shall be loosened with raking or harrowing.
- Spread hydroseed mix uniformly and according to manufacturer's recommendations.

[1] If a plant type is allelopathic, it exudes chemicals into the surrounding soil that discourage or inhibit other plant types from growing. Eucalyptus is a commonly known allelopathic species.

- Cover hydroseeded areas with other methods as needed.

BMP MAINTENANCE

- Inspect during seed establishment period. Re-seed, due to mortality, as necessary. Areas that fail to establish cover adequate to prevent sheet and rill erosion will be reseeded as soon as such areas are identified. Spot seeding can be done on small areas to fill in bare spots where grass did not grow properly.

BMP REMOVAL

- BMP removal should not be necessary.

BMP: EC-8

MULCHING

DESCRIPTION

Mulching is the application of rice or sterile straw, wood chips, leaf litter, redwood duff, or other suitable materials on the soil surface applied manually or by machine. This BMP is used to reduce the potential for soil becoming water or air borne, and to encourage vegetation establishment.

APPLICATIONS

This BMP may be used to provide protection to the soil surface and to protect newly seeded areas. This BMP may be used in combination with plantings.

LIMITATIONS

- Mulch may not adhere well to slopes steeper than 2:1.
- Mulch should not be placed in water bodies or in ditches where water flow is continuous.

CONSTRUCTION GUIDELINES

- Mulch should be applied so that the soil is covered enough to allow seeds to protect against erosion, but still allow seeds to germinate.
- Native mulches (redwood duff, leaf litter, etc.) are preferred in sensitive areas.
- In areas subject to runoff or wind erosion, mulch shall be secured into the soil by mechanical or manual crimping, anchoring with branches, or other appropriate methods.

BMP MAINTENANCE

- Periodic inspection should be conducted, and mulch reapplied in areas where missing.

BMP REMOVAL

- BMP removal is not necessary.

BMP: EC-9

VEGETATIVE BUFFER

DESCRIPTION

A vegetative buffer is a strip of vegetation adjacent to sensitive areas, ditches, pavement and water bodies. This BMP prevents soil from becoming water borne, and may help restore shallow slope failures by trapping soil and debris.

APPLICATIONS

This BMP may be used adjacent to ditches and/or sensitive areas and water bodies, parallel to roadways, parking lots, etc. It may be used in combination with other BMPs.

LIMITATIONS

This BMP should not be used:

- if it creates a potential public safety hazard.

CONSTRUCTION GUIDELINES

1) Existing vegetation shall be preserved as a buffer to the greatest extent possible.
2) Use live staking, brush layering, wattles/fascines and/or seeding methods to restore vegetative buffers after disturbances.

BMP MAINTENANCE

- Mow, trim or selectively harvest the vegetative buffer in accordance with applicable permits and/or approved vegetation management plans.
- Revegetate as necessary.

BMP REMOVAL

- BMP removal is not necessary.

BMP: EC-10

EROSION CONTROL BLANKETS & MATS

DESCRIPTION

Erosion control blankets and mats are installed to protect the prepared soil surface of a steep slope. This BMP may be used at maintenance sites to provide stabilization on steep slopes or stream banks. Erosion control blankets and mats are available in a variety of biodegradable materials including jute (natural fiber that is made into a yarn and loosely woven into a biodegradable mesh), excelsior (curled wood fiber) blanket material, straw, wood fiber blanket, coconut fiber blanket, coconut fiber mesh, and straw coconut fiber blanket. Coir fabric/netting is a geo-textile product made from coconut fibers loosely woven into a fabric usually packaged in roll form. This fabric can be used to provide a reduction in water velocity/erosive forces and/or habitat protection and topsoil stabilization.

APPLICATIONS

This BMP may be used in areas to provide stabilization/protection to the soil surface of steep slopes or stream banks. It can be used in combination with vegetation and/or seeding to reinforce soil in high flow/high velocity waters and on slopes as steep as 1:1. It may be used as bank stabilization before vegetation efforts have occurred.

Erosion control blankets are used on steep slopes to temporarily stabilize and protect disturbed soil from raindrop impact and surface erosion, to increase infiltration, decrease compaction and soil crusting, and to conserve soil moisture. Erosion control blankets also protect seeds from predators, reduce desiccation and evaporation by insulating the soil and seed environment.

Some types of erosion control blankets and turf reinforcement mats are specifically designed to stabilize channelized flow areas.

LIMITATIONS

This BMP should not be used:

- In the streambed.
- When short-term biodegradability is desired.
- In areas subject to scour from high flows (e.g. streambanks) unless designed by an engineer.
- Permits shall be obtained prior to any streambank or shoreline installation.

Blankets and mats manufactured with plastic netting shall be avoided.

CONSTRUCTION GUIDELINES

- When used near watercourses or streams, coir fabrics/nettings must be used in accordance with permit requirements.
- Proper soil preparation is essential to ensure complete contact of the protection matting with the soil. Prepare the soil on the slope prior to laying out the erosion control blanket or mat.
- Grade and shape area of installation.
- Remove all rocks, clods, vegetative or other obstructions so that the installed blankets, or mats will have direct contact with the soil.
- Prepare seedbed by loosening 2-3 inches of topsoil above final grade.
- Seed area before blanket installation for erosion control and re-vegetation. Seeding after mat installation is often specified for turf reinforcement application. When seeding prior to blanket installation, all areas disturbed during blanket installation should be re-seeded. Where soil filling is specified for turf reinforcement mats, seed the matting and entire disturbed area after installation and prior to filing the mat with soil.
- Fertilize and seed in accordance with seeding specifications or other types of landscaping plans. The protective matting can be laid over areas where grass has been planted and the seedlings have emerged. Where vines or other ground covers are to be planted, lay the protective matting first and then plant through matting according to design of planting.
- Check slots should be installed as specified by the manufacturer.
- Before laying the matting, all check slots should be installed and the seedbed should be friable, made free from clods, rocks, and roots. The surface should be compacted and finished according to the requirements of the manufacturer's recommendations.
- Use mechanical or manual lay down equipment capable of handling full rolls of fabric and laying the fabric smoothly without wrinkles or folds. Equipment should meet fabric manufacturer's recommendations or standards.
- Install mats or blankets in accordance with the manufacturer's recommendations. In general, begin at the top of the slope and anchor blanket/fabric in a 6 inch by 6 inch wide trench and backfill the trench. Unroll the blanket/fabric down slope in the direction of water flow. Overlap the edges of adjacent rolls 2-3 inches and stable every 3 feet. If splicing is needed, place blankets end over end (shingle style) with 6 inches of overlap. Staple through the overlapped area, approximately 12 inches apart.
- If coir fabric is used, lay loosely on the surface so fabric makes contact with the ground and conforms to the ground surface's topography (do not stretch for extra coverage). Overlap fabric edges at least 12 inches. The fabric should be trenched in at least 12 inches deep at the top and bottom ends of the installation to prevent undercutting. If used in conjunction with hand seeding or hydroseeding, place seeding first and cover with fabric.
- U-shaped wire staples, metal geotextile stake pins, or triangular wooden stakes can be used to anchor mats to the ground surface. Wire staples should be a minimum of 11 gauge. Metal stake pins should be 3/16 inch diameter steel with a

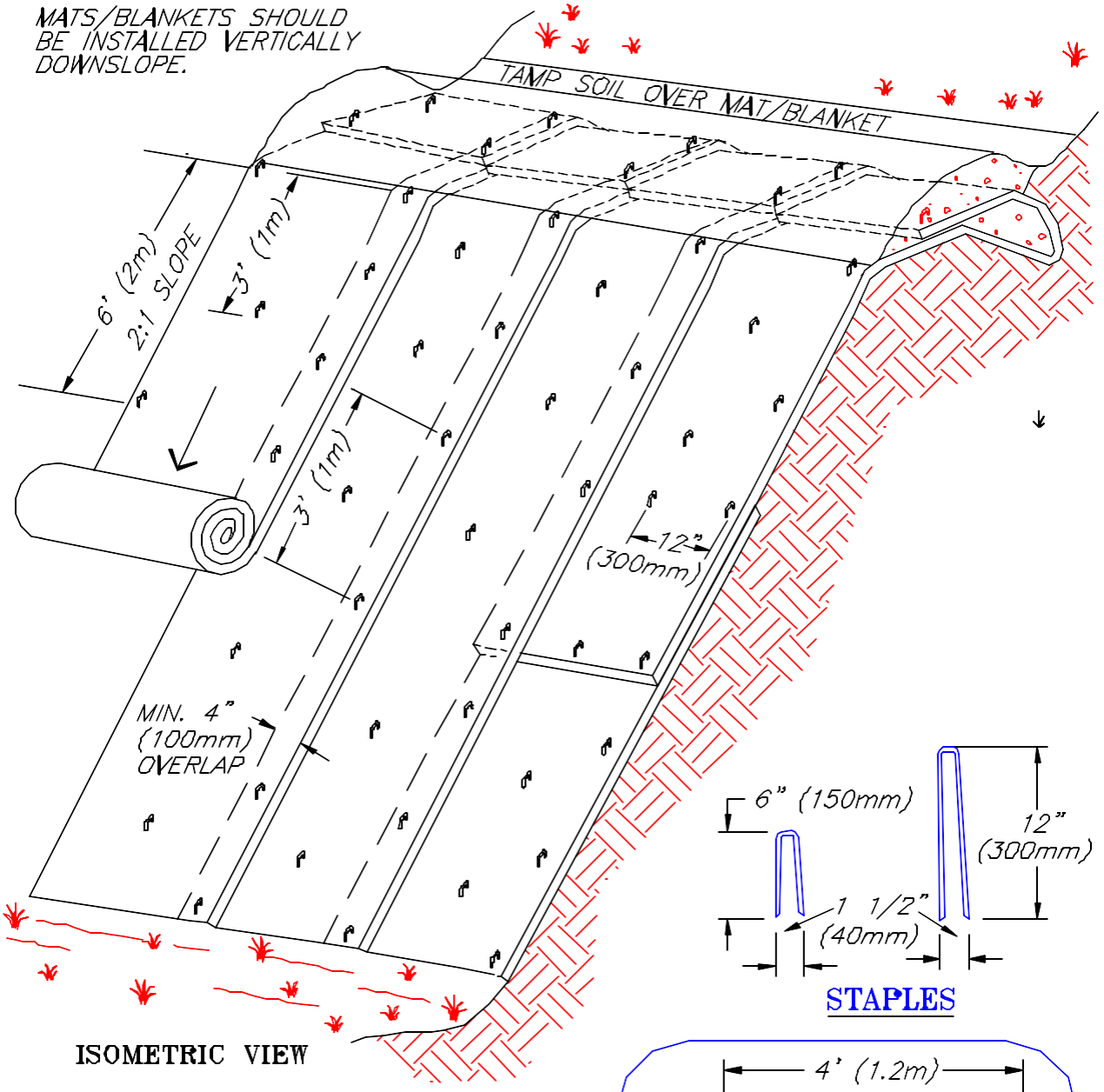
1 1/2 inch steel washer at the head of the pin. Wire staples and metal stakes should be driven flush to the soil surface. All anchors should be 6-8 inches long and have sufficient ground penetration to resist pullout. Longer anchors may be required for loose soils. For coir netting, live staking may be done after the fabric is placed by piercing the fabric.

BMP MAINTENANCE

- During construction, inspect daily during the work week.
- Schedule additional inspections during storm events.
- Make any required repairs immediately.

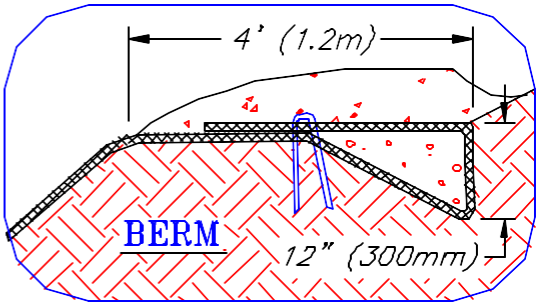
BMP REMOVAL

- BMP removal is not necessary.



ISOMETRIC VIEW

STAPLES



BERM

TYPICAL SLOPE SOIL STABLIZATION

NOTES:

1. SLOPE SURFACE SHALL BE FREE OF ROCKS, CLODS, STICKS AND GRASS. MATS/BLANKETS SHALL HAVE GOOD SOIL CONTACT.
2. APPLY PERMANENT SEEDING BEFORE PLACING BLANKETS.
3. LAY BLANKETS LOOSELY AND STAKE OR STAPLE TO MAINTAIN DIRECT CONTACT WITH THE SOIL. DO NOT STRETCH.

NOT TO SCALE

EROSION BLANKETS & TURF REINFORCEMENT MATS SLOPE INSTALLATION

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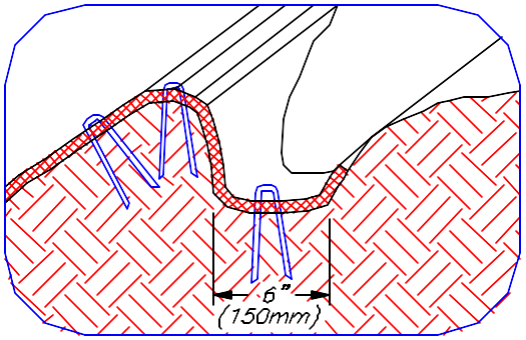
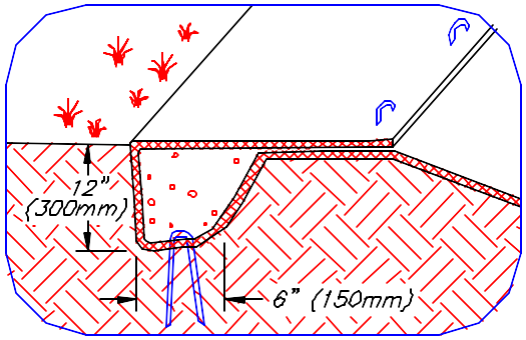
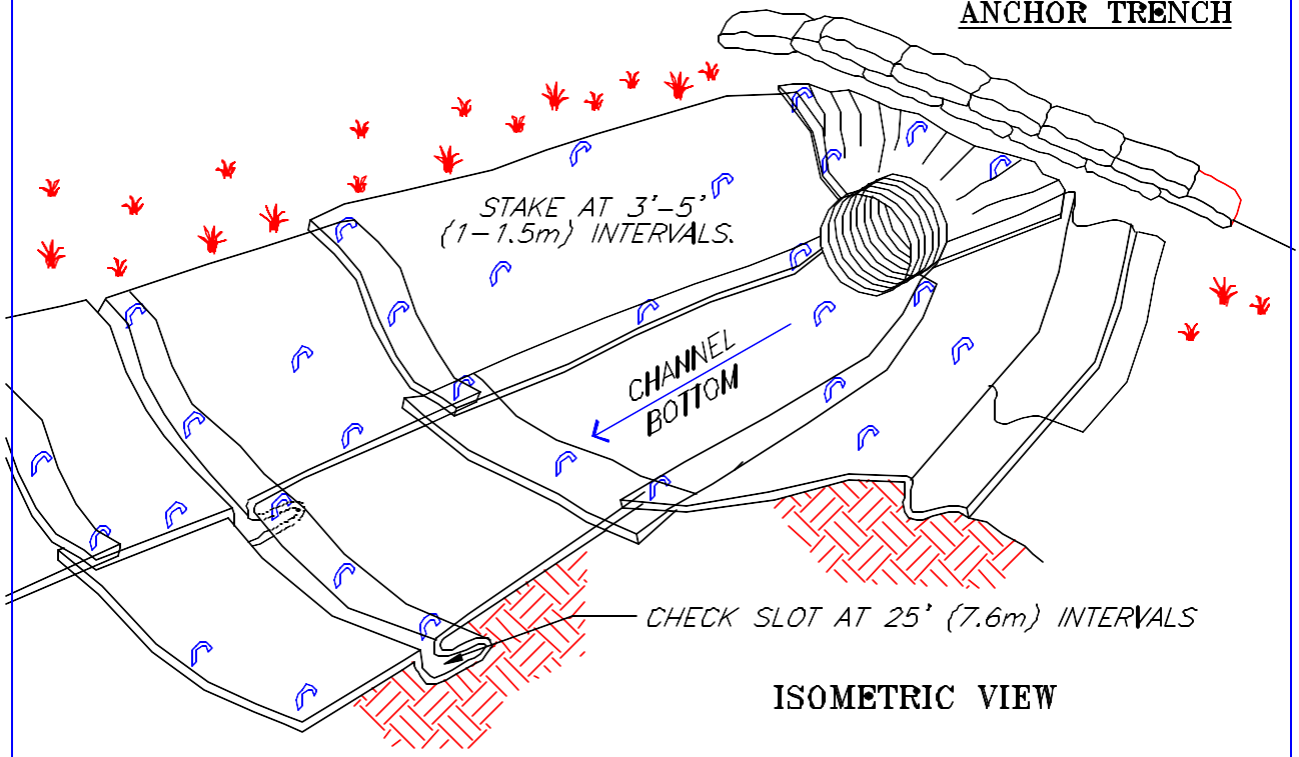
FILE. BLNKTSLP



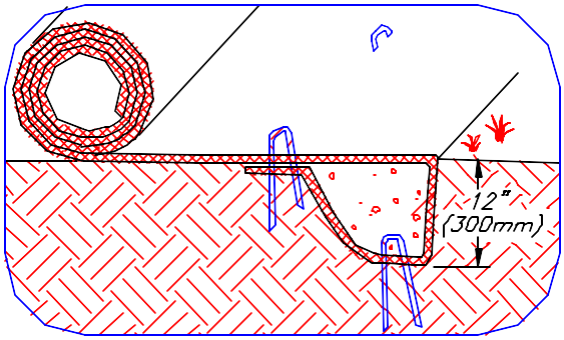
LONGITUDINAL ANCHOR TRENCH



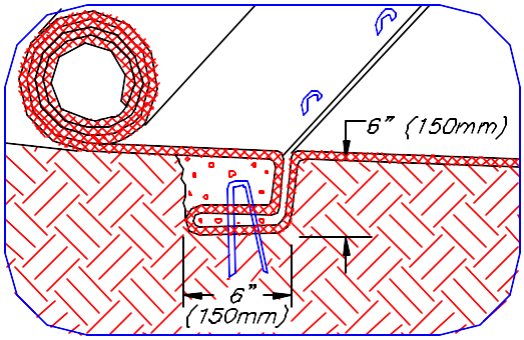
TERMINAL SLOPE AND CHANNEL ANCHOR TRENCH



ISOMETRIC VIEW



INITIAL CHANNEL ANCHOR TRENCH



INTERMITTENT CHECK SLOT

NOTES:

1. CHECK SLOTS TO BE CONSTRUCTED PER MANUFACTURERS SPECIFICATIONS.
2. STAKING OR STAPLING LAYOUT PER MANUFACTURERS SPECIFICATIONS.

EROSION BLANKETS & TURF REINFORCEMENT MATS CHANNEL INSTALLATION

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FILE: BLNKTCHA

BMP: EC-11

SURFACE ROUGHENING

DESCRIPTION

Surface roughening is a technique for roughening a bare soil surface with furrows running across the slope, stair stepping, or tracking with construction equipment. Surface roughening is intended to aid the establishment of vegetative cover from seed, to reduce runoff velocity and increase infiltration, and to reduce erosion and provide for sediment trapping.

APPLICATIONS

All construction slopes require surface roughening to facilitate long-term stabilization with vegetation, particularly slopes steeper than 3:1.

LIMITATIONS

Slopes may be impossible to get machinery on due to steepness of slope or difficult access. Hand raking across the slope may be the only way to roughen the surface.

Do not use this BMP under the following conditions:

- on slopes with a rock surface.
- unless simultaneous revegetation/seeding is planned.

CONSTRUCTION GUIDELINES

Cut Slope Roughening:

1) Stair-step grade or groove the cut slopes that are steeper than 3:1.
2) Use stair-step grading on any erodible material soft enough to be ripped with a bulldozer. Slopes consisting of soft rock with some subsoil are particularly suited to stair-step grading.
3) Make the vertical cut distance less than the horizontal distance, and slightly slope the horizontal position of the "step" in toward the vertical wall.
4) Groove the slope using machinery to create a series of ridges and depressions that run across the slope, on the contour.

Fill Slope Roughening:

1) Place fill slopes with a gradient steeper than 3:1 in lifts not to exceed 8 inches, and make sure each lift is properly compacted.
2) Ensure that the face of the slope consists of loose, uncompacted fill 4-6 inches deep.

3) Use grooving or tracking to roughen the face of the slopes, if necessary.
4) Apply seed, fertilizer and straw mulch then track or punch in the mulch with the bulldozer.
5) Do not blade or scrape the final slope face.

Roughening With Tracked Machinery:

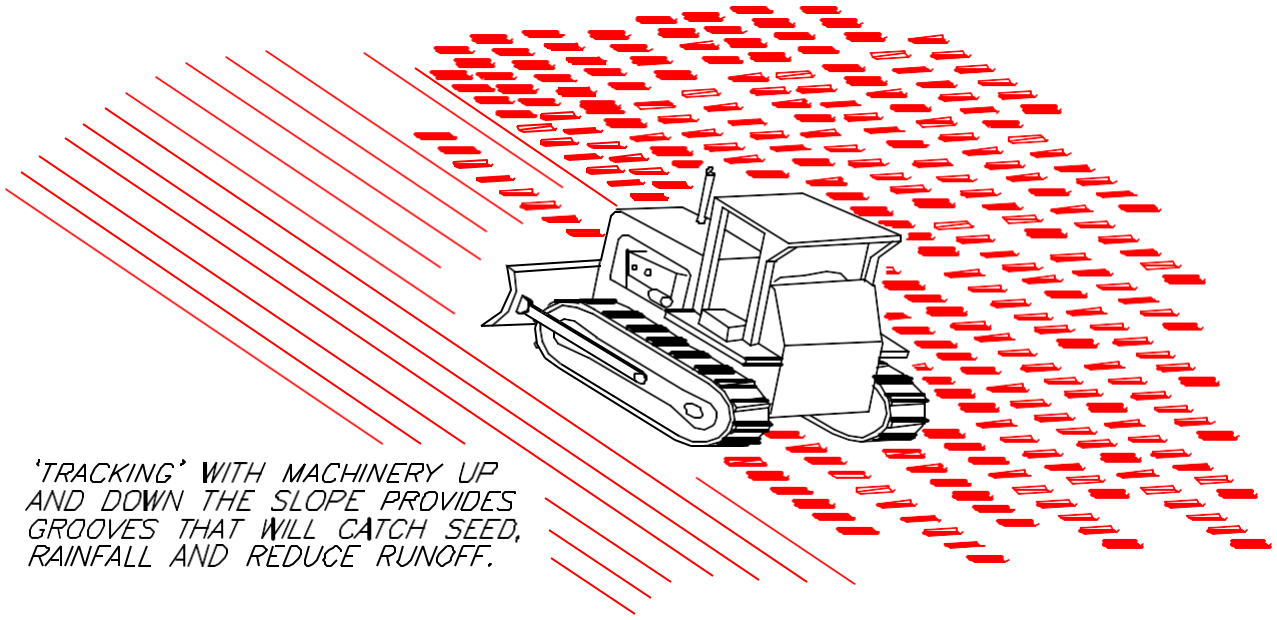
1) Limit roughening with tracked machinery to soils with a sandy textural component to avoid undue compaction of the soil surface.
2) Operate tracked machinery up and down the slope to leave horizontal depressions in the soil. Do not back-blade during the final grading operation.
3) Immediately seed and mulch roughened areas to obtain optimum seed germination and growth.

BMP MAINTENANCE

- During construction, inspect BMPs daily during the workweek.
- Schedule additional inspections during storm events. Check for erosion and sloughing, and make any required repairs.

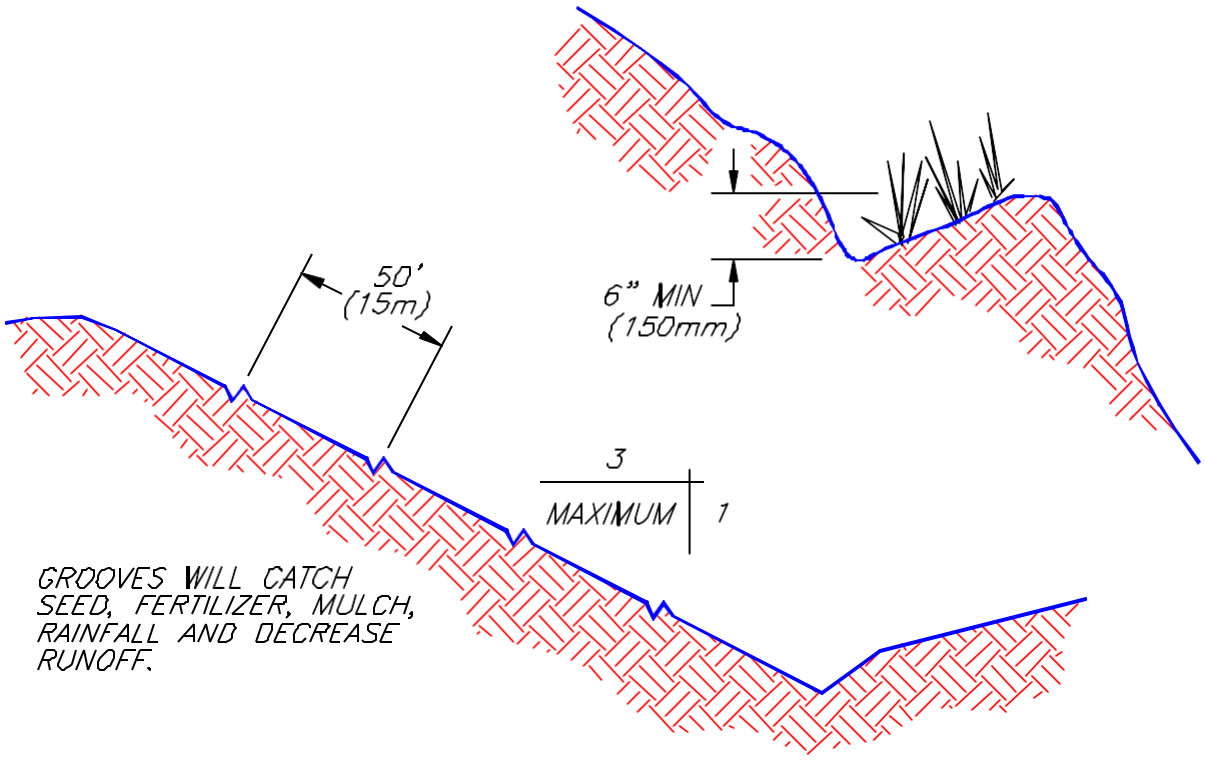
BMP REMOVAL

BMP removal is not necessary.



'TRACKING' WITH MACHINERY UP AND DOWN THE SLOPE PROVIDES GROOVES THAT WILL CATCH SEED, RAINFALL AND REDUCE RUNOFF.

TRACKING



CONTOUR FURROWS

SURFACE ROUGHENING

© 1994 JOHN McCULLAH

FILE: SRFROUGH

BMP: EC-12

ROLLING DIP

DESCRIPTION

Rolling dips are ridges or ridge-and-channels constructed diagonally across a sloping road or utility right-of-way that is subject to erosion to limit the accumulation of erosive volumes of water on roads by diverting surface runoff at designated intervals. Rolling dips are appropriate to use on low and moderate grades and on both high or low traffic roads.

APPLICATIONS

Rolling dips are gently sloping excavations running diagonally across the road surface, and are appropriate for winter use on unpaved roads and in areas prone to inundation. Rolling dips are much easier to traverse and require less maintenance than waterbars.

LIMITATIONS

- Never outlet rolling dips onto unprotected fill slopes. Install energy dissipaters or overside drains at outlet ends.
- Use gravel to stabilize the diversion where significant vehicular traffic is anticipated.
- Rolling dips should not be constructed in areas of high speed vehicle travel.

CONSTRUCTION GUIDELINES

- Rolling dips should be built at an angle of 45 to 60 degrees from the centerline.
- The diversion should have a positive grade of 2% minimum.
- For rolling dips the height from channel bottom to the top of the settled ridge shall be 18 inches and the side slopes of the ridge shall be 2:1 or flatter where practicable.
- The distance it takes for unrocked, unprotected running surface of a nearby road to develop a 1-inch rill is a rough measure of the appropriate spacing distance.
- Signs alerting motorists to the dip or waterbar shall be installed in both directions.

BMP MAINTENANCE

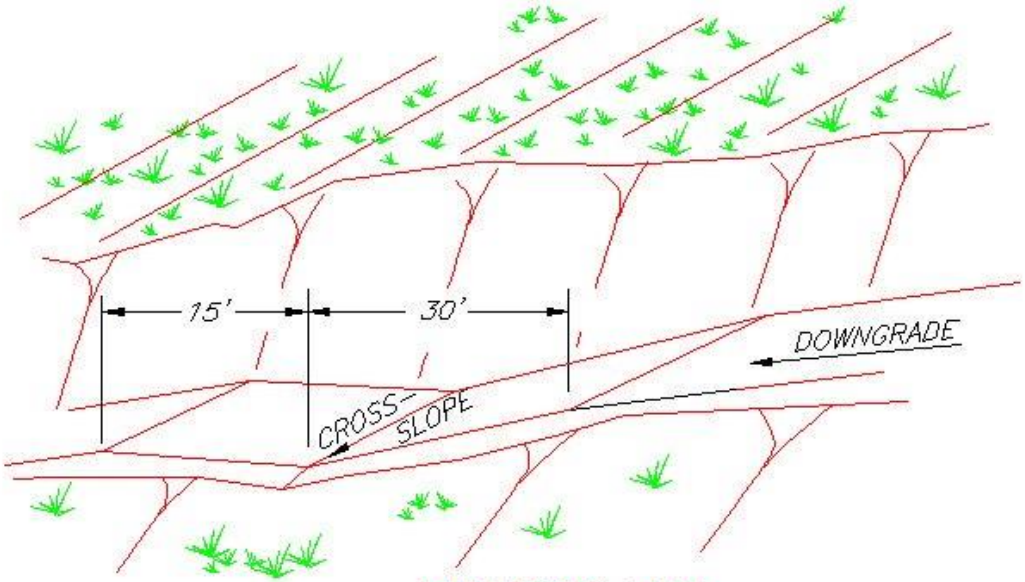
- Periodically inspect waterbars and rolling dips. Inspect after every heavy rainfall for erosion damage. Immediately remove sediment from the flow area.
- Check outlet areas and make timely repairs as needed.

BMP REMOVAL

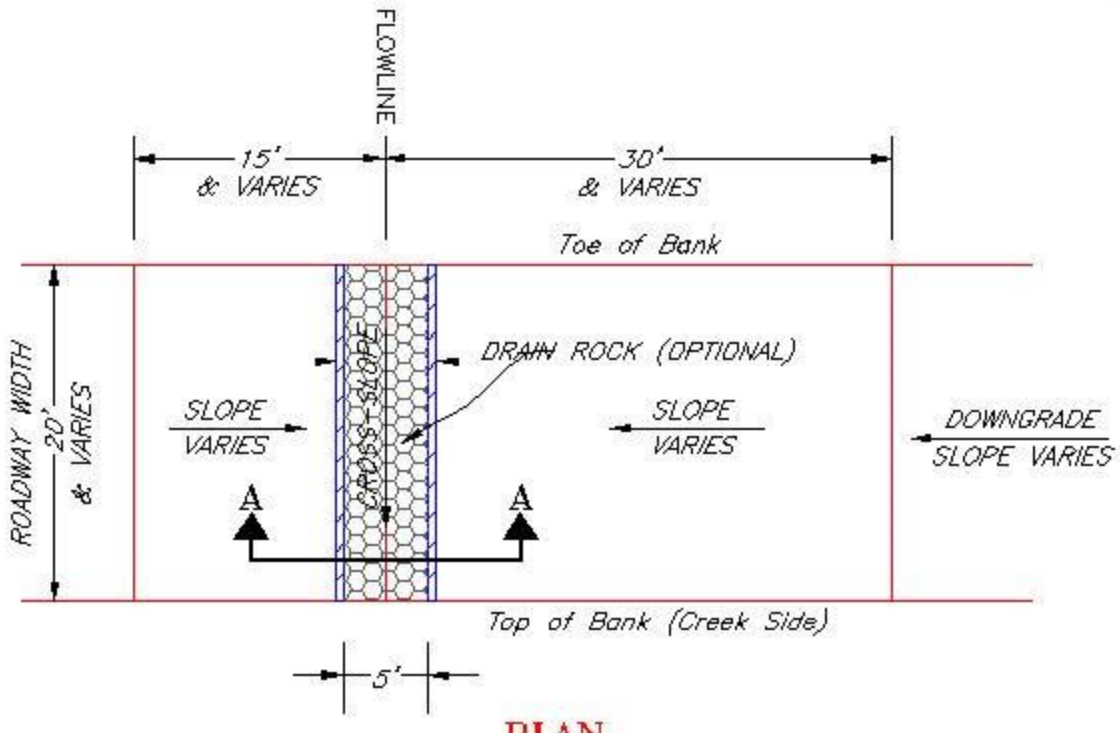
- BMP removal should not be necessary.

ADDITIONAL RESOURCES

Handbook for Forest and Ranch Roads, Mendocino County Resource Conservation District, April 2015.



ROLLING DIP



PLAN

BMP: EC-13

SLOPE OR BANK STABILIZATION

DESCRIPTION

The County strives to implement biotechnical methods to stabilize streambanks. Biotechnical stabilization methods utilize native materials such as large woody debris, willows, and other vegetation, to stabilize streambanks. Refer to BMPs EC-1 (Brush Layering), EC-2 (Brush Packing), and EC-4 (Wattles and Fascines) for description of biotechnical methods.

Where biotechnical methods are unsuitable (i.e., in locations with very steep slopes or limited right-of-way width), and where engineered retaining structures are necessary, hardened engineered solutions such as rock slope protection, solider pile walls, retaining walls, or slope soil nailing may be utilized along a failed portion of slope to provide a buttress for against additional failure. To the extent possible, the County shall aim to combine these hardened solutions with biotechnical methods and incorporate habitat features at the base of the structure. Such design approaches may include structural fixes such as solider pile retaining walls with concrete or wood laggings installed above the ordinary high water mark with vegetated rock slope protection or slope soil nailing fronted by a vegetated boulder revetments or habitat features at the toe of the slope. These hardscape solutions are utilized to stabilize steep slopes with seepage problems and/or unstable soils that need armoring to prevent sloughing, as well as along narrow, steep roadways where the right-of-way width is limited.

Vegetated boulder revetments involve placing logs, rootwads, and boulders in selective areas in and on streambanks. This method is effective in higher velocity streams, and trap sediment between components support restoration of slope vegetation and distribute flow velocities.

LIMITATIONS

- Streambank and road embankment stabilization methods shall only be implemented after identifying potential impacts to upstream and downstream banks, structures and facilities.
- Do not use hardscape engineered solutions (e.g., riprap, concrete, shot-crete, soil nailing) as a stand-alone method of streambank stabilization.
- Obtain permits from appropriate agencies before placing any fill below the mean high water line of any water body, or in other sensitive areas. For example, placing rock in pools at the bottom of culverts is a regulated activity.

DESIGN AND CONSTRUCTION GUIDELINES

- For vegetated boulder revetments, the construction guidelines will vary based on existing site conditions, size and shape of woody materials, forces exerted by moving water, etc.
- For bank stabilization methods using hardened materials, consult with a qualified engineer to determine the appropriate size of boulders and hardscape protection needed, the appropriate placement techniques, and the potential application of biotechnical stabilization treatments in conjunction with the hardscape protection. The selected engineer shall conduct a shear stress evaluation to confirm the appropriate sizing of rock to be used.
- Attempt to limit hardscape protection methods below the ordinary high water mark.
- Anchor hardscape walls horizontally and vertically to the slope.
- Incorporate plantings, designed to allow tree growth, into hardscape designs; and key into the bank as appropriate.
- For rock slope protection treatments, angular rock should be used and sized to ensure a thickness of at least 2 courses over the slope failure. Filter or geotextile fabric, which allows water to flow through the material while blocking sediment, silt and other aggregates, may be placed on the slope prior to the rock. If filter/geotextile fabric is used, the edges should be buried to a depth of six inches (6”). Filter or geotextile fabric may not be necessary along portions of the slope where vegetation is incorporated.
- Carefully place rock to avoid damaging the filter fabric.
    - Stone 4-6” may be carefully dumped onto filter fabric from a height not to exceed 12”.
    - Stone 8-12” must be placed by hand onto filter fabric, or the filter fabric may be covered with 4” of gravel and the 8-12” rock may be dumped from a height not to exceed 16”.
    - Stone greater than 12” shall only be dumped onto filter fabric protected with a layer of gravel with a thickness equal to one half the D_{50} (median) rock size, and the dump height limited to twice the depth of the gravel protection layer thickness (CASQA 2015).
- Where vegetation can be incorporated into bank stabilization projects, perform live staking or pole planting during rock placement as appropriate.
- Place rock to its full thickness in one operation.
- The toe of the rock slope should be keyed to a stable foundation at its base.
- Schedule topsoil and revegetation finish work at an appropriate time or year.

BMP MAINTENANCE

- Where biotechnical streambank stabilization methods are implemented, monitor finished streambanks to ensure stability and vegetative growth. Consult as necessary for adjustments and/or modifications to streambank stabilization installations.
- During construction of hardscape methods, inspect daily during the work week.

- Schedule additional inspections of bank stabilization sites during storm events.
- Immediately repair any gaps, holes, scour, or underlying filter fabric observed where hardened solutions have been implemented. Replace dislodged stones immediately.

BMP REMOVAL

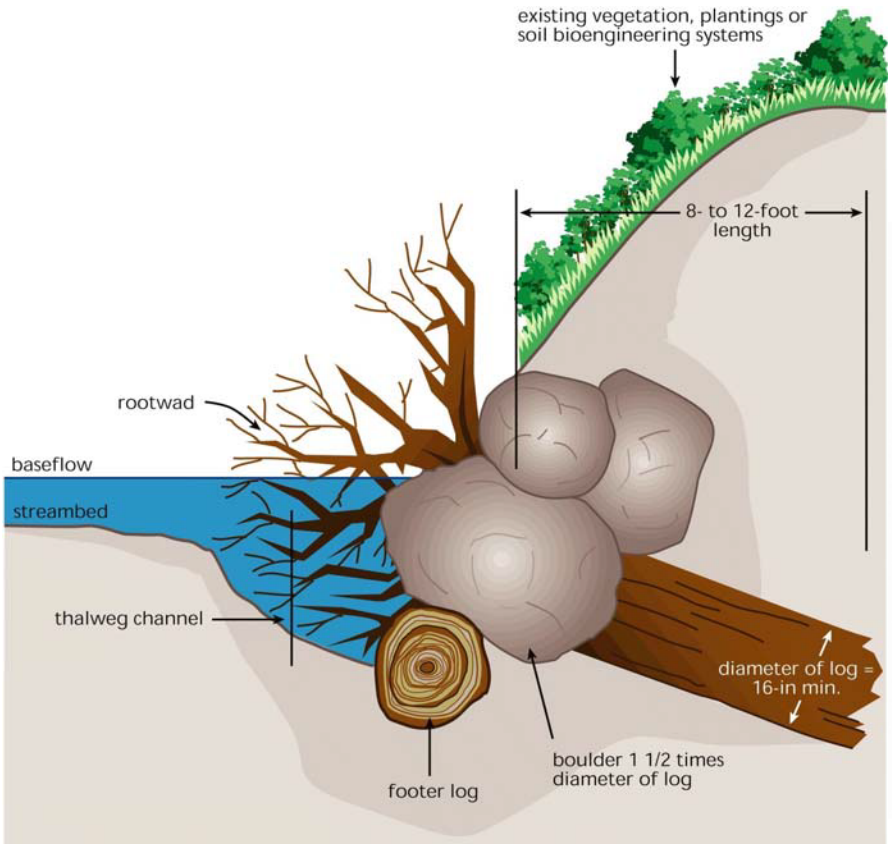
BMP removal should not be necessary.

ADDITIONAL RESOURCES

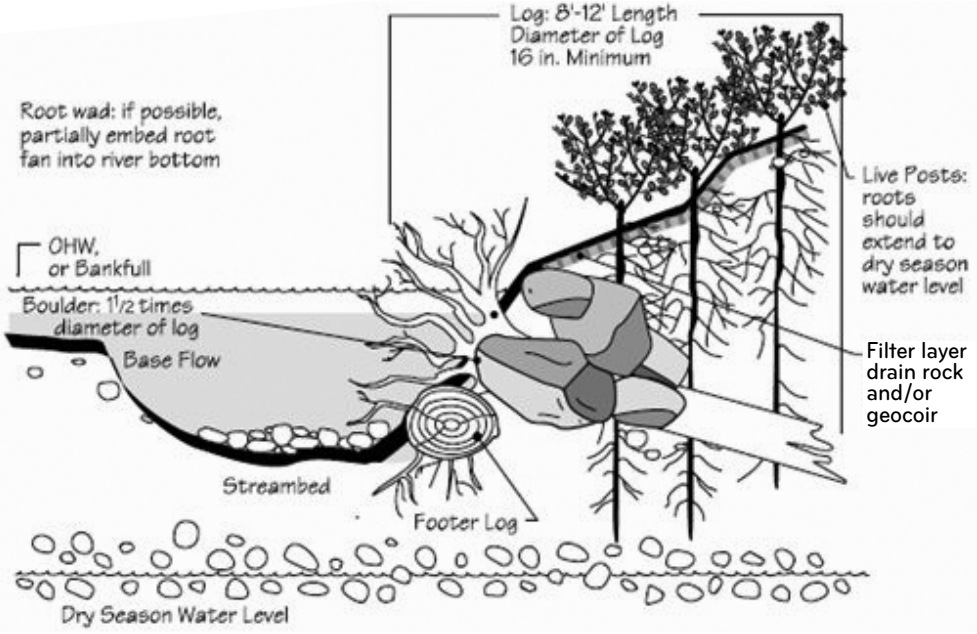
Bio Draw 1.0, Compendium of Biotechnical Soil Stabilization Solutions, Salix Applied Earthcare, 2000.

California Stormwater BMP Handbook. Construction. January 2011.

Guidelines for Bank Stabilization Projects in the Riverine Environments of King County, King County, Washington, Department of Public Works, June 1993.



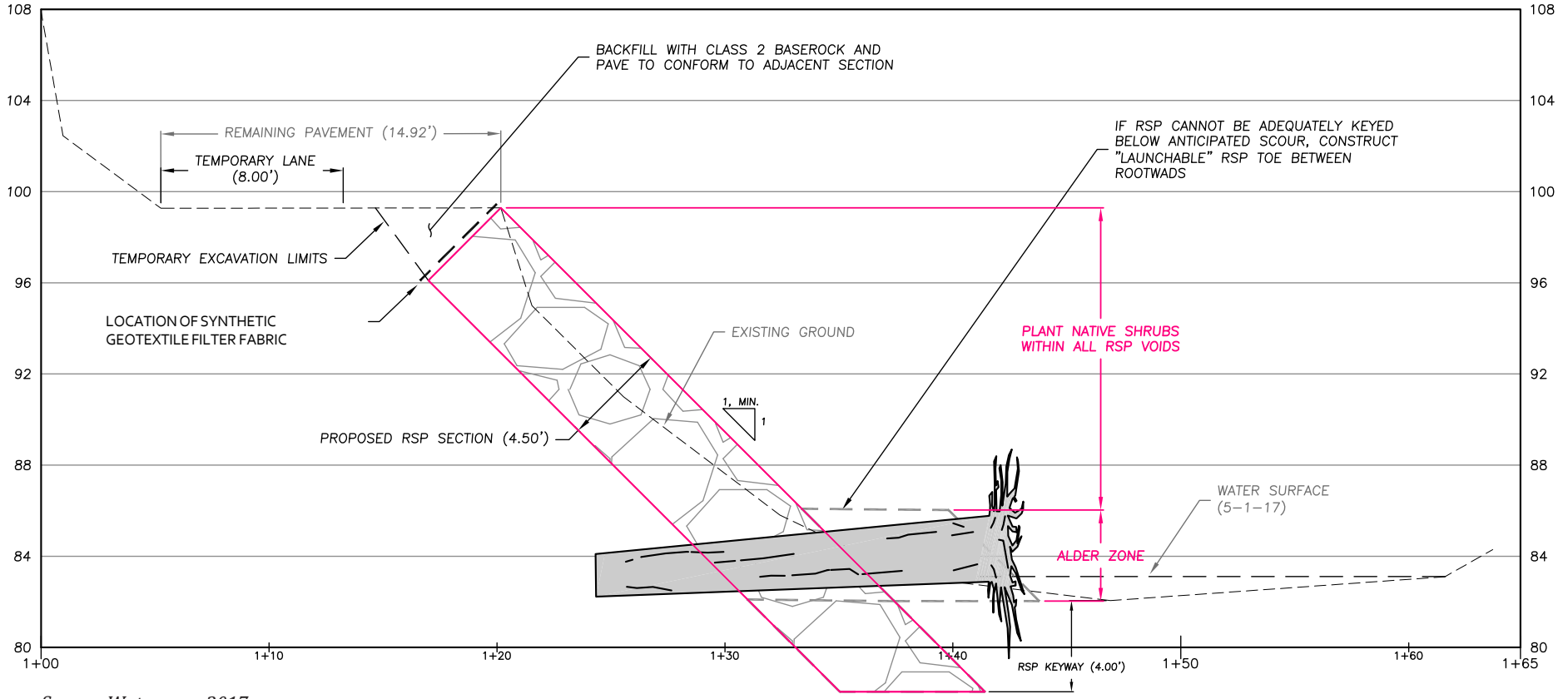
Source: LCSMC and USDA-NRCC 2002



Source: Indiana General Assembly 2012
Revised by County 2025

Horizon WATER and ENVIRONMENT

Example Profile Views of Log, Rootwad and Boulder Revetment Designs
(1 of 3)



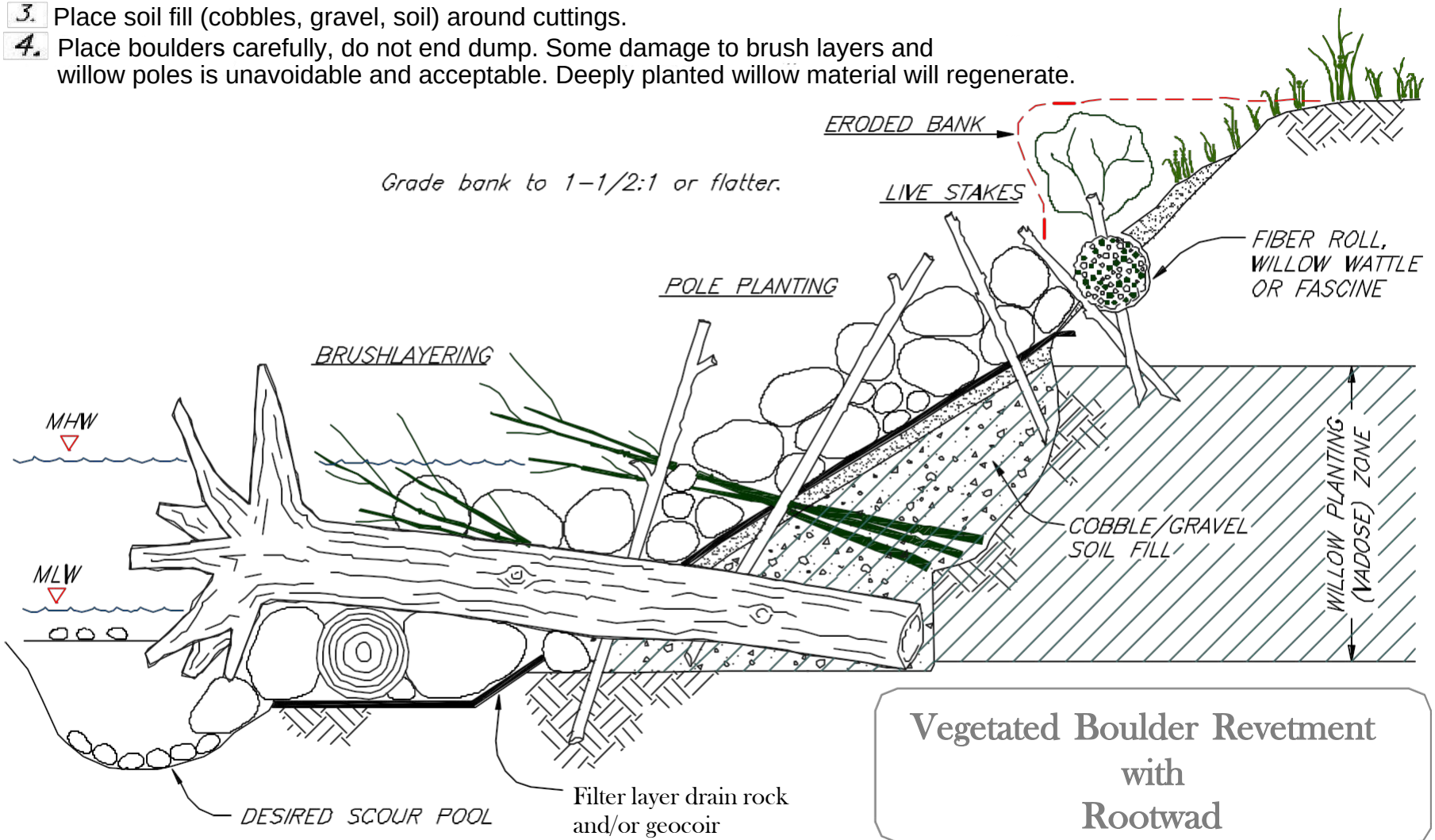
Source: Waterways 2017
Updated by County June 2025

Horizon WATER and ENVIRONMENT

Example Profile Views of Log, Rootwad and Boulder Revetment Designs (2 of 3)

NOTES:

1. Willow pole planting and brushlayering shall be installed during bank grading and boulder placement to ensure good contact with 'native ground' and soil fill.
2. Willow poles and brush layers shall extend down into expected soil moisture zones (vadose).
3. Place soil fill (cobbles, gravel, soil) around cuttings.
4. Place boulders carefully, do not end dump. Some damage to brush layers and willow poles is unavoidable and acceptable. Deeply planted willow material will regenerate.



Vegetated Boulder Revetment with Rootwad

Source: John McCullah 1999

Horizon WATER and ENVIRONMENT

Example Profile Views of Log, Rootwad and Boulder Revetment Designs
(3 of 3)

NOTES:

1. Willow pole planting and brushlayering shall be installed during bank grading and boulder placement to ensure good contact with 'native ground' and soil fill.
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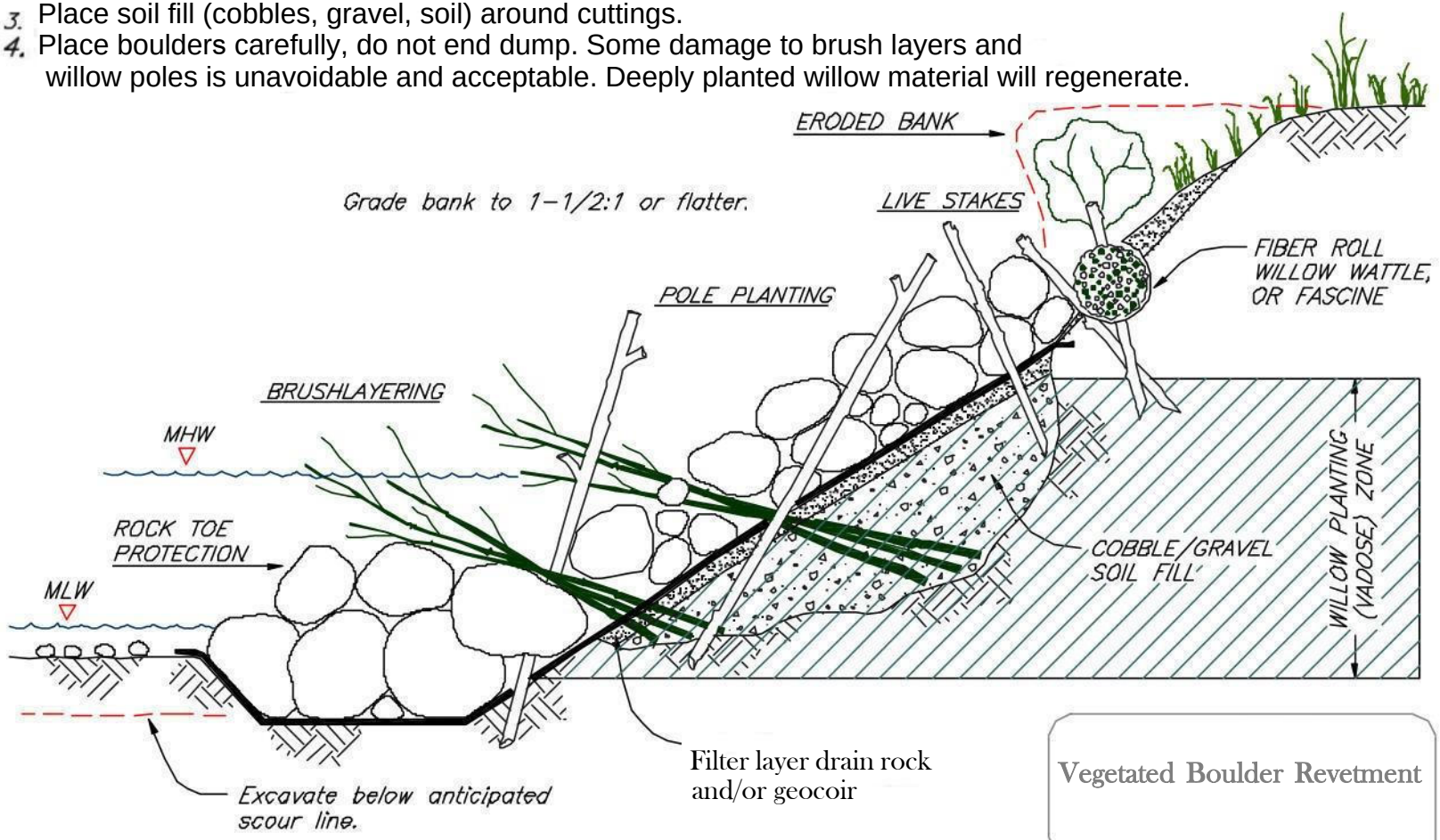
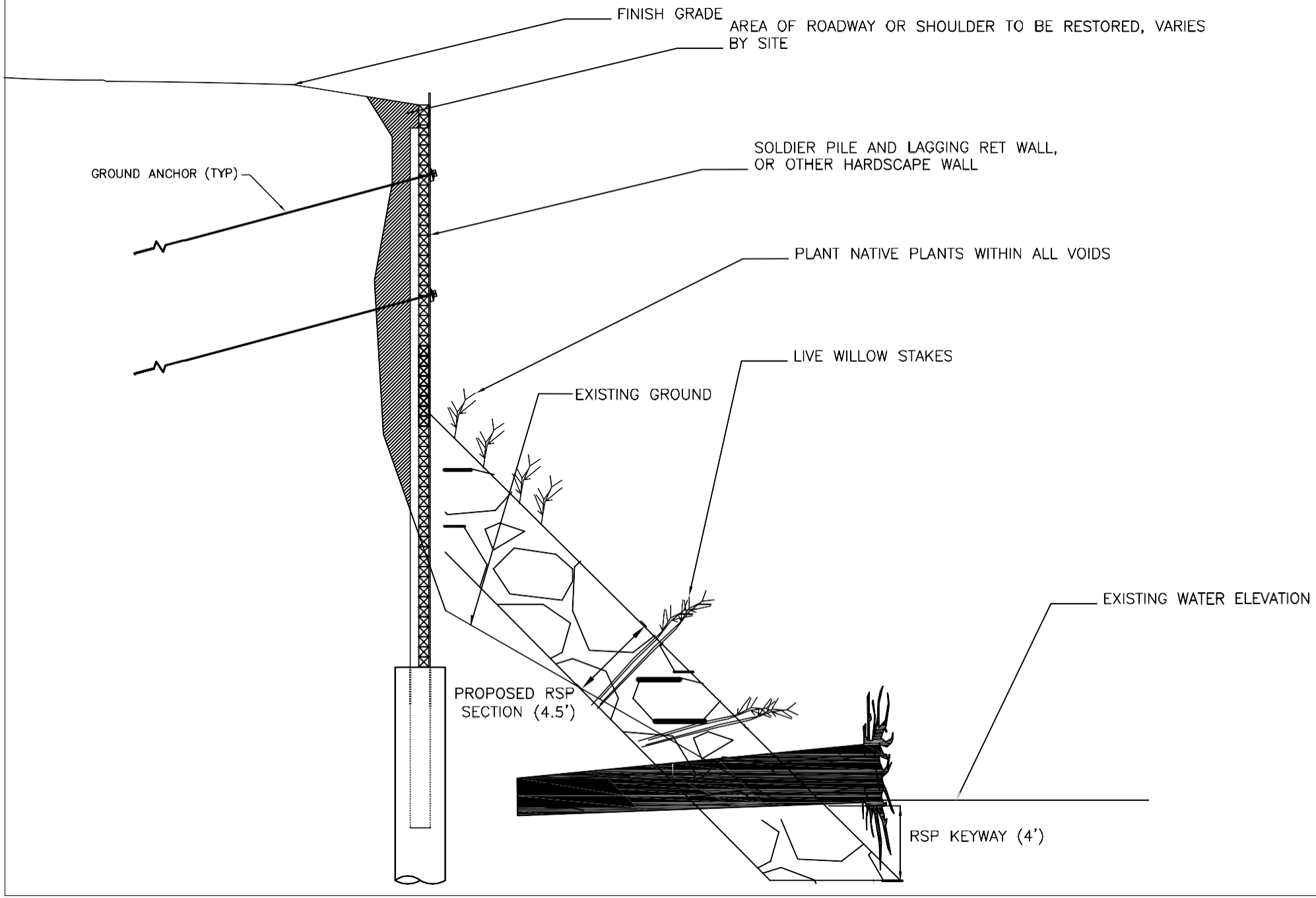


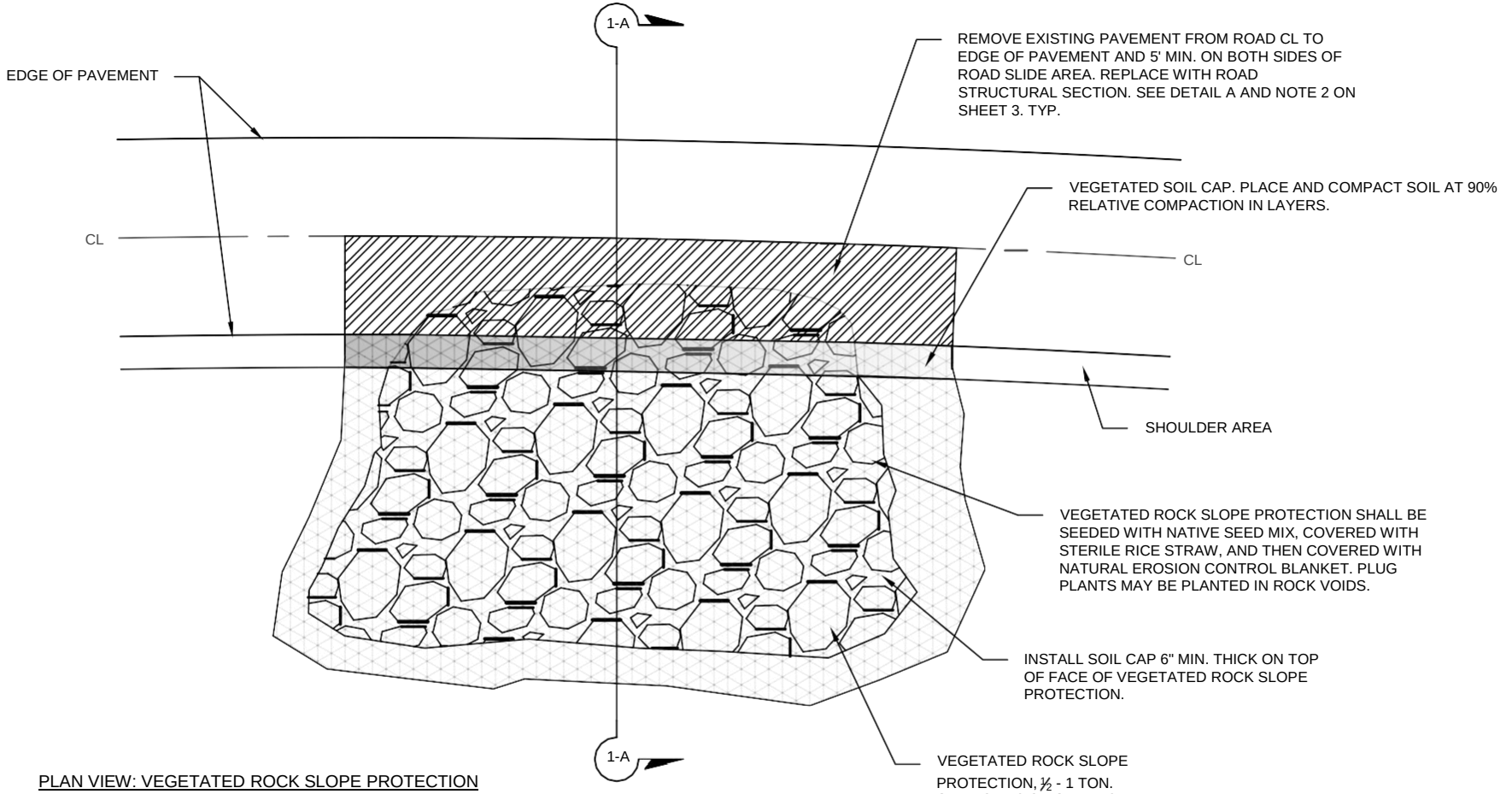
Vegetated Boulder Revetment

© 1999 JOHN McCULLAH

VGRIPRAP

RETAINING WALL WITH VEGETATED REVETMENT





PLAN VIEW: VEGETATED ROCK SLOPE PROTECTION

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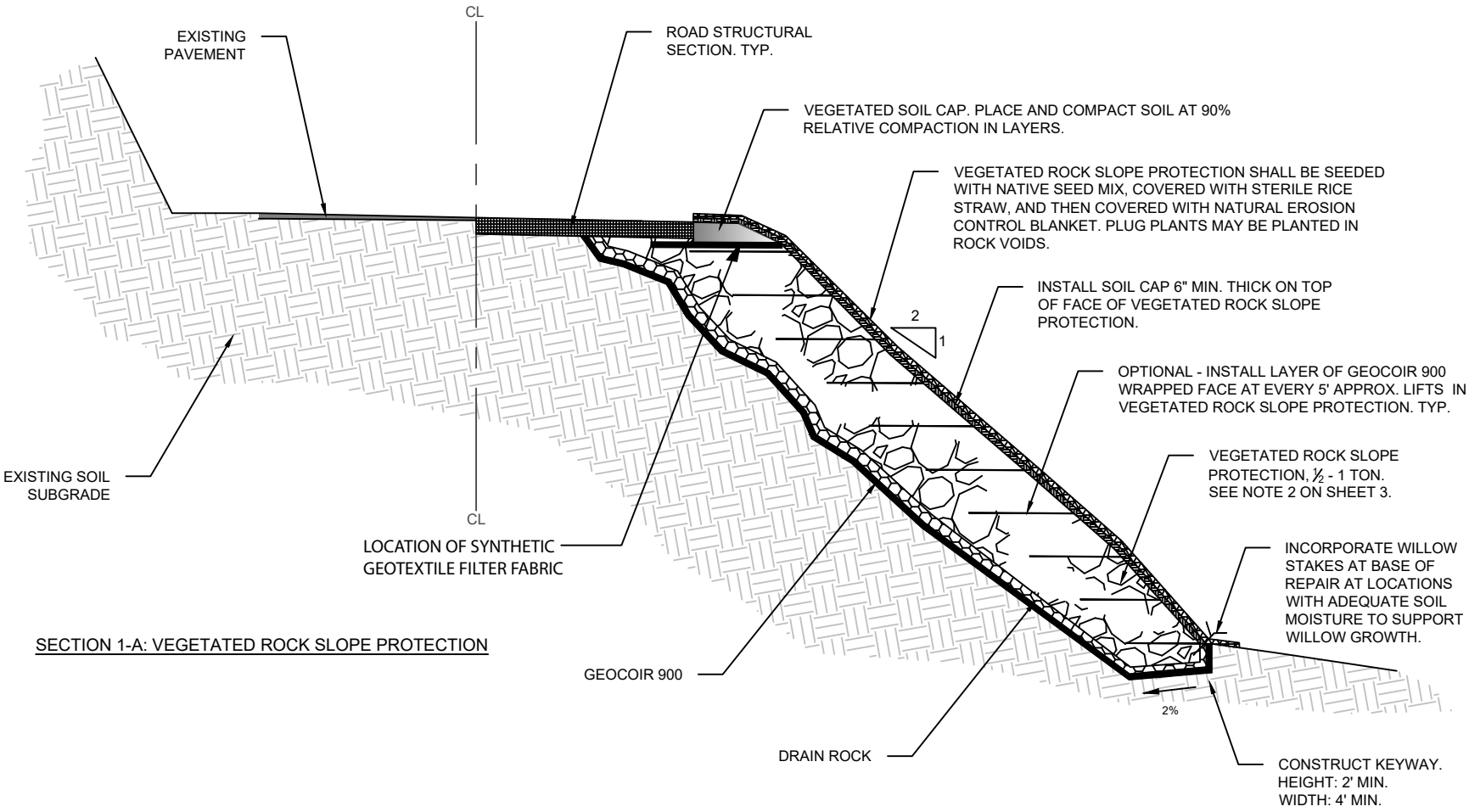
CHECKED BY: AL/JC	COUNTY OF SAN MATEO	DATE: 04-14-2023
DRAWN BY: ADG	ROUTINE MAINTENANCE PROGRAM	FILE NO: NONE

ANN M. STILLMAN, DIRECTOR OF PUBLIC WORKS
COUNTY OF SAN MATEO

555 COUNTY CENTER, 5TH FLOOR
REDWOOD CITY, CALIFORNIA 94063-1665



SECTION 1-A: VEGETATED ROCK SLOPE PROTECTION

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Updated by County of San Mateo 2025

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CHECKED BY: AL/JC	COUNTY OF SAN MATEO	DATE: 04-14-2023
DRAWN BY: ADG	ROUTINE MAINTENANCE PROGRAM	FILE NO: NONE

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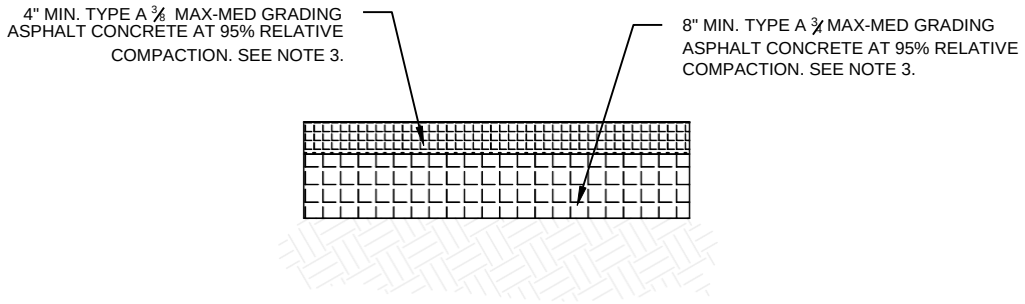
REDWOOD CITY, CALIFORNIA 94063–1665



DETAIL A:
ROAD STRUCTURAL SECTION

NOTES:

1. DRAIN ROCK SHALL BE USED TO FILL VOIDS OF ROCK SLOPE PROTECTION BEFORE PLACEMENT OF SOIL.
2. ROAD STRUCTURAL SECTION SHALL CONFORM TO EXISTING PAVEMENT AND EXISTING CROSS SLOPE.
3. LAYING AND COMPACTING OF ASPHALT CONCRETE SHOULD BE DONE IN 3"-4" MAX LIFTS.

ABBREVIATIONS:

CL	CENTERLINE
MAX	MAXIMUM
MIN	MINIMUM
TYP	TYPICAL

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DRAWN BY: ADG	ROUTINE MAINTENANCE PROGRAM	FILE NO: NONE

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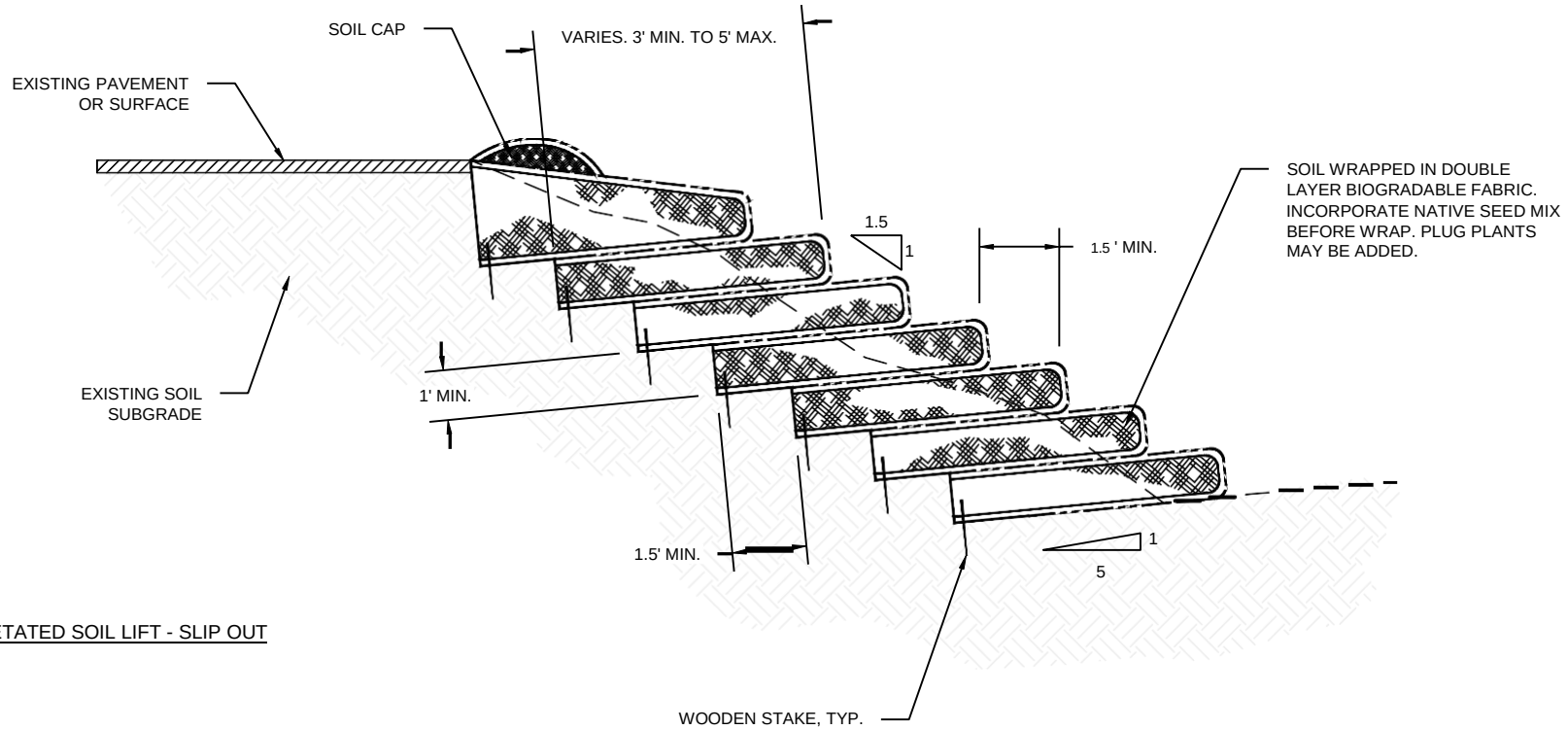

VEGETATED SOIL LIFT - SLIP OUT

ABBREVIATIONS:

MAX	MAXIMUM
MIN	MINIMUM
TYP	TYPICAL
VSL	VEGETATED SOIL LIFT

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CHECKED BY: AL/JC	COUNTY OF SAN MATEO	DATE: 04-14-2023
DRAWN BY: ADG	ROUTINE MAINTENANCE PROGRAM	FILE NO: NONE

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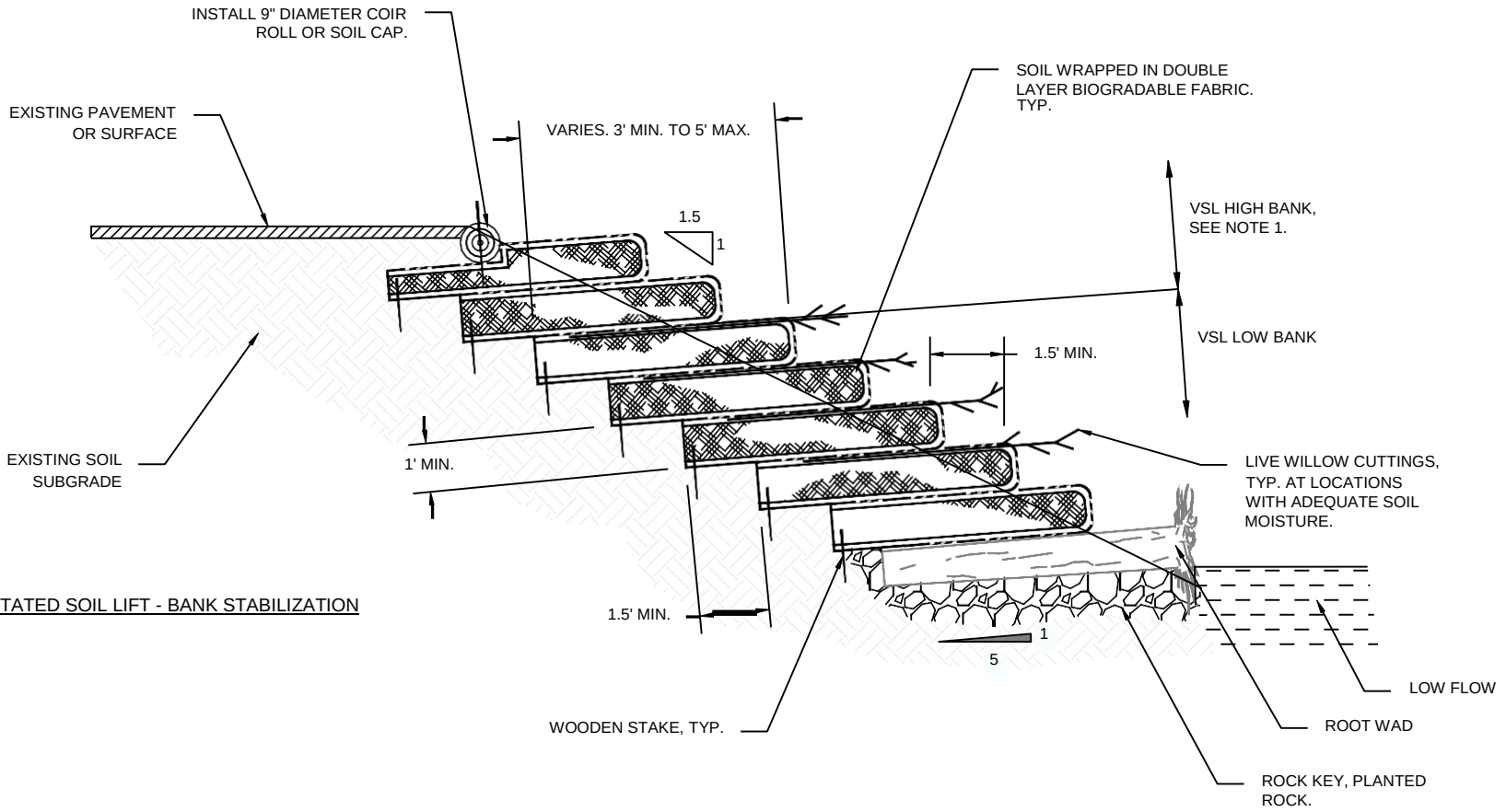

VEGETATED SOIL LIFT - BANK STABILIZATION

NOTES:

1. INCORPORATE NATIVE SEED MIX BEFORE WRAP ON LAYERS AT VSL HIGH BANK.

ABBREVIATIONS:

MAX	MAXIMUM
MIN	MINIMUM
TYP	TYPICAL
VSL	VEGETATED SOIL LIFT

FILENAME: F:\USERS\DESIGN\C3D\RMP EXHIBITS\DWG\RMP EXHIBITS.DWG

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CHECKED BY: AL/JC	COUNTY OF SAN MATEO	DATE: 04-14-2023
DRAWN BY: ADG	ROUTINE MAINTENANCE PROGRAM	FILE NO: NONE

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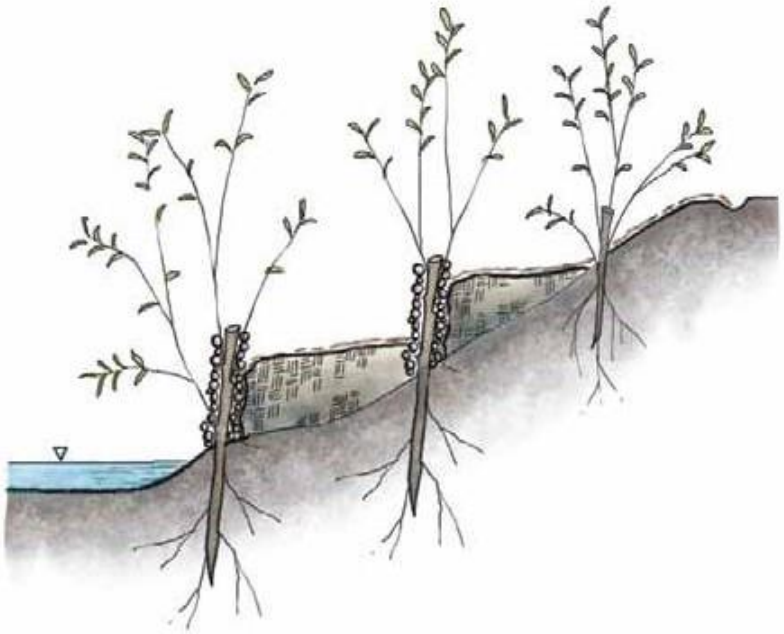

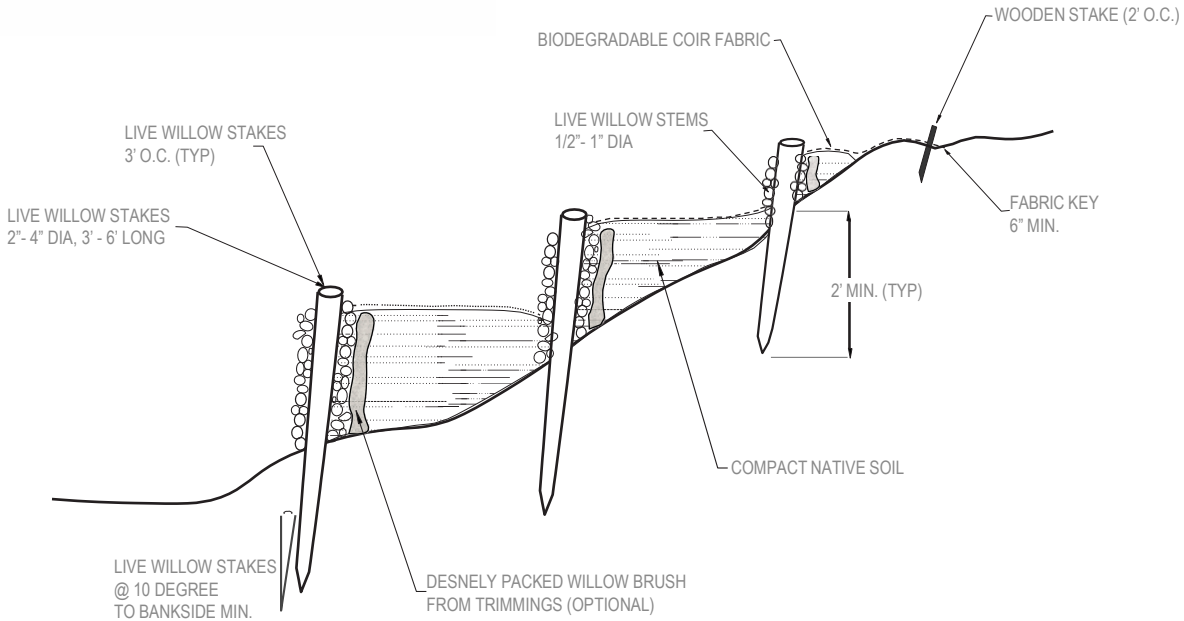

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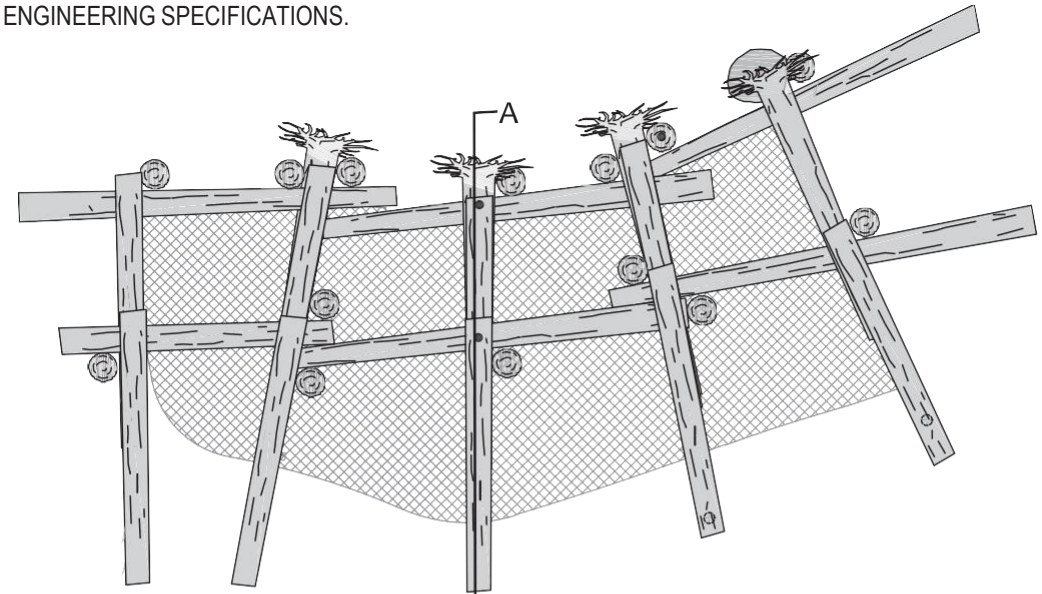
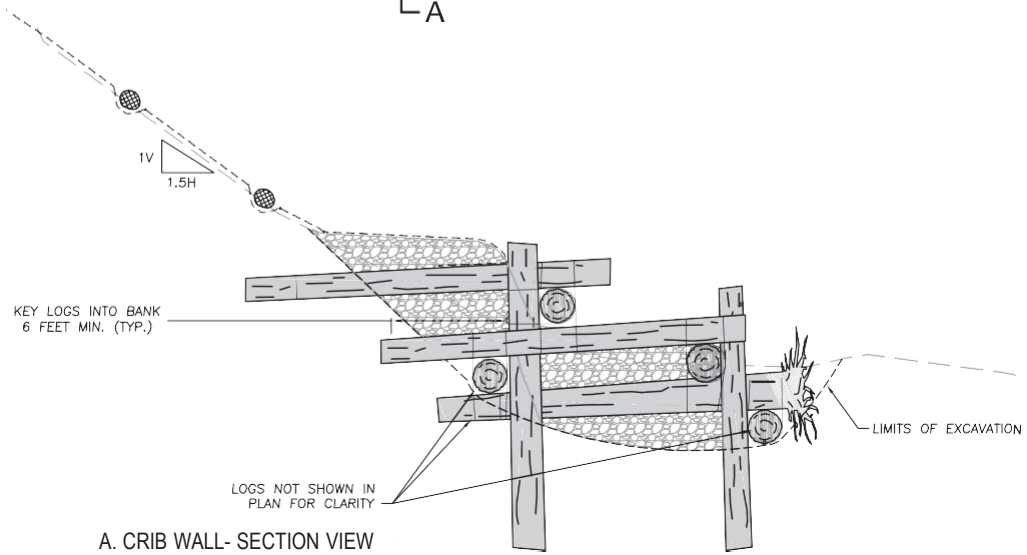
Horizon WATER and ENVIRONMENT

Figure EC-13
Plan Details for Willow Wall

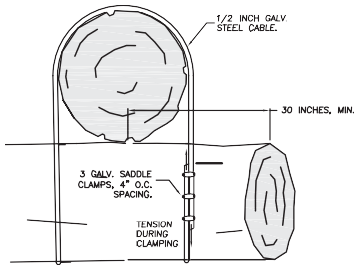
*THESE ARE FOR CONCEPTUAL PURPOSES ONLY. LOG DIAMETER/LENGTH, EMBEDMENT DEPTH, AND NUMBER/TYPE OF CONNECTORS ARE DEPENDENT UPON SITE CONDITIONS AND ENGINEERING SPECIFICATIONS.



