CITY OF PACIFICA
PLANNING DEPARTMENT

# Serra Drive Outfall Repair Project

# Initial Study/Mitigated Negative Declaration

## February 2021

Prepared by

ENVIRONMENTAL CONSULTANTS
4225 Hollis St.
Emeryville, CA 94608

# TABLE OF CONTENTS


| Section Name and Number | | | Page |
|---|---|---|---|
| **1.0** | **BACKGROUND** | | **1** |
| **2.0** | **SOURCES** | | **3** |
| **3.0** | **ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED** | | **4** |
| **4.0** | **DETERMINATION** | | **5** |
| **5.0** | **BACKGROUND AND INTRODUCTION** | | **6** |
| **6.0** | **PROPOSED PROJECT DESCRIPTION** | | **7** |
| | 6.1 | Proposed project Location and Setting | 7 |
| | 6.2 | Staging and Construction Access | 12 |
| | 6.3 | Outfall Replacement and Bank Stabilization | 12 |
| | 6.4 | Bypass Pipe and Temporary Coffer Dam Upstream of the Proposed project | 12 |
| | 6.5 | Revegetation Plan | 13 |
| | 6.6 | Tree Removal and Vegetation Clearing | 13 |
| | 6.7 | General Avoidance and Minimization Measures | 13 |
| **7.0** | **ENVIRONMENTAL CHECKLIST** | | **16** |
| | 7.1 | Aesthetics | 17 |
| | 7.2 | Agriculture and Forest Resources | 19 |
| | 7.3 | Air Quality | 21 |
| | 7.4 | Biological Resources | 25 |
| | 7.5 | Cultural Resources | 46 |
| | 7.6 | Energy | 53 |
| | 7.7 | Geology and Soils | 57 |
| | 7.8 | Greenhouse Gas Emissions | 62 |
| | 7.9 | Hazards and Hazardous Materials | 64 |
| | 7.10 | Hydrology and Water Quality | 70 |
| | 7.11 | Land Use and Planning | 74 |
| | 7.12 | Mineral Resources | 76 |
| | 7.13 | Noise | 77 |
| | 7.14 | Population and Housing | 81 |
| | 7.15 | Public Services | 82 |
| | 7.16 | Recreation | 84 |
| | 7.17 | Transportation | 85 |
| | 7.18 | Tribal Cultural Resources | 88 |
| | 7.19 | Utilities and Service Systems | 94 |
| | 7.20 | Wildfire | 96 |
| | 7.21 | Mandatory Findings of Significance | 99 |
| **8.0** | **REFERENCES** | | **101** |
| **9.0** | **REPORT PREPARATION** | | **103** |

## LIST OF FIGURES

**Figure Name and Number** **Page**

Figure 1. Regional Proposed Project Location Map ..... 8
Figure 2. Aerial View and Proposed Project Components Map (landscape orientation) ..... 9
Figure 3. Photographs of the Proposed Project Site ..... 10
Figure 4. Photographs of Surrounding Land Uses ..... 11
Figure 5. Biological Communities ..... 28
Figure 6. CNDDB Plant Species Occurrences ..... 29
Figure 7. CNDDB Wildlife Occurrences ..... 30

## LIST OF TECHNICAL APPENDICES

| Appendix | Document Title |
|---|---|
| Appendix A | Biological Resources Assessment |
| Appendix B | Cultural Resources Survey Report |
| Appendix C | Geotechnical Report |
| Appendix D | Hydrology Report |

## ACRONYMS, ABBREVIATIONS, AND UNITS OF MEASURE

| | |
|---|---|
| § | Section |
| AB | Assembly Bill |
| AB 32 | Assembly Bill 32 |
| ALUCP | Airport Land Use Compatibility Plan |
| amsl | Above Mean Sea Level |
| APN | Assessor Parcel Number |
| AQMP | Air Quality Management Plan |
| BMPs | Best Management Practices |
| CAAQS | California Ambient Air Quality Standards |
| CalEEMod | California Emissions Estimator Model |
| CARB | California Air Resources Board |
| CBC | California Building Code |
| CCR | California Code of Regulations |
| CDFW | California Department Fish and Wildlife |
| CEQA | California Environmental Quality Act |
| CFGC | California Fish and Game Code |
| CFS | Cubic Feet per Second |
| CNEL | Community Noise Equivalent Level |
| CO | Carbon Monoxide |
| c.y. | Cubic Yards |
| dB | decibels |
| dBA | A-weighted Decibels |
| dBA Leq | equivalent decibels |
| DTSC | Department of Toxic Substances Control |
| e.g. | exempli gratia, meaning “for example” |
| EIR | Environmental Impact Report |
| EPA | Environmental Protection Agency |
| ESA | Endangered Species Act |
| et seq. | et sequentes, meaning "and the following" |
| FEMA | Federal Emergency Management Agency |
| GHG | Greenhouse Gas |
| I-# | Interstate # |
| i.e. | that is |
| kWh | kilowatt-hour |
| $L_{eq}$ | Equivalent Continuous Sound Level |
| MBTA | Migratory Bird Treaty Act |
| MM | Mitigation Measure |

| | |
|---|---|
| MND | Mitigated Negative Declaration |
| mpg | Miles per gallon |
| MPC | Metropolitan Planning Commission |
| $MTCO_2e$ | Metric Tons of Carbon Dioxide Equivalent |
| NAAQS | National Ambient Air Quality Standards |
| NAHC | Native American Heritage Commission |
| NOD | Notice of Determination |
| $NO_x$ | Nitrogen Oxides |
| NPDES | National Pollutant Discharge Elimination System |
| $O_3$ | Ozone |
| PM2.5 | Fine Particulate Matter (2.5 microns or smaller) |
| PM10 | Fine Particulate Matter (10 microns or smaller) |
| RWQCB | Regional Water Quality Control Board |
| SB 32 | Senate Bill 32 |
| SF/s.f. | Square Foot or Square Feet |
| SLF | Sacred Lands File |
| $SO_x$ | Sulfur Oxides |
| SR-# | State Route # |
| SRA | State Responsibility Area |
| SWPPP | Storm Water Pollution Prevention Plan |
| US EPA | United States Environmental Protection Agency |
| USFWS | U.S. Fish and Wildlife Service |
| VHFHSZ | Very High Fire Hazard Severity Zone |

# 1.0 BACKGROUND

**1. Proposed Project Title:** Serra Drive Outfall Repair Project

**2. Lead Agency Name and Address:** City of Pacifica
Department of Public Works
151 Milagra Drive
Pacifica, CA 94044

**3. Contact Person and Phone Number:** Sam Bautista
650-738-3760
bautistas@ci.pacifica.ca.us

**4. Proposed Project Location:** 1411 Serra Drive, Pacifica, California

**5. Proposed Project Sponsor's Name and Address:** City of Pacifica
Department of Public Works
151 Milagra Drive
Pacifica, CA 94044

**6. Existing General Plan Designation:** Low Density Residential

**7. Existing Zoning Designation:** Single Family Residential (R-1)

**8. Required Approvals from Other Public Agencies:**

The information contained in this Initial Study (IS) will be used by the City of Pacifica (the California Environmental Quality Act [CEQA] Lead Agency) (City) as it considers approval of the proposed project. If the proposed project is approved, the IS and associated Mitigated Negative Declaration (MND) would be used by the City and responsible and trustee agencies in conjunction with various approvals and permits. These actions include, but may not be limited to, the following approvals by the agencies indicated:

- City of Pacifica – City Council Approval
- Army Corps of Engineers (Corps) – Clean Water Act (CWA) Section 404 (Section 404) Discharge into Waters of the U.S. Section 7 of the Federal Endangered Species Act (ESA) (Section 7) consultation with the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) and issue a Biological Opinion (BO) for the proposed project.
- Regional Water Quality Control Board (RWQCB) - Clean Water Act, Section 401 Water Quality Certification
- California Department of Fish and Wildlife (CDFW) – Fish and Game Code, Section 1602, Streambed Alteration Agreement

**9. Surrounding Land Uses and Setting:**

Most of the land use in the area surrounding the proposed project site is single family residential homes, for which the parcels are zoned accordingly by the City's Zoning Map 40. Pacifica Fire Department Station No. 72 is on a nearby parcel (65 feet to the west-northwest) designated as Public Facilities (P-F). The Pacific Bay Christian School, Coastside Community Church, and their associated private sports fields are on a parcel approximately 200 feet to the west-northwest of the proposed project site; this parcel is also

designated P-F. Two areas with Agriculture (A) land use designations exist within a quarter mile. The area to the northeast contains residential uses. The area to the east contains agricultural and public and community uses.

**10. Proposed Project Description Summary:**

The Serra Drive Outfall Repair Project would include the repair of an existing concrete pipe storm drain and headwall behind two private residences along San Pedro Creek. Project components include the removal of the existing damaged headwall, high density polyethylene pipe (HDPE), and spillway and construction of a new concrete headwall, wingwall, and partially grouted rock rip-rap energy dissipater. The rip-rap energy dissipater would be 7.5 feet wide and located approximately 5 feet downstream of the concrete headwall apron to the toe of the embankment. Four feet of riprap extends into the creek bed to prevent erosion at the toe of the embankment. It would be partially grouted to provide appropriate energy dissipation prior to flows from the storm drainpipe reaching the creek.