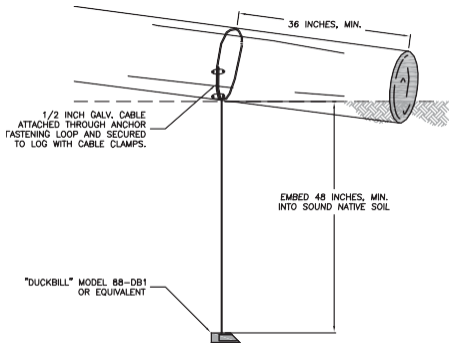
CRIB WALL - PLAN VIEW



A. CRIB WALL- SECTION VIEW



EXAMPLE: LOG/LOG CONNECTION



EXAMPLE: EARTH ANCHOR DETAIL

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Horizon
WATER and ENVIRONMENT

Figure EC-13
Plan Details for Log Crib Wall

BMP: EC-14

ENERGY DISSIPATOR

DESCRIPTION

An energy dissipator is a structure designed to control erosion at the outlet of a channel or conduit by reducing the velocity of flow and dissipating the energy.

APPLICATIONS

This BMP is recommended at the outlet of any new or replacement drainage culvert. The outlets of channels, conduits, and other structures are points of high erosion potential. To prevent scour and undermining, an outlet stabilization structure is needed to absorb the impact of the flow and reduce the velocity to non-erosive levels. Evaluate existing culverts and schedule upgrades of energy dissipater installations as appropriate.

A rock-lined apron is a commonly used practice for this purpose because of its relatively low cost and ease of installation. Extend the rock apron downstream until desired conditions are reached, even though this may exceed the length calculated for design velocity control. Down drains and flumes may also be used as energy dissipaters. Rock aprons may also be required below down drains and flumes depending on slope steepness and soil conditions.

LIMITATIONS

- Do not use this BMP below the mean high water line before obtaining appropriate permits. Due to issues relative to Corps 404 jurisdiction, sometimes energy dissipaters are not placed below the ordinary high water mark, which results in increased erosion.
- Consider other energy dissipators such as concrete impact basins, paved outlet structures, or a half culvert where site conditions warrant.

CONSTRUCTION GUIDELINES

- Ensure that the subgrade for the filter material and rock dissipator follows the required lines and grades as shown in the design plan. Compact any fill required in the subgrade to the density of the surrounding undisturbed material. Low areas in the subgrade on disturbed soil may also be filled by increasing the rock thickness.
- The rock and gravel filter must conform to the specified grading limits shown on the plans.

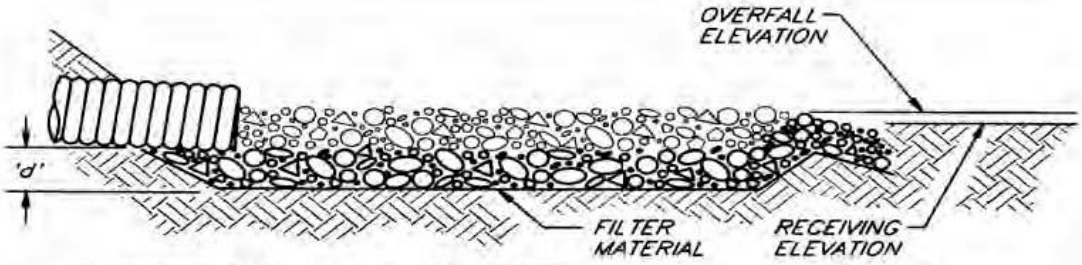
- If filter fabric is used, it must meet design requirements and be properly protected from punching or tearing during installation. Repair any damaged fabric by removing the rock and placing another piece of filter cloth over the damaged area. All connecting joints should overlap a minimum of 1 foot. If the damage is extensive, replace the entire filter cloth.
- Depending on the type of energy dissipator used, equipment may be needed to install the structure.
- The minimum thickness of the rock dissipator should be 1.5 times the maximum stone diameter.
- Rock dissipator may be field stone or rough quarry stone. It should be hard, angular, highly weather-resistant and well graded.
- Construct the apron on zero grade with no overfall at the end. THe top of the rock at the downstream end shall be level with the receiving area or slightly below it.
- Ensure that the apron is properly aligned with the receiving water body and preferably straight throughout its length. If a curve is needed to fit site conditions, place it in the upper section of the apron.
- Stabilize all disturbed areas with vegetation.

BMP MAINTENANCE

- Inspect outlet structures after heavy rains to see if any erosion around the structures has taken place or if stones have been dislodged. Immediately make all needed repairs to prevent further damage.
- Clean flumes as necessary.

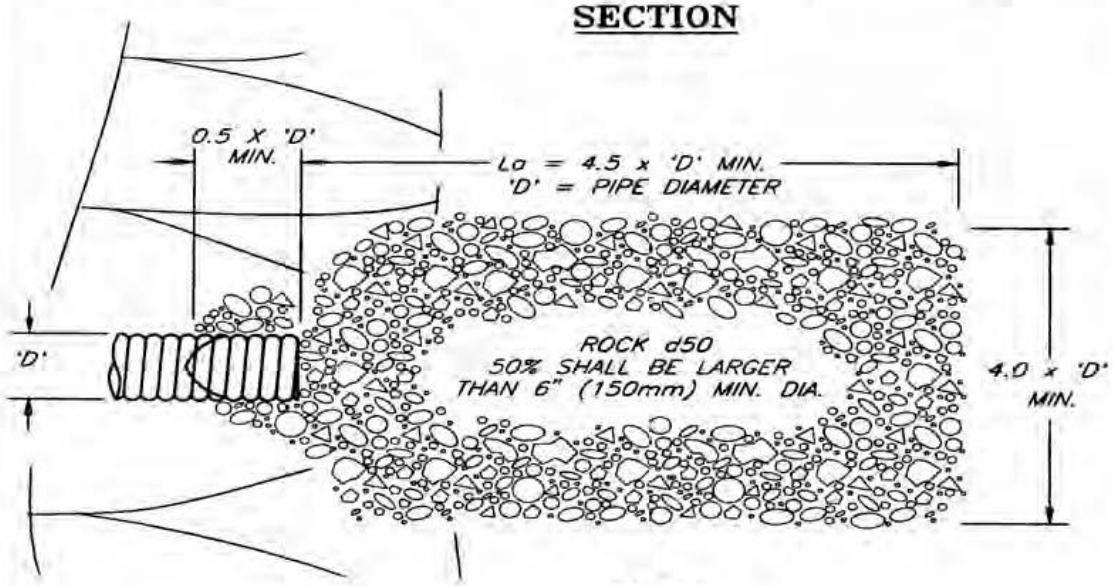
BMP REMOVAL

- BMP removal should not be necessary.



THICKNESS ('d') = 1.5 x MAX. ROCK DIAMETER – 6" (150mm) MIN.

SECTION



PLAN

NOTES:

1. 'La' = LENGTH OF APRON. DISTANCE 'La' SHALL BE OF SUFFICIENT LENGTH TO DISSIPATE ENERGY.
2. APRON SHALL BE SET AT A ZERO GRADE AND ALIGNED STRAIGHT.
3. FILTER MATERIAL SHALL BE FILTER FABRIC OR 6" (150mm) THICK MINIMUM GRADED GRAVEL LAYER.

ENERGY DISSIPATOR

© 1994 JOHN McCULLAH

FILE: ENRGYDIS

BMP: SC-1

SANDBAGS AND GRAVEL BAGS

DESCRIPTION

Sandbags and gravel bags are pre-manufactured cloth or plastic bags filled with sand or gravel. These can be used to keep water away from work areas and unstable slopes, and to construct curb inlet sediment barriers. Both are also used as protection against flooding, as ballast.

APPLICATIONS

This BMP may be used during emergencies to control the flow and level of water. It may be used during construction to form dewatered areas such as cofferdams and clean water bypasses. Sandbags and gravel bags may also be used to protect storm drain inlets, gutters, ditches, and drainage courses.

LIMITATIONS

Do not use this BMP where prohibited by permit conditions or as a permanent structure.

CONSTRUCTION GUIDELINES

- When using this BMP in water bodies, fulfill appropriate permit conditions.
- Secure ends of sandbags to ensure material does not scatter.
- Carefully handle sandbags and gravel bags to prevent them from breaking.
- When used as a barrier, stack bags tightly together and in alternative (brick-layer) fashion.
- Fill bags with clean sand or gravel.

BMP MAINTENANCE

- During construction, inspect daily during the workweek. Schedule additional inspections during storm events. Make any required repairs.
- Replace damaged sandbags.
- Remove sediment when deposits reach ½ the height of the sandbag barrier.

BMP REMOVAL

- Evaluate site to determine when BMP is no longer needed.
- Remove sediment buildup in front of BMP.
- Remove BMP, recycle and/or re-use if applicable.
- Revegetate area disturbed by BMP removal.
- Material in sandbags may be spread on slopes and stable areas where allowed by permit conditions.

BMP: SC-2

SILT FENCE

DESCRIPTION

A silt fence is a temporary sediment barrier consisting of fabric stretched across and attached to supporting posts and entrenched into the soil. It is generally installed perpendicular to the flow direction to slow or stop water and to allow perimeter filtration, settling of soil particles, and to reduce water velocity. Alternative materials that could be used as a substitute for silt fencing include newer perimeter control technologies such as Ertec® and Durawattle®.

APPLICATIONS

This BMP may be used for perimeter protection (around construction work sites, slide debris stockpiles, etc.). It may be used in combination with other BMPs.

LIMITATIONS

This BMP should not be used:

- where rock or hard surfaces prevent full and uniform anchoring of the barrier.
- directly in streams or water courses.
- around drop inlets or in front of storm drain inlets.
- as a diversion dam.

CONSTRUCTION GUIDELINES

- Place silt fence or alternative perimeter material fencing along contours.
- Stakes or posts should be to the downhill side of the fence.
- The bottom of the fabric must be continuously and securely anchored for its entire length to prevent undermining.
- Increase the elevation at the ends of the BMP installation to prevent “end runs.”

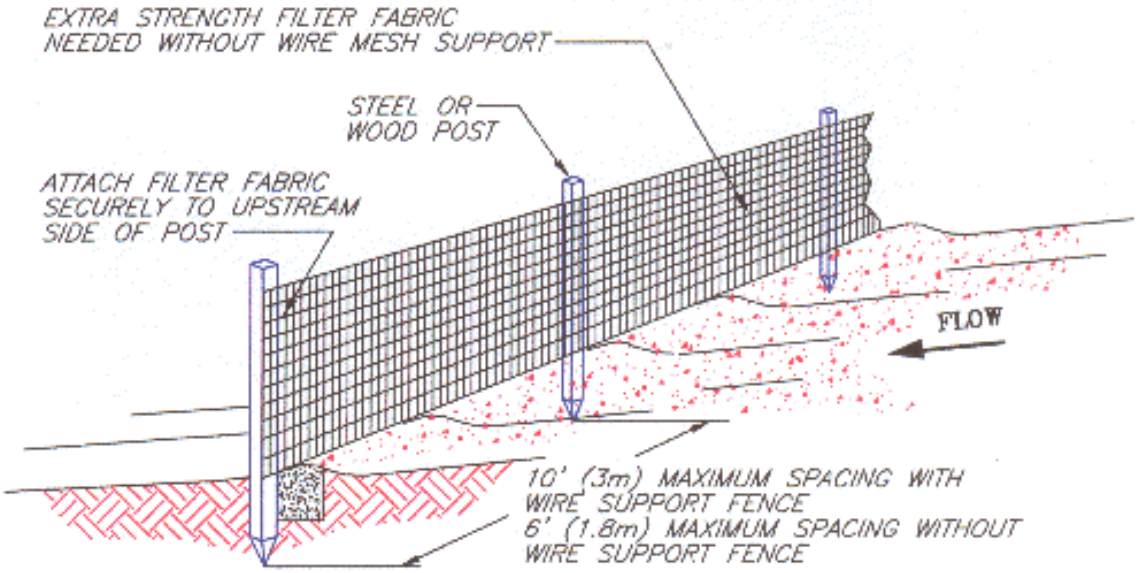
BMP MAINTENANCE

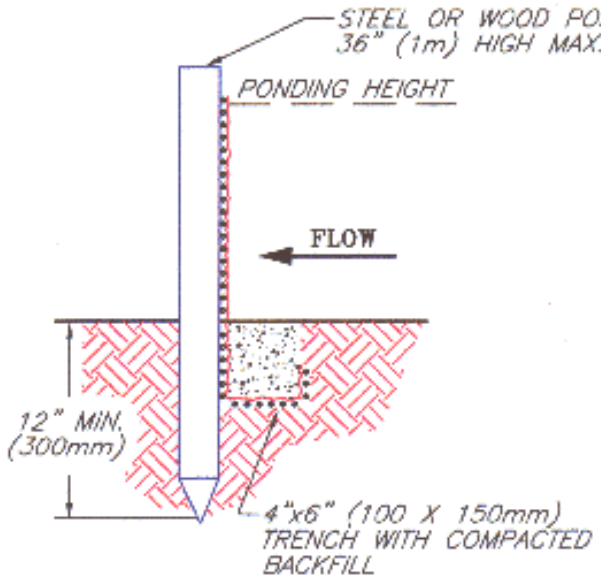
- During construction, inspect daily during the workweek. Schedule additional inspections during storm events. Make any required repairs.
- Replace damaged sections.
- Remove sediment when deposits reach ½ the height of the silt fence.

BMP REMOVAL

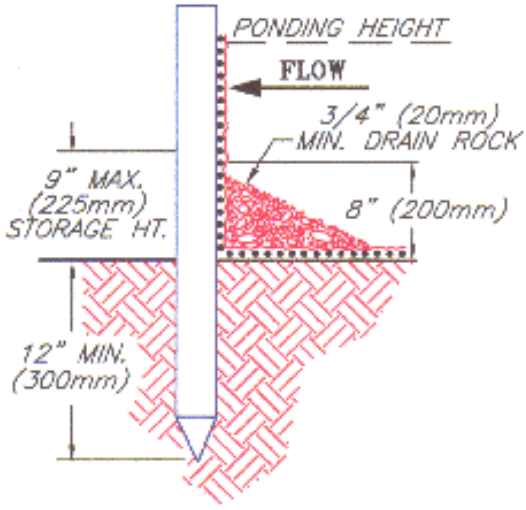
- Evaluate site to determine when BMP is no longer needed.
- Remove sediment buildup in front of BMP.

- Remove BMP, recycle and/or re-use if applicable.
- Revegetate area disturbed by BMP removal.





TRENCH DETAIL



INSTALLATION WITHOUT TRENCHING

NOTES:

1. SILT FENCE SHALL BE PLACED ON SLOPE CONTOURS TO MAXIMIZE PONDING EFFICIENCY.

2. INSPECT AND REPAIR FENCE AFTER EACH STORM EVENT AND REMOVE SEDIMENT WHEN NECESSARY. 9" (225mm) MAXIMUM RECOMMENDED STORAGE HEIGHT.

3. REMOVED SEDIMENT SHALL BE DEPOSITED TO AN AREA THAT WILL NOT CONTRIBUTE SEDIMENT OFF-SITE AND CAN BE PERMANENTLY STABILIZED.

NOT TO SCALE

SILT FENCE

FILE: SILTFENC

© 1994 JOHN McCULLAH

BMP: SC-3

STRAW ROLL, STRAW LOG, COIR LOG

DESCRIPTION

Straw rolls/logs are manufactured from straw wrapped in netting. Coir logs are similar, but are filled with coconut fiber rather than straw. As an alternative, compostable filter socks/berms comprised of natural fibers and other bio-based materials, may be used in lieu of straw rolls/logs or coir logs. The logs or berms are placed and staked in shallow trenches along the contour of newly constructed or disturbed slopes. They can be used to provide perimeter protection, settling, reduction in water velocity/erosive forces and habitat protection.

APPLICATIONS

The BMP may be used for temporary soil stockpile protection; protection of storm drains, gutters, and drainage courses; temporary check dams; bank or slope stabilization; and streambank toe protection. This BMP may be used for perimeter sediment control, and is preferred over silt fencing and straw bales. It may also be used to replace missing sections of earthen berms (example: above new ditch relief culverts).

Straw rolls/logs should be manufactured of rice straw or a sterile (non-seed bearing) straw to prevent the introduction of non-native grasses. Polypropylene or coir netting is preferred over plastic netting. Compostable filter socks/berms should be manufactured of recycled, bio-based, and natural materials.

LIMITATIONS

This BMP should not be used:

- where flow volume or water velocity inhibit its usefulness.

CONSTRUCTION GUIDELINES

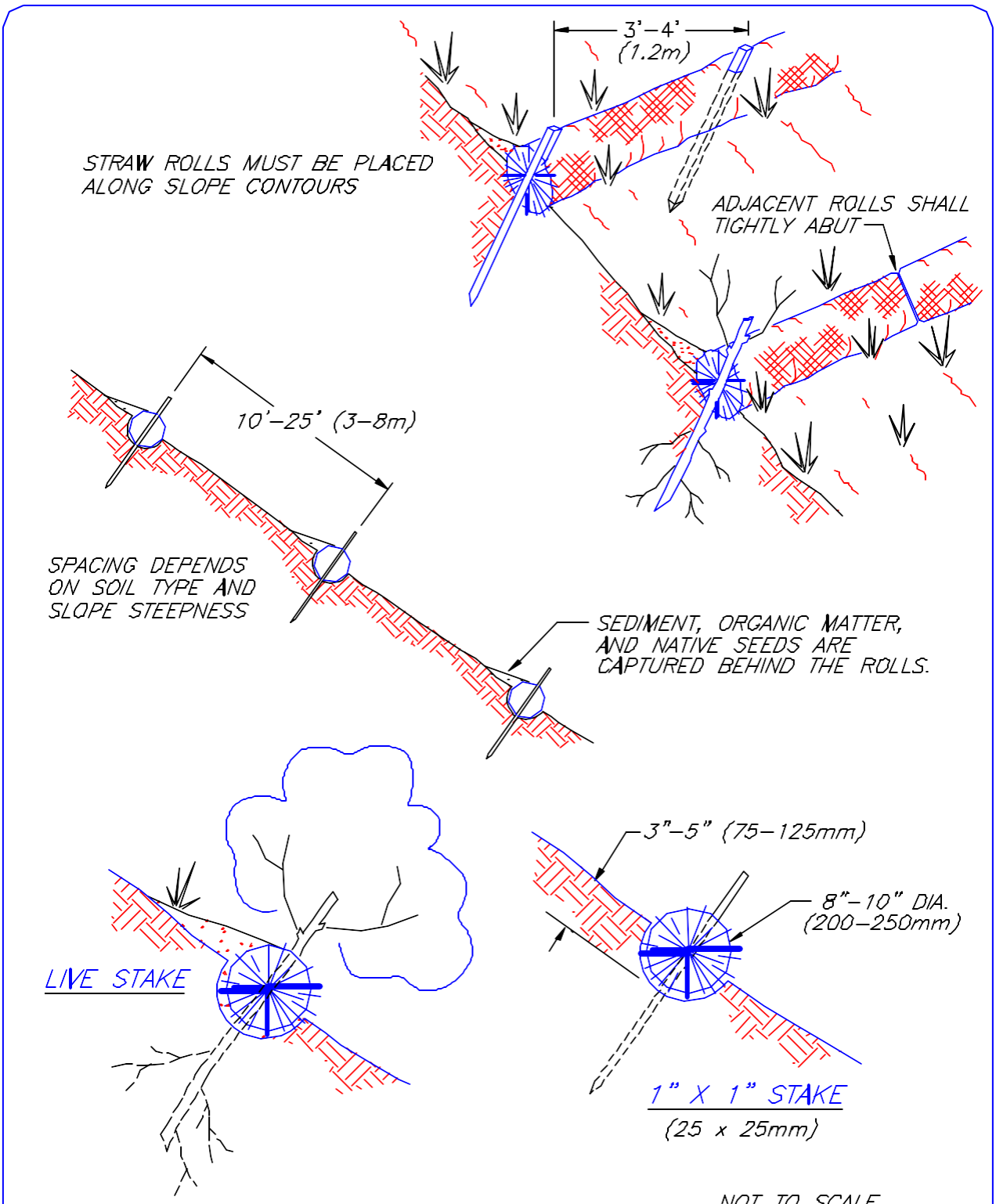
1) Logs are placed in 2- to 3- inch deep trenches and staked along the contours of newly constructed or disturbed slopes.
2) Log spacing depends on soil type and slope steepness.
3) Adjacent logs shall be tightly abutted to prevent water flow and gully formation between logs.
4) Ensure that logs are in contact with the ground in the trenches to prevent water flow under logs.
5) Live staking may be used in conjunction with logs.

BMP MAINTENANCE

- During construction, inspect daily during the work week.
- Schedule additional inspections during storm events.
- Make any required repairs immediately.
- For perimeter control installations (securing spoils, etc.), remove sediment deposits when they reach ½ the height of the log/roll.

BMP REMOVAL

- Remove sediment buildup in front of BMP.
- Revegetation of the site may be necessary.
- Dispose of netting properly. Straw or coir filling may be used as mulch.
- BMP removal may not be necessary.



NOT TO SCALE

NOTE:

1. STRAW ROLL INSTALLATION REQUIRES THE PLACEMENT AND SECURE STAKING OF THE ROLL IN A TRENCH, 3"-5" (75-125mm) DEEP, DUG ON CONTOUR. RUNOFF MUST NOT BE ALLOWED TO RUN UNDER OR AROUND ROLL.

STRAW ROLLS

© 1998 JOHN McCULLAH

FILE: STRWROLL

BMP: SC-4

INLET PROTECTION

DESCRIPTION

Inlet protection may be achieved by using temporary barriers typically constructed from silt fences, gravel filled sandbags, and other proprietary barriers such as geotextile inserts, biofilter bags, or compost socks.

APPLICATIONS

Inlet sediment barriers are intended to prevent and reduce the sediment discharged into storm drains by ponding the runoff and allowing the sediment to settle out. The structures allow for overflow from high runoff events, and some devices allow the ponds to dewater rapidly. Inlet sediment barriers should be used where new construction, maintenance, reconstruction and/or where private development has potential for generating sediment or polluted runoff. Inlet sediment barriers may be comprised of sandbags, straw rolls/logs, or compostable filter socks comprised of natural fibers or other bio-based materials. See BMP-3 (Straw Roll, Straw Log, Coir Log) for additional detail regarding installation guidelines for the straw rolls/logs method. Temporary geotextile storm drain inserts may also be inserted underneath storm drain grates to capture and filter stormwater.

LIMITATIONS

- Do not use this BMP on steep sloping streets.
- Consider this BMP a “backup,” used in addition to controlling potential erosion at the source.
- Drainage area should not exceed 1 acre.
- Do not use straw bales for inlet protection.
- Requires an adequate area for water to pond without encroaching into portions of the roadway subject to traffic.
- Sediment removal may be inadequate to prevent sediment discharges in high flow conditions or if runoff is heavily sediment laden. If high flow conditions are expected, use other onsite sediment trapping techniques in conjunction with inlet protection.

DESIGN AND LAYOUT

The following design and layout considerations are based on guidance provided in the California Stormwater BMP Handbook Construction (CASQA 2015).

1) Identify existing and planned storm drain inlets that have the potential to receive sediment-laden surface runoff. Determine if drain inlet protection is needed and which method to use.

- Determine where runoff that is directed toward the inlet to be protected will pond or be diverted as a result of installing the protection device.
- Determine the extent of potential runoff diversion caused by the storm drain inlet protection device. Runoff ponded by inlet protection devices may flow around the devices and towards the next downstream inlet. In some cases, this is acceptable and in other cases, this could cause erosion or downstream property damage. The possibility of runoff diversions will influence whether or not storm drain inlet protection is suitable; and, if suitable, the type and design of the device.

2) The location and extent of ponding, and the extent of the diversion, can usually be controlled through appropriate placement of the inlet protection device. In some cases, moving the inlet protection device a short distance upstream of the inlet can provide more efficient sediment control, limit ponding to desired areas.
3) Seven types of inlet protection are presented below. However, it is recognized that other effective methods and proprietary devices exist and may be selected.
   - Silt fence: appropriate for drainage basins with less than a 5% slope, sheet flows, and flows under 0.5 cfs.
   - Excavated drop inlet sediment trap: an excavated area around the inlet to trap sediment.
   - Gravel bag barrier: Used to create a small sediment trap upstream of inlets on sloped, paved streets. Appropriate for sheet flow or when concentrated flow may exceed 0.5 cfs, and where overtopping is required to prevent flooding.
   - Block and gravel filter: appropriate for flows greater than 0.5 cfs.
   - Temporary geotextile storm drain inserts: different products provide different features. Refer to manufacturer details for targeted pollutants and additional features.
   - Biofilter bag barrier: Used to create a small retention area upstream of inlets and can be located on pavement or soil. These bags slowly filter runoff allowing sediment to settle out. Appropriate for flows under 0.5 cfs.
   - Compost socks: allow filtered runoff to pass through the compost while retaining sediment and potentially other pollutants. Appropriate for flows under 1.0 cfs.
4) Select the appropriate type of inlet protection and design as referred to or as described below.
5) Provide sufficient area around the inlet for water to pond without flooding structures and property.
6) Grates and spaces around all inlets should be sealed to prevent seepage of sediment-laden water.
7) Excavate sediment sumps (where needed) 1 to 2 feet with 2:1 side slopes around the inlet.

CONSTRUCTION GUIDELINES

The following construction guidelines are based on those provided in the California Stormwater BMP Handbook (CASQA 2015).

Silt Fence (DI Protection Type 1): Do not place fabric underneath the inlet grate since the collected sediment may fall into the drain inlet when the fabric is removed or replaced and water flow through the grate will be blocked resulting in flooding.

1) Excavate a trench approximately 6 inches (in.) wide and 6 in. deep along the line of the silt fence inlet protection device.
2) Place 2 in. by 2 in. wooden stakes around the perimeter of the inlet a maximum of 3 ft apart and drive them at least 18 in. into the ground or 12 in. below the bottom of the trench. The stakes should be at least 48 in.
3) Lay fabric along bottom of trench, up side of trench, and them up stakes. The maximum silt fence height around the inlet should be 24 in.
4) Staple the filter fabric to wooden stakes. Use heavy-duty wire stapes at least 1 in. in length.
5) Backfill the trench with gravel or compacted earth all the way around.

Excavated Drop Inlet Sediment Trap (DI Protection Type 2): Install filter fabric fence in accordance with the guidelines described above for silt fencing. Size excavated trap to provide a minimum storage capacity calculated at the rate 67 yd3/acre of drainage area. See typical Type 2 installation details at the end of this fact sheet.

Gravel Bag (DI Protection Type 3): Flow from a severe storm should not overtop the curb. In areas of high clay and silts, use filter fabric and gravel as additional filter media. Construct gravel bags in accordance with BMP SC-1 (Sandbags and Gravel Bags). Gravel bags should be used due to their high permeability. See typical Type 3 installation details at the end of this fact sheet.

1) Construct on gently sloping street.
2) Leave room upstream of barrier for water to pond and sediment to settle.
3) Place several layers of gravel bags – overlapping the bags and packing them tightly together.
4) Leave gap of one bag on the top row to serve as a spillway. Flow from a severe storm (e.g., 10 year storm) should not overtop the curb.

Block and Gravel Filter (DI Protection Type 4): Block and gravel filters are suitable for curb inlets commonly used in residential, commercial, and industrial construction. See typical Type 4 installation details at the end of this fact sheet.

1) Place hardware cloth or comparable wire mesh with 0.5 in. openings over the drop inlet so that the wire extends a minimum of 1 ft beyond each side of the inlet structure. If more than one strip is necessary, overlap the strips. Place woven geotextile over the wire mesh.
2) Place concrete blocks lengthwise on their sides in a single row around the perimeter of the inlet, so that the open ends face outward, not upward. The ends of adjacent blocks should abut. The height of the barrier can be varied, depending on design needs, by stacking combinations of blocks that are 4 in., 8 in., and 12 in. wide. The row of blocks should be at least 12 in. but no greater than 24 in. high.

3) Place wire mesh over the outside vertical face (open end) of the concrete blocks to prevent stone from being washed through the blocks. Use hardware cloth or comparable wire mesh with 0.5 in. opening.
4) Pile washed stone against the wire mesh to the top of the blocks. Use 0.75 to 3 in.

Temporary Geotextile Insert (DI Protection Type 5): Many types of temporary inserts are available. Most inserts fit underneath the grate of a drop inlet or inside of a curb inlet and are fastened to the outside of the grate or curb. These inserts are removable and many can be cleaned and reused. Installation of these inserts differs between manufacturers. Please refer to manufacturer instruction for installation of proprietary devices.

Biofilter bags (DI Protection Type 6): Biofilter bags may be used as a substitute for gravel bags in low-flow situations. These consist of a plastic mesh bag filled with recycled wood product waste and are generally an effective short-term solution for preventing runoff from flowing into inlets.

1) Construct in a gently sloping area.
2) Biofilter bags should be placed around inlets to intercept runoff flows.
3) All bag joints should overlap by 6 in.
4) Leave room upstream for water to pond and for sediment to settle out.
5) Stake bags to the ground as described in the following detail. Stakes may be omitted if bags are placed on a paved surface.

Compost Socks (DI Protection Type 7): A compost sock can be assembled on site by filling a mesh sock (e.g., with a pneumatic blower). Compost socks do not require special trenching compared to other sediment control methods (e.g., silt fence).

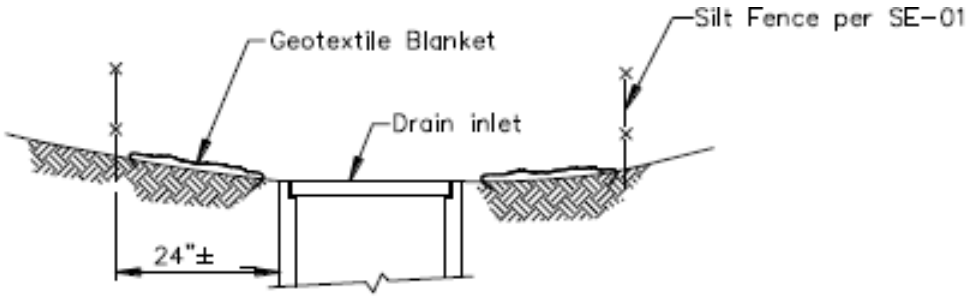
BMP MAINTENANCE

- Inspect and clean barrier during and after each significant storm and remove sediment from behind sandbag structure after every storm.
- Silt fences: If the fabric becomes clogged, torn or degrades, it should be replaced. Make sure the stakes are securely driven in the ground and are in good shape (i.e., not bent, cracked, or splintered, and are reasonably perpendicular to the ground). Replace damaged stakes. At a minimum, remove the sediment behind the fabric fence when accumulation reaches one-third the height of the fence or barrier height.
- Gravel Filters. If the gravel becomes clogged with sediment, it should be carefully removed from the inlet and either cleaned or replaced. Since cleaning gravel at a construction site may be difficult, consider using the sediment-laden stone as fill material and put fresh stone around the inlet. Inspect bags for holes, gashes, and snags, and replace bags as needed. Check gravel bags for proper arrangement and displacement.

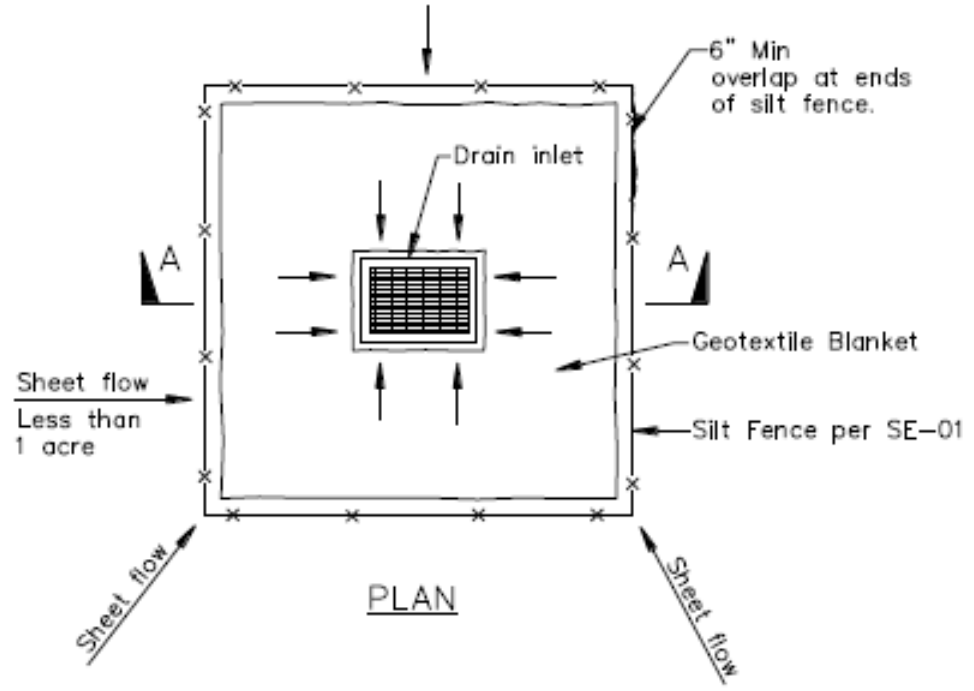
- Any sediment and gravel shall be immediately removed from the traveled way of roads.
- The removed sediment shall be placed where it cannot enter a storm drain, stream, or be transported off site.
- If the gravel becomes clogged with sediment, it must be carefully removed from the inlet and either cleared or replaced.
- Geotextile Insert Devices: Inspect and maintain temporary geotextile insert devices according to manufacturer's specifications.

BMP REMOVAL

- Remove storm drain inlet protection once the drain area is stabilized. Clean and regrade area around the inlet and clean the inside of the storm drain inlet, as it should be free of sediment and debris at the time of final inspection.



SECTION A–A

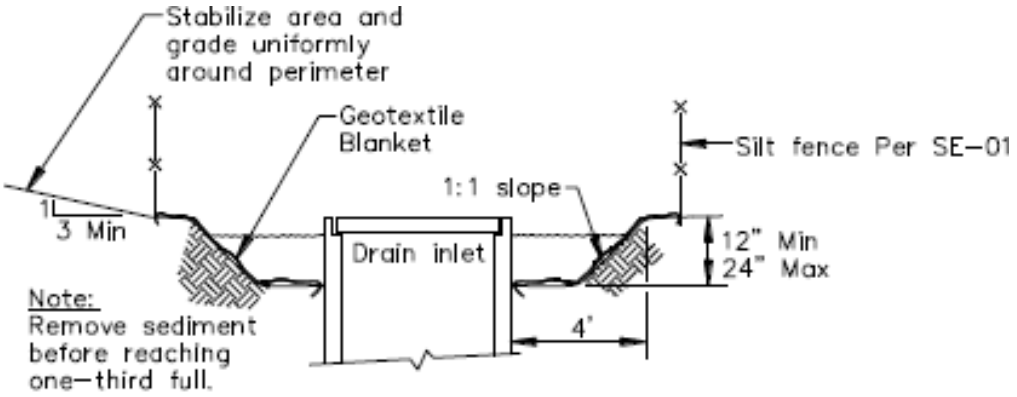


PLAN

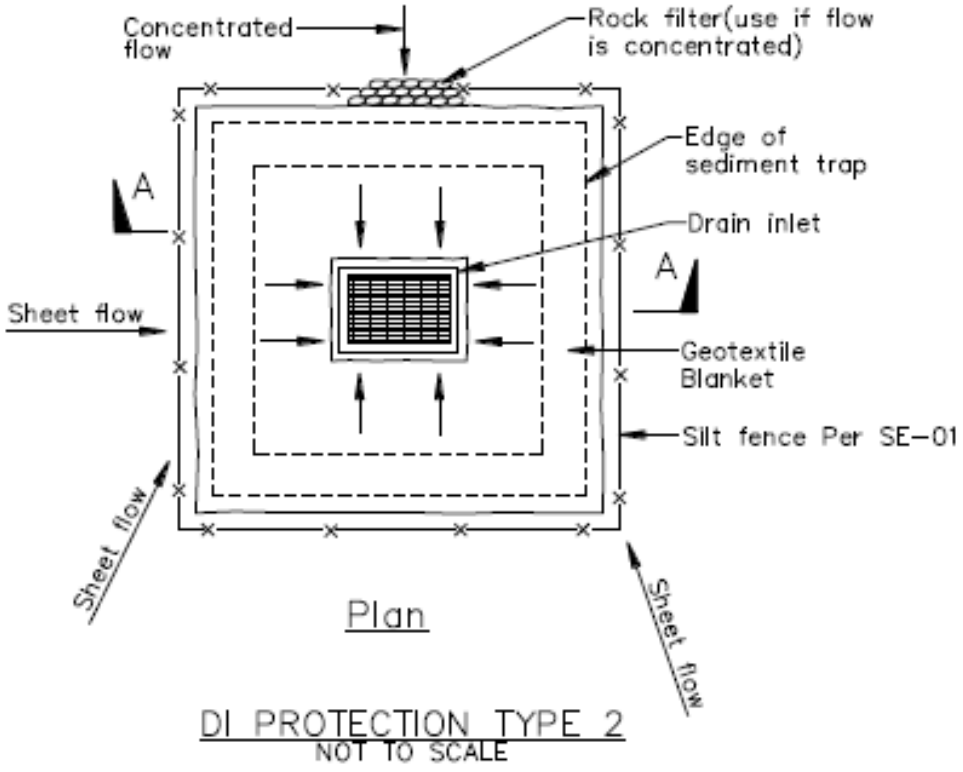
DI PROTECTION TYPE 1
NOT TO SCALE

NOTES:

1. For use in areas where grading has been completed and final soil stabilization and seeding are pending.
2. Not applicable in paved areas.
3. Not applicable with concentrated flows.



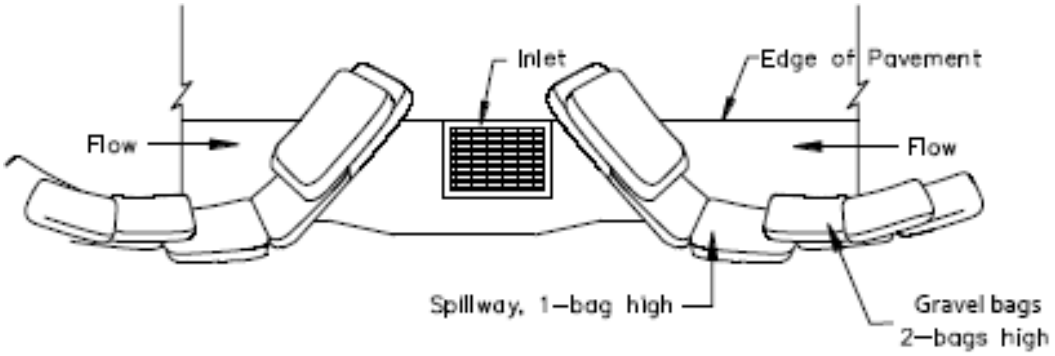
Section A–A



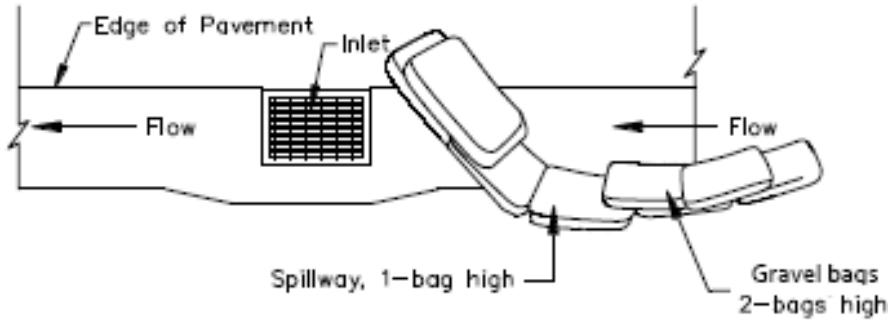
Plan

DI PROTECTION TYPE 2
NOT TO SCALE

Notes
1. For use in cleared and grubbed and in graded areas.
2. Shape basin so that longest inflow area faces longest length of trap.
3. For concentrated flows, shape basin in 2:1 ratio with length oriented towards direction of flow.



TYPICAL PROTECTION FOR INLET ON SUMP



TYPICAL PROTECTION FOR INLET ON GRADE

NOTES:

1. Intended for short-term use.
2. Use to inhibit non-storm water flow.
3. Allow for proper maintenance and cleanup.
4. Bags must be removed after adjacent operation is completed
5. Not applicable in areas with high silts and clays without filter fabric.
6. Protection can be effective even if it is not immediately adjacent to the inlet provided that the inlet is protected from potential sources of pollution.

DI PROTECTION TYPE 3
NOT TO SCALE

BMP: SC-5

STORMWATER SEPARATION SYSTEMS

DESCRIPTION

Stormwater separation systems are engineered devices installed in storm drain facilities to remove solids, grease and other pollutants.

APPLICATIONS

Stormwater separation systems may be installed where deep structures allow for their placement and maintenance, or where sufficient quantities of pollutant materials require regular removal in order for the storm drains to operate correctly.

LIMITATIONS

This BMP should not be used:

- Where it will not be regularly maintained.
- In lieu of regularly scheduled inspections and cleaning.

BMP MAINTENANCE

- Inspect and clean separation systems at least twice annually, or as indicated by manufacturer.
- Schedule additional inspections during storm events.
- Remove debris, sediment, grease, and pollutants and dispose of properly.
- Report debris removed for Countywide Stormwater Pollution Prevention Program.

BMP REMOVAL

BMP removal is not necessary.

BMP: SC-6

DIVERSION BERM

DESCRIPTION

A diversion berm is a temporary ridge of compacted soil or aggregate base material, sandbags or continuous bag berm constructed at the top or base of a disturbed slope. A diversion berm may also consist of a ridge of asphalt concrete or “cutback” constructed at the top of a disturbed slope. The purpose of the BMP is direct stormwater runoff away from an unstable slope.

APPLICATIONS

This BMP may be used wherever stormwater runoff must be temporarily diverted away from a disturbed slope and toward a sediment containment facility or stable runoff.

LIMITATIONS

This is not a routine maintenance BMP. This BMP should not be used:

- in fast flowing water.
- as a replacement for failing roadway shoulders.
- as slide debris storage within 150’ of any water body.

Asphalt berms shall not be used:

- to concentrate runoff onto unstable, eroded areas.
- near edges of slides or streambanks where cutback berms could slip into a stream.

CONSTRUCTION GUIDELINES

- Berm material should be adequately compacted to prevent failure.
- Temporary seeding and mulch shall be applied to all surfaces of a soil diversion berm according to the “Timing of Work” BMP.
- For asphalt berms, construct the berm to the minimum height and width needed to divert runoff without adding unnecessary weight.
- Asphalt berms may be striped or marked for traffic safety.
- Asphalt berms may be used to anchor temporary plastic sheeting.

BMP MAINTENANCE

- Periodic inspection should be conducted, and berms repaired as necessary.

BMP REMOVAL

- Evaluate site to determine BMP is no longer needed (the area has stabilized – potential of sediment laden water exiting the area has passed).
- Remove sediment buildup.
- Remove BMP – recycle and/or re-use if applicable.
- Revegetate area disturbed by BMP removal if applicable.
- Asphalt berm removal may not be necessary, or may be conducted during permanent slope or streambank repair activities.
- Recycle or reuse asphalt berm material.

BMP: DW-1

COFFERDAM OR CLEAN WATER BYPASS INSTALLATION METHODS FOR CHANNEL DEWATERING

DESCRIPTION

When work in flowing streams is unavoidable, streamflow shall be diverted around work areas by either installing cofferdams and/or clean water bypass systems.

A cofferdam is a temporary structure built into a waterway to enclose a construction area and reduce sediment pollution from construction work in or adjacent to water. Cofferdams may be made of rock, gravel bags, wood or aqua barriers. They may also be composed of inflatable rubber material.

A clean water bypass enables operators or maintenance workers to transport surface or subsurface flows around a construction area without adding significant amounts of turbidity or sediment. Clean water bypasses are typically used for short-term diversion of small amounts of water over short distances to enable dewatering of minor construction or repair sites. Depending on site conditions of the work area, clean water bypasses may be either gravity driven or require use of a pump to divert water around a construction area.

APPLICATIONS AND DESIGN CONSIDERATIONS

Clean water bypasses may be used to divert low flow volumes away from culvert replacements/installations, bridge and headwall repairs, bank stabilization projects, or other in-stream maintenance activities. Clean water bypasses may not be used in active streams or tributaries inhabited by anadromous fishes (i.e., Gazos, Pescadero, Butano, Alpine, etc.) at migration times. Cofferdams may be used on similar projects listed above and may be used in combination with clean water bypasses and/or pumps.

Prior to dewatering, the best means to bypass flow through the work area will be determined to minimize disturbance to the channel and avoid direct mortality of fish and other aquatic vertebrates. Dewatering will be conducted per the detailed concept included below or per the site-specific dewatering plan reviewed by the appropriate regulatory agencies. The area to be dewatered shall encompass the minimum area necessary to avoid impacts to waters of the U.S./state in order to perform the maintenance activity. The period of dewatering should extend only for the minimum amount of time needed to perform the maintenance activity. Downstream flows adequate to prevent fish or vertebrate stranding will be maintained at all times during dewatering activities.

LIMITATIONS

Do not use this BMP:

- in deep water unless designed or reviewed by the Project Engineer, or
- to completely dam stream flows.

CONSTRUCTION GUIDELINES

1) When used in watercourses or streams, cofferdams and clean water bypasses must be used in accordance with permit requirements. Materials for cofferdams should be selected based on ease of maintenance and complete removal following construction activities.
2) Where feasible and appropriate, dewatering shall occur via gravity driven systems.
3) Cofferdams shall be installed both upstream and downstream not more than 100 feet from the extent of the work areas.
4) Instream cofferdams shall only be built from materials such as clean gravel or rubber bladders which cause little or no siltation or turbidity. No earthen fill shall be used to construct the cofferdam. Plastic sheeting (e.g., visqueen) shall be placed over bags filled with clean gravel to minimize water seepage into the maintenance areas. The plastic sheets shall be firmly anchored to the streambed to minimize water seepage. If necessary, the footing of the cofferdam shall be keyed into the channel bed at an appropriate depth to capture the majority of subsurface flow needed to dewater the streambed.
5) Stream flows shall be allowed to gravity flow around or through the work site using temporary bypass pipes. Bypass pipe diameter shall be sized to convey, at a minimum, the 2-year, 24-hour design storm, or anticipated high-flow conditions if applicable. This is shown as ‘Diversion A (through work area)’ on the Dewatering Plan – Sheet 1.
6) When gravity-based dewatering is not feasible, stream flow shall be pumped around the work site. This is shown as ‘Diversion B (around work area)’ on the Dewatering Plan – Sheet 1.
7) All dewatering/diversion methods shall be installed such that natural flow is maintained upstream and downstream of the Project area.
8) Any temporary dams or diversions shall be installed such that the diversion does not cause sedimentation, siltation, or erosion upstream or downstream of the project area.

IMPLEMENTATION PROCEDURES

1) A qualified biologist shall be present to ensure that state or federally listed fish and other aquatic vertebrates are not stranded during construction and implementation of channel dewatering. Prior to dewatering, the affected area shall be surveyed by a qualified biologist. If sensitive species are observed: a

relocation effort will be led by a qualified biologist, the stream channel will be blocked with fish mesh above and below the work area (mesh will be no greater than 3.1 mm), and pumps will be screened. During cofferdam installation, the downstream cofferdam shall be installed first. Most of the upstream cofferdam, with the exception of an opening large enough for fish passage, shall then be constructed. Then, qualified biologists shall walk from the downstream cofferdam upstream while carrying a block net or nets in order to encourage fish to move upstream and out of the opening in the upper cofferdam. The block net shall then be positioned to prevent fish from re-entering the dewatering area while the upper cofferdam is completed. If insufficient water is present in the area upstream from the work area to support fish, but sufficient water is present downstream from the work area, then the process shall be reversed (with the upstream cofferdam constructed first, and with fish encouraged to move downstream). Alternatively, if insufficient habitat is present either upstream or downstream from the work area, the biologist shall capture fish within the project area, using seines, dip nets, or electrofishing, and relocate the fish to suitable habitat within another reach of a particular creek (the relocation site to be determined in consultation with NMFS, USFWS, and/or CDFW as applicable).

2) Diverted water shall be protected from maintenance activity-related pollutants, such as soils or equipment lubricants or fuels.
3) If a pump is required to route water around the work area, the pump inlets shall be outfitted with appropriate screens that meet CDFW and NMFS criteria to prevent entrainment of fish and other sensitive aquatic organisms. Ensure that BMP 9 (Vehicle Maintenance & Parking) and BMP 10 (Equipment Maintenance & Fueling) are also implemented to ensure that fuels are properly contained near waterways and proper containment is provided during vehicle maintenance and cleaning activities. A back-up plan should also be developed and implemented in the event that the pump fails.
4) For full channel dewatering, pumped water shall be pre-filtered with a gravel pack and/or perforated pipe around sumps for subsurface flows and a silt fence around pumps for surface flow, or as otherwise directed by the Project Engineer, to ensure that the turbidity of discharged water is not visibly more turbid than in the channel upstream of the maintenance site. If increases in turbidity are observed, additional measures shall be implemented such as a larger settling basin or additional filtration. If increases in turbidity persist, the County's Project Manager shall be alerted, and turbidity reduction measurements implemented immediately.
5) If necessary, discharged water shall pass over some form of energy dissipation to prevent downstream erosion and increased turbidity. Energy dissipation and turbidity reduction methods may include the following: settling basin, settling tank, upland vegetated area, dewatering silt bags, gravel bags, or other energy dissipation device. Sediment control, such as natural fiber straw wattles, will be placed downstream during the installation and removal of BMPs to ensure there is not a significant increase in sediment.

BMP MAINTENANCE

- Inspect during the construction of the system to ensure there is not an increase in turbidity. Should turbidity increase during cofferdam installation, a turbidity curtain or some other method will be installed downstream of the lower cofferdam. An inspection and assessment action plan will be utilized:
    - Ensure that bypass pump(s) can handle incoming flows, especially after precipitation.
    - Inspect flow barriers (dams, berms, etc.) at the start and end of each work day and if excess water is observed in work areas that are supposed to be dry. Inspect for leakage and repair.
    - Inspect diversion channels for signs of erosion, and repair or replace lining as necessary.
    - Inspect pumped and piped diversions to ensure flow is adequately diverted. Inspect for leakage and repair as necessary.
    - Inspect the diversion path for erosion and repair any damages with rock, gravel, or other appropriate methods.
    - Inspect the diversion discharge point for erosion and repair as necessary.
    - Inspect dewatering device(s) and ensure that discharge is not sediment laden. Check for buildup of sediment and debris and remove as needed.

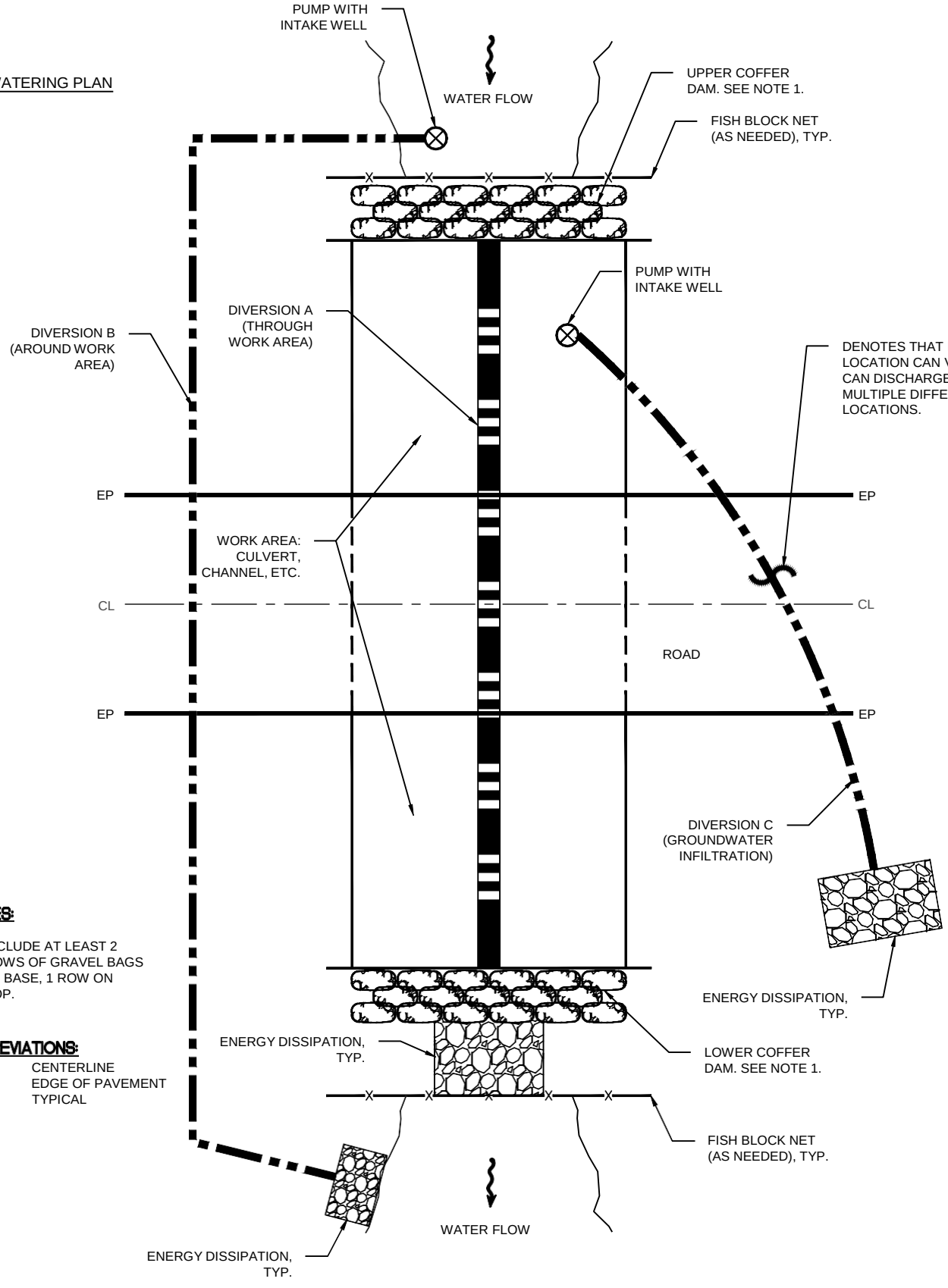
- During construction, inspect daily during the work week to observe the condition of the system. If the capacity of the system needs to be increased, consult with the Project Engineer for appropriate re-sizing.
- Schedule additional inspections during storm events. If an increase in turbidity is observed, work shall halt immediately.
- Immediately repair any gaps, holes or scour.
- Block nets shall be maintained throughout construction. Maintenance includes periodic removal of accumulated debris, as necessary to ensure function.

BMP REMOVAL

- When in-stream maintenance is completed, the flow diversion structure shall be removed as soon as possible. Impounded water shall be released at a reduced velocity to minimize erosion, turbidity, or harm to downstream habitat. Cofferdams shall be removed such that surface elevations of water impounded above the cofferdam are lowered at a rate greater than one inch per hour.
- When diversion structures are removed, to the extent practicable, the ponded flows shall be directed into the low-flow channel within the work site to minimize downstream water quality impacts.
- The area disturbed by flow bypass mechanisms shall be restored at the completion of the project. This may include, but is not limited to, recontouring the area and planting of riparian vegetation.
- If the County is unable to complete work and remove the system by the stop-work deadline, coordination with the agencies will take place during the permit extension request.

- A contingency plan describing what the County will do should a flow event occur that exceeds the capacity of the system shall be developed. The plan should address at least the following:
    - Descriptions of the measures the County will take (e.g., increase the capacity of the system, demobilize and stabilize the construction site and remove the system, etc.);
    - The length of time it will take the County to enact the above measures.

DEWATERING PLAN



NOTES:

1. INCLUDE AT LEAST 2 ROWS OF GRAVEL BAGS AT BASE, 1 ROW ON TOP.

ABBREVIATIONS:

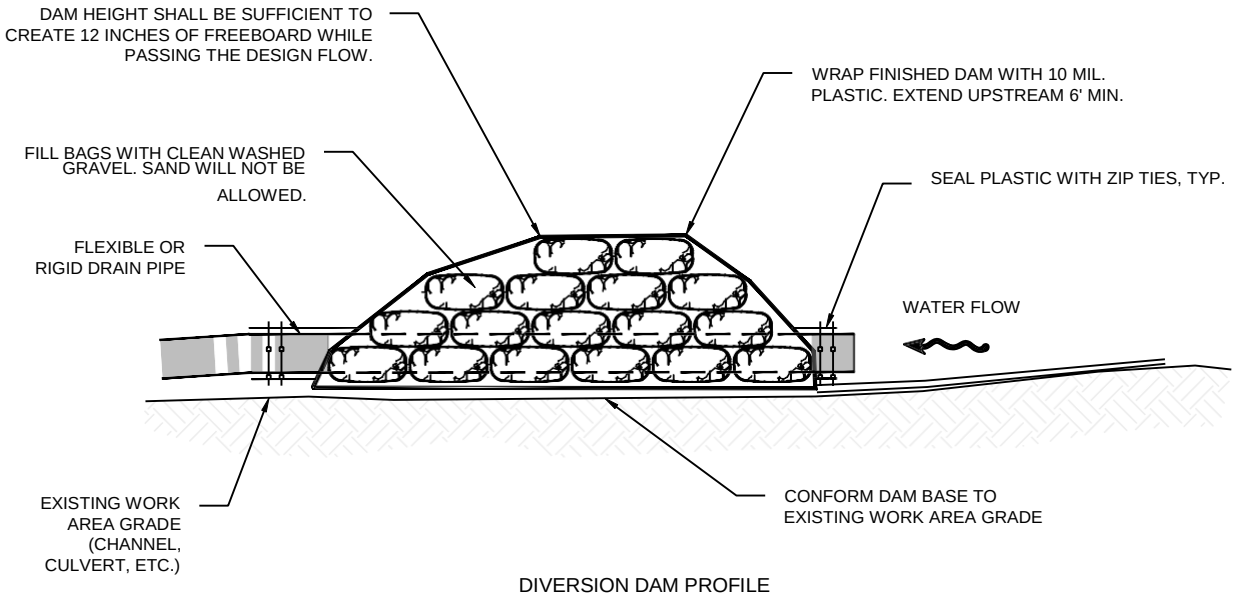
CL	CENTERLINE
EP	EDGE OF PAVEMENT
TYP	TYPICAL

FILENAME: F:\USERS\DESIGN\C3D\RMP EXHIBITS\DWG\RMP EXHIBITS.DWG

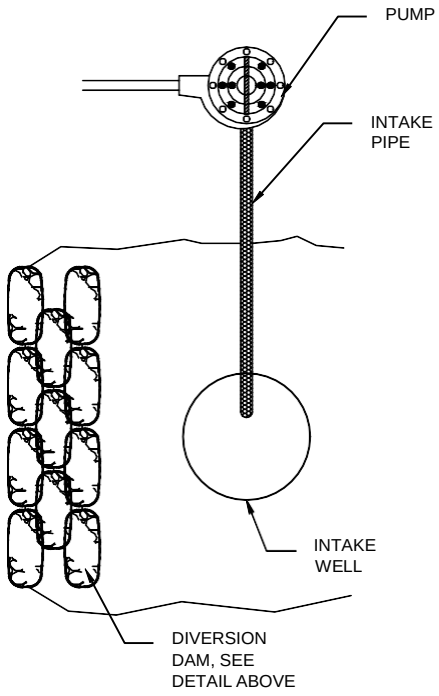
	DESIGNED BY: JC	DEWATERING PLAN - SHEET 1	SCALE: NONE
	CHECKED BY: AL/JC	COUNTY OF SAN MATEO	DATE: 04-14-2023
	DRAWN BY: ADG	ROUTINE MAINTENANCE PROGRAM	FILE NO: NONE

ANN M. STILLMAN, DIRECTOR OF PUBLIC WORKS
COUNTY

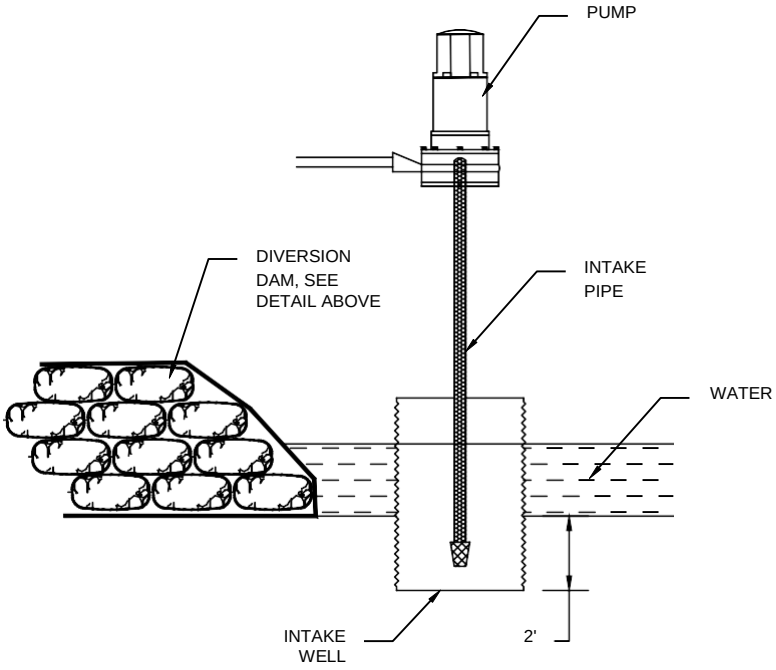
555 COUNTY CENTER, 5TH FLOOR
REDWOOD CITY, CALIFORNIA 1665



DIVERSION DAM PROFILE



PLAN VIEW: PUMP AND INTAKE WELL



PROFILE: PUMP AND INTAKE WELL

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DESIGNED BY: JC	DEWATERING PLAN - SHEET 2	SCALE: NONE
CHECKED BY: AL/JC	COUNTY OF SAN MATEO	DATE: 04-14-2023
DRAWN BY: ADG	ROUTINE MAINTENANCE PROGRAM	FILE NO: NONE

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Appendix B

Maintenance Sites Summary

T:_PROJECTS\18004_CSM_Maintenance_Permitting\mxd\Permitting\Figure_B-X_RoutineMaintenanceSites_revised_No6468.mxd RH 1/30/2020

Figure B-1
County of San Mateo
Routine Maintenance Sites
(1 of 7)

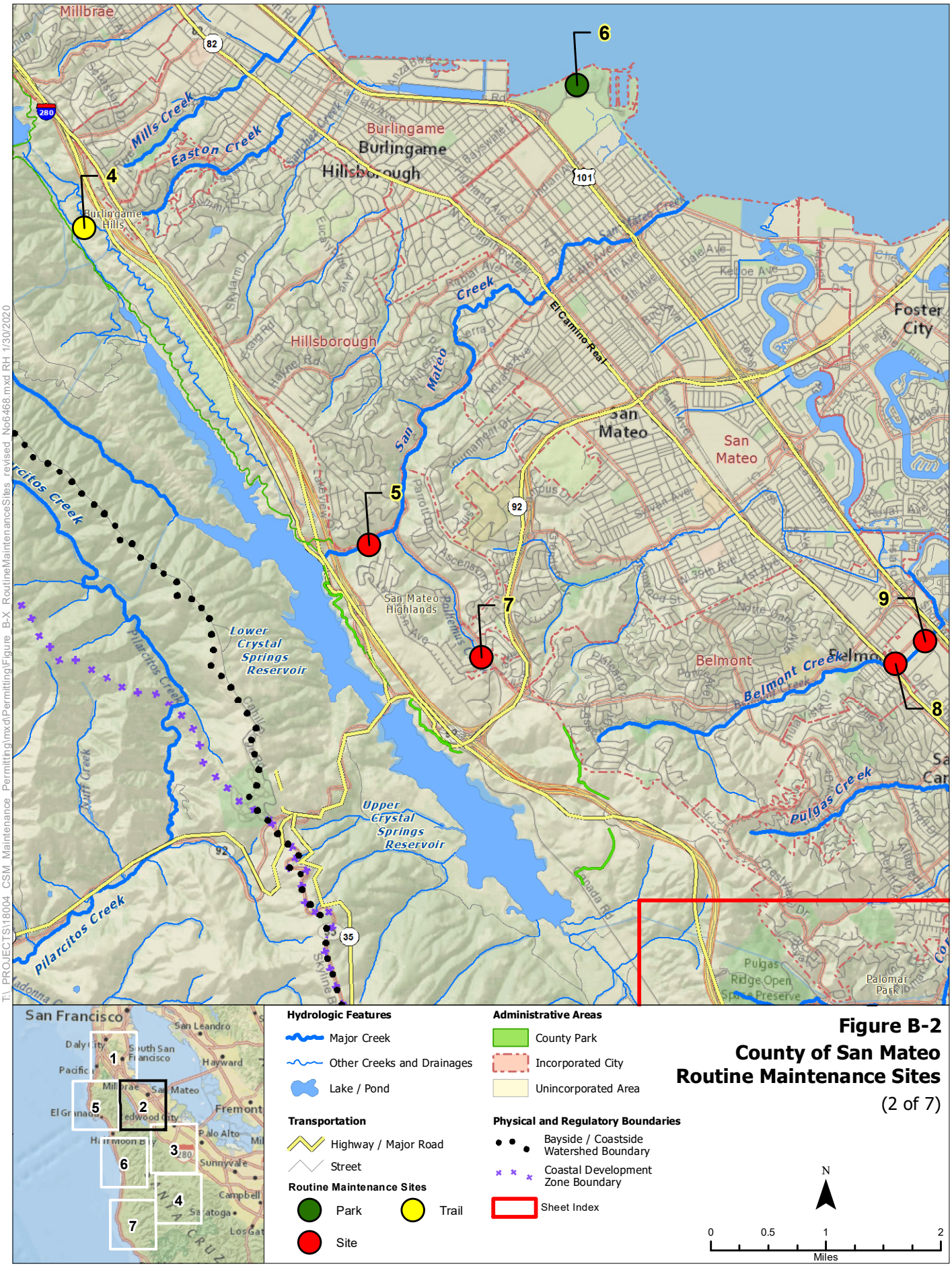

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Figure B-2
County of San Mateo
Routine Maintenance Sites
(2 of 7)

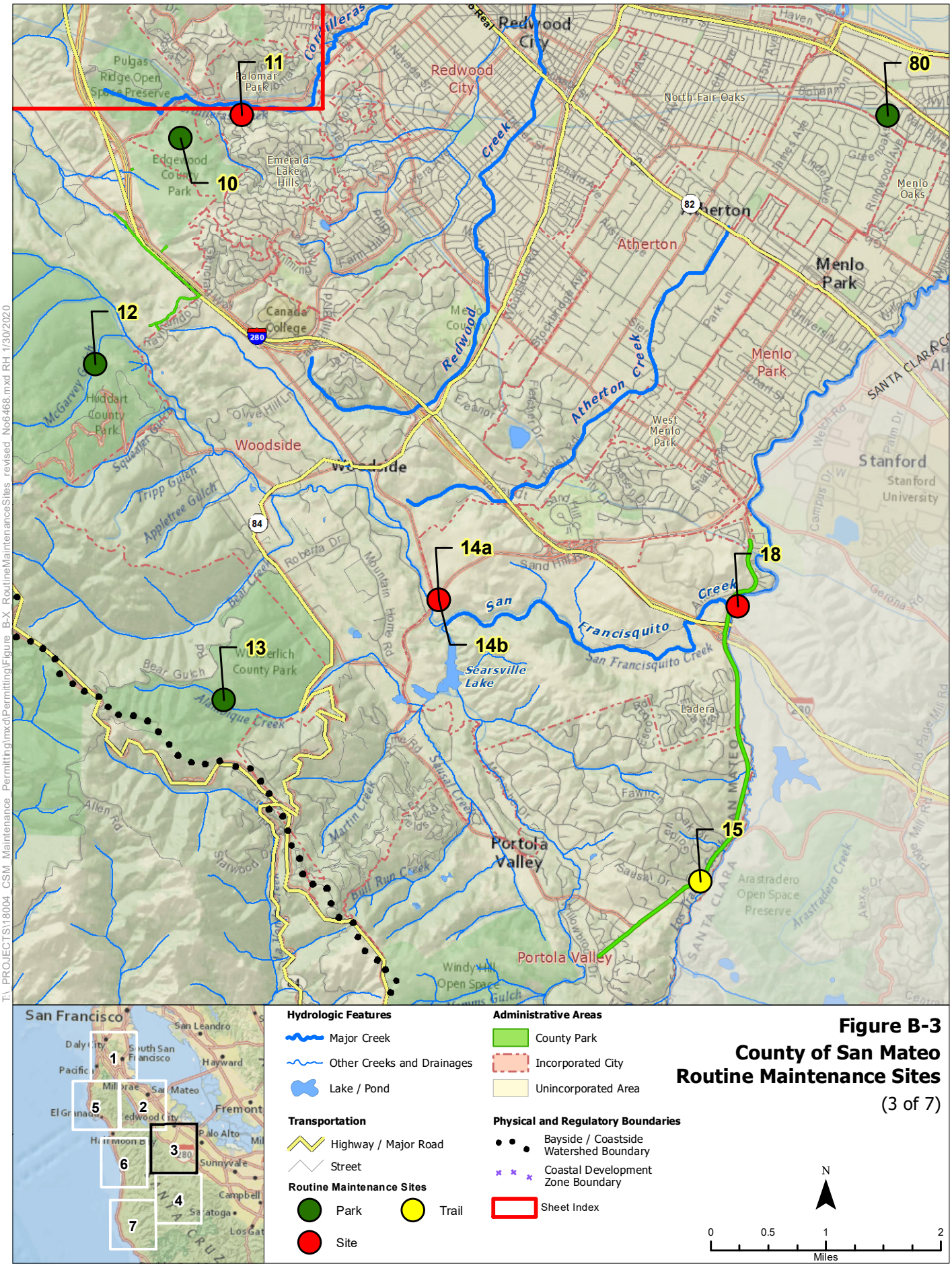

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Figure B-3
County of San Mateo
Routine Maintenance Sites
(3 of 7)

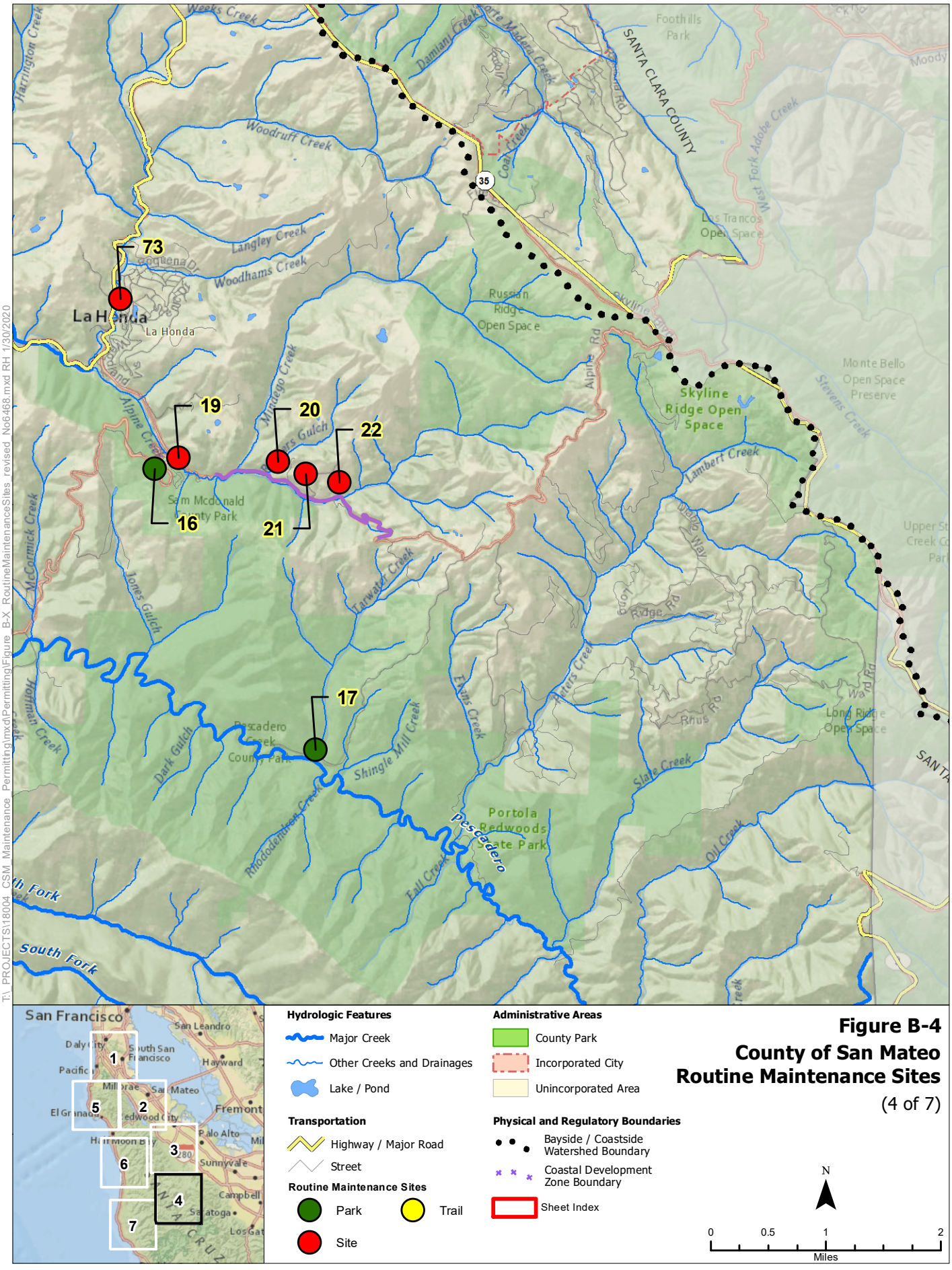

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Figure B-4
County of San Mateo
Routine Maintenance Sites
(4 of 7)

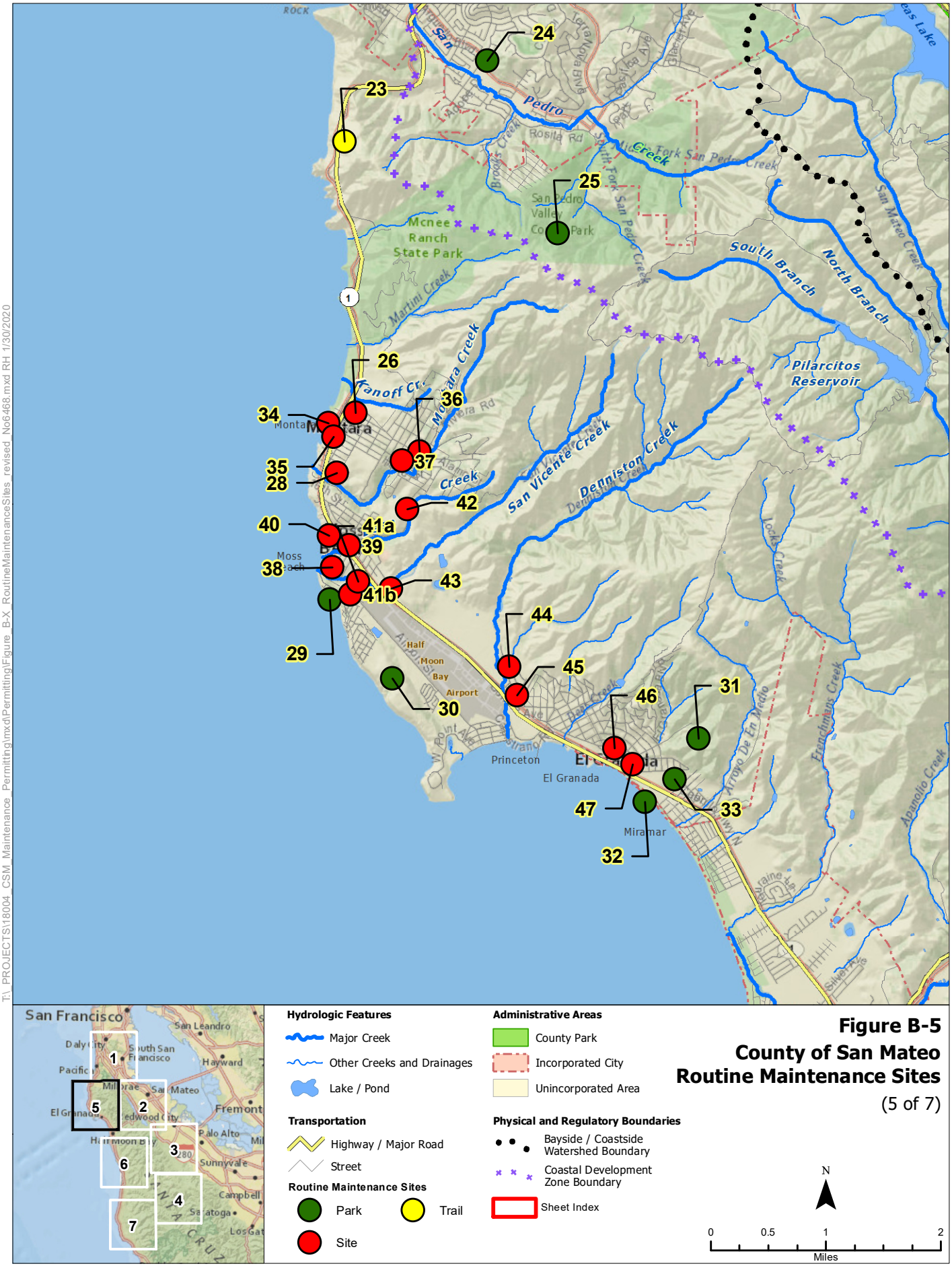

Figure B-5
County of San Mateo
Routine Maintenance Sites
(5 of 7)

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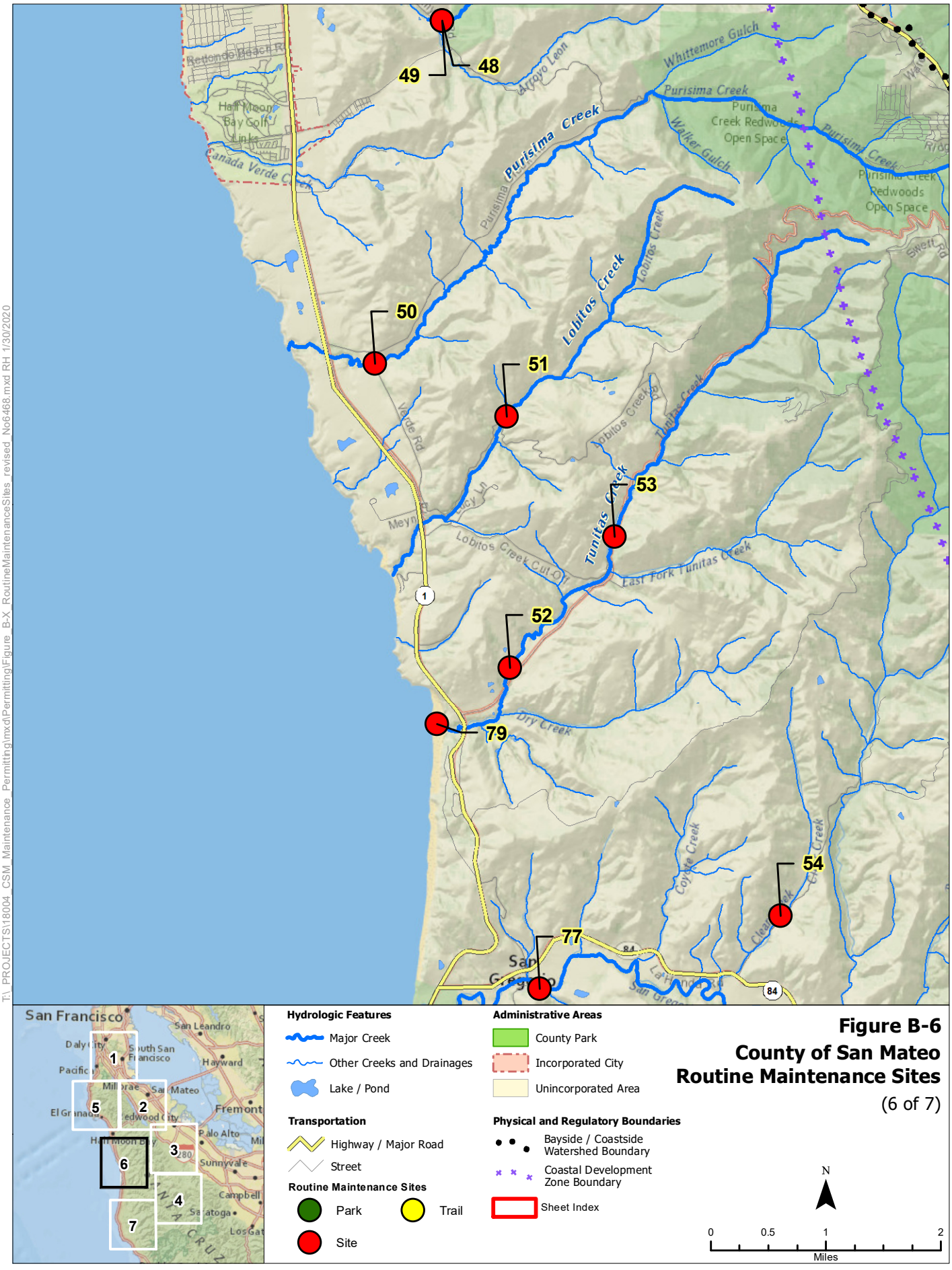

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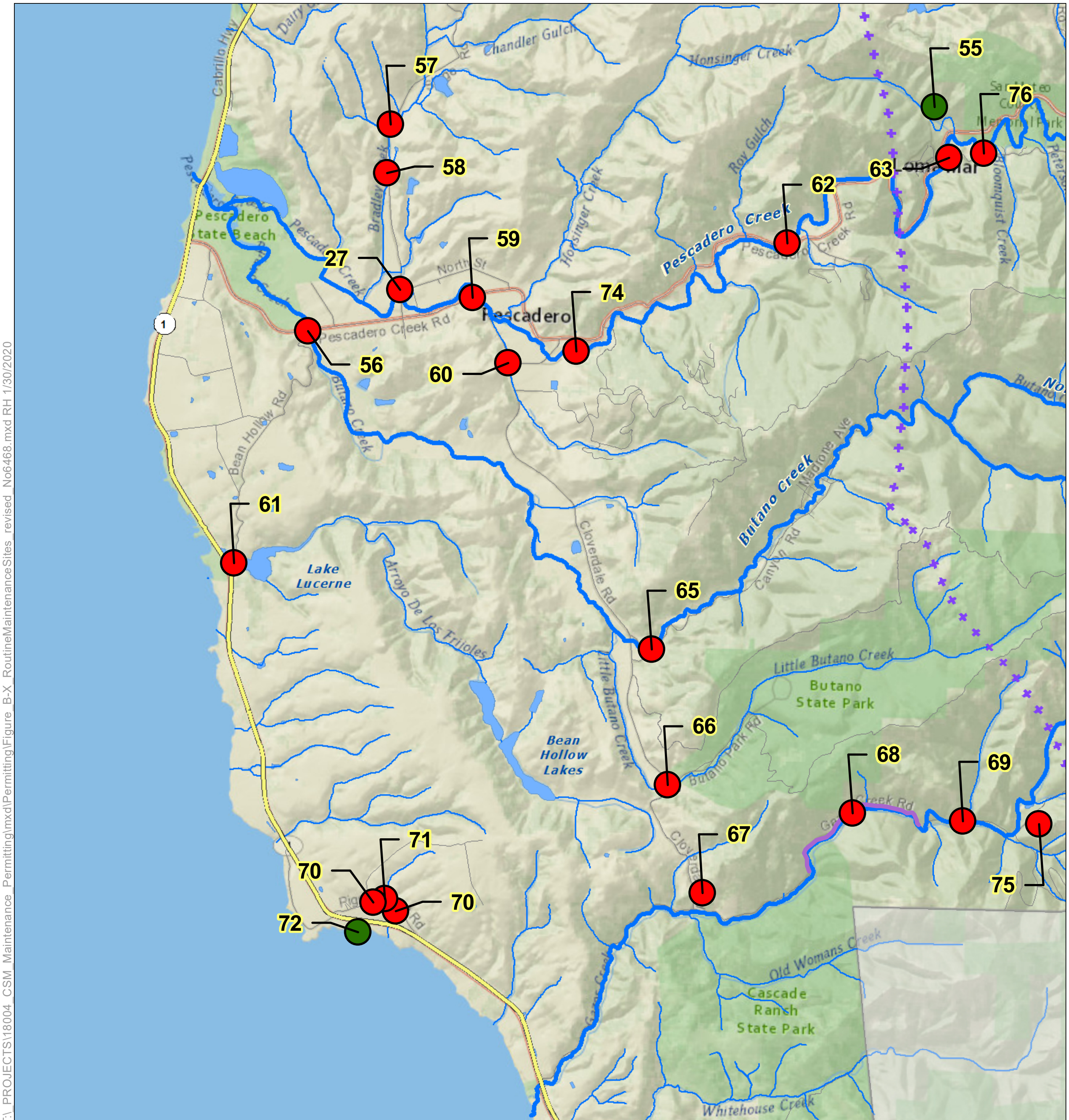
Figure B-6
County of San Mateo
Routine Maintenance Sites
(6 of 7)



Hydrologic Features

- Major Creek
- Other Creeks and Drainages
- Lake / Pond

Transportation

- Highway / Major Road
- Street

Routine Maintenance Sites

- Park
- Trail
- Site

Administrative Areas

- County Park
- Incorporated City
- Unincorporated Area

Physical and Regulatory Boundaries

- Bayside / Coastside Watershed Boundary
- Coastal Development Zone Boundary
- Sheet Index

Figure B-7
County of San Mateo
Routine Maintenance Sites
(7 of 7)

N

0 0.5 1 2
Miles

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Table B-1. Summary of San Mateo County Department of Public Works Routine Maintenance Sites

No.	Site/Facility	County Unit	County Region	Located on Detailed Map	Community	Routine Maintenance Activities	Year Recent Maintenance Conducted	Expected to be Regulated by USACE?	Anticipated Permit Under RWQCB	Likely Tier Category USFWS	Likely Tier Category NMFS	Potential for CESA Take? CDFW[a]	Special-Status Species with Potential to Occur and Notes[b]
Channel Maintenance at County Road/Bridge/Culvert Crossings (includes Sediment and Vegetation Removal)													
56	Pescadero Creek Road at Butano Creek	DPW	Coastside South	Figure B-7	Pescadero	– Sediment removal from channel	2016	Yes	Section 401 Water Quality Certification	Tier 2	Tier 2	No	CRLF, SFGS Steelhead, coho, tidewater goby
7	Polhemus Road between Ticonderoga Road and Timberland Way	DPW	Bayside South	Figure B-2	San Mateo	– Sediment removal from creek channel	2010	Yes	Section 401 Water Quality Certification	Tier 2	Tier 1	No	CRLF
36	George Street	DPW	Coastside North	Figure B-5	Montara	– Vegetation management and sediment removal (approximately 50 cubic yards [cy]) from Montara Creek	2015	Yes, sediment removal would likely be regulated if sediment is pushed and then scooped out.	Section 401 Water Quality Certification	Tier 2	Tier 1	No	CRLF
42	Sunshine Valley Road	DPW	Coastside North	Figure B-5	Moss Beach	– Vegetation and sediment removal (approximately 10 cy) from Dean Creek	2015	Yes – sediment removal work would likely be regulated.	Section 401 Water Quality Certification	Tier 3	Tier 1	No	CRLF
43	Etheldore Street	DPW	Coastside North	Figure B-5	Moss Beach	– Vegetation and sediment removal (approximately 35 cy) from three 24-inch diameter smooth plastic pipes crossing San Vicente Creek	2015	Yes – sediment removal work would likely be regulated by USACE.	Section 401 Water Quality Certification	Tier 3	Tier 1	No	CRLF
41a	Cypress Avenue	DPW	Coastside North	Figure B-5	Moss Beach	– Vegetation and sediment removal (approximately 15 cy) from a box culvert crossing San Vicente Creek	2015	Yes – sediment removal work would likely be regulated by USACE.	Section 401 Water Quality Certification	Tier3	Tier 1	No	CRLF
44	Bridgeport Drive	DPW	Coastside North	Figure B-5	El Granada	– Vegetation and sediment removal (approximately 100 cy) from 60-inch concrete pipe and 60-ft concrete channel on an unnamed tributary to Denniston Creek	No recent maintenance	Yes – sediment removal work would likely be regulated by USACE.	Section 401 Water Quality Certification	Tier 2	Tier 1	No	CRLF
45	Sonora Avenue	DPW	Coastside North	Figure B-5	El Granada	– Vegetation and sediment removal (approximately 40 cy) from a 36-inch diameter storm drain pipe on an unnamed tributary to Pillar Pt. Harbor	2015	Yes – sediment removal work would likely be regulated by USACE.	Section 401 Water Quality Certification	Tier 2	Tier 1	No	CRLF

No.	Site/Facility	County Unit	County Region	Located on Detailed Map	Community	Routine Maintenance Activities	Year Recent Maintenance Conducted	Expected to be Regulated by USACE?	Anticipated Permit Under RWQCB	Likely Tier Category USFWS	Likely Tier Category NMFS	Potential for CESA Take? CDFW[a]	Special-Status Species with Potential to Occur and Notes[b]
46	Obispo Road at Avenue Portola	DPW	Coastside North	Figure B-5	El Granada	– Vegetation and sediment removal (20 cubic yards) from two 24-inch diameter concrete storm drain pipes on an unnamed tributary to Half Moon Bay	2015	Yes – sediment removal work would likely be regulated by USACE.	Section 401 Water Quality Certification	Tier 2	Tier 1	No	CRLF
47	Obispo Road	DPW	Coastside North	Figure B-5	El Granada	– Vegetation and sediment removal (20 cy) from a 50-inch concrete culvert on an unnamed tributary to Half Moon Bay.	2015	Yes – sediment removal work would likely be regulated by USACE.	Section 401 Water Quality Certification	Tier 3	Tier 1	No	CRLF
2	San Bruno Creek at Walnut St. (North Channel)	DPW	Bayside North	Figure B-1	San Bruno	– Sediment removal within 450-foot section of engineered trapezoidal earthen channel (approx. 500 cy) to restore flow capacity to 1970 as-built conditions	2003	Maybe – If the channel is engineered and previously permitted by USACE, USACE may not regulate this activity. If sediment gets removed by pushing and then scooping out, USACE could regulate this activity.	Type of RWQCB permit is dependent upon Corps jurisdiction	Tier 3	Tier 1	No	CRLF, SFGS
58	Stage Road at Bradley Creek	DPW	Coastside	Figure B-7	Pescadero	– Sediment and minor vegetation removal (similar to Butano Creek project) from concrete arch culvert and upstream and downstream sections of channel with right-of-way		Yes	Section 401 Water Quality Certification	Tier 3	Tier 3	No	CRLF = Tier 3 SFGS = Tier 2 Steelhead, coho = Tier 3
37	Harte Street and Date Street	DPW	Coastside North	Figure B-5	Montara	– Vegetation and sediment removal within County right-of-way near two 60-inch diameter CMP culverts – Replacement of two 60-inch diameter CMP culverts	2015	Yes	Section 401 Water Quality Certification	Tier 3	Tier 1	No	CRLF CRLF have been observed at the site.

No.	Site/Facility	County Unit	County Region	Located on Detailed Map	Community	Routine Maintenance Activities	Year Recent Maintenance Conducted	Expected to be Regulated by USACE?	Anticipated Permit Under RWQCB	Likely Tier Category USFWS	Likely Tier Category NMFS	Potential for CESA Take? CDFW[a]	Special-Status Species with Potential to Occur and Notes[b]
60	Cloverdale Road at Butano Cutoff	DPW	Coastside South	Figure B-7	Pescadero	– Potential future maintenance needs: targeted sediment and vegetation removal along approx. 2,575-foot segment of channel (5000 cy). Hydraulic modelling study currently underway.	Potential future maintenance needed at this site.	Yes – sediment removal work would likely be regulated by USACE.	Section 401 Water Quality Certification	Tier 3	Tier 1	No	CRLF, SFGS
71	Pigeon Point Road (Mile 0.4 from south Hwy 1)	DPW	Coastside South	Figure B-7	Pescadero	– Removal of sediment from approximately 75 linear feet of drainage downstream of culvert outlet.		Likely	Section 401 Water Quality Certification	Tier 3	Tier 1	No	CRLF = Tier 3 SFGS = Tier 2 CRLF have been observed in proposed work area. Will result in temporary impacts to wetland habitat.
8	Belmont Creek at Old County Road	DPW	Bayside	Figure B-2	Harbor Industrial	– Vegetation trimming and sediment removal from 240-foot section of Belmont Creek within County Right-of-Way (approx. 75 cy); as-needed repairs to concrete wall and arch culvert	Annual vegetation trimming conducted annually. Sediment removal last conducted in 2011.	Yes	Section 401 Water Quality Certification	Tier 1	Tier 1	No	No federally listed species expected
26	Farallone Ave from Kanoff Street to Fourth Street	DPW	Coastside North	Figure B-5	Montara	– Weeding/vegetation maintenance and light sediment clearing	Swale improvements conducted in 2014	Maybe – USACE may regulate sediment removal if removed from a ditch or culvert that is hydrologically connected to waters of the U.S.	Type of RWQCB permit is dependent upon Corps jurisdiction	Tier 2	Tier 1	No	CRLF Roadside ditch not following path of historic drainage based on topo. However, some water is generally present due to springs in area. Limited wetland vegetation was present prior to swale improvement. Jurisdictional determination was never performed, but several projects have been conducted in past without Corps permit. Depending on Corps staff, some may say jurisdictional, and some may say no. 2 CRLF were observed during 2014 swale improvements

No.	Site/Facility	County Unit	County Region	Located on Detailed Map	Community	Routine Maintenance Activities	Year Recent Maintenance Conducted	Expected to be Regulated by USACE?	Anticipated Permit Under RWQCB	Likely Tier Category USFWS	Likely Tier Category NMFS	Potential for CESA Take? CDFW[a]	Special-Status Species with Potential to Occur and Notes[b]
34	Seventh Street (approximately 260 feet west of Hwy 1)	DPW	Coastside	Figure B-5	Montara	– Weeding/vegetation maintenance and light sediment clearing, and planting	Swale improvements conducted in 2014	Not likely	Waste Discharge Requirement (WDR)	Tier 1	Tier 1	No	No federally listed species expected Concrete-lined roadside ditch that empties to storm drain
35	Main Street (between 8th and 9th Street)	DPW	Coastside	Figure B-5	Montara	– Weeding/vegetation maintenance and light sediment clearing, and planting	Swale improvements conducted in 2014	Not likely	WDR	Tier 1	Tier 1	No	No federally listed species expected Short stretch of roadside ditch
28	14th Street (approximately 210 feet west of Hwy 1, north of street)	DPW	Coastside	Figure B-5	Montara	– Weeding/vegetation maintenance and light sediment clearing, and planting	Swale improvements conducted in 2014	Not likely	WDR	Tier 1	Tier 1	No	CRLF Short stretch of roadside ditch. Stream corridor within dispersal distance for frog. However, stream only flows during rain events. CRLF unlikely to be present if work is conducted during the dry season.
40	Wienke Way	DPW	Coastside	Figure B-5	Moss Beach	– Weeding/vegetation maintenance and light sediment clearing, and planting	Swale improvements conducted in 2014	Not likely	WDR	Tier 2	Tier 1	No	CRLF Short section of roadside ditch with one side comprised of a concrete block wall. The remaining section is a constructed earthen swale. Stream only flows during rain events but minimal nuisance water may be present year-round at depths less than 1-inch. Vegetative cover is minimal. CRLF unlikely to be present.

No.	Site/Facility	County Unit	County Region	Located on Detailed Map	Community	Routine Maintenance Activities	Year Recent Maintenance Conducted	Expected to be Regulated by USACE?	Anticipated Permit Under RWQCB	Likely Tier Category USFWS	Likely Tier Category NMFS	Potential for CESA Take? CDFW[a]	Special-Status Species with Potential to Occur and Notes[b]
39	Carlos St.	DPW	Coastside	Figure B-5	Moss Beach	– Weeding/vegetation maintenance and light sediment clearing, and planting	Swale improvements conducted in 2014	Not likely	WDR	Tier 2	Tier 1	No	CRLF Wetland vegetation visible on photos of channel. CRLF have been observed in adjacent Caltrans ditch and in DPW's catch basin. If present in bioretention area, biologist would be able to determine presence.
38	Ocean Boulevard	DPW	Coastside	Figure B-5	Moss Beach	– Weeding/vegetation maintenance and light sediment clearing, and planting	Swale improvements conducted in 2014	Not likely	WDR	Tier 1	Tier 1	No	CRLF Rarely any flow at this site. The swale is shallow, has no vegetative cover, and is situated along a residential street. There is no good migration corridor from San Vicente Creek. CRLF unlikely to occur.
41b	Cypress and Beach Way	DPW	Coastside	Figure B-5	Moss Beach	– Weeding/vegetation maintenance and light sediment clearing, and planting	Swale improvements conducted in 2014	Not likely	WDR	Tier 1	Tier 1	No	CRLF Only flows during storm events. CRLF are unlikely to be present.
Bank Stabilization / Slip-out Repair													
14a	Bear Gulch Creek at Sand Hill Road (near intersection with Whiskey Hill)	DPW	Bayside	Figure B-3	Stanford Lands	– Bank repair		Yes	Section 401 Water Quality Certification	Tier 2	Tier 3	No	CRLF, steelhead
52	Tunitas Creek Road (Mile 0.6 from Hwy 1)	DPW	Coastside Central	Figure B-6	Half Moon Bay	– Bank stabilization		Not likely	WDR	Tier 2	Tier 2	No	CRLF, steelhead May need future geotechnical analysis to determine type of repair. Project likely remain in upland areas above OHW for Tunitas Creek outside of USACE jurisdiction.

No.	Site/Facility	County Unit	County Region	Located on Detailed Map	Community	Routine Maintenance Activities	Year Recent Maintenance Conducted	Expected to be Regulated by USACE?	Anticipated Permit Under RWQCB	Likely Tier Category USFWS	Likely Tier Category NMFS	Potential for CESA Take? CDFW[a]	Special-Status Species with Potential to Occur and Notes[b]
53	Tunitas Creek Road (Miles 2.2A and 2.2B from Hwy 1)	DPW	Coastside Central	Figure B-6	Half Moon Bay	– Bank stabilization at Mile 2.2A – Bank stabilization and potential large woody debris management at Mile 2.2B		Yes, likely	Section 401 Water Quality Certification	Tier 2	Tier 2	No	CRLF, steelhead May need future geotechnical analysis to determine type of repair. USACE regulation dependent on whether or not repair would extend below OHW for Tunitas Creek.
68	Gazos Creek Road (8 slip-outs: 1 at Mile 1 from Cloverdale Rd, 1 at Mile 1.2 from Cloverdale Rd, 1 at Mile 1.3 from Cloverdale Rd, 4 at Mile 2 from Cloverdale Rd, 1 from Mile 2.2)	DPW	Coastside South	Figure B-7		– Potential need for bank stabilization work		Likely – if bank stabilization work extends below OHW	Section 401 Water Quality Certification	Tier 2	Tier 2	No	Marbled murrelet = Tier 1 CRLF, SFGS = Tier 2 Steelhead, coho = Tier 2 Currently planning field visit and Geotechnical analysis and prioritization of slip-outs currently underway. Several of these may require construction of significant retaining wall and may not be suitable for programmatic. May still be worth including projects on list and discussing with agencies.
20	Alpine Road (Mile 0.5, 1.1, 1.2, 1.3, and 1.6 from Pescadero Creek Road)	DPW	Coastside	Figure B-4	La Honda	– Bank stabilization/slip-out repair at 5 creekside locations – At mile 1.6, repair scour damage behind and adjacent to upstream wingwall and install drainage system. Repair deteriorated concrete railing.		Likely – if bank stabilization work extends below OHW	Section 401 Water Quality Certification	Tier 2	Tier 2	No	Marbled murrelet = Tier 1 CRLF = Tier 2 Steelhead/coho = Tier 2
67	Cloverdale Road (approximately 300 feet north of Gazos Creek Rd) series of 4 slip-outs	DPW	Coastside South	Figure B-7		– Bank stabilization		Likely – if bank stabilization work extends below OHW	Section 401 Water Quality Certification	Tier 2	Tier 1	No	CRLF, SFGS
57	Stage Road (along Bradley Creek)	DPW	Coastside	Figure B-7	Pescadero	– Bank stabilization		Yes	Section 401 Water Quality Certification	Tier 2	Tier 2	No	CRLF, SFGS, steelhead, coho

No.	Site/Facility	County Unit	County Region	Located on Detailed Map	Community	Routine Maintenance Activities	Year Recent Maintenance Conducted	Expected to be Regulated by USACE?	Anticipated Permit Under RWQCB	Likely Tier Category USFWS	Likely Tier Category NMFS	Potential for CESA Take? CDFW[a]	Special-Status Species with Potential to Occur and Notes[b]
54	Bear Gulch Road (Miles 0.6, 0.7, and 0.75 from Hwy 84)	DPW	Coastside	Figure B-6	San Gregorio	– Three small bank repairs along Clear Creek		Likely, depending if boulders are keyed in below OHW	Section 401 Water Quality Certification	Tier 2	Tier 2	No	CRLF Steelhead = Tier 2 if work occurs when water is not present, otherwise Tier 3. CRLF previously observed in Clear Creek. Only marginal habitat for steelhead b/c of substrate and because channel goes dry during summer, but NMFS would likely consult. Likely repaired with vegetated, large boulder revetment.
48	Higgins Creek Road at Mill Creek	DPW	Coastside	Figure B-6	Half Moon Bay	– Bank stabilization near bridge		Likely, depending if boulders are keyed in below OHW	Section 401 Water Quality Certification	Tier 2	Tier 3	No	CRLF, steelhead
		Culvert Replacement											
21	Alpine Road culvert replacements (Mile 0.5, 1.2a, 1.2b, 1.3, 1.4, 1.5, 1.6, 1.8, 2.1, 2.2, 2.3, 2.5 from Pescadero Creek Road)	DPW	Coastside	Figure B-4	La Honda	– Replacement of 12 culverts and associated headwall/inlet structures and outlet dissipation structures		10 sites – not likely 2 sites with seeps - maybe	Type of RWQCB permit is dependent upon Corps jurisdiction	Tier 2	Tier 1	No	Marbled murrelet = Tier 1 CRLF = Tier 2 Steelhead, coho = Tier 1 (assuming that water-quality BMPs are implemented for all activities as necessary) 10 culverts discharge along upper bank of Alpine Creek or within riparian buffer area; 2 are associated with seeps and inlets are wet most of year Although these may not all be USACE jurisdiction, this is case when Section 7 coverage would be ideal.

No.	Site/Facility	County Unit	County Region	Located on Detailed Map	Community	Routine Maintenance Activities	Year Recent Maintenance Conducted	Expected to be Regulated by USACE?	Anticipated Permit Under RWQCB	Likely Tier Category USFWS	Likely Tier Category NMFS	Potential for CESA Take? CDFW[a]	Special-Status Species with Potential to Occur and Notes[b]
22	Alpine Road culvert replacement (Mile 0.9 and 2.0 from Pescadero Creek Road)	DPW	Coastside	Figure B-4	La Honda	– Replacement of 2 culverts located on drainages to Alpine Creek; Mile 0.9 is Rodger's Gulch and was included in barrier assessment.		Yes	Section 401 Water Quality Certification	Tier 2	Tier 3	No	Marbled murrelet = Tier 1 CRLF = Tier 2 steelhead/coho = Tier 3 Rodger's Gulch would likely need to be designed for fish passage.
69	Gazos Creek Road (Mile 2.7 east of Cloverdale Road)	DPW	Coastside South	Figure B-7	Pescadero	– Culvert repair via slip-lining or concrete bottom		Yes	Section 401 Water Quality Certification	Tier 2	Tier 3	No	Marbled murrelet = Tier 1 CRLF = Tier 2 steelhead/coho = Tier 3 Located on Slate Creek (trib to Gazos Creek) Full replacement would be major undertaking. Would likely require fish passage despite limited upstream habitat. Potential to mobilize a large amount of sediment if grade is significantly changed (failed Humboldt crossing upstream).
70	Pigeon Point Road (Mile 0.2 and 0.5 from south Hwy 1)	DPW	Coastside South	Figure B-7	Pescadero	– Replacement of 2 culverts		Likely	Section 401 Water Quality Certification	Tier 2	Tier 1	No	CRLF, SFGS One site will require likely require USACE permit. The other site needs a site visit. CRLF have been observed at one of the locations.

No.	Site/Facility	County Unit	County Region	Located on Detailed Map	Community	Routine Maintenance Activities	Year Recent Maintenance Conducted	Expected to be Regulated by USACE?	Anticipated Permit Under RWQCB	Likely Tier Category USFWS	Likely Tier Category NMFS	Potential for CESA Take? CDFW[a]	Special-Status Species with Potential to Occur and Notes[b]
Bridge Maintenance													
51	Lobitos Creek Road (1.1 miles northwest of Verde Road)	DPW	Coastside	Figure B-6	Half Moon Bay	– Implement erosion control measure to prevent surface roadway runoff from eroding the embankment(s). Fill the erosion gully and implement anti-erosion control measures at the right side of abutment 1. Patch the exposed threaded anchor inserts and diagonal cracks found along the exterior girders of the superstructure.		Likely	Section 401 Water Quality Certification	Tier 2	Tier 2	No	CRLF = Tier 2 Steelhead = Tier 2 According to the Caltrans inspection report there is a large erosion gully in the embankment at the right side of abutment 1. Erosion is due to the runoff from above which travels down an AC gutter along the wingwall and then abruptly ends at the abutment face.
14b	Sand Hill Road (Bear Gulch Creek; south of Whiskey Hill Road)	DPW	Bayside	Figure B-3	Stanford Lands	– Clean and paint the metal arch plating with a protective coating where corrosion exists. The sill of the raised concrete footing should allow positive drainage to prevent further corrosion along the bottom of the metal arch. Scour mitigation measures should be implemented behind the wingwalls to prohibit the passage of runoff from the above roadway. The 8’ CMP should also be extended away from this scour envelope. Cement slurry may be used to fill the undermined areas beneath the culvert footings. Scour mitigation measures may also be implemented to avoid further erosion beneath the footings.		Likely	Section 401 Water Quality Certification	Tier 2	Tier 3	No	CRLF, steelhead

No.	Site/Facility	County Unit	County Region	Located on Detailed Map	Community	Routine Maintenance Activities	Year Recent Maintenance Conducted	Expected to be Regulated by USACE?	Anticipated Permit Under RWQCB	Likely Tier Category USFWS	Likely Tier Category NMFS	Potential for CESA Take? CDFW[a]	Special-Status Species with Potential to Occur and Notes[b]
19	Pescadero Creek Road (Alpine Creek; intersection of Pescadero Creek Road and Alpine Road)	DPW	Coastside	Figure B-4	La Honda	– 2 bridges – The bottom of the metal arch culvert should be painted with a protective coating to prevent further corrosion. This may require removing the upper portion of the creek bed to expose the entire rusted area. – Replace or bypass culvert/Caltrans inspection report indicated that a culvert is eroding the bank at the end of the right wingwall at abutment 1, spalling along the edge of the soffit/headwall interface at both ends of the arch, repair erosion at abutment 1. – Replace damaged portion of the guardrail and replace the missing timber blocks in the west/left guardrail.		Likely	Section 401 Water Quality Certification	Tier 2	Tier 2	No	Marbled murrelet = Tier 1 CRLF = Tier 2 Steelhead, coho = Tier 2
59	Pescadero Creek Road at Cloverdale Road (Pescadero Creek)	DPW	Coastside	Figure B-7	Pescadero	– Cement slurry the underside of Abutment 1. Repair AC roadway at the bridge deck joint. Paint the corroded surface of the pile casing with a protective coating. Place a protective deck overlay to seal the cracks along the bridge deck. – Place riprap along the west bridge slope.		Likely	Section 401 Water Quality Certification	Tier 2	Tier 2	No	CRLF, SFGS, steelhead, coho Caltrans inspection report indicated undermining at abutment 1, improve drainage behind abutment 1, and repair erosion.
63	Wurr Road (Pescadero Creek; located 0.1 mile south of Pescadero Creek Road)	DPW	Coastside	Figure B-7	Loma Mar	– Patch spalls at the joint headers of Piers 2 and 3.		Likely	Section 401 Water Quality Certification	Tier 2	Tier 3	No	CRLF, steelhead, coho, marbled murrelet The footing at abutment 1 has scoured and undermined for the full length. It appears that the degradation may be the result of erosion from storm water running from the roadway above. Concrete slope protection apron has shifted and moved down slope and away from the abutment.

No.	Site/Facility	County Unit	County Region	Located on Detailed Map	Community	Routine Maintenance Activities	Year Recent Maintenance Conducted	Expected to be Regulated by USACE?	Anticipated Permit Under RWQCB	Likely Tier Category USFWS	Likely Tier Category NMFS	Potential for CESA Take? CDFW[a]	Special-Status Species with Potential to Occur and Notes[b]
49	Higgins Purisima Road Bridge (Mills Creek)	DPW	Coastside	Figure B-6	Half Moon Bay	– According to the Caltrans Inspection Report there is severe diagonal soffit crack in Bay 4, abutment 2, and at the right wingwall at abutment 2, repair the scour at the footing of abutment 2. However, no undermining.		Likely	Section 401 Water Quality Certification	Tier 2	Tier 3	No	CRLF, steelhead
62	Pescadero Creek Road (Hayward Bridge – Pescadero Creek; located approximately 2 miles east of Butano Cutoff Road)	DPW	Coastside	Figure B-7	Pescadero	– Fill the erosion gully at the left side of abutment 1 and gutter to protect the abutment from water coming from roadway above.		Likely	Section 401 Water Quality Certification	Tier 2	Tier 2	No	Marbled murrelet = Tier 1 CRLF = Tier 2 Steelhead, coho = Tier 2
9	Industrial Way (Belmont Creek south of Harbor Blvd.)	DPW	Bayside	Figure B-2	Harbor Industrial	– The concrete surfaces of the culvert, retaining walls and barriers should be patched where spalling, pocketing and cracking was discovered to prevent the exposure of underlying reinforcing steel. The metal barrier railing should be painted to prohibit corrosion.		Likely	Section 401 Water Quality Certification	Tier 1	Tier 1	No	No federally listed species expected to occur
5	Crystal Springs Road (San Mateo Creek; located at intersection with Polhemus Road)	DPW	Bayside	Figure B-2	San Mateo Highlands (Hillsborough)	– The acute edges of the retaining walls and the damaged area of the middle culvert wall at the upstream opening should be repaired by concrete patching. Scour mitigation measures may be employed at the downstream opening of the culvert where the invert elevation of the culvert varies from the bed of the creek.		Likely	Section 401 Water Quality Certification	Tier 2	Tier 2	No	CRLF, SFGS, steelhead
50	Verde Road (Purisima Creek; located approximately 0.1 mile south of Purisima Creek Road)	DPW	Coastside	Figure B-6	Half Moon Bay	– Repair damaged MBGR, minor concrete repairs, replace type B compression joint seals at both abutments, repair erosion gully and place slope protection at abutment 1.		Likely	Section 401 Water Quality Certification	Tier 2	Tier 1	No	CRLF

No.	Site/Facility	County Unit	County Region	Located on Detailed Map	Community	Routine Maintenance Activities	Year Recent Maintenance Conducted	Expected to be Regulated by USACE?	Anticipated Permit Under RWQCB	Likely Tier Category USFWS	Likely Tier Category NMFS	Potential for CESA Take? CDFW[a]	Special-Status Species with Potential to Occur and Notes[b]
66	Cloverdale Road (Little Butano Creek; located near North Butano Park Road)	DPW	Coastside	Figure B-7	Pescadero	– Perform routine maintenance to remove debris from within the box culvert chambers. Minor concrete repairs to lower portions of the culvert walls where scour was found.		Likely	Section 401 Water Quality Certification	Tier 2	Tier 2	No	CRLF, SFGS, steelhead
65	Canyon Road (Butano Creek)	DPW	Coastside	Figure B-7	Pescadero	– Clean the vegetative debris from the truss members. Replace or rehab the rusted bolts and pins. New or reconditioned bolts should have some protection against rusting. – Replace the missing cotter pin for the bottom bolt connection at the third top panel from abutment 1 of the right truss.		Likely	Section 401 Water Quality Certification	Tier 2	Tier 2	No	CRLF, SFGS, steelhead
61	Bean Hollow Road (Arroyo de los Frijoles; located approximately 0.2 mile north of Hwy 1)	DPW	Coastside	Figure B-7	Pescadero	– Future bridge maintenance may be needed. – Patch the spalls at the top of the barrel in spans 1 and 2. – Consider using galvanic protection for the reinforcing steels.		No	None	Tier 2	Tier 1	No	CRLF, SFGS Minor concrete patching may be necessary where cracking and other defects are visible along the exposed concrete surfaces of the culvert, wingwalls and barriers/Caltrans inspection report does not recommend any repair work.
11	Cordilleras Road (Cordilleras Creek) near Edgewood Road and Lakeview Way	DPW	Bayside	Figure B-3	Emerald Lake Hills	– Bridge repair work (current erosion behind abutment/box structure		Yes	Section 401 Water Quality Certification	Tier 2	Tier 2	No	CRLF, SFGS = Tier 2 Steelhead = Tier 2
18	Alpine Road at San Francisquito Creek (0.3 mile north of Highway 280)	DPW	Bayside	Figure B-3	Portola Valley	– Repair the damaged slope drainage paving adjacent to abutment 1.		Yes	Section 401 Water Quality Certification	Tier 2	Tier 2	No	CRLF = Tier 2 Steelhead = Tier 2
27	Stage Road (Pescadero Creek; located south of North Street)	DPW	Coastside	Figure B-7	Pescadero	– Repair cracks and concrete spalls at pier 2.		No	None	Tier 2	Tier 2	No	CRLF, SFGS = Tier 2 Steelhead, coho = Tier 2
73	Entrada Way at La Honda Creek	DPW	Coastside	Figure B-4	La Honda	– Repair due to storm damage. Work would likely involve bank stabilization and channel work to redirect flows and stabilize existing slope protection near the wingwall.		Yes	Section 401 Water Quality Certification	Tier 2	Tier 3	No	CRLF = Tier 2 Steelhead, coho = Tier 3

No.	Site/Facility	County Unit	County Region	Located on Detailed Map	Community	Routine Maintenance Activities	Year Recent Maintenance Conducted	Expected to be Regulated by USACE?	Anticipated Permit Under RWQCB	Likely Tier Category USFWS	Likely Tier Category NMFS	Potential for CESA Take? CDFW[a]	Special-Status Species with Potential to Occur and Notes[b]
74	Pescadero Creek at Butano Cutoff	DPW	Coastside	Figure B-7	Pescadero	– Extend the slope protection further at pier 2 to prevent undermining of the slope protection.		Yes	Section 401 Water Quality Certification	Tier 2	Tier 3	No	CRLF, SFGS = Tier 2 Steelhead, coho = Tier 3
75	Gazos Creek Road at Gazos Creek (3.3 miles east of Cloverdale Road)	DPW	Coastside	Figure B-7	Pescadero	– Repair or replace the flattening steel arch, repair cracks and gaps on headwalls caused by the arch.		Likely	Section 401 Water Quality Certification	Tier 2	Tier 2	No	Marbled murrelet = Tier 1 CRLF = Tier 2 steelhead/coho = Tier 2
76	Wurr Road (Loma Mar) at Pescadero Creek	DPW	Coastside	Figure B-7	Loma Mar	– Repair the slope protection and mitigate the scour at Abutment 1 in accordance with HEC 23. Due to slope stability concerns at the Abutment 1 bridge slope and upstream embankment and the vulnerability of the Bent 2 footing due to scour, bridge replacement may be necessary. – Fill the undermining at Bent 2 and provide scour protection. – Repaint all steel members.		Yes	Section 401 Water Quality Certification	Tier 2	Tier 3	No	Marbled murrelet = Tier 1 CRLF = Tier 2 Steelhead, coho = Tier 3
77	Seaside School Road (0.25 mile east of Stage Road)	DPW	Coastside	Figure B-6	San Gregorio	– Clean rust and paint the railroad car.		No	WDR	Tier 2	Tier 2	No	CRLF, SFGS = Tier 2 Steelhead, coho = Tier 2
Tide Gate Maintenance													
78	San Bruno Tide Gates	DPW	Bayside	Figure B-1	San Bruno	– Remove accumulated debris and trash – Re-paint tide gates for corrosion protection – Replace tide gate flaps on an as-needed basis		Yes	Section 401 Water Quality Certification	Tier 1	Tier 1	No	Green sturgeon, steelhead, longfin smelt = Tier 1

[a] Potential for take under CESA assumes implementation of Best Management Practices

[b] CRLF = California red-legged frog; SFGS = San Francisco garter snake

Table B-2. Summary of San Mateo County Parks Department Routine Maintenance Sites

No.	Site/Facility	County Region	Located on Detailed Map	Community	Routine Maintenance Activities	Year Recent Maintenance Conducted	Expected to be Regulated by USACE?	Anticipated Permit Under RWQCB	Highest Likely Tier Category USFWS	Highest Likely Tier Category NMFS	Potential for CESA Take? CDFW [a]	Special-Status Species with Potential to Occur
County Parks												
San Bruno Mountain State and County Park												
1	San Bruno Mountain State and County Park	Bayside North	Figure B-1	Brisbane	**Paved Roads:** – Brushing, sweeping, blowing and roadside mowing – Roadside ditch clearing (vegetation, debris, garbage) – Debris/ slide removal from surface and associated repairs	Ongoing, as funding and staff capacity allows	Unlikely, though some ditch clearing activities could affect waters of the U.S.	Type of RWQCB permit is dependent upon Corps jurisdiction	Tier 2	Tier 1	No	Mission blue, San Bruno elfin, bay checkerspot and callippe silverspot butterfly
					Unpaved Roads/ Trails: – Re-grading (re-surfacing, tread repair) – Repair of rolling dips – Re-rocking – Brushing and roadside mowing – Roadside ditch clearing (vegetation, debris, garbage) – Debris/ slide removal from surface and associated repairs	Ongoing, as funding and staff capacity allows	Unlikely, though some ditch clearing activities could affect waters of the U.S.	Type of RWQCB permit is dependent upon Corps jurisdiction	Tier 2	Tier 1	No	Mission blue, San Bruno elfin, bay checkerspot and callippe silverspot butterfly
					Culvert Maintenance: – Replacement in-kind – Replacement for undersized culverts – Cleaning – vegetation, debris, garbage – Trash rack replacement/ install	2017	Maybe – Most culvert maintenance activities involve clearing of debris and vegetation; no culvert replacement work in the next 5 years. Culvert clearing activities may be regulated by USACE if culverts drain waters that are hydrologically connected to waters of the U.S. ***Yes, associated with Colma Creek headwaters and its associated wetlands	Type of RWQCB permit is dependent upon Corps jurisdiction	Tier 2	Tier 1	No	Mission blue, San Bruno elfin, bay checkerspot and callippe silverspot butterfly

No.	Site/Facility	County Region	Located on Detailed Map	Community	Routine Maintenance Activities	Year Recent Maintenance Conducted	Expected to be Regulated by USACE?	Anticipated Permit Under RWQCB	Highest Likely Tier Category USFWS	Highest Likely Tier Category NMFS	Potential for CESA Take? CDFW [a]	Special-Status Species with Potential to Occur
					General Maintenance Activities **Fuel Reduction and Defensible Space:** – Re-treatment of fuel management areas – Re-treatment of high use campgrounds, picnic areas, etc. – Re-treatment of defensible space areas surrounding facilities and infrastructure – Maintenance of shaded fuel breaks along key ingress/ egress routes (roads and trails) and along Park boundary – Hazard Tree Removal and Pruning – Removal of immediate hazards to life, property, infrastructure - Thinning techniques utilized where ever full removal can be avoided to reduce risks to life, property, or infrastructure could be lost or damaged (end weight or directional pruning, removal of dead material, etc.)		Unlikely	Waste Discharge Requirement (WDR)	Tier 2	Tier 1	No	Mission blue, San Bruno elfin, bay checkerspot and callippe silverspot butterfly
					Weed/ Non-native removal: – Hand – Mechanical – Herbicide - Grazing	Weed removal occurs all year round on a monthly basis.	Unlikely unless fuel reduction activities occur within waters of the U.S.	Type of RWQCB permit is dependent upon Corps jurisdiction	Tier 2	Tier 1	No	Mission blue, San Bruno elfin, bay checkerspot and callippe silverspot butterfly
					Grassland/ Meadow/ Prairie Maintenance: – Annual Mowing – Grazing - Brush removal		Unlikely	WDR	Tier 2	Tier 1	No	Mission blue, San Bruno elfin, bay checkerspot and callippe silverspot butterfly
					Facility Repairs general and along roads/ trails: – Directional signage repair/ replacement – Interpretive/ informational signage repair/ replacement – Fence and gate repair/ replacement - Bridge repair, paint, etc.		Unlikely unless bridges repairs require work within a channel where USACE has regulatory authority.	Type of RWQCB permit is dependent upon Corps jurisdiction	Tier 2	Tier 1	No	Mission blue, San Bruno elfin, bay checkerspot and callippe silverspot butterfly
Junipero Serra County Park												
3	Junipero Serra County Park	Bayside North	Figures B-1 and C-1	San Bruno	**Paved Roads:** – Brushing, sweeping, blowing and roadside mowing – Roadside ditch clearing (vegetation, debris, garbage) – Debris/ slide removal from surface and associated repairs		Unlikely, though some ditch clearing activities could affect waters of the U.S.	Type of RWQCB permit is dependent upon Corps jurisdiction	Tier 2	Tier 1	No	CRLF, SFGS

No.	Site/Facility	County Region	Located on Detailed Map	Community	Routine Maintenance Activities	Year Recent Maintenance Conducted	Expected to be Regulated by USACE?	Anticipated Permit Under RWQCB	Highest Likely Tier Category USFWS	Highest Likely Tier Category NMFS	Potential for CESA Take? CDFW [a]	Special-Status Species with Potential to Occur
					Unpaved Roads/ Trails: – Re-grading (re-surfacing, tread repair) – Repair of rolling dips – Re-rocking – Brushing and roadside mowing – Roadside ditch clearing (vegetation, debris, garbage) – Debris/ slide removal from surface and associated repairs		Unlikely, though some ditch clearing activities could affect waters of the U.S.	Type of RWQCB permit is dependent upon Corps jurisdiction	Tier 2	Tier 1	No	CRLF, SFGS
					Culvert Maintenance: – Replacement in-kind – Replacement for undersized culverts – Cleaning – vegetation, debris, garbage – Trash rack replacement/ install ***Oak Cove culvert replacement (possibly 2)		Maybe - Most culvert maintenance activities involve clearing of debris and vegetation. Culvert maintenance may be regulated if it's hydrologically connected to waters of the U.S. *** Yes, El Zanjon Creek is in close proximity to Oak Cove culvert replacement sites.	Type of RWQCB permit is dependent upon Corps jurisdiction	Tier 2	Tier 1	No	CRLF, SFGS
					General Maintenance Activities **Fuel Reduction and Defensible Space:** – Re-treatment of fuel management areas – Re-treatment of high use campgrounds, picnic areas, etc. – Re-treatment of defensible space areas surrounding facilities and infrastructure – Maintenance of shaded fuel breaks along key ingress/ egress routes (roads and trails) and along Park boundary – Hazard Tree Removal and Pruning – Removal of immediate hazards to life, property, infrastructure – Thinning techniques utilized where ever full removal can be avoided to reduce risks to life, property, or infrastructure could be lost or damaged (end weight or directional pruning, removal of dead material, etc.)		Unlikely	WDR	Tier 2	Tier 1	No	CRLF, SFGS

No.	Site/Facility	County Region	Located on Detailed Map	Community	Routine Maintenance Activities	Year Recent Maintenance Conducted	Expected to be Regulated by USACE?	Anticipated Permit Under RWQCB	Highest Likely Tier Category USFWS	Highest Likely Tier Category NMFS	Potential for CESA Take? CDFW [a]	Special-Status Species with Potential to Occur
					Weed/ Non-native removal: – Hand – Mechanical – Herbicide – Grazing		Unlikely	WDR	Tier 2	Tier 1	No	CRLF, SFGS
					Grassland/ Meadow/ Prairie Maintenance: – Annual Mowing/ string cutting – Grazing – Brush removal		Unlikely	WDR	Tier 2	Tier 1	No	CRLF, SFGS
					Facility Repairs general and along roads/ trails: – Bridge repair, paint, etc.		Unlikely unless any bridge repair activities occur within a creek channel	Type of RWQCB permit is dependent upon Corps jurisdiction	Tier 2	Tier 1	No	CRLF, SFGS
Coyote Point Recreation Area												
6	Coyote Point Recreation Area	Bayside North	Figures B-2 and C-1	San Mateo	**Paved Roads:** – Brushing, sweeping, blowing and roadside mowing – Roadside ditch clearing (vegetation, debris, garbage) – Debris/ slide removal from surface and associated repairs		Unlikely, though some ditch clearing activities could affect waters of the U.S.	Type of RWQCB permit is dependent upon Corps jurisdiction	Tier 1	Tier 1	No	Ridgway's rail and least tern (nonbreeding)
					Unpaved Roads/ Trails: – Re-grading (re-surfacing, tread repair) – Repair of rolling dips – Re-rocking – Brushing and roadside mowing – Roadside ditch clearing (vegetation, debris, garbage) – Debris/ slide removal from surface and associated repairs		Unlikely, though some ditch clearing activities could affect waters of the U.S.	Type of RWQCB permit is dependent upon Corps jurisdiction	Tier 1 or 2	Tier 1	No	Ridgway's rail (nonbreeding) = Tier 2 for work occurring near the marsh in the extreme southwest corner of the park, Tier 1 for other areas Least tern (nonbreeding) = Tier 1
					Culvert Maintenance: – Replacement in-kind – Replacement for undersized culverts – Cleaning – vegetation, debris, garbage – Trash rack replacement/ install		Unlikely. The County maintains two culverts in the park and both appear to be located in a parking lot where presence of waters of the U.S. is unlikely.	Type of RWQCB permit is dependent upon Corps jurisdiction	Tier 1	Tier 1	No	Ridgway's rail and least tern (nonbreeding)

No.	Site/Facility	County Region	Located on Detailed Map	Community	Routine Maintenance Activities	Year Recent Maintenance Conducted	Expected to be Regulated by USACE?	Anticipated Permit Under RWQCB	Highest Likely Tier Category USFWS	Highest Likely Tier Category NMFS	Potential for CESA Take? CDFW [a]	Special-Status Species with Potential to Occur
					General Maintenance Activities **Fuel Reduction and Defensible Space:** – Re-treatment of fuel management areas – Re-treatment of high use campgrounds, picnic areas, etc. – Re-treatment of defensible space areas surrounding facilities and infrastructure – Maintenance of shaded fuel breaks along key ingress/ egress routes (roads and trails) and along Park boundary – Hazard Tree Removal and Pruning – Removal of immediate hazards to life, property, infrastructure – Thinning techniques utilized where ever full removal can be avoided to reduce risks to life, property, or infrastructure could be lost or damaged (end weight or directional pruning, removal of dead material, etc.)		Unlikely	WDR	Tier 1 or 2	Tier 1	No	Ridgway's rail (nonbreeding) = Tier 2 for work occurring near the marsh in the extreme southwest corner of the park, Tier 1 for other areas Least tern (nonbreeding) = Tier 1
					Weed/ Non-native removal: – Hand – Mechanical – Herbicide – Grazing		Unlikely	WDR	Tier 1 or 2	Tier 1	No	Ridgway's rail (nonbreeding) = Tier 2 for work occurring near the marsh in the extreme southwest corner of the park, Tier 1 for other areas Least tern (nonbreeding) = Tier 1
					Grassland/ Meadow/ Prairie Maintenance: – Annual mowing/ string cutting – Grazing – Brush removal		Unlikely	WDR	Tier 1 or 2	Tier 1	No	Ridgway's rail (nonbreeding) = Tier 2 for work occurring near the marsh in the extreme southwest corner of the park, Tier 1 for other areas Least tern (nonbreeding) = Tier 1
					Facility Repairs general and along roads/ trails: – Parking lot island mulching and weed barrier re-install		Unlikely	WDR	Tier 1	Tier 1	No	Ridgway's rail and least tern (nonbreeding)
					GI Maintenance: – Semi-annual inspection for plant replacement needs and sediment and debris accumulation – Periodic plant and soil replacement – Periodic sediment removal		Maybe – USACE may regulate sediment removal if removed from a ditch or culvert that is hydrologically connected to waters of the U.S.	Type of RWQCB permit is dependent upon Corps jurisdiction	Tier 1	Tier 1	No	Ridgway's rail and least tern (nonbreeding)

No.	Site/Facility	County Region	Located on Detailed Map	Community	Routine Maintenance Activities	Year Recent Maintenance Conducted	Expected to be Regulated by USACE?	Anticipated Permit Under RWQCB	Highest Likely Tier Category USFWS	Highest Likely Tier Category NMFS	Potential for CESA Take? CDFW [a]	Special-Status Species with Potential to Occur
					Marina Maintenance **Sewer Lines/ Ejector tanks:** – Annual ejector tank cleaning – Annual pump out readings – Periodic line clearing		Likely – USACE may regulate sewer line clearing activities if they occur within the waters of the U.S.	Section 401 Water Quality Certification	Tier 1	Tier 2	No	Ridgway's rail and least tern (nonbreeding) Steelhead, longfin smelt, green sturgeon
					Dock Maintenance: – Replace damage fascia and bumper striping, broken cleats, broken gussets, damaged gusset covers, damaged shore power centers, damaged water lines – Repair/ replace damaged dock boxes – Repair/ replace damaged concrete on docks – Pressure wash docks/ dock boxes		Likely – USACE may regulate dock maintenance activities that have potential to impact waters of the U.S. Activities limited to the dock itself would unlikely be regulated by USACE.	Section 401 Water Quality Certification	Tier 1	Tier 2	No	Ridgway's rail and least tern (nonbreeding) = Tier 1 or 2 (depending on location of activity) Steelhead, longfin smelt, sturgeon = Tier 2
					Water Lines: – Inspection of dock water lines and valves – Backflow preventer inspections/ certification		Unlikely	WDR	Tier 1	Tier 1	No	Ridgway's rail and least tern (nonbreeding) Steelhead, longfin smelt, green sturgeon
					Launch Ramp: – Replace damaged floats, cleats, bumper striping – Remove debris from launch ramp lanes		Likely – USACE may regulate float repair activities if they involve dredging or filling.	Section 401 Water Quality Certification	Tier 1	Tier 2	No	Ridgway's rail and least tern (nonbreeding) Steelhead, longfin smelt, green sturgeon
					Channel Entrance/ Breakwater: – Inspection of channel entrance pilings, day markers, entrance lights, range lights, and replace bulbs – Remove hazardous logs and driftwood from channel entrance, marina, and recreational area – Re-rock – Marina depth soundings/ annual depth survey		Maybe – USACE may regulate re-rocking activities.	Type of RWQCB permit is dependent upon Corps jurisdiction	Tier 1 or 2	Tier 2	No	Ridgway's rail (nonbreeding) = Tier 1 Least tern (nonbreeding) = Tier 2 Steelhead, longfin smelt, green sturgeon
Edgewood County Park and Preserve												

No.	Site/Facility	County Region	Located on Detailed Map	Community	Routine Maintenance Activities	Year Recent Maintenance Conducted	Expected to be Regulated by USACE?	Anticipated Permit Under RWQCB	Highest Likely Tier Category USFWS	Highest Likely Tier Category NMFS	Potential for CESA Take? CDFW [a]	Special-Status Species with Potential to Occur
10	Edgewood County Park and Preserve	Bayside South	Figures B-3 and C-5	Redwood City	**Paved Roads:** – Brushing, sweeping, blowing and roadside mowing – Roadside ditch clearing (vegetation, debris, garbage) – Debris/ slide removal from surface and associated repairs – pruning, removal of dead material, etc.)		Unlikely, though some ditch clearing activities could affect waters of the U.S.	Type of RWQCB permit is dependent upon Corps jurisdiction	Tier 2	Tier 1	No	Bay checkerspot butterfly, CRLF, SFGS
					Unpaved Roads/ Trails: – Re-grading (re-surfacing, tread repair) – Repair of rolling dips – Re-rocking – Brushing and roadside mowing – Roadside ditch clearing (vegetation, debris, garbage) – Debris/ slide removal from surface and associated repairs		Unlikely, though some ditch clearing activities could affect waters of the U.S.	Type of RWQCB permit is dependent upon Corps jurisdiction	Tier 2	Tier 1	No	Bay checkerspot butterfly, CRLF, SFGS
					Culvert Maintenance: – Replacement in-kind – Replacement for undersized culverts – Cleaning – vegetation, debris, garbage – Trash rack replacement/ install – ***14 culverts in poor condition w/in ECP: Clarkia Trail- 6; Edgewood Trail- 3; Franciscan- 1; Serpentine Trail- 3		Likely – The culvert at Crestview Drive and Edgewood Rd. may be regulated if it's hydrologically connected to Cordilleras Creek	Section 401 Water Quality Certification	Tier 2	Tier 1	No	Bay checkerspot butterfly, CRLF, SFGS
					General Maintenance Activities **Fuel Reduction and Defensible Space:** – Re-treatment of fuel management areas – Re-treatment of high use campgrounds, picnic areas, etc. – Re-treatment of defensible space areas surrounding facilities and infrastructure – Maintenance of shaded fuel breaks along key ingress/ egress routes (roads and trails) and along Park boundary – Hazard Tree Removal and Pruning – Removal of immediate hazards to life, property, infrastructure – Thinning techniques utilized where ever full removal can be avoided to reduce risks to life, property, or infrastructure could be lost or damaged (end weight or directional		Unlikely	WDR	Tier 2	Tier 1	No	Bay checkerspot butterfly, CRLF and SFGS

No.	Site/Facility	County Region	Located on Detailed Map	Community	Routine Maintenance Activities	Year Recent Maintenance Conducted	Expected to be Regulated by USACE?	Anticipated Permit Under RWQCB	Highest Likely Tier Category USFWS	Highest Likely Tier Category NMFS	Potential for CESA Take? CDFW [a]	Special-Status Species with Potential to Occur
					Weed/ Non-native removal: – Hand – Mechanical – Herbicide – Grazing		Unlikely	WDR	Tier 2	Tier 1	No	Bay checkerspot butterfly, CRLF, SFGS
					Grassland/ Meadow/ Prairie Maintenance: – Annual Mowing/ string cutting – Grazing – Brush removal		Unlikely	WDR	Tier 2	Tier 1	No	Bay checkerspot butterfly, CRLF, SFGS
					Facility Repairs general and along roads/ trails: – Parking lot island mulching and weed barrier re-install		Unlikely	WDR	Tier 2	Tier 1	No	Bay checkerspot butterfly, CRLF, SFGS
Huddart Park												
12	Huddart Park	Bayside South	Figures B-3 and C-5	Woodside	**Paved Roads:** – Brushing, sweeping, blowing and roadside mowing – Roadside ditch clearing (vegetation, debris, garbage) – Debris/ slide removal from surface and associated repairs	None obtained.	Unlikely, though some ditch clearing activities could affect waters of the U.S.	Type of RWQCB permit is dependent upon Corps jurisdiction	Tier 2	Tier 1	No	CRLF, SFGS
					Unpaved Roads/ Trails: – Re-grading (re-surfacing, tread repair) – Repair of rolling dips – Re-rocking – Brushing and roadside mowing – Roadside ditch clearing (vegetation, debris, garbage) – Debris/ slide removal from surface and associated repairs		Unlikely, though some ditch clearing activities could affect waters of the U.S.	Type of RWQCB permit is dependent upon Corps jurisdiction	Tier 2	Tier 1	No	CRLF, SFGS
					Culvert Maintenance: – Replacement in-kind – Replacement for undersized culverts – Cleaning – vegetation, debris, garbage – Trash rack replacement/ install – *** 1 culvert in poor condition along unmarked trail.		Maybe – To be determined during field verification.	Type of RWQCB permit is dependent upon Corps jurisdiction	Tier 2	Tier 1	No	CRLF, SFGS

No.	Site/Facility	County Region	Located on Detailed Map	Community	Routine Maintenance Activities	Year Recent Maintenance Conducted	Expected to be Regulated by USACE?	Anticipated Permit Under RWQCB	Highest Likely Tier Category USFWS	Highest Likely Tier Category NMFS	Potential for CESA Take? CDFW [a]	Special-Status Species with Potential to Occur
					Bridge Maintenance: – Replacement of one arm bridge – Replace pedestrian bridge		Maybe – Bridge maintenance activities are anticipated to occur at 4 bridges in Huddart Park. USACE may regulate if bridge maintenance activities affect waters of the U.S.	Type of RWQCB permit is dependent upon Corps jurisdiction	Tier 2	Tier 1	No	CRLF, SFGS, steelhead (depending on bridge locations)
					General Maintenance Activities **Fuel Reduction and Defensible Space:** – Re-treatment of fuel management areas – Re-treatment of high use campgrounds, picnic areas, etc. – Re-treatment of defensible space areas surrounding facilities and infrastructure – Maintenance of shaded fuel breaks along key ingress/ egress routes (roads and trails) and along Park boundary – Hazard Tree Removal and Pruning – Removal of immediate hazards to life, property, infrastructure – Thinning techniques utilized where ever full removal can be avoided to reduce risks to life, property, or infrastructure could be lost or damaged (end weight or directional pruning, removal of dead material, etc.)		Unlikely	WDR	Tier 2	Tier 1	No	CRLF, SFGS
					Weed/ Non-native removal: – Hand – Mechanical – Herbicide – Grazing		Unlikely	WDR	Tier 2	Tier 1	No	CRLF, SFGS
					Grassland/ Meadow/ Prairie Maintenance: – Annual Mowing/ string cutting – Grazing – Brush removal		Unlikely	WDR	Tier 2	Tier 1	No	CRLF, SFGS
					Facility Repairs general and along roads/ trails: – Parking lot island mulching and weed barrier re-install		Unlikely	WDR	Tier 2	Tier 1	No	CRLF, SFGS
Wunderlich County Park												

No.	Site/Facility	County Region	Located on Detailed Map	Community	Routine Maintenance Activities	Year Recent Maintenance Conducted	Expected to be Regulated by USACE?	Anticipated Permit Under RWQCB	Highest Likely Tier Category USFWS	Highest Likely Tier Category NMFS	Potential for CESA Take? CDFW [a]	Special-Status Species with Potential to Occur
13	Wunderlich County Park	Bayside South	Figures B-3 and C-6	Woodside	**Paved Roads:** – Brushing, sweeping, blowing and roadside mowing – Roadside ditch clearing (vegetation, debris, garbage) – Debris/ slide removal from surface and associated repairs		Unlikely, though some ditch clearing activities could affect waters of the U.S.	Type of RWQCB permit is dependent upon Corps jurisdiction	Tier 2	Tier 1	No	CRLF, SFGS
					Unpaved Roads/ Trails: – Re-grading (re-surfacing, tread repair) – Repair of rolling dips – Re-rocking – Brushing and roadside mowing – Roadside ditch clearing (vegetation, debris, garbage) – Debris/ slide removal from surface and associated repairs		Unlikely, though some ditch clearing activities could affect waters of the U.S.	Type of RWQCB permit is dependent upon Corps jurisdiction	Tier 2	Tier 1	No	CRLF, SFGS
					Culvert Maintenance: – Replacement in-kind – Replacement for undersized culverts – Cleaning – vegetation, debris, garbage – Trash rack replacement/ install ***** Replacement of up to 7 culverts. Alambique Trail- 4; Oak Trail- 2; Bear Gulch- 1.**		Maybe – The County plans to conduct culvert maintenance at up to 7 sites. Although they don't appear to be near Alambique Creek, it's possible that they're hydrologically connected to this creek.	Type of RWQCB permit is dependent upon Corps jurisdiction	Tier 2	Tier 1	No	CRLF, SFGS

No.	Site/Facility	County Region	Located on Detailed Map	Community	Routine Maintenance Activities	Year Recent Maintenance Conducted	Expected to be Regulated by USACE?	Anticipated Permit Under RWQCB	Highest Likely Tier Category USFWS	Highest Likely Tier Category NMFS	Potential for CESA Take? CDFW [a]	Special-Status Species with Potential to Occur
					General Maintenance Activities **Fuel Reduction and Defensible Space:** – Re-treatment of fuel management areas – Re-treatment of high use campgrounds, picnic areas, etc. – Re-treatment of defensible space areas surrounding facilities and infrastructure – Maintenance of shaded fuel breaks along key ingress/ egress routes (roads and trails) and along Park boundary – Hazard Tree Removal and Pruning – Removal of immediate hazards to life, property, infrastructure – Thinning techniques utilized where ever full removal can be avoided to reduce risks to life, property, or infrastructure could be lost or damaged (end weight or directional pruning, removal of dead material, etc.)		Unlikely	WDR	Tier 2	Tier 1	No	CRLF, SFGS
					Weed/ Non-native removal: – Hand – Mechanical – Herbicide – Grazing		Unlikely	WDR	Tier 2	Tier 1	No	CRLF, SFGS
					Grassland/ Meadow/ Prairie Maintenance: – Annual Mowing/ string cutting – Grazing – Brush removal		Unlikely	WDR	Tier 2	Tier 1	No	CRLF, SFGS
					Facility Repairs general and along roads/ trails: – Parking lot island mulching and weed barrier re-install		Unlikely	WDR	Tier 2	Tier 1	No	CRLF, SFGS
Flood County Park												
80	Flood County Park	Bayside South	Figure B-3	Menlo Park	**Paved Roads/ Trails:** – Brushing, sweeping, blowing and roadside mowing – Roadside ditch clearing (vegetation, debris, garbage)		Unlikely	None	Tier 1	Tier 1	No	None

No.	Site/Facility	County Region	Located on Detailed Map	Community	Routine Maintenance Activities	Year Recent Maintenance Conducted	Expected to be Regulated by USACE?	Anticipated Permit Under RWQCB	Highest Likely Tier Category USFWS	Highest Likely Tier Category NMFS	Potential for CESA Take? CDFW [a]	Special-Status Species with Potential to Occur
					General Maintenance Activities **Fuel Reduction and Defensible Space:** – Re-treatment of high use picnic areas, etc. – Re-treatment of defensible space areas surrounding facilities and infrastructure – Maintenance of shaded fuel breaks along key ingress/ egress routes (roads and trails) and along Park boundary – Hazard Tree Removal and Pruning – Removal of immediate hazards to life, property, infrastructure – Thinning techniques utilized where ever full removal can be avoided to reduce risks to life, property, or infrastructure could be lost or damaged (end weight or directional pruning, removal of dead material, etc.)		Unlikely	None	Tier 1	Tier 1	No	None
					Weed/ Non-native removal: – Hand – Mechanical – Herbicide		Unlikely	None	Tier 1	Tier 1	No	None
					Grassland/ Meadow/ Prairie Maintenance: – Annual Mowing/ string cutting – Brush removal		Unlikely	None	Tier 1	Tier 1	No	None
					Facility Repairs general and along roads/ trails: – Parking lot island mulching and weed barrier re-install		Unlikely	None	Tier 1	Tier 1	No	None
					Culvert Maintenance: – Cleaning – vegetation, debris, garbage- at one culvert at the eastern edge of the park.		Unlikely	None	Tier 1	Tier 1	No	None
Sanchez Adobe County Park												
24	Sanchez Adobe County Park	Coastside North	Figures B-5 and C-3	Pacifica	**Paved Roads/ trails:** – Brushing, sweeping, blowing and roadside mowing – Roadside ditch clearing (vegetation, debris, garbage) Debris/ slide removal from surface and associated repairs		Unlikely	WDR	Tier 2	Tier 1	No	CRLF
					Unpaved Roads/ Trails: – Re-grading (re-surfacing, tread repair) – Repair of rolling dips – Re-rocking – Brushing and roadside mowing – Roadside ditch clearing (vegetation, debris, garbage) Debris/ slide removal from surface and associated repairs		Unlikely	WDR	Tier 2	Tier 1	No	CRLF

No.	Site/Facility	County Region	Located on Detailed Map	Community	Routine Maintenance Activities	Year Recent Maintenance Conducted	Expected to be Regulated by USACE?	Anticipated Permit Under RWQCB	Highest Likely Tier Category USFWS	Highest Likely Tier Category NMFS	Potential for CESA Take? CDFW [a]	Special-Status Species with Potential to Occur
					Culvert Maintenance: – Replacement in-kind – Replacement for undersized culverts – Cleaning – vegetation, debris, garbage Trash rack replacement/ install		Unlikely - The County does not plan to conduct any culvert maintenance activities at this location in the near future.	Type of RWQCB permit is dependent upon Corps jurisdiction	Tier 2	Tier 1	No	CRLF
					General Maintenance Activities **Fuel Reduction and Defensible Space:** – Re-treatment of fuel management areas – Re-treatment of high use campgrounds, picnic areas, etc. – Re-treatment of defensible space areas surrounding facilities and infrastructure – Maintenance of shaded fuel breaks along key ingress/ egress routes (roads and trails) and along Park boundary – Hazard Tree Removal and Pruning – Removal of immediate hazards to life, property, infrastructure Thinning techniques utilized where ever full removal can be avoided to reduce risks to life, property, or infrastructure could be lost or damaged (end weight or directional pruning, removal of dead material, etc.)		Unlikely	WDR	Tier 2	Tier 1	No	CRLF
					Weed/ Non-native removal: – Hand – Mechanical – Herbicide Grazing		Unlikely	WDR	Tier 2	Tier 1	No	CRLF
					Grassland/ Meadow/ Prairie Maintenance: – Annual Mowing/ string cutting – Grazing Brush removal		Unlikely	WDR	Tier 2	Tier 1	No	CRLF
					Facility Repairs general and along roads/ trails: – Parking lot island mulching and weed barrier re-install		Unlikely	WDR	Tier 2	Tier 1	No	CRLF
San Pedro Valley Park and Pedro Point Headlands												