**11. Status of Native American Consultation Pursuant to Public Resources Code Section 21080.3.1:**

No California Native American tribes previously requested notification regarding City proposed projects for potential consultation under California Public Resources Code (PRC) Section 21080.3.1 (i.e., Assembly Bill [AB] 52). Therefore, no formal consultation pursuant to PRC Section 21080.3.1 (see AB 52) was required for the proposed project, and no proposed project notification letters were distributed for PRC Section 21080.3.1 purposes and no such requests were received by the City.

## 2.0 SOURCES

Appendices associated with sources referenced in this IS/MND are attached to the end of this document and include the following: Appendix A – Biological Resources Assessment, Appendix B – Cultural Resources Survey Report, Appendix C – Geotechnical Report, and Appendix D – Hydrology Report. All technical reports used for the proposed project analysis are available upon request at the City Planning Department; note, the Cultural Resources Survey Report is only available upon request by qualified cultural resources professionals. The following documents are referenced information sources used for the purposes of this IS/MND:

1. Professional judgment and expertise of the environmental/technical specialists evaluating the proposed project, based on a review of existing conditions and proposed project details, including standard construction measures and technical reports
2. City of Pacifica General Plan (GP), Conservation Element (1980)
3. California Department of Transportation (2012)
4. California Department of Conservation (2016)
5. USFWS, CDFW, and California Native Plant Society species lists
6. Natural Resources Conservation Service (2017)
7. Federal Emergency Management Agency [FEMA] (2016)
8. California Department of Conservation (2015)
9. ABAG Hazards Mapping (2019)
10. Bay Area Air Quality Management District (2010)
11. USGS Mineral Resources Data System (2011)
12. WRA Biological Resources Assessment Report (Spicher 2020)
13. WRA Cultural Resources Survey Report (Hoffman 2020)
14. Cotton, Shires, and Associates, Inc. Geotechnical Investigation (Schrier and Mead 2019)
15. Woodard & Curran Hydrology and Hydraulics Technical Memorandum (Bass 2020)

## 3.0 ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

The environmental factors checked below would be potentially affected by the proposed project, involving at least one impact that would be potentially significant unless the appropriate environmental regulatory requirements are complied with, or identified mitigation measures are incorporated, as indicated by the checklist on the following pages.

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

## 4.0 DETERMINATION

On the basis of this Initial Study:

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

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

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

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

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

| | |
|---|---|
| Signature | Date |
| Sam Bautista, Acting Director of Public Works | City of Pacifica |
| Printed Name | For |

# 5.0 BACKGROUND AND INTRODUCTION

This IS of environmental impacts is being prepared to conform to the requirements of CEQA, the CEQA Guidelines (California Code of Regulations [CCR] Section 15000 *et seq.*), and the regulations and policies of the City. This IS evaluates the potential environmental impacts which might reasonably be anticipated to result from the City's proposed Serra Drive Outfall Repair Project (proposed project).

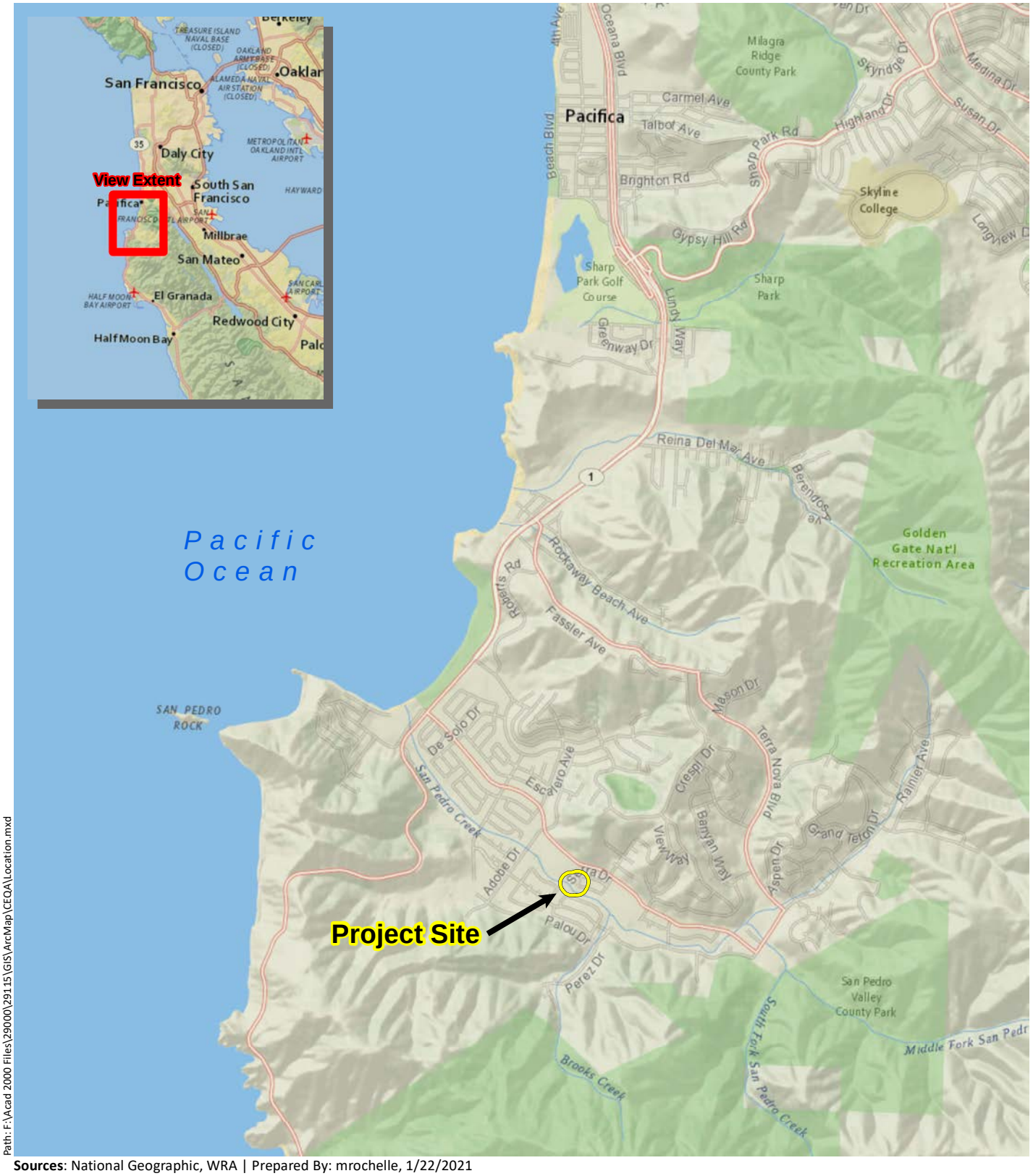
The City is the Lead Agency under CEQA and has prepared this IS to address any impacts of implementing the proposed project. The purpose of the proposed project is to repair the outfall for an 18-inch-diameter reinforced concrete pipe storm drain located on and adjacent to two private parcels containing single-family residences.

# 6.0 PROPOSED PROJECT DESCRIPTION

The proposed project consists of activities to repair the outfall for an 18-inch-diameter reinforced concrete pipe storm drain located in the easement at 1411 Serra Drive in the City (Figure 1). The storm drain picks up drainage from the surrounding streets and discharges to San Pedro Creek. The existing concrete headwall at the outfall has detached from the pipe due to erosion of the surrounding slope. Proposed project components include the removal of the existing damaged headwall, HDPE pipe, and spillway, and construction of a new concrete headwall, wingwall, and partially grouted rock rip-rap energy dissipater (Figure 2). The new headwall would be founded on a pier foundation to support the headwall. The rock rip-rap energy dissipater would be 7.5 feet wide, located approximately 5 feet downstream of the concrete headwall, and partially grouted to provide appropriate energy dissipation prior to flows reaching the creek. As shown in Figure 2, approximately 4 feet of ungrouted rip-rap would be provided on each side of the grouted rip-rap energy dissipater to provide a transition from the grouted rip-rap to the existing natural slope. The outfall would be sized for a 100-year discharge from the pipe of 17 cubic feet per second (CFS). At the bottom of the slope, rip-rap would extend 4 feet into the creek bottom to provide stability at the toe of the slope and to prevent a scour hole from forming at the end of the partially grouted rock rip-rap energy dissipater at the toe of the embankment. The proposed project would not result in any operational or maintenance changes.

## 6.1 PROPOSED PROJECT LOCATION AND SETTING

The proposed project site is located on and directly west-southwest of two private residences at 1407 and 1411 Serra Drive, Pacifica, California, at Assessor's Parcel Numbers (APN[s]) 023-261-320 and 023-261-310 (Figures 1 and 2). Proposed project activities to repair the storm drain between these parcels would take place in and around San Pedro Creek within a footprint encompassing 0.07 acres (Figure 2). Temporary work areas would extend on to 1129 Galvez Drive (APN 023-261-590). Currently, the storm drain picks up drainage from the surrounding streets and conveys that stormwater in pipes underground until it discharges to San Pedro Creek. Areas designated as Low Density Residential, such as the proposed project site, are defined by the City GP to include areas with 3 to 9 dwelling units per acre. Figures 3 and 4, respectively, provide photographs of the proposed project site and areas immediately adjacent to the proposed project site in their current condition.




Path: F:\Acad 2000 Files\29000\29115\GIS\ArcMap\CEQA\Location.mxd

**Sources**: National Geographic, WRA | Prepared By: mrochelle, 1/22/2021

# Figure 1. Regional Project Location Map

Serra Drive Outfall Repair Project
Pacifica, California

0 0.5 1 Miles

N

wra
ENVIRONMENTAL CONSULTANTS

# Figure 2.
# Aerial Location and Project Components

Sierra Drive Outfall Repair Project
Pacifica, California




Biological Study Area - 7.16 ac.

Project Area - 0.07 ac.

**Temporary Impacts - 0.06 ac./ 2,572 sq.ft.**

- Construction Access Path
- Install Coffer Dam
- Remove and Replace Gate
- Remove and Replace Hedge
- Remove and Replace Shed
- Remove Existing Concrete, Install Partially Grouted Rip Rap
- Remove Existing HDPE Pipe
- Spillway
- Staging Area
- Temporary Contractor Work Limits

**Permanent Impacts - 0.01 ac./ 291 sq.ft.**

- Headwall Piers
- Install Rip Rap and Cobbles
- Wingwall

N

0 10 20

Feet

wra
ENVIRONMENTAL CONSULTANTS

Path: F:\Acad 2000 Files\29000\29115\GIS\ArcMap\CEQA\Project Components.mxd

**Sources**: Google Earth May 2018 Aerial, WRA | Prepared By: mrochelle, 1/22/2021



View of existing storm drain outfall and riprap.



View looking down at storm drain outfall towards San Pedro Creek.



View of existing storm drain.



View of San Pedro Creek below the storm drain outfall.

wra
ENVIRONMENTAL CONSULTANTS

**Figure 3. Views of the Project Site**
Serra Drive Outfall Repair Project
Pacifica, California



View of surrounding residential houses and street storm drain.



View of San Pedro Creek.



View of San Pedro Creek and adjacent riprap.



View of surrounding foliage and residential use in the distance.

wra
ENVIRONMENTAL CONSULTANTS

**Figure 4. Views of Surrounding Land Uses**
Serra Drive Outfall Repair Project
Pacifica, California

## 6.2 STAGING AND CONSTRUCTION ACCESS

On-site staging locations are proposed in the backyard of the residences adjacent to the work area and on Serra Drive. All site access would be from Serra Drive via access points designated by the proposed project engineer and shown in Figure 2. The City would obtain a temporary easement for access to the property owner's property. No access would be permitted from adjoining properties. All lanes would remain open on all roads and no detours would be required, as all work is contained in the creek bank where the existing outfall is located. Any public roadways affected by the proposed project would be repaired to their original condition upon completion of the work. Where appropriate, temporary facilities (e.g., cones placed around parked construction equipment) would be provided during construction.

## 6.3 OUTFALL REPLACEMENT AND BANK STABILIZATION

Within the creek limits, a mini excavator would be used for demolition of the existing spillway and earthwork activities. For all other demolition and preparatory construction activities, hand tools (e.g., rebar cutters and circular saws) would be used. The grading needed to prepare the proposed project site for construction of the new headwall would involve approximately 8 cubic yards (CY) of excavation and 14 CY of fill behind the headwall at the top of the bank. Once the area has been graded and prepared, the mini excavator would be removed, and a pumper truck would be used to convey concrete to the proposed project site. The pumper truck would be parked in the staging area in the street. A portable drill rig would be used for construction of the headwall and wingwall support piers; it would be kept out of the limits of the creek and would be operated from the construction work limits upslope from the improvements. As more fully described below, the stream flow would be diverted using a temporary sandbag or earthen coffer dam at the upstream end of the temporary work limits shown in Figure 2. The diverted water would be moved through a bypass pipe and released downstream of the construction site back to the stream. Once the proposed project work within the creek bottom is complete, the coffer dam would be removed, and the water would flow in the natural stream as before the proposed project. Approximately 10 CY of 15-inch-diameter partially grouted rip-rap, and 15 CY of 15-inch-diameter rip-rap would be placed around the new headwall. All construction activities would take place within the temporary work limits shown on Figure 2. Exclusion fencing would be provided around the work area adjacent to the existing vegetation to be protected in place. The construction would occur between 8 A.M. and 4 P.M. during weekdays over no more than 20 workdays. The peak number of construction workers concurrently on-site is anticipated to be five. The construction workers would park their vehicles along the residential street adjacent to the proposed project site. All work would take place between April 1 and October 31, with in-channel work occurring between June 1 and October 31 (i.e., during the dry season).

## 6.4 BYPASS PIPE AND TEMPORARY COFFER DAM UPSTREAM OF THE PROPOSED PROJECT

The contractor would be required to develop and submit, in coordination with the proposed project engineer, a dewatering and flow bypass plan for both creek flows and the flows from the storm drain outfall. The in-channel work window would occur between June 1 and October 31. Dewatering and flow bypassing would convey only baseflows, not stormflows. Any rainfall runoff events that occur during the in-channel work window would not be controlled by the bypass system. Earthwork within the stream would only occur in the dry season, as defined above. In the unlikely event of stormflows in San Pedro Creek in the summer months or early fall, crews would not work in the creek until flows have subsided. The contractor would monitor weather conditions throughout construction. If more than 0.5 inch of rain is forecast within two days, the contractor would cease grading and stabilize the site. The contractor would continue work 24 hours after the end of the precipitation event. There are no stream gauges on San Pedro Creek. However, based on a flow depth of about 6 inches, summer flows are estimated to be 3 to 6 CFS or less.

The bypass system for the creek may need to safely convey flows as large as 6 CFS, but baseflows may be significantly lower if the preceding winter has had low levels of precipitation. Flow would be collected at the upstream end of the bypass system by constructing a temporary sandbag or earthen coffer dam. The coffer dam would have a crest elevation high enough above the channel bottom to provide enough pressure head and freeboard for the bypass pipe inlet, with the bypass pipe set in the channel invert, for gravity flow bypassing the portion of the proposed project site where earthwork and hard structure installation would occur. The pipe would extend from the upstream side of the proposed project to the downstream side, a distance of approximately 50 feet. The pipe would be a minimum 12 inches in diameter or two smaller pipes equivalent to that. The bypass system for the outfall would connect a pipe at the storm drain outfall and convey flows down the embankment through an 8-inch-diameter pipe and outlet downstream of the proposed project site.

## 6.5 REVEGETATION PLAN

The main approach for revegetation on the site would be to rely on natural regeneration assisted by native seeding and willow stake installation. Natural recruitment of native vegetation is expected to occur and would be augmented through seeding with a native seed mix. Six willow poles would be added at the downstream edge of the rip-rapped sections of the bank to improve stability and enhance habitat. Access areas and other disturbed areas would be stabilized and re-seeded to promote natural recruitment of native vegetation.

Willow poles would be obtained from arroyo willow (*Salix lasiolepis*) obtained on-site or from adjacent areas within San Pedro Creek. Poles would be 3 to 4 feet long, with all side branches removed. Each pole would have a minimum diameter of 0.75 inch. Poles would be planted using a sand-filled mallet or 2-inch-diameter soil auger, such that at least 80 percent of the pole would be buried.

After the plants are installed, annual monitoring will be conducted for three years. All surviving installed plants will be counted in Years 1-3 to determine survivorship; survival is expected to be 70 percent or higher in all three years. The goals of the revegetation plan will have been met if 70 percent or higher survival is achieved in this time frame.

## 6.6 TREE REMOVAL AND VEGETATION CLEARING

No trees would be removed as a part of the proposed project, though some willows would be trimmed. Additional vegetation clearing may occur as necessary to facilitate bank stabilization. No Heritage Trees, as defined by the City Municipal Code, would be affected by the proposed project and no work would occur within the dripline of a Heritage Tree.

## 6.7 GENERAL AVOIDANCE AND MINIMIZATION MEASURES

The general avoidance and minimization measures that would be implemented during the proposed project are outlined below. All permit conditions, legal requirements, and appropriate excavation and engineering practices associated with the proposed project would be followed. Furthermore, any other Best Management Practices (BMPs), as identified by RWQCB, Corps, and CDFW would also be followed.

Bay Area Air Quality Management District 2017 Clean Air Plan BMPs:

- All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas) shall be watered two times per day.
- All haul trucks transporting soil, sand, or other loose material off-site shall be covered.

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

- All vehicle speeds on unpaved roads shall be limited to 15 mph.

- 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.

- Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to five minutes (as required by the California airborne toxics control measure 13 CCR Section 2485).

- All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications, and all equipment will be checked by a certified visible emissions evaluator.

- A publicly visible sign with the telephone number and person to contact at the lead agency regarding any dust complaints shall be posted in or near the proposed project site. The contact person shall respond to complaints and take corrective action within 48 hours. The Air District's phone number shall also be visible to ensure compliance with applicable regulations.