No.	Site/Facility	County Region	Located on Detailed Map	Community	Routine Maintenance Activities	Year Recent Maintenance Conducted	Expected to be Regulated by USACE?	Anticipated Permit Under RWQCB	Highest Likely Tier Category USFWS	Highest Likely Tier Category NMFS	Potential for CESA Take? CDFW [a]	Special-Status Species with Potential to Occur
25	San Pedro Valley Park and Pedro Point Headlands	Coastside North	Figures B-5 and C-3	Pacifica	**Paved Roads/Trails:** – Brushing, sweeping, blowing and roadside mowing – Roadside ditch clearing (vegetation, debris, garbage) – Debris/ slide removal from surface and associated repairs	Non-native plant removal occurs all year round on a monthly basis.	Unlikely, though some ditch clearing activities could affect waters of the U.S.	Type of RWQCB permit is dependent upon Corps jurisdiction	Tier 2	Tier 1	No	San Bruno elfin, CRLF = Tier 2 Steelhead = Tier 1 (assuming that water-quality BMPs are implemented for all activities as necessary)
					Unpaved Roads/ Trails: – Re-grading (re-surfacing, tread repair) – Repair of rolling dips – Re-rocking – Brushing and roadside mowing – Roadside ditch clearing (vegetation, debris, garbage) – Debris/ slide removal from surface and associated repairs – *** Bridge Replacement Possible – Trout Farm Trail along Brooks Creek upstream from the S. Fork of SPC; Plaskon Nature Trail; 1 bridge at Walnut Parking area (over S. Fork San Pedro Creek)		Unlikely, though some ditch clearing activities could affect waters of the U.S.	Type of RWQCB permit is dependent upon Corps jurisdiction	Tier 2	Tier 3	No	San Bruno elfin, CRLF = Tier 2 Steelhead = Tier 3 if bridge replacement work includes dewatering or extensive in-channel work
					Culvert Maintenance: – Replacement in-kind – Replacement for undersized culverts – Cleaning – vegetation, debris, garbage – Trash rack replacement/ install – *** Up to 3 culvert replacements due to poor condition: Valley View Trail- 1; Hazelnut Trail- 1; Montara Mountain Trail- 1; Weiler Ranch Trail – 2; Plaskon Nature Trail – 2		Likely – There are about 10 culverts along Weiler Ranch Trail and some or all of them are hydrologically connected to San Pedro Creek.	Section 401 Water Quality Certification	Tier 2	Tier 3	No	CRLF = Tier 2 San Bruno elfin = Tier 2 Steelhead = Tier 3
					General Maintenance Activities **Fuel Reduction and Defensible Space:** – Re-treatment of fuel management areas – Re-treatment of high use campgrounds, picnic areas, etc. – Re-treatment of defensible space areas surrounding facilities and infrastructure – Maintenance of shaded fuel breaks along key ingress/ egress routes (roads and trails) and along Park boundary – Hazard Tree Removal and Pruning – Removal of immediate hazards to life, property, infrastructure – Thinning techniques utilized where ever full removal can be avoided to reduce risks to life, property, or infrastructure could be lost or damaged (end weight or directional pruning, removal of dead material, etc.)		Unlikely	WDR	Tier 2	Tier 1	No	San Bruno elfin, CRLF = Tier 2 Steelhead = Tier 1 (assuming that water-quality BMPs are implemented for all activities as necessary)

No.	Site/Facility	County Region	Located on Detailed Map	Community	Routine Maintenance Activities	Year Recent Maintenance Conducted	Expected to be Regulated by USACE?	Anticipated Permit Under RWQCB	Highest Likely Tier Category USFWS	Highest Likely Tier Category NMFS	Potential for CESA Take? CDFW [a]	Special-Status Species with Potential to Occur
					Weed/ Non-native removal: – Hand – Mechanical – Herbicide – Grazing		Unlikely	WDR	Tier 2	Tier 2	No	San Bruno elfin, CRLF = Tier 2 Steelhead = Tier 2 (to address potential water-quality effects of herbicides)
					Grassland/ Meadow/ Prairie Maintenance: – Annual Mowing/ string cutting – Grazing – Brush removal		Unlikely	WDR	Tier 2	Tier 1	No	San Bruno elfin, CRLF Steelhead
					Facility Repairs general and along roads/ trails: – Parking lot island mulching and weed barrier re-install		Unlikely	WDR	Tier 2	Tier 1	No	San Bruno elfin, CRLF Steelhead
Quarry County Park and Wicklow Property												
31	Quarry County Park and Wicklow Property	Coast side North	Figures B-5 and C-4	Half Moon Bay	**Paved Roads/ Trails:** – Brushing, sweeping, blowing and roadside mowing – Roadside ditch clearing (vegetation, debris, garbage) – Debris/ slide removal from surface and associated repairs	Fuel management work conducted in July 2015	Unlikely, though some ditch clearing activities could affect waters of the U.S.	Type of RWQCB permit is dependent upon Corps jurisdiction	Tier 2	Tier 1	No	CRLF
					Unpaved Roads/ Trails: – Re-grading (re-surfacing, tread repair) – Repair of rolling dips – Re-rocking – Brushing and roadside mowing – Roadside ditch clearing (vegetation, debris, garbage) – Debris/ slide removal from surface and associated repairs		Unlikely, though some ditch clearing activities could affect waters of the U.S.	Type of RWQCB permit is dependent upon Corps jurisdiction	Tier 2	Tier 1	No	CRLF
					Culvert Maintenance: – Replacement in-kind – Replacement for undersized culverts – Cleaning – vegetation, debris, garbage – Trash rack replacement/ install ***** In-progress 5 culvert replacements not w/in waters of the US. An additional 4 culverts in poor condition should be replaced. Trail 1- 3; Trail 4- 5; Trail 13- 1.**		Maybe - The County does not plan to conduct any culvert maintenance activities at this park within the next 5 years.	Type of RWQCB permit is dependent upon Corps jurisdiction	Tier 2	Tier 1	No	CRLF
					Weed/ Non-native removal: – Hand – Mechanical – Herbicide – Grazing		Unlikely	WDR	Tier 2	Tier 1	No	CRLF

No.	Site/Facility	County Region	Located on Detailed Map	Community	Routine Maintenance Activities	Year Recent Maintenance Conducted	Expected to be Regulated by USACE?	Anticipated Permit Under RWQCB	Highest Likely Tier Category USFWS	Highest Likely Tier Category NMFS	Potential for CESA Take? CDFW [a]	Special-Status Species with Potential to Occur
					Grassland/ Meadow/ Prairie Maintenance: – Annual Mowing/ string cutting – Grazing – Brush removal		Unlikely	WDR	Tier 2	Tier 1	No	CRLF
					General Maintenance Activities **Fuel Reduction and Defensible Space:** – Re-treatment of fuel management areas – Re-treatment of high use campgrounds, picnic areas, etc. – Re-treatment of defensible space areas surrounding facilities and infrastructure – Maintenance of shaded fuel breaks along key ingress/ egress routes (roads and trails) and along Park boundary – Hazard Tree Removal and Pruning – Removal of immediate hazards to life, property, infrastructure – Thinning techniques utilized where ever full removal can be avoided to reduce risks to life, property, or infrastructure could be lost or damaged (end weight or directional pruning, removal of dead material, etc.)		Unlikely	WDR	Tier 2	Tier 1	No	CRLF
					Facility Repairs general and along roads/ trails: – Parking lot island mulching and weed barrier re-install		Unlikely	WDR	Tier 2	Tier 1	No	CRLF
Fitzgerald Marine Reserve												
29	Fitzgerald Marine Reserve[c]	Coastside North	Figures B-5 and C-4	Moss Beach	**Paved Roads/ Trails:** – Brushing, sweeping, blowing and roadside mowing – Roadside ditch clearing (vegetation, debris, garbage) – Debris/ slide removal from surface and associated repairs		Unlikely, though some ditch clearing activities could affect waters of the U.S.	Type of RWQCB permit is dependent upon Corps jurisdiction	Tier 2	Tier 1	No	CRLF Steelhead = Tier 1 (assuming that water-quality BMPs are implemented for all activities as necessary)
					Unpaved Roads/ Trails: – Re-grading (re-surfacing, tread repair) – Repair of rolling dips – Re-rocking – Brushing and roadside mowing – Roadside ditch clearing (vegetation, debris, garbage) – Debris/ slide removal from surface and associated repairs		Unlikely, though some ditch clearing activities could affect waters of the U.S.	Type of RWQCB permit is dependent upon Corps jurisdiction	Tier 2	Tier 1	No	CRLF Steelhead = Tier 1 (assuming that water-quality BMPs are implemented for all activities as necessary)

No.	Site/Facility	County Region	Located on Detailed Map	Community	Routine Maintenance Activities	Year Recent Maintenance Conducted	Expected to be Regulated by USACE?	Anticipated Permit Under RWQCB	Highest Likely Tier Category USFWS	Highest Likely Tier Category NMFS	Potential for CESA Take? CDFW [a]	Special-Status Species with Potential to Occur
					Culvert Maintenance: – Replacement in-kind – Replacement for undersized culverts – Cleaning – vegetation, debris, garbage – Trash rack replacement/ install		Unlikely - The County does not plan to conduct any culvert maintenance activities at this park within the next 5 years.	Type of RWQCB permit is dependent upon Corps jurisdiction	Tier 2	Tier 3	No	CRLF Steelhead
					General Maintenance Activities **Fuel Reduction and Defensible Space:** – Re-treatment of fuel management areas – Re-treatment of high use campgrounds, picnic areas, etc. – Re-treatment of defensible space areas surrounding facilities and infrastructure – Maintenance of shaded fuel breaks along key ingress/ egress routes (roads and trails) and along Park boundary – Hazard Tree Removal and Pruning – Removal of immediate hazards to life, property, infrastructure – Thinning techniques utilized where ever full removal can be avoided to reduce risks to life, property, or infrastructure could be lost or damaged (end weight or directional pruning, removal of dead material, etc.)		Unlikely	WDR	Tier 2	Tier 1	No	CRLF Steelhead = Tier 1 (assuming that water-quality BMPs are implemented for all activities as necessary)
					Weed/ Non-native removal: – Hand – Mechanical – Herbicide – Grazing		Unlikely	WDR	Tier 2	Tier 2	No	CRLF Steelhead = Tier 2 (to address potential water-quality effects of herbicides)
					Grassland/ Meadow/ Prairie Maintenance: – Annual Mowing/ string cutting – Grazing – Brush removal		Unlikely	WDR	Tier 2	Tier 1	No	CRLF Steelhead
					Facility Repairs general and along roads/ trails: – Parking lot island mulching and weed barrier re-install		Unlikely	WDR	Tier 2	Tier 1	No	CRLF Steelhead

No.	Site/Facility	County Region	Located on Detailed Map	Community	Routine Maintenance Activities	Year Recent Maintenance Conducted	Expected to be Regulated by USACE?	Anticipated Permit Under RWQCB	Highest Likely Tier Category USFWS	Highest Likely Tier Category NMFS	Potential for CESA Take? CDFW [a]	Special-Status Species with Potential to Occur
					GI Maintenance: – Semi-annual inspection for plant replacement needs and sediment and debris accumulation – Periodic plant and soil replacement – Periodic sediment removal		Unlikely – the LID maintenance site is in the parking lot and doesn't seem hydrologically connected to any wetlands/waters of the U.S.	Type of RWQCB permit is dependent upon Corps jurisdiction	Tier 2	Tier 1	No	CRLF Steelhead = Tier 1 (assuming that water-quality BMPs are implemented for all activities as necessary)
Pillar Point Bluffs												
30	Pillar Point Bluffs	Coastside North	Figures B-5 and C-4	Moss Beach	**Unpaved Roads/ Trails:** – Re-grading (re-surfacing, tread repair) – Repair of rolling dips – Re-rocking – Brushing and roadside mowing – Roadside ditch clearing (vegetation, debris, garbage) – Debris/ slide removal from surface and associated repairs		Unlikely, though some ditch clearing activities could affect waters of the U.S.	Type of RWQCB permit is dependent upon Corps jurisdiction	Tier 2	Tier 1	No	CRLF = Tier 2 Western snowy plover = Tier 1
					Culvert Maintenance: – Replacement in-kind – Replacement for undersized culverts – Cleaning – vegetation, debris, garbage – Trash rack replacement/ install ***** Two unmarked Trail culverts in poor condition for replacement.**		Maybe - To be determined during field verification	Type of RWQCB permit is dependent upon Corps jurisdiction	Tier 2	Tier 1	No	CRLF = Tier 2 Western snowy plover = Tier 1
					General Maintenance Activities **Fuel Reduction and Defensible Space:** – Re-treatment of fuel management areas – Re-treatment of high use campgrounds, picnic areas, etc. – Re-treatment of defensible space areas surrounding facilities and infrastructure – Maintenance of shaded fuel breaks along key ingress/ egress routes (roads and trails) and along Park boundary – Hazard Tree Removal and Pruning – Removal of immediate hazards to life, property, infrastructure – Thinning techniques utilized where ever full removal can be avoided to reduce risks to life, property, or infrastructure could be lost or damaged (end weight or directional pruning, removal of dead material, etc.)		Unlikely	WDR	Tier 2	Tier 1	No	CRLF = Tier 2 Western snowy plover = Tier 1

No.	Site/Facility	County Region	Located on Detailed Map	Community	Routine Maintenance Activities	Year Recent Maintenance Conducted	Expected to be Regulated by USACE?	Anticipated Permit Under RWQCB	Highest Likely Tier Category USFWS	Highest Likely Tier Category NMFS	Potential for CESA Take? CDFW [a]	Special-Status Species with Potential to Occur
					Weed/ Non-native removal: – Hand – Mechanical – Herbicide – Grazing		Unlikely	WDR	Tier 2	Tier 1	No	CRLF = Tier 2 Western snowy plover = Tier 1
					Grassland/ Meadow/ Prairie Maintenance: – Annual Mowing/ string cutting – Grazing – Brush removal		Unlikely	WDR	Tier 2	Tier 1	No	CRLF = Tier 2 Western snowy plover = Tier 1
					Facility Repairs general and along roads/ trails: – Parking lot island mulching and weed barrier re-install		Unlikely	WDR	Tier 2	Tier 1	No	CRLF = Tier 2 Western snowy plover = Tier 1
Mirada Surf East County Park												
33	Mirada Surf East County Park	Coastside North	Figures B-5 and C-4	Half Moon Bay	**Paved Roads/ trails:** – Brushing, sweeping, blowing and roadside mowing – Roadside ditch clearing (vegetation, debris, garbage) Debris/ slide removal from surface and associated repairs		Unlikely	WDR	Tier 2	Tier 1	No	CRLF
					Unpaved Roads/ Trails: – Re-grading (re-surfacing, tread repair) – Repair of rolling dips – Re-rocking – Brushing and roadside mowing – Roadside ditch clearing (vegetation, debris, garbage) Debris/ slide removal from surface and associated repairs		Unlikely	WDR	Tier 2	Tier 1	No	CRLF

No.	Site/Facility	County Region	Located on Detailed Map	Community	Routine Maintenance Activities	Year Recent Maintenance Conducted	Expected to be Regulated by USACE?	Anticipated Permit Under RWQCB	Highest Likely Tier Category USFWS	Highest Likely Tier Category NMFS	Potential for CESA Take? CDFW [a]	Special-Status Species with Potential to Occur
					General Maintenance Activities **Fuel Reduction and Defensible Space:** – Re-treatment of fuel management areas – Re-treatment of high use campgrounds, picnic areas, etc. – Re-treatment of defensible space areas surrounding facilities and infrastructure – Maintenance of shaded fuel breaks along key ingress/ egress routes (roads and trails) and along Park boundary – Hazard Tree Removal and Pruning – Removal of immediate hazards to life, property, infrastructure Thinning techniques utilized where ever full removal can be avoided to reduce risks to life, property, or infrastructure could be lost or damaged (end weight or directional pruning, removal of dead material, etc.)		Unlikely	WDR	Tier 2	Tier 1	No	CRLF
					Weed/ Non-native removal: – Hand – Mechanical – Herbicide Grazing		Unlikely	WDR	Tier 2	Tier 1	No	CRLF
					Grassland/ Meadow/ Prairie Maintenance: – Annual Mowing/ string cutting – Grazing Brush removal		Unlikely	WDR	Tier 2	Tier 1	No	CRLF
					Facility Repairs general and along roads/ trails: Parking lot island mulching and weed barrier re-install		Unlikely	WDR	Tier 2	Tier 1	No	CRLF
Mirada Surf West County Park												
32	Mirada Surf West County Park	Coastside North	Figures B-5 and C-4	Half Moon Bay	**Paved Roads/ trails:** – Re-paving (resurfacing, tread repair, slurry coating) – Patching – Crack sealing – Surfacing – Re-striping – Brushing, sweeping, blowing and roadside mowing – Roadside ditch clearing (vegetation, debris, garbage) Debris/ slide removal from surface and associated repairs		Unlikely	WDR	Tier 2	Tier 1	No	CRLF

No.	Site/Facility	County Region	Located on Detailed Map	Community	Routine Maintenance Activities	Year Recent Maintenance Conducted	Expected to be Regulated by USACE?	Anticipated Permit Under RWQCB	Highest Likely Tier Category USFWS	Highest Likely Tier Category NMFS	Potential for CESA Take? CDFW [a]	Special-Status Species with Potential to Occur
					Unpaved Roads/ Trails: – Re-grading (re-surfacing, tread repair) – Repair of rolling dips – Re-rocking – Brushing and roadside mowing – Roadside ditch clearing (vegetation, debris, garbage) Debris/ slide removal from surface and associated repairs		Unlikely	WDR	Tier 2	Tier 1	No	CRLF
					Culvert Maintenance: – Replacement in-kind – Replacement for undersized culverts – Cleaning – vegetation, debris, garbage Trash rack replacement/ install		Unlikely - The County does not plan to conduct any culvert maintenance activities at this location in the near future.	Type of RWQCB permit is dependent upon Corps jurisdiction	Tier 2	Tier 1	No	CRLF
					General Maintenance Activities **Fuel Reduction and Defensible Space:** – Re-treatment of fuel management areas – Re-treatment of high use campgrounds, picnic areas, etc. – Re-treatment of defensible space areas surrounding facilities and infrastructure – Maintenance of shaded fuel breaks along key ingress/ egress routes (roads and trails) and along Park boundary – Hazard Tree Removal and Pruning – Removal of immediate hazards to life, property, infrastructure – Thinning techniques utilized where ever full removal can be avoided to reduce risks to life, property, or infrastructure could be lost or damaged (end weight or directional pruning, removal of dead material, etc.)		Unlikely	WDR	Tier 2	Tier 1	No	CRLF
					Weed/ Non-native removal: – Hand – Mechanical – Herbicide – Grazing		Unlikely	WDR	Tier 2	Tier 1	No	CRLF

No.	Site/Facility	County Region	Located on Detailed Map	Community	Routine Maintenance Activities	Year Recent Maintenance Conducted	Expected to be Regulated by USACE?	Anticipated Permit Under RWQCB	Highest Likely Tier Category USFWS	Highest Likely Tier Category NMFS	Potential for CESA Take? CDFW [a]	Special-Status Species with Potential to Occur
					Grassland/ Meadow/ Prairie Maintenance: – Annual Mowing/ string cutting – Grazing – Brush removal		Unlikely	WDR	Tier 2	Tier 1	No	CRLF
					Facility Repairs general and along roads/ trails: Parking lot island mulching and weed barrier re-install		Unlikely	WDR	Tier 2	Tier 1	No	CRLF
Tunitas Creek Beach												
79	Tunitas Creek Beach	Central Coastside	Figure B-6	San Gregorio	**Unpaved Roads/Trails:** – Re-grading (re-surfacing, tread repair) – Repair of rolling dips – Re-rocking – Brushing and roadside mowing – Roadside ditch clearing (vegetation, debris, garbage) Debris/ slide removal from surface and associated repairs		Unlikely	WDR	Tier 2	Tier 1	No	CRLF = Tier 2 Western snowy plover = Tier 1
					Culvert Maintenance: – Replacement in-kind – Replacement for undersized culverts Cleaning – vegetation, debris, garbage		Maybe – Culvert maintenance activities may be regulated if they drain to waters of the U.S.	Type of RWQCB permit is dependent upon Corps jurisdiction	Tier 2	Tier 1	No	CRLF Western snowy plover = Tier 1
					Weed/ Non-native removal: – Hand – Mechanical – Herbicide		Unlikely	WDR	Tier 2	Tier 1	No	CRLF = Tier 2 Western snowy plover = Tier 1
					Facility Repairs general and along roads/ trails: Parking lot island mulching and weed barrier re-install		Unlikely	WDR	Tier 2	Tier 1	No	CRLF = Tier 2 Western snowy plover = Tier 1

No.	Site/Facility	County Region	Located on Detailed Map	Community	Routine Maintenance Activities	Year Recent Maintenance Conducted	Expected to be Regulated by USACE?	Anticipated Permit Under RWQCB	Highest Likely Tier Category USFWS	Highest Likely Tier Category NMFS	Potential for CESA Take? CDFW [a]	Special-Status Species with Potential to Occur
					General Maintenance Activities **Fuel Reduction and Defensible Space:** – Re-treatment of fuel management areas – Re-treatment of high use campgrounds, picnic areas, etc. – Re-treatment of defensible space areas surrounding facilities and infrastructure – Maintenance of shaded fuel breaks along key ingress/ egress routes (roads and trails) and along Park boundary – Hazard Tree Removal and Pruning – Removal of immediate hazards to life, property, infrastructure Thinning techniques utilized where ever full removal can be avoided to reduce risks to life, property, or infrastructure could be lost or damaged (end weight or directional pruning, removal of dead material, etc.)		Unlikely	WDR	Tier 2	Tier 1	No	CRLF = Tier 2 Western snowy plover = Tier 1
Sam McDonald County Park												
16	Sam McDonald County Park	Coastside South	Figure B-4	Loma Mar	**Paved Roads:** – Brushing, sweeping, blowing and roadside mowing – Roadside ditch clearing (vegetation, debris, garbage) Debris/ slide removal from surface and associated repairs		Unlikely, though some ditch clearing activities could affect waters of the U.S.	Type of RWQCB permit is dependent upon Corps jurisdiction	Tier 2	Tier 1	No	Marbled murrelet = Tier 1 CRLF = Tier 2 Steelhead, coho = Tier 1 (assuming that water-quality BMPs are implemented for all activities as necessary)
					Unpaved Roads/ Trails: – Re-grading (re-surfacing, tread repair) – Repair of rolling dips – Re-rocking – Brushing and roadside mowing – Roadside ditch clearing (vegetation, debris, garbage) Debris/ slide removal from surface and associated repairs		Unlikely, though some ditch clearing activities could affect waters of the U.S.	Type of RWQCB permit is dependent upon Corps jurisdiction	Tier 2	Tier 1	No	Marbled murrelet = Tier 1 CRLF = Tier 2 Steelhead, coho = Tier 1 (assuming that water-quality BMPs are implemented for all activities as necessary)
					Culvert Maintenance: – Replacement in-kind – Replacement for undersized culverts – Cleaning – vegetation, debris, garbage – Trash rack replacement/ install *** Culvert replacement of up to 5 in poor condition. Big Tree Loop- 4; Heritage Grove- 1 (near Alpine Creek)		Maybe – To be determined during field verification.	Type of RWQCB permit is dependent upon Corps jurisdiction	Tier 2	Tier 1	No	Marbled murrelet = Tier 1 CRLF = Tier 2 or 3 Steelhead, coho = Tier 1 (assuming that water-quality BMPs are implemented for all activities as necessary)

No.	Site/Facility	County Region	Located on Detailed Map	Community	Routine Maintenance Activities	Year Recent Maintenance Conducted	Expected to be Regulated by USACE?	Anticipated Permit Under RWQCB	Highest Likely Tier Category USFWS	Highest Likely Tier Category NMFS	Potential for CESA Take? CDFW [a]	Special-Status Species with Potential to Occur
					General Maintenance Activities **Fuel Reduction and Defensible Space:** – Re-treatment of fuel management areas – Re-treatment of high use campgrounds, picnic areas, etc. – Re-treatment of defensible space areas surrounding facilities and infrastructure – Maintenance of shaded fuel breaks along key ingress/ egress routes (roads and trails) and along Park boundary – Hazard Tree Removal and Pruning – Removal of immediate hazards to life, property, infrastructure Thinning techniques utilized where ever full removal can be avoided to reduce risks to life, property, or infrastructure could be lost or damaged (end weight or directional pruning, removal of dead material, etc.)		Unlikely	WDR	Tier 2	Tier 1	No	Marbled murrelet = Tier 1 CRLF = Tier 2 Steelhead, coho = Tier 1 (assuming that water-quality BMPs are implemented for all activities as necessary)
					Weed/ Non-native removal: – Hand – Mechanical – Herbicide Grazing		Unlikely	WDR	Tier 2	Tier 2	No	Marbled murrelet = Tier 1 CRLF = Tier 2 Steelhead, coho = Tier 2 (to address potential water-quality effects of herbicides)
					Grassland/ Meadow/ Prairie Maintenance: – Annual Mowing/ string cutting – Grazing Brush removal		Unlikely	WDR	Tier 2	Tier 1	No	Marbled murrelet = Tier 1 CRLF = Tier 2 Steelhead, coho = Tier 1
					Facility Repairs general and along roads/ trails: Parking lot island mulching and weed barrier re-install		Unlikely	WDR	Tier 2	Tier 1	No	Marbled murrelet = Tier 1 CRLF = Tier 2 Steelhead, coho = Tier 1
Memorial County Park												
55	Memorial County Park	Coastside South	Figures B-7 and C-7	Loma Mar	**Paved Roads/ trails:** – Brushing, sweeping, blowing and roadside mowing – Roadside ditch clearing (vegetation, debris, garbage) – Debris/ slide removal from surface and associated repairs		Unlikely, though some ditch clearing activities could affect waters of the U.S.	Type of RWQCB permit is dependent upon Corps jurisdiction	Tier 2	Tier 1	No	Marbled murrelet = Tier 1 CRLF = Tier 2 Steelhead, coho = Tier 1 (assuming that water-quality BMPs are implemented for all activities as necessary)

No.	Site/Facility	County Region	Located on Detailed Map	Community	Routine Maintenance Activities	Year Recent Maintenance Conducted	Expected to be Regulated by USACE?	Anticipated Permit Under RWQCB	Highest Likely Tier Category USFWS	Highest Likely Tier Category NMFS	Potential for CESA Take? CDFW [a]	Special-Status Species with Potential to Occur
					Unpaved Roads/ Trails: – Re-grading (re-surfacing, tread repair) – Repair of rolling dips – Re-rocking – Brushing and roadside mowing – Roadside ditch clearing (vegetation, debris, garbage) – Debris/ slide removal from surface and associated repairs		Unlikely, though some ditch clearing activities could affect waters of the U.S.	Type of RWQCB permit is dependent upon Corps jurisdiction	Tier 2	Tier 1	No	Marbled murrelet = Tier 1 CRLF = Tier 2 Steelhead, coho = Tier 1 (assuming that water-quality BMPs are implemented for all activities as necessary)
					Culvert Maintenance: – Replacement in-kind – Replacement for undersized culverts – Cleaning – vegetation, debris, garbage – Trash rack replacement/ install – *** Two poor condition culverts need replacement. Homestead Trail- 1; Pomponio Trail- 1		Maybe – Culvert maintenance activities may be regulated if they drain to waters of the U.S.	Type of RWQCB permit is dependent upon Corps jurisdiction	Tier 2	Tier 2	No	Marbled murrelet = Tier 1 CRLF Steelhead and coho
					General Maintenance Activities **Fuel Reduction and Defensible Space:** – Re-treatment of fuel management areas – Re-treatment of high use campgrounds, picnic areas, etc. – Re-treatment of defensible space areas surrounding facilities and infrastructure – Maintenance of shaded fuel breaks along key ingress/ egress routes (roads and trails) and along Park boundary – Hazard Tree Removal and Pruning – Removal of immediate hazards to life, property, infrastructure – Thinning techniques utilized where ever full removal can be avoided to reduce risks to life, property, or infrastructure could be lost or damaged (end weight or directional pruning, removal of dead material, etc.)		Unlikely	WDR	Tier 2	Tier 1	No	Marbled murrelet = Tier 1 CRLF = Tier 2 Steelhead, coho = Tier 1 (assuming that water-quality BMPs are implemented for all activities as necessary)
					Weed/ Non-native removal: – Hand – Mechanical – Herbicide – Grazing		Unlikely	WDR	Tier 2	Tier 2	No	Marbled murrelet = Tier 1 CRLF = Tier 2 Steelhead, coho = Tier 2 (to address potential water-quality effects of herbicides)
					Grassland/ Meadow/ Prairie Maintenance: – Annual Mowing/ string cutting – Grazing – Brush removal		Unlikely	WDR	Tier 2	Tier 1	No	Marbled murrelet = Tier 1 CRLF = Tier 2 Steelhead, coho

No.	Site/Facility	County Region	Located on Detailed Map	Community	Routine Maintenance Activities	Year Recent Maintenance Conducted	Expected to be Regulated by USACE?	Anticipated Permit Under RWQCB	Highest Likely Tier Category USFWS	Highest Likely Tier Category NMFS	Potential for CESA Take? CDFW [a]	Special-Status Species with Potential to Occur
					Facility Repairs general and along roads/ trails: – Parking lot island mulching and weed barrier re-install		Unlikely	WDR	Tier 2	Tier 1	No	Marbled murrelet = Tier 1 CRLF = Tier 2 Steelhead, coho
Pescadero Creek County Park												
17	Pescadero Creek Park	Coastside South	Figures B-4 and C-7	Loma Mar	**Paved Roads:** – Brushing, sweeping, blowing and roadside mowing – Roadside ditch clearing (vegetation, debris, garbage) Debris/ slide removal from surface and associated repairs		Unlikely, though some ditch clearing activities could affect waters of the U.S.	Type of RWQCB permit is dependent upon Corps jurisdiction	Tier 2	Tier 1	No	Marbled murrelet = Tier 1 CRLF, SFGS = Tier 2 Steelhead and coho = Tier 1 (assuming that water-quality BMPs are implemented for all activities as necessary)
					Unpaved Roads/ Trails: – Re-grading (re-surfacing, tread repair) – Repair of rolling dips – Re-rocking – Brushing and roadside mowing – Roadside ditch clearing (vegetation, debris, garbage) Debris/ slide removal from surface and associated repairs		Unlikely, though some ditch clearing activities could affect waters of the U.S.	Type of RWQCB permit is dependent upon Corps jurisdiction	Tier 2	Tier 1	No	Marbled murrelet = Tier 1 CRLF, SFGS = Tier 2 Steelhead and coho = Tier 1 (assuming that water-quality BMPs are implemented for all activities as necessary)
					Culvert Maintenance: – Replacement in-kind – Replacement for undersized culverts – Cleaning – vegetation, debris, garbage Trash rack replacement/ install		Maybe – The County does not plan to conduct any culvert maintenance activities at this park within the next 5 years.	Type of RWQCB permit is dependent upon Corps jurisdiction	Tier 2	Tier 3	No	Marbled murrelet = Tier 1 CRLF, SFGS = Tier 2 Steelhead, coho = Tier 3
					Bridge Maintenance: – General maintenance		Maybe – may regulate if bridge maintenance activities could affect Pescadero Creek	Type of RWQCB permit is dependent upon Corps jurisdiction	Tier 2	Tier 2	No	CRLF, SFGS, steelhead, coho, marbled murrelet

No.	Site/Facility	County Region	Located on Detailed Map	Community	Routine Maintenance Activities	Year Recent Maintenance Conducted	Expected to be Regulated by USACE?	Anticipated Permit Under RWQCB	Highest Likely Tier Category USFWS	Highest Likely Tier Category NMFS	Potential for CESA Take? CDFW [a]	Special-Status Species with Potential to Occur
					General Maintenance Activities **Fuel Reduction and Defensible Space:** – Re-treatment of fuel management areas – Re-treatment of high use campgrounds, picnic areas, etc. – Re-treatment of defensible space areas surrounding facilities and infrastructure – Maintenance of shaded fuel breaks along key ingress/ egress routes (roads and trails) and along Park boundary – Hazard Tree Removal and Pruning – Removal of immediate hazards to life, property, infrastructure Thinning techniques utilized where ever full removal can be avoided to reduce risks to life, property, or infrastructure could be lost or damaged (end weight or directional pruning, removal of dead material, etc.)		Unlikely	WDR	Tier 2	Tier 1	No	Marbled murrelet = Tier 1 CRLF, SFGS = Tier 2 Steelhead and coho = Tier 1 (assuming that water-quality BMPs are implemented for all activities as necessary)
					Weed/ Non-native removal: – Hand – Mechanical – Herbicide Grazing		Unlikely	WDR	Tier 2	Tier 2	No	Marbled murrelet = Tier 1 CRLF, SFGS = Tier 2 Steelhead and coho = Tier 2 (to address potential water-quality effects of herbicides)
					Grassland/ Meadow/ Prairie Maintenance: – Annual Mowing/ string cutting – Grazing Brush removal		Unlikely	WDR	Tier 2	Tier 1	No	Marbled murrelet = Tier 1 CRLF, SFGS = Tier 2 Steelhead and coho = Tier 1
					Facility Repairs general and along roads/ trails: Parking lot island mulching and weed barrier re-install		Unlikely	WDR	Tier 2	Tier 1	No	Marbled murrelet = Tier 1 CRLF, SFGS= Tier 2 Steelhead and coho = Tier 1
72	Pigeon Point Overlook	Coastside South	Figure B-7	South of Pescadero	**Unpaved Roads/ Trails:** – Re-grading (re-surfacing, tread repair) – Repair of rolling dips – Re-rocking – Brushing and roadside mowing – Roadside ditch clearing (vegetation, debris, garbage) – Debris/ slide removal from surface and associated repairs		Unlikely	WDR	Tier 2	Tier 1	No	CRLF, SFGS = Tier 2 Western snowy plover = Tier 1

No.	Site/Facility	County Region	Located on Detailed Map	Community	Routine Maintenance Activities	Year Recent Maintenance Conducted	Expected to be Regulated by USACE?	Anticipated Permit Under RWQCB	Highest Likely Tier Category USFWS	Highest Likely Tier Category NMFS	Potential for CESA Take? CDFW [a]	Special-Status Species with Potential to Occur
					Culvert Maintenance: – Replacement in-kind – Replacement for undersized culverts – Cleaning – vegetation, debris, garbage – Trash rack replacement/ install		Unlikely – The County does not plan to conduct any culvert maintenance activities at this location in the near future.	Type of RWQCB permit is dependent upon Corps jurisdiction	Tier 2	Tier 1	No	CRLF, SFGS = Tier 2 Western snowy plover = Tier 1
					General Maintenance Activities **Fuel Reduction and Defensible Space:** – Re-treatment of fuel management areas – Re-treatment of high use campgrounds, picnic areas, etc. – Re-treatment of defensible space areas surrounding facilities and infrastructure – Maintenance of shaded fuel breaks along key ingress/ egress routes (roads and trails) and along Park boundary – Hazard Tree Removal and Pruning – Removal of immediate hazards to life, property, infrastructure – Thinning techniques utilized where ever full removal can be avoided to reduce risks to life, property, or infrastructure could be lost or damaged (end weight or directional pruning, removal of dead material, etc.)		Unlikely	WDR	Tier 2	Tier 1	No	CRLF, SFGS = Tier 2 Western snowy plover = Tier 1
					Weed/ Non-native removal: – Hand – Mechanical – Herbicide – Grazing		Unlikely	WDR	Tier 2	Tier 1	No	CRLF, SFGS = Tier 2 Western snowy plover = Tier 1
					Grassland/ Meadow/ Prairie Maintenance: – Annual Mowing/ string cutting – Grazing – Brush removal		Unlikely	WDR	Tier 2	Tier 1	No	CRLF, SFGS = Tier 2 Western snowy plover = Tier 1
					Facility Repairs general and along roads/ trails: – Parking lot island mulching and weed barrier re-install		Unlikely	WDR	Tier 2	Tier 1	No	CRLF, SFGS = Tier 2 Western snowy plover = Tier 1

No.	Site/Facility	County Region	Located on Detailed Map	Community	Routine Maintenance Activities	Year Recent Maintenance Conducted	Expected to be Regulated by USACE?	Anticipated Permit Under RWQCB	Highest Likely Tier Category USFWS	Highest Likely Tier Category NMFS	Potential for CESA Take? CDFW [a]	Special-Status Species with Potential to Occur
County Trails												
4	Crystal Springs Trail	Bayside North	Figures B-2, and C-1C-2	San Mateo	**Paved Roads/ trails:** – Brushing, sweeping, blowing and roadside mowing – Roadside ditch clearing (vegetation, debris, garbage) – Debris/ slide removal from surface and associated repairs		Unlikely	WDR	Tier 2	Tier 1	No	Mission blue = Tier 2 if pre-activity surveys for host plants can be conducted, and the host plants avoided if present. Otherwise, Tier 3. CRLF, SFGS = Tier 2
					Culvert Maintenance: – Replacement in-kind – Replacement for undersized culverts – Cleaning – vegetation, debris, garbage – Trash rack replacement/ install ***** two culverts at milepost 4.0 and 4.1 along the Sawyer Camp Trail section**		Maybe – There are many culverts along this trail and two require replacement at mileposts 4.0 and 4.1. Culvert replacement activities may be regulated if they drain to waters or wetlands of the U.S.	Type of RWQCB permit is dependent upon Corps jurisdiction	Tier 2	Tier 1	No	Mission blue = Tier 2 if pre-activity surveys for host plants can be conducted, and the host plants avoided if present. Otherwise, Tier 3. CRLF, SFGS = Tier 2
					General Maintenance Activities **Fuel Reduction and Defensible Space:** – Re-treatment of fuel management areas – Re-treatment of high use campgrounds, picnic areas, etc. – Re-treatment of defensible space areas surrounding facilities and infrastructure – Maintenance of shaded fuel breaks along key ingress/ egress routes (roads and trails) and along Park boundary – Hazard Tree Removal and Pruning – Removal of immediate hazards to life, property, infrastructure – Thinning techniques utilized where ever full removal can be avoided to reduce risks to life, property, or infrastructure could be lost or damaged (end weight or directional pruning, removal of dead material, etc.)		Unlikely	WDR	Tier 2	Tier 1	No	Mission blue = Tier 2 if pre-activity surveys for host plants can be conducted, and the host plants avoided if present. Otherwise, Tier 3. CRLF, SFGS = Tier 2
					Weed/ Non-native removal: – Hand – Mechanical – Herbicide – Grazing		Unlikely	WDR	Tier 2	Tier 1	No	Mission blue = Tier 2 if pre-activity surveys for host plants can be conducted, and the host plants avoided if present. Otherwise, Tier 3. CRLF, SFGS = Tier 2

No.	Site/Facility	County Region	Located on Detailed Map	Community	Routine Maintenance Activities	Year Recent Maintenance Conducted	Expected to be Regulated by USACE?	Anticipated Permit Under RWQCB	Highest Likely Tier Category USFWS	Highest Likely Tier Category NMFS	Potential for CESA Take? CDFW [a]	Special-Status Species with Potential to Occur
					Grassland/ Meadow/ Prairie Maintenance: – Annual Mowing/ string cutting – Grazing – Brush removal		Unlikely	WDR	Tier 2	Tier 1	No	Mission blue = Tier 2 if pre-activity surveys for host plants can be conducted, and the host plants avoided if present. Otherwise, Tier 3. CRLF, SFGS = Tier 2
					Facility Repairs general and along roads/ trails: – Parking lot island mulching and weed barrier re-install		Unlikely	WDR	Tier 2	Tier 1	No	Mission blue = Tier 2 if pre-activity surveys for host plants can be conducted, and the host plants avoided if present. Otherwise, Tier 3. CRLF, SFGS = Tier 2
15	Alpine Trail	South Bayside	Figures B-3 and C-6	Ladera	**Paved Roads/ trails:** – Re-paving (resurfacing, tread repair, slurry coating) – Patching – Crack sealing – Surfacing – Re-striping – Brushing, sweeping, blowing and roadside mowing – Roadside ditch clearing (vegetation, debris, garbage) – Debris/ slide removal from surface and associated repairs		Unlikely	WDR	Tier 2	Tier 1	No	CRLF
					Unpaved Roads/ Trails: – Re-grading (re-surfacing, tread repair) – Repair of rolling dips – Re-rocking – Brushing and roadside mowing – Roadside ditch clearing (vegetation, debris, garbage) – Debris/ slide removal from surface and associated repairs		Unlikely	WDR	Tier 2	Tier 1	No	CRLF
					Culvert Maintenance: – Replacement in-kind – Replacement for undersized culverts – Cleaning – vegetation, debris, garbage – Trash rack replacement/ install		Likely – Some culverts along the trail drain to Los Trancos Creek and may be regulated.	Section 401 Water Quality Certification	Tier 2	Tier 1	No	CRLF

No.	Site/Facility	County Region	Located on Detailed Map	Community	Routine Maintenance Activities	Year Recent Maintenance Conducted	Expected to be Regulated by USACE?	Anticipated Permit Under RWQCB	Highest Likely Tier Category USFWS	Highest Likely Tier Category NMFS	Potential for CESA Take? CDFW [a]	Special-Status Species with Potential to Occur
					General Maintenance Activities **Fuel Reduction and Defensible Space:** – Re-treatment of fuel management areas – Re-treatment of high use campgrounds, picnic areas, etc. – Re-treatment of defensible space areas surrounding facilities and infrastructure – Maintenance of shaded fuel breaks along key ingress/ egress routes (roads and trails) and along Park boundary – Hazard Tree Removal and Pruning – Removal of immediate hazards to life, property, infrastructure Thinning techniques utilized where ever full removal can be avoided to reduce risks to life, property, or infrastructure could be lost or damaged (end weight or directional pruning, removal of dead material, etc.)		Unlikely	WDR	Tier 2	Tier 1	No	CRLF
					Weed/ Non-native removal: – Hand – Mechanical – Herbicide – Grazing		Unlikely	WDR	Tier 2	Tier 1	No	CRLF
					Grassland/ Meadow/ Prairie Maintenance: – Annual Mowing/ string cutting – Grazing – Brush removal		Unlikely	WDR	Tier 2	Tier 1	No	CRLF
					Facility Repairs general and along roads/ trails: – Parking lot island mulching and weed barrier re-install		Unlikely	WDR	Tier 2	Tier 1	No	CRLF
23	Devil's Slide Trail	Coastside North	Figures B-5 and C-3	Pacifica	**Paved Roads/ Trails:** – Brushing, sweeping, blowing and roadside mowing – Roadside ditch clearing (vegetation, debris, garbage) – Debris/ slide removal from surface and associated repairs		Unlikely	WDR	Tier 2	Tier 1	No	CRLF
					Culvert Maintenance: – Replacement in-kind – Replacement for undersized culverts – Cleaning – vegetation, debris, garbage – Trash rack replacement/ install		Maybe - The County does not plan to conduct any culvert maintenance activities at this trail in the near future.	Type of RWQCB permit is dependent upon Corps jurisdiction	Tier 2	Tier 1	No	CRLF

No.	Site/Facility	County Region	Located on Detailed Map	Community	Routine Maintenance Activities	Year Recent Maintenance Conducted	Expected to be Regulated by USACE?	Anticipated Permit Under RWQCB	Highest Likely Tier Category USFWS	Highest Likely Tier Category NMFS	Potential for CESA Take? CDFW [a]	Special-Status Species with Potential to Occur
					General Maintenance Activities **Fuel Reduction and Defensible Space:** – Re-treatment of fuel management areas – Re-treatment of high use campgrounds, picnic areas, etc. – Re-treatment of defensible space areas surrounding facilities and infrastructure – Maintenance of shaded fuel breaks along key ingress/ egress routes (roads and trails) and along Park boundary – Hazard Tree Removal and Pruning – Removal of immediate hazards to life, property, infrastructure – Thinning techniques utilized where ever full removal can be avoided to reduce risks to life, property, or infrastructure could be lost or damaged (end weight or directional pruning, removal of dead material, etc.)		Unlikely	WDR	Tier 2	Tier 1	No	CRLF
					Weed/ Non-native removal: – Hand – Mechanical – Herbicide – Grazing		Unlikely	WDR	Tier 2	Tier 1	No	CRLF
					Facility Repairs general and along roads/ trails: – Parking lot island mulching and weed barrier re-install		Unlikely	WDR	Tier 2	Tier 1	No	CRLF
	Green Valley Trail[a]	Coastside North	Figure B-5 (south of Devil's Slide Trail)	Pacifica	**Unpaved Roads/ Trails:** – Re-grading (re-surfacing, tread repair) – Repair of rolling dips – Re-rocking – Brushing and roadside mowing – Roadside ditch clearing (vegetation, debris, garbage) – Debris/ slide removal from surface and associated repairs		Unlikely	WDR	Tier 2	Tier 1	No	CRLF
					Culvert Maintenance: – Replacement in-kind – Replacement for undersized culverts – Cleaning – vegetation, debris, garbage – Trash rack replacement/ install		Unlikely - The County does not plan to conduct any culvert maintenance activities at this trail in the near future.	Type of RWQCB permit is dependent upon Corps jurisdiction	Tier 2	Tier 1	No	CRLF

No.	Site/Facility	County Region	Located on Detailed Map	Community	Routine Maintenance Activities	Year Recent Maintenance Conducted	Expected to be Regulated by USACE?	Anticipated Permit Under RWQCB	Highest Likely Tier Category USFWS	Highest Likely Tier Category NMFS	Potential for CESA Take? CDFW [a]	Special-Status Species with Potential to Occur
					General Maintenance Activities **Fuel Reduction and Defensible Space:** – Re-treatment of fuel management areas – Re-treatment of high use campgrounds, picnic areas, etc. – Re-treatment of defensible space areas surrounding facilities and infrastructure – Maintenance of shaded fuel breaks along key ingress/ egress routes (roads and trails) and along Park boundary – Hazard Tree Removal and Pruning – Removal of immediate hazards to life, property, infrastructure – Thinning techniques utilized where ever full removal can be avoided to reduce risks to life, property, or infrastructure could be lost or damaged (end weight or directional pruning, removal of dead material, etc.)		Unlikely	WDR	Tier 2	Tier 1	No	CRLF
					Weed/ Non-native removal: – Hand – Mechanical – Herbicide – Grazing		Unlikely	WDR	Tier 2	Tier 1	No	CRLF
					Facility Repairs general and along roads/ trails: – Parking lot island mulching and weed barrier re-install		Unlikely	WDR	Tier 2	Tier 1	No	CRLF

[a] Note that the Green Valley Trail is currently in the design phase and does not yet exist. Once completed, maintenance activities of the Green Valley Trail would be covered under the County's Routine Maintenance Program.
[b] Potential for take under CESA assumes implementation of Best Management Practices.
[c] At the Fitzgerald Marine Reserve, no maintenance activities below mean high tide line (e.g. staircase and main access ramp) will occur under the proposed program.

Appendix C

San Mateo County Routine Maintenance Sites in County Parks

Figure C-1

San Mateo County Routine Maintenance Sites in County Parks

SAN FRANCISCO COUNTY

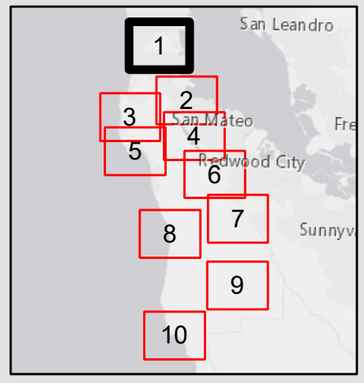
Trails (27)

Routine Maintenance Sites

- Culvert and V-Ditch Cleaning (32)
- Trail or Road Surface Maintenance (4)
- Waterbar/Rolling Dip Repair or Installation (7)
- Culvert Replacements 2017 (1)

Admnistrative Areas

- County Park
- Colma — Incorporated City
- Montara — Unincorporated Area



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Horizon WATER and ENVIRONMENT

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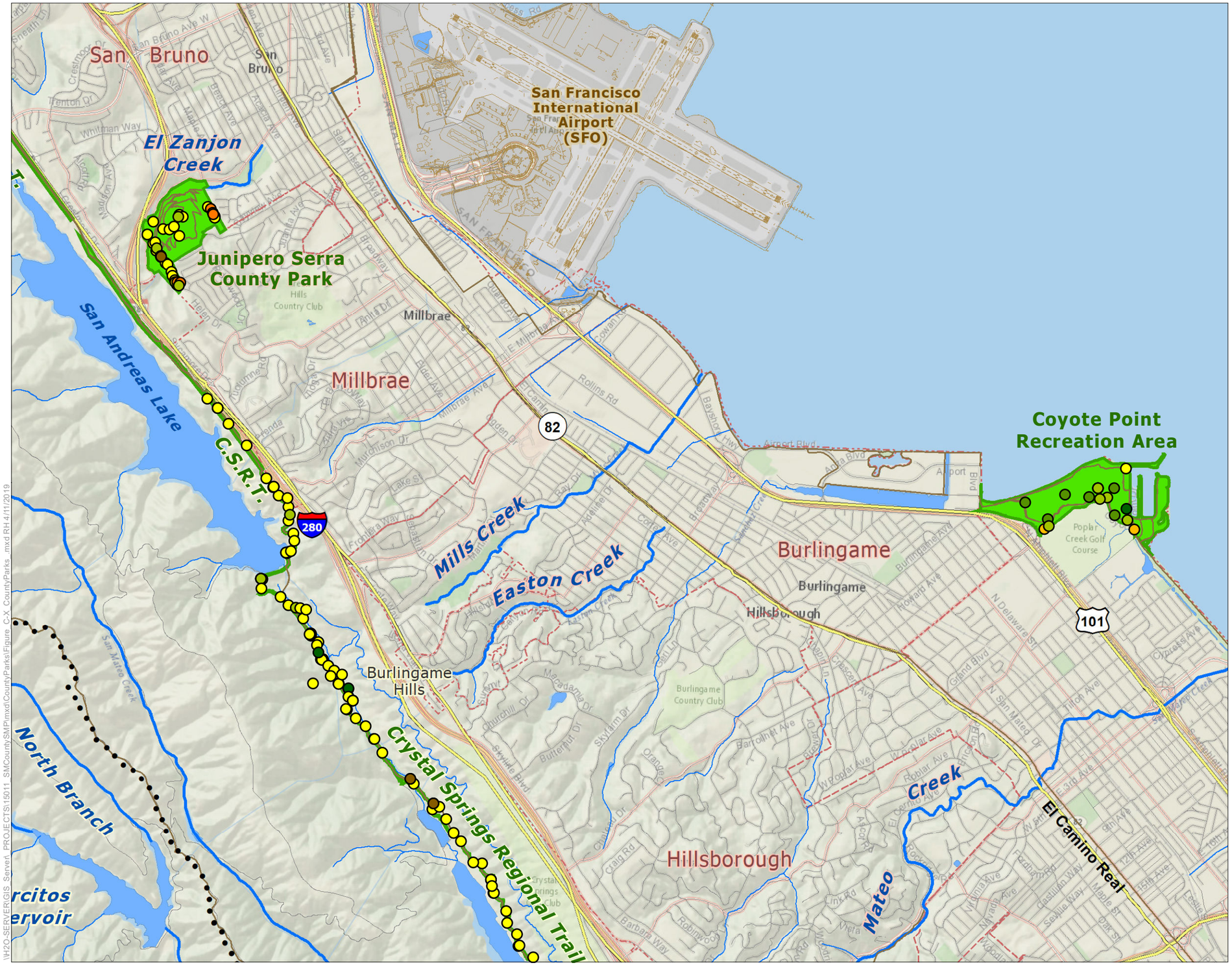
Figure C-2

San Mateo County Routine Maintenance Sites in County Parks



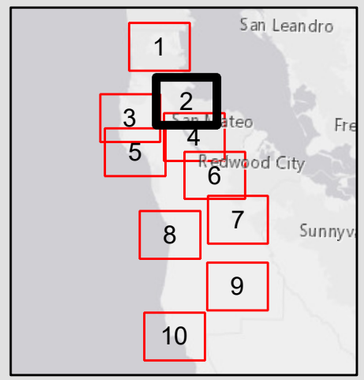
Trails (38)

Routine Maintenance Sites

- Culvert Repair or Replacement (7)
- Culvert and V-Ditch Cleaning (108)
- Other (3)
- Trail or Road Surface Cleaning (6)
- Trail or Road Surface Maintenance (16)
- Waterbar/Rolling Dip Repair or Installation (5)
- Culvert Replacements 2017 (4)

Admnistrative Areas

- County Park
- Colma — Incorporated City
- Montara — Unincorporated Area



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Horizon WATER and ENVIRONMENT

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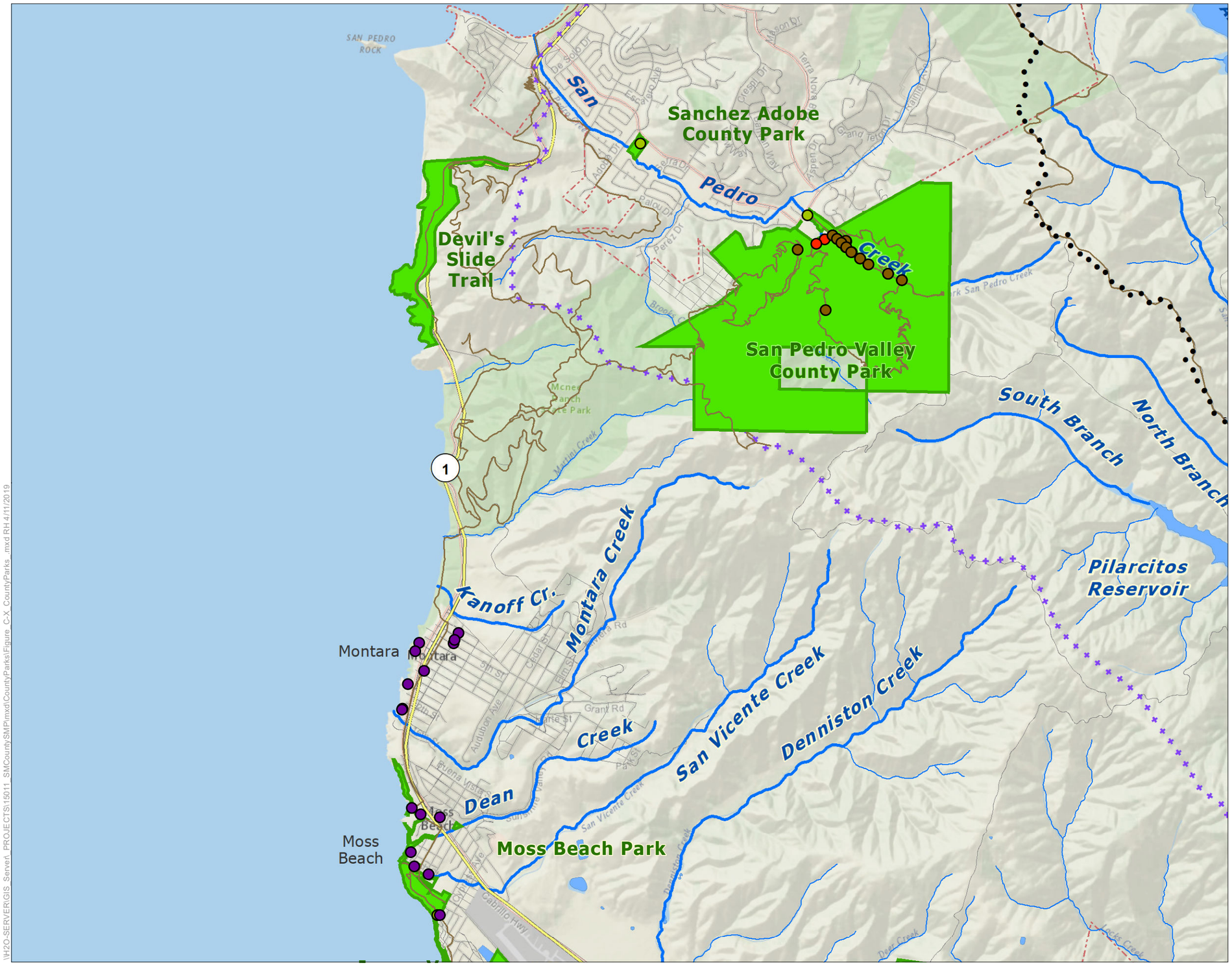
Figure C-3

San Mateo County Routine Maintenance Sites in County Parks



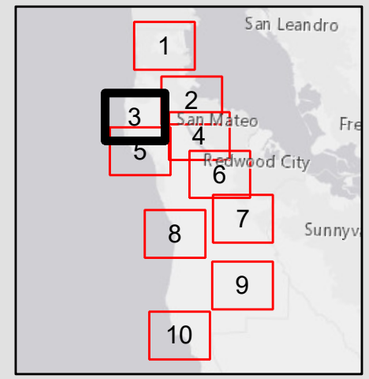
Trails (30)

Routine Maintenance Sites

- Bridge Maintenance (2)
- Culvert Repair or Replacement (10)
- Trail or Road Surface Maintenance (3)
- Culvert Replacements 2017 (12)
- Fitzgerald BMPs (16)

Admnistrative Areas

- County Park
- Colma — Incorporated City
- Montara — Unincorporated Area



Horizon WATER and ENVIRONMENT

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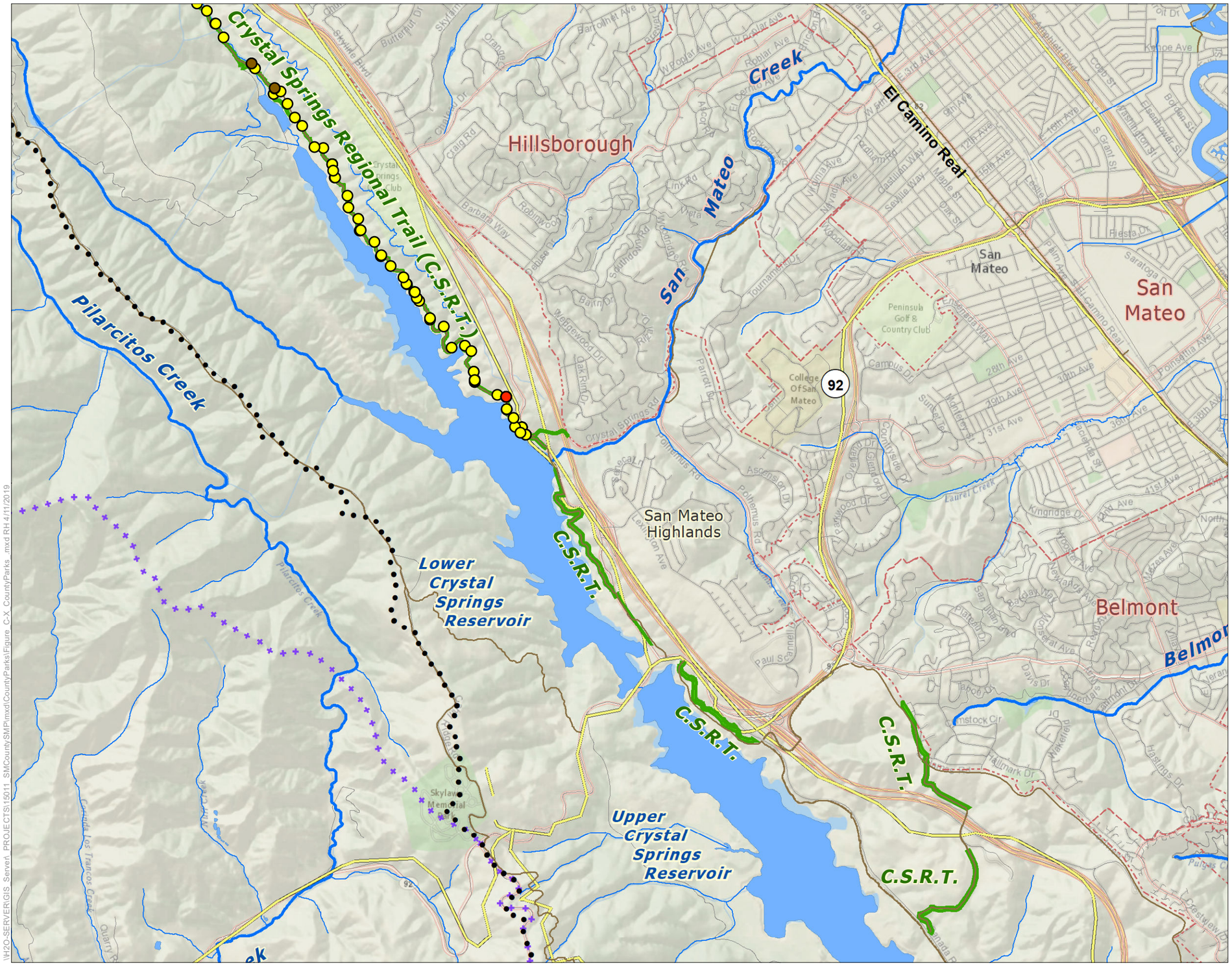
Figure C-4

San Mateo County Routine Maintenance Sites in County Parks

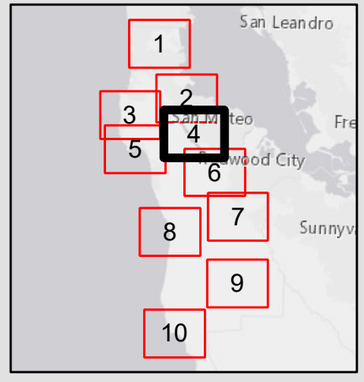


Routine Maintenance Sites

- Trails (12)
- Bridge Maintenance (5)
- Culvert Repair or Replacement (2)
- Culvert and V-Ditch Cleaning (64)
- Culvert Replacements 2017 (2)

Admnistrative Areas

- County Park
- Colma — Incorporated City
- Montara — Unincorporated Area



Horizon WATER and ENVIRONMENT

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Figure C-5

San Mateo County Routine Maintenance Sites in County Parks

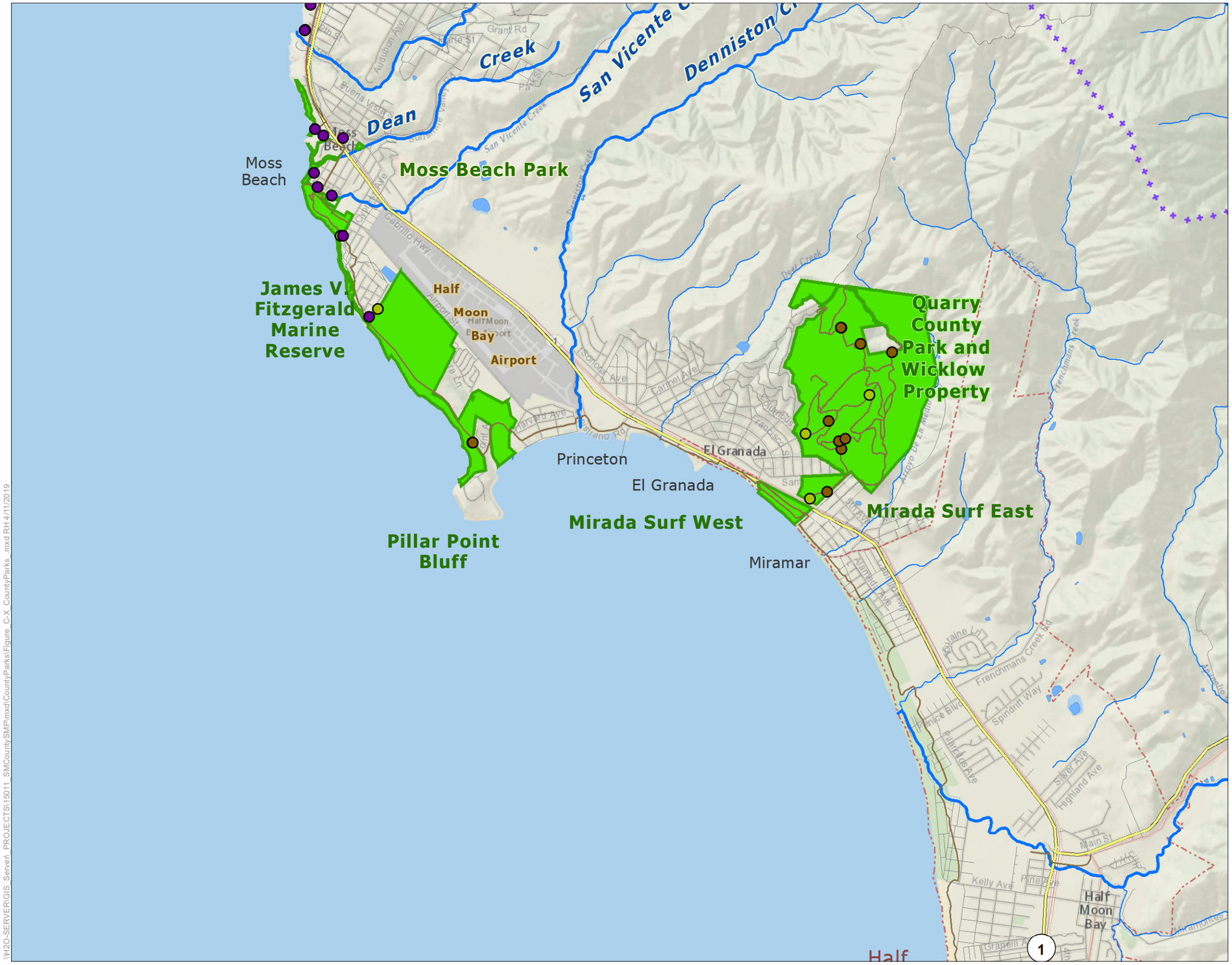

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Figure C-6

San Mateo County Routine Maintenance Sites in County Parks

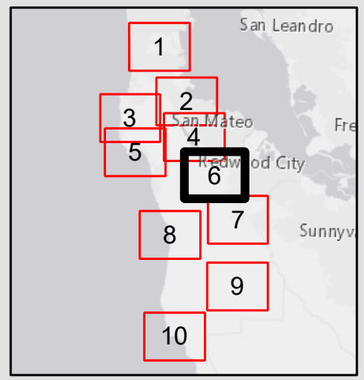
Trails (32)

Routine Maintenance Sites

- Bridge Maintenance (7)
- Culvert Repair or Replacement (1)
- Culvert and V-Ditch Cleaning (1)
- Other (1)
- Trail or Road Surface Cleaning (44)
- Trail or Road Surface Maintenance (24)
- Waterbar/Rolling Dip Repair or Installation (13)
- Culvert Replacements 2017 (15)

Admnistrative Areas

- County Park
- Colma — Incorporated City
- Montara — Unincorporated Area



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Horizon WATER and ENVIRONMENT

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Figure C-7

San Mateo County Routine Maintenance Sites in County Parks

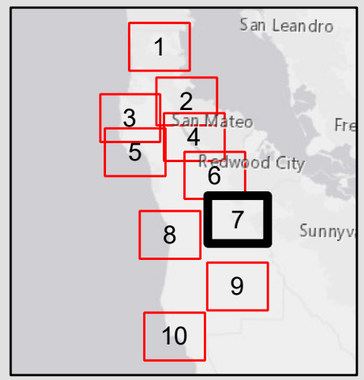
Trails (16)

Routine Maintenance Sites

- Bridge Maintenance (1)
- Culvert Repair or Replacement (2)
- Culvert and V-Ditch Cleaning (2)
- Trail or Road Surface Maintenance (4)
- Waterbar/Rolling Dip Repair or Installation (2)
- Culvert Replacements 2017 (7)

Admnistrative Areas

- County Park
- Colma — Incorporated City
- Montara — Unincorporated Area



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Horizon WATER and ENVIRONMENT

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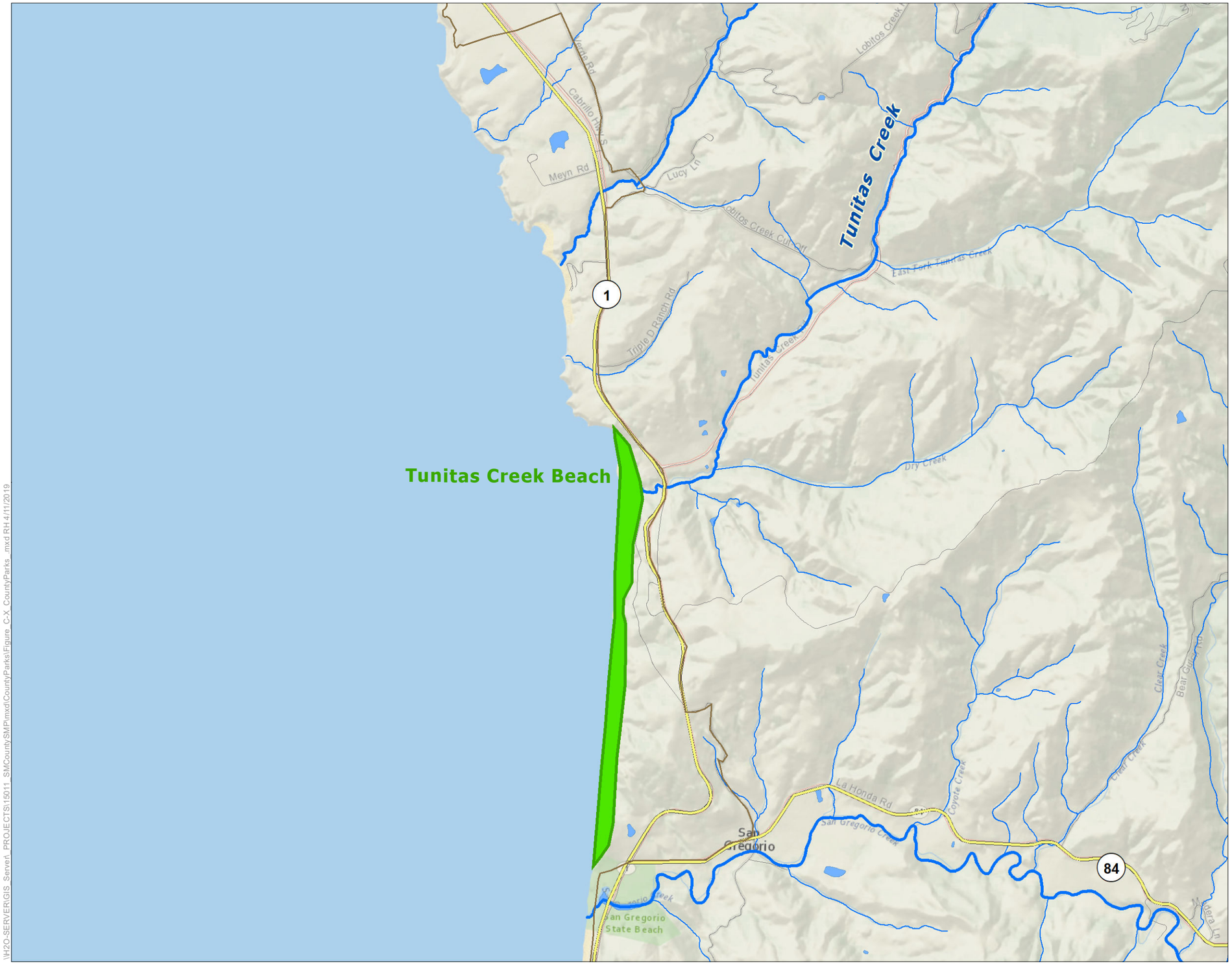
Figure C-8

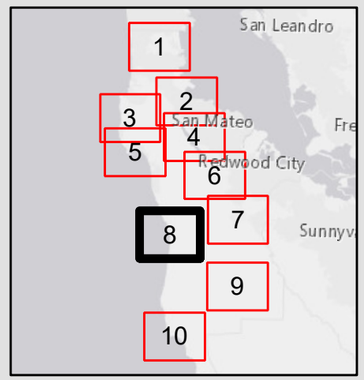
San Mateo County Routine Maintenance Sites in County Parks



Trails (1)

Admnistrative Areas

- County Park
- Colma — Incorporated City
- Montara — Unincorporated Area



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Horizon WATER and ENVIRONMENT

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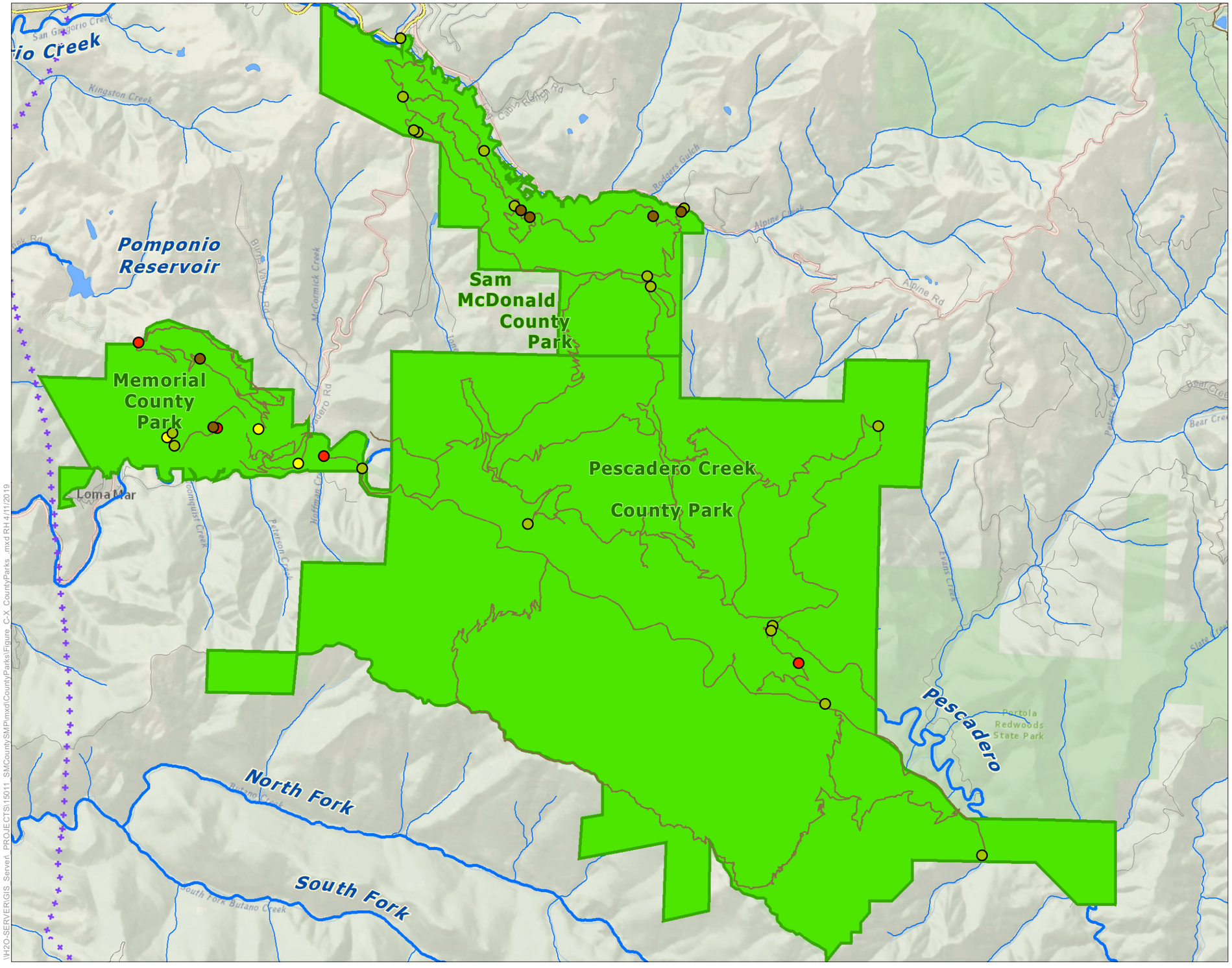
Figure C-9

San Mateo County Routine Maintenance Sites in County Parks



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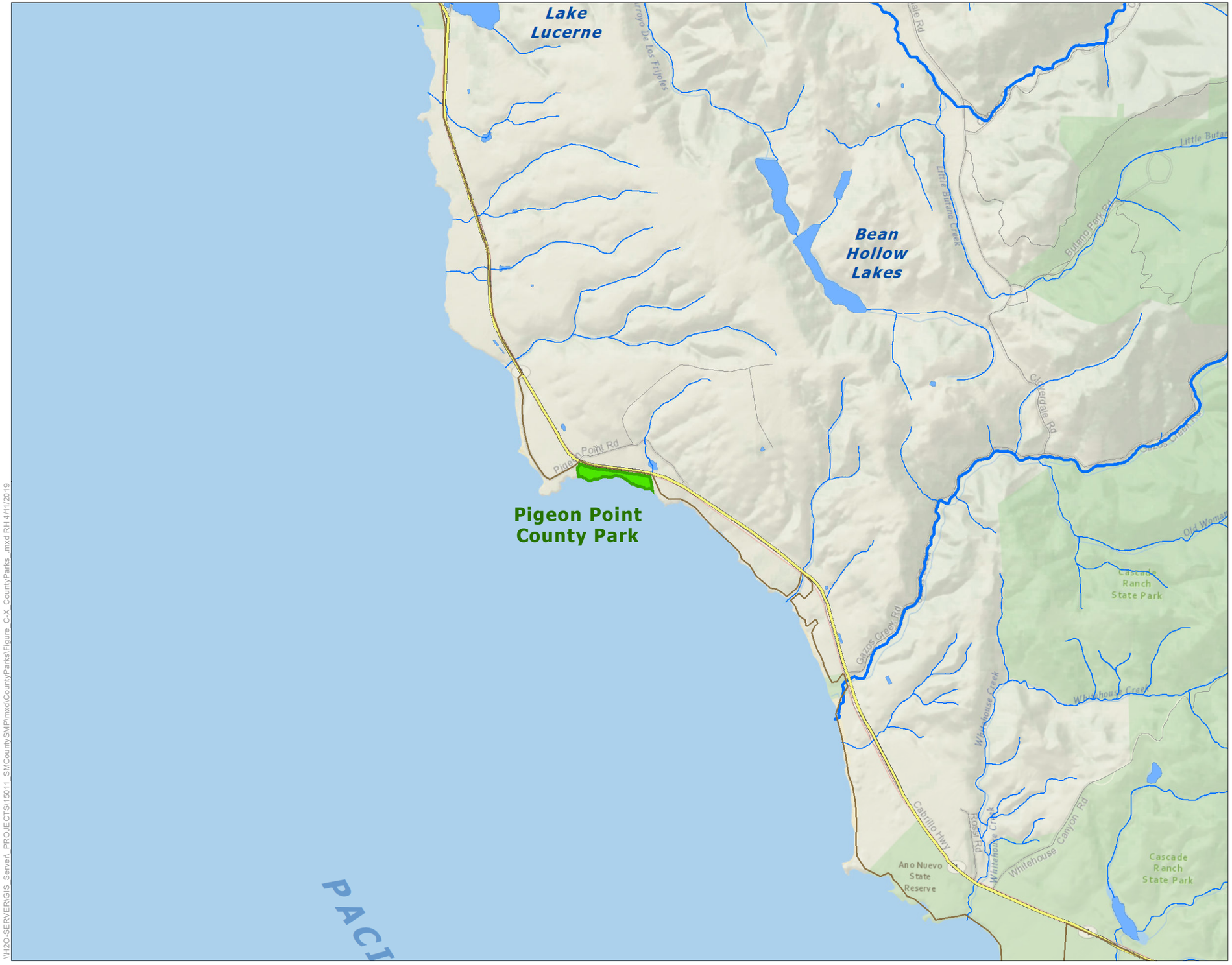


Figure C-10

San Mateo County Routine Maintenance Sites in County Parks

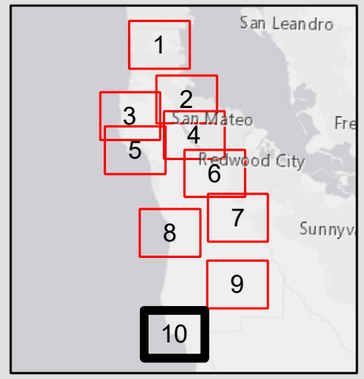
Trails (1)

Admnistrative Areas

County Park

Colma — Incorporated City

Montara — Unincorporated Area



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Horizon WATER and ENVIRONMENT

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Appendix D

Regulatory Meeting Notes

Programmatic Permit Meeting Notes
February 1, 2012

In attendance:
Shin-Roei Lee, Water Board - srlee@waterboards.ca.gov
Dale Bowyer, Water Board - dbowyer @waterboards.ca.gov
Sandi Potter, Water Board - smpotter@waterboards.ca.gov
Mark Chow, County Flood Control - mchow@co.sanmateo.ca.us
Carole Foster, County Flood Control - cfoster@co.sanmateo.ca.us
Julie Casagrande, County Flood Control - Jcasagrande@co.sanmateo.ca.us
Joe LoCoco, County Flood Control - Jlococo@co.sanmateo.ca.us
Edelzar Garcia, County Flood Control - Egarcia@co.sanmateo.ca.us
Samuel Herzberg, County Parks Department - sherzberg@co.sanmateo.ca.us
Suzanne Deleon, Fish & Game - deleon@dfg.ca.gov
Craig Weightman, Fish & Game - Cweightman@dfg.ca.gov
Ian Liffmann, Corps of Engineers - Ian.liffmann@usace.army.mil
Bill Stevens, NOAA Fisheries - William.stevens@noaa.gov

County Standard Maintenance Activities (Roads and Parks)
- -Sediment removal, vegetation management, bank repair, culverts, LWD, trails, haul roads, log bridges

Programmatic Process
- -Develop Programmatic EIR
- -Annual report to be approved
  - -mitigation considered then
- -End of year report

SCVWD SMP – was 10 year permit. Agencies finding that 5-year is better.