Additional general measures to be implemented as part of the proposed project include:

1. Erosion control measures (e.g., silt fence and fiber rolls) would be utilized throughout all phases of the proposed project where sediment runoff from construction may potentially enter waters. Erosion control structures would be monitored for effectiveness and would be repaired or replaced as needed. Appropriate erosion control measures would be installed around any stockpiles of soil or other materials that could be mobilized by rainfall or runoff.

2. Prior to construction, an Accidental Spill Prevention and Cleanup Plan would be prepared and would include procedures to prevent/mitigate spills; reporting procedures; containment, storage, and disposal activities; documentation; and follow-up procedures and procedures and/or controls to minimize spills and leaks. This plan would include required spill control absorbent material, for use beneath stationary equipment, to be present on-site and available at all times. The Plan will require immediate clean-up of any spills, and any spills shall be reported to Regional Water Quality Control Board.

3. No fueling, cleaning, or maintenance of vehicles or equipment would take place within any areas where an accidental discharge may cause hazardous materials to enter waterways.

4. Any equipment or vehicles used for the proposed project would be checked and maintained daily to prevent leaks of fluids that could be deleterious to aquatic habitats.

5. All equipment would be cleaned before arriving on the proposed project site and before removal from the proposed project site to prevent spread of invasive plants.

6. Construction disturbance or removal of vegetation would be restricted to the minimum footprint necessary to complete the work. The work area would be delineated to minimize impacts to vegetated habitats beyond the work area, or to protect vegetation within the work area.

7. Prior to construction, locations and equipment access points that minimize riparian disturbance would be determined. Pre-existing access points would be used whenever possible. Unstable areas, which may increase the risk of channel instability, would be avoided.

8. Staging and storage areas for equipment, materials, fuels, lubricants, and solvents, would be located outside of the stream channel banks.

9. Stationary equipment such as motors, pumps, and generators, located adjacent to aquatic features would be positioned over secondary containment sufficient to arrest a catastrophic failure.

10. All activities performed near aquatic features would have absorbent materials designated for spill containment and cleanup activities on-site for use in case of an accidental spill.

11. Stockpiles of excavated soil or other debris would be covered when not in active use (i.e., will not be used or moved for 72 hours). All trucks hauling soil, sand, and other loose materials would be covered.

12. No construction debris of any type would be allowed to enter or be placed where it may be washed into any aquatic features.

13. At the end of the proposed project, all temporary flagging, fencing, or other materials would be removed from the proposed project site and vicinity of the channel.

14. No equipment would be washed down where runoff could enter the creek.

15. No motorized equipment would be left within the channel overnight.

16. Vehicle engines would be shut down during refueling. All refueling and maintenance of equipment, other than stationary equipment, would occur outside of the top-of-bank. Refueling of stationary equipment within the channel (top-of-bank to top-of-bank) would only occur when secondary containment sufficient to eliminate escape of all potential fluids is in place.

# 7.0 ENVIRONMENTAL CHECKLIST

This section describes the existing environmental conditions in and near the proposed project site and evaluates environmental impacts associated with the proposed project. The environmental checklist, as recommended in the CEQA Guidelines (Appendix G), was used to identify environmental impacts that could occur if the proposed project is implemented. The cited sources are identified at the end of this section.

Each of the environmental categories was fully evaluated, and one of the following four determinations was made for each checklist question:

- **"No Impact"** means that no impacts to the resource would occur as a result of implementing the proposed project.

- **"Less than Significant Impact"** means that implementation of the proposed project would not result in a substantial and/or adverse change to the resource, and no mitigation measures are required.

- **"Less than Significant with Mitigation Incorporated"** means that the incorporation of one or more mitigation measures is necessary to reduce the impact from potentially significant to less than significant.

- **"Potentially Significant Impact"** means that there is either substantial evidence that a proposed project-related effect may be significant, or, due to a lack of existing information, could have the potential to be significant.

In the following topical sections for boxes checked "Less than significant with mitigation incorporated," the stated level of impact has been found as a result of mitigation measures that reduce potentially significant impacts to less than significant. For any boxes checked "Less than significant," two possible situations apply. In the first situation, this finding was made because there are existing environmental laws, regulations, and policies that when adhered to, ensure impacts are not potentially significant. In the second situation, the impact level is too low to be potentially significant, regardless of whether there are existing environmental laws, regulations, and policies that address this level of impact.

## 7.1 AESTHETICS

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

### Environmental Setting

Typical scenic vistas would include mountain ranges, ridgelines, or bodies of water as viewed from a highway, public space, or any other area designated for the express purpose of viewing and sightseeing. In general, a proposed project's impact to a scenic vista would occur if development of the proposed project would substantially change or remove a scenic vista. The City GP does not contain any policies that specifically address scenic vistas, nor does it define or identify any scenic vistas within the vicinity of the proposed project site. Policy 3 of the City GP's Community Design Element sets the goal of protecting the City's irreplaceable scenic and visual amenities but does not define or identify specific scenic vistas.[1] The proposed project site is in an existing residential neighborhood, zoned R-1 for Single-Family Residential housing. The City does not contain an Officially Designated Scenic Highway.[2] Highway 1is an Eligible State Scenic Highway but is not officially designated as such. The proposed project site is not visible from Highway 1, and the proposed project would not negatively affect scenic resources associated with the roadway. The closest access to Highway 1 is approximately 1.5 miles northwest of the proposed project site and the closest access to Sharp Park Road is approximately 4 miles north of the proposed project site. Motorists would not be able to view the proposed project site, as views from any major road are blocked by residential housing. Existing sources of nighttime light in the proposed project site include vehicle

[1] *The City of Pacifica General Plan, Community Design Element. Accessed 4/7/2020 at: https://www.cityofpacifica.org/civicax/filebank/blobdload.aspx?t=75298.48&BlobID=15615*

[2] *California Scenic Highway Mapping System. San Mateo County. Available at: https://dot.ca.gov/programs/design/lap-landscape-architecture-and-community-livability/lap-liv-i-scenic-highways. Accessed March 27, 2020.*

headlights, parking lot lights, and residential lighting. Existing sources of glare are mainly limited to automobile windshields and reflective building materials associated with residential uses.

## ***Discussion of Impacts***

a, b) ***No Impact.*** The proposed project would not change the existing operation and maintenance activities and therefore these phases of the project would not have an impact on scenic vistas. No GP-designated scenic vistas exist in or near the proposed project site. Partial views of Montara Mountain are possible from the proposed project site; complete views of Montara Mountain are obstructed from existing development. The temporary presence of construction activity associated with the proposed project would not alter the existing, partial views of Montara Mountain. Furthermore, there is no state- or locally- designated scenic highway, road, or corridor within the vicinity of the proposed project site. Also, the proposed project would not result in impacts within a state scenic highway, such as the removal of trees, rock outcroppings, or historic buildings.

c) ***Less than Significant.*** The proposed project would not change the existing operation and maintenance activities and therefore these phases of the project would not have an impact on scenic resources. The proposed project has the potential to result in temporary aesthetic impacts to the existing visual quality of the surrounding area during construction. Temporary visual impacts could result from the presence of construction vehicles or ground disturbance during proposed project construction activities; however, construction activities would be temporary. The permanent development of the proposed project site would be consistent with the existing conditions of the proposed project site, as the new storm drain would replace the current storm drain, thereby maintaining the visual character of the area. The City GP does not contain any policies that specifically address scenic vistas, nor does it define or identify any scenic vistas within the vicinity of the proposed project site. Therefore, the proposed project does not consist of, nor would it block, any City-designated scenic resources or viewsheds. Related impacts would be less than significant.

d) ***No Impact.*** The proposed project would not change the existing operation and maintenance activities and therefore these phases of the project would not have an impact on light and glare. Construction of the proposed project would not create a significant source of light or glare during daytime. No nighttime construction would occur, and the long-term operation of the proposed project would not result in the addition of new sources of light and glare. Upon completion of construction, the light and glare conditions at the proposed project site would be nearly identical to existing conditions. The proposed project would not create a new source of substantial light or glare which adversely affect day or nighttime views in the area.