Mitigation – watershed specific or coastside/bayside

- -Mitigation into perpetuity?
  - -Depends on type of mitigation
    - -Enhancement or removal of invasive species not in perpetuity
    - -creation or restoration of habitat possibly in perpetuity (Need to re-mitigate if mitigation is permanent??)
- - Impacts to habitat (USFWS) or species (NMFS, USFWS, DFG)
  - -Need to mitigate for species impacts each time?
- -Repair of slip-out/culvert failures could reduce sources of sediment.
  - -In past, Regional Board did not consider sediment source reduction as mitigation
  - -now, may be included as components of mitigation

What should not be included?
- -where impacts to species is definite
- -Replacing one structure with a different structure (unless improving fish passage)
- -Gazos Creek LWD projects

NMFS – would expect direct take and adverse effects
- -Limit size, scope, number of projects
- -write consultation for 5-year plan
- - require pre-construction notification

Next steps –

- -list of projects for next 5-10 years
  - -Tiered approach to permitting needed
  - - Highlight sediment impaired streams in list (San Gregorio, Butano, Pescadero, San Francisquito)
- -Update Maintenance standards manual
- -Potential mitigation proposals (Ocean/Bayside)
  - -various project types: sediment reduction vs. restoration vs. enhancement
  - -possibility for Roads to fund restoration projects in Parks as Roads mitigation
  - -need to determine if mitigation is fundable upfront, especially for listed species
    - -look into sect. 6 grants/wildlife conservation
- -Look at other agency models (SCWA, SCVWD SMP, EBRPD, MPROSD)
- -Do PEIR on whole range of projects
  - -EIR covers all species, BMPs, Mitigation

Meeting Notes
Programmatic Permit Meeting with Joseph Terry, USFWS
February 8, 2012

- Impacts to species (NMFS, USFWS, DFG) will require mitigation each time. Need to anticipate the number of times and mitigate up front, otherwise need to mitigate individually.

    E.g. Look at SFPUC BO – have large 'mitigation bank'

- For O&M Biological Opinion, would be for 5 to 10 years. Would need to know how much impact ahead of time.

- Project list does not need to be complete. Projects can be appended to list.

- Need to limit the size, scope, and number of projects

    E.g. ½ acre cap per project, annual cap and 5-year cap (need to consult with all agencies first).

- For programmatic BO, need to know types of activities, effects analysis, and conservation measures. Do not need to know exact projects up front.

- Critical habitats (e.g. CRLF) need to be in units (e.g. north vs. south).

- Need to update Maintenance Standards, specifically to address species per region (look at Corps CRLF BO).

- SFGS: cannot relocate, exclusion fencing needs to be snake friendly, erosion control silt fencing may not be adequate.

- Exclusion fencing: required during wet season, not needed during dry season if no major ground disturbance and not right in riparian corridor.

- May not be worth including CTS in programmatic.

- Need to address spread of invasive plants either in programmatic or in revised maintenance standards (e.g. protocols for cleaning vehicles, transporting and storing removed materials, etc.)

- Silverspot butterfly on San Bruno Mntn should be addressed. Look at existing HCP for SBM.

- Projects where impacts have the potential to injure or kill species should not be included in programmatic.

County of San Mateo Department of Public Works, Parks
Programmatic Permitting Efforts

Background:

In 2004, the County of San Mateo Department of Public Works (County) developed a manual of maintenance standards as part of its Watershed Protection Program. This manual was developed based on a provision written into the County's NPDES permit that became effective in 1999 that required standards for rural road maintenance. The County developed these procedures to minimize impacts to water quality and fish and wildlife habitat throughout the unincorporated areas of the County. The County of San Mateo Watershed Protection Program's Maintenance Standards (Maintenance Standards) manual contains standards, Best Management Practices (BMPs) and conservation outcomes for all maintenance activities undertaken by the Department of Public Works. Maintenance activities must also be conducted in accordance with the San Mateo Countywide Water Pollution Prevention Program (SMCWPPP) standards. The Department of Public Works includes Roads, Utilities (flood control, water, sewer, lighting, landfills), and Airports Divisions.

The standards in the manual are not discretionary; any deviation from implementation of these standards must be documented and reported to management.

In addition to the above, the County also utilizes the Guidelines for Protecting Aquatic Habitat and Salmon Fisheries for County Maintenance from the FishNet 4C (Fishery Network of the Central California Coastal Counties).

Current Status of Maintenance Standards Implementation:

Currently, the Maintenance Standards manual does not provide any regulatory coverage. Permits for road maintenance work are sought on a case-by-case basis by the County, requiring staff time and individual permit fees. Some of the types of routine road, utility, airport, and park maintenance activities that may require permits and CEQA review include:

- Facilities maintenance, including roads, trails, bridges, culverts, and water supply facilities
    - Sediment and debris removal within County structures (culverts and bridges)
    - Culvert replacement projects
    - Maintenance of unpaved roads and trails (e.g., road rocking and rolling dips)
- Bank and slope stabilization projects intended to protect County roads, trails or streambanks
- Vegetation management
    - Mowing, controlled grazing, manual removal, herbicide use, removal of trees that may impact County facilities, and replanting of vegetation
    - Large wood debris management
- Ditch clearing

Each time a project requires permits, staff time must be spent on the permit application and permit fees must also be paid. In addition, the time required to obtain permits sometimes delays projects or prevents them from being constructed until the subsequent field season. This increases project costs and decreases the efficient implementation of maintenance projects. Replacing deteriorated culverts or stabilizing slopes in a timely manner minimizes the overall sediment input into sensitive habitats.

Species of Concern:

Over 90% of unincorporated San Mateo County has been designated as critical habitat for a variety of Endangered and Threatened species such as California red-legged frog (CRLF), marbled murrelet, Coho salmon and steelhead, and Bay checkerspot butterfly. Following the designation of critical habitat, streams and, in some cases, watersheds that are

currently, historically, or have future potential to be habitat for Endangered coho salmon and Threatened steelhead are considered sensitive biological habitats. Additionally, numerous occurrences have been documented for sensitive animal and plant species such as the San Francisco garter snake (SFGS), California clapper rail, San Mateo woolly sunflower, coast yellow leptosiphon, and San Mateo thornmint. Although few reported occurrences exist, the San Francisco dusky-footed woodrat, a Species of Special Concern, is found throughout the woodland, scrub, and chaparral habitats of unincorporated San Mateo County. A list of sensitive species known to occur in San Mateo County is included in Attachment C.

Programmatic Meeting Summary

Horizon Water and Environment (Horizon) presented a Scope of Work to Parks and Public Works department representatives on February 21, 2014, for obtaining programmatic permits for general maintenance activities.

The following representatives were in attendance:
Mark Chow, Public Works - mchow@smcgov.org
Carole Foster, Public Works - cfoster@smcgov.org
Julie Casagrande, Public Works - Jcasagrande@smcgov.org
Joe LoCoco, Public Works-Roads - Jlococo@smcgov.org
Edelzar Garcia, Public Works - Egarcia@smcgov.org
Samuel Herzberg, Parks - sherzberg@smcgov.org
Marlene Finley, Parks - mfinley@smcgov.org
Ramona Arechiga, Parks – trarechiga@smcgov.org
James Wadleigh, Public Works-Airports – jwadleigh@smcgov.org
Michael Huynh, Public Works-Roads - mhuynh@smcgov.org
Ann Stillman, Public Works - astillman@smcgov.org
Ken Schwarz, Horizon – ken@horizonh2o.com
Jill Sunahara, Horizon – jill@horizonh2o.com
Tom Engels, Horizon – tom@horizonh2o.com

Below is a summary of that meeting.

County standard maintenance activities (Roads and Parks) include sediment removal, vegetation management, bank repair, culvert replacement, LWD management, and trail, haul road, and log bridge management.

The programmatic process would include development of a Programmatic EIR, annual reporting to be approved by agencies, and an end of year report. Mitigation would be considered on an annual basis. There would be a limit to the size, scope, and number of projects.

Projects or maintenance activities that should NOT be included in a Programmatic include ones where impacts to species is definite, where there is a need to replace one structure with a different structure (unless improving fish passage), and any Gazos Creek LWD projects.

The County's next steps in obtaining programmatic permits include developing a list of projects for the next 5-10 years utilizing a tiered approach based on impacts, updating the Maintenance Standards Manual, developing potential mitigation proposals, and completing a PEIR on the entire range of projects. The PEIR will cover all species, BMPs, and potential mitigation.

Benefits & Drawbacks of a Programmatic Approach:

Benefits:

- Reduces workload for regulatory agency staff
- Provides regulatory certainty
- Reduces costs for environmental review and permitting by bundling projects. For example, the County estimates that it spends about $30,000 annually in permit fees alone for routine road and park maintenance, excluding staff time spent on permit applications.
- Reduce staff time required to implement environmental review and permitting, which also results in reduced costs. For example, the County estimates it spends about $100,000 annually for staff time to permit projects.
- Streamlines the state and federal environmental permitting process by allowing review of the annual plan rather than piecemeal projects.
- Prevents project delays due to permitting issues and insures efficient implementation of maintenance projects prior to the next storm season.
- Allows for improved assessment of cumulative impacts.
- Replacing outdated culverts with same size or upgraded culverts in a more expedient manner will benefit fish passage, water quality and flood protection, and protect County facilities.
- Allows for consolidated mitigation opportunities rather than fragmented projects

Drawbacks:

- Development of a PEIR can be time-consuming and expensive;
- Some projects (bridge construction, etc.) may still require individual permits
- County staff would need to prepare the Annual Maintenance Plan and monitoring reports

For more information contact:

Mark Chow
Public Works, County of San Mateo
(650) 599-1489
mchow@smcgov.org

Sam Herzberg
Division of Parks, County of San Mateo
(650) 363-1823
sherzberg@smcgov.org

Allison Chan

From: Allison Chan
Sent: Monday, April 24, 2017 5:24 PM
To: 'Galacatos, Katerina CIV USARMY CESPN (US)'; 'Schowalter, Naomi A CIV USARMY CESPN (US)'; 'Sturgis, Tahsa@Waterboards'; 'leif_goude@fws.gov'; 'william.stevens@noaa.gov'; 'ryan_olah@fws.gov'; 'randi.adair@wildlife.ca.gov'
Cc: 'Julie Casagrande'; 'Mark Chow'; 'Joe Lo Coco'; 'Krzysztof Lisaj'; 'Ramona Arechiga'; 'Michael Huynh'; 'Ginger Bolen'; 'steve'; Ken Schwarz
Subject: SM County Routine Maintenance Program: 4/19/17 meeting notes

Hello all,

Thank you once again for participating in last Wednesday's meeting for the San Mateo County Routine Maintenance Program. The agenda, PowerPoint presentation, and other meeting materials are available on Dropbox at this link. As discussed at the meeting, please feel free to provide us with feedback on topics raised by **May 3**. We are planning to have a draft Manual for your review in early June.

Below are brief notes and action items from the meeting.

- Horizon provided an overview of the Program purpose, Program area, goals/objectives, planned maintenance activities, and overall status of the draft Program Manual.
- Group reviewed meeting handouts including:
  - 2012 regulatory meeting notes,
  - Maintenance Manual Table of contents, and Ch. 1 Introduction of Manual
  - Draft site characterization sheets prepared for some maintenance sites
  - Maintenance activities summary table prepared for Department of Public Works (DPW) and Parks Department sites.
- Culvert replacement activities –
  - In most situations, damaged culverts are replaced in kind. In some situations, the County would like to replace degrading or undersized culverts with larger ones that are correctly sized for site conditions to minimize future maintenance. Bill Stevens supported installation of larger culverts where appropriate. **Horizon/County** will coordinate further with other regulatory agencies on this topic. Per past guidance from the Regional Board, the routine maintenance program would not include installation of new culverts where none currently exist.
- Maintenance Program Tiers and Summary Tables –
  - The classification of tiers by resource sensitivity are still in draft form. The County and consultant team would like to coordinate further with USFWS and NMFS on the tiering definitions and obtain feedback on the listed species that should be considered present at certain sites and which tiers are appropriate for specific maintenance sites.
  - Revise the "Notes" column of the maintenance activities summary tables to provide a better description.
- USFWS comments -
  - Recommended that the Manual define and establish book ends (e.g. area or length limits) for the maintenance activities.
  - USFWS seemed willing to work with the County and consultant team to identify appropriate BMPs to avoid take at maintenance locations considered "Tier 2 – Not Likely to Result in Adverse Effects".
- USACE comments –
  - USACE reminded team that they do not regulate all activities below Ordinary High Water Mark.
  - Requested that the Manual describe where dredged sediment is planned to be disposed of or stored.

    - The **County/consultant team** should submit permit applications along with the Draft Manual to USACE. This will ensure that a project number is assigned to the Program.
    - USACE and USFWS general coordination meeting between the agencies is scheduled to occur in May.
- NMFS comment – NMFS BA should address Essential Fish Habitat.
- RWQCB comments –
    - The Program Manual should include a prioritized list of projects that will likely be addressed in the next 5 years.
    - Would like to see the Program Manual explore opportunities to beneficially reuse sediment – possibly along coastal beaches?
    - Recommended that the County/consultant team coordinate with BCDC.
    - RWQCB will follow recommendations of FWS, NMFS and CDFW with regards to species impacts/mitigation.
    - **County** should look to where quantitative or analytic approaches can be used to assess the maintenance need.

Anticipated Timeline:

- Feedback on topics raised at 4/19/17 meeting – 5/3/17
- Draft Maintenance Manual – June 2017
- Meeting with regulatory team to discuss Manual – early July 2017
- Revised Manual – August/September 2017
- CEQA Notice of Preparation – September 2017
- Draft permit applications – October-November 2017
- Meeting to discuss draft permit applications – November 2017
- Summer 2018 maintenance work

We look forward to working with you on this exciting project.

Regards,
Allison

Attendees
Keith Lichten – San Francisco RWQCB
Tahsa Sturgis – San Francisco RWQCB
Katie Hart – San Francisco RWQCB
Jenna Tuttle – San Francisco RWQCB
Katerina Galacatos – USACE, San Francisco District
Naomi Schowalter – USACE, San Francisco District
Bill Stevens – NOAA-NMFS
Ryan Olah – USFWS
Leif Goudy – USFWS
Mark Chow – County of San Mateo, DPW
Julie Casagrande - County of San Mateo, DPW
Joe Lococo - County of San Mateo, DPW
Ramona Arechiga – County of San Mateo, Parks Department
Micahel Huynh - County of San Mateo, DPW
Ken Schwarz – Horizon
Allison Chan – Horizon
Steve Rottenborn – HT Harvey & Associates
Ginger Bolen – HT Harvey & Associates

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Oakland, CA 94612
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Allison Chan

From: Allison Chan
Sent: Monday, July 31, 2017 10:21 AM
To: 'leif_goude@fws.gov'
Cc: Julie Casagrande; 'Ramona Arechiga'; Ken Schwarz; 'Steve Rottenborn'; 'Ginger Bolen'; 'Krzysztof Lisaj'
Subject: San Mateo County Routine Maintenance Program - 7/19/17 meeting summary

Hi Leif,
Good morning. Again, thank you for meeting with San Mateo County and the consultant team regarding the Routine Maintenance Program on July 19, 2017. Below are some summary notes. Please let us know if you have any additional notes or edits to this. We will be in touch soon after the draft Manual is complete.

Regards,
Allison

- Ken provided a re-cap of the proposed impact tiering approach for the Routine Maintenance Program and summarized the County's routine maintenance activities.
- For the Tier 2 definition, Leif recommended that the term "direct impacts" be removed from the definition; replace with "effect". Further, Leif recommended that the language regarding the tiers in the Manual not mirror FESA language (for example use "low impact" rather than "adverse effect").
- USFWS recommended that the County go through a formal consultation process with USFWS for the entire Program. The tiers can be structured such that the Tier 2 and Tier 3 designations for specific species would be used to track which activities will require compensatory mitigation (and additional tiers can be added if needed for mitigation at different ratios). **HT Harvey** will revise the tiering definitions.
- County requested that separate tiers be assigned to each maintenance site for USFWS vs. NMFS. Structuring of tiers for specific species would address this.
- Once consultation for the Program is complete, USFWS noted that Tier 1 activities should not require annual reporting.
- BO could be structured such that maintenance activities classified as Tier 3 (or 4 depending on revisions to tiers) would require an appendage. Mitigation for covered activities will need to be provided on an annual basis.
- Maintenance Manual should establish "book ends" for bank stabilization and slip-out repairs (e.g., X linear feet or acres of bank stabilization work would occur per year). USFWS may structure the BO such that bank stabilization and other maintenance activities are only described in the annual report (no need to request for permission prior to conducting work).
- Similarly, book ends should be established for culvert replacement and sediment removal activities. Hand clearing of debris from smaller culverts should be exempt from mitigation requirements.
- For on-site mitigation sites, Leif indicated that activities could probably be managed by Parks or DPW. **USFWS** will send an example turnkey form for reference. **County** can also share the deed restriction prepared for the Butano Creek habitat mitigation site with Leif.
- Leif prefers restoration projects that provide instream habitat complexity.
- The group reviewed the tiering designations for all the various maintenance activities. Some key points:
    - For San Bruno Mountain State Park, Maintenance Program Manual should only include maintenance activities not covered in the HCP. **Horizon** to revisit HCP to confirm which activities should be included in manual (possibly trash rack replacement, debris/slide removal)
    - For the Routine Maintenance Program, no formal consultation should be needed for the Ridgway's rail. Work windows and other BMPs (e.g., hand removal of vegetation near salt marsh habitat) should be sufficient for avoiding potential effects on this species. For the County's future Flood Resiliency projects

(i.e., Bayfront Canal, Colma Creek/San Bruno/Navigable Slough, Belmont) we could reinitiate consultation in the future if needed.
    - At Pescadero Creek Park, impacts on marbled murrelet would not likely to occur (Tier 1) due to the nature of maintenance activities and BMPs that would be implemented (i.e., work windows).
    - Assume Tier 1 for marbled murrelet throughout the Program area, but implement work windows and other BMPs (e.g., to avoid disturbance in direct flight paths)
    - The chances of encountering San Francisco garter snake are higher between Pacifica and Pescadero.
    - Leif clarified the tiering classifications of specific species at each maintenance location/Park. **HT Harvey** will revise the maintenance activities tables accordingly.
- Leif is interested in reviewing the implementation chapter of the Maintenance Manual.
- Leif noted that the BO may incorporate the Maintenance Manual by reference.

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Meeting Notes

San Mateo County Routine Maintenance Program

Inter-Agency Conference Call to Discuss Program Manual

September 17, 2018

Time: 2:00-3:30 pm

Attendees:

Tahsa Sturgis (SF-RWQCB)
Naomi Schowalter (USACE)
Bill Stevens (NOAA-NMFS)
Leif Goude (USFWS)
Julie Casagrande (SM County, DPW)
Joe Lo Coco (SM County, DPW)
Mark Chow (SM County, DPW)
Hannah Ormshaw (SM County, Parks)
Mike Schaller (SM County, Planning)
Ken Schwarz (Horizon)
Bridget Lillis (Horizon)
Ginger Bolen (HT Harvey)
Steve Rottenborn (HT Harvey)

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1. Introduction and Status Update

- The primary objective of this meeting (phone call) is to receive agency feedback on the Manual and to keep forward momentum as the County moves through the permitting process.
- A secondary objective of the meeting is to review overall timeline/schedule for the permitting and environmental compliance process.
- The purpose of the Manual is to provide a more comprehensive, consistent, and efficient approach to conducting routine maintenance activities in the County, versus submitting individual applications and agency authorizations for individual actions.

2. Manual Overview

- Ken led an overview "walk -through" of the Routine Maintenance Manual including a discussion of the overall structure/outline of the Manual and review of individual chapters. Important takeaways from the Manual overview include:
    1. The Manual is envisioned as a desk reference for regulatory staff, to use over the life of the permit durations, to provide general description of Program activities, protocols, and resource conditions.
    2. Where possible, specific routine maintenance sites and activities were identified to provide regulatory staff with a clear understanding of known or anticipated activities and locations during the permitting term (refer to Appendix B, Table B-1). Because it is impossible to know in advance where every routine maintenance project will occur, the Manual describes the activities to be permitted. Annual notifications will provide additional detail on specific maintenance sites that are not yet included in Appendix B, Table B-1.

3. The Manual uses a tiered approach in regards to a site's ecologic sensitivity and the potential presence of sensitive species at maintenance sites. The Tier 1 (no foreseeable impact), Tier 2 (low impact), and Tier 3 (potential for more significant impact) approach was based on guidance during past inter-agency meetings and more recent collaboration with resource agency staff (refer to Appendix D and E)
4. Work triggering thresholds and work limits are identified for routine maintenance activities. If a site is too big or too complicated, such that it is not routine, the project would be permitted separately outside of the Program.
5. The Maintenance Program aligns with other regulatory and county planning efforts such as the Pescadero TMDL (draft) and the San Gregorio TMDL (under development). In addition, the Program provides opportunities for mitigation to partner with the RCD to implement projects.

3. Questions and Comments on Manual

- Tahsa Sturgis (RWQCB)
  - Please add a column for area expected to be regulated by RWQCB in Table B-1, Appendix B. Please note that some sites may not be regulated by the USACE but will be under the jurisdiction of the RWQCB.
- Bill Stevens (NOAA-NMFS)
  - Will the BA include specific acreages or limits of dewatering? The BA should include sideboard limits and caps for purposes of the program. This information will be provided in the BA and the Manual to frame the extent and limit of program activities, such as the limit of dewatering. The annual workplan notification will provide specific project and site details, including construction method and dewatering lengths.
- Mike Schaller (SM County Planning)
  - Has there been any outreach to the California Coastal Commission? The Coastal Commission has not been contacted yet; the County and Horizon will follow up with the California Coastal Commission. Marin County may provide a useful reference, and Horizon will follow-up.
  - Has BCDC been contacted? No, Horizon will follow-up with BCDC. In the past they have not always taken jurisdiction for routine maintenance activities such as these.

4. Next Steps and Timeline

- The overall schedule goal is to obtain the Program permits to use for next season's maintenance work (i.e., obtain permits by August 2019).
  - August is busy time for the RWQCB, and in the past August Board meetings have been cancelled. Please note that public notice needs to occur two months before the Board meeting. CEQA may need to be completed prior to Board approval. Horizon to follow-up.
  - RWQCB and USFWS – recommended that for projects the County wishes to do in summer 2019, it may be best to have those projects prioritized and potentially fast tracked for permitting prior to issuance of programmatic permits.

  - Leif Goude (USFWS)/Bill Stevens (NOAA-NMFS): If activities need to be conducted prior to issuance of programmatic permits, only one BA/BO would need to be prepared for those maintenance activities.
- Horizon will incorporate regulatory agency comments/recommendations into the Manual and provide a revised Final Manual to the County by December 2018. However, the Manual is intended to be a "living" document.
- The County and Horizon are available for additional conference calls or in-person meetings to discuss agency comments or recommendations on Manual.
- Agencies will aim to provide Horizon with comments/questions on Manual by October 15th.
  - Tahsa Sturgis (RWQCB) will provide formal comments on Manual in email. Horizon and RWQCB may need to have a follow-up call or meeting in early November to discuss Manual. RWQCB will get back to Horizon on the proposed schedule.

5. Action Items:

1. Horizon will provide Leif Goude and Mike Schaller hard copies of the Manual by **9/21**
2. Horizon will update Table B-1 to add a column for activities regulated by RWQCB and distribute to regulators by **9/21**.
3. Agencies will provide Horizon comments on the Manual and schedule by **10/15**.
4. USACE will provide feedback on Table B-1 if an activity is or is not regulated by USACE by **10/15**.
5. Horizon/HT Harvey will provide sideboard limits and caps in the Bas and in the Manual.
6. Julie Casagrande (SM County) and Horizon will follow-up with SM County Planning and California Coastal Commission regarding authorization process for the Maintenance Program.
7. Horizon will follow-up with Marin County to see if they have issued a Coastal Development Permit for their routine maintenance activities.
8. Tahsa Sturgis (RWQCB) will check to see if public draft of a CEQA document will suffice for his agency's public noticing requirements.
9. Tahsa Sturgis (RWQCB) will check to see if the schedule is feasible to meet the 10/15 comment deadline and August 2019 permits.
10. Horizon will check with BCDC to see if they are taking jurisdiction over these routine maintenance activities.

Meeting Notes

San Mateo County Routine Maintenance Program

County of San Mateo and California Coastal Commission Meeting to Discuss Program Manual and Coastal Development Permit Authorization Process

November 19, 2018

Time: 2:00-3:15 pm

Attendees:

Julie Casagrande (SM County, DPW)
Joe Lo Coco (SM County, DPW)
Mark Chow (SM County, DPW)
Steve Monowitz (SM County, Planning)
Krzysztof Lisaj (SM County, DPW)
Renee Ananda (California Coastal Commission)
Ken Schwarz (Horizon)
Bridget Lillis (Horizon)

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1. Introduction and Meeting Purpose

- The primary objectives of this meeting are to present the County's Routine Maintenance Program and to discuss the California Coastal Commission (CCC) and County of San Mateo (County) planning permitting authorization process.

2. Maintenance Program Overview

- Ken led an overview discussion of the Routine Maintenance Program, including a discussion of the Program area, types of maintenance activities, forecasted coastside projects, and impact tiering.
    1. Where possible, specific routine maintenance sites and activities were identified to provide regulatory staff with a clear understanding of known or anticipated activities and locations during the permitting term (refer to Appendix B, Table B-1 of the Manual). However, it is impossible to know in advance where every routine maintenance project will occur.
    2. Horizon provided two tables to attendees: one table included a list of anticipated coastside Parks Department projects and the other table included a list of anticipated coastside DPW projects.
    3. Appendix H, Resource Characterization of the Manual includes examples of site characterizations, including natural resource descriptions, site that would be completed as maintenance work is conducted.
    4. Mitigation approaches (onsite and offsite) are described in Chapter 9 of the Manual. The CCC prefers to see onsite mitigation.

3. Program Activities to Date

- County invested significant time/effort to develop the Maintenance Manual as a comprehensive guide to the Program. The Manual represents the review, integration, and

updating of previous County guidance documents pertaining to maintenance and maintenance standards.

- The County has meet previously with other regulatory agencies, including meeting collectively with the USACE, RWQCB, USFWS, NMFS, and CDFW to discuss the Program and its permitting.
- The County is currently working on permit applications for these other agencies and plans to submit applications by the end of the year or in January.
- The County will be undertaking CEQA in 2019 on the Program. The Manual will largely serve as the Project Description for CEQA.

4. Coastal Development Permit - Options

- A 5-year CDP is anticipated. The whole Program would be included in the CDP application. The CDP application will likely classify which sites would be subject to a CDP and which would be exempt.
- The Program would cover activities at locations that have not yet been identified. However, any work would be similar in type and scope to those activities already described in the Manual.
- Maintenance work that involves replacing in kind (i.e., no expansion) is likely to be exempt. However, any upsizing or change in location or size would require a CDP (e.g., a larger culvert would be considered an expansion and would require a CDP).
- Tier 1 projects (i.e., no potential for sensitive species and/or habitat) are anticipated to be exempt while Tier 2 and Tier 3 projects (i.e., potential for Environmentally Sensitive Habitat Areas [ESHAs]/sensitive species to occur) are anticipated to require a CDP.
- The CCC stated that it is helpful to see the specific locations of the anticipated maintenance sites.
- The County planning CDP permit annual notifications and reporting would align with other regulatory agencies.

5. Action Items:

1. Horizon will revise the forecasted coastside projects table to include columns describing any past CDP history; if a CDP or CDX is anticipated; if a CDX is required, what type of exemption; parameters; and the distance of the site to any creeks/wetlands or bluffs. This table will be submitted to the CCC and County planning as a working process for review and comment – prior to developing the CDP permit application.
2. Horizon will review the CDP exemptions text.
3. Horizon will provide the CCC and County planning with a Draft EIR for review and comment during the public review period.
4. The County will check with the County attorney and Parks to see if the Board needs to approve the Program or if it can be certified by the Planning Commission.
5. Renee will look into permits prepared for similar projects (Marin County, San Luis Obispo County Public Works, Santa Cruz County, and City of Half Moon Bay).

Meeting Notes

San Mateo County Routine Maintenance Program

Conference Call with BCDC to Discuss Program

December 21, 2018

Time: 2:00-2:45 pm

Attendees:
Brenda Goeden (BCDC)
Julie Casagrande (County of San Mateo)
Ken Schwarz (Horizon)
Bridget Lillis (Horizon)

I. Introductions

- The primary objective of the conference call was to introduce the County of San Mateo's Routine Maintenance Program to BCDC and discuss the materials BCDC needs for their review and decision-making as we move through the permitting process.

II. Overview of County of San Mateo Program

- The purpose of the Manual is to provide a more comprehensive, consistent, and efficient approach to conducting routine maintenance activities in the County, versus submitting individual applications and agency authorizations for individual actions.
- As possible, specific routine maintenance sites and activities have been identified to provide regulatory staff with a clear understanding of known or anticipated activities and locations during the permitting term (Tables B-1 and B-2). Because it is impossible to know in advance where every routine maintenance project will occur, the Manual describes the general class of activities to be permitted, independent of specifically known sites. Annual notifications will provide additional detail on specific maintenance sites that are not yet included in these tables.

III. BCDC's Role and Permitting Process

- In order to move through the permitting process and determine if a site is within BCDC jurisdiction, BCDC needs the following information for each anticipated site:
    1. Location of activity (including detailed maps and relation to tidal activity)
    2. Detailed description of activity (including dimensions, footprint, volume of sediment removed, etc.)
    3. Description of existing condition
- BCDC can authorize a permit for anticipated sites. If additional sites need to be included based on the annual work plan, an amendment to the existing permit can be prepared. The

process can be similar to what the SCVWD currently does for their routine maintenance program.

- Preliminary sites identified in the Program potentially within BCDC jurisdiction include San Bruno Creek at Walnut Street (North Channel) (#2); Belmont Creek at Industrial Way (South of Harbor Boulevard) (#9), and Coyote Point Marina (#6).
- Coyote Point Recreation Area may already have its own permit; County/Horizon will determine if there is an existing permit.
- Brenda will most likely not be reviewing the permit application; however, she will be a point of contact for the County/Horizon and provide guidance through the pre-permit application consultation process.

IV. Action Items

1. Horizon will send Breda an electronic copy of the Draft Manual.
2. Horizon/County will provide Brenda with more detailed information regarding potential maintenance sites that could be within BCDC jurisdiction. The project information package will include detailed location maps, descriptions of activities and existing conditions, dimensions, and anticipated project costs.
3. Once the project information is reviewed by Brenda, Horizon/County/BCDC will schedule another conference call to discuss the subsequent permitting process.
4. County/Horizon will check to see if there is an existing permit for Coyote Point Recreation Area.

Appendix E

Maintenance Tier Guidelines

Tier 1 – No effect

No impacts to sensitive species or habitat, no CNDDB occurrences within ½ mile radius (2 mile for CRLF) or no suitable habitat present, upland sites, no riparian/wetland habitat, generally no flow during summer

Standard BMPs

Typical project types:

- Ditch relief culvert replacement in upland areas and/or bayside
- Maintenance of ditch relief culvert in upland areas and/or bayside
- Maintenance of ditches and swales on bayside or upland area with no wetland habitat
- Bank/shoulder slip-out repairs in upland areas and/or bayside
- Channel maintenance in highly modified channels (i.e., concrete) and/or bayside

Example Projects:

Culvert replacements

- Emerald Hills Culvert Replacements - 751 Vista Dr, 606 South Oak Park,927 FaIlen Leaf, 1043 Wilmington , 738 Lakeview (bayside, ditch relief, dry)

Slip-out Repair

- Old La Honda Road Slip-out – soil nailing (upland)
- Purisima Creek Road Slip-out Repair (upland)

Tier 2- Not Likely to Adversely Affect

A) Not Likely to Impact Sensitive Species/Habitat

CNDDB occurrences within ½ mile radius (2 mile for CRLF), but habitat and sensitive plants not present in (or are easily excluded from) work area, generally no flow during summer

Standard BMPs, Avoidance Measures, May Require On-site Biologist

Typical project types:

- Ditch relief culvert replacement in close proximities to natural waterways and/or on the coastside (or within the coastal zone) of the County
- Culvert replacements on natural drainages on the bayside and/or with little potential for sensitive species presence
- Maintenance of ditch relief culverts in close proximities to natural waterways and/or on the coastside (or within the coastal zone)

- Maintenance of culverts or bridges on natural drainages on the bayside and/or with little potential for sensitive species presence
- Maintenance of ditches and swales on coastside with no wetland habitat
- Bank/slip-out repair on upland or bayside w/out presence of sensitive habitat
- Channel maintenance in highly modified channel (i.e., concrete) and/or bayside, water present

Example Projects:

Culvert Replacement

- Stage Rd Culvert Replacement - 1 culvert north of San Gregorio (coastside, ephemeral gully, no sensitive habitat)
- Stage Road culverts Mile 0.5 south of 84, 0.5 south of Pomponio, 1.3 mile south 84 (coastside)
- Emerald Hills Culvert Replacements - 820 Occidental, 3803 Eastlake, 773 Lakeview, 280 Sylvan, and 601 Sylvan – bayside, natural drainages
- 2550 Pescadero Road Culvert Replacement (coastside, ditch relief adjacent to Pescadero Creek, species in area but easy to exclude, dry during construction)
- Sand Hill Rd at Portola Road Culvert Replacement (bayside, ditch relief, species in area but easy to exclude, will be dry)

Bank/Slip-out Repair

- Alpine Road Slip Out Repairs Project (soil nailing or rock fill, bayside, no creek fill)
- Lobitos Cut-off Slide/Drainage Improvement (coastside, roadway drainage repair)
- Bear Gulch Slip-out Repairs Mile 1.2 (coastside, upland)
- 211 Lynton Ave Slip-out repair (bayside, upland), with woodrats but nests can be excluded.

B) Possible Impacts to Sensitive Species/ Habitat

CNDDB occurrences within ½ mile radius (2 mile for CRLF), habitat in project area but no direct impacts, assume presence, often summer water present requiring cleanwater bypass

Standard BMPs, Avoidance Measures, and on-site biologist

Typical project types:

- Culvert replacements on natural drainages on the coastside with the potential for sensitive species
- Maintenance of culverts or bridges on natural drainages on the coastside with the potential for sensitive species.
- Maintenance of ditches and swales with sensitive habitat nearby
- Bank/Slip-out repair, non-salmonid stream, coastside with adjacent habitat
- Channel maintenance with minimal habitat impacts (i.e., trimming), no species, water present

Example Projects:

Bridge repair

- Lobitos Creek Rd Bridge Repair (adjacent to steelhead stream, no work below OHW, no riparian impacts)

Culverts

- Midcoast Culvert Replacements CDP - 5 total - Alamo Street, Sunshine Valley Rd [2], Valencia Ave, Ave Balboa (coastside, minimal impacts, habitat degraded, remove non-natives)
- Tunitas/Lobitos Culverts - Tunitas Mile 1.2, 2.5, and 2.7, Lobitos Cut-Off Mile 0.1 (coastside, minimal impacts, ditch relief and intermittent tributaries to Tunitas Creek, w/in CRLF critical habitat, will reduce sediment inputs, work below OHW when site is dry)
- Cloverdale Road Culverts - 4 culverts - Mile 0.1. 0.4, Mile 0.8, Mile 5.2 & Canyon 2 culverts- Mile 0.7, 0.8 (coastside, minimal impacts, SFGS/CRLF/marbled murrelet in area, work below OHW when site is dry or use cleanwater bypass)
- Wurr Road and Pescadero Road Culvert Replacements (Wurr Road at 0.2, 0.3, 0.5, 0.6, 0.8, 1.1, 1.2, and 1.6 miles and 10065 Pescadero Creek Road) (mostly ditch relief, marbled murrelet in area, sites will be dry)
- Lower Bear Gulch Road Culvert Repair Mile 0.5 (coastside, perennial creek, not anadromous)
- Alpine Road (0.5, 1.2, 1.3, 1.4, 1.5, 1.6, 1.8, 2.1, 2.2, 2.5 miles from Pescadero Creek Road) – one might be Rodger's Gulch (tributaries to Alpine Creek)

Bank/Slip-out Repair

- Tunitas Mile 2.7 Slip-out repair at same time as culvert replacement (above OHW of Tunitas Creek, bio-fix, BMPs used to exclude work area from creek)
- Bear Gulch Slip-out Repair Mile 2.1 (above El Corte de Madera Creek, no creek fill)

Channel Maintenance

- Belmont Creek at Old County Road sediment removal/vegetation trimming
- Polhemus?

Tier 3- Likely to Adversely Affect – include temporal impacts?

Likely impacts to sensitive species/habitat, listed species documented on-site, work on salmonid streams, temporal impacts to wetland/riparian vegetation/critical habitat – i.e., wetland sediment dredging, new fill below ordinary high water (i.e., rip-rap) in critical habitat

Require avoidance measures, BMPs, on-site biologist and MITIGATION

Typical project types:

- Channel Maintenance – sensitive habitat, species
- LWD Management
- Bank repair salmonid stream

Example Projects:

Culvert Replacement

- Lower Pescadero Creek Rd (16 locations)(wetland habitat impacts, multiple species)
- Gazos Creek Road Mile 2.7 Culvert Repair (possibly slip line to avoid species impact and increased sediment loading due to grade change, steelhead/coho present

Channel Maintenance

- Pigeon Point (CRLF on-site, temporal wetland impacts)
- Cloverdale Road Ditch Maintenance (temporal wetland impacts, CRLF/SFGS documented in close proximity, presence likely)
- North Channel Maintenance (temporal impacts to wetland habitat)
- Coastside Veg & Sediment Management - 9 sites - George, Date/Harte, Sunshine Valley Rd, SanVicente @ Etheldore, San Vicente @ Cypress, Sonora/Coral Reef, Bridgeport/Denniston trib, Obispo/Portola, Obispo) (temporal impacts to wetland and riparian habitat)
- Stage Rd – shoulder sediment removal (wetland habitat, CRLF and steelhead critical habitat)
- Stage Rd – Bradley Creek sediment (steelhead stream, CRLF and steelhead critical habitat)

Bridge Repair

- Alpine Road Bridge Repair at Mindego Creek (steelhead, coho, marbled murrelet)

Bank Repair

- Higgins Rd Slip-out at Mill Creek (steelhead)
- Gazos bank stabilization, multiple sites (steelhead/coho)
- Tunitas Slipout Mile 2.2 (steelhead)
- Alpine Road - bank erosion at Heritage Grove, Rodgers Gulch (steelhead, coho, marbled murrelet)
- Stage Rd Slip-out at Bradley Creek (fill, steelhead, CRLF and steelhead critical habitat)
- Sand Hill Road/Bear Creek (bank repair, SH, CTS, SFDW, fill)
- Alpine Road/Los Trancos Creek Slip near Webb Ranch (bank repair, SH, CTS, SFDW, fill)

Tier 4- Likely to Benefit

Typical project types:

- Fish passage projects
- LWD management

- Sediment reduction project

Example Projects:

- Rodger's Gulch/Alpine Road culvert (fish passage likely required)

Other project types to categorize:

Vegetation management activities may be conducted by mechanical mowing or trimming, manual removal, or controlled grazing using goats

Possible classification to add to projects:

Absent [A]	- No habitat present and no further work needed.
Habitat Present [HP]	- Habitat is, or may be present. The species may be present.
Present [P]	- Species is present
Critical Habitat [CH]	- Project footprint is located within a designated critical habitat unit, but does not necessarily mean that appropriate habitat is present.

Highlight 303d listed water bodies

San Pedro Creek – Coliform Bacteria

Pacific Ocean at Pacifica State/Linda Mar Beach– Coliform Bacteria

Pacific Ocean at Fitzgerald Marine Reserve – Coliform Bacteria

San Vicente Creek – Coliform Bacteria

Pacific Ocean at Pillar Point - Mercury

Pacific Ocean at Pillar Point Beach– Coliform Bacteria

Pacific Ocean at Rockaway Beach– Coliform Bacteria

Pacific Ocean at Venice Beach– Coliform Bacteria

Pomponio Creek - Coliform Bacteria

San Gregorio Creek – Coliform Bacteria, Sedimentation/Siltation

Pescadero Creek- Sedimentation/Siltation

Butano Creek - Sedimentation/Siltation

San Francisco Bay, Central

Colma Creek – Trash

Marina Lagoon – Coliform Bacteria

San Mateo Creek – Trash, Diazinon, sediment toxicity (lower)

San Francisquito Creek – Diazinon, Trash, Sedimentation/Siltation

SF Bay Lower, Central, South- Chlordane , DDT (Dichlorodiphenyltrichloroethane), Dieldrin, Dioxin compounds (including 2,3,7,8-TCDD), Furan Compounds, Invasive Species, Mercury, Mercury (sediment), PAHs (Polycyclic Aromatic Hydrocarbons) (sediment), PCBs (Polychlorinated biphenyls), PCBs (Polychlorinated biphenyls) (dioxin-like), Selenium, Trash

Appendix F

Special-Status Plants in List CRPR 3 or 4

Special-Status Plants in List CRPR 3 or 4

Family	Scientific Name	Common Name	CRPR Status
Apiaceae	*Perideridia gairdneri ssp. gairdneri*	Gairdner's yampah	List 4.2
Apiaceae	*Sanicula hoffmannii*	Hoffmann's sanicle	List 4.3
Asteraceae	*Corethrogyne leucophylla*	branching beach aster	List 3.2
Asteraceae	*Grindelia hirsutula var. maritima*	San Francisco gumplant	List 3.2
Asteraceae	*Lessingia hololeuca*	woolly-headed lessingia	List 3
Boraginaceae	*Plagiobothrys chorisianus var. hickmanii*	Hickman's popcorn-flower	List 4.2
Brassicaceae	*Arabis blepharophylla*	coast rockcress	List 4.3
Brassicaceae	*Erysimum franciscanum*	San Francisco wallflower	List 4.2
Equisetaceae	*Equisetum palustre*	marsh horsetail	List 3
Fabaceae	*Astragalus nuttallii var. nuttallii*	ocean bluff milk-vetch	List 4.2
Fabaceae	*Hosackia gracilis*	harlequin lotus	List 4.2
Fabaceae	*Lupinus arboreus var. eximius*	San Mateo tree lupine	List 3.2
Iridaceae	*Iris longipetala*	coast iris	List 4.2
Liliaceae	*Calochortus umbellatus*	Oakland star-tulip	List 4.2
Liliaceae	*Calochortus uniflorus*	pink star-tulip	List 4.2
Liliaceae	*Fritillaria agrestis*	stinkbells	List 4.2
Melanthiaceae	*Toxicoscordion fontanum*	marsh zigadenus	List 4.2
Montiaceae	*Calandrinia breweri*	Brewer's calandrinia	List 4.2
Orchidaceae	*Cypripedium fasciculatum*	clustered lady's-slipper	List 4.2
Orchidaceae	*Cypripedium montanum*	mountain lady's-slipper	List 4.2
Orchidaceae	*Piperia michaelii*	Michael's rein orchid	List 4.2
Orobanchaceae	*Castilleja ambigua var. ambigua*	johnny-nip	List 4.2
Parmeliaceae	*Usnea longissima*	Methuselah's beard lichen	List 4.2
Poaceae	*Elymus californicus*	California bottle-brush grass	List 4.3
Poaceae	*Hordeum intercedens*	vernal barley	List 3.2
Polemoniaceae	*Leptosiphon acicularis*	bristly leptosiphon	List 4.2
Polemoniaceae	*Leptosiphon ambiguus*	serpentine leptosiphon	List 4.2
Polemoniaceae	*Leptosiphon grandiflorus*	large-flowered leptosiphon	List 4.2
Primulaceae	*Androsace elongata ssp. acuta*	California androsace	List 4.2
Ranunculaceae	*Ranunculus lobbii*	Lobb's aquatic buttercup	List 4.2

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Appendix G

Species Descriptions

Federally or State Listed Species

Bay Checkerspot Butterfly (*Euphydryas editha bayensis*). Federal status: Threatened; State status: None. The Bay checkerspot butterfly (Photo 1) was listed as threatened in September 1987 (USFWS 1987), and a recovery plan addressing the species was approved by the USFWS in 1998 (USFWS 1998). Critical habitat was designated on August 26, 2008 (USFWS 2008a), and includes four critical habitat units in San Mateo County (i.e., Unit 1, San Bruno Mountain; Unit 2 Pulgas Ridge; Unit 3 Edgewood Park/Triangle; and Unit 4 Jasper Ridge). The life cycle of the Bay checkerspot butterfly is closely tied to the biology of its primary larval host plant, dwarf plantain (*Plantago erecta*). Secondary host plants, purple owl's-clover (*Castilleja exserta*) and exserted paintbrush (*Castilleja exserta*), are also important sources of food for both larvae and adults (Black and Vaughn 2005a). Populations of the Bay checkerspot butterfly are restricted to areas with shallow serpentine-derived or similar soils that have substantial populations of dwarf plantain, which are highly fragmented and isolated (USFWS 2008a).

Photo 1. Bay checkerspot butterfly

The Bay checkerspot butterfly formerly ranged around San Francisco Bay from Twin Peaks and San Bruno Mountain on the San Francisco Peninsula east to the Franklin Canyon and Morgan Territory areas of Contra Costa County and south to Santa Clara County (Murphy and Ehrlich 1980, USFWS 1998). However, the species has been extirpated from most of its former range due to development on serpentine habitats and local extinctions resulting from severe droughts in portions of the 1970s and 1980s (USFWS 1998). Through much of the 1990s, Bay checkerspot butterflies still occurred at two locations (Jasper Ridge Biological Preserve and Edgewood Park) in San Mateo County, in addition to several locations in central Santa Clara County. However, the species was last recorded at Jasper Ridge in 1997 and, prior to reintroduction efforts, at Edgewood Park in 2002 (Weiss 2002). Reintroduction efforts at Edgewood Park, which began in 2007, have been successful, with almost 800 adults spotted in 2014 (Friends of Edgewood 2015). In 2017, reintroduction efforts were also initiated on San Bruno Mountain (Creekside Science 2017).

Mission Blue Butterfly (*Icaricia icarioides missionensis*). Federal status: Endangered. State status: None. The Mission blue butterfly (Photo 2) was listed by USFWS as endangered in June 1976 (USFWS 1976). Critical habitat has not been designated for this butterfly. Adult Mission blue butterflies feed on the nectar of hairy false goldenaster (*Heterotheca villosa*), bluedicks (*Dichelostemma capitatum*), and seaside buckwheat (*Eriogonum latifolium*) (Black and Vaughn 2005b). Eggs are laid on the leaves, stems, flowers, and seed pods of the larval host plants (i.e., silver lupine [*Lupinus albifrons*], summer lupine [*Lupinus formosus*], and manycolored lupine

[*Lupinus versicolor*]), which grow in poor soils with little grass, on rocky outcrops, and in recently disturbed areas, such as road cuts, and landslides (County of San Mateo 1982). Formerly widespread on the Marin and San Francisco peninsulas, Mission blue butterflies are restricted to small populations at Twin Peaks in San Francisco, Fort Point in Marin County, and the Skyline ridges and San Bruno Mountain in San Mateo County (USFWS 2018a). The Mission blue butterfly is the most widespread of the endangered butterfly species within the San Bruno Mountain Habitat Conservation Plan area, where it most frequently uses silver lupine and summer lupine as its primary host plants (San Mateo County Parks Department 2017). During monitoring transects conducted on San Bruno Mountain in 2013 (MIG|TRA 2015), the highest number of sightings/hour occurred on Southeast Ridge and South Slope, where large grasslands are present, and on Northeast Ridge.

Photo 2. Mission blue butterfly

San Bruno Elfin Butterfly (*Callophrys mossii bayensis*). Federal status: Threatened. State status: None. The San Bruno elfin butterfly (Photo 3) was listed as endangered by the USFWS in June 1976 (USFWS 1976). Critical habitat has not been designated for this species. All known locations of the San Bruno elfin butterfly are restricted to San Mateo County, where populations are known from San Bruno Mountain, Milagra Ridge, the San Francisco Peninsula Watershed, and Montara Mountain (USFWS 2018a). A thousand or more adults may exist in about 15 total subpopulations on San Bruno Mountain. Montara Mountain supports about 10 local populations, and Milagra Ridge supports about four (USFWS 2010a).

Photo 3. San Bruno elfin butterfly

The adult flight period occurs from late February to mid-April (Black and Vaughn 2005c, USFWS 2018b). Eggs are laid on broadleaf stonecrop (*Sedum spathulifolium*), a low growing succulent that grows in rocky outcrops on steep north facing slopes (Black and Vaughn 2005c, USFWS 2007a). Larvae hatch from the eggs within 5 to 7 days of being laid. Later instars are tended and protected by native ants in a symbiotic relationship, as the larvae secrete a "honeydew" sugar substance that attracts the ants to this behavior (Black and Vaughn 2005c, USFWS 2018b). The adult food plants have not been fully determined, but Montara Mountain colonies are suspected to use Montara manzanita (*Arctostaphylos montaraensis*) and California huckleberry (*Vaccinium ovatum*) (The Xerces Society 2015).

Callippe Silverspot Butterfly (*Speyeria callippe callippe*). Federal status: Endangered; State status: None. The callippe silverspot butterfly (Photo 4) was listed as endangered by the USFWS on December 5,

1997 (USFWS 1997a). Critical habitat has not been designated. Historically, the callippe silverspot butterfly occupied much of the grasslands in the San Francisco Bay region. However, all known locations are currently restricted to San Mateo County, where several populations are known from San Bruno Mountain, Milagra Ridge, the San Francisco Peninsula Watershed, and Montara Mountain. During monitoring transects conducted on San Bruno Mountain in 2012 (TRA 2014), the highest number of sightings/hour for this species occurred on transects on the Southeast Ridge.

Photo 4. Callippe silverspot butterfly

Adults have one flight period, which is typically from mid-May to July, but largely depends on environmental conditions (USFWS 2018c). Males seek hilltops and hillsides of native grasslands for mates. Females lay their eggs in the dead or dying larval food plant (*Viola pedunculata*) or in nearby woody debris.

Monarch Butterfly (*Danaus plexippus*). Federal status: Candidate; State status: None. The monarch butterfly is federally proposed for listing as threatened. Monarchs feed and breed exclusively on plant species in the subfamily Asclepiadoideae, with 27 species of milkweed (*Asclepias* sp.), as wells as a few plants in closely related genera, having been recorded as larval food plants (Malcolm and Brower 1986). Monarchs are known to overwinter along the California coast from Mendocino County south to Baja California, with the largest groups typically occurring in Santa Cruz, Monterey, San Luis Obispo, and Santa Barbara Counties. They typically begin arriving at overwintering sites in mid-October (Hill et al. 1976), where they form dense clusters on the branches and leaves of trees. Monarchs depart from these overwintering sites in late-February or March. At this time, they disperse across California and several western states to breed (Dingle et al. 2005).

Photo 5. Monarch butterfly

In the Program area, monarch butterflies occur primarily as migrating individuals in the fall and spring. The California Natural Diversity Database (CNDDB) (2019) includes 15 fall/winter site records along the San Mateo coast south of Pescadero State Beach. However, no occurrences have been recorded since 1998.

Green Sturgeon (*Acipenser medirostris*). Federal status: Threatened; State status: Species of Special Concern. The National Marine Fisheries Service (NMFS) listed the southern Distinct Population Segment (DPS) of the green sturgeon (Photo 6) as threatened on April 7, 2006 (NMFS 2006). Critical habitat for the southern DPS of the green sturgeon was designated on October 9, 2009 (NMFS 2009). All tidally influenced areas of the San Francisco Bay, up to the elevation of mean higher high water, have been designated as critical habitat for this species (NMFS 2009). The range of the green sturgeon extends from Ensenada, Mexico, to the Bering Sea; the species occurs in coastal waters from the San Francisco Bay to Canada. Green sturgeon occur widely in accessible estuarine habitat, and in summer and fall the species is found in estuaries not associated with known spawning activity and where there are no records of their occurrence farther up the river system (Adams et al. 2007). Spawning within the southern DPS occurs predominantly in the upper Sacramento River (Adams et al. 2007).

Green sturgeon juveniles are found throughout the Sacramento/San Joaquin River delta and San Francisco Bay (Beamesderfer et al. 2007, Kelly et al. 2007). Although little is known about the distribution and abundance of green sturgeon in the South Bay, the species appears to be relatively rare. The California Department of Fish and Wildlife (CDFW) conducts monthly monitoring of fish assemblages at numerous sites in the San Francisco, San Pablo, and Suisun Bays using otter trawls and midwater trawls, of which 13 sites are in the South Bay. Between 1980 and 2011, 74 green sturgeon were captured in the San Francisco Estuary; however, only four of these were collected in the South Bay, two at a main channel site near the Bay Bridge and two from a shoal site north of the San Mateo Bridge (K. Hieb, CDFW, pers. comm.). According to NMFS (2009), a sport fishing group reported catches of two green sturgeon in Central San Francisco Bay, three in South-Central San Francisco Bay, and four in South San Francisco Bay in 2006. To date, the only confirmed record of green sturgeon south of the Dumbarton Bridge is represented by a single individual that had been equipped with an acoustic tag in the Sacramento River or Delta and that was detected on multiple occasions in 2011 at receivers positioned along the Dumbarton Railroad Bridge (ECORP 2012).

Photo 6. Green sturgeon

The green sturgeon is known to occur in the Bay, though it apparently occurs only as a rare, nonbreeding visitor to the South Bay. There is no evidence that the green sturgeon has ever spawned in any creeks within the Program area or anywhere else in the South Bay. Based on this species' preferences for streams having strong flow over large cobbles in deep pools, it is unlikely that South Bay tributaries historically provided suitable spawning habitat, and such habitat is certainly absent now. The species may occur in the Program area in tidal waters along the Bay edge at San Francisco International Airport and Coyote Point Recreation Area, albeit infrequently and in low numbers, if at all.

Coho Salmon (*Oncorhynchus kisutch*) (Central California Coast ESU); Federal status: Endangered; State status: Endangered. The coho salmon (Photo 7 ranges from Alaska in the north to central coastal California in the south. The Central Coastal California Evolutionarily Significant Unit (ESU) of the Coho salmon is concentrated in coastal watersheds between Punta Gorda in Humboldt County and the San Lorenzo River in Santa Cruz County (Spence et al. 2008). Coho are anadromous, spawning in cool, clear, freshwater streams and rivers with oceanic outlets. They prefer forested areas, and deposit eggs at the head of riffles with plentiful medium to small, clean gravel (Moyle 2002). Juveniles seek out cool, deep (> 3.2 feet) water with substantial overhead cover and instream cover such as woody debris (Moyle 2002).

Central California Coast coho salmon have recently been recorded spawning in the southwestern portion of the Maintenance Program area in Pescadero Creek (Ambrose pers. comm., POST 2018) and in Alpine Creek (NOAA 2008). Historical records also document the presence of coho salmon in Butano Creek and San Gregorio Creek, though coho salmon have not been found during more recent stream surveys (NMFS 2001 as cited in NMFS 2016). Similarly, no coho have been recorded in Gazos Creek during annual monitoring since 2008 (Smith 2013 as cited in CDFW 2015), though hatchery fish were recently released into Gazos Creek (Monterey Bay Salmon and Trout Project 2018). The species was historically collected from San Mateo Creek (Leidy 2007) and may have been present in the San Francisquito Creek watershed (Leidy et al. 2005). However, it has been functionally extirpated from all County of San Mateo streams flowing to the Bay (Leidy 2007). Designated critical habitat occurs in the Program area and includes all accessible reaches of all rivers including estuarine areas and tributaries) between Punta Gorda and the San Lorenzo River (inclusive) in California.

Photo 7. Central California Coast Coho salmon

Central California Coast Steelhead (*Oncorhynchus mykiss*). Federal status: Threatened; State status: None. NMFS has categorized steelhead (Photo 8) into DPS. The Central California Coast DPS consists of all runs from the Russian River in Sonoma County south to Aptos Creek in Santa Cruz County, including all steelhead spawning in streams that flow into the San Francisco Bay. In 1997, the NMFS published a final rule to list the Central California Coast DPS as threatened under the Federal Endangered Species Act (FESA) (NMFS 1997). Critical habitat for this DPS was designated on September 2, 2005 (NMFS 2005). Designated critical habitat for Central California Coast steelhead includes all river reaches and estuarine areas accessible to listed steelhead in coastal river basins from the Russian River to Aptos Creek, California (inclusive), and the drainages of San Francisco and San Pablo Bays (NMFS 2000, 2005).

The steelhead is an anadromous form of rainbow trout that migrates upstream from the ocean to spawn in late fall or early winter, when flows are sufficient to allow them to reach suitable habitat in far upstream areas. In the South Bay, adults typically migrate to spawning areas from late December through early April, and both adults and smolts migrate downstream from February through May. Steelhead typically spawn in gravel substrates located in clear, cool, perennial sections of relatively undisturbed streams, with dense canopy cover that provides shade, woody debris, and organic matter. Steelhead usually cannot survive long in pools or streams with water temperatures above 70 °F, however, they can use warmer habitats if adequate food is available.

Photo 8. Central California Coast steelhead

In the Program area, steelhead are known to spawn in the San Mateo Creek, San Francisquito Creek, San Pedro Creek, Pilarcitos Creek, Lobitos Creek, Tunitas Creek, San Gregorio Creek, Pescadero Creek, Butano Creek, and Gazos Creek watersheds (Spence et al. 2008, Becker and Reining 2008) and could potentially occur in other coastal streams. Designated critical habitat includes all river reaches and estuarine areas accessible to listed steelhead in coastal river basins from the Russian River to Aptos Creek, California (inclusive), and the drainages of San Francisco and San Pablo Bays of San Francisco and San Pablo Bays (NMFS 2000, 2005).

Longfin Smelt (*Spirinchus thaleichthys*). Federal status: Proposed Endangered; State status: Threatened. The longfin smelt (Photo 9) was declared a threatened species under the California Endangered Species Act (CESA) in March 2009 and has been petitioned for listing as endangered under FESA (USFWS 2008b). This southernmost population of longfin smelt is found as far north as Prince William Sound, Alaska, and occurs in the San Francisco Bay. Longfin smelt are adapted to a wide range of salinities and occupy different portions of the Bay throughout the year. The majority of adults are found in the Central Bay, San Pablo Bay, and Suisun Bay in the summer but move upstream in early fall. Adults are most widespread in the winter and spring, when there distribution extends from the South Bay through the Delta, with the greatest concentrations in San Pablo Bay, Suisun Bay, and the West Delta (Rosenfield 2009). Spawning in the Bay is thought to occur mainly below Medford Island in the San Joaquin River and below Rio Vista on the Sacramento River, while the lower end of spawning habitat seems to be upper Suisun Bay around Pittsburg and Montezuma Slough, in Suisun Marsh (Larson et al. 1983 as cited in Moyle 2002, Wang 1986).

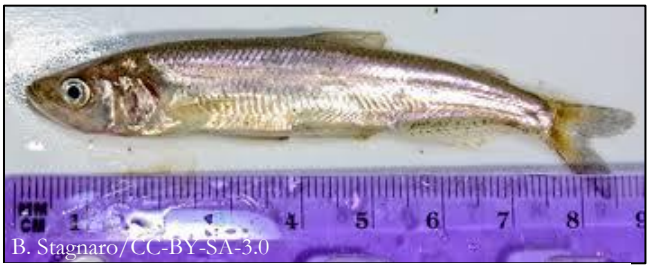

Photo 9. Longfin smelt

Distribution of larvae is strongly influenced by freshwater outflow to the Delta (Baxter 1999 and Dege and Brown 2004 as cited in Robinson and Greenfield 2011). In dry years, larvae are concentrated primarily in the West Delta and Suisun Bay, and in wet years, larvae are found throughout the San Francisco Estuary, including the South Bay, with the greatest concentrations in San Pablo and Suisun Bay early in the season and into the Central Bay later in the season (Rosenfield 2009). Juveniles occupy the entire upper estuary through the Central Bay during their first summer, moving throughout the estuary by the following winter (CDFG 2009).

Longfin smelt spawning in the Bay is thought to occur mainly below Medford Island in the San Joaquin River and below Rio Vista on the Sacramento River, while the lower end of spawning habitat seems to be upper Suisun Bay around Pittsburg and Montezuma Slough, in Suisun Marsh (Larson et al. 1983 as cited in Moyle 2002, Wang 1986). The species is not expected to spawn in the Program area. However, larvae occur throughout the South Bay, including in waters off the San Mateo coast, but larval sampling in the South Bay is not extensive enough to adequately characterize the presence or abundance (if any) of larval longfin smelt in the Program area (Rosenfield 2010). Adult distribution is the most widespread in the winter and spring, extending from the South Bay through the Delta, but information on adult use and distribution in tributaries feeding into the South Bay is very limited and no information is available for the Program area (Rosenfield 2010).

Tidewater Goby (*Eucyclogobius newberryi*). Federal status: Endangered; State status: Species of Special Concern. The tidewater goby (Photo 10) was listed as endangered on March 7, 1994 (USFWS 1994). A recovery plan addressing the species was approved by the USFWS on December 7, 2005 (USFWS 2005a). Revised critical habitat was designated on February 6, 2013 (USFWS 2013). Four critical habitat units are located within the Program area, SM-1 (San Gregorio Creek), SM-2 (Pomponio Creek), SM-3 (Pescadero-Butano Creeks), and SM-4 (Bean Hollow Creek) in the Purisima Creek-Frontal Pacific Ocean, Lower Pescadero Creek, and Gazos Creek-Frontal Año Nuevo Bay subwatersheds. The tidewater goby is endemic to California, having occurred historically from Tillas Slough (mouth of the Smith River, Del Norte County) to Agua Hedionda Lagoon (northern San Diego County) (USFWS 2013). Currently, tidewater gobies are found throughout their known, historic range, but in fewer locations than historically occurred. They are found in brackish water habitats along the coast, in still but not stagnant water with high oxygen levels. Breeding typically occurs on sandy substrates but the species can be found on rocky, mud, and silt substrates as well. The tidewater goby has been recorded in the lower mouths of creeks along the southern portion of the San Mateo County coast to San Gregorio Creek. However, an apparently natural gap in the tidewater goby distribution along the California coast occurs north of San Gregorio Creek to the San Francisco Bay (USFWS 2005a).

Photo 10. Tidewater goby

California Red-legged Frog (*Rana draytonii*). Federal status: Threatened; State status: Species of Special Concern. The California red-legged frog (Photo 11) was listed as threatened throughout its entire

range on May 23, 1996 (USFWS 1996) by the USFWS. A recovery plan addressing the species was approved by the USFWS on May 28, 2002 (USFWS 2002). Revised critical habitat was designated on March 17, 2010 (USFWS 2010b). Two critical habitat units occur in San Mateo County, SNM-1 and SNM-2. Portions of these critical habitat units occur in 11 subwatersheds in the County (i.e., San Pedro Creek-Frontal Pacific Ocean, San Mateo Creek Frontal San Francisco Bay Estuaries, Arroyo Leon, Denniston Creek-Frontal Pacific Ocean, Purisima Creek-Frontal Pacific Ocean, San Gregorio Creek, La Honda Creek, Upper Pescadero Creek, Lower Pescadero Creek, Gazos Creek-Frontal Año Nuevo Bay, and Waddell Creek). The species' current distribution includes isolated locations in the Sierra Nevada and the San Francisco Bay area, and along the central coast (USFWS 2002). The California red-legged frog inhabits perennial freshwater pools, streams, and ponds throughout the Central California Coast Range and isolated portions of the western slope of the Sierra Nevada (Fellers 2005). Its preferred breeding habitat consists of deep perennial pools with emergent vegetation for attaching egg clusters (Fellers 2005), as well as shallow benches to act as nurseries for juveniles (Jennings and Hayes 1994). Non-breeding frogs may be found adjacent to streams and ponds in grasslands and woodlands, and may travel up to 2 miles from their breeding locations across a variety of upland habitats (Bulger and Scott 2003; Fellers and Kleeman 2007).

Photo 11. California red-legged frog

In the Program area, California red-legged frogs are found primarily in or adjacent to creeks and reservoirs west of the mountain ridges in the less urbanized portions of the County. The greatest concentration of records are located around the shores of Crystal Springs Reservoir and one of the largest known single populations south of San Francisco, consisting of an estimated 350 adult frogs, occurs at Pescadero Marsh (Fellers 2005). Additional records are scattered throughout the western portion of the County. In addition, the species has also been recorded in wetlands near the San Francisco International Airport (CNDDB 2019) and could potentially be present in other suitable habitat in the eastern portion of the County, although urbanization limits this species' occurrence in the eastern portion.

Foothill Yellow-legged Frog (*Rana boylii*). Federal status: None; State status: Candidate, Species of Special Concern. The foothill yellow-legged frog (Photo 12) is a stream-breeding frog that was historically found in most Pacific drainages from the Coast Ranges to the western Sierra Nevada and San Gabriel Mountain foothills (Jennings and Hayes 1994, CaliforniaHerps.com 2019). Currently, the foothill yellow-legged frog may occupy only 55% of its historical range (CaliforniaHerps.com 2019). Ideal habitat for this frog consists of streams with riffles and cobble-sized rocks, with slow water flow (Jennings and Hayes 1994). Suitable breeding habitat is composed of stream reaches with consistently slow-moving flows surrounded by upland non-breeding

habitat. Adults often bask on exposed rock surfaces near streams. During periods of inactivity, especially during cold weather, individuals seek cover under rocks in the streams or on shore within a few yards of water. Suitable habitat for the foothill yellow-legged frog is present in the Program area along Coast side streams in the Santa Cruz Mountains. However, there are only two recorded occurrence of the species in San Mateo County in recent history, in 1999 at Pescadero Creek County Park and in Portola Redwoods State Park in 1995 (CNDDB 2019). Thus, the species is likely rare and of very limited distribution, if it still occurs at all, in the Program area.

Photo 12. Foothill yellow-legged frog

California Tiger Salamander (*Ambystoma californiense*). Federal status: Threatened (Central Population); State status: Species of Special Concern. The California tiger salamander (Photo 13) was federally listed as threatened in August 2004 (USFWS 2004), and critical habitat was designated in August 2005 (USFWS 2005b). No critical habitat occurs in San Mateo County. The species' preferred breeding habitat consists of temporary (minimum of 3 to 4 months), ponded environments (e.g., vernal pools, ephemeral pools, or human-made ponds) surrounded by uplands that support small mammal burrows. They will also utilize permanent ponds provided aquatic, vertebrate predators are not present. Such ponds provide breeding and larval habitat, while burrows of small mammals such as California ground squirrels and valley pocket gophers in upland habitats provide refugia for juvenile and adult salamanders during the dry season.

Photo 13. California tiger salamander

The range of the California tiger salamander is restricted to the Central Valley and the South Coast Range of California from Butte County south to Santa Barbara County. Tiger salamanders have disappeared from a significant portion of their range due to habitat loss from agriculture and urbanization and the introduction of non-native aquatic predators. Southeastern San Mateo County represents the northernmost limit of the species range on the San Francisco peninsula and the species is expected to have a very limited distribution in the Program area, if it is extant at all, as it has been recorded in San Mateo County only three times (CNDDB 2019). The last recorded occurrence was located in the *Palo Alto, California* U.S. Geological Survey (USGS) 7.5-minute quadrangle just west of San Francisquito Creek in 2002 (CNDDB 2019). It was also recorded northwest

of the Town of Woodside in the *San Mateo, California* 7.5-minute quadrangle in 1962 and in Palo Alto in the *Palo Alto* 7.5-minute quadrangle in 1893 (CNDDB 2019).

San Francisco Garter Snake (*Thamnophis sirtalis tetrataenia*). Federal status: Endangered; State status: Endangered. The San Francisco garter snake (Photo 14) was one of the first reptiles to be listed under FESA by the USFWS in 1967 (USFWS 1967). It was also listed under CESA in 1971, and it is a fully protected species under state Fish and Game Code. Critical habitat has not been established for this species. San Francisco garter snakes have been observed in a number of aquatic and terrestrial habitats throughout their historic range, including ponds, pools in or next to streams, streams, lakes, and reservoirs. The presence of adjacent upland areas with abundant small mammal burrows is also important as hibernation sites for snakes during the winter. They prefer a dense cover of vegetation such as willows (*Salix* ssp.), bulrushes (*Scirpus* spp.), cattails (*Typha* spp.), and tules (*Schoenoplectus* spp.). San Francisco garter snakes depend on frogs, particularly the threatened California red-legged frog, for food.

Photo 14. San Francisco garter snake

The San Francisco garter snake is restricted to the San Francisco peninsula. It occurs in scattered wetland areas from approximately the San Francisco County line south along the eastern and western bases of the Santa Cruz Mountains, at least to the Upper Crystal Springs Reservoir, and along the coast south to Año Nuevo Point, San Mateo County, and Waddell Creek, Santa Cruz County (USFWS 2007a). West of the crest of the Santa Cruz Mountains, it is found along virtually the entire coast of San Mateo County. East of the crest, it is found from the City of South San Francisco and the San Francisco airport, south to Crystal Springs Reservoir (Stanford University 2012). An intergrade zone comprised of hybrids between the San Francisco garter snake and red-sided garter snake (*Thamnophis sirtalis sirtalis*) occurs from Palo Alto north to the Pulgas region near Upper Crystal Springs Reservoir (Barry 1994).

Marbled Murrelet (*Brachyramphus marmoratus*). Federal status: Threatened; State status: Endangered. The USFWS listed the marbled murrelet (Photo 15 as threatened on September 28, 1992 (USFWS 1992) and a recovery plan was released in 1997 (USFWS 1997). Critical habitat was designated on October 4, 2011 (USFWS 2011). Four critical habitat units are present in the Program area (CA-12, CA-13, CA14a, and CA14b), portions of which occur in seven subwatersheds (i.e., Arroyo Leon, San Francisquito Creek, La Honda Creek, Lower Pescadero Creek, Upper Pescadero Creek, Butano Creek, and Gazos Creek-Frontal Año Nuevo Bay). The marbled murrelet occurs along the Pacific coast from Alaska to California, foraging in marine subtidal and pelagic habitats for small fish and invertebrates. Breeding occurs in mature,

coastal coniferous forest with nests built in tall trees. In California, breeding occurs primarily in Del Norte and Humboldt Counties.

In the Program area, marbled murrelets nest in old growth redwood and Douglas-fir forests adjacent to coastal waters in southern and central County. The marbled murrelet Recovery Plan (USFWS 1997) created six recovery zones for the murrelet. All potential nesting habitat for the species in the Program area is located within Zone 6, which includes the forested coastal zone from San Francisco City and County south to Point Sur in Monterey County and up to 14.9 miles inland. Suitable breeding habitat is not evenly distributed throughout Zone 6, but is clustered into seven aggregations of habitat stands with intervening non-habitat lands, with each suitable aggregation identified as an Important Murrelet Area (Halbert and Singer 2017). Four Important Murrelet Areas (i.e., Mill Creek–Big Creek, Scott Creek, Lower Pescadero, and Middle Pescadero-Portola) occur within the Program area, including portions of Memorial County Park and Pescadero Creek County Park. There have been 63 documented instances of nesting in Zone 6 (Halbert and Singer 2017). Identified nesting habitats include Portola Redwoods State Park (SP), Butano SP, Big Basin Redwoods SP, San Mateo County Memorial Park, Pescadero SP, Pescadero Creek County Park, and private property in the watersheds of Scott, Waddell, Butano, Gazos, and Pescadero Creeks (Rana Creek Habitat Restoration 2002; Peery et al. 2004 and Suddjian 2004 as cited in Sanctuary Integrated Monitoring Network 2015). Although individuals breeding in these old-growth montane forests overfly areas between breeding sites and the ocean, murrelets are not expected to occur on land except in nesting habitats.

Photo 15. Marbled murrelet

Western Snowy Plover (*Charadrius nivosus nivosus*). Federal status: Threatened; State status: Species of Special Concern. The USFWS listed the Pacific coast population of the western snowy plover (Photo 16) as threatened in 1993 (USFWS 1993). Critical habitat was designated for this population in 1999 (USFWS 1999a) and revised in 2012 (USFWS 2012). A revised recovery plan was released in 2007 (USFWS 2007b). Two critical habitat units are present in the Program area, CA 16 (Half Moon Bay), and CA 17 (Waddell

Photo 16. Western snowy plover

Creek Beach) in the Gazos Creek-Frontal Año Nuevo Bay subwatershed. The snowy plover is a small shorebird that occurs on almost every continent. On the Pacific coast, snowy plovers nest on sandy beaches and salt panne habitat from Washington to Baja Mexico. Because they nest during the summer, primarily on beaches in a temperate climate, snowy plovers are susceptible to nest disturbance and other negative interactions with humans. Much of their nesting habitat, particularly in southern California, has been lost to development and high human use. In addition, introduced predators, especially the non-native red fox (*Vulpes vulpes*), have had dramatic effects on snowy plover nesting success (Neuman et al. 2004).

In the South San Francisco Bay, snowy plovers nest on low, barren to sparsely vegetated saline managed pond levees and islands, at pond edges, and on salt panne areas of dry ponds (Page et al. 2000), and preferentially use light-colored substrates such as salt flats (Feeney and Maffei 1991, Marriott 2003). Nesting areas are located near water, where prey (usually brine flies and other insects) are abundant. In some areas, snowy plovers nest within dry saline managed ponds; in other areas where ponds typically hold water through the summer, nests are located primarily on levees. In the Program area, the western snowy plover is restricted primarily to the coast (SAS 2001, Cornell Lab of Ornithology 2019). On the coast, snowy plovers are known to occur on beaches at Pacifica State Beach, Half Moon Bay, Pescadero State Beach, Tunitas Creek Beach, Pillar Point Harbor, and Pigeon Point (USFWS 2010d, Cornell Lab of Ornithology 2019); however, the CNDDB (2019) includes no records of nesting locations on the coast since 1978. Along the Bay, the species breeds in managed ponds in the East Palo Alto/Menlo Park area, outside of the Program area, although nonbreeding individuals may occasionally occur in the Program area at the Coyote Point Recreation Area.

California Least Tern (*Sternula antillarum browni*). Federal status: Endangered; State status: Endangered, Fully Protected. The USFWS listed the California least tern (Photo 17) as endangered in 1970 (USFWS 1970), and the State of California listed the species as both endangered and fully protected in 1971 (Baron and Takegawa 1994). No critical habitat has been designated for this species. California least terns nest in California during the breeding season from April to September (Rigney and Granholm 1990, Baron and Takegawa 1994). Their nesting habitat consists of shallow depressions in sand or small gravel along large tracts of undisturbed beaches (Baron and Takegawa 1994, Marschalek 2008). Habitat requirements for the California least tern typically consist of quiet, extensive beaches or tidal flats located close to an abundance of small fish (Baron and Takegawa 1994, Rigney and Granholm 1990). In San Francisco Bay, this species' largest colony is located on an old airport runway at the former Alameda Naval Air Station, although small numbers of least terns nest on islands and salt pannes in former saline managed ponds in a few areas.

Photo 17. California least tern

Least terns nest in small colonies and, due to their endangered status, nesting locations are closely monitored and well known. In recent decades, the closest least terns have nested to the planning area is in the Eden Landing Ecological Preserve, at Hayward Regional Shoreline, and at Alameda Point, all of which are located across the Bay in Alameda County. Therefore, California least terns are not expected to nest in the Program area. Two historical records of nesting are present in San Mateo County (one at Bair Island and one at the Redwood City salt ponds); however, both are extirpated (CNDDB 2019). Small numbers of least terns may forage over open water habitat off the shoreline of the Coyote Point Recreation Area and the San Francisco International Airport in the Program area.

California Ridgway's Rail (*Rallus obsoletus obsoletus*). Federal status: Endangered; State status: Endangered and Fully Protected. The California Ridgway's rail (formerly the California clapper rail) (Photo 18) was listed as endangered by the USFWS in 1970 (USFWS 1970) and by the State of California in 1971. The USFWS approved a joint recovery plan for the salt marsh harvest mouse and the California clapper rail in 1984 (USFWS 1984), and an updated *Recovery Plan for Tidal Marsh Ecosystems in Northern and Central California* was released in 2013 (USFWS 2014). Critical habitat has not been proposed. The California Ridgway's rail is a secretive marsh bird that is endemic to marshes of the San Francisco Bay. It nests in salt and brackish marshes along the edge of the Bay, and is most abundant in extensive salt marshes and brackish marshes dominated by Pacific cordgrass (*Spartina foliosa*), pickleweed (*Salicornia* spp.), and marsh gumplant (*Grindelia hirsutula*) and that contain complex networks of tidal channels (Harvey 1980). It may also occupy habitats with other vegetative components, which include, but are not limited to, bulrush, cattails, and Baltic rush (*Juncus balticus*). Shrubby areas adjacent to or within these marshes are important for predator avoidance at high tides. The species does not occur in muted tidal or diked salt marshes. However, it has been documented in brackish marshes in the South Bay. Surveys conducted during the 1990 breeding season (H. T. Harvey & Associates 1990b) and winter season (H. T. Harvey & Associates 1990a) found a number of California Ridgway's rails occupying salt/brackish transitional marshes and several brackish, alkali bulrush-dominated marshes. In addition, they were found in nearly pure stands of alkali bulrush in the South Bay (H. T. Harvey & Associates 1990a, 1990b, 1991). Occasional non-breeding individuals may also wander upstream along tidal sloughs from their typical salt marsh habitats into tidal brackish/freshwater marsh habitats.

Photo 18. California Ridgway's rail

The salt marshes along the Bay provide suitable nesting and foraging habitat for the California Ridgway's rail, and numerous detections of this species have been recorded in San Mateo County (CNDDB 2019), including marshes bordering Bair Island, Corkscrew Slough, Deepwater Slough, Steinberger Slough, Redwood Creek, Belmont Slough, and San Bruno Point; marshes surrounding the mouth of San Francisquito Creek and Seal

Slough; and marshes on Greco Island and bordering Westpoint Slough (CNDDB 2019). However, within the Program area, suitable marsh habitat is found only along the shoreline of the San Francisco International Airport, where the species was detected in 2012 (H. T. Harvey & Associates 2012). Even there, habitat is very limited, and it is of low quality due to its narrow, fragmented nature. Ridgway's rails were previously known to breed near the mouth of Colma Creek in the Maintenance Program area (CNDDB 2019, Horizon Water and Environment 2015, ISP 2008), prior to the onset of the Invasive *Spartina* Program. However, following the onset of Spartina control, numbers of rails detected in the area declined, and surveys in 2012-2013 did not detect the species. In addition, Horizon Water and Environment (2015) concluded that there was no suitable habitat present in the area in 2015. Although it is possible that Ridgway's rails could return to the area if suitable habitat re-establishes, in 2017 the USFWS considered the Ridgway's rail absent from Colma Creek (based on survey data from the Invasive Spartina Project 2016 annual rail monitoring program and recent CNDDB queries) (USFWS 2017), and no Ridgway's rails were detected during a protocol-level survey conducted by BioMaAS, Inc. near the mouth of Colma Creek in 2018 (BioMaAS, Inc. 2018).

California Black Rail (*Laterallus jamaicensis coturniculus*). Federal status: None; State status: Threatened and Fully Protected. The California black rail (Photo 19) was listed under CESA in 1971 and is a fully protected species under state Fish and Game Code. The California black rail is a small rail that inhabits a variety of marsh types. It is most abundant in extensive tidal marshes with some freshwater input (Evens et al. 1991). It nests primarily in pickleweed-dominated marshes with patches or borders of bulrushes, often near the mouths of creeks. Black rails build nests in tall grasses or marsh vegetation during spring, and lay about six eggs. Nests are usually constructed of pickleweed, and are placed directly on the ground or slightly above ground in vegetation. Black rails feed on terrestrial insects, aquatic invertebrates, and possibly seeds (Trulio and Evens 2000).

Photo 19. California black rail

The California black rail reportedly nested in the Alviso area in the early 1900s (Wheelock 1916), but until recently it was known in the South Bay primarily as a non-breeder. However, since 2012, black rails have been increasingly detected in the Alviso area of Santa Clara County during the breeding season (http://groups.yahoo.com/group/south-bay-birds). These records suggest that small numbers of black rails have recently begun oversummering, and likely breeding, in the South Bay. However, black rails nest primarily in marshes in northern San Francisco Bay (i.e., San Pablo Bay and Suisun Bay), and this species is expected to occur in most parts of the South Bay primarily as a scarce winter visitor. Suitable habitat for nonbreeding California black rails is present in tidal salt marsh throughout much of the bayside portion of the County, and the species has been recorded outside of the Program area at the Ravenswood Open Space (Cornell Lab of

Ornithology 2019). However, within the Program area, suitable nonbreeding habitat is present only along the shoreline of the San Francisco International Airport. Even there, habitat is very limited, and it is of low quality due to its narrow, fragmented nature. Thus, California black rails are expected to occur rarely, if at all, in the Program area.

Bald Eagle (*Haliaeetus leucocephalus*). Federal status: None; State status: Endangered, Fully Protected. Bald eagle (Photo 20) populations exhibited precipitous declines in the early part of the 20th century primarily due to pesticide poisoning, which severely affected reproductive rates (Buehler 2000). DDT was the most debilitating of these chemicals, and since its use was banned in the United States in 1972, eagle populations have recovered rapidly (Buehler 2000). The bald eagle was removed from the federal endangered species list in 2008 but remains listed as both endangered and fully protected by the State of California.

Photo 20. Bald eagle

Ideal habitat for bald eagles is composed of remote, forested landscape with old-growth or mature trees and easy access to an extensive and diverse prey base. Bald eagles forage in fresh and salt water where fish are abundant and diverse. They build nests in tall, sturdy trees at sites that are in relatively close proximity to aquatic foraging areas and isolated from human activities. The eagle breeding season extends from January through August (Buehler 2000). In the Program area, the bald eagle occurs primarily as a migrant and winter visitor, and is rare during the summer months (Cornell Lab of Ornithology 2019). It occurs most often at larger reservoirs, where it forages on fish and waterfowl, but migrants may occur virtually throughout the Program area. A pair successfully nested at Crystal Springs Reservoir in 2013, 2014, and 2015 and there are rumors of possible nesting by what was likely the same pair nearby in subsequent years. Given recent increases in breeding populations along the central California coast, additional breeding pairs may colonize other lakes and reservoirs in the near future.

Bank Swallow (*Riparia riparia*). Federal status: None; State status: Threatened (Nesting). The bank swallow (Photo 21) is listed as threatened under the CESA. In California, bank swallows are found primarily in riparian and other lowland habitats in the Central Valley, typically between April and September. The majority of colonies occur along the banks of the Sacramento and Feather Rivers in the northern Central Valley in areas where the rivers still meander in a mostly natural state. Other

Photo 21. Bank swallow

colonies persist along the central coast from Monterey to San Mateo Counties and in northeastern California in Shasta, Siskiyou, Lassen, Plumas, and Modoc Counties (Zeiner et al. 1990a). Bank swallows are migratory, spending the spring and summer months in the Central Valley of California and wintering in South America. The species nests colonially and inhabits isolated places where fine-textured or sandy vertical bluffs or riverbanks are available in which to dig burrows 2 to 3 feet deep. Bank swallows forage for insects over open riparian areas, brushland, grassland, and cropland.

In the Program area, bank swallows occur as rare migrants along the coast and South Bay, although they could occur anywhere in the Program area. As breeders, they are very rare. The only known extant breeding colony in San Mateo County is at Point Año Nuevo (CNDDB 2019).

Tricolored Blackbird (*Agelaius tricolor*). Federal status: None; State status: Threatened. Tricolored blackbirds (Photo 22) are found primarily in the Central Valley and in central and southern coastal areas of California. This species is considered a California species of special concern (at its nesting colonies) because of concerns over the loss of wetland habitats in the state. The tricolored blackbird is highly colonial in its nesting habits and forms dense breeding colonies that, in some parts of the Central Valley, may consist of up to tens of thousands of pairs. This species typically nests in tall, dense stands of cattails or tules, but it also nests in blackberry (*Rubus* spp.), wild rose bushes (*Rosa californica*), and tall herbs. Nesting colonies usually are located near fresh water. Tricolored blackbirds form large, often multi-species flocks during the non-breeding period and range more widely than during the breeding season. Suitable habitat for the tricolored blackbird occurs primarily along the coastal lowlands of the Program area and in the San Francisco Bay lowlands, and less frequently along the ridgeline of the Santa Cruz Mountains. It is an uncommon to common migrant and wintering visitor (SAS 2001, Cornell Lab of Ornithology 2019); however, there are no recent breeding records from the County (CNDDB 2019, Information Center for the Environment 2015).

Photo 22. Tricolored blackbird

Salt Marsh Harvest Mouse (*Reithrodontomys raviventris*). Federal status: Endangered; State status: Endangered and Fully Protected. The salt marsh harvest mouse (Photo 23) was listed as endangered by the USFWS in 1970 (USFWS 1970) and by the State of California in 1971. Critical habitat has not been designated for this species. The *Draft Recovery Plan for Tidal Marsh Ecosystems of Northern and Central California* was issued in 2010 (USFWS 2010c), an expansion and revision of the *Salt Marsh Harvest Mouse and California Clapper Rail Recovery Plan* issued in 1984 (USFWS 1984). The salt marsh harvest mouse is a rodent endemic to the salt and brackish marshes, and adjacent tidally influenced areas, of the San Francisco Bay estuary. At present, the distribution of the northern subspecies, *R. raviventris halicoetes*, occurs along Suisun and San Pablo Bays north of

Point Pinole in Contra Costa County, and Point Pedro in Marin County. The southern subspecies, *R. raviventris raviventris*, is found in marshes in Corte Madera, Richmond, and the South Bay mostly south of the San Mateo Bridge (Highway 92).

Photo 23. Salt marsh harvest mouse

The salt marsh harvest mouse has evolved to a life in tidal marshes. It depends mainly on dense pickleweed as its primary cover and food source and may utilize a broader source of food and cover that includes saltgrass (*Distichlis spicata*) and other vegetation typically found in the salt and brackish marshes of this region. In natural systems, salt marsh harvest mice can be found in the middle tidal marsh and upland transition zones. Upland refugia are an essential habitat component during high tide events, when the marsh plain is inundated, as salt marsh harvest mice are highly dependent on cover (Shellhammer 1978, as cited in USFWS 1984). The harvest mouse does not burrow, but the northern subspecies may build nests of loose grasses. Salt marsh harvest mice are capable of breeding year-round, although most reproductive activity likely occurs between March and November, with a peak in mid-summer.

Numerous detections of this species have been recorded in salt marsh habitat along the Bay. However, suitable habitat in the Program area is limited, occurring only along the coast of the San Francisco Airport. Even there, habitat is very limited, and it is of low quality due to its narrow, fragmented nature; no detections of the species have been recorded there. The species may also occur immediately adjacent to the Program area in an unnamed channel west of Flood Slough, although the narrow nature of the tidal marsh along that channel reduces habitat quality and potential for occurrence.

California Species of Special Concern

Photo 24. California giant salamander

California Giant Salamander (*Dicamptodon ensatus*). Federal status: None; State status: Species of Special Concern. The California giant salamander (Photo 24) occurs in moist forests and riparian areas near clear, cold streams, seeps, and ponds (Stebbins 2003). Breeding takes place primarily from March through May, but may also occur in the fall. This species prefers to breed in cold, clear running water but may also breed in lakes and ponds. California giant salamanders are endemic to

California. They range from Mendocino County south through the San Francisco Bay Area to Santa Cruz County, but do not occur in the East Bay (Kucera 1997). Records in the Program area are primarily restricted to the Santa Cruz Mountains and foothills (CNDDB 2019).

Santa Cruz Black Salamander (*Aneides flavipunctatus niger*). Federal status: None; State status: Species of Special Concern. The Santa Cruz black salamander (Photo 25) is endemic to California and is found in moist streamside habitats in woodlands and forests in the Santa Cruz Mountains in western Santa Clara, northern Santa Cruz, and southernmost San Mateo Counties. This subspecies is mostly terrestrial, staying underground during dry periods and foraging for small invertebrates aboveground at night during wet weather. Females lay eggs in July or August (Petranka 1998 as cited in Thomson et al. 2016) in cavities below ground and may stay with the eggs until they hatch. Records in the Program area are primarily restricted to the Santa Cruz Mountains and foothills (CNDDB 2019).

Photo 25. Santa Cruz black salamander

Western Pond Turtle (*Actinemys marmorata*). Federal status: None; State status: Species of Special Concern. The western pond turtle (Photo 26) occurs in ponds, streams, and other wetland habitats in the Pacific slope drainages of California (Bury and Germano 2008). Ponds or slack-water pools with suitable basking sites (such as logs) are an important habitat component for this species, and western pond turtles do not occur commonly along high-gradient streams. Females lay eggs in upland habitats, in clay or silty soils in unshaded (often south-facing) areas. Nesting habitat is typically found within 600 feet of aquatic habitat (Jennings and Hayes 1994), but if no suitable nesting habitat can be found close by, adults may travel overland considerable distances to nest. Juveniles occur in shallow aquatic habitats (often creeks) with emergent vegetation and ample invertebrate prey.

Photo 26. Western pond turtle

Creeks and freshwater marshes within the Program area provide suitable habitat for the western pond turtle; however, records are limited to one location each on San Mateo and San Francisquito Creeks and several locations along the shores of Crystal Springs Reservoir (CNDDB 2019). The cumulative stressors of

urbanization including the release of non-native turtles, predation and harassment by pets and non-native mammals, capture by humans, degradation of water quality, loss of upland nesting habitat due to development, and the construction of barriers between creeks and nesting areas have reduced western pond turtle populations, and pond turtle numbers are expected to be low in the Program area.

Black Skimmer (*Rynchops niger*). Federal status: None; State status: Species of Special Concern (Nesting Colony). In California, black skimmers (Photo 27) are considered a species of special concern only when nesting. They were considered a rare non-breeding visitor to the San Francisco Bay area until the mid-1990s. In 1994, one pair of black skimmers was documented nesting at saline managed Pond AB2 in Santa Clara County and a second pair nested at Hayward Regional Shoreline in Alameda County (Layne et al. 1996). Since 1994, black skimmers have occurred in the South Bay every year, nesting at several additional sites (Armstrong 1976). In the San Francisco Bay area, black skimmers typically nest among Forster's terns (*Sterna forsteri*), on small dredge-spoil islands (including both bare islands and islands vegetated, sometimes heavily, with pickleweed) in saline managed ponds. Exact nesting locations vary from year to year. In San Mateo County during the breeding season, the black skimmer occurs primarily in South San Francisco Bay, where it is known to have nested at Redwood Shores and in managed ponds in the Menlo Park/East Palo Alto area. It also occurs on the coast as a very rare migrant (SAS 2001, Cornell Lab of Ornithology 2019). The species' unique physiology, with the lower mandible longer than the upper mandible, allows this species to fly over the surface of the water, "skimming" for small fish.

Photo 27. Black skimmer

Northern Harrier (*Circus cyaneus*). Federal status: None; State status: Species of Special Concern (Nesting). The northern harrier (Photo 28) nests in marshes and grasslands, usually those with tall vegetation and moisture sufficient to inhibit accessibility of nest sites to predators. Northern harriers forage in a variety of open habitats, especially during the nonbreeding season. The species is fairly widespread as a forager in grasslands, extensive wetlands, and agricultural areas in the Program area during migration and winter. During the breeding season, the northern harrier occurs primarily along the coast, where it nests in extensive marshes and grasslands, and in tidal marsh along South San Francisco Bay (SAS 2001, Cornell Lab of Ornithology 2019).

Photo 28. Northern harrier

Short-eared Owl (*Asio flammeus*). Federal status: None; State status: Species of Special Concern (Nesting). The short-eared owl (Photo 29) occurs in open habitats such as grasslands, wet meadows, and marshes. It requires tall, herbaceous vegetation for nesting or daytime refuge. Short-eared owls once bred much more widely in California, including the San Francisco Bay area. However, the species now occurs primarily as a migrant and winter visitor, and it is a rare and local breeder in the South Bay. In the Program area, the short-eared owl occurs primarily from October to March, with most records confined to grasslands, fallow fields, and marshes along the coast and South Bay (SAS 2001, Cornell Lab of Ornithology 2019).

Photo 29. Short-eared owl

Long-eared Owl (*Asio otus*). Federal status: None; State status: Species of Special Concern (Nesting). The long-eared owl (Photo 30) is an uncommon year-long resident throughout much of the state. Long-eared owls frequent dense riparian and live oak thickets near meadow edges, and nearby woodland and forest habitats, but also may be found in dense conifer stands at higher elevations. Long-eared owls typically nest in trees, but will occasionally nest on the ground. This species forages over open areas, where it hunts for rodents and small birds. The long-eared owl breeds from valley foothill hardwood up to ponderosa pine habitats from early March to late July. In the Program area, the long-eared owl occurs in small numbers throughout the county in appropriate habitat, but is relatively rare and secretive (SAS 2001, Cornell Lab of Ornithology 2019).

Photo 30. Long-eared owl

Burrowing Owl (*Athene cunicularia*). Federal status: None; State status: Species of Special Concern. The burrowing owl (Photo 31) is a small, terrestrial owl of open country. It prefers annual and perennial grasslands, typically with

Photo 31. Burrowing owl

sparse or nonexistent tree or shrub canopies. In California, burrowing owls are found in close association with California ground squirrels (*Otospermophilus beecheyi*); owls use abandoned ground squirrels burrows for shelter and nesting. The nesting season, as recognized by the CDFW (2012), runs from February 1 through August 31. After nesting is completed, adult owls may remain in their nesting burrows or in nearby burrows, or they may migrate (Rosenberg et al. 2007); young birds disperse across the landscape from 0.1 mile to 35 miles from their natal burrows (Rosier et al. 2006). Burrowing owl populations have declined substantially in the San Francisco Bay area in recent. In the Program area, the burrowing owl occurs as a rare winter visitor to grasslands and other open habitats, primarily along the coast and Bay. A statewide survey conducted between 1991 and 1993 indicated that breeding owls had nearly been extirpated from San Mateo County with only one to two known breeding pairs remaining (DeSante et al. 2007). Although there may still be a few breeding pairs along the Bay in the Bedwell-Bayfront Park vicinity (SAS 2001, Cornell Lab of Ornithology 2019), outside the Program area, this species is expected to occur in the Program area only as a fairly rare migrant and winter visitor.

Photo 32. Vaux's swift

Vaux's Swift (*Chaetura vauxi*). Federal status: None; State status: Species of Special Concern (Nesting). In California, the range of the Vaux's swift (Photo 32) is concurrent with the range of the coast redwood, which extends along the coast from Del Norte County in the north to Monterey County in the south (Hunter 2008). This species also can be found in smaller numbers in other coniferous forest types (Hunter 2008). Vaux's swifts nest both in small colonies and as single pairs, occupying cavities in redwoods and other trees (Hunter and Mazurek 2003). They also occasionally use artificial cavities such as chimneys (Hunter 2008). Swifts forage on flying insects in the air above a variety of habitats and can often be seen far from the nearest suitable breeding habitat (Hunter 2008). In the Program area, the Vaux's swift breeds in mature redwood forests during the breeding season (SAS 2001), although it could potentially breed elsewhere, as it occasionally nests in chimneys (Rottenborn 2007). This species can occur throughout the Program area during the breeding season and migration (Cornell Lab of Ornithology 2019).

Photo 33. Black swift

Black Swift (*Cypseloides niger*). Federal status: None; State status: Species of Special Concern. Black swift (Photo 33) nest sites are very limited, they are found only behind or beside permanent or semipermanent waterfalls, on perpendicular cliffs near water (above Sierran rivers or on the sea coast), and in sea caves (Legg 1956, Knorr 1993, Lowther and Collins 2002). Black swifts feed exclusively on insects and

forage over many habitats. In the Program area, the black swift occurs primarily along the immediate coast and coastal ranges, although it can occur anywhere in the County during migration (Cornell Lab of Ornithology 2019). It is a rare breeder in the Program area; the only known breeding location is at Año Nuevo State Park (SAS 2001).

Olive-sided Flycatcher (*Contopus cooperi*). Federal status: None; State status: Species of Special Concern (Nesting). Olive-sided flycatchers (Photo 34) are associated with coniferous forest habitats and breed in mature forests with open canopies, along forest edges in more densely vegetated areas, in recently burned forest habitats, and in selectively harvested landscapes (Altman and Sallabanks 2000; Robertson and Hutto 2007). They nest in tall trees, arriving at their breeding territories beginning in mid-May and remaining until late July. The olive-sided flycatcher occurs at low densities in woodland and forest habitats throughout much of the Program area during the breeding season, with the exception of the highly developed South Bay (SAS 2001). During spring and fall migration, individuals can occur anywhere in the Program area (Cornell Lab of Ornithology 2019).

Photo 34. Olive-sided flycatcher

Purple Martin (*Progne subis*). Federal status: None; State status: Species of Special Concern. In California, the purple martin (Photo 35) breeds in riparian woodlands; oak woodlands; partially logged, broken, or burned coniferous forests; and montane mixed forests, nesting in cavities (usually old woodpecker cavities) of tall trees, often near water (Fix and Bezener 2000). This species also breeds in nest boxes. Foraging occurs over bottomlands, bays, coastal lagoons, ponds, and wetlands. During migration, purple martins occur over rivers, reservoirs, and agricultural fields. Purple martins occur in the Program area as rare migrants, primarily along the coast, although a few pairs nest along the ridgeline of the Santa Cruz Mountains as well (SAS 2001, Cornell Lab of Ornithology 2019).

Photo 35. Purple martin

Loggerhead Shrike (*Lanius ludovicianus*). Federal status: None; State status: Species of Special Concern (Nesting). The loggerhead shrike (Photo 36) is a predatory songbird associated with open habitats interspersed with shrubs, trees, poles, fences, or other perches from which it can hunt. Nests are built in densely foliated shrubs or trees, often containing thorns, which offer protection from predators and on which prey

items are impaled. The breeding season for loggerhead shrikes may begin as early as mid-February and lasts through July (Yosef 1996). Grassland, ruderal, and marsh habitats throughout the Program area provide suitable nesting and foraging habitat for this species. However, the loggerhead shrike is a rare breeder in the Program area, with the few known recent nesting records all being from the San Francisco Bay lowlands (SAS 2001, Cornell Lab of Ornithology 2019). It thus occurs primarily as a migrant and wintering visitor along the coastal and San Francisco Bay lowlands, and is generally absent from the crest of the Santa Cruz Mountains.

Photo 36. Loggerhead shrike

Yellow Warbler (*Setophaga petechia*). Federal status: None; State status: Species of Special Concern (Nesting). In California, the yellow warbler (Photo 37) occupies wooded riparian habitats along the coast, on both eastern and western slopes of the Sierra Nevada, and throughout the northern portion of the state (Heath 2008). This species prefers riparian corridors with an overstory of mature cottonwoods and sycamores, a midstory of box elder and willow, and a substantial shrub understory (Bousman 2007e), particularly in areas with more open space adjacent to the riparian habitat. Riparian areas with reduced understory resulting from grazing or disturbance are generally not used by this species, and riparian corridors lacking open ruderal or herbaceous vegetation along the edges or with development up to the corridor edge are often avoided as well. Yellow warblers construct open-cup nests in upright forks of shrubs or trees in dense willow thickets or other dense vegetation (Lowther et al. 1999). The yellow warbler is an uncommon to rare breeder in wooded riparian habitats, occurring primarily in association with alders and willows, in the Program area. Riparian woodlands in the Program area provide suitable nesting and foraging habitat for this species, but the species is scarce and local, being particularly scarce as a breeder on the immediate coast (SAS 2001). It is an abundant migrant during the spring and fall.

Photo 37. Yellow warbler

San Francisco Common Yellowthroat (*Geothlypis trichas sinuosa*). Federal status: None; State status: Species of Special Concern. The San Francisco common yellowthroat (Photo 38) inhabits emergent vegetation and breeds in fresh and brackish marshes and moist floodplain vegetation. It will also nest in salt marsh habitats that support tall vegetation (Guzy and Ritchison 1999). The San Francisco common yellowthroat uses small and isolated patches of habitat as long as groundwater is close enough to the surface to encourage

the establishment of dense stands of rushes, cattails, willows, and other emergent vegetation (Nur et al. 1997, Gardali and Evens 2008). Ideal habitat, however, has extensive, thick riparian, marsh, or herbaceous floodplain vegetation in perpetually moist areas, where populations of brown-headed cowbirds (*Molothrus ater*) are low (Menges 1998). This subspecies builds open-cup nests, low in the vegetation, and nests from mid-March through late July (Guzy and Ritchison 1999, Gardali and Evens 2008). In the Program area, this species is a locally common breeder in taller salt, brackish, and freshwater marsh habitat, in moist coastal scrub, and in riparian habitat dominated by willows and herbaceous vegetation.

Photo 38. San Francisco common yellowthroat

Alameda Song Sparrow (*Melospiza melodia pusillula*). Federal status: None; State status: Species of Special Concern. The Alameda song sparrow (Photo 39) is one of three subspecies of song sparrow that breed only in salt marsh habitats in the San Francisco Bay area (Chan and Spautz 2008). Prime habitat for the Alameda song sparrow consists of large areas of tidally influenced salt marsh, dominated by cordgrass and gumplant and intersected by tidal sloughs, offering dense vegetative cover and singing perches. Although the *pusillula* subspecies (the "species" of special concern) is occasionally found in brackish marshes dominated by bulrushes, it is apparently very sedentary and is not known to disperse upstream into freshwater habitats (Basham and Mewaldt 1987). Song sparrows nest as early as March, but peak nesting activity probably occurs in May and June. In the Program area, the Alameda song sparrow occurs only in salt marshes along San Francisco Bay (Chan and Spautz 2008).

Photo 39. Alameda song sparrow

Grasshopper Sparrow (*Ammodramus savannarum*). Federal status: None; State status: Species of Special Concern (Nesting). In California, the distribution of breeding grasshopper sparrows (Photo 40) includes the Coast Ranges, the northern Central Valley, and areas west of the southeastern deserts (Lyon 2000, Unitt 2008). The grasshopper sparrow breeds in open, short grasslands with scattered clumps of shrubby vegetation, constructing domed ground nests with grasses in patches of dense vegetation (Vickery 1996, Sutter and Ritchison 2005, Unitt 2008). Prime breeding habitat features very large, unfragmented areas of grassland

with patches of bare ground, and clumps of shrubby vegetation surrounded by denser grass cover for singing perches and nest sites (Vickery 1996, Lyon 2000, Sutter and Ritchison 2005). Grasshopper sparrows breed from mid-March to August in California, after which they migrate to wintering grounds that are presumed to be in Mexico and Central America (Vickery 1996, Unitt 2008). Breeding grasshopper sparrows occur in small numbers in extensive grassland areas throughout much of the Program area, but primarily west of and along the Santa Cruz Mountains ridgeline (SAS 2001, Cornell Lab of Ornithology 2019, Unitt 2008).

Photo 40. Grasshopper sparrow

Bryant's Savannah Sparrow (*Passerculus sandwichensis alaudinus*). Federal status: None; State status: Species of Special Concern. The Bryant's savannah sparrow (Photo 41) is one of four subspecies of savannah sparrow that breed in California. The *alaudinus* subspecies occurs primarily in coastal and bayshore areas, from Humboldt Bay to Morro Bay, and is found year-round in low-elevation, tidally influenced habitat, specifically pickleweed-dominated salt marshes, and in grasslands and ruderal areas. Along the edge of the Bay, levee tops with short vegetative growth and levee banks with high pickleweed are the preferred nesting habitat of this sparrow (Fitton 2008). This species also nests in extensive grasslands in coastal areas and in the interior of the Santa Cruz Mountains (SAS 2001).

Photo 41. Bryant's savannah sparrow

San Francisco Dusky-footed Woodrat (*Neotoma fuscipes annectens*). Federal status: None; State status: Species of Special Concern. San Francisco dusky-footed woodrats (Photo 42) prefer riparian and oak woodland forests with dense understory cover, or thick chaparral habitat (Lee and Tietje 2005). Dusky-footed woodrats build large, complex nests of sticks and other woody debris, which may be maintained by a series of occupants for several

Photo 42. San Francisco dusky-footed woodrat

years (Carraway and Verts 1991). Woodrats also are very adept at making use of human-made structures, and can nest in electrical boxes, pipes, wooden pallets, and even portable storage containers. Woodrat nest densities increase with canopy density and with the presence of poison oak (Carraway and Verts 1991). Woodlands and scrub habitats throughout much of the Program area provide suitable nesting and foraging habitat for this species, and this species can be abundant in suitable habitat.

Salt Marsh Wandering Shrew (*Sorex vagrans halicoetes*). Federal status: None; State status: Species of Special Concern. The salt marsh wandering shrew occurs primarily in medium-high, wet tidal marsh (6 to 8 feet above mean sea level) with abundant driftwood and other debris for cover (Shellhammer 2000). This species also has been recorded in diked marsh habitat. Within these habitats, individuals typically prefer patches of tall pickleweed, in which they build nests. Salt marsh wandering shrew breeds and gives birth during the spring; however, very little is known about the natural history of this species.

The salt marsh wandering shrew historically was more widely distributed in the San Francisco Bay, but it is currently confined to salt marshes in the South Bay (Findley 1955). Salt marsh wandering shrew occasionally is captured during salt marsh harvest mouse trapping studies, but the difficulty in identifying it to species has precluded a better understanding of its current distribution in the South Bay. The shrew was formerly recorded from marshes of San Pablo and San Francisco Bays in Alameda, Contra Costa, San Francisco, San Mateo, and Santa Clara Counties, but captures in recent decades have been very infrequent in these areas. Suitable habitat for this species within the Program area is limited, occurring primarily around the San Francisco Airport. However, owing to the fragmented, limited nature of salt marsh habitat in the Program area, there is a low probability of this species' occurrence in the Program area.

American Badger (*Taxidea taxus*). Federal status: None; State status: Species of Special Concern. The American badger (Photo 43) is a stocky, burrowing mammal that occurs in grassland habitats throughout the western United States. Badgers can have large territories, up to 21,000 acres in size, with territory size varying by sex and by season. They are strong diggers and feed primarily on other burrowing mammals, such as ground squirrels. In central California, American badgers typically occur in annual grasslands, oak woodland savannas, semi-arid shrub/scrublands, and any habitats with stable ground squirrel populations or other fossorial rodents (i.e., ground squirrels, gophers, kangaroo rats, and chipmunks [Zeiner et al. 1990b]). They occur to a lesser extent in agricultural areas, where intensive cultivation inhibits den establishment and reduces prey abundance. Badgers are primarily nocturnal, although they are often active during the day. They breed during late summer, and females give birth to a litter of young the following spring. In the Program area, small numbers of badgers

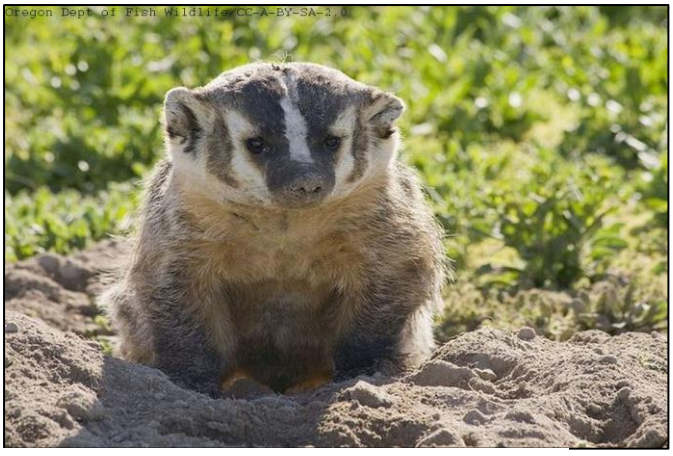

Photo 43. American badger

may occur in extensive grasslands along the coast and in the Santa Cruz Mountains. This species is not expected to occur on the flat bayside lands of the eastern portion of the Program area or in urban areas.

Pallid Bat (*Antrozous pallidus*). Federal status: None; State status: Species of Special Concern. Pallid bats (Photo 44) are most commonly found in oak savannah and in open dry habitats with rocky areas, trees, buildings, or bridge structures that are used for roosting (Zeiner et al. 1990; Ferguson and Azerrad 2004). Coastal colonies commonly roost in deep crevices in rocky outcroppings, in buildings, under bridges, and in the crevices, hollows, and exfoliating bark of trees. Night roosts often occur in open buildings, porches, garages, highway bridges, and mines. Colonies can range in size from a few individuals to over a hundred (Barbour and Davis 1969), and they usually consist of at least 20 individuals (Wilson and Ruff 1999). Pallid bats typically winter in canyon bottoms and riparian areas. After mating during the late fall and winter, females leave to form maternity colonies, often on ridge tops or other warmer locales (Johnston et al. 2006). Pallid bat roosts are very susceptible to human disturbance. The pallid bat occurs sporadically throughout open areas and along roads of the Pacific coastal regions and the Santa Cruz Mountains within the Program area. This species is not expected to occur on the flat bayside lands of the eastern portion of the Program area but likely occurs occasionally at the edges of developed areas in the foothills immediately west of the low elevation bayside areas.

Photo 44. Pallid bat

Western Red Bat (*Lasiurus blossevillii*). Federal status: None; State status: Species of Special Concern. Western red bats (Photo 45) are strongly associated with intact cottonwood and sycamore valley riparian habitats in low elevations (Pierson et al. 2006). Both day and night roosts usually are located in the foliage of trees; red bats in the Central Valley show a preference for large trees and extensive, intact riparian habitat (Pierson et al. 2006). Day roosts often are located along the edges of riparian areas, near streams, grasslands, and even urban areas. During the breeding season, western red bats establish individual tree roosts and occasionally small maternity colonies in riparian habitats (Zeiner et al. 1990b). Little is known about the habitat use of western red bats during the non-breeding season (Pierson et al. 2006). The red

Photo 45. Western red bat

bat requires habitat mosaics or edges that provide close access to foraging sites as well as cover for roosting (Zeiner et al. 1990b). The western red bat occurs as a migrant and winter resident, but does not breed in the Program area. Small numbers may roost in foliage in trees virtually anywhere in the Program area, but are expected to roost primarily in riparian areas.

Townsend's Big-eared Bat (*Corynorhinus townsendii*). Federal status: None; State status: Species of Special Concern. Townsend's big-eared bat (Photo 46) is a colonial species, and females aggregate in the spring at maternity colonies to begin their breeding season, which may extend through the end of August. Females give birth to one young, and females and young show a high fidelity to both their group and their specific roost site (Pearson et al. 1952). Although the Townsend's big-eared bat is usually a cave dwelling species, many colonies are found in anthropogenic structures, such as the attics of buildings or old abandoned mines. Known roost sites in California include limestone caves, lava tubes, mine tunnels, buildings, and other structures (Williams 1986). This species also roosts in deep crevices of redwood trees. Radio tracking studies suggest that movement from a colonial roost during the maternity season is confined to the area within 9 miles of the roost (Pierson and Rainey 1998). This species is easily disturbed while roosting in buildings, and females are known to abandon their young when disturbed (Humphrey and Kunz 1976). Townsend's big-eared bats feed primarily on moths and other soft-bodied insects (Kunz and Martin 1982). The Townsend's big-eared bat is a rare resident in the coastal region of the Program area, potentially roosting in old mines, caves, very large cavities in redwood trees, and barns and abandoned buildings in the Santa Cruz Mountains. It has been extirpated from the flat bayside lands of the eastern portion of the Program area.

Photo 46. Townsend's big-eared bat

State Fully Protected Species

White-tailed Kite (*Elanus leucurus*). Federal status: None; State status: Fully Protected. In California, white-tailed kites (Photo 47) can be found in the Central Valley and along the coast, in grasslands, agricultural fields, cismontane woodlands, and other open habitats (Zeiner et al. 1990b, Dunk 1995, Erichsen et al. 1996). White-tailed kites are year-round residents of the state, establishing nesting

Photo 47. White-tailed kite

territories that encompass open areas with healthy prey populations, and snags, shrubs, trees, or other nesting substrates (Dunk 1995).

Nonbreeding birds typically remain in the same area over the winter, although some movements do occur (Polite 1990). The presence of white-tailed kites is closely tied to the presence of prey species, particularly voles, and prey base may be the most important factor in determining habitat quality for white-tailed kites (Dunk and Cooper 1994, Skonieczny and Dunk 1997). Marshes and grasslands throughout the County provide suitable breeding and/or foraging habitat for the white-tailed kite, with breeding occurring primarily in the southwestern-most portion of the Program area and along the Bay outside of the Program area (SAS 2001).

American Peregrine Falcon (*Falco peregrinus anatum*). Federal status: None; State status: Fully Protected. The American peregrine falcon (Photo 48) was listed as endangered by the USFWS in 1970 (USFWS 1970) and by the State of California in 1971. Recovery efforts included the banning of DDT in North America, and captive breeding programs to help bolster populations. The USFWS removed the American peregrine falcon from the endangered species list in 1999 (USFWS 1999b), and from the state endangered species list in 2009.

Photo 48. American peregrine falcon

The American peregrine falcon occurs throughout much of the world and is known as one of the fastest flying birds of prey. In California, it is a permanent resident and migrant throughout the state. Peregrine falcons prey almost entirely on birds, which they kill while in flight. These falcons nest on ledges and caves on steep cliffs, as well as on human-made structures such as buildings, bridges, and electrical transmission towers. In California, they are known to nest along the entire coastline, the northern Coast, and the Cascade Ranges and Sierra Nevada. They may be present in suitable habitat throughout the Program area. Recently, the species has been documented nesting along the Devil's Slide Coastal Trail, and it is possible that it may nest on bridges or cliffs elsewhere in the Program area.

Golden Eagle (*Aquila chrysaetos*). Federal status: None; State status: Fully Protected. In California, the golden eagle (Photo 49) is an uncommon permanent resident and migrant throughout the state. The species' breeding range in California excludes only the Central Valley, the immediate coast in the far north, and the southeastern corner of the state (Zeiner et al. 1990b). The golden eagle nests in a range of open

Photo 49. Golden eagle

habitats, including desert scrub, foothill cismontane woodlands, and annual or perennial grasslands. Nesting habitat is characterized by large, remote patches of grassland or open woodland; a hilly topography that generates lift; an abundance of small mammal prey; and tall structures that serve as nest platforms and hunting perches. Once a breeding pair establishes a territory, they may build a number of nests in tall structures such as tall trees or snags, cliffs, or utility towers (Zeiner et al. 1990b, Kochert et al. 2002), only one of which is used in any given year. The nesting season begins in late January and continues through August. Following nesting, adult eagles usually remain in or near their breeding territory (Zeiner et al. 1990b). Young birds in California tend to be sedentary, remaining in or near their parental home ranges (Kochert et al. 2002). In the Program area, the golden eagle is an uncommon to rare permanent resident (Cornell Lab of Ornithology 2019). It occurs sparingly in grasslands throughout the County, primarily as a nonbreeder, although a few pairs nest there (SAS 2001).

Ringtail (*Bassariscus astutus*). Federal status: None; State status: Fully Protected. Ringtails (Photo 50) occur in forests and shrublands, often in close association with rocky areas or riparian habitats. The species nests in rock recesses, hollow trees, logs, snags, abandoned burrows, or woodrat nests. Ringtails are omnivorous, eating rodents, rabbits, birds, invertebrates, fruits, and nuts (Taylor 1954, Trapp 1978). The status of this species in San Mateo County is poorly known. Although this species' strictly nocturnal habits may be at least partially responsible for the lack of information on this species' distribution in the Program area, it is likely rare given the lack of sightings, and the scarcity of roadkill records (e.g., compared to the nocturnal American badger, which is more frequently detected by roadkills [California Roadkill Observation System 2015]). Suitable habitat is present in portions of the Program area with dense woodlands and/or rocky outcroppings, primarily in the less developed western portion of the Program area.

Photo 50. Ringtail

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Appendix H

Resource Characterizations

Montara Creek – Harte Street Culvert

Location
Harte Street near the intersection with Date Street in Montara

COUNTY REGION: Coastside
MAINTENANCE TIER: 2 OR 3

COUNTY UNIT: Department of Public Works

COORDINATES: 37.538075, -122.504757

HYDROLOGIC UNIT CODE: 180500060205, Denniston Creek – Frontal Pacific Ocean

WATERSHED: Montara Creek

CREEK/TRIBUTARY: Montara Creek

MAINTENANCE WORK AREA: 250 square feet

MAINTENANCE ACTIVITY TYPE: Culvert repair

WORK BELOW OHWM: Yes

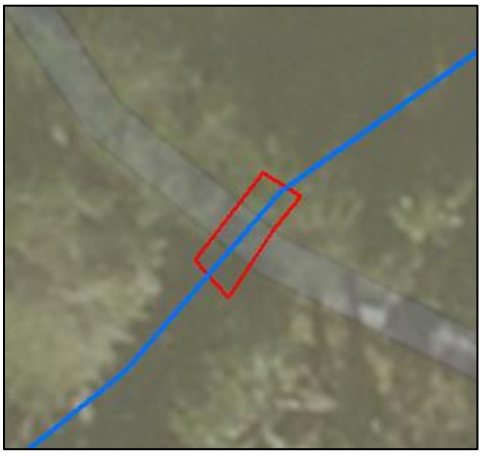
Photo 1. Upstream side of the Harte Street culvert. (April 6, 2017)

PHYSICAL SETTING

The maintenance site is located in the community of Montara along Montara Creek. The creek drains the western slopes of Montara Mountain and flows west-southwest until reaching the Pacific Ocean. The maintenance site is located at the Harte Street crossing as Montara Creek flows across the Quaternary marine terrace and coastal plain. The local topography is gradually sloped to the west-southwest and flattens out moving westward. The creek channel is approximately 10 to 14 feet wide with subtle bank slopes and height.

Land uses in the vicinity of the maintenance site and along the creek corridor consist mostly of natural, undeveloped areas. Residential development becomes more prevalent moving downstream of the site. The maintenance work area would be limited to the immediate road right-of-way and the channel upstream and downstream of the Harte Street crossing.

MAINTENANCE SITE LOCATION MAP AND APPROXIMATE WORK AREA MAP



BIOLOGICAL CONDITIONS

Aquatic or Instream Habitat: Montara Creek in the maintenance area supports flows ranging from 4 to 10 inches in depth (April 2017). During summer and fall, very low flow is present (less than 1 cubic foot per second). No pools are present in or near the culvert. The substrate consists mostly of gravels with sand and silt. Dense woody and herbaceous vegetation provides shading and cover for many aquatic invertebrates, fish, and amphibian species directly upstream and downstream of the culvert maintenance area.

Vegetation Composition: Overstory vegetation immediately upstream of the culvert consists of willow (*Salix* sp.) thickets. Dominant species in the understory include tall flatsedge (*Cyperus eragrostis*), giant horsetail (*Equisetum telmateia*), rushes (*Juncus* spp.), and hedge nettle (*Stachys* sp.). Near the roadside, ruderal grasses are found above the upstream end of the culvert (Photo 1), while ornamental vegetation is found above the downstream end of the culvert (Photo 3). Downstream of the work area, vegetation is similar to upstream vegetation with California blackberry (*Rubus ursinus*) as an additional species in the understory.

Potential for Sensitive Species and Fish or Wildlife Observations:

Common Name	Scientific Name	Potential for occurring
Plants		
Western leatherwood	*Dirca occidentalis*	**Not expected.** Marginally suitable habitat is present.
Hickman's cinquefoil	*Potentilla hickmanii*	**Not expected.** Marginally suitable habitat is present.
San Francisco gum plant	*Grindelia hirsutula* var. *maritima*	**Not expected.** Marginally suitable habitat is present.
Wildlife		
California giant salamander	*Dicamptodon ensatus*	**Possible.** Suitable habitat is present in the riparian corridor.
California red-legged frog	*Rana draytonii*	**Present**. This species has been observed at this location.
San Francisco gartersnake	*Thamnophis sirtalis tetrataenia*	**Not expected.** There are occurrences for this species within the USGS quadrangle containing the maintenance site. However, the maintenance area lacks the preferred habitat of this species but it may use the creek channel as a movement corridor between other wetland areas.
San Francisco dusky-footed woodrat	*Neotoma fuscipes*	**Possible.** No woodrat structures were observed near the maintenance area. However, suitable habitat is present in the Montara Creek riparian corridor.
Western pond turtle	*Emys marmorata*	**Not expected.** The habitat is marginally suitable for this species. The maintenance area lacks pools or deep water.

For more detailed discussion on sensitive species, see Chapter 4 of the Manual.

There are no critical habitats at this location (USFWS 2017).

MAINTENANCE NEEDS AND ENHANCEMENT OPPORTUNITIES

Montara Creek passes under Harte Street via two 60-inch metal culverts (Photo 1). The culverts have deteriorated and need to be replaced. Maintenance activities would include replacement of the culverts with similarly sized polyethylene pipes. A concrete headwall and apron would be installed to prevent scour

around the face of the openings. The concrete would also allow for more efficient inspection and maintenance over the lifetime of the structure.

In addition, the gradual creek slope and lower energy environment result in some deposition at the Harte Street crossing. Coarse material consisting mostly of gravels and sand accumulates on the upstream side of the culvert while fine sand, silt, and clay amasses downstream of the culvert. This deposition severely reduces the conveyance capacity of the culvert during moderate to large storm events. During replacement of the culverts, localized sediment removal upstream and downstream of the crossing would restore the conveyance capacity of the culverts and prevent flooding of the roadway and adjacent properties. Sediment removal would focus on the immediate area directly upstream and downstream to the minimum depth necessary to restore conveyance. Sediment would be removed using an excavator with a telescoping arm from the roadway or the top of the embankment. Mechanized equipment would be operated from the road and shoulder; equipment would not enter the channel below the ordinary high water elevation. Vegetation management upstream and downstream of the crossing may also be necessary periodically to help alleviate flooding risks and reduce instream sedimentation near the culvert openings. Vegetation management would include hand trimming of emergent vegetation growing within the channel bed and trimming of tree limbs encroaching on the roadway.

All temporarily disturbed areas (i.e., roadway shoulder) would be revegetated with native plants and erosion control BMPs, such as placement of sterile rice straw or natural fiber jute netting, would be installed to prevent erosion and protect water quality. Maintenance activities would require 2-4 days to complete.

Sediment removal from the culvert inlet and outlet areas would habitat for aquatic organisms by increasing water depth, instream complexity, and refugia.

Photo 2. Montara Creek supports a densely vegetated riparian corridor upstream of Harte Street. (April 6, 2017)

Photo 3. The downstream side of the culverts at Harte Street. (April 6, 2017)

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Montara Creek – George Street Bridge

Location
George Street east of Elm Street, in Montara

COUNTY REGION: Coastside

MAINTENANCE TIER: 2 OR 3

COUNTY UNIT: Department of Public Works

COORDINATES: 37.539210, -122.502144

HYDROLOGIC UNIT CODE: 180500060205,
Denniston Creek – Frontal Pacific Ocean

WATERSHED: Montara Creek

CREEK/TRIBUTARY: Montara Creek

MAINTENANCE WORK AREA: 1,200 square feet
[County to confirm]

MAINTENANCE ACTIVITY TYPE: Sediment removal

WORK BELOW OHWM: Yes

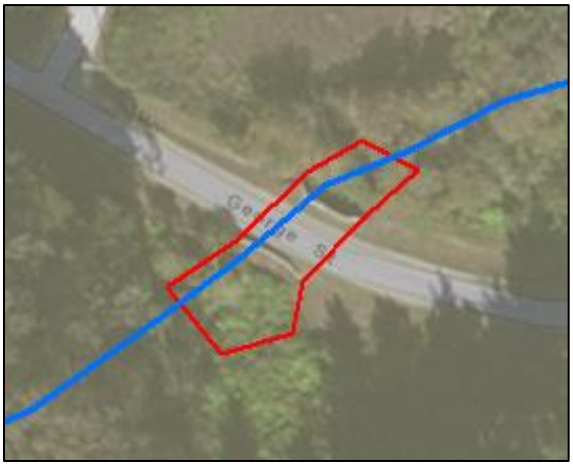
Photo 1. The downstream face of the George Street bridge. (April 6, 2017)

PHYSICAL SETTING

The maintenance site is located in the community of Montara along Montara Creek. The creek drains the western slopes of Montara Mountain flowing west-southwest until reaching the Pacific Ocean. The maintenance site is located at the George Street crossing as Montara Creek flows across the Quaternary marine terrace and coastal plain. The local topography is gradually sloped to the west-southwest and flattens out moving westward. The creek channel is approximately 10 to 14 feet wide with subtle bank slopes and height.

Land uses in the vicinity of the maintenance site and along the creek corridor consist mostly of natural, undeveloped areas. Residential development becomes more prevalent moving downstream of the site (west of the site). The maintenance work area would be limited to the channel upstream and downstream of the George Street crossing within the County right-of-way. This maintenance site is approximately 800 feet upstream of the Harte Street culverts on Montara Creek.

MAINTENANCE SITE LOCATION MAP AND APPROXIMATE WORK AREA MAP



BIOLOGICAL CONDITIONS

Aquatic or Instream Habitat: Montara Creek in the maintenance area flows diffusely over an 8- to 10-foot wide area. Creek flow ranged in depth from 2 to 4 inches (observed April 6, 2017). Several small instream and off-channel pools were observed directly upstream from the work area. No pools were observed in the maintenance area near the crossing. Upstream of George Street, the substrate consists mostly of gravels with sand; downstream of George Street, the substrate consists mostly of fine sand and silt. The maintenance area lacks woody plants and vegetative cover with the wetted channel predominantly free of vegetation. The shallow water depth and high exposure limit the aquatic habitat value within the work area. However, dense riparian vegetation directly upstream of the work area shades the channel and provides suitable cover for many aquatic invertebrates, fish, and amphibian species.

Vegetation Composition: Upstream of the bridge, vegetation consists of willows (*Salix* sp.) in the canopy, with California blackberry (*Rubus ursinus*), horsetail (*Equisetum* sp.), and red elderberry (*Sambucus racemosa*) in the understory. Some pampas grass (*Cortederia* sp.) is also present upstream of the bridge. The sediment bar located upstream of the bridge is unvegetated. Downstream of the bridge, vegetation is dominated by poison hemlock (*Conium maculatum*), cape ivy (*Delairea odorata*) and hedge nettle (*Stachys* sp.). Sedges (*Carex* sp.) and rushes (*Juncus* sp.) are located on the sediment bar near the left bank. Canopy vegetation is largely absent immediately downstream of the bridge but further downstream, Monterey pines (*Pinus radiata*) become dominant in the canopy.

Potential for Sensitive Species and Fish or Wildlife Observations:

Common Name	Scientific Name	Potential for occurring
Plants		
Western leatherwood	*Dirca occidentalis*	**Not expected.** Marginally suitable habitat is present.
Hickman's cinquefoil	*Potentilla hickmanii*	**Not expected.** Marginally suitable habitat is present.
San Francisco gum plant	*Grindelia hirsutula* var. *maritima*	**Not expected.** Marginally suitable habitat is present.
Wildlife		
California giant salamander	*Dicamptodon ensatus*	**Possible.** Suitable habitat is present in the Montara Creek riparian corridor.
California red-legged frog	*Rana draytonii*	**Present**. This species has been observed at this location.
San Francisco garter snake	*Thamnophis sirtalis tetrataenia*	**Not expected.** There are occurrences for this species within the USGS quadrangle containing the maintenance site. However, the maintenance area lacks the preferred habitat of this species but individuals may use the creek channel as a movement corridor between other wetland areas.
San Francisco dusky-footed woodrat	*Neotoma fuscipes*	**Possible.** No woodrat structures were observed near the maintenance area. However, suitable habitat is present in the Montara Creek riparian corridor.
Western pond turtle	*Emys marmorata*	**Not expected.** Suitable habitat is present in Montara Creek. However, the maintenance area lacks deep water or pools.

For more detailed discussion on sensitive species, see Chapter 4 of the Manual.

There are no critical habitats at this location (USFWS 2017).

MAINTENANCE NEEDS AND ENHANCEMENT OPPORTUNITIES

The gradual creek slope and southward bend of the creek at the George Street bridge combine to create a choke-point in the creek and backwatering effect upstream of the bridge crossing resulting in sediment deposition. Coarse material is deposited upstream of the bridge while fine material accumulates on the downstream side. This deposition severely reduces the conveyance capacity of the culverted crossing. Significant deposition has reduced current flow depth (April 2017) through the culvert to less than 4 inches in depth. Sediment removal would focus on the area immediately upstream and downstream of the bridge, as well as from the culvert itself, to restore the conveyance capacity of the crossing and prevent flooding of the roadway and adjacent properties.

Deposited sediment would be removed using an excavator operated from the roadway. The culvert interior would be flushed using Vac-Con trucks. Returning the crossing to its design capacity would result in two instream pools: one at the culvert inlet and one at the culvert outfall. Vegetation management upstream of the crossing may also be periodically necessary to help alleviate flooding risks and reduce instream sedimentation near the bridge. Vegetation management would include hand trimming of

emergent vegetation growing within the channel bed and trimming of tree limbs encroaching on the roadway.

The creek is easily accessible from the roadway on either side of the bridge. During construction, exclusion fencing would be installed around the work area; coffer dams and a clean water bypass system would also be installed prior to construction. Temporarily disturbed areas would be revegetated with native plants and erosion control BMPs, such as placement of sterile rice straw or natural fiber jute netting, would be installed to prevent erosion and protect water quality. Maintenance activities would require 2-4 days to complete.

The creation of deeper, instream pools and clearing of the culvert interior would be beneficial to aquatic organisms by increasing instream depth, inundation duration, complexity, and providing refugia. As part of the County's 5-year mitigation plan for dredging work completed in 2015 at this site, invasive plants are removed from this site twice per year in May and September. Going forward, continued localized removal of invasive plant species (e.g., cape ivy and poison hemlock) and augmentation with native riparian plant species would benefit terrestrial species by increasing vegetative diversity. Other enhancement opportunities may involve the placement of excavated sediment near the outfall of Montara Creek to the Pacific Ocean so as to maintain the sediment balance of the watershed and replenish coastal shoreline material.

Photo 2. Upstream face of George Street bridge. The bridge culvert is nearly full of sediment (as indicated by the arrow). The reduced capacity has further decreased flow and resulted in a depositional area directly upstream of the bridge and formation of a large instream bar. (April 6, 2017)

Photo 3. Deposition also occurs directly downstream of the bridge. Note the sediment accumulation on the left bank (photo left) and in the channel. (April 6, 2017)

Tunitas Creek – Mile 0.6

Location
North side of Tunitas Creek Road, approximately 0.6 miles east of Highway 101 near the homestead at 4001 Tunitas Creek Road.

COUNTY REGION: Coastside

MAINTENANCE TIER: 3

COUNTY UNIT: Department of Public Works

COORDINATES: 37.364541, -122.389539

HYDROLOGIC UNIT CODE: 180500060206, Purisima Creek – Frontal Pacific Ocean

WATERSHED: Tunitas Creek

CREEK/TRIBUTARY: Tunitas Creek

MAINTENANCE WORK AREA: 600 square feet

MAINTENANCE ACTIVITY TYPE: Bank stabilization

WORK BELOW OHWM: Yes

Photo 1. Bank slip-out along the north side of Tunitas Creek Road. (April 6, 2017)

PHYSICAL SETTING

Tunitas Creek is located at the bottom of a steep ravine adjacent to Tunitas Creek Road. The maintenance site is located along Tunitas Creek Road, approximately 60 to 70 feet above the channel bed. The steep slopes of the ravine are vulnerable to erosion and slip-outs where creek flows scour the base of the slope or drainage culverts from the road, resulting in exacerbated erosion along the ravine's side slopes. The banks are nearly vertical in some areas close to the maintenance area. As a result of the 2016/2017 winter rainy season, water has been observed trickling out mid-slope due to oversaturated soil conditions, which has created a weak spot and worsened bank erosion.

Land uses in the vicinity of the work site is primarily rural, agricultural and ranching areas. Several homesteads are located east of the maintenance area adjacent to Tunitas Creek Road. The maintenance work area would be limited to the road right-of-way and the south (left) bank of Tunitas Creek.

MAINTENANCE SITE LOCATION MAP AND APPROXIMATE WORK AREA MAP

BIOLOGICAL CONDITIONS

Aquatic or Instream Habitat: Aquatic habitat in the vicinity of the maintenance area consists of Tunitas Creek. Tunitas Creek is perennial and supports a pool-riffle system with predominately gravel substrate. The creek is confined by steep banks on either side that limit lateral movement. The creek flows through mature riparian woodland with dense canopy cover that shades most of the creek and provides large woody debris to the system.

Vegetation Composition: Vegetation in the vicinity of the maintenance area consists of willow (*Salix* sp.) and eucalyptus (*Eucalyptus* sp.) in the canopy and coyotebrush (*Baccharis pilularis*), red elderberry (*Sambucus racemosa*), California bee plant (*Scrophularia californica*), and cape ivy (*Delairea odorata*) in the understory. Ruderal vegetation is present along the roadside, and includes grasses such as ripgut brome (*Bromus diandrus*) and foxtail barley (*Hordeum murinum*).

Potential for Sensitive Species and Fish or Wildlife Observations:

Common Name	Scientific Name	Potential for occurring
Plants		
Western leatherwood	*Dirca occidentalis*	**Not expected.** Marginally suitable habitat is present the Tunitas Creek riparian corridor.
Fish		
Central California Coast DPS Steelhead	*Oncorhynchus mykiss*	**Possible.** Suitable habitat is present in Tunitas Creek. This location is within designated critical habitat for this species.
Wildlife		
California giant salamander	*Dicamptodon ensatus*	**Possible.** Suitable habitat is present in the Tunitas Creek riparian corridor.
California red-legged frog	*Rana draytonii*	**Possible**. This species has been observed approximately 900 feet northeast of this location. This location is within designated critical habitat for this species.
San Francisco garter snake	*Thamnophis sirtalis tetrataenia*	**Not expected.** There are observances of this species within the USGS quadrangle containing the maintenance site. However, the maintenance area lacks the preferred habitat of this species but the species may use the creek channel as a movement corridor between other wetland areas.
San Francisco dusky-footed woodrat	*Neotoma fuscipes*	**Possible.** No woodrat structures were observed near the maintenance area. However, suitable habitat is present in the Tunitas Creek riparian corridor.
Western pond turtle	*Emys marmorata*	**Possible.** Suitable habitat is present in Tunitas Creek.

For more detailed discussion on sensitive species, see Chapter 4 of the Manual.

MAINTENANCE NEEDS AND ENHANCEMENT OPPORTUNITIES

A road slip-out occurred on the north side of Tunitas Creek Road near 4001 Tunitas Creek Road. Repair and stabilization of the slip-out is necessary for maintaining the integrity of the roadway for public safety and access for residents and emergency vehicles. The maintenance activities would also result in a more stable, less erosive environment decreasing the sediment load to the creek and improved water quality.

Bank stabilization and repair of the slip-out may entail placement boulders along the hillslope from the toe of the slope to the edge of the roadway, or installation of a soldier pile wall or a soil nail wall. Heavy equipment would be operated from the roadway would not enter Tunitas Creek below ordinary high water (OHW). Following construction of the bank stabilization structure, the upper portion of the repair would be covered with several inches of soil and hand seeded with a native plant mix. Post-construction erosion control BMPs would be installed to conserve soil resources and protect water quality. Sterile rice straw would be placed over the soil and covered with natural fiber jute netting. All temporary surface disturbances would be revegetated with native plants.

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Pigeon Point Road – Mile 0.25, Mile 0.4 and Mile 0.5 Culverts

Location
Pigeon Point Road. Culverts are located 0.25, 0.4, and 0.5 mile from the southern intersection of Pigeon Point Road at Highway 1.

COUNTY REGION: Coastside

MAINTENANCE TIER: 2 OR 3

COUNTY UNIT: Department of Public Works

COORDINATES:

Mile 0.25; 37.185176, -122.381807

Mile 0.40; 37.186482, -122.383450

Mile 0.50; 37.186022, -122.384590

HYDROLOGIC UNIT CODE: 180500060303, Gazos Creek – Frontal Ano Nuevo Bay

WATERSHED: Unnamed; overland drainage to Pacific Ocean

CREEK/TRIBUTARY: N/A

MAINTENANCE WORK AREA: 250 square feet

MAINTENANCE ACTIVITY TYPE: Culvert replacement/maintenance

WORK BELOW OHWM: Yes

Photo 1. Pigeon Point Road at Mile 0.4 culvert. (April 6, 2017)

PHYSICAL SETTING

Pigeon Point is a rocky headland at the western edge of a small catchment covering approximately 3.5 square miles in area and roughly 2.7 miles of coastline, in unincorporated San Mateo County south of Yankee Jim Gulch. Pigeon Point is flanked by a relatively narrow coastal terrace and Highway 1 with gradual hillslopes east of the highway corridor. Pigeon Point Road extends eastward from Highway 1. The maintenance site includes culverts draining the runoff from hillslopes above Pigeon Point Road downslope to the Pacific Ocean.

Upslope of Pigeon Point Road, the catchment supports coastal scrub vegetation and is almost exclusively undeveloped, with the exception of several homesteads located directly adjacent to the roadway. Downslope of Pigeon Point Road, land uses include mostly agricultural land, open space and the Highway 1 transportation corridor. The maintenance work area would be limited to the immediate road right-of-way and areas directly upstream and downstream of the culverts.

MAINTENANCE SITE LOCATION MAP AND APPROXIMATE WORK AREA MAP

BIOLOGICAL CONDITIONS

Aquatic or Instream Habitat: The culvert inlet and outfall areas adjacent to Pigeon Point Road provide shallow pools of varying size and depth depending on sediment accumulation. During a site visit on April 6, 2017, deeper pools were noted at the Mile 0.4 culvert (Photos 6 and 7). Little to no water was observed (April 6, 2017) near the Mile 0.25 culvert (Photos 2 through 5). During summer and fall, culvert areas would likely be dry or support very minimal pools. The substrate consists mostly of sand and silt. Dense coastal scrub habitat provides shading and cover for wildlife species directly upstream and downstream of the culvert maintenance areas.

Vegetation Composition: Vegetation consists of dense coastal scrub with low growing herbaceous vegetation directly adjacent to the roadways and work areas. Dense willow (*Salix* sp.) thickets, coyote brush (*Baccharis pilularis*), and poison oak (*Toxicodendron diversilobum*) creates a shrub layer with 75-100 percent canopy cover directly upstream and downstream of the culverts. Understory vegetation in the vicinity of the maintenance areas include tall flatsedge (*Cyperus eragrostis*), horsetail (*Equisetum* sp.), rushes (*Juncus* spp.), and California bee plants (*Scrophularia californica*). Near the roadside, ruderal grasses and weeds such as ripgut brome (*Bromus diandrus*) and bristly oxtongue (*Helminthotheca echiodes*) are more prevalent.

Potential for Sensitive Species and Fish or Wildlife Observations:

Common Name	Scientific Name	Potential for occurring
Plants		
Choris' popcornflower	*Plagiobothrys chorisianus var. chorisianus*	**Possible.** A historic occurrence was mapped at Pigeon Point. Suitable habitat is present in maintenance area.
Perennial goldfields	*Lasthenia californica ssp. macrantha*	**Possible.** Species identified at Pigeon Point. Suitable habitat is present in maintenance area.
Blasdale's bent grass	*Agrostis blasdalei*	**Not expected.** Recorded occurrence within 0.5 mile south of maintenance area. Species associated with sandy or gravelly soil close to rocks; often in nutrient-poor soil with sparse vegetation. Marginally suitable habitat is present.
Marsh microseris	*Microseris paludosa*	**Possible.** Recorded occurrence 2.6 miles north of maintenance area. Suitable habitat is present.
Wildlife		

California giant salamander	*Dicamptodon ensatus*	**Possible.** Suitable habitat is present near the maintenance area.
California red-legged frog	*Rana draytonii*	**Present**. This species has been observed in ponds within 260 feet of the maintenance area. This area is designated critical habitat for this species.
San Francisco dusky-footed woodrat	*Neotoma fuscipes*	**Present.** Woodrat structure observed near Mile 0.5 culvert.
San Francisco gartersnake	*Thamnophis sirtalis tetrataenia*	**Possible.** There are occurrences for this species within the USGS quadrangle containing the maintenance area. Suitable habitat is present near the maintenance area.

For more detailed discussion on sensitive species, see Chapter 4 of the Manual.

MAINTENANCE NEEDS AND ENHANCEMENT OPPORTUNITIES

Maintenance needs along Pigeon Point Road involve sediment and vegetation clearing from culvert inlet and outfall areas. Culverts located at Miles 0.25 and 0.5 have deteriorated and are in need of replacement. Maintenance activities would include replacement of the culverts with similarly sized polyethylene pipes. A concrete headwall and apron would be installed to prevent scour around the face of the openings. The concrete would also allow for more efficient inspection and maintenance over the lifetime of the structure. Significant erosion has occurred at the outfall of the Mile 0.25 culvert (Photos 3 through 5) and requires rehabilitation and stabilization. Some erosion was observed near the Mile 0.5 culvert inlet (Photo 8) but would likely be addressed through the installation of a concrete headwall and apron.

In addition, the change in slope of the drainages as they pass under Pigeon Point Road results in a lower energy environment and deposition on either or bother sides of the culverts. This deposition severely reduces the conveyance capacity of the culvert. During replacement of the Mile 0.25 and 0.5 culverts, localized sediment removal upstream and downstream of the crossing would restore the conveyance capacity of the culverts and prevent flooding of the roadway and adjacent properties. Sediment removal would focus on the immediate area directly upstream and downstream to the minimum depth necessary to restore conveyance. Sediment would be removed using an excavator with a telescoping arm from the roadway or the top of the embankment. Mechanized equipment would be operated from the road and shoulder; equipment would not enter the drainages below the ordinary high water elevation. Vegetation management upstream and downstream of the crossing may also be necessary periodically to help alleviate flooding risks and reduce instream sedimentation near the culvert openings. Vegetation management would include hand trimming of emergent vegetation growing within the drainage channel and trimming of tree limbs which may encroach towards the roadway.

All temporarily disturbed areas (i.e., roadway shoulder) would be revegetated with native plants and erosion control BMPs, such as placement of sterile rice straw or natural fiber jute netting, to prevent erosion and protect water quality. Maintenance activities would require approximately 2-4 days to complete.

Sediment removal from the culvert inlet and outlet areas would enhance habitat for aquatic organisms by increasing water depth and prolonging the inundation period.

Mile 0.25 Culvert	
Photo 2. The upstream side of Mile 0.5 culvert. The culvert conveys surface runoff from Pigeon Point Road and a 600-foot (approximate) private driveway (April 6, 2017)	**Photo 3.** The downstream side of Mile 0.5 culvert. Sediment is deposited near the culvert outfall area before flows disperse under densely vegetated coastal scrub habitat. (April 6, 2017)
Photo 4. The upstream side of Mile 0.5 culvert. The culvert conveys surface runoff from Pigeon Point Road and a 600-foot (approximate) private driveway (April 6, 2017)	**Photo 5**. The downstream side of Mile 0.5 culvert. Sediment is deposited near the culvert outfall area before flows disperse under densely vegetated coastal scrub habitat. (April 6, 2017)

Mile 0.4 Culvert

Photo 6. The upstream side of Mile 0.4 culvert. The culvert conveys stormwater runoff from the hillslope above. Sediment has accumulated at the culvert opening diminishing conveyance capacity. (April 6, 2017)

Photo 7. The downstream side of Mile 0.4 culvert. Sediment is deposited near the culvert outfall area before flows disperse over densely vegetated coastal scrub habitat. (April 6, 2017)

Mile 0.5 Culvert

Photo 8. The upstream side of Mile 0.5 culvert. The culvert conveys surface runoff from Pigeon Point Road and a 600-foot (approximate) private driveway (April 6, 2017)

Photo 9. The downstream side of Mile 0.5 culvert. Sediment is deposited near the culvert outfall area before flows disperse over densely vegetated coastal scrub habitat. (April 6, 2017)

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Pescadero Creek @ Cloverdale Road

Location
Bridge near the intersection of Pescadero Creek Road and Cloverdale Road.

COUNTY REGION: Coastside

MAINTENANCE TIER: 3

COUNTY UNIT: Department of Public Works

COORDINATES: 37.254841, -122.383208

HYDROLOGIC UNIT CODE: 180500060103, Lower Pescadero Creek

WATERSHED: Pescadero Creek

CREEK/TRIBUTARY: Pescadero Creek

MAINTENANCE WORK AREA: 500 square feet

MAINTENANCE ACTIVITY TYPE: Bridge maintenance/bank stabilization

WORK BELOW OHWM: Yes

Photo 1. Upstream side of Pescadero Creek Road bridge near Cloverdale Road. (April 6, 2017)

PHYSICAL SETTING

Pescadero Creek is major stream system approximately 27 miles in length and covering a watershed area of 60 square miles. The maintenance site consists of a bridge crossing located near the intersection of Pescadero Creek Road and Cloverdale Road, located in an alluvial valley near the community of Pescadero. Flows from Pescadero Creek and Honsinger Creek, a major tributary, converge on the valley floor approximately 0.18 mile upstream of the maintenance site and continue downstream 2.8 miles (approximate) before draining into Pescadero Marsh and the Pacific Ocean. The average top-of-bank width near the maintenance area averages 100-110 feet with a wider riparian corridor of 200-240 feet. Pescadero Creek exhibits several slight meanders upstream and downstream of the maintenance site. A large depositional bench has formed on the left bank upstream of the bridge with willows and alders that have established on the bench. As the creek approaches the bridge, a slight meander directs the main current along the left bank of the channel and left bridge pier (Photo 1). Large boulders were place along the left bank and left bridge pier to prevent scour and undermining of the structure.

Most surrounding land use consists of agricultural lands or open space. The maintenance work area would be limited to the immediate road right-of-way and areas directly upstream and downstream of the bridge, the bridge abutments, and the bank areas directly upstream, underneath, and downstream of the bridge. No work would be performed in the channel bed.

MAINTENANCE SITE LOCATION MAP AND APPROXIMATE WORK AREA MAP

BIOLOGICAL CONDITIONS

Aquatic or Instream Habitat: This reach of Pescardero Creek is considered high quality habitat for many aquatic species. The channel at the maintenance site maintains perennial flow with a substrate consisting of sand and silt. Dense riparian vegetation grows up to the water's edge resulting in a canopy cover that shades much of channel and provides cover for aquatic and terrestrial wildlife species. Underneath the bridge, the main current has resulted in scouring of the left bank and left abutment (Abutment 1), exposing adjacent tree roots and creating a deep pool in the vicinity of Abutment 1.

Vegetation Composition: Vegetation is typical of riparian areas in the region. Canopy cover includes willow (*Salix* sp.), box elder (*Acer negundo*), and red alder (*Alnus rubra*). Understory species include arroyo willow (*Salix lasiolepis*), California blackberry (*Rubus ursinus*), hedge nettle (*Stachys* sp.) and red elderberry (*Sambucus* racemosa). Near the roadside, ruderal grasses and weeds are more prevalent.

Potential for Sensitive Species and Fish or Wildlife Observations:

Common Name	Scientific Name	Potential for occurring
Plants		
Choris' popcornflower	*Plagiobothrys chorisianus var. chorisianus*	**Not expected.** Recorded occurrence approximately 1.2 miles west. Marginally suitable habitat is present in maintenance area.
Coastal marsh milk-vetch	*Astragalus pycnostachyus var. pycnostachyus*	**Not expected.** Historic occurrence (1935) but presumed extant. Species more closely associated with coastal environments but can be found along lower portions of streams. Marginally suitable habitat is present.
Round-leaved filaree	*California macrophylla*	**Not expected.** Historic occurrence for the area (1896) but presumed extant. Marginally suitable habitat is present along access to the maintenance site.
San Mateo woolly sunflower	*Eriophyllum latilobum*	**Not expected.** Recorded occurrence 2.9 miles east of maintenance area, which is presumed extirpated. Can grow along road cuts.
Fish		
Steelhead, Central California Coast (CCC)	*Oncorhynchus (=Salmo) mykiss*	**Present.** This species is present in Pescadero Creek. The maintenance area is designated critical habitat for this species.
Longfin smelt	*Spirinchus thaleichthys*	**Not expected.** Historic occurrence from 1893 reported a single specimen collected – assumed to be a stray from the SF Bay-Delta population pushed southward by currents. No breeding habitat present in Pescadero Creek.

Wildlife		
California giant salamander	*Dicamptodon ensatus*	**Possible.** Recorded occurrences near Cloverdale Road, approximately 3 miles south of Pescadero Creek Road. Suitable habitat is present near the maintenance area.
California red-legged frog	*Rana draytonii*	**Possible**. Recorded occurrence along Cloverdale Road, 0.5 miles south of Pescadero Creek. Suitable habitat may be present in portions of the creek near the maintenance area. This species may use the creek as a movement corridor.
San Francisco dusky-footed woodrat	*Neotoma fuscipes*	**Present.** Woodrat structure observed downstream of the bridge.
San Francisco garter snake	*Thamnophis sirtalis tetrataenia*	**Not expected.** There are occurrences for this species within the USGS quadrangle containing the maintenance area. The creek corridor near the maintenance area provides marginally **s**uitable habitat for this species. This species may use the creek as a movement corridor.

For more detailed discussion on sensitive species, see Chapter 4 of the Manual.

MAINTENANCE NEEDS AND ENHANCEMENT OPPORTUNITIES

A slight meander in the creek directs the main current along the left bank as it passes underneath the bridge. This has resulted in scouring of the left bank and Abutment 1. Large boulders that were placed along the left bank and left bridge pier to prevent scour and further undermining of the bridge support have partially failed and slipped downslope (Photos 2 and 3). Field inspections and a Caltrans inspection report[1] indicated undermining of the Abutment 1 (Photo 4). Maintenance is needed to improve drainage behind Abutment 1, as well as to repair erosion of the left bank. Maintenance is anticipated to include application of cement slurry to the underside of Abutment 1.