## 7.2 AGRICULTURE AND FOREST RESOURCES

| *Would the proposed project:* | Potentially Significant Impact | Less-Than-Significant with Mitigation Incorporated | Less-Than-Significant Impact | No Impact |
|---|---|---|---|---|
| a. Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use? | ☐ | ☐ | ☐ | ✖ |
| b. Conflict with existing zoning for agricultural use, or a Williamson Act contract? | ☐ | ☐ | ☐ | ✖ |
| c. Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))? | ☐ | ☐ | ☐ | ✖ |
| d. Result in the loss of forest land or conversion of forest land to non-forest use? | ☐ | ☐ | ☐ | ✖ |
| e. Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use? | ☐ | ☐ | ☐ | ✖ |

### *Environmental Setting*

Under the California Department of Conservation, the Division of Land Resource Protection (DLRP) serves as the state's leader in conserving California's agricultural lands. The Farmland Mapping and Monitoring Program (FMMP), administered by the DLRP, designates the proposed project site as "Urban and Built-Up Land."[3] Therefore, the proposed project does not contain any farmland or forestry land, and is not designated for agricultural or forestry uses or Prime, Statewide, or Locally Important Farmland. The proposed project site is in a residential area, zoned R-1 for Single-Family Residential.[4]

### *Discussion of Impacts*

a-e) ***No Impact.*** There are no agricultural or forestry resources within the proposed project site. There are no Prime, Unique, Statewide or Locally Important farmlands in the area. The proposed project

[3] *California Division of Land Resource Protection, Farmland Mapping and Monitoring Program. San Mateo County Important Farmland 2018. https://www.conservation.ca.gov/dlrp/fmmp/Pages/SanMateo.aspx, Accessed March 26, 2020.*

[4] *City of Pacifica Zoning Maps, Edited 2001. Zoning Map # 40. Prepared by the City of Pacifica Planning Department. https://www.cityofpacifica.org/civicax/filebank/blobdload.aspx?BlobID=13644. Accessed March 26, 2020*

site is not under a Williamson Act Contract, nor is the proposed project site zoned as forest land or timber production. The proposed project would be confined within creek limits, and all work and staging would take place on the street or in homeowner backyards. The proposed project would not change the existing operation and maintenance activities and therefore these phases of the project would not have an impact on agriculture. Nor would there be construction impacts to agricultural or forestry resources.

## 7.3 AIR QUALITY

| *Would the proposed project:* | Potentially Significant Impact | Less-Than-Significant with Mitigation Incorporated | Less-Than-Significant Impact | No Impact |
|---|---|---|---|---|
| a. Conflict with or obstruct implementation of the applicable air quality plan? | ☐ | ☐ | ✖ | ☐ |
| b. Result in a cumulatively considerable net increase of any criteria pollutant for which the proposed project region is non-attainment under an applicable federal or state ambient air quality standard? | ☐ | ☐ | ✖ | ☐ |
| c. Expose sensitive receptors to substantial pollutant concentrations? | ☐ | ☐ | ✖ | ☐ |
| d. Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people? | ☐ | ☐ | ✖ | ☐ |

### *Environmental Setting*

The proposed project site is in a residential area in the City, in northern San Mateo County, which is part of the nine-county San Francisco Bay Air Basin (SFBAB). The main nearby air pollutant sources include outdoor lawn equipment and vehicles traveling along residential and city streets in the proposed project's vicinity.

The Bay Area Air Quality Management District (BAAQMD) has jurisdiction over air quality in the SFBAB in accordance with the Clean Air Act (CAA) and under the delegation of the California Air Resource Board (CARB) and the U.S. Environmental Protection Agency (USEPA). BAAQMD regulates air quality through its permit authority over most types of stationary emission sources and through its planning and review activities. BAAQMD monitors air quality at numerous sites within the nine-county BAAQM, though not within Pacifica. The closest air monitoring stations are in San Francisco, to the north, and Redwood City, to the south.

Air quality standards and thresholds are generally developed and regulated with the health of sensitive receptors in mind. Sensitive receptors are especially vulnerable to air pollution's health effects and include children, seniors, and people with pre-existing health conditions. Such individuals can often be found at residences, hospitals, and schools. The proposed project site is in a residential area where there may be children, elderly people, and people with pre-existing health conditions. Additionally, Pacific Bay Christian School is 0.15 miles northwest of the proposed project site, with the outdoor play facilities 0.04 miles from the proposed project site.

### *Regulatory Setting*

Under the authority of the CAA, the USEPA establishes National Ambient Air Quality Standards (NAAQS), or maximum allowable concentrations, for six common air pollutants (also known as "criteria pollutants" because they are the only air pollutants for which specific air quality criteria have been set). The six criteria air pollutants under the CAA are ozone ($O_3$), nitrogen dioxide ($NO_2$), sulfur dioxide ($SO_2$), carbon monoxide (CO), lead (Pb), and particulate matter (PM) of 10 and 2.5 microns in size ($PM_{10}$ and $PM_{2.5}$).

For PM, there are separate NAAQS for these different size ranges of particles. The class of pollutants designated as $PM_{2.5}$, particles with diameters smaller than 2.5 microns and referred to as "fine particulate matter", includes essentially all particles created by burning of gaseous or liquid fuel, smoking/vaping, and atmospheric reactions between gases. The class of pollutants designated as $PM_{10}$, particles with diameters smaller than 10 microns and referred to as "respirable particulate matter", includes $PM_{2.5}$ as well as windblown and mechanically generated dust, including re-suspended road dust and dust from earthmoving activities.

The California Clean Air Act (CCAA) establishes maximum allowable concentrations, known as California Ambient Air Quality Standards (CAAQS), for the above-mentioned six criteria pollutants, as well as four additional pollutants (visibility-reducing particles, sulfates [$SO_4$], hydrogen sulfide [$H_2S$], and vinyl chloride). The CAAQS are overseen by CARB, which is part of the California Environmental Protection Agency (CEPA) and has jurisdiction over local air districts.

Local and regional ambient air quality is assessed relative to both these national standards (NAAQS) and state standards (CAAQS), which are required to be protective of human health (allowing an adequate margin of safety) and public welfare. When air pollution levels within an air basin are below the thresholds set by the NAAQS and CAAQS, the region is said to be in attainment. Similarly, nonattainment status refers to a situation in which air basin pollution levels do not meet these standards.

The Bay Area exceeded the ozone NAAQS and CAAQS on three days in 2018, the $NO_2$ NAAQS on one day, the $PM_{10}$ CAAQS on six days, and the $PM_{2.5}$ NAAQS on 18 days.[5] The SFBAB is formally designated as having attained all of the federal and state standards except ozone and particulate matter. The SFBAB is currently in non-attainment of the $O_3$ and $PM_{2.5}$ NAAQS and CAAQS, as well as the $PM_{10}$ CAAQS.[6]

BAAQMD is directly responsible for reducing emissions from stationary (area and point), mobile, and indirect sources, and it has responded to this requirement by preparing a series of Air Quality Management Plans (AQMP[s]), with the most recent issued in April 2017 (2017 Clean Air Plan). AQMPs are prepared with the cooperation of the Metropolitan Transportation Commission (MTC) and the Association of Bay Area Governments (ABAG). The 2017 Clean Air Plan strives to improve Bay Area air quality and protect public health by defining a control strategy to reduce emissions and ambient concentrations of air pollutants, reducing exposure to air pollutants the pose the greatest health risk, and reducing greenhouse gas emissions to protect the climate.

Proposed projects that are consistent with the population forecasts identified by ABAG are considered consistent with the 2017 Clean Air Plan's transportation and growth-related goals and policies, since ABAG's proposed projections form the basis of the land use and transportation control strategies of the Plan. The Plan also assumes that general development proposed projects will include feasible strategies (i.e., mitigation measures) to reduce emissions generated during construction and operation and bases estimates of future emissions considering state policies and regulations already adopted or likely to be adopted and implemented over the next 10 to 15 years.

[5] *BAAQMD (Bay Area Air Quality Management District). 2019. Bay Area Air Pollution Summary – 2018. Available from http://www.baaqmd.gov/about-air-quality/air-quality-summaries. Accessed September, 2019.*

[6] *BAAQMD (Bay Area Air Quality Management District). 2019. Air Quality Standards and Attainment Status. Available from http://www.baaqmd.gov/about-air-quality/research-and-data/air-quality-standards-and-attainment-status. Accessed September, 2019.*

## ***Discussion of Impacts***

a) ***Less than Significant***. Construction activities would result in short-term increases in emissions from: the use of equipment that generates dust, exhaust, and tire-wear emissions; soil disturbance; materials used in construction; and construction traffic. Proposed project construction would produce fugitive dust (PM10 and PM2.5) during ground disturbance and would generate carbon monoxide, ozone precursors, and other emissions from vehicle and equipment operation. The proposed project site is within approximately 0.25 mile of multiple residences and a public park. In 2017, BAAQMD released a Clean Air Plan for the Bay Area, which would be the applicable air quality plan for the proposed project. BMPs recommended by BAAQMD in the 2017 CEQA Air Quality Guidelines and identified under the *General Avoidance and Minimization Measures* heading above would be implemented during construction to minimize fugitive dust. The outfall repair and construction staging would mainly occur within a previously developed footprint. Construction emissions would be temporary, lasting approximately 20 workdays, and would not have long-term effects on air quality in the Bay Area. The proposed project size does not exceed screening criteria for construction activity for any of the proposed projects included in the BAAQMD 2017 CEQA Guidelines. Operational emissions would be consistent with current baseline conditions. These construction impacts would be potentially significant in the absence of BAAQMD BMPs. Because of the small area of disturbance, temporary nature of the emissions, and implementation of construction measures, impacts on air quality resulting from the proposed project would be less than significant and would comply with the BAAQMD 2017 Clean Air Plan by implementing the BMPs as detailed under the *General Avoidance and Minimization Measures* heading above.