Other maintenance needs include general repairs and preventative measures to the bridge surfaces. A protective deck overlay may be placed on the bridge deck to seal any visible cracks, and repair of the asphalt concrete roadway may be needed at the bridge deck joint. Additionally, a protective coating should be applied to the corroded surface of the pile casing. It is likely that some tree removal would be required for equipment and materials to access the maintenance area. Some bank hardening beneath the bridge deck may be needed, but the cross-section of the creek would not change.

During the April 2017 site visit, a failed culvert was visible in an upland area at the top of the left bank (Photo 5). This failed culvert appears to drain stormwater runoff from the roadway to just upstream of the bridge and may be contributing to erosion issues in the vicinity of the bridge. This culvert may need to be replaced during other bridge maintenance activities to help reduce continued erosion at the bridge. Maintenance activities would include replacement of the culvert with a similarly sized polyethylene pipe. A concrete headwall and apron may be installed to prevent scour around the face of the culvert outfall. The concrete headwall would also allow for more efficient inspection and maintenance over the lifetime of the structure.

All temporarily disturbed areas would be revegetated with native plants and erosion control BMPs, such as placement of sterile rice straw or natural fiber jute netting, to prevent erosion and protect water quality.

[1] Cornerstone Structural Engineering Group. 2008. Bridge Preventative Maintenance Program. Prepared for County of San Mateo. April 30.

Photo 2. (April 6, 2017)

Photo 3. (April 6, 2017)

Photo 4. (April 6, 2017)

Photo 5. Failed culvert upslope from the bridge (April 6, 2017)

Farallone Avenue – Kanoff Street to Fourth Street

Location
Ditch along Farallone Avenue from Kanoff Street to Fourth Street.

COUNTY REGION: Coastside

MAINTENANCE TIER: 2

COUNTY UNIT: Department of Public Works

COORDINATES: 37.544489, -122.512194

HYDROLOGIC UNIT CODE: 180500060205, Denniston Creek-Frontal Pacific Ocean

WATERSHED: Kanoff Creek

CREEK/TRIBUTARY: Tributary to Kanoff Creek

MAINTENANCE WORK AREA: 900 linear feet

MAINTENANCE ACTIVITY TYPE: Vegetation removal and light sediment clearing

WORK BELOW OHWM: Maybe

Photo 1. Stormwater drainage ditch along Farallone Avenue, looking south (upstream) from Second Street. (May 18, 2015)

PHYSICAL SETTING

The maintenance site consists of a roadside ditch that runs along Farallone Avenue in the community of Montara. The roadside ditch carries stormwater north along Farallone Avenue and Kanoff Street before draining into Kanoff Creek north of Kanoff Road. This site is a constructed ditch for conveying stormwater runoff and does not follow the path of any historic drainage. Turf-reinforcing mats were installed within this ditch. However, some water is generally present in the ditch due to irrigation runoff (nuisance water) and springs in area. Several rock check dams help control flow velocity and reduce erosion (Photo 1). As such, dimensions of the ditch vary slightly ranging from 2 to 3 feet in width and 6 to 18 inches in depth.

Land uses in the vicinity of the maintenance site and along the creek corridor consist of residential development. Open space is present north of the maintenance site. The maintenance work area would be limited to the ditch.

MAINTENANCE SITE LOCATION MAP AND APPROXIMATE WORK AREA MAP

BIOLOGICAL CONDITIONS

Aquatic or Instream Habitat: The ditch contains minimal aquatic habitat. Water may be present from runoff from storm events, nuisance water, and/or springs in the area. Small pools may develop on the upstream side of the rock check dams or in front of culvert inlets. The substrate is mainly earthen, with riprap present in some locations (Photos 1, 2, and 3) before transitioning to concrete along Kanoff Street (Photos 4 and 5). Culverts are present in several areas, where the ditch crosses roads or driveways (Photos 2, 3, and 4).

Vegetation Composition: Vegetation consists of ruderal vegetation in upland areas immediately adjacent to the ditch. The canopy generally consists of ornamental vegetation from adjacent residences. Within the ditch, vegetation is dominated by watercress (*Nasturtium officinale*) at the bottom, and grasses dominant higher along the sides of the ditch.

Potential for Sensitive Species and Fish or Wildlife Observations:

Common Name	Scientific Name	Potential for occurring
Plants		
Hickman's cinquefoil	*Potentilla hickmanii*	**Not expected.** Marginally suitable habitat is present.
San Francisco gum plant	*Grindelia hirsutula* var. *maritima*	**Not expected.** Marginally suitable habitat is present.
Wildlife		
California giant salamander	*Dicamptodon ensatus*	**Not expected.** Ditch lacks habitat complexity and refugia. Much of the ditch is highly exposed due to residential landscaping. Marginally suitable habitat is present.
California red-legged frog	*Rana draytonii*	**Present.** Two California red-legged frogs were observed at this site during 2014 swale improvements.
San Francisco garter snake	*Thamnophis sirtalis tetrataenia*	**Not expected.** There are occurrences for this species within the USGS quadrangle containing the maintenance site. However, the maintenance area lacks the preferred habitat of this species. Marginally suitable habitat is present near Kanoff Street.

For more detailed discussion on sensitive species, see Chapter 4 of the Manual.

MAINTENANCE NEEDS AND ENHANCEMENT OPPORTUNITIES

Maintenance needs along Farallone Avenue involve light sediment and vegetation clearing from the roadside ditch. Sediment would be removed using an embankment Ditch Master (truck-mounted tool that uses a horizontal rotating auger to remove sediment) and hand tools. A Ditch Master would be operated from the road and shoulder. Vegetation management may also be necessary periodically to help maintain capacity within the ditch. Vegetation management would include hand trimming of emergent vegetation growing within the ditch and trimming of overhanging tree limbs which may encroach upon the roadway. If necessary, other maintenance activities may include replacing turf mats where vegetation has been removed.

Maintenance activities would typically require about 2 days to complete.

Sediment removal from the ditch would enhance habitat for aquatic organisms by increasing water depth and prolonging the inundation period.

Photo 2. Culvert inlet on southeast corner of Farallone Avenue and 3rd Street. (March 18, 2015)

Photo 3. Culverted outfall at northwest corner of Farallone Avenue and 2nd Street. (March 18, 2015)

Photo 4. Culvert outfall on southwest corner of Kanoff Street. This portion of the drainage ditch along Kanoff Street is concrete. (March 18, 2015)

Photo 5. Looking downstream (west) along Kanoff Street. The ditch has a concrete bed while a rock revetment lines the left (south) bank. (March 18, 2015)

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0.9 Alpine Road

Location
Alpine Road, north of Alpine Creek and south of Roger's Gulch, west of Heritage Road

COUNTY REGION: Coastside

MAINTENANCE TIER: Tier 2 for California red-legged frog; Tier 3 for steelhead and Coho salmon

COUNTY UNIT: DPW

COORDINATES: 37.297394, -122.249869

HUC: 180500060202, La Honda Creek

WATERSHED: San Gregorio Creek

CREEK/TRIBUTARY: Alpine Creek/Roger's Gulch

MAINTENANCE WORK AREA: ~180 square feet

MAINTENANCE ACTIVITY TYPE: Culvert replacement

WORK BELOW OHWM: Yes

Photo 1. Maintenance work area and Alpine Road looking east towards Heritage Road. Arrow on the left points to culvert inlet for tributary; arrow on the right points to culvert outlet (May 2011).

PHYSICAL SETTING

Land uses in the vicinity of the work site primarily include park land and open space use. The maintenance work area will be limited to the road prism and within a 10-foot radius of the culvert inlet and outlet. The culvert conveys flow from the Rodger's Gulch tributary to Alpine Creek. The culvert is located approximately 30 feet north of the confluence of Roger's Gulch and Alpine Creek. Perennial flow is observed in Roger's Gulch at the culvert.

MAINTENANCE SITE LOCATION MAP AND APPROXIMATE WORK AREA MAP

BIOLOGICAL CONDITIONS

Aquatic or Instream Habitat: In the vicinity of the maintenance work area, Alpine Creek is distinguished by a pool-riffle system with predominately cobble/gravel substrate. Roger's Gulch is a tributary to Alpine Creek and is

distinguished by riffle habitat units of cobble substrate. 0.9 Alpine is located approximately 30 feet upstream of the Roger's Gulch-Alpine Creek confluence.

Vegetation Composition: Riparian-woodland vegetation with native vegetation in the vicinity of the Project Area and ruderal vegetation in the shoulders of the road. Native species include: redwood (*Sequoia sempervirens*), tan oak (*Notholithocarpus densiflorus*), Douglas fir (*Pseudotsuga menziesii*), white alder (*Alnus rhombifolia*), ninebark (*Physocarpus capitatus*), beaked hazelnut (*Corylus cornuta*), poison oak (*Toxicodendron diversilobum*), redwood sorrel (*Oxalis oregena*), horsetail (*Equisetum* sp.), and western sword fern (*Polystichum munitum*).

Potential for Sensitive Species and Fish or Wildlife Observations:

Common Name	Scientific Name	Potential for occurring
Plants		
Arcuate bush-mallow	*Malacothamnus arcuatus*	**None**. No suitable habitat present.
Woodland woolythreads	*Monolopia gracilens*	**None**. No suitable habitat present.
Fish		
Central California Coast DPS Steelhead	*Oncorhynchus mykiss irideus*	**Possible**. Suitable habitat within Alpine Creek, and Steelhead were observed in Mindego Creek in 2008. Habitat for juvenile Steelhead would be flow-dependent.
Central California Coast ESU Coho Salmon	*Oncorhynchus kisutch*	**Possible.** Suitable habitat within the San Gregorio watershed. Habitat for juvenile Coho would be flow-dependent. Alpine Creek (and any accessible tributaries) is designated essential fish habitat.
Wildlife		
California giant salamander	*Dicamptodon ensatus*	**Possible.** This species was observed within 1 miles of the maintenance area. Suitable habitat is present in the maintenance area.
California red-legged frog	*Rana draytonii*	**Possible.** This species was observed within 1 mile of the Project Area, and has potential to disperse through the site. Suitable aquatic breeding habitat was observed within the vicinity. The maintenance work area lacks suitable breeding habitat but this species may use the creek as a movement corridor or for foraging.
San Francisco garter snake	*Thamnophis sirtalis tetrataenia*	**Not expected.** There was one occurrence observed within one mile in 2012 and the maintenance work area is within this species dispersal capabilities. However, the maintenance work area lacks deeps pools and emergent vegetation and refugia and provides only marginally suitable habitat for this species.
San Francisco dusky-footed woodrat	*Neotoma fuscipes*	**Possible.** Nests were not observed in the Project Area during a site visit; however, suitable habitat is present in the vicinity of the Project Area.

For more detailed discussion on sensitive species, see Chapter 4 of the Manual.

MAINTENANCE NEEDS AND ENHANCEMENT OPPORTUNITIES

The corrugated metal pipe (CMP) at 0.9 Alpine has deteriorated and should be excavated and replaced with a high-density polyethylene pipe of similar size. The current culvert sizing should be evaluated to determine if a larger conveyance is required. If surface flow is present within Roger's Gulch, a clean water bypass would be implemented. Prior to construction, cofferdams would be placed upstream and downstream of the culvert and the work area. Streamflow would be diverted through or around the culvert using a flex pipe. During construction, the proper BMPs would be applied to ensure clean water bypass and a biologist would be on-site to monitor all construction activities. Following excavation and pipe replacement, the trenches would then be backfilled, compacted, and resurfaced. Construction would primarily take place within the existing road prism and temporary surface disturbance outside of the road prism would be limited to less than 10 linear feet along the margin of the inlet and outlet. All temporary surface disturbances would be reseeded with native plant species.

Enhancement opportunities include bank stabilization via native vegetation planting, instream fish habitat enhancement, and enhanced fish passage within and at the inlet and outlet of the culvert. The project should result in improved water quality conditions due to lese erosion at the culvert outlet.

Photo 2. 0.9 Alpine culvert inlet (August 10, 2016).

Photo 3. 0.9 Alpine culvert outlet (August 10, 2016).

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1.5 Alpine Road

Location
Alpine Road, north of Alpine Creek and west of Mindego Hill Road

COUNTY REGION: Coastside

MAINTENANCE TIER: Tier 2 for California red-legged frog and San Francisco garter snake; Tier 1 for steelhead and coho salmon

COUNTY UNIT: DPW

COORDINATES: 37.294350, -122.242275

WATERSHED: San Gregorio Creek

CREEK/TRIBUTARY: Alpine Creek

MAINTENANCE WORK AREA: ~90 square feet

MAINTENANCE ACTIVITY TYPE: Culvert replacement

WORK BELOW OHWM: Yes

Photo 1. Maintenance work area and Alpine Road looking east towards Mindego Hill Road (August 5, 2016).

PHYSICAL SETTING

Land uses in the vicinity of the work site primarily include park land and open space with residential parcels to the north that contain agricultural plots. The maintenance work area will be limited to the road prism and the culvert's inlet and outlet within a 5-foot radius. A seep (spring) was observed in the drainage ditch on the northern side of the road.

MAINTENANCE SITE LOCATION MAP AND APPROXIMATE WORK AREA MAP

BIOLOGICAL CONDITIONS

Aquatic or Instream Habitat: In the vicinity of the maintenance area, Alpine Creek is distinguished by a pool-riffle system with predominately gravel substrate. Aquatic habitat in the maintenance area consists of an ephemeral

roadside drainage ditch. A natural seep was observed at the inlet of the culvert and in the ditch that runs along the northern side of the road in the vicinity of the culvert.

Vegetation Composition: Riparian woodland vegetation with native vegetation in the vicinity of the maintenance area and typical ruderal vegetation in the immediate vicinity of the maintenance area. Native species include: thimbleberry (*Rubus parviflorus*), red elderberry (*Sambucus racemosa*), horsetail (*Equisetum* sp.), California blackberry (*Rubus ursinus*), coast live oak (*Quercus agrifolia*), and big leaf maple (*Acer macrophyllum*).

Potential for Sensitive Species and Fish or Wildlife Observations:

Common Name	Scientific Name	Potential for occurring
Fish		
Central California Coast DPS Steelhead	*Oncorhynchus mykiss*	**None**. Maintenance work area not accessible by this species.
Central California Coast ESU Coho Salmon	*Oncorhynchus kisutch*	**None.** Maintenance work area not accessible by this species.
Wildlife		
California giant salamander	*Dicamptodon ensatus*	**Possible.** This species was observed within 0.25 mile of the maintenance area. Suitable habitat is present in the maintenance area.
California Red-legged frog	*Rana draytonii*	**Possible.** No suitable aquatic breeding habitat was observed; however, this species was observed within 1 mile of the Project Area, and has potential to disperse through the site.
marbled murrelet	*Brachyramphus marmoratus*	**Not expected.** Marginally suitable habitat is present in the vicinity of the Project.
San Francisco garter snake	*Thamnophis sirtalis tetrataenia*	**Not expected.** There was one occurrence observed within one mile in 2012 and the maintenance work area is within this species dispersal capabilities. However, the maintenance work area lacks deeps pools and emergent vegetation and refugia and provides only marginally suitable habitat for this species.
San Francisco dusky-footed woodrat	*Neotoma fuscipes*	**Possible.** Nests were not observed in the Project Area during the site visit; however, suitable habitat is present in the vicinity of the Project Area.

For more detailed discussion on sensitive species, see Chapter 4 of the Manual.

MAINTENANCE NEEDS AND ENHANCEMENT OPPORTUNITIES

The corrugated metal pipe (CMP) at 1.5 Alpine has deteriorated and should be excavated and replaced with a high-density polyethylene pipe of similar size. The trenches would then be backfilled, compacted, and resurfaced. Construction would primarily take place within the existing road prism and temporary surface disturbance outside of the road prism will be limited to less than 5 linear feet along the margin of the inlet and outlet. All temporary surface disturbances will be reseeded with native plant species. Maintenance activities would not enter the riverine habitat, and implementation of appropriate BMPs would prevent the transference of sediment. One mature big leaf maple exists near the outlet; maintenance activities would not require removing this or any other existing trees.

The maintenance and repair of the existing culvert should result in a more stable and less erosive environment under a range of discharges, resulting in improved water quality conditions.

Photo 2. 1.5 Alpine culvert outlet (August 2016).	**Photo 3**. 1.5 Alpine culvert inlet; a seep was observed at the inlet and in the ditch in the vicinity of the culvert (August 2016).

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2.5 Alpine Road

Location
Alpine Road, West of Mindego Hill Road

COUNTY REGION: Coastside

MAINTENANCE TIER: TBD

COUNTY UNIT: DPW

COORDINATES: 37 17'26.65"N; 122 13'50.80"W

WATERSHED: San Gregorio Creek

SUBBASIN: Mindego Creek

CREEK/TRIBUTARY: Alpine Creek

MAINTENANCE WORK AREA: ~90 square feet

MAINTENANCE ACTIVITY TYPE: Culvert replacement

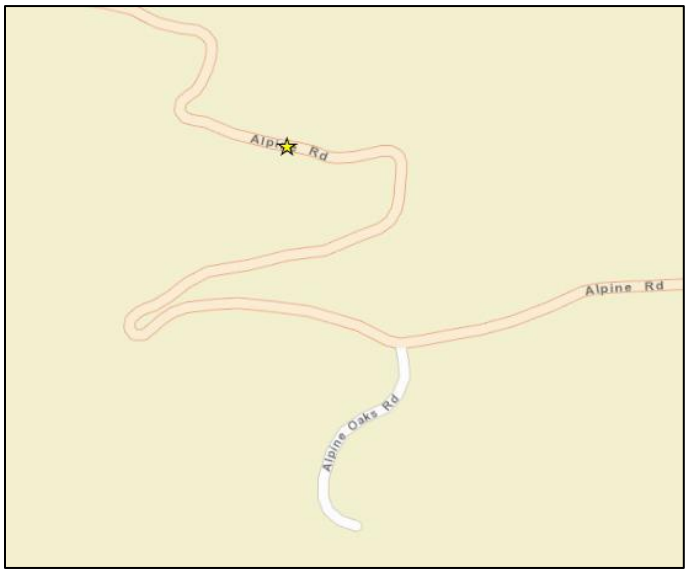
WORK BELOW OHWM? Yes

Photo 1. Maintenance work area and Alpine Road looking southwest. (August 5, 2016)

PHYSICAL SETTING

Land uses in the vicinity of the work site is primarily open space with residential parcels to the north that contain agricultural plots. The maintenance work area would be limited to the road prism and the culvert's inlet and outlet within a 5-ft radius.

MAINTENANCE SITE LOCATION MAP AND APPROXIMATE WORK AREA MAP



BIOLOGICAL CONDITIONS

Aquatic or Instream Habitat: In the vicinity of the Project Area, Alpine Creek is distinguished by a pool-riffle system with predominately gravel substrate.

Vegetation Composition: Upland woodland vegetation with native vegetation in the vicinity of the Project Area and ruderal vegetation in the shoulders of the road. Native species include: western sword fern (*Polystichum munitum)*, bay laurel (*Umbellularia californica*), California Blackberry (*Rubus ursinus*), coast live oak (*Quercus agrifolia*), and poison oak (*Toxicodendron diversilobum*).

Potential for Sensitive Species and Fish or Wildlife Observations:

Common Name	Scientific Name	Potential for occurring
Fish		
Central California Coast DPS Steelhead	*Oncorhynchus mykiss*	**None.** No suitable habitat present.
Central California Coast ESU Coho Salmon	*Oncorhynchus kisutch*	**None.** No suitable habitat present.
Wildlife		
California giant salamander	*Dicamptodon ensatus*	**Possible.** This species was observed within 0.1 mile of the maintenance area. Suitable habitat is present in the maintenance area.
California Red-legged frog	*Rana draytonii*	**Possible**. No suitable aquatic breeding habitat was observed; however, this species was observed within 1 mile of the Project Area, and has potential to disperse through the site.
marbled murrelet	*Brachyramphus marmoratus*	**Not expected.** Marginally suitable habitat is present in the vicinity of the Project.
San Francisco garter snake	*Thamnophis sirtalis tetrataenia*	**Not expected.** There was one occurrence observed within one mile in 2012 and the maintenance work area; site is within this species dispersal capabilities. However, the maintenance work area lacks deep pools and emergent vegetation and refugia and provides only marginally suitable habitat for this species.
San Francisco dusky-footed woodrat	*Neotoma fuscipes*	**Possible.** Nests were not observed in the Project Area during the site visit; however, suitable habitat is present in the vicinity of the Project Area.

For more detailed discussion on sensitive species, see Chapter 4 of the Manual.

MAINTENANCE NEEDS AND ENHANCEMENT OPPORTUNITIES

The corrugated metal pipe (CMP) at 2.5 Alpine has deteriorated and should be excavated and replaced with a high-density polyethylene pipe of similar size. The trenches would then be backfilled, compacted, and resurfaced. Construction would primarily take place within the existing road prism and temporary surface disturbance outside of the road prism would be limited to less than 5 linear feet along the margin of the inlet and outlet. All temporary surface disturbances would be revegetated with native seed. The maintenance and repair of the existing culvert

2.5 Alpine Road

Location
Alpine Road, West of Mindego Hill Road

should result in a more stable and less erosive environment under a range of discharges, resulting in improved water quality conditions. The maintenance activities would not affect riverine habitat, and the appropriate BMPs will prevent the transference of sediment.

Photo 2. 2.5 Alpine culvert inlet looking southwest (August 5, 2016)

Photo 3. 2.5 Alpine culvert outlet looking northeast (August 5, 2016)

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Lower Bear Gulch Road Slip Out Repair Project

Location
Lower Bear Gulch Road, north of CA-84

COUNTY REGION: Coastside

MAINTENANCE TIER: Tier 2 or 3

COUNTY UNIT: DPW

COORDINATES: 37°20'6.48"N, 122°20'43.71"W
37°20'5.79"N, 122°20'45.16"W
37°20'7.66"N, 122°20'42.20"W

WATERSHED: San Lorenzo-Soquel 18060001

CREEK/TRIBUTARY: Clear Creek, Tributary to San Gregorio Creek

MAINTENANCE WORK AREA: Approximately 0.006 acre (284 square feet) for three slip-outs

MAINTENANCE ACTIVITY TYPE: Bank stabilization

WORK BELOW OHWM? Yes

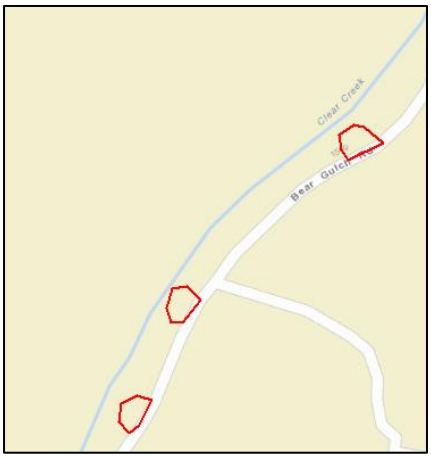
Photo 1. West side of Bear Gulch Road (February 26, 2016).

PHYSICAL SETTING

The Lower Bear Gulch Road slip out repairs entail the repair of slip outs at three locations along Lower Bear Gulch Road. The maintenance sites are located on Lower Bear Gulch Road approximately 2 miles east of the unincorporated town of San Gregorio within the coastal zone of San Mateo County. The surrounding land use consists of private residential and ranchettes.

The sensitive habitats component of the San Mateo County Local Coastal Program (LCP) includes all perennial and intermittent streams and their tributaries, as well as, but not limited to, riparian corridors, wetlands, marine habitats, sand dunes, sea cliffs, and habitats supporting rare, endangered, and unique species (County of San Mateo 2013). Designated critical habitat for the federally listed California red-legged frog (*Rana draytonii*) occurs in the project area.

MAINTENANCE SITE LOCATION MAP AND APPROXIMATE WORK AREA MAP



BIOLOGICAL CONDITIONS

Aquatic or Instream Habitat*:* Lower Bear Gulch Road is immediately adjacent to Clear Creek, an intermittent tributary to San Gregorio Creek that contributes surface flow exclusively in the rainy season. The tributary originates 3 miles north of the intersection of Bear Gulch Road and State Route 84 and joins San Gregorio Creek approximately 0.5 mile south of the maintenance site locations. Clear Creek had surface flow or approximately 6-12 inches deep during a site assessment in late February 2017.

Although San Gregorio Creek and many of its tributaries are habitat for steelhead and potentially Coho salmon, the two salmonids species are not expected to occur in Clear Creek. A CDFW stream survey (1973) states that Clear Creek "does not provide salmonid summer nursery habitat, and offers minimal spawning habitat" and that the creek "is not an important anadromous salmonid producing tributary for the San Gregorio Creek drainage". Salmonid habitat value within Clear Creek was marginal to poor with limited pool habitat and a sand/silt dominated substrate (Taylor 2004). Habitat quality and availability appears to be a major limiting factor for potential salmonids within Clear Creek.

Vegetation Composition: The vegetation types present in the project areas include: riparian, coastal scrub, and ruderal/ non-native annual grasslands.

Potential for Sensitive Species and Fish or Wildlife Observations:

Common Name	Scientific Name	Potential for occurring
Plants		
San Mateo Woolly sunflower	*Eriophyllum latilobum*	**Not expected.** This species is very rare and there are no documented occurrences of San Mateo woolly sunflower within 10 miles of the maintenance work areas.
Fish		
Central California Coast DPS Steelhead	*Oncorhynchus mykiss*	**None**. There are fish passage barriers upstream and downstream that would prevent steelhead from occurring on the project areas.
Wildlife		

California red-legged frog	*Rana draytonii*	**Possible**. There are documented occurrences of CRLF within one quarter mile of the maintenance work areas.
San Francisco dusky-footed woodrat	*Neotoma fuscipes annectens*	**Possible**. County biologists observed SFDW nests on the bank of Clear Creek within one half mile of the maintenance work areas.
San Francisco garter snake	*Thamnophis sirtalis tetrataenia*	**Possible**. There are documented occurrences of SFGS within one mile of the maintenance work areas.

For more detailed discussion on sensitive species, see Chapter 4 of the Manual.

MAINTENANCE NEEDS AND ENHANCEMENT OPPORTUNITIES

The slip-out repairs are necessary for maintaining the integrity of the roadway for public safety and access for residents and emergency vehicles. County roads crew will use a metal cable attached to the bucket of the Gradall excavator operated from Lower Bear Gulch Road to place the RSP along the eroded embankment. Crew members will guide the RSP into place. The base layer along the flow line will be constructed using 4-5 foot diameter rock. The upper portions of the eroded embankment and the cracked roadway will be backfilled with base rock and soil that will be compacted. It is anticipated that the slip-out repairs can be completed in two to three days. All of the work would occur using machinery from the road and top of embankment. No equipment will operate in Clear Creek.

Upon completion of the slip out repairs, the upper portion of the repair would be covered with several inches of soil and hand seeded with a native plant mix. Where feasible, bioengenieering using techniques such as brushlayering will be implemented at the repair sites. Brushlayering is a technique used in stabilizing shallow slope failures or rebuilding slopes which incorporates willows and other types of branches with soil backfill. Live brush layers act as horizontal drains, improve slope stability by providing tensile strength and natural revegetation. Brushlayering may include the use of geogrids or fabric soil wraps and rip rap or other structural toe support (See BMP 10.2 Fact Sheet included with this notification). Post-construction erosion control BMPs including, but not limited to, sterile rice straw placed over the soil and covered with natural fiber jute netting will be installed to protect water quality.

Photo 1 – Slip out location #1 (Red dashed line) on west side of Bear Gulch Road, looking north. (February 26, 2016)

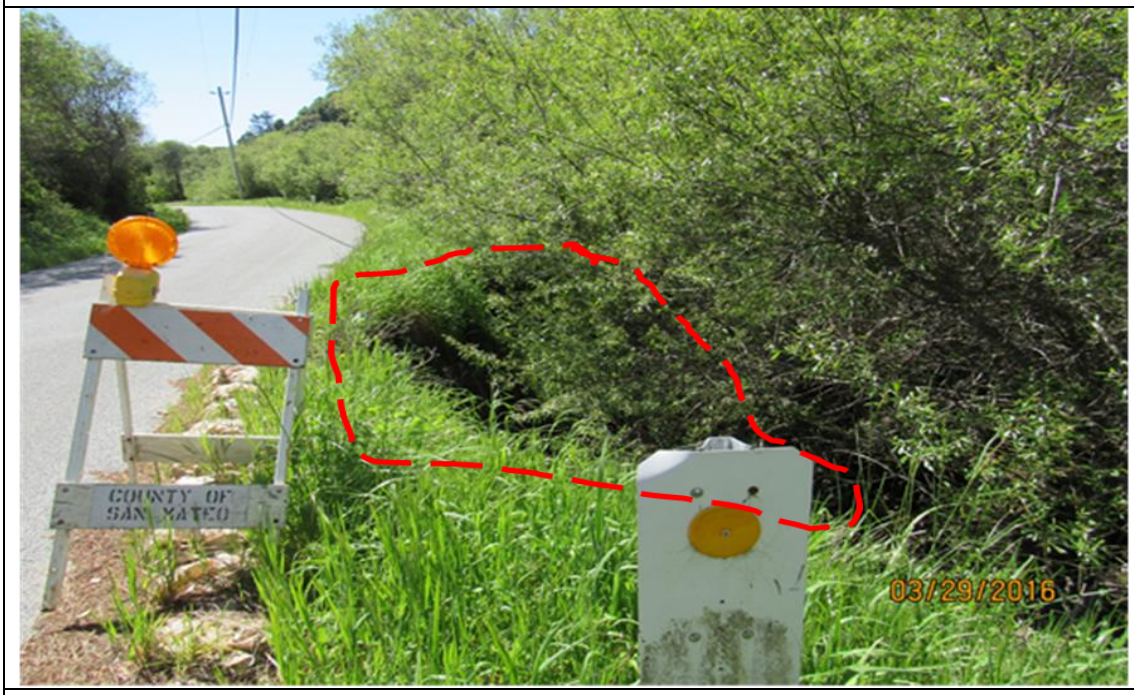


Photo 2 – Slip-out location #2 (Red dashed line) on Bear Gulch Road, looking south. (March 29, 2016)

Photo 3. Slip-out Location #3 (Red dashed line) on the west side of Bear Gulch Road, looking south. (February 26, 2016)

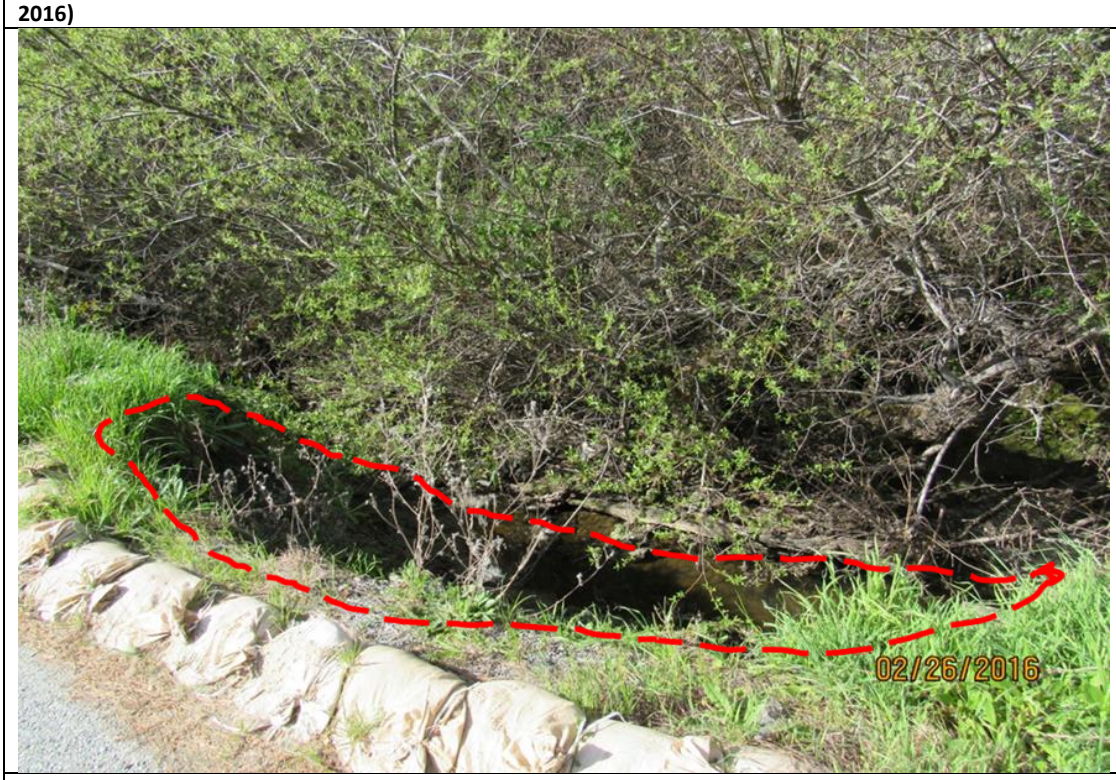


Photo 4– Slip out location #3. Edge of roadway and flowing water in Clear Creek pictured from Bear Gulch Road. (February 26, 2016)

Photo 5- Existing vegetation at slip out location #3, looking north. (February 26, 2016)

Appendix I

Cultural Resources Report

CULTURAL RESOURCES ASSESSMENT REPORT

County of San Mateo Routine Maintenance Program

April 2019

Prepared for

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Acronyms and Abbreviations

BMP	best management practice
BRM	Bedrock Mortar
Caltrans	California Department of Transportation
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CHRIS	California Historical Resources System
Corps	U.S. Army Corps of Engineers
CRHR	California Register of Historical Resources
DPW	County of San Mateo Department of Public Works
GIS	geographic information system
LCP	Local Coastal Program
LID	low-impact development
Maintenance Program	County of San Mateo Routine Maintenance Program
MLD	most likely descendant
NAHC	Native American Heritage Commission
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
NWIC	Northwest Information Center
Parks	County of San Mateo Parks Department
PRC	Public Resources Code
Program	County of San Mateo Routine Maintenance Program
TCR	tribal cultural resource
USC	United States Code

Executive Summary

The County of San Mateo (County) Department of Public Works (DPW) and Parks Department (Parks) are required to conduct routine maintenance activities to ensure that County facilities are properly functioning and operational. Historically, the County has developed guidance documents to describe basic maintenance needs and best management practices (BMPs). To date, the County has developed, permitted, and conducted maintenance activities as individual discrete actions. The purpose of developing the County of San Mateo Routine Maintenance Program (Maintenance Program or Program) is to provide a more comprehensive and consistent approach to conducting routine maintenance activities. Administered as a program, versus a series of individual maintenance activities, the County will follow a consistent set of maintenance methods, BMPs, and impact avoidance approaches.

This cultural resources assessment report supports the environmental impact report that is being prepared pursuant to the requirements of the California Environmental Quality Act (CEQA) of 1970 (as amended) and the State CEQA guidelines (14 California Code of Regulations 15000 et seq.), as well as the obligations under Section 106 of the National Historic Preservation Act for federal U.S. Army Corps of Engineers Clean Water Act Section 404 permit(s) required to conduct the maintenance activities described in the Maintenance Program. The purpose of the report is to characterize the variety of cultural resources expected within the Program area and to identify areas within DPW's and Parks' jurisdiction that are sensitive for the presence of cultural resources. The report also identifies the kinds of work activities that could impact cultural resources and provides BMPs and recommended mitigation measures to avoid impacts to cultural resources from these activities. Furthermore, this document identifies the kinds of activities that would be exempt from the consideration of impacts.

1 Introduction

1.1 Program Description

A summary of the County of San Mateo Routine Maintenance Program (Maintenance Program or Program) is described in this section. A more detailed description can be found in the Routine Maintenance Program Manual (Manual).

1.1.1 Background

The County of San Mateo (County) Department of Public Works (DPW) and Parks Department (Parks) are both responsible for conducting routine maintenance activities to ensure that County facilities are properly functioning and operational. For the purposes of this document, these two departments are referred to collectively as "the County" or "the Departments" unless otherwise specified or described individually. DPW is responsible for maintaining over 300 miles of roadway and associated facilities including roadway shoulder areas, roadside ditches, ditch relief culverts, bridges, green infrastructure (GI) and low impact development (LID)-based stormwater facilities, and flood control facilities in active flood control zones. DPW is also responsible for conducting vegetation management at two small municipal airports including the Half Moon Bay Airport and San Carlos Airport, and closed landfills including the Pescadero Landfill and Half Moon Bay Landfill. The Parks Department is responsible for maintaining various County park and recreational facilities, including trails and campgrounds.

1.1.2 Program Objectives

Objectives of the Program include the following:

- Maintain the functional integrity and operational quality and capacity of County channels, stormwater facilities, roads, trails, and other recreational facilities.
- Prevent roadway flooding, reduce safety hazards, and minimize potential threats to the structural integrity of roadways, bridges, and stormwater and channel facilities within unincorporated San Mateo County.
- Repair and stabilize eroding streambanks and failing culverts in a timely manner to prevent larger-scale slope failures, avoid emergencies, and minimize sedimentation to downstream water bodies.
- Maintain vegetation around County facilities and infrastructure for preventative maintenance and for the purposes of protecting infrastructure and public safety including: maintaining visibility, reducing fire risk and hazards, and reducing the potential for unauthorized encampments.
- Avoid and minimize potential impacts to the natural environment when conducting routine maintenance activities by incorporating detailed appraisals of habitat, species, and resource conditions while identifying and prioritizing maintenance needs and developing site-specific maintenance plans.
- Protect and enhance the natural environment at County facilities.
- Provide regulatory assurance to enable long-term permits with fewer delays and improved work planning and implementation.

- Develop mitigation approaches in a more strategic and integrative manner that targets areas in the county that could benefit from habitat enhancement, restoration, and/or preservation.

1.1.3 Program Area and Maintenance Zones

The proposed Program area is located within San Mateo County, California (**Figure 1**). The Program area consists of two physiographic regions: (1) County areas draining to San Francisco Bay (Bayside); and (2) County areas draining to the Pacific Ocean (Coastside). The County is divided by the Santa Cruz Mountains, and these physiographic regions reflect the principal drainage patterns and directions. Within these two regions, routine maintenance areas in San Mateo County are further located according to County-maintained roads, trails, parks, and channels and stream courses. **Figure 2** shows locations that have either been maintained by the County in recent years or are expected to be maintained in the next 5 to 10 years. While many of these sites are located in unincorporated areas of San Mateo County, some DPW- and Parks-maintained areas are in incorporated areas of the county.

Since 1980, the County has assumed responsibility for implementing the California Coastal Act through administering its Local Coastal Program (LCP). The LCP guides, reviews, and authorizes potential development in the coastal zone. The Coastal Zone Boundary shown in Figure 2 shows the portions of the county (along the Coastside) where the County's LCP applies.

1.2 Program Maintenance Activities

1.2.1 Mechanisms for Impacting Cultural Resources

In general, projects that include ground-disturbing activities such as grading and excavation have the potential to impact historic and prehistoric archaeological resources and may impact historic architectural resources if buildings would be demolished, moved, or altered, or if the setting of an historic resource would be substantially changed. Projects that entail minor surface disturbance or construction would likely result in negligible impacts to cultural resources, but not in every case. On the other hand, large-scale impacts can result from projects that require the movement of large quantities of sediment. In essence, as the intensity of construction impacts increases, the potential to impact cultural resources increases. The following provides more detailed descriptions of the maintenance activities typically conducted followed by a brief discussion of the potential for those activities to impact cultural resources.

1.2.2 Maintenance Activities Descriptions

The proposed Program has seven primary activities: culvert, channel, bridge, and other storm drainage maintenance; roadside ditch and swale maintenance; sediment removal; bank stabilization; vegetation management; road and trail maintenance; and marina and other shoreline maintenance activities. **Table 1** provides a summary of the proposed routine maintenance activities by facility type or feature.

Table 1. Summary of Key Facility Types and Maintenance Activities

Facility or Feature	Maintenance Activity	Potential to Impact Cultural Resources
On-channel crossings	Culvert repair or replacement Sediment and debris removal	1. Sediment and debris removal has the potential to impact archaeological sites. 2. Culvert repair or maintenance that does not expand existing capacity does not have the potential to impact archaeological sites; this includes debris and sediment removal within an existing culvert.
Bridges	Erosion protection at bridge abutments Apply protective paint coating Seal/repair cracks on bridge deck and concrete surfaces	1. Excavation around bridge footings or abutments has the potential to impact archaeological resources. 2. All other bridge maintenance activities would not impact archaeological resources.
Roadside ditch relief culverts	Culvert repair or replacement Sediment and debris removal	1. Sediment and debris removal beyond the original prism of the culvert has the potential to impact archaeological sites. 2. Culvert repair that does not expand existing capacity does not have the potential to impact archaeological sites.

Facility or Feature	Maintenance Activity	Potential to Impact Cultural Resources
Flood control channels, drainages and creeks (engineered and non-engineered)	Sediment and debris removal Bank stabilization Downed tree management Vegetation management Tide gate maintenance and repair Diversion structure maintenance Spalled or cracked concrete repair Repair of existing rock slope protection (RSP) along creek banks Floodwall maintenance (graffiti removal, localized vegetation management, and other minor repairs) Levee maintenance (repair damage from animals, in-kind repair of existing RSP, crack repair, repair slip-outs along levee face)	1. Sediment and debris removal activities conducted in natural and earthen engineered channels have the potential to impact archaeological sites. 2. Bank stabilization has the potential to impact archaeological sites. 3. Downed tree and vegetation management is not likely to impact archaeological resources unless it involves heavy mechanized ground disturbance. 4. All other flood control channel activities would not impact archaeological resources.
Roadside ditches and swales	Ditch or swale resurfacing Sediment and debris removal Vegetation management	1. Sediment and debris removal beyond the original prism of the ditch or swale has the potential to impact archaeological sites
Roads	Repaving and repair of damaged paved roads Street sweeping on paved roads Slip-out and slide repairs (including removal of slide material) Mowing, trimming, and pruning vegetation along County roads	1. Impact potential is considered low due to lack of substantial native ground disturbance and structural modifications; work mainly in hardscaped areas.

Facility or Feature	Maintenance Activity	Potential to Impact Cultural Resources
Trails, campgrounds, picnic areas, and other County Parks features	Trail tread repair and re-grading Mowing, trimming, and pruning vegetation along trails Non-native vegetation removal (e.g. herbicide, grazing, mechanical) Fire fuel management Hazard tree trimming and removal	1. Vegetation removal would not likely impact cultural resources, but the tree and vegetation management activities described, where heavy equipment is used, would have the potential to impact archaeological resources; trail re-grading and repair also have the potential to impact resources.
Green Infrastructure (GI)	Vegetation and thatch removal Light sediment clearing and planting	1. Impact potential is considered low due to lack of substantial native ground disturbance and structural modifications.
Marina facilities including docks, sewer lines/tanks, water lines, launch ramp, and seawall revetment	Repair/replace damaged dock boxes and concrete Periodic sewer line/ejector tank cleaning Water line inspections Replace damaged floats, cleats and bumper striping Debris removal from launch ramp Seawall revetment repair and riprap replacement Inspect channel entrance pilings, markers, and lighting	1. Because this type of activity is within previously disturbed areas and mostly within hardscaped location, the potential to impact archaeological resources is considered low.
Rock slope protection along shorelines	Repair of existing RSP (i.e., replacement of fallen or shifted rock)	1. Repair of existing rock slopes would not impact archaeological resources.
Storm drain facilities (storm drain pipes, manholes, catch basins, trash capture devices, flap gates, pump stations, diversion structures)	Debris clearing, flushing, and cleaning	1. Impact potential is considered low due to lack of native ground disturbance and work in mainly hardscaped areas.

The majority of near-term maintenance activities involve vegetation management, repair or replacement of deteriorating culverts, bank stabilization, sediment removal, bridge maintenance, and trail maintenance. Table A-1 and A-2 (provided in **Appendix A** of this report) identifies DPW's anticipated routine maintenance sites. Table A-2 summarizes maintenance activities that would occur at County Parks and County regional trails. While the proposed Program covers routine maintenance activities countywide, the sites and maintenance projects identified in Table A-1 and A-2 provides a good basis for understanding future maintenance activities that are expected to occur under the proposed Program.

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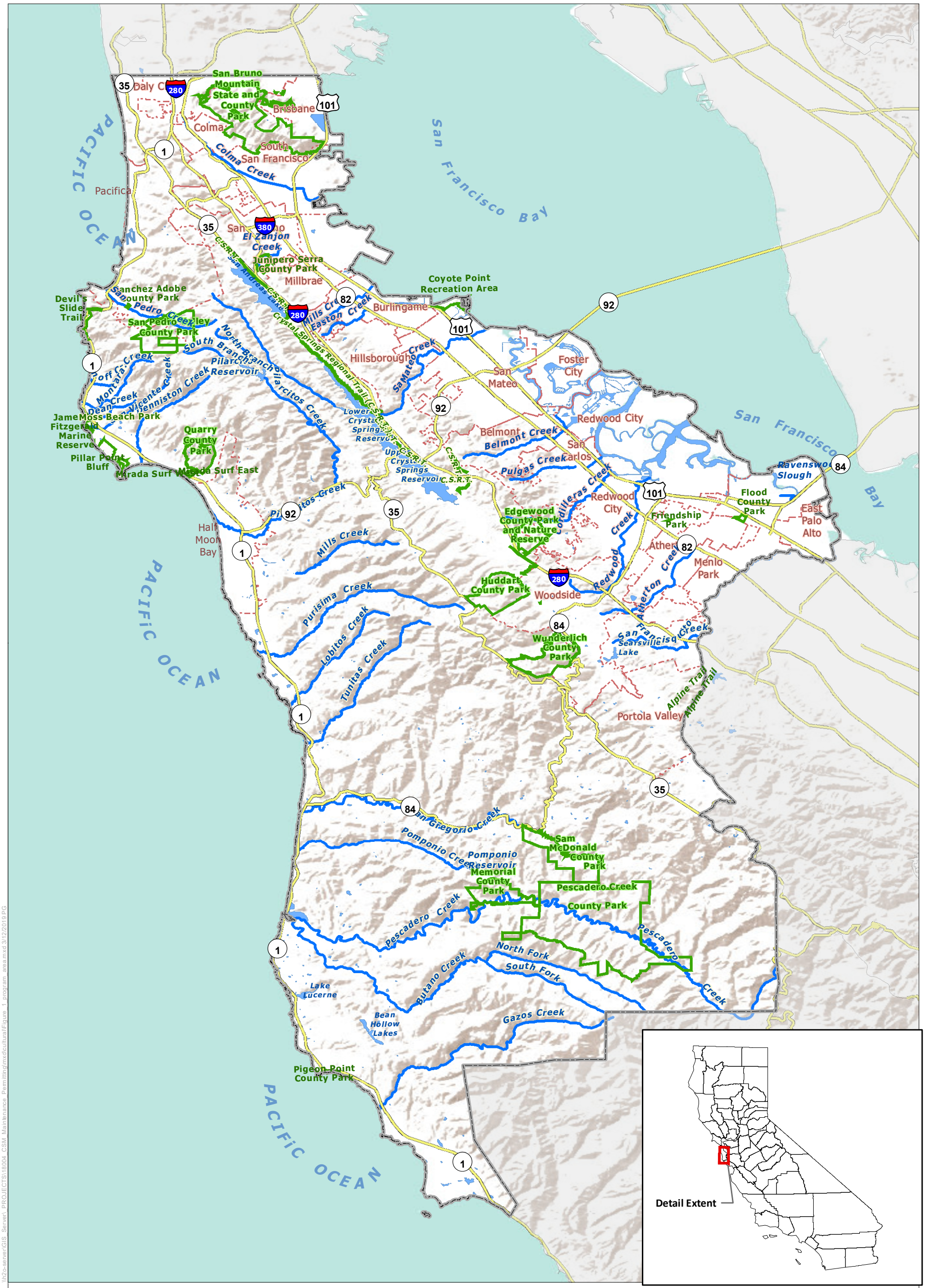

Basebap Sources: Sources: Esri, USGS, NOAA

N

0 5 Miles

- San Mateo County Parks
- Highway / Major Road
- Incorporated City
- Water Feature
- Major Creek
- San Mateo County Boundary

Source: San Mateo County GIS 2018; CalFire 2007

Figure 1
Project Vicinity

Cultural Resource Assessment
San Mateo County Routine Maintenance Program

Horizon WATER and ENVIRONMENT

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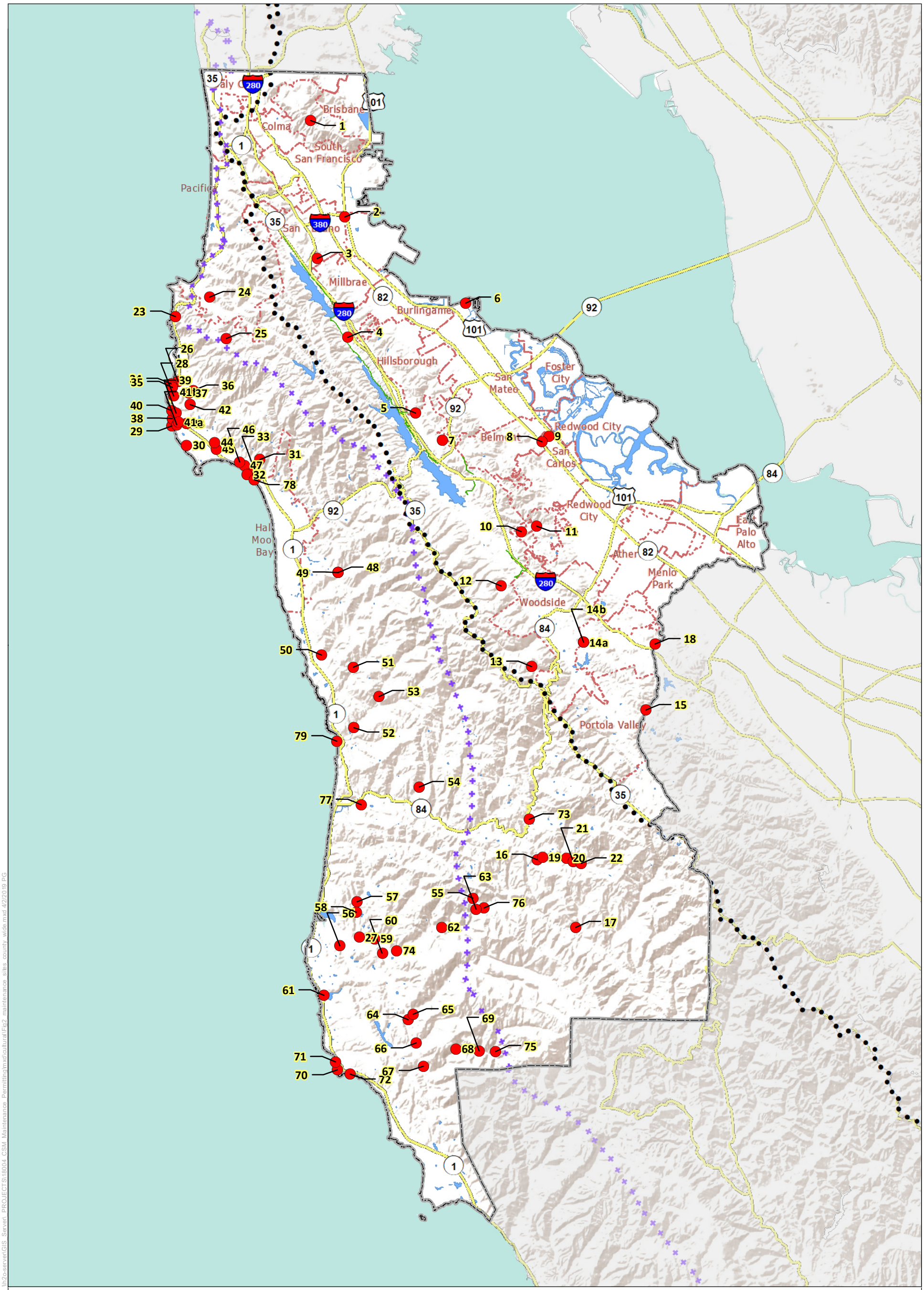

Figure 2
Routine Maintenance Sites

Cultural Resources Assessment
San Mateo County Routine
Maintenance Program

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1.3 Regulatory Setting

1.3.1 San Mateo County General Plan

The County maintains a series of goals and objectives to encourage the protection of cultural resources within the County, as described in the County General Plan (1986):

Goals and Objectives

5.1 Historic Resource Protection

Protect historic resources for their historic, cultural, social and educational values and the enjoyment of future generations.

5.2 Rehabilitation of Historic Structures

Encourage the rehabilitation, preservation and use of historically significant structures.

5.3 Protection of Archaeological/Paleontological Sites

Protect archaeological/paleontological sites from destruction in order to preserve and interpret them for future scientific research, and public educational programs.

5.4 Historical Resources Inventory

Encourage the development of inventories of historical resources which have national, State and Countywide significance.

5.5 Planning and Historic Preservation

Integrate historical preservation into the planning process of the County.

5.6 Increase Public Awareness

Develop increased public awareness of the County's heritage to foster widespread support and understanding for the need to preserve historical resources.

1.3.2 State of California Regulations

CEQA and State CEQA Guidelines

The proposed Program seeks to comply with the California Environmental Quality Act (CEQA) (Public Resources Code [PRC] 21000 et seq.) and the CEQA guidelines (California Code of Regulations [CCR], Title 14, Chapter 3), which determine, in part, whether a project has a significant effect on a unique archaeological resource (per PRC 21083.2) or a historical resource (per PRC 21084.1).

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

- Listed in, or determined to be eligible for listing in, the California Register of Historical Resources (CRHR) (per PRC 5024.1(k));

- Included in a local register of historical resources (per PRC 5020.1) or identified as significant in a historical resource survey meeting the requirements of PRC 5024.1(g); or
- Determined by a lead state agency to be historically significant.

CEQA guidelines in CCR 15064.5 also apply to unique archaeological resources as defined in PRC 21084.1.

Assembly Bill 52, which went into effect on July 1, 2015, requires, per PRC 21080.3.1, that CEQA lead agencies consult with a California Native American tribe that is traditionally and culturally affiliated with the geographic area of a proposed project, if requested by the tribe, and if the agency intends to release a negative declaration, mitigated negative declaration, or environmental impact report for a project. The bill also specifies, under PRC 21084.2, that a project with an effect that may cause a substantial adverse change in the significance of a tribal cultural resource (TCR) is considered a project that may have a significant effect on the environment. This latter language is scheduled to be added to the CEQA checklist in the near future.

As defined in Section 21074(a) of the PRC, TCRs are:

(1) Sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe that are either of the following:

   a. Included or determined to be eligible for inclusion in the CRHR; or

   b. Included in a local register of historical resources as defined in subdivision (k) of Section 5020.1.

(2) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Section 5024.1. In applying the criteria set forth in subdivision (c) of Section 5024.1 for the purposes of this paragraph, the lead agency shall consider the significance of the resource to a California Native American tribe.

TCRs are further defined under Section 21074(b) and (c) as follows:

(b) A cultural landscape that meets the criteria of subdivision (a) is a TCR to the extent that the landscape is geographically defined in terms of the size and scope of the landscape; and

(c) A historical resource described in Section 21084.1, a unique archaeological resource as defined in subdivision (g) of Section 21083.2, or a "nonunique archaeological resource" as defined in subdivision (h) of Section 21083.2 may also be a tribal cultural resource if it conforms to the criteria of subdivision (a).

Mitigation measures for TCRs must be developed in consultation with the affected California Native American tribe pursuant to the newly chaptered Section 21080.3.2 or according to Section 21084.3. Section 21084.3 identifies mitigation measures that include avoidance and preservation of TCRs and treating TCRs with culturally appropriate dignity, taking into account the tribal cultural values and meaning of the resource.

The County will consult with Native American tribes pursuant to PRC 21080.3.1. The results of that consultation are not included in this report.

California Register of Historical Resources

PRC Section 5024.1 establishes the CRHR. This register lists all California properties considered to be significant historical resources. The CRHR includes all properties listed, or determined to be

eligible for listing, in the National Register of Historic Places (NRHP), including properties evaluated under Section 106 of the National Historic Preservation Act (NHPA). The criteria for listing are similar to those of the NRHP. Criteria for listing in the CRHR include resources that:

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

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

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

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

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

1.3.3 Federal Regulations

The County will be seeking a Regional General Permit for the proposed Program from the U.S. Army Corps of Engineers (Corps). As a result, the Program, and by extension the various maintenance projects under the Program, constitutes a federal undertaking as defined by Title 54 United States Code (USC) Section 300101 of the NHPA and mandates compliance with 54 USC Section 306108, commonly known as Section 106 of the NHPA, and its implementing regulations found under Title 36 of the Code of Federal Regulations (CFR) Section 800, as amended in 2001. To comply with Section 106 of the NHPA, the project proponent must "take into account the effect of the undertaking on any County, site, building, structure, or object that is included in or eligible for inclusion in the National Register."

The implementing regulations of the NHPA require that cultural resources be evaluated for eligibility to the NRHP if they cannot be avoided by an undertaking (proposed Program). To determine site significance through application of NRHP criteria, several levels of potential significance that reflect different (although not necessarily mutually exclusive) values must be considered. As provided in Title 36 CFR Section 60.4, "the quality of significance in American history, architecture, archaeology, and culture is present in County, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association" and must be considered within the historic context. Resources must also be at least 50 years old, except in rare cases, and, to meet eligibility criteria of the NRHP, must:

(A) Be associated with events that have made a significant contribution to the broad patterns of our history; or

(B) Be associated with the lives of persons significant in our past; or

(C) Embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

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

For archaeological sites evaluated under Criterion (D), integrity requires that the site remain sufficiently intact to convey information necessary to address specific important research questions.

Cultural resources also may be considered separately under the National Environmental Protection Act per Title 42 USC Sections 4321 through 4327. These sections require federal agencies to consider potential environmental impacts and appropriate mitigation measures for projects with federal involvement.

1.4 Program Area of Potential Effects

The footprint for any maintenance project to be conducted by the County will vary considerably depending on the type of maintenance required. The County will need to evaluate the potential for disturbing cultural resources following the protocols outlined in the Program Manual and described in Section 4.2, Best Management Practices, of this report for identifying and protecting cultural resources.

Some of the projects, or undertakings, under the Program will fall under a Regional General Permit from the Corps. These projects will primarily be associated with in-channel maintenance activities from vegetation removal to culvert replacement or repair, bridge maintenance, and bank stabilization. When there is a federal nexus to a maintenance project, the project will require delineation of an area of potential effects, in compliance with the implementing regulations found under 36 CFR 800 for Section 106 of the NHPA.

For the purposes of this Program, the area of potential effect for projects with a federal nexus will include the affected stream channel(s) under the Program's jurisdiction and a 50-foot buffer. However, the exact nature of the undertaking and the type of area of potential effects will be developed in consultation with the Corps at the time the undertaking is defined.

2 Project Context

2.1 Prehistoric Archaeological Context

The prehistory of the Program area reflects information known about the indigenous population from the time the region was first populated with humans until the arrival of the first Europeans, who visited and recorded their journeys through the written record. The prehistoric record is derived from over a century of archaeological research, and while much has been gleaned from these studies, large gaps in the data record remain. The following prehistoric culture sequence, derived from Milliken et al. (2009:114-118), briefly outlines the prehistory of the San Francisco Bay region.

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

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

The Middle Period, which includes the Lower Middle Period (Initial Upper Archaic; 500 B.C. to A.D. 430) and Upper Middle Period (Late Upper Archaic; A.D. 430 to 1050), appears to be a time when geographic mobility may have continued, although groups began to establish longer-term base camps in localities from which a more diverse range of resources could be exploited. The first rich black middens are recorded from this period. The addition of milling tools, obsidian and chert concave-base projectile points, and the occurrence of sites in a wider range of environments suggest that the economic base was more diverse. By the Upper Middle Period, mobility was being replaced by the development of numerous small villages. Around A.D. 430 a "dramatic cultural disruption" occurred, as evidenced by the sudden collapse of the Olivella saucer bead trade network.

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

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

San Mateo County

Present day San Mateo County was intensively occupied throughout the prehistoric periods discussed above, due to the variety and proximity of resources from the San Francisco Bay, the interior foothills and valleys, and the Pacific Ocean, and relatively easy access to these areas. Given these diverse ecological characteristics of the San Francisco Peninsula, large populations of people were able to establish their residential communities among three principal environmental zones: tidal marshland, grassland prairie, and oak woodland habitats. Riparian corridors, including small creeks and springs, meandered through these ecological communities and supplemented the subsistence patterns and settlement habits during the prehistoric periods. As a result of these favorable conditions, archaeological sites are well-documented in all portions of the county.

Research in the San Mateo County region suggests that the area was inhabited as early as 5,400 years Before Present (BP), and was likely associated with a pre-Ohlone/Costanoan, possibly Esselen, population (Clark 1989). Some of the most notable investigations have been conducted up and down the San Francisquito Creek watershed, which yielded data suggesting an annual settlement system along the western side of the bay (Bocek 1992).

2.2 Ethnographic Context

The population indigenous to the project area spoke a language referred to as Costanoan, a derivative from a Spanish term for "coast people." Costanoan, which consisted of six known languages and various dialects within those languages, was spoken over a broad territory that included all of the San Francisco Peninsula, along the east and south of San Francisco Bay, and south to Monterey Bay, Salinas Valley, and the area around Hollister. Those residing in San Francisco Peninsula and the project area spoke the Ramaytush dialect of San Francisco Bay Costanoan (Milliken et al. 2009:33-35).

The Costanoan peoples, also referred to as the Ohlone, Mutsun, or Rumsen, depending on geography, were not a united cultural or political entity (Milliken et al. 2009:2-4). Rather, there were strong differences not only in language, but also in culture, between the San Francisco and Monterey Bay occupants. Political affinity was based on the tribelet, which was comprised of one or more villages within a specific geographic territory (Levy 1978:487).

The tribelet territory was 10 to 12 miles in diameter and contained a population of 200 to 400 people living among four or five villages (Milliken et al. 2009:99). Those living in the project area resided in large villages along permanent streams in locations that allowed access to the diverse resources found in the tidal marshlands, the valley floor, and the hills (Milliken et al. 2010:106; Moratto 2004:225).

Seven local Costanoan tribes lived entirely within modern-day San Mateo County. Along the bay were the *Urebure* of San Bruno, the *Ssalson* in San Mateo and the *Lamchin* at Redwood City. The coastal groups included the *Aramai* in San Pedro Valley, the *Chiguan* in Half Moon Bay, the *Cotegen* along Purisima Creek, and the *Oljon* at San Gregorio. Three other tribes were partially in San Mateo County but also spilled over into more southern counties. These included the *Puichun* who were on the bay front at San Francisquito Creek, and the *Olpen* who lived in the mountains above the Puichun at the headwaters of San Francisquito Creek. The third group, the *Quiroste*, lived on the coast in the area of Point Ano Nuevo (Milliken et al. 2009:87-89). Numerous village locations throughout San Mateo County have been identified for some of these groups (Milliken et al. 2009:4-5).

2.3 Historic Era Context

The historic era began in the San Francisco Bay area when Spanish explorers arrived in the late 1760s and the 1770s. Members of the Portola expedition were the first to arrive in present-day San Mateo County. On October 23, 1769, the party entered the Quiroste village of Mitenne, where they were graciously welcomed. Portola's group continued northward, encountering and staying at villages of all the peninsula tribes as they crossed to the bay-side of the peninsula via Sweeny Ridge and camped near Palo Alto by the middle of November. The party retraced their route back to Monterey. Following Portola's exploration, the Rivera-Palou expedition followed Portola's exploration five years later, in 1774. Instead of coming up the coast, the Rivera-Palou party arrived through Santa Clara Valley, and followed along the bay shore to San Francisquito Creek. The team made their way to the north end of the peninsula before returning to Monterey via the coastal route. Early exploration

was conducted near Woodside Valley in 1769, when the first Portola expedition camped in the valley. By 1793, the area encompassing the northern and central peninsula was no longer inhabited by tribal villages and the local San Francisco Bay Costanoan-speaking local tribes of the area had been absorbed into Mission Dolores (Milliken et al. 2009). In August 1840, the Governor of Spanish California granted the 12,545-acre Rancho Canada de Raymundo to John Coppinger, an Irishman who had become a naturalized Mexican citizen. This rancho consisted of most of the eastern slopes and valleys in the Woodside area, including today's Wunderlich Park.

Mexico, which included California, became independent from Spain in 1822, and after that time, the government began issue grants of land to favored citizens. First granted only to Mexican nationals, these tracts of land were soon bestowed upon those outsiders (largely Americans) who agreed to become citizens (Kyle et al. 2002:xiii-xiv). During Mexican rule, at least 20 tracts of land, or Ranchos, were granted within what was to become San Mateo County (California State Lands Commission 1982). Nine of the ranchos (one of which overlaps into San Francisco County, and one into Santa Cruz County) were stretched out along the Pacific coast, three were entirely within the interior mountains, and the remainder bordered San Francisco Bay. These properties were largely used for cattle grazing, agriculture, or timber harvesting, though the operations also attracted settlers who would purchase small tracts of land in order to establish their own livelihoods. Central settlements eventually became established on many of the ranchos, particularly on the bay side, that are the sites of modern-day communities (Kyle et al. 2002).

Some of the County's parks contain elements of the ranchos, such as the Sanchez Adobe, which was the home of Don Francisco Sanchez at Rancho San Pedro in Pacifica (County of San Mateo 2019 https://parks.smcgov.org/sanchez-adobe, January 23, 2019). The Woodside Store and other County parks possess elements of mid-nineteenth century life or are within former rancho lands. For example, in 1846, a man named Charles Brown received from Copinger a formal deed to 2,880 acres of timbered slopes and valley range, which contained Wunderlich Park. James A Folger II came to California in 1850 and had gone into the coffee business in San Francisco. Under Folger's ownership, the land changed roles, becoming a recreation area suited to the family's taste. In about 1905, Folger built the stables, garage, and blacksmith barn that exist in the park today. In 2004, the Folger Estate Stable Historic District, located within Wunderlich Park, was listed in the NRHP.

After California became part of the United States, San Mateo County was formed in 1856 out of the southern portion of San Francisco County (Marschner 2000). Given the rugged nature of the terrain in San Mateo County, with densely forested areas and rocky shorelines, the area retained its rural character throughout its history. The economy of the area was principally the water supply and lumber for San Francisco's development—especially following the 1906 earthquake. By 1870, there were over 30 sawmills in the county, which served to supply the rebuilding of San Francisco through the logging of redwoods (Marschner 2000). Much of the San Andreas Valley was flooded in order to provide a water supply to further help with the development of San Francisco. With the development of railway connections to San Francisco in the later 1800s, many wealthy San Franciscans built summer homes in San Mateo County, which, in turn, encouraged the development of economies to support these large mansions.

By the middle of the 20th century, the wartime industry provided jobs and a fledgling local economy. It was at this time that San Mateo County began to be a focal point of the electronics industry. The economy and population continued to grow during the mid-20th century. Post–World War II growth fueled the creation of the Interstate Highway system and dense suburbs typical of many parts of modern San Mateo County. The modern economy in San Mateo County is predominately information and technology driven, with the population being mostly employed by the major technology

companies, like Google and Facebook. The median household income is more than $100,000 and the median property value is $1 million.

3 Native American Consultation and Archival Research

3.1 Native American Consultation

As discussed in Section 1.3.2, State of California Regulations, the lead CEQA agency (i.e., the County) is required to notify Native American tribes with a traditional and cultural affiliation with the Program area about a proposed project, which is preparation of the Program Manual, pursuant to PRC Section 21080.3.1. The County has not received any requests from tribes for project notifications under PRC Section 21080.3.1(b)(1). However, in the spirit of Assembly Bill 52, the County contacted the Native American Heritage Commission (NAHC) on December 21, 2018, for a list of tribes with a traditional and cultural affiliation with San Mateo County, as well as for a search of the sacred lands files. The NAHC responded on December 27, 2018, noting that sacred sites have been recorded within the vicinity of the Program. They also provided a list of four tribes affiliated with the county, and requested that the tribes be contacted for additional information about important cultural sites. Subsequently, the County sent project notification letters on January 4, 2019, via certified return receipt, to all of the tribes listed by the NAHC (**Table 2**). All correspondence between the County, the NAHC, and notified tribes is provided in **Appendix B**. To date, there has been no response from any of the tribes contacted.

Table 2. Native American Correspondence

Tribe	Name	Address	Notification Letter Mailed	Letter Receipt Date
Amah Mutsun Tribal Band	Valentin Lopez, Chairperson	P.O. Box 5272 Galt, CA 95632	January 4, 2019	January 10, 2019
Amah Mutsun Tribal Band of Mission San Juan Bautista	Irenne Zwierlein, Chairperson	789 Canada Road Woodside, CA 94062	January 4, 2019	January 7, 2019
Costanoan Rumsen Carmel Tribe	Tony Cerda, Chairperson	244 E. 1st Street Pomona, CA 91766	January 4, 2019 Resent via email February 5, 2019	Returned February 5, 2019
Indian Canyon Mutsun Band of Costanoan	Ann Marie Sayers, Chairperson	P.O. Box 28 Hollister, CA 95024	January 4, 2019	January 11, 2019
Muwekma Ohlone Indian Tribe of the San Francisco Bay Area	Charlene Nijmeh, Chairperson	20885 Redwood Road, Suite 232 Castro Valley, CA 94546	January 4, 2019	January 7, 2019
Ohlone Indian Tribe	Andrew Galvin	P.O. Box 3152 Fremont, CA 94539	January 4, 2019	January 11, 2019

3.2 Archival Research and Cultural Resources Sensitivity

A records search of the entire geographic area representing San Mateo County was conducted at the Northwest Information Center (NWIC) of the California Historical Resources Information System at

Sonoma State University in October 2018 (NWIC File No. 18-1001). The purpose of the record search was to provide baseline information about the number of recorded cultural resources within the Program area in order to ascertain the general sensitivity of the region for cultural resources. (**Appendix C** [confidential] provides a list of the sites and mapping.) The NWIC information has largely been derived from study results filed at the Information Center, and is not necessarily a comprehensive reflection of all cultural resources work conducted in the county. It is important to note that a vast majority of the waterways and roads included in the Program area have not been completely surveyed for archaeological resources. The database was queried for only archaeological sites, both historical and prehistoric, and did not select for historic buildings or structures (although some structural sites were listed because they contain multiple types of historic material at the location of the recorded site).

The record search revealed that 441 archaeological resources have been recorded in the Program area. These include 313 Native American sites, 93 historic era sites and 35 sites that include both Native American and historic era remains. Not surprisingly, these resources are recorded throughout the entirety of the Program area; however, they tend to cluster in areas in proximity to the historic shoreline of the bay and Pacific coast, as well as some upland sites focused on resource processing and procurement.

Similarly, many historic-period resources have been recorded throughout the Program area. These resources date back to the early 1800s and Spanish mission expansion, and largely relate to early ranching and farming efforts. The types of sites are discussed in Section 3.3 of this report.

A review of the California Department of Transportation (Caltrans) lists of historical bridges (Caltrans 2018a, b) identified six bridges within the Program area, and under County jurisdiction, that have been either listed or are eligible for listing on the NRHP (**Table 3**). Five of the bridges are on County roads, and one is on State Route 92. All of the bridges are stone masonry structures constructed in the late 19th and 20th centuries.

Table 3. San Mateo County NRHP-Eligible or Listed Bridges

Bridge No.	Date Built	Bridge Name	Eligibility Status	Location
35-0054	1967	San Mateo-Hayward Bridge	Eligible for NRHP	04-SM-092-R14.44-
35C0025	1900	Pilarcitos Creek	Listed on the NRHP	0.25 Miles South of State Route 92
35C0018	1937	Pescadero Creek	Eligible for NRHP	2 Miles East of Butano Cutoff
35C0053	1937	Pescadero Creek	Eligible for NRHP	3 Miles East of Butano Cutoff
35C0122	1900	Bear Creek	Eligible for NRHP	0.3 Miles South of State Highway 84
35C123	1905	West Union Creek	Eligible for NRHP	0.05 Miles E Tripp Road

The sensitivity of the Program area for cultural resources is further supported by a review of the California Office of Historic Preservation's web page of California Historical Resources (2019), which lists 121 resources for San Mateo County. These include resources listed in the NRHP (49), as a State Landmark (37), and as a State Point of Interest (35). While a large percentage of these resources are buildings that would not be affected by the Program, many are located adjacent or in close proximity to streams or roads. However, many of the listed properties are Native American archaeological sites, such as the mounds at Pillar Point. Others are places of historical significance related to the early

Spanish exploration, such as the Anza Expedition camp sites, which are located near San Mateo Creek, and signify where Captain J. B. de Anza camped March 29, 1776, after exploring the peninsula and selecting the sites for the Mission and Presidio of San Francisco.

3.3 Cultural Resource Types

As mentioned in Section 3.2, a total of 441 sites have been identified in San Mateo County or what could be considered the majority of the San Francisco Peninsula—mainly distributed along the bay shore, Pacific coastline, and uplands. The following sections describe the kinds of cultural resources that are likely to be present within San Mateo County.

3.3.1 Native American Site Types

The Native American prehistoric and ethnographic periods are represented by 313 sites within the Program area; another 35 sites contain Native American components in addition to historic era materials (see **Table 4** and Appendix C). In general, sites that represent the Native American prehistoric and ethnographic periods would include the remains of village life and subsistence practices. Indeed, "habitation debris" is the most common attribute for sites recorded in the Program area (109 sites). Major occupation sites would most likely be located in valleys where perennial water sources are available. Village sites might contain darkened, organic-rich soils referred to as *midden*, as well as depressions that reflect the locations of circular residential houses or, more rarely, larger dance houses used for ceremonial purposes. Satellite villages may be situated in close proximity to primary occupation sites. Seasonal campsites may also contain midden soils, but would likely be located on flats or swales in the surrounding hills; again, proximity to water would be important. Bedrock mortars, used to grind acorns, or bedrock milling stones, used to grind seeds, are also generally found close to water sources. These features may be found in conjunction with villages or campsites, or they may be isolated in areas where there is (was) an abundance of acorns or seeds. Human burials, including cremations, could be expected at occupation sites.

Less well-documented Native American site types in the Program region include rock shelters and caves. These sites would more likely be among the mountains and, therefore, less likely to be directly associated with the Program area.

While the north end of the San Francisco Peninsula has had some prominent and recent excavations of Native American sites, including deeply buried burials (the BART [SFR-28] Transbay skeletons) and large shell mounds (Nelson 1910), much less study has been conducted along the bay margins and uplands to the south along the peninsula. The following summarizes some of the more notable sites that have been studied within the Program area.

The San Bruno Mountain mound (SMA-40) is a particularly prominent site along the bay margin (Clark 1989). It is an Early Period-dominated site with dates starting at the end of the Middle Holocene. In the vicinity of San Mateo Creek, just north of Coyote Point, notable work has been done at sites such as SMA-33, the San Mateo mound (Nelson 1910), and at SMA-6 (Byrd et al. 2012) within a cluster of 35 shell mounds. In addition, a human skeleton (SMA-273) dated to the Middle Holocene was uncovered 3.7 meters (12 feet) beneath the surface of San Francisco Bay during dredging operations off Coyote Point (Leventhal 1987).

In areas further south of Coyote Point, a number of other prominent sites include SMA-125, an important Middle to Late Period site with burials, and a formation of mounds situated to the southeast of the county (Galloway 1976; Griffin et al. 2006). This series of bay shore occupations indicates a long period of settlement in the area before contact (Cartier 1996Gerow 1968). The

occupational sequence begins with an Early Period site at University Village (SCL-77), followed by two Early/Middle Transition Period sites (SMA-248, also known as the Tarleton site, and SMA-368/H), and then a Middle Period area of occupation at the Hillier mound (SMA-160). In addition, a cluster of sites along the Pacific coast, focused in Half Moon Bay, suggests some migration to the outer coast for food procurement during the latter part of the Middle Period onward (Hylkema 1998).

3.3.2 Historic Era Site Types

Historic era resources in the Program region would span the time from the arrival of the Spanish in the Bay Area and the rapid settlement of the peninsula by recipients of land grants in the early 1800s, to modern historic times. There are 93 recorded historic era sites within the Program limits and 35 additional sites that include historic era materials along with Native American artifacts. Most of the sites (n=39) are categorized as privies/dumps/trash scatters (see **Table 4**).

As noted previously, there is one listed NRHP-listed bridge and five NRHP-eligible bridges within the Program area. Other built environment resources that could be located within the Program area include dams, many of which date to the late 1800s and early 1900s.

Table 4 Recorded Archaeological Site Types for San Mateo County

Site Type	Site Age			
	Historic	Prehistoric	Multi-Component	Total
BRM	—	4	—	4
BRM; Burials	—	1	—	1
BRM; Habitation Debris	—	2	—	2
Burials; Habitation Debris	—	24	—	24
Foundation, Structures, Pads; Graves, Cemetery; Other	1	—	—	1
Foundations, Structures, Pads	12	—	2	14
Graves/Cemetery	4	—	1	5
Habitation Debris	—	109	2	111
Hearths/Pits; Habitation Debris	—	11	—	11
Historic Structure	30	—	—	30
Lithic Scatter	—	28	—	28
Lithic Scatter; BRM	—	2	—	2
Lithic Scatter; Burials; Habitation Debris	—	19	—	19
Lithic Scatter; Habitation Debris	—	83	3	86
Machinery; Standing Structures	3	—	—	3
Mines/Quarries/Tailings	5	—	—	5
Multi-Component	—	—	2	2
Other	13	—	5	18
Petroglyphs	—	1	—	1

Site Type	Site Age			
	Historic	Prehistoric	Multi-Component	Total
Privies/dumps/trash scatters	21	—	2	23
Privies/dumps/trash scatters; Multi-Component	—	—	16	16
Rock Shelter/Cave	—	1	1	2
Standing Structures	1	—	—	1
Unknown	—	28	1	29
Water Conveyance System	3	—	—	3
Total	**93**	**313**	**35**	**441**

3.3.3 Archaeological Site Potential Model

In an effort to determine areas within the Maintenance Program area that may possess sensitivity for archaeological resources, a predictive model was developed using a geographic information system (GIS). The fundamental concept surrounding predictive models is to project known patterns or relationships into unknown areas. In the case of archaeological predictive modeling, the primary assumption is that archaeological sites tend to recur in areas favorable to human settlement. The model utilizes those environmental characteristics of places where sites do or do not occur and allows for the extrapolation from small areas to broader geographic areas. Previous research by Meyer (2013 as cited by Byrd et al. 2017) has indicated that among the multiple environmental conditions that may predict prehistoric human settlement or activity in central and northern California, three environmental factors—distance to water, slope, and distance to confluence—were identified as predicting the majority of site locations.

Slope

For the purposes of this analysis, an elevation model (Digital Elevation Model) of San Mateo County was used to develop a surface that was reclassified to slope percentage. All spatial analyses were carried out using ESRI ArcMap 10.6 and the Spatial Analyst extension. All GIS datasets were saved as standard ESRI grids, shapefiles, or personal geodatabases.

Hydrography

The streams dataset was derived from the National Hydrography Database and was clipped to the San Mateo County boundaries. The confluences were derived from intersect points within the stream dataset and then selected for those that were within 1 mile of the historic bayshore margins or Pacific coastline. These areas of confluence were the focus given the primacy of these areas of confluence for resource procurement, as opposed to all other possible confluence points across the landscape.

Surface Site Potential Model

Based on the weighted model of environmental criteria described above, a map depicting the potential for surface archaeological sites was developed. Surface site potential was calculated using the relative contribution, or weighted value, of each environmental theme (score) for every 10-x-10-meter grid cell across the entire Program area. The distance to water factor was weighted higher than the other factors because it proved to have the greatest positive and negative correlation with known

site locations. The relative contribution of the factors of slope, and distance to confluence were found to be nearly equal, and were weighted accordingly. **Table 5** lists the model criteria classes as well as the weight for each class. Adding the appropriate weight for each layer determined the overall sensitivity score for each pixel, which in this case was a scale of 1 to 5 where the lower score indicates a lower potential for surface archaeological sites to occur. **Figure 3** presents a surface sensitivity mapping for archaeological sites in the Program area. While the surface site model itself does not alter the "geologic potential" of a landform to contain buried sites, it does provide a rationale to better distinguish areas with the highest buried site potential from those with lower potential, even across the same landform.

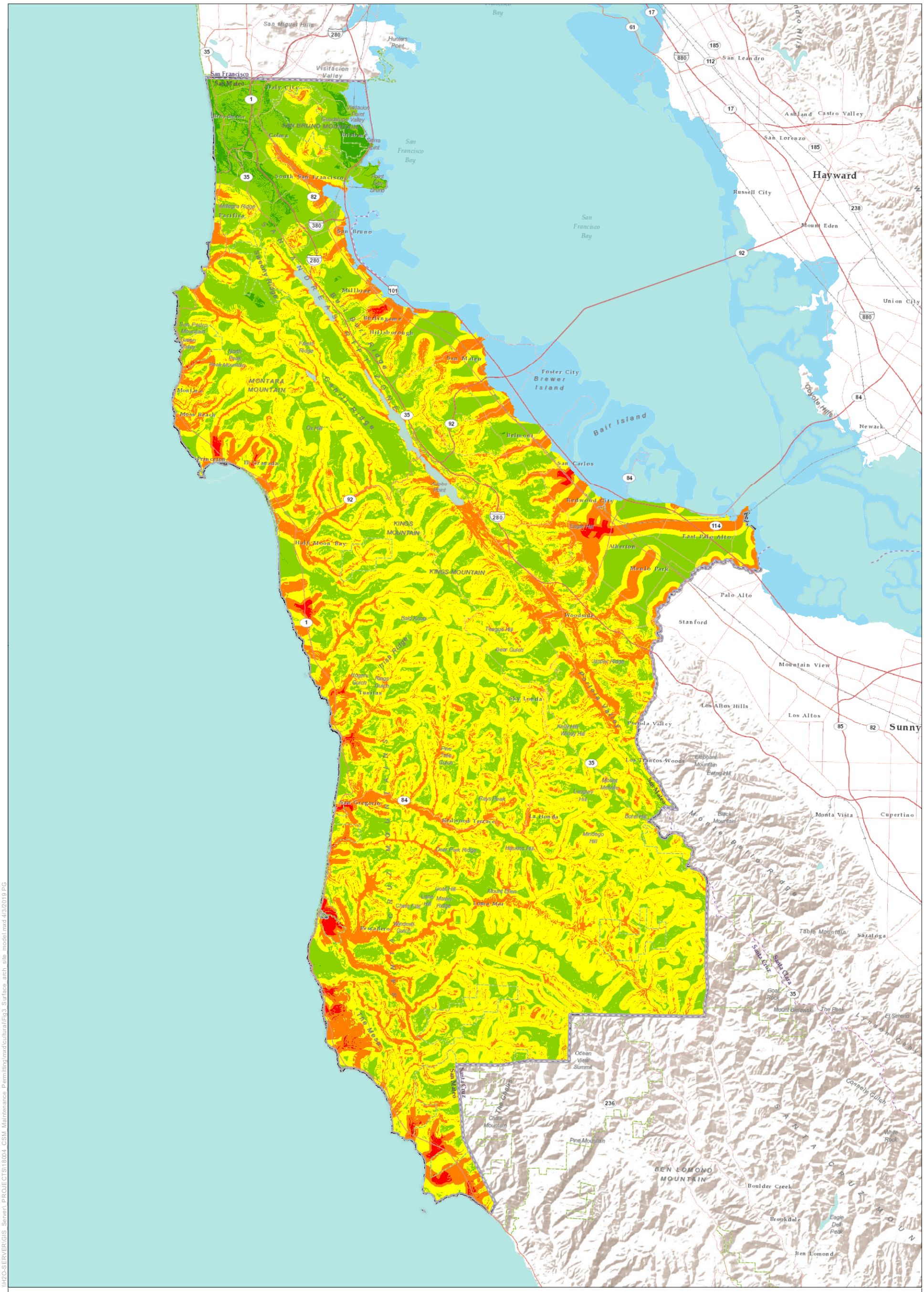
Table 5. Surface Model Weights by Environmental Condition

Environmental Condition	Scores				
Slope (%) (20% Weight)	>20	15 to 20	10 to 15	10 to 5	0 to 5
Distance to Streams (Feet) (60% Weight)	>1,200	600 to 1,200	300 to 600	150 to 300	0 to 150
Distance to Confluence at shoreline zone (Feet) (20% Weight)	>1,200	600 to 1,200	300 to 600	150 to 300	0 to 150
Scale Value	**1**	**2**	**3**	**4**	**5**

Buried Site Potential

To develop a map of buried site potential, geologic age of landforms was mapped based on methods outlined in Meyer and Rosenthal (2007). The basis for identifying buried site potential is predicated on two assumptions: (1) archaeological deposits cannot be buried within landforms that developed prior to human colonization of North America; and (2) older surface landforms are less likely to contain buried deposits because human occupation on these landforms was shorter and the populations were smaller and less dense during periods of greater antiquity. As a result, **Figure 4** depicts the age of landforms, based on soil age data, in this case the Holocene (11,700 BP to the present) period being the highest to potentially contain buried deposits and Pleistocene (2.5 Million Years BP to 11,700 BP) landforms having lower to the lowest potential for buried deposits. The remaining area (not shown on the map) is underlain by much older landforms that would have very little to any potential for buried deposits.

As indicated in the buried site potential map, the younger depositional landforms (higher potential for buried deposits) tend to occur in valleys and along the shorelines, while the less depositional and older landforms (low potential for buried deposits) tend to occur in the mountainous regions of the county. The corridor that follows the northern end of the San Andreas Rift Zone and the low-lying areas west of San Bruno Mountain exhibit the higher range of potential for buried deposits.


Basebap Sources: Sources: Esri, USGS, NOAA
N
0
5
Miles
Surface Site Potential Model
Highest
High
Moderate
Low
Lowest
Historical Bay Shoreline
San Mateo County Boundary
Source: Historic baylands, SFEI 2007
Horizon
WATER and ENVIRONMENT
Figure 3
Archaeological Surface Site Potential Model
Cultural Resources Assessment
San Mateo County Routine Maintenance Program
\\H2O-SERVER\GIS Server\ PROJECTS\18004 CSM Maintenance Permitting\mxd\culturalFig3 Surface arch site model.mxd 4/3/2019 PG

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61
San Leandro
Ashland
San Lorenzo
Daly City
San Bruno Mountain
82
35
South San Francisco
380
Pacifica
San Bruno
SAN ANDREAS RIFT ZONE
Millbrae
Burlingame
Hillsborough
San Mateo
Foster City
Montara Mountain
92
Belmont
San Carlos
Redwood City
East Palo Alto
84
Menlo Park
Palo Alto
Half Moon Bay
Kings Mountain
Woodside
Stanford
Mountain View
Sky Londa
Tunitas
Portola Valley
Los Trancos Woods
San Gregorio
Redwood Terrace
La Honda
Loma Mar
Pescadero
Santa Cruz
San Mateo
Boulder Creek
BEN LOMOND MOUNTAIN
Brookd
Basebap Sources: Sources: Esri, USGS, NOAA
N
0
5
Miles
Buried Deposit Potential
Holocene (High)
Terminal Pleistocene (Moderate)
Plio-Pleistocene (Low)
Historical Bay Shoreline
San Mateo County Boundary
Source: Historic baylands, SFEI 2007
Horizon
WATER and ENVIRONMENT
Figure 4
Buried Archaeological Site Potential
Cultural Resources Assessment
San Mateo County Routine
Maintenance Program
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4 Cultural Resources Best Management Practices

4.1 Potential Impacts to Cultural Resources

The activities described in Section 1.2, Program Maintenance Activities, include a number of ground-disturbing activities that could potentially impact archaeological resources and, perhaps, some built environment resources such as historic bridges. Ground-disturbing activities that could impact cultural resources include, but are not limited to:

- Culvert replacement
- Bridge maintenance
- Sediment removal
- Creek bank stabilization / slip-out and slide repairs
- Vegetation Management where substantial ground disturbance is required

It is equally important to note that some maintenance activities do not have the potential to impact cultural resources. These activities include, but are not limited to:

- **Clearing Culverts and other Storm Drainage Facilities**: This work is necessary when culvert inlets, culvert outfalls, flap gates, diversion structures, storm drains, manholes, catch basins or other storm drainage facilities are noticeably clogged with debris and at least 30% of their conveyance area is impacted or reduced. This work has no potential to impact cultural resources.
- **Trash Capture and Catch Basin Devices:** Trash rack clearing is necessary when a substantial volume of trash has accumulated such that flows are backing up from the rack and drainage and conveyance is impeded. Similarly, trash removal is conducted using a Vac-Con at smaller catch basin devices when trash has accumulated behind the screen or pipe such that flows are substantially impeded. This work has no potential to impact cultural resources.
- **Pump Station Inspections:** Pump stations are routinely inspected to ensure they are in operational condition, particularly prior to forecasted periods of rain. Repairs and modifications are conducted as-needed.
- **Channel Maintenance.** These activities are limited to:
    - **Concrete Channel Repair.** These activities are limited to minor patching and repair of concrete channel walls and beds.
    - **Repair of Existing Channel Rock Slope Protection.** These activities are limited to conducting in-kind repairs by replacing missing or damaged rocks at existing bank stabilization sites and below existing culvert outfalls.
    - **Tide Gate Maintenance.** These activities are limited to clearing debris blockages and replacing the flaps on tide gates where necessary.
    - **Floodwall and Levee Maintenance.** For purposes of the Maintenance Program, floodwall maintenance and repair activities would be minor (e.g., graffiti removal, removal of some vegetation to allow visual inspection of floodwall, removing rust,

adding protective coatings, replacing rubber gaskets or seals at access gates) and conducted to return the floodwalls to its as-built design. Levee maintenance would be limited to minor repair of existing levees to maintain structure integrity (i.e., filling in burrows, replacing fallen rocks, repairing cracks, and repairing slip-outs)—this is assumed to be in "improved" levees that are concrete lined, earthen engineered, or similar where no substantial alteration of the levee subsurface is necessary.

- **Maintenance of Green Infrastructure.** This work would be limited to minor maintenance activities including trash, debris and sediment clearing; replanting of vegetation; cleaning storm drainage inlets and outlets; and as-needed repairs after large storms.
- **Roadside and Trail Ditch and Swale Clearing.** This work would be limited to minor debris and sediment removal from ditches and swales in order to restore original capacity—it is assumed this work is limited to the previously disturbed zones.
- **Vegetation Management.** Hand removal of invasive plants or other vegetation would not be ground disturbing and would thus have a low potential to impact archaeological resources; substantial vegetation clearing where mechanical means are necessary to remove vegetation would likely have a higher potential to impact archaeological resources.
- **Downed Tree Management.** This work occurs when a downed tree is significantly decreasing flood conveyance capacity or obstructing or deflecting streamflow causing bank erosion, or where there's an opportunity to improve habitat value for fish and wildlife. Preserving, repositioning or removing downed trees would not result in substantial ground disturbance and therefore, would have a low potential to impact archaeological resources.
- **Marina Maintenance and Other Shoreline Maintenance Activities.** These activities would be limited to minor repair and debris removal activities and would not require dredging; therefore, the potential to impact archaeological resources is low.

4.2 Best Management Practices

Maps depicting the perceived sensitivity within San Mateo County for archaeological resources, based on a weighted overlay of slope (%), distance to water, and confluence of streams in shoreline areas were produced for the purposes of this Manual (see Figure 3, and further discussed in Section 3.3.3). In addition, a map representing the potential for buried deposits was also produced (see Figure 4, and further discussed in Section 3.3.3). Further, a records search was conducted for the entire county to provide additional guidance on the potential for known resources within areas where maintenance may occur. Using these figures and data as a guideline, the County will implement a series of best management practices (BMPs) to evaluate whether a proposed maintenance area requires a more detailed cultural resources investigation.

Table A-1 in Appendix A lists DPW's anticipated routine maintenance sites and provides the potential sensitivity for archaeological resources for each location based on the sensitivity model. The County parks and trails identified in Table A-2 were assigned a sensitivity score based on the results of a majority statistic run for the area representing the parks and trails. Because the model determines sensitivity based on a discrete 10x10 meter area, certain areas within a given park or trail may have higher or lower sensitivity than others within its boundary. The majority statistic is meant to provide a sense of the general sensitivity of a park or trail for potential archaeological sites.. Appendix C [Confidential] provides a mapped version of the recorded cultural resources discussed in Section 3.3.1.

A programmatic approach has been designed to allow County to conduct maintenance activities in an efficient and cost-effective manner without sacrificing protection of cultural resources. For maintenance activities that involve excavation or repair into previously undisturbed native soils beyond the channel design (e.g., some bank stabilization, road slip-out or slide repair, or some culvert replacement projects), the first step is to conduct a desktop investigation to determine the sensitivity of the site. In areas with unknown or high sensitivity, a cultural resources investigation will be conducted by a qualified professional archaeologist prior to the maintenance activity being performed. The cultural resources investigation will include the following elements:

- Background research and Native American consultation;
- Pedestrian survey;
- Documentation; and
- Management requirements, if necessary.

When cultural resources are identified within a maintenance project area, the first consideration should be to avoid the resource, if feasible. If an archaeological resource cannot be avoided and project activities will impact the site, the resource must be evaluated for significance and eligibility for listing in the NRHP and CRHR. Resources determined to be historic properties/historical resources[1] through evaluation will require mitigation. Avoidance or capping of an eligible resource is the preferred mitigation; however, if a site cannot be preserved, data recovery is an acceptable method of mitigation. Data recovery involves additional excavation to retrieve important information from those portions of a site that will be disturbed by the project. If maintenance activities are directly adjacent to an archaeological site, construction work should be monitored by a qualified archaeologist. If maintenance must occur, then an unanticipated discovery plan would be

[1] Resources determined eligible for the NRHP are referred to as *historic properties*; those found eligible to the CRHR are called *historical resources*.

developed and recovery work would be coordinated with local Native American tribal representatives.

Similarly, if a built environment resource, such as a bridge, must be modified, then it will require NRHP/CRHR evaluation by a qualified architectural historian, if it has not previously been evaluated.

The County has included a set of cultural resource BMPs in the Program Manual (see **Table 6** below) that are intended to be implemented specifically during ground-disturbing activities (e.g., bank stabilization, culvert replacement, sediment removal, excavation). Implementation of these BMPs will be coordinated by the Program managers and directed by qualified cultural resource specialists.

Table 6. Cultural Resources Best Management Practices

BMP Number	BMP Title	BMP Description
CUL-1	Review Cultural Resources Sensitivity Map Data and County Baseline Maps to Determine if the Work Area Has Been Subject to a Previous Cultural Resource Study	▪ During the early phases of Annual Work Plan development, the County will review the Cultural Sensitivity Map Data and County Baseline Maps (provided in the Program's Cultural Resources Assessment Report) for all locations where ground-disturbing activities are proposed. See Section 3.3.3 of the Cultural Resources Assessment Report for details on the sensitivity ratings. Based on the desktop review of existing information, BMPs CUL-2 through CUL-4 will be implemented as follows: – If maintenance locations that reflect the lowest sensitivity (Rating 1-2) and do not have any previously recorded sites within 200 feet of the area of direct disturbance proposed for the maintenance actions: CUL-2 through CUL-4 not required. – If maintenance locations reflect the lowest sensitivity (Rating 1-2) but the area of direct disturbance of proposed maintenance work is within 200 feet of any previously recorded sites: BMPs CUL-2 through CUL-4 required. – Areas that have identified/known cultural resources or historical resources: BMPs CUL-3, CUL-5, and CUL-6 required – If known or of previous survey information is available, locales that have been subject to cultural resource studies within the past 5 years and where no previously identified cultural resources or historical resources were documented: BMPs CUL-2 through CUL- 4 not required – Facilities or cultural resources that have been determined not eligible for listing in the California Register of Historical Resources (CRHR) or the National Register of Historic Places (NRHP): BMPs CUL-2 through CUL- 4 not required ▪ BMPs CUL-5 and CUL-6 are applicable to all ground-disturbing activities, regardless of the sensitivity level of the maintenance location.
CUL-2	Field Inventory for Highly or Moderately Sensitive Areas (Sensitivity Ratings 3-5)	▪ The County will retain a qualified cultural resources specialist to conduct a field inventory of the project area to determine the presence/absence of surface cultural materials associated with prehistoric or historic occupation. A field inventory is required for all locations with a sensitivity Rating of 3 to 5. Surveys in locations with sensitivity ratings of 1 and 2 are required only if the archival information provided by the California Historical Resources Information System/Northwest Information Center (CHRIS/NWIC) under BMP CUL-4 indicate that cultural resources have been previously identified in, or in close proximity to (e.g., within 200 feet), the project location. The results, along with any mitigation and/or management recommendations, will be presented to the County in an appropriate report format that includes any necessary maps, figures, and correspondence with interested parties.

BMP Number	BMP Title	BMP Description
		▪ A summary table indicating appropriate management actions (e.g., monitoring during construction, presence/absence testing for subsurface resources, and data recovery) will be developed for each project work area reviewed. ▪ The maintenance activities will be implemented on-site to avoid significant impacts to cultural resources.
CUL-3	Construction Monitoring for Highest Sensitive Cultural Areas (Sensitivity Rating 5)	▪ The County will retain a qualified archaeologist to be present onsite during ground-disturbing activities within highly sensitive cultural areas. The qualified archaeologist will have the authority to stop work if cultural resources are discovered. ▪ If any cultural resources are discovered during these or any Maintenance Program activities, BMP CUL-2 or BMP CUL-6 will be implemented as appropriate.
CUL-4	Review Project Activities Involving Disturbance of Native Soil	▪ During development of the Annual Work Plan, the County will retain a cultural resources specialist to conduct a review and evaluation of those locations that would involve disturbance/excavation of soil to determine the potential for these activities to affect significant cultural resources. ▪ The evaluation of the potential to disturb cultural resources will be based on an initial review of the County sensitivity maps and archival information provided by the CHRIS/NWIC in regard to the project area based on a 0.25-mile search radius. It is recommended that this initial archival review be completed by a professional archaeologist who will be able to view confidential site location data and literature to arrive at a preliminary sensitivity determination. ▪ Consultation with Native American tribes pursuant to California Public Resources Code 21080.3.1 (also known as Assembly Bill 52) will be conducted by the County. This includes a review of the Sacred Lands Inventory, which is maintained by the Native American Heritage Commission (NAHC). In addition, interested stakeholders, including Native American Tribes and tribal communities and historical societies, will be contacted in accordance with 36 CFR § 800.2(4), "Participants in the Section 106 Process," as required by Section 106 of the NHPA. ▪ If necessary, a further archival record search and literature review and a field inventory of the project area may be conducted. ▪ The results, along with any mitigation and/or management recommendations, will be presented to the County as described in BMP CUL-2.
CUL-5	Conduct Pre-Maintenance Educational Training	At the beginning of each maintenance season and before conducting ground-disturbing stream maintenance activities, all maintenance personnel will participate in an educational training session conducted by a qualified cultural resources specialist. This training will include instruction on how to identify historic and prehistoric resources that may be encountered, and will describe the appropriate protocol to be followed if resources are discovered during maintenance work.
CUL-6	Address Discovery of Cultural Remains or Historic or Paleontological Artifacts Appropriately	Examples of cultural remains are obsidian and chert flaked-stone tools (e.g., projectile points, knives, scrapers) or significant areas of tool-making debris; culturally darkened soil ("midden") containing heat-affected rocks, artifacts, or shellfish remains; stone milling equipment (e.g., mortars, pestles, handstones, or milling slabs); and battered stone tools, such as hammerstones and pitted stones. Historic-period artifacts may include stone, concrete, or adobe footings and walls; filled wells or privies; and deposits of metal, glass, and/or ceramic refuse. Paleontological artifacts are fossilized remains of plants and animals. Work will be restricted or stopped in areas where remains or artifacts are found until proper protocols are met.

		Protocol for treatment of prehistoric or historic cultural resources: 1. Work at the location of the find will halt immediately within 50 feet of the find. A "no work" zone will be established utilizing appropriate flagging to delineate the boundary of this zone, which will measure at least 50 feet in all directions from the find. 2. The County will retain the services of a consulting archaeologist, who will visit the discovery site as soon as practicable and perform minor hand excavation to describe the archaeological or paleontological resources present and assess the amount of disturbance. 3. The consulting archaeologist will provide to the County and USACE, at a minimum, written and digital-photographic documentation of all observed materials, utilizing the CRHR and NRHP guidelines for evaluating archaeological resources. Based on the assessment, the County and USACE will identify the CEQA and Section 106 cultural resources compliance procedures to be implemented. 4. If the consulting archaeologist determines that the find appears not to meet the CRHR or NRHP criteria of significance, and a USACE archaeologist concurs with the consulting archaeologist's conclusions, construction may continue while monitored by the consulting archaeologist. The authorized maintenance work will resume at the discovery site only after the County has retained a consulting archaeologist to monitor and the Maintenance Manager has received notification from USACE allowing work to continue. 5. If the find appears significant, avoidance of additional impacts is the preferred alternative. The consulting archaeologist will determine if adverse impacts to the resources can be avoided. 6. Where avoidance is not practical (e.g., maintenance activities cannot be deferred or must be completed to satisfy the Maintenance Program objective), the County will develop an action plan (also known as a data recovery plan) and submit it to USACE within 48 hours of determining that maintenance activities cannot be deferred. The action plan will be submitted by email to the appropriate archeological/cultural resources contact at the USACE. The action plan is equivalent to a data recovery plan. It will be prepared in accordance with the current professional standards and state guidelines for reporting the results of the work, and will describe the services of a Native American consultant and a proposal for curation of cultural materials recovered from a non-grave context. 7. The recovery effort will be documented in a report prepared by the consulting archaeologist in accordance with current archaeological standards. Any non-grave artifacts will be placed with an appropriate repository. 8. In the event of discovery of human remains (or if a find consists of bones suspected to be human), the field crew supervisor will take immediate steps to secure and protect such remains from vandalism during periods when work crews are absent.) 9. The maintenance crew supervisor will immediately notify the San Mateo County Coroner and provide any information that identifies the remains as Native American. If the remains are determined to be those of a prehistoric Native American or a Native American from the ethnographic period, the Coroner will contact NAHC within 24 hours of being notified about the remains. NAHC will designate and notify a Most Likely Descendant (MLD) within 24 hours. The MLD will have 24 hours to consult and provide recommendations for the treatment or disposition, with proper dignity, of the human remains and grave goods. 10. Preservation in situ is the preferred option for human remains. Human remains will be preserved in situ if continuation of the maintenance work, as determined by the consulting archaeologist and MLD, will not cause further damage to the remains. The remains and artifacts will be documented, the

BMP Number	BMP Title	BMP Description
		find location carefully backfilled (with protective geo-fabric if desirable), and the information recorded in Maintenance Program files. 11. If human remains or cultural items are exposed during maintenance that cannot be protected from further damage, they will be exhumed by the consulting archaeologist at the discretion of the MLD and reburied, with the concurrence of the MLD, in a place mutually agreed upon by all parties. <u>Protocol for treatment of paleontological resources:</u> 1. Work at the location of the find will halt immediately within 50 feet of the find. A "no work" zone will be established utilizing appropriate flagging to delineate the boundary of this zone, which will measure at least 50 feet in all directions from the find. 2. The County shall retain the services of a consulting paleontologist. The consulting paleontologist will meet the Society for Vertebrate Paleontology's criteria for a qualified professional paleontologist (Society of Vertebrate Paleontology 2010). 3. The consulting paleontologist shall visit the discovery site as soon as practicable and perform minor hand-excavation to describe the paleontological resources present and assess the amount of disturbance. The consulting paleontologist will follow the Society for Vertebrate Paleontology's guidelines (2010) for treatment of the artifact. Treatment may include preparation and recovery of fossil materials for an appropriate museum or university collection, and may include preparation of a report describing the finds. The County will be responsible for ensuring that the consulting paleontologist's recommendations for treatment are implemented.

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5 Summary

Archival research, record searches, and sensitivity analysis have demonstrated that all of San Mateo County is sensitive for cultural resources, and this is particularly applicable to areas near watercourses, which are a substantial focus of the Maintenance Program. As such, the County is committed to protecting cultural resources during the course of regular maintenance activities and has developed a series of BMPs for evaluating the need for cultural resources studies prior to conducting specific actions. The BMPs define protocols for evaluating the potential of disturbing cultural resources at a project location and, if necessary, conducting site-specific record searches and field surveys. The County will make every effort to avoid impacts to identified cultural resources, if possible. However, construction monitoring may be recommended, or further investigations to evaluate sites for the NRHP or the CRHR may be necessary if cultural resources are identified and cannot be avoided by the activity. Sites eligible for the NRHP/CRHR may require data recovery at those sites that cannot be avoided. The County will consult with federal agencies, as required, and with Native American tribes with a traditional and cultural affiliation with a specific project area, as appropriate. Implementation of the BMP protocols will be conducted pursuant to the requirements of Section 106 of the NHPA, with the goal of having no historic properties affected per 36 CFR 800.4(d)(1), and no effect on historic properties per 36 CFR 800.5(b).

Archaeological sites, including human remains, are not always visible on the ground surface and may be revealed during construction. The BMPs include protocols for addressing unanticipated discoveries. These protocols are similar to those followed for addressing archaeological sites prior to construction. As with known sites, the County is committed to protecting sites discovered during construction, if possible.

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Appendix A

List of Maintenance Sites and Archaeological Sensitivity Scores

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Table A-1. Summary of San Mateo County Department of Public Works Routine Maintenance Sites

No.	Site/Facility	County Unit	County Region	Archaeological Sensitivity Score	Located on Detailed Map	Community	Routine Maintenance Activities	Year Recent Maintenance Conducted	Expected to be Regulated by USACE?	Anticipated Permit Under RWQCB	Likely Tier Category USFWS	Likely Tier Category NMFS	Special-Status Species with Potential to Occur and Notes
Channel Maintenance at County Road/Bridge/Culvert Crossings (includes Sediment and Vegetation Removal)													
56	Pescadero Creek Road at Butano Creek	DPW	Coastside South	4	Figure B-7	Pescadero	– Sediment removal from channel	2016	Yes	Section 401 Water Quality Certification	Tier 2 or 3	Tier 2 or 3	CRLF, SFGS Steelhead, coho, tidewater goby = Tier 2 or 3
7	Polhemus Road between Ticonderoga Road and Timberland Way	DPW	Bayside South	3	Figure B-2	San Mateo	– Sediment removal from creek channel	2010	Yes	Section 401 Water Quality Certification	Tier 2 or 3	Tier 1	CRLF, SFGS
36	George Street	DPW	Coastside North	4	Figure B-5	Montara	– Vegetation management and sediment removal (approximately 50 cubic yards [cy]) from Montara Creek	2015	Yes, sediment removal would likely be regulated if sediment is pushed and then scooped out.	Section 401 Water Quality Certification	Tier 2 or 3	Tier 1	CRLF, SFGS
42	Sunshine Valley Road	DPW	Coastside North	3	Figure B-5	Moss Beach	– Vegetation and sediment removal (approximately 10 cy) from Dean Creek	2015	Yes – sediment removal work would likely be regulated.	Section 401 Water Quality Certification	Tier 2 or 3	Tier 1	CRLF, SFGS
43	Etheldore Street	DPW	Coastside North	4	Figure B-5	Moss Beach	– Vegetation and sediment removal (approximately 35 cy) from three 24-inch diameter smooth plastic pipes crossing San Vicente Creek	2015	Yes – sediment removal work would likely be regulated by USACE.	Section 401 Water Quality Certification	Tier 2 or 3	Tier 1	CRLF, SFGS
41a	Cypress Avenue	DPW	Coastside North	4	Figure B-5	Moss Beach	– Vegetation and sediment removal (approximately 15 cy) from a box culvert crossing San Vicente Creek	2015	Yes – sediment removal work would likely be regulated by USACE.	Section 401 Water Quality Certification	Tier 2 or 3	Tier 1	CRLF, SFGS

No.	Site/Facility	County Unit	County Region	Archaeological Sensitivity Score	Located on Detailed Map	Community	Routine Maintenance Activities	Year Recent Maintenance Conducted	Expected to be Regulated by USACE?	Anticipated Permit Under RWQCB	Likely Tier Category USFWS	Likely Tier Category NMFS	Special-Status Species with Potential to Occur and Notes
44	Bridgeport Drive	DPW	Coastside North	5	Figure B-5	El Granada	– Vegetation and sediment removal (approximately 100 cy) from 60-inch concrete pipe and 60-ft concrete channel on an unnamed tributary to Denniston Creek	No recent maintenance	Yes – sediment removal work would likely be regulated by USACE.	Section 401 Water Quality Certification	Tier 2 or 3	Tier 1	CRLF, SFGS
45	Sonora Avenue	DPW	Coastside North	4	Figure B-5	El Granada	– Vegetation and sediment removal (approximately 40 cy) from a 36-inch diameter storm drain pipe on an unnamed tributary to Pillar Pt. Harbor	2015	Yes – sediment removal work would likely be regulated by USACE.	Section 401 Water Quality Certification	Tier 2 or 3	Tier 1	CRLF, SFGS
46	Obispo Road at Avenue Portola	DPW	Coastside North	3	Figure B-5	El Granada	– Vegetation and sediment removal (20 cubic yards) from two 24-inch diameter concrete storm drain pipes on an unnamed tributary to Half Moon Bay	2015	Yes – sediment removal work would likely be regulated by USACE.	Section 401 Water Quality Certification	Tier 2 or 3	Tier 1	CRLF, SFGS
47	Obispo Road	DPW	Coastside North	3	Figure B-5	El Granada	– Vegetation and sediment removal (20 cy) from a 50-inch concrete culvert on an unnamed tributary to Half Moon Bay.	2015	Yes – sediment removal work would likely be regulated by USACE.	Section 401 Water Quality Certification	Tier 2 or 3	Tier 1	CRLF, SFGS
2	San Bruno Creek at Walnut St. (North Channel)	DPW	Bayside North	4	Figure B-1	San Bruno	– Sediment removal within 450-foot section of engineered trapezoidal earthen channel (approx. 500 cy) to restore flow capacity to 1970 as-built conditions	2003	Maybe – If the channel is engineered and previously permitted by USACE, USACE may not regulate this activity. If sediment gets removed by pushing and then scooping out, USACE could regulate this activity.	Type of RWQCB permit is dependent upon Corps jurisdiction	Tier 2 or 3	Tier 1	CRLF, SFGS

No.	Site/Facility	County Unit	County Region	Archaeological Sensitivity Score	Located on Detailed Map	Community	Routine Maintenance Activities	Year Recent Maintenance Conducted	Expected to be Regulated by USACE?	Anticipated Permit Under RWQCB	Likely Tier Category USFWS	Likely Tier Category NMFS	Special-Status Species with Potential to Occur and Notes
58	Stage Road at Bradley Creek	DPW	Coastside	4	Figure B-7	Pescadero	– Sediment and minor vegetation removal (similar to Butano Creek project) from concrete arch culvert and upstream and downstream sections of channel with right-of-way		Yes	Section 401 Water Quality Certification	Tier 2 or 3	Tier 3	CRLF, SFGS Steelhead, coho = Tier 2 or 3
37	Harte Street and Date Street	DPW	Coastside North	4	Figure B-5	Montara	– Vegetation and sediment removal within County right-of-way near two 60-inch diameter CMP culverts – Replacement of two 60-inch diameter CMP culverts	2015	Yes	Section 401 Water Quality Certification	Tier 2 or 3	Tier 1	CRLF, SFGS CRLF have been observed at the site.
60	Cloverdale Road at Butano Cutoff	DPW	Coastside South	3	Figure B-7	Pescadero	– Potential future maintenance needs: targeted sediment and vegetation removal along approx. 2,575-foot segment of channel (5000 cy). Hydraulic modelling study currently underway.	Potential future maintenance needed at this site.	Yes – sediment removal work would likely be regulated by USACE.	Section 401 Water Quality Certification	Tier 2 or 3	Tier 1	CRLF, SFGS
71	Pigeon Point Road (Mile 0.4 from south Hwy 1)	DPW	Coastside South	3	Figure B-7	Pescadero	– Removal of sediment from approximately 75 linear feet of drainage downstream of culvert outlet.		Likely	Section 401 Water Quality Certification	Tier 2 or 3	Tier 1	CRLF, SFGS CRLF have been observed in proposed work area. Will result in temporary impacts to wetland habitat.
8	Belmont Creek at Old County Road	DPW	Bayside	4	Figure B-2	Harbor Industrial	– Vegetation trimming and sediment removal from 240-foot section of Belmont Creek within County Right-of-Way (approx. 75 cy); as-needed repairs to concrete wall and arch culvert	Annual vegetation trimming conducted annually. Sediment removal last conducted in 2011.	Yes	Section 401 Water Quality Certification	Tier 1	Tier 1	No federally listed species expected

No.	Site/Facility	County Unit	County Region	Archaeological Sensitivity Score	Located on Detailed Map	Community	Routine Maintenance Activities	Year Recent Maintenance Conducted	Expected to be Regulated by USACE?	Anticipated Permit Under RWQCB	Likely Tier Category USFWS	Likely Tier Category NMFS	Special-Status Species with Potential to Occur and Notes
26	Farallone Ave from Kanoff Street to Fourth Street	DPW	Coastside North	3	Figure B-5	Montara	– Weeding/vegetation maintenance and light sediment clearing	Swale improvements conducted in 2014	Maybe – USACE may regulate sediment removal if removed from a ditch or culvert that is hydrologically connected to waters of the U.S.	Type of RWQCB permit is dependent upon Corps jurisdiction	Tier 2	Tier 1	CRLF, SFGS Roadside ditch not following path of historic drainage based on topo. However, some water is generally present due to springs in area. Limited wetland vegetation was present prior to swale improvement. Jurisdictional determination was never performed, but several projects have been conducted in past without Corps permit. Depending on Corps staff, some may say jurisdictional, and some may say no. 2 CRLF were observed during 2014 swale improvements
34	Seventh Street (approximately 260 feet west of Hwy 1)	DPW	Coastside	3	Figure B-5	Montara	– Weeding/vegetation maintenance and light sediment clearing, and planting	Swale improvements conducted in 2014	Not likely	Waste Discharge Requirement (WDR)	Tier 1	Tier 1	No federally listed species expected Concrete-lined roadside ditch that empties to storm drain
35	Main Street (between 8th and 9th Street)	DPW	Coastside	3	Figure B-5	Montara	– Weeding/vegetation maintenance and light sediment clearing, and planting	Swale improvements conducted in 2014	Not likely	WDR	Tier 1	Tier 1	No federally listed species expected Short stretch of roadside ditch
28	14th Street (approximately 210 feet west of Hwy 1, north of street)	DPW	Coastside	3	Figure B-5	Montara	– Weeding/vegetation maintenance and light sediment clearing, and planting	Swale improvements conducted in 2014	Not likely	WDR	Tier 2	Tier 1	CRLF, SFGS Short stretch of roadside ditch. Stream corridor within dispersal distance for frog. However, stream only flows during rain events. CRLF unlikely to be present if work is conducted during the dry season.

No.	Site/Facility	County Unit	County Region	Archaeological Sensitivity Score	Located on Detailed Map	Community	Routine Maintenance Activities	Year Recent Maintenance Conducted	Expected to be Regulated by USACE?	Anticipated Permit Under RWQCB	Likely Tier Category USFWS	Likely Tier Category NMFS	Special-Status Species with Potential to Occur and Notes
40	Wienke Way	DPW	Coastside	4	Figure B-5	Moss Beach	– Weeding/vegetation maintenance and light sediment clearing, and planting	Swale improvements conducted in 2014	Not likely	WDR	Tier 2	Tier 1	CRLF, SFGS Short section of roadside ditch with one side comprised of a concrete block wall. The remaining section is natural. However, stream only flows during rain events and in summer. CRLF unlikely to be present if work is conducted during the dry season.
39	Carlos St.	DPW	Coastside	4	Figure B-5	Moss Beach	– Weeding/vegetation maintenance and light sediment clearing, and planting	Swale improvements conducted in 2014	Not likely	WDR	Tier 2	Tier 1	CRLF, SFGS Wetland vegetation visible on photos of channel. CRLF have been observed in adjacent Caltrans ditch and in DPW's catch basin. If present in bioretention area, biologist would be able to determine presence.
38	Ocean Boulevard	DPW	Coastside	4	Figure B-5	Moss Beach	– Weeding/vegetation maintenance and light sediment clearing, and planting	Swale improvements conducted in 2014	Not likely	WDR	Tier 1	Tier 1	CRLF, SFGS Rarely any flow at this site. The swale is shallow, has no vegetative cover, and is situated along a residential street. There is no good migration corridor from San Vicente Creek. CRLF and SFGS unlikely to occur.
41b	Cypress and Beach Way	DPW	Coastside	4	Figure B-5	Moss Beach	– Weeding/vegetation maintenance and light sediment clearing, and planting	Swale improvements conducted in 2014	Not likely	WDR	Tier 1	Tier 1	CRLF, SFGS Only flows during storm events. CRLF and SFGS are unlikely to be present.
Bank Stabilization / Slip-out Repair													
14a	Bear Gulch Creek at Sand Hill Road (near intersection with Whiskey Hill)	DPW	Bayside	4	Figure B-3	Stanford Lands	– Bank repair		Yes	Section 401 Water Quality Certification	Tier 3	Tier 3	CRLF, SFGS, steelhead

No.	Site/Facility	County Unit	County Region	Archaeological Sensitivity Score	Located on Detailed Map	Community	Routine Maintenance Activities	Year Recent Maintenance Conducted	Expected to be Regulated by USACE?	Anticipated Permit Under RWQCB	Likely Tier Category USFWS	Likely Tier Category NMFS	Special-Status Species with Potential to Occur and Notes
52	Tunitas Creek Road (Mile 0.6 from Hwy 1)	DPW	Coastside Central	4	Figure B-6	Half Moon Bay	– Bank stabilization	Not likely		WDR	Tier 2	Tier 2	CRLF, SFGS, steelhead May need future geotechnical analysis to determine type of repair. Project likely remain in upland areas above OHW for Tunitas Creek outside of USACE jurisdiction.
53	Tunitas Creek Road (Miles 2.2A and 2.2B from Hwy 1)	DPW	Coastside Central	3	Figure B-6	Half Moon Bay	– Bank stabilization at Mile 2.2A – Bank stabilization and potential large woody debris management at Mile 2.2B			Yes, likely	Section 401 Water Quality Certification	Tier 3	Tier 3
68	Gazos Creek Road (8 slip-outs: 1 at Mile 1 from Cloverdale Rd, 1 at Mile 1.2 from Cloverdale Rd, 1 at Mile 1.3 from Cloverdale Rd, 4 at Mile 2 from Cloverdale Rd, 1 from Mile 2.2)	DPW	Coastside South	3	Figure B-7		– Potential need for bank stabilization work			Likely – if bank stabilization work extends below OHW	Section 401 Water Quality Certification	Tier 3	Tier 3
20	Alpine Road (Mile 0.5, 1.1, 1.2, 1.3, and 1.6 from Pescadero Creek Road)	DPW	Coastside	3	Figure B-4	La Honda	– Bank stabilization/slip-out repair at 5 creekside locations – At mile 1.6, repair scour damage behind and adjacent to upstream wingwall and install drainage system. Repair deteriorated concrete railing.			Likely – if bank stabilization work extends below OHW	Section 401 Water Quality Certification	Tier 3	Tier 3
67	Cloverdale Road (approximately 300 feet north of Gazos Creek Rd) series of 4 slip-outs	DPW	Coastside South	3	Figure B-7		– Bank stabilization			Likely – if bank stabilization work extends below OHW	Section 401 Water Quality Certification	Tier 3	Tier 1

No.	Site/Facility	County Unit	County Region	Archaeological Sensitivity Score	Located on Detailed Map	Community	Routine Maintenance Activities	Year Recent Maintenance Conducted	Expected to be Regulated by USACE?	Anticipated Permit Under RWQCB	Likely Tier Category USFWS	Likely Tier Category NMFS	Special-Status Species with Potential to Occur and Notes
57	Stage Road (along Bradley Creek)	DPW	Coastside	4	Figure B-7	Pescadero	– Bank stabilization			Yes	Section 401 Water Quality Certification	Tier 3	Tier 3
54	Bear Gulch Road (Miles 0.6, 0.7, and 0.75 from Hwy 84)	DPW	Coastside	4	Figure B-6	San Gregorio	– Three small bank repairs along Clear Creek			Likely, depending if boulders are keyed in below OHW	Section 401 Water Quality Certification	Tier 2 or 3	Tier 2 or 3
48	Higgins Creek Road at Mill Creek	DPW	Coastside	4	Figure B-6	Half Moon Bay	– Bank stabilization near bridge		Likely, depending if boulders are keyed in below OHW	Section 401 Water Quality Certification	Tier 3	Tier 3	CRLF, SFGS, steelhead
Culvert Replacement													
21	Alpine Road culvert replacements (Mile 0.5, 1.2a, 1.2b, 1.3, 1.4, 1.5, 1.6, 1.8, 2.1, 2.2, 2.3, 2.5 from Pescadero Creek Road)	DPW	Coastside	3	Figure B-4	La Honda	– Replacement of 12 culverts and associated headwall/inlet structures and outlet dissipation structures		10 sites – not likely 2 sites with seeps - maybe	Type of RWQCB permit is dependent upon Corps jurisdiction	Tier 2	Tier 1	Marbled murrelet = Tier 1 CRLF, SFGS = Tier 2 Steelhead, coho = Tier 1 (assuming that water-quality BMPs are implemented for all activities as necessary) 10 culverts discharge along upper bank of Alpine Creek or within riparian buffer area; 2 are associated with seeps and inlets are wet most of year Although these may not all be USACE jurisdiction, this is case when Section 7 coverage would be ideal.
22	Alpine Road culvert replacement (Mile 0.9 and 2.0 from Pescadero Creek Road)	DPW	Coastside	3	Figure B-4	La Honda	– Replacement of 2 culverts located on drainages to Alpine Creek; Mile 0.9 is Rodger's Gulch and was included in barrier assessment.		Yes	Section 401 Water Quality Certification	Tier 2	Tier 3	Marbled murrelet = Tier 1 CRLF, SFGS = Tier 2 steelhead/coho = Tier 3 Rodger's Gulch would likely need to be designed for fish passage.

No.	Site/Facility	County Unit	County Region	Archaeological Sensitivity Score	Located on Detailed Map	Community	Routine Maintenance Activities	Year Recent Maintenance Conducted	Expected to be Regulated by USACE?	Anticipated Permit Under RWQCB	Likely Tier Category USFWS	Likely Tier Category NMFS	Special-Status Species with Potential to Occur and Notes
69	Gazos Creek Road (Mile 2.7 east of Cloverdale Road)	DPW	Coastside South	3	Figure B-7	Pescadero	– Culvert repair via slip-lining or concrete bottom		Yes	Section 401 Water Quality Certification	Tier 2	Tier 3	Marbled murrelet = Tier 1 CRLF, SFGS = Tier 2 steelhead/coho = Tier 3 Located on Slate Creek (trib to Gazos Creek) Full replacement would be major undertaking. Would likely require fish passage despite limited upstream habitat. Potential to mobilize a large amount of sediment if grade is significantly changed (failed Humboldt crossing upstream).
70	Pigeon Point Road (Mile 0.2 and 0.5 from south Hwy 1)	DPW	Coastside South	2	Figure B-7	Pescadero	– Replacement of 2 culverts		Likely	Section 401 Water Quality Certification	Tier 2	Tier 1	CRLF, SFGS One site will require likely require USACE permit. The other site needs a site visit. CRLF have been observed at one of the locations.
Bridge Maintenance													
51	Lobitos Creek Road (1.1 miles northwest of Verde Road)	DPW	Coastside	4	Figure B-6	Half Moon Bay	– Implement erosion control measure to prevent surface roadway runoff from eroding the embankment(s). Fill the erosion gully and implement anti-erosion control measures at the right side of abutment 1. Patch the exposed threaded anchor inserts and diagonal cracks found along the exterior girders of the superstructure.		Likely	Section 401 Water Quality Certification	Tier 2	Tier 3	CRLF, SFGS = Tier 2 Steelhead = Tier 3 According to the Caltrans inspection report there is a large erosion gully in the embankment at the right side of abutment 1. Erosion is due to the runoff from above which travels down an AC gutter along the wingwall and then abruptly ends at the abutment face.

No.	Site/Facility	County Unit	County Region	Archaeological Sensitivity Score	Located on Detailed Map	Community	Routine Maintenance Activities	Year Recent Maintenance Conducted	Expected to be Regulated by USACE?	Anticipated Permit Under RWQCB	Likely Tier Category USFWS	Likely Tier Category NMFS	Special-Status Species with Potential to Occur and Notes
14b	Sand Hill Road (Bear Gulch Creek; south of Whiskey Hill Road)	DPW	Bayside	4	Figure B-3	Stanford Lands	– Clean and paint the metal arch plating with a protective coating where corrosion exists. The sill of the raised concrete footing should allow positive drainage to prevent further corrosion along the bottom of the metal arch. Scour mitigation measures should be implemented behind the wingwalls to prohibit the passage of runoff from the above roadway. The 8' CMP should also be extended away from this scour envelope. Cement slurry may be used to fill the undermined areas beneath the culvert footings. Scour mitigation measures may also be implemented to avoid further erosion beneath the footings.		Likely	Section 401 Water Quality Certification	Tier 3	Tier 3	CRLF, SFGS, steelhead
19	Pescadero Creek Road (Alpine Creek; intersection of Pescadero Creek Road and Alpine Road)	DPW	Coastside	3	Figure B-4	La Honda	– 2 bridges – The bottom of the metal arch culvert should be painted with a protective coating to prevent further corrosion. This may require removing the upper portion of the creek bed to expose the entire rusted area. – Replace or bypass culvert/Caltrans inspection report indicated that a culvert is eroding the bank at the end of the right wingwall at abutment 1, spalling along the edge of the soffit/headwall interface at both ends of the arch, repair erosion at abutment 1. – Replace damaged portion of the guardrail and replace the missing timber blocks in the west/left guardrail.		Likely	Section 401 Water Quality Certification	Tier 3	Tier 3	Marbled murrelet = Tier 1 CRLF = Tier 3 Steelhead, coho = Tier 3

No.	Site/Facility	County Unit	County Region	Archaeological Sensitivity Score	Located on Detailed Map	Community	Routine Maintenance Activities	Year Recent Maintenance Conducted	Expected to be Regulated by USACE?	Anticipated Permit Under RWQCB	Likely Tier Category USFWS	Likely Tier Category NMFS	Special-Status Species with Potential to Occur and Notes
59	Pescadero Creek Road at Cloverdale Road (Pescadero Creek)	DPW	Coastside	4	Figure B-7	Pescadero	– Cement slurry the underside of Abutment 1. Repair AC roadway at the bridge deck joint. Paint the corroded surface of the pile casing with a protective coating. Place a protective deck overlay to seal the cracks along the bridge deck. – Place riprap along the west bridge slope.		Likely	Section 401 Water Quality Certification	Tier 3	Tier 3	CRLF, SFGS, steelhead, coho Caltrans inspection report indicated undermining at abutment 1, improve drainage behind abutment 1, and repair erosion.
64	Cloverdale Road (Butano Creek; located at Cloverdale Road and North Butano Park Road)	DPW	Coastside	3	Figure B-7	Pescadero	– Provide scour mitigation countermeasures at Pier 2.		Likely	Section 401 Water Quality Certification	Tier 3	Tier 3	CRLF, SFGS, steelhead Caltrans inspection report indicated that the toe of slope protection in front of pier 2 is undermined, slope protection at pier 2 is scoured, bridge scour is critical, the washout of the slope protection could potentially cause pier 2 to be undermined, threatening the structural integrity of the structure.
63	Wurr Road (Pescadero Creek; located 0.1 mile south of Pescadero Creek Road)	DPW	Coastside	4	Figure B-7	Loma Mar	– Patch spalls at the joint headers of Piers 2 and 3.		Likely	Section 401 Water Quality Certification	Tier 3	Tier 3	CRLF, steelhead, coho, marbled murrelet The footing at abutment 1 has scoured and undermined for the full length. It appears that the degradation may be the result of erosion from storm water running from the roadway above. Concrete slope protection apron has shifted and moved down slope and away from the abutment.
49	Higgins Purisima Road Bridge (Mills Creek)	DPW	Coastside	4	Figure B-6	Half Moon Bay	– According to the Caltrans Inspection Report there is severe diagonal soffit crack in Bay 4, abutment 2, and at the right wingwall at abutment 2, repair the scour at the footing of abutment 2. However, no undermining.		Likely	Section 401 Water Quality Certification	Tier 3	Tier 3	CRLF, SFGS, steelhead

No.	Site/Facility	County Unit	County Region	Archaeological Sensitivity Score	Located on Detailed Map	Community	Routine Maintenance Activities	Year Recent Maintenance Conducted	Expected to be Regulated by USACE?	Anticipated Permit Under RWQCB	Likely Tier Category USFWS	Likely Tier Category NMFS	Special-Status Species with Potential to Occur and Notes
62	Pescadero Creek Road (Hayward Bridge – Pescadero Creek; located approximately 2 miles east of Butano Cutoff Road)	DPW	Coastside	4	Figure B-7	Pescadero	– Fill the erosion gully at the left side of abutment 1 and gutter to protect the abutment from water coming from roadway above.		Likely	Section 401 Water Quality Certification	Tier 2	Tier 3	Marbled murrelet = Tier 1 CRLF, SFGS = Tier 2 Steelhead, coho = Tier 3
9	Industrial Way (Belmont Creek south of Harbor Blvd.)	DPW	Bayside	4	Figure B-2	Harbor Industrial	– The concrete surfaces of the culvert, retaining walls and barriers should be patched where spalling, pocketing and cracking was discovered to prevent the exposure of underlying reinforcing steel. The metal barrier railing should be painted to prohibit corrosion.		Likely	Section 401 Water Quality Certification	Tier 1	Tier 1	No federally listed species expected to occur
5	Crystal Springs Road (San Mateo Creek; located at intersection with Polhemus Road)	DPW	Bayside	3	Figure B-2	San Mateo Highlands (Hillsborough)	– The acute edges of the retaining walls and the damaged area of the middle culvert wall at the upstream opening should be repaired by concrete patching. Scour mitigation measures may be employed at the downstream opening of the culvert where the invert elevation of the culvert varies from the bed of the creek.		Likely	Section 401 Water Quality Certification	Tier 2	Tier 2	CRLF, SFGS, steelhead
50	Verde Road (Purisima Creek; located approximately 0.1 mile south of Purisima Creek Road)	DPW	Coastside	4	Figure B-6	Half Moon Bay	– Repair damaged MBGR, minor concrete repairs, replace type B compression joint seals at both abutments, repair erosion gully and place slope protection at abutment 1.		Likely	Section 401 Water Quality Certification	Tier 2	Tier 1	CRLF, SFGS
66	Cloverdale Road (Little Butano Creek; located near North Butano Park Road)	DPW	Coastside	4	Figure B-7	Pescadero	– Perform routine maintenance to remove debris from within the box culvert chambers. Minor concrete repairs to lower portions of the culvert walls where scour was found.		Likely	Section 401 Water Quality Certification	Tier 2	Tier 2	CRLF, SFGS, steelhead

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65	Canyon Road (Butano Creek)	DPW	Coastside	4	Figure B-7	Pescadero	– Clean the vegetative debris from the truss members. Replace or rehab the rusted bolts and pins. New or reconditioned bolts should have some protection against rusting. – Replace the missing cotter pin for the bottom bolt connection at the third top panel from abutment 1 of the right truss.		Likely	Section 401 Water Quality Certification	Tier 2	Tier 2	CRLF, SFGS, steelhead
61	Bean Hollow Road (Arroyo de los Frijoles; located approximately 0.2 mile north of Hwy 1)	DPW	Coastside	4	Figure B-7	Pescadero	– Future bridge maintenance may be needed. – Patch the spalls at the top of the barrel in spans 1 and 2. – Consider using galvanic protection for the reinforcing steels.		No	None	Tier 2	Tier 1	CRLF, SFGS Minor concrete patching may be necessary where cracking and other defects are visible along the exposed concrete surfaces of the culvert, wingwalls and barriers/Caltrans inspection report does not recommend any repair work.
11	Cordilleras Road (Cordilleras Creek) near Edgewood Road and Lakeview Way	DPW	Bayside	3	Figure B-3	Emerald Lake Hills	– Bridge repair work (current erosion behind abutment/box structure		Yes	Section 401 Water Quality Certification	Tier 2	Tier 2	CRLF, SFGS = Tier 2 Steelhead = Tier 2
18	Alpine Road at San Francisquito Creek (0.3 mile north of Highway 280)	DPW	Bayside	4		Portola Valley	– Repair the damaged slope drainage paving adjacent to abutment 1.		Yes	Section 401 Water Quality Certification	Tier 2	Tier	CRLF, SFGS = Tier 2 Steelhead = Tier 3
27	Stage Road (Pescadero Creek; located south of North Street)	DPW	Coastside	4		Pescadero	– Repair cracks and concrete spalls at pier 2.		No	None	Tier 2	Tier 2	CRLF, SFGS = Tier 2 Steelhead, coho = Tier 2

No.	Site/Facility	County Unit	County Region	Archaeological Sensitivity Score	Located on Detailed Map	Community	Routine Maintenance Activities	Year Recent Maintenance Conducted	Expected to be Regulated by USACE?	Anticipated Permit Under RWQCB	Likely Tier Category USFWS	Likely Tier Category NMFS	Special-Status Species with Potential to Occur and Notes
73	Entrada Way at La Honda Creek	DPW	Coastside	4		La Honda	– Repair [[specifically??]] due to storm damage. Work would likely involve bank stabilization and channel work to redirect flows and stabilize existing slope protection near the wingwall.		Yes	Section 401 Water Quality Certification	Tier 2	Tier 3	CRLF, SFGS = Tier 2 Steelhead, coho = Tier 3
74	Pescadero Creek at Butano Cutoff	DPW	Coastside	4		Pescadero	– Extend the slope protection further at pier 2 to prevent undermining of the slope protection.		Yes	Section 401 Water Quality Certification	Tier 2	Tier 3	CRLF, SFGS = Tier 2 Steelhead, coho = Tier 3
75	Gazos Creek Road at Gazos Creek (3.3 miles east of Cloverdale Road)	DPW	Coastside	3		Pescadero	– Repair or replace the flattening steel arch, repair cracks and gaps on headwalls caused by the arch.		Likely	Section 401 Water Quality Certification	Tier 2	Tier 3	Marbled murrelet = Tier 1 CRLF, SFGS = Tier 2 steelhead/coho = Tier 3
76	Wurr Road (Loma Mar) at Pescadero Creek	DPW	Coastside	4		Loma Mar	– Repair the slope protection and mitigate the scour at Abutment 1 in accordance with HEC 23. Due to slope stability concerns at the Abutment 1 bridge slope and upstream embankment and the vulnerability of the Bent 2 footing due to scour, bridge replacement may be necessary. – Fill the undermining at Bent 2 and provide scour protection. – Repaint all steel members.		Yes	Section 401 Water Quality Certification	Tier 2	Tier 3	Marbled murrelet = Tier 1 CRLF, SFGS = Tier 2 Steelhead, coho = Tier 3
77	Seaside School Road (0.25 mile east of Stage Road)	DPW	Coastside	3		San Gregorio	– Clean rust and paint the railroad car.		No	WDR	Tier 2	Tier 2	CRLF, SFGS = Tier 2 Steelhead, coho = Tier
78	Mirada Road (between Magellan Avenue and the Pedestrian Bridge south of Medio Avenue)	DPW	Coastside	3		Half Moon Bay	– Replace fallen or shifted rock that has sloughed away from the seawall revetment along Mirada Road.		Yes	Section 401 Water Quality Certification	Tier 1	Tier 1	NA

Notes: CRLF = California red-legged frog; SFGS = San Francisco garter snake

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Table A-2. Majority Archaeological Sensitivity Scores for San Mateo County Parks and Trail Areas

No.	Site/Facility	Archaeological Sensitivity Score (majority)
15	Alpine Trail	4
6	Coyote Point Recreation Area	2
4	Crystal Springs Trail	3
23	Devil's Slide Trail	2
10	Edgewood County Park and Natural Preserve	3
29	Fitzgerald Marine Reserve	4
12	Huddart County Park	3
3	Junipero Serra County Park	3
55	Memorial County Park	3
33	Mirada Surf East	3
32	Mirada Surf West	3
17	Pescadero County Park	3
72	Pigeon Point County Park	3
30	Pillar Point Bluff	2
31	Quarry County Park	3
24	Sanchez Adobe	4
1	San Bruno Mountain State and County Park	2
18	Sam McDonald County Park	3
25	San Pedro Valley Park	3
79	Tunitas Creek Beach	2
13	Wunderlich County Park	2

Note: Scores are classified as the following: 1=Lowest, 2=Low, 3=Moderate, 4=High, 5=Highest

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Appendix B

Native American Correspondence

Appendix C

CONFIDENTIAL: Recorded Archaeological Sites within San Mateo County

Appendix J

Eelgrass Survey Memorandum

HALEY & ALDRICH, INC.
2033 N. Main Street
Suite 309
Walnut Creek, CA 94596
925.949.1012

21 March 2017
File No. 43157

San Francisco Bay Conservation and Development Commission
455 Golden Gate, Suite 10600
San Francisco, CA 94102

Attention: Mr. Alex Braud
NOAA Coastal Management Fellow

Subject: **Evaluation of Potential Eelgrass Beds near the Coyote Point Marina**
USACE PERMIT #: 26774S
BCDC PERMIT #: M1993.014.00

Dear Mr. Braud:

As you mentioned in your February 23, 2017 email, the 2009 eelgrass (*Zostera marina*) survey does seem to show two very small potential eelgrass patches within 250 meters of the proposed Coyote Point Marina (Marina) dredge footprint. As shown in Attachment A, potential eelgrass patch #1 is protected from any dredging related turbidity on account of the physical obstruction provided by the jetty that forms the north boundary of the Marina. Presence of vegetation in the 2.5 square meters covered by potential eelgrass patch #2 was surveyed by a professional diver hired by TranSystems. The results of this survey are summarized below.

The eelgrass swim survey was performed at 16:00 on March 8, 2017 during a -0.5 ft MLLW tide. At this tide level, the potential eelgrass patch would have been present at the waterline (Attachment B). No eelgrass was visible. The diver swam throughout an approximate 80-foot diameter circle around the potential eel grass patch area as shown in Attachment B. The diver placed four stakes in the survey area in order to provide a visual of approximate swim coverage (Attachment C). The diver found very little vegetation. But did collect samples of what he encountered at two locations shown with stakes labeled “Vegetation 1” and “Vegetation 2” in Attachments B and C. The specimens he collected were photographed and are shown in Attachment D.

The minimal amount of material found was compared to plants exhibited in the *Jepson Manual Higher Plants of California* and in *Eelgrass Conservation and Restoration in San Francisco Bay: Opportunities and Constraints* in the San Francisco Bay Subtidal Habitat Goals Project Report. After it was determined that the collected specimens did not resemble eelgrass plants depicted in the literature, they were assessed in person by Dr. Michael McGowan, a local aquatic ecologist with expertise in wetlands ecology, fish and fisheries, and ecological restoration. Dr. McGowan stated that “In my opinion, the specimens I saw are neither eelgrass, *Zostera marina*, nor pickleweed, *Salicornia* spp. They may be tubes of mud and mucus constructed by a benthic worm.”

Based on the absence of any visually observed eelgrass plants at a tide level that would have revealed plants in the area mapped as eelgrass in the 2009 survey, the absence of any significant subaquatic vegetation within the swim survey area, and confirmation by a qualified ecologist that the specimens collected from within the swim survey area were not eelgrass, it appears that eelgrass patch #2 was either

erroneously mapped in 2009, or was accurately mapped but no longer exists. As such, the County of San Mateo requests that their maintenance dredging permits be finalized without provisions requiring measures to protect eelgrass.

If you have questions or would like to discuss further, please do not hesitate to contact me via telephone at (415) 748-2193 or email at sbodensteiner@HaleyAldrich.com.

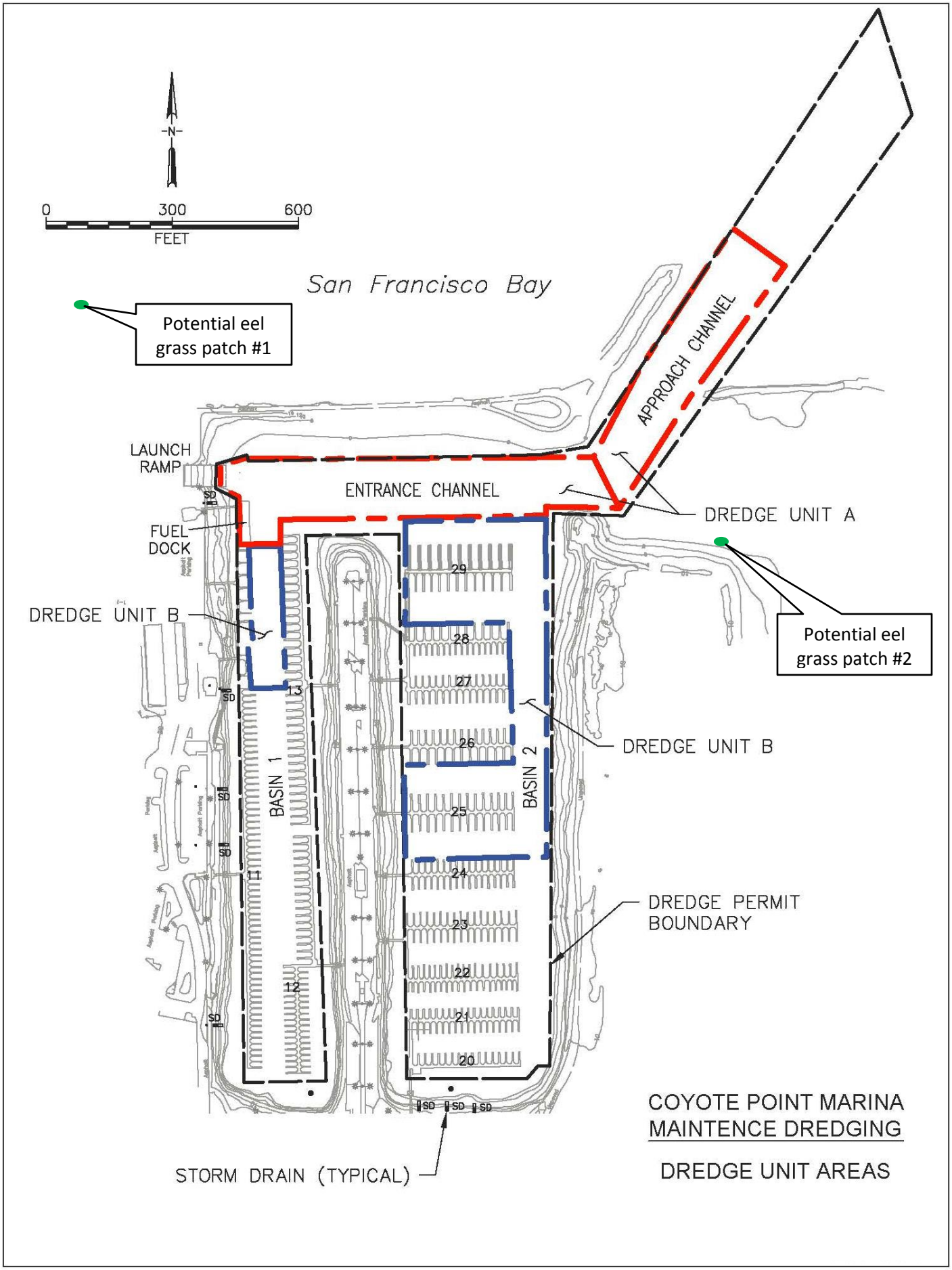
Sincerely,

Scott Bodensteiner
HALEY & ALDRICH, INC.

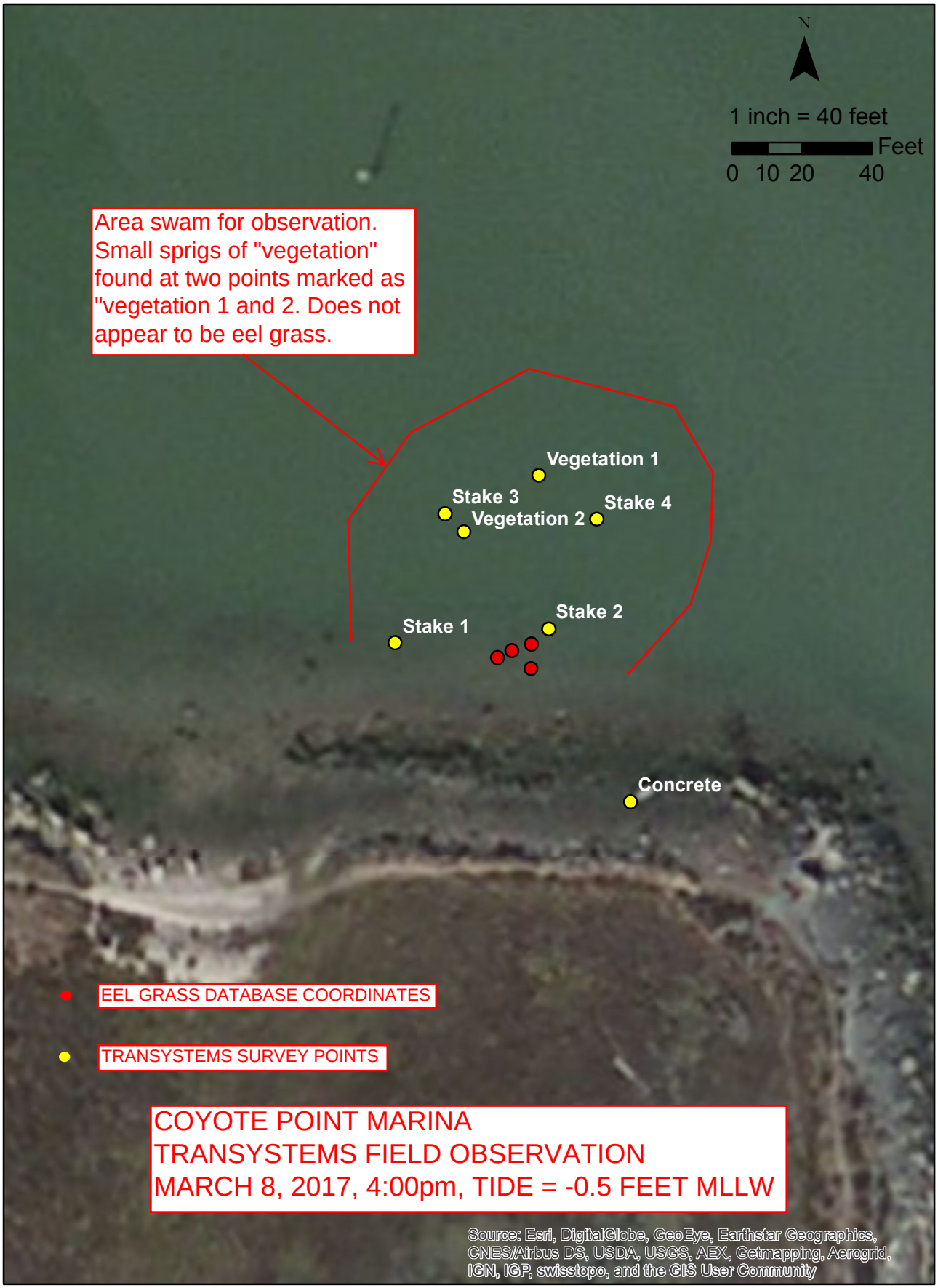
Attachment A: Project Area Maps with Location of Potential Eelgrass Patches Mapped in 2009
Attachment B: Swim Survey Map
Attachment C: Swim Survey Photo
Attachment D: Photo of Collected Specimens

cc: Mr. Mark D'Avignon, USACE
Sam Herzberg, San Mateo County
Mr. Greg Mailho, TranSystems

ATTACHMENT A


-N-
0
300
600
FEET
San Francisco Bay
Potential eel grass patch #1
APPROACH CHANNEL
LAUNCH RAMP
ENTRANCE CHANNEL
DREDGE UNIT A
FUEL DOCK
DREDGE UNIT B
Potential eel grass patch #2
BASIN 1
BASIN 2
DREDGE UNIT B
DREDGE PERMIT BOUNDARY
STORM DRAIN (TYPICAL)
COYOTE POINT MARINA
MAINTENCE DREDGING
DREDGE UNIT AREAS

ATTACHMENT B


N
1 inch = 40 feet
Feet
0 10 20 40
Area swam for observation. Small sprigs of "vegetation" found at two points marked as "vegetation 1 and 2. Does not appear to be eel grass.
Vegetation 1
Stake 3
Stake 4
Vegetation 2
Stake 1
Stake 2
Concrete
EEL GRASS DATABASE COORDINATES
TRANSYSTEMS SURVEY POINTS
COYOTE POINT MARINA
TRANSYSTEMS FIELD OBSERVATION
MARCH 8, 2017, 4:00pm, TIDE = -0.5 FEET MLLW
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

ATTACHMENT C

LOCATION OF "EEL GRASS" PATCH PER PROVIDED DATA BASE COORDINATE POINTS
TRANSYSTEMS STAKE #2
TRANSYSTEMS STAKE #1 (OUT OF PHOTO) ALONG WATER'S EDGE AT CURRENT TIDE.
COYOTE POINT MARINA
TRANSYSTEMS FIELD OBSERVATION
MARCH 8, 2017, 4:00pm, TIDE = -0.5 FEET MLLW

ATTACHMENT D

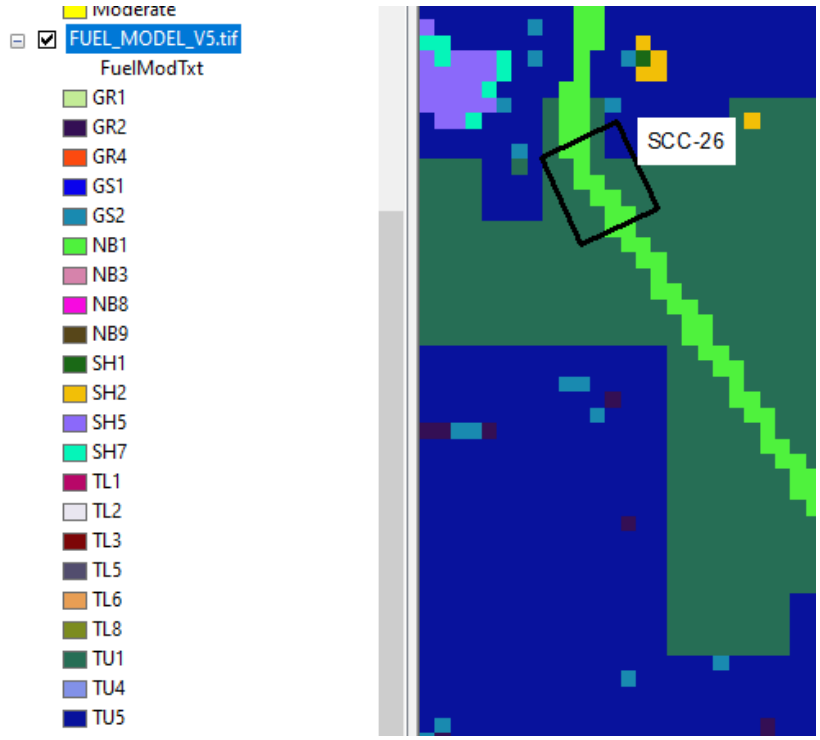
Appendix K. Culvert Material Determination Methodology

Below are screenshots depicting the Countywide GIS layers that should be reviewed by County staff when determining whether plastic vs. metal pipe material should be utilized for culvert replacement projects. The screenshots below show an example culvert from the 2022 Annual Notification Report – Sawyer Camp Trail Culvert (SCC-26) (Site 2022-19-PARKS).

Step 1: Identify the fire hazard severity zone (FHSZ) using the CAL FIRE Wildfire Responsibility Areas shapefile.

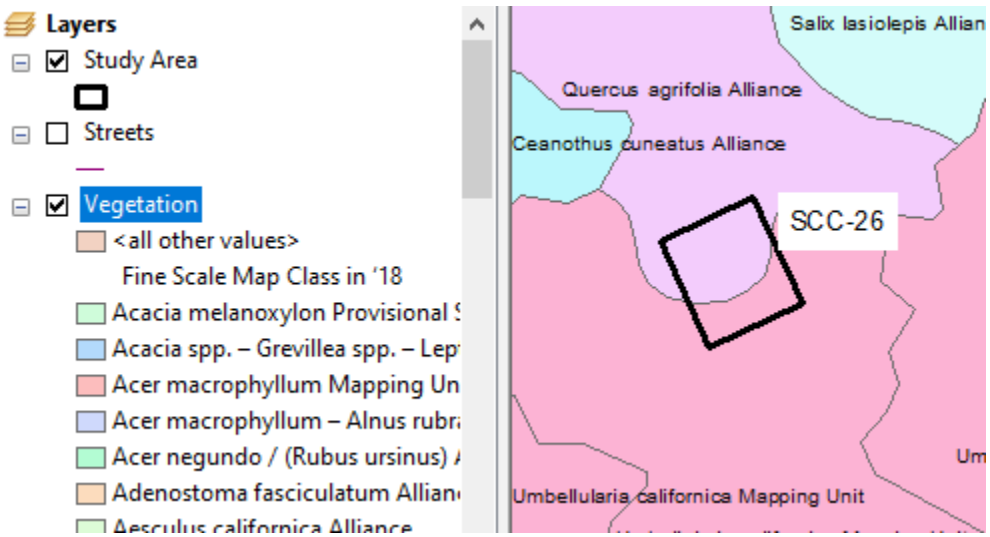
Site SCC-26 is located within a Moderate FHSZ.

Step 2: Identify the fuel load using the fuel model raster file.



Site SCC-26 has three different fuel types present in the work area. NB1 (Urban/Developed) for the paved pathway, GS1 (Low-load, Dry Climate Grass-Shrub), and TU1 (Low Load Dry Climate Timber-Grass-Shrub).

Step 3: Identify whether the site is located on developed land using the vegetation shapefile.



Site SCC-26 is not located within a mapped developed area.

Conclusions/Recommendations:

Given the location of Site SCC-26 within a moderate FHSZ and within areas mapped as low fuels, a plastic culvert may be the most appropriate choice. Additionally, this culvert crosses the Sawyer Camp Trail, which is a recreational trail and is not an emergency evacuation route so a plastic culvert is still likely appropriate.