b) ***Less than Significant.*** As discussed under impact discussion a), the proposed project would result in minor construction-related emissions. Operational emissions would be consistent with current baseline levels. It would not result in a cumulatively considerable net increase of any criteria pollutant. The proposed project would cause short-term air quality impacts as a result of construction activities, and in the absence of BMPs established by the BAAQMD 2017 Clean Air Plan, these impacts would be potentially significant. However, implementation of BAAQMD BMPs (refer to above impact analysis for significance threshold a) would ensure that the temporary increase in air pollutant emissions associated with construction activities would result in less than significant contributions to cumulative pollutant levels in the region. The proposed project would not result in long-term or cumulatively considerable increases in air quality pollutant emissions for which the Bay Area is currently in non-attainment (ozone and particulate matter).

c) ***Less than Significant.*** The primary sensitive receptors in the proposed project vicinity are residents, which may include children, elderly people, or people with respiratory illnesses, and Pacific Bay Christian School students. Sensitive receptors located in close proximity to several locations adjacent to the construction area could be exposed to temporary air pollutants from construction activities, such as fugitive dust, ozone precursors, and carbon monoxide. Exposure to these temporary air pollutants would be a potentially significant impact. The duration of construction activities would be limited to 20 working days, most likely in summer months when school is out of session. BMPs for construction recommended by BAAQMD would be implemented during proposed project construction to minimize air pollutants. New construction equipment has been subject to increasingly stringent emissions requirements at the Federal level (e.g., Title 40 of the Code of Federal Regulations Part 89 and 1039); designated "Tier 1", "Tier 2", "Tier 3", etc.; and older construction equipment is subject to potential retrofit requirements required by the State (13 CCR Section 2449, 13 CCR Section 2450 *et seq.*, and 17 CCR Section 93116). Operational emissions would be consistent with current baseline levels. With implementation of the above-mentioned control measures and new construction equipment emission requirements,

sensitive receptors in the vicinity of the proposed project would not be exposed to substantial pollutant concentrations, and impacts would be less than significant.

d) ***Less than Significant.*** Construction activities would involve the use of gasoline- or diesel-powered equipment that emits exhaust fumes. These activities would take place intermittently throughout the workday, and the associated odors are expected to dissipate within the immediate vicinity of the work area. Operational emissions would be consistent with current baseline levels. Persons near the construction work area may find these odors objectionable. However, the proposed project would not include uses that have been identified by BAAQMD as potential sources of objectionable odors, such as restaurants, manufacturing plants, landfills, and agricultural and industrial operations. If exhaust fumes were not able to quickly dissipate, there would be the possibility for objectionable odors to contact people within the project area. The project would adhere to the BAAQMD BMPs listed above which would lessen the possibility of odor impacts. Additionally, the infrequency of the emissions, rapid dissipation of the exhaust and other odors into the air, and short-term nature of the construction activities would result in less than significant odor impacts.

## 7.4 BIOLOGICAL RESOURCES

| *Would the proposed project:* | Potentially Significant Impact | Less-Than-Significant with Mitigation Incorporated | Less-Than-Significant Impact | No Impact |
|---|---|---|---|---|
| a. Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service? | ☐ | ✖ | ☐ | ☐ |
| b. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Wildlife or US Fish and Wildlife Service? | ☐ | ✖ | ☐ | ☐ |
| c. Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means? | ☐ | ☐ | ✖ | ☐ |
| d. Interfere substantially with the movement of any resident or migratory fish or wildlife species or with established resident or migratory wildlife corridors, or impede the use of wildlife nursery sites? | ☐ | ✖ | ☐ | ☐ |
| e. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance? | ☐ | ☐ | ☐ | ✖ |
| f. Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Conservation Community Plan, or other approved local, regional, or state habitat conservation plan? | ☐ | ☐ | ☐ | ✖ |

The following discussion related to biological resources is based on WRA's Biological Resources Assessment Report (BRA) (Spicher 2020), included as Appendix A, and all details regarding methodologies of the field reconnaissance, literature review, desktop analyses, and results are outlined therein.

### *Environmental Setting*

The proposed project footprint, as described in the Proposed project Description, encompasses 0.07 acres, and consists of all areas where proposed project work would occur. Following construction there would be no environmental impacts from the storm drain outfall operation. The Biological Study Area analyzed by this IS/MND comprises 7.16 acres and includes the proposed project footprint as well as adjacent areas upstream and downstream that may be indirectly affected by the proposed project (Figure 2).

### *Sensitive and Non-Sensitive Biological Communities*

The majority of the Biological Study Area (5.56 of the 7.16 acres) consists of non-sensitive developed/landscaped residential areas. The remaining terrestrial area of the Biological Study Area is riparian woodland (1.33 acres) and San Pedro Creek, which was mapped to the Ordinary High Water Mark (OHWM) of the creek and classified as perennial stream (0.27 acres and 803 lineal feet). Both of these are considered sensitive communities under CEQA.

The San Pedro Creek channel bottom is earthen, though large debris such as pieces of concrete are present throughout. The banks of the creek are partially earthen and partially armored with rip-rap, concrete, and other manmade materials. The bottom of the creek is generally unvegetated to sparsely vegetated, while the unarmored banks are dominated by dense woody and herbaceous vegetation such as arroyo willow (*Salix lasiolepis*), American dogwood (*Cornus sericea*), California blackberry (*Rubus ursinus*), thimbleberry (*R. parviflorus*), stinging nettle (*Urtica dioica*), and English ivy (*Hedera helix*). Vegetation within the perennial stream community is composed of elements of several vegetation alliances, but none were large or consistent enough to map individually.

Riparian woodland occurs on the banks of San Pedro Creek, above the OHWM. The overstory canopy was varied from open to dense and was comprised of a mix of species such as arroyo willow and Pacific willow (*Salix lasiandra*). The understory was a diverse, dense assemblage of woody and herbaceous species such as American dogwood, California blackberry, thimbleberry, stinging nettle, and English ivy.

A detailed discussion of the biotic habitats on-site is provided in the BRA (Appendix A). Figure 5 graphically depicts sensitive and non-sensitive community types within the Biological Study Area.

### *Special-Status Species*

#### Special-Status Plants

Based on a review of a nine-quadrangle map search using the California Native Diversity Database (CNDDB), 83 special-status plant species have been documented within 5 miles of the proposed project site (Figure 6). No special-status plant species were observed in the Biological Study Area during the site visits (Figure 6). All 83 special-status plant species documented in the vicinity of the Biological Study Area are unlikely or have no potential to occur due to the following reasons:

- Absence of specific soil types (e.g., serpentine soils)
- Absence of suitable habitat (e.g., chaparral, grassland, coastal salt marsh)
- Dominance of invasive, non-native species
- Dense understory vegetation that would outcompete the special-status species

#### Special-Status Wildlife

There are approximately 46 special status animal species documented to occur within the region of the proposed project site (Figure 7). Of these, 41 are absent or unlikely to occur on-site due to a lack of suitable habitat or being outside of the range of occurrence. One Federal-threatened species, steelhead (*Oncorhynchus mykiss*), is documented to occur in San Pedro Creek and is presumed to be present. Several fish putatively identified as steelhead or resident rainbow trout were observed during the site visit. An additional Federal-listed species, California red-legged frog (*Rana draytonii*) (CRLF) has been documented near the mouth of San Pedro Creek (approximately 1.25 miles west) and may be present in the proposed

project site but was determined to be unlikely to breed within it. The remaining three special-status species, western red bat (*Lasiurus blossevillii*), fringed Myotis (*Myotis thysanodes*), and San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*) may occur as occasional foragers or residents adjacent to or on the proposed project site, though no evidence of these species was detected during the site visits. Background information for each of these species and a site-specific assessment for their potential to occur is provided below.

*Western red bat (Lasiurus blossevillii), CDFW Species of Special Concern, Western Bat Working Group (WBWG) High Priority. Moderate Potential.*

This species is highly migratory and broadly distributed, ranging from southern Canada through much of the western United States. Western red bats are believed to make seasonal shifts in their distribution, although there is no evidence of mass migrations. They are typically solitary, roosting primarily in the foliage of broad-leafed trees or shrubs. Day roosts are commonly in edge habitats adjacent to streams or open fields, in orchards, and sometimes in urban areas possibly and association with riparian trees (particularly willows, cottonwoods, and sycamores [Pierson et al. 2006]). It is believed that males and females maintain different distributions during pupping, where females take advantage of warmer inland areas and males occur in cooler areas along the coast.

Western red bat may roost within riparian vegetation within the Biological Study Area and has moderate potential to occur. However, while western red bat may forage within the proposed project site, the proposed project site does not contain broad-leaved vegetation such as sycamores and cottonwoods and the density of willows that are present are too thin to provide the thermal stability that this species is most typically associated for day roosting and has no potential to support maternity roosting, which requires a much more stable thermal condition.

*Fringed myotis (Myotis thysanodes), WBWG High Priority. Moderate Potential.*

The fringed myotis ranges throughout much of western North America from southern British south to southern Mexico. This species is most common in drier woodlands (e.g., oaks, pinyons-junipers); a variety of other habitats are used including desert scrubland, grassland, and coniferous and mixed (coniferous-deciduous) forests. Maternity roosting occurs in colonies of 10 to 2,000 individuals, although large colonies are rare. Caves, buildings, mines, rock crevices in cliff faces, and bridges are used for maternity and night roosts; tree cavities/hollows are also commonly used.

The Biological Study Area contains low to moderately dense stands of trees which may provide roosting opportunities for fringed Myotis. However, while this species may forage within the proposed project site, the area does not have caves, buildings, mines, or rock crevices to support roosting by this species.

*San Francisco dusky-footed woodrat (Neotoma fuscipes annectens), CDFW Species of Special Concern. Moderate Potential.*

This subspecies of the dusky-footed woodrat occurs in the Coast Ranges between San Francisco Bay and the Salinas River. Occupied habitats are variable and include forest, woodland, riparian areas, and chaparral. Woodrats feed on woody plants, but will also consume fungi, grasses, flowers, and acorns. Foraging occurs on the ground and in bushes and trees. This species constructs robust stick houses/structures in areas with moderate cover and a well-developed understory containing woody debris. Breeding takes place from December to September. Individuals are active year-round, and generally nocturnal.

# Figure 5.
# Biological Communities

Sierra Drive Outfall Repair Project
Pacifica, California




Biological Study Area - 7.16 ac.

Project Area - 0.07 ac.

Ordinary High Water Mark

Top of Bank

**Non-sensitive Land Cover Types within Biological Study Area**

Developed/Landscaped - 5.56 ac.

**Sensitive Land Cover Types within Biological Study Area**

Riparian Woodland - 1.33 ac.

Perennial Stream - 0.27 ac. & 803 LF

N

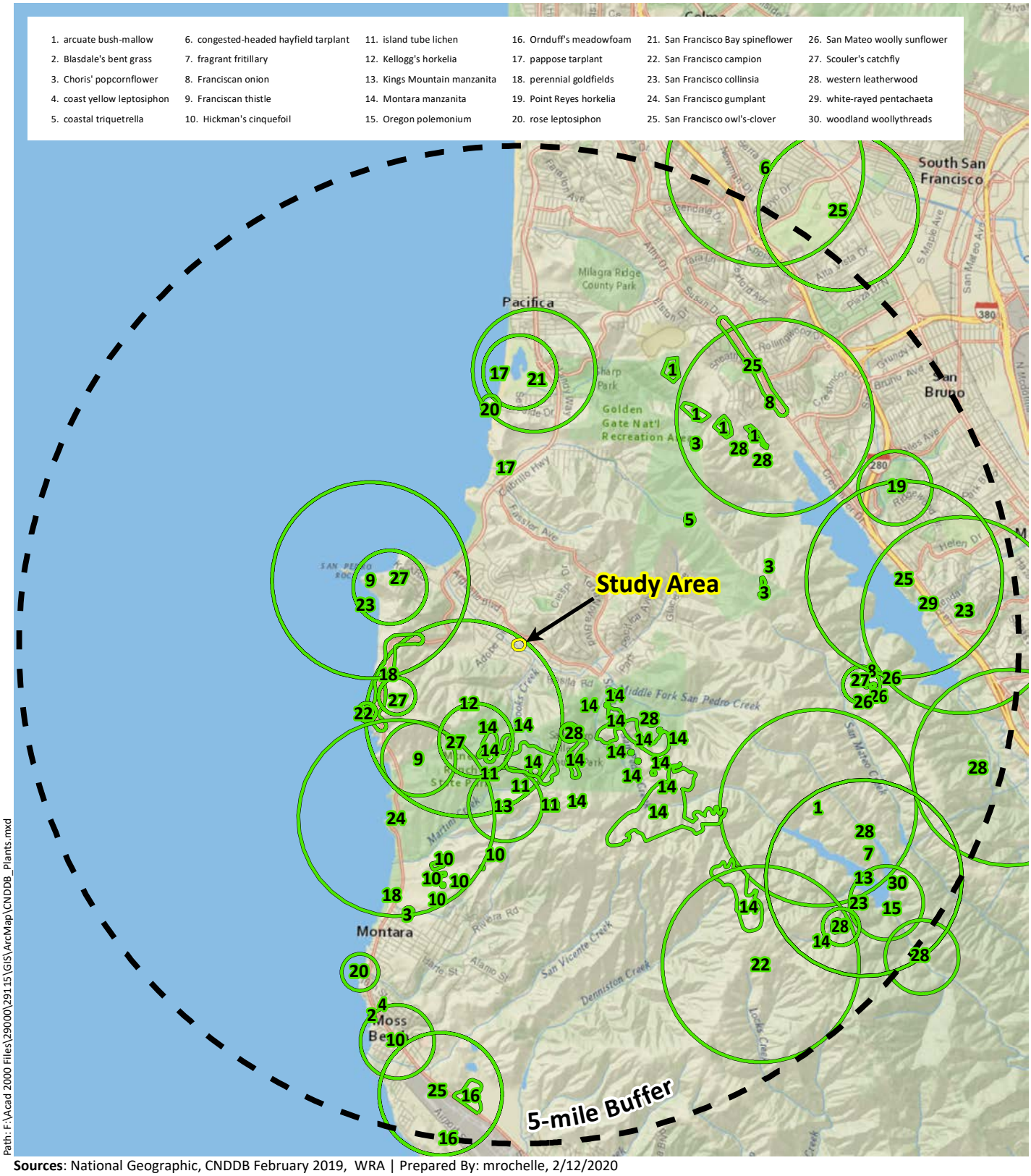
0 50 100

Feet

wra
ENVIRONMENTAL CONSULTANTS

Path: F:\Acad 2000 Files\29000\29115\GIS\ArcMap\CEQA\Land Cover.mxd

**Sources**: Google Earth May 2018 Aerial, WRA | Prepared By: mrochelle, 1/22/2021




**Sources**: National Geographic, CNDDB February 2019, WRA | Prepared By: mrochelle, 2/12/2020

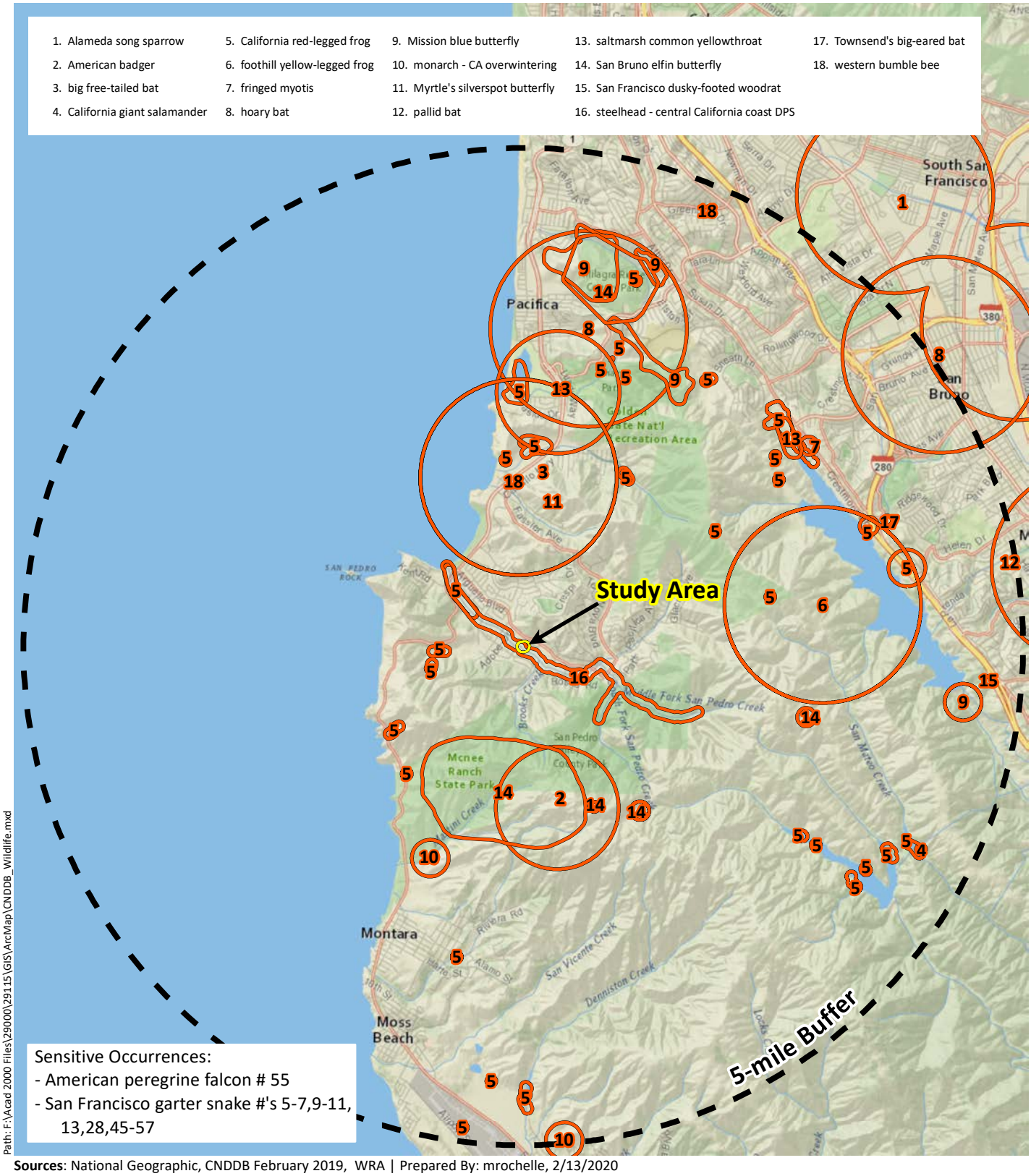
# Figure 6. Special-Status Plant Species Documented in the CNDDB within 5-miles of the Study Area

Serra Drive Outfall Repair Project
Pacifica, California

0 1 2 Miles

N

ENVIRONMENTAL CONSULTANTS




**Sources**: National Geographic, CNDDB February 2019, WRA | Prepared By: mrochelle, 2/13/2020

# Figure 7. Special-Status Wildlife Species Documented in the CNDDB within 5-miles of the Biological Study Area

Serra Drive Outfall Repair Project
Pacifica, California

0 1 2 Miles

N

ENVIRONMENTAL CONSULTANTS

The Biological Study Area contains areas of moderately dense riparian vegetation that may support San Francisco dusky-footed woodrat. However, the bank within the proposed project site is eroded and vegetation is not suitably dense to support this species, and no woodrats or nest structures (middens) were observed within the proposed project site.

*California red-legged frog (Rana draytonii), Federal Threatened Species, CDFW Species of Special Concern. Moderate Potential.*

The CRLF is dependent on suitable aquatic, estivation, and upland habitat. During periods of wet weather, starting with the first rainfall in late fall, CRLF disperse away from their estivation sites to seek suitable breeding habitat. Aquatic and breeding habitat are characterized by dense, shrubby, riparian vegetation and deep, still, or slow-moving water. Breeding occurs between late November and late April. CRLF estivate (period of inactivity) during the dry months in small mammal burrows, moist leaf litter, incised stream channels, and large cracks in the bottom of dried ponds.

San Pedro Creek runs through the Biological Study Area, and the creek corridor contains potential aquatic and upland habitat. A combination of factors, including barriers associated with dense residential development and reduced extent of upland habitat, frequency and duration of scouring flows, and lack of emergent vegetation make habitat within the Biological Study Area unsuitable for CRLF breeding and larval development.

Dominant substrates within the portion of San Pedro Creek that runs through the Biological Study Area consist of mostly small grains such as sand and small gravel with smaller cobble and larger gravel being less abundant. The stream is generally incised by about 10 feet in and around the proposed project site, and numerous revetment structures are present both upstream and downstream of the proposed project site. As a result, the flows in the creek are relatively flashy and do not support emergent macrophytes that would in turn support oviposition by CRLF in the Biological Study Area. Pools and runs are heavily scoured during the winter, making CRLF breeding unlikely to be successful. Downstream of the Biological Study Area, where the stream is of lower gradient and less confined, especially near the mouth, some potential breeding sites are present, and there are also some potential breeding sites associated with off-channel aquatic features. It is expected that if CRLF do occur in the Biological Study Area, the source for individuals would be these downstream areas, more than 0.75 mile from the proposed project site. The stream is in a relatively low position in the watershed and has a moderate overall gradient, resulting in a flow regime that is punctuated by peak flows that attenuate rapidly and reduce the capacity to naturally maintain backwater areas. Due to CRLF's breeding season correlating with the rainy season, these scouring peak flows would subject CRLF eggs and larvae to water velocities that they are not adapted to endure. As a combined result of these factors, suitable breeding habitat for CRLF is absent from the Biological Study Area.

The upland areas surrounding the narrow riparian corridor contain dense residential housing and are not likely to support upland dwelling CRLF, if they occur in the area. Similarly, beyond the banks of San Pedro Creek, dispersal habitat is unavailable due to the presence of dense housing.

There are multiple documented occurrences of CRLF in the San Pedro Creek watershed, though none have been documented within 0.5 mile of the Biological Study Area. Additional occurrences documented within 5 miles of the proposed project site are depicted in Figure 7.

The Biological Study Area does not contain aquatic breeding habitat, but it does contain potential non-breeding aquatic and upland habitat, although use of these habitats by CRLF has not been documented. If CRLF is present, it is likely to be at low densities due to the lack of suitable aquatic breeding habitat and the presence of barriers associated with residential development that surround the Biological Study Area.

The USFWS has prepared a Biological Opinion for potential impacts to CRLF as a result of project activities. In July 2020, USFWS agreed to append the proposed project to the Programmatic Biological Opinion for Issuance of Permits under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act, including Authorizations Under 22 Nationwide Permits, for Projects that May Affect the Threatened California Red-Legged Frog in Nine San Francisco Bay Area Counties, California (Programmatic Biological Opinion) (Service file number 08ESMF00-2014-F-0389). The City and their contractors will implement the conservation measures in the Programmatic Biological Opinion to avoid and minimize effects on the California red-legged frog and its habitats during construction of the proposed project with the following measures summarized below.

1. Ground-disturbing activities shall occur during the summer dry season when flows are low, or streams are dry. Work shall be restricted to the period of June 1 through October 31. If work is not completed by October 31, and significant precipitation is not forecast within 48 hours, work may extend beyond this date with Service agreement.

2. The access and work area limits shall be identified with wooden lathe stakes and flagging.

3. Prior to proposed project commencement, a worker environmental awareness program shall be implemented to educate all construction personnel of the area's environmental concerns and conditions.

4. During all proposed project activities, all trash that may attract predators shall be properly contained, removed from the work site, and disposed of regularly.

5. Erosion control BMPs shall be developed and implemented to minimize any wind- or water-related erosion.

6. No more than twenty-four (24) hours prior to the date of initial ground disturbance, a preconstruction survey for the California red-legged frog will be conducted by a Service approved biologist at the project area. If any adults, subadults, juveniles, tadpoles, or eggs are found, the biologist will contact the Service to determine if moving of the individuals is appropriate. If the Service approves moving animals, the Service-approved biologist will be given sufficient time to move the animals from the work site before ground disturbance is initiated. Only Service-approved biologists will capture, handle, and monitor the California red-legged frog.

7. A Service-approved biologist will be on-site during all activities that may result in take of the California red-legged frog in areas where the species has potential to occur except in areas that are protected by an exclusion fence. To minimize the potential for impacts, daily work shall commence no less than 30 minutes after sunrise and shall cease no less than 30 minutes before sunset.

8. The Service-approved biologist(s) will be given the authority to freely communicate at any time with construction personnel, any other person(s) at the project area, persons otherwise associated with the proposed project, the Service, CDFW, or their designated agents. The Service-approved biologist will have oversight over implementation of all the California red-legged frog conservation measures and will have the authority and responsibility to stop project activities if they determine any of the associated requirements are not being fulfilled.

9. Initial ground-disturbing activities shall be avoided between November 1 and March 31.,. Trenches or pits one foot or deeper that are going to be left unfilled for more than forty-eight (48) hours shall be securely covered with boards or other material to prevent individuals from falling into them. Further, no construction activities shall occur during rain events or within 24 hours following a rain event, and nighttime construction shall be minimized or avoided.

10. To minimize harassment, injury, death, and harm in the form of temporary habitat disturbances, all project-related vehicle traffic will be restricted to established roads, construction areas, equipment staging, storage, parking, and stockpile areas. Off-road traffic outside of designated and demarcated project work areas will be prohibited.

11. Prior to entering the project site and before capturing and handling the California red-legged frog, the Service-approved biologist(s) will decontaminate all of their equipment (i.e., boots, waders, dip nets, etc.) and follow the measures for handling amphibians.

12. Equipment tracks, treads, and tires will not be allowed to enter the live stream; all work shall be performed from the top of bank. To the maximum extent feasible, workers shall avoid disturbing and removing vegetation in the work area.

13. For portions of the work site that will be temporarily dewatered by pumping, intakes shall be completely screened with wire mesh not larger than five millimeters to prevent the California red-legged frog, if present, from entering the pump system. Water will be released or pumped downstream at an appropriate rate to maintain downstream flows during construction. Upon completion of construction activities, any barriers to flow will be removed in a manner that would allow flow to resume with the least disturbance to the substrate.

14. An exclusion fence will be installed around work areas after vegetation removal is complete if a biological monitor will not be present during work in those areas. The Service-approved biologist will perform a clearance survey within the excluded area prior to the commencement of additional proposed project activities and will establish that the excluded area is clear of the California red-legged frog before the commencement of further project activities that could harm the California red-legged frog. The fence will be inspected at least once per week by the Service-approved biologist or by a qualified person.

15. If conditions prevent an exclusion fence from being able to fully enclose the project area for any reason (e.g., conditions such as the presence of open waters prevents installation of a fence around part of the work area), the project area shall be surveyed by a qualified person before the commencement of work each day.

16. If a California red-legged frog is detected within the project area, presence of a monitor will be instituted in any undeveloped areas not protected by an exclusion fence.

The full conservation measures set forth in the Programmatic Biological Opinion shall be adhered to. The USFWS concludes that the effects of the project would not jeopardize the continued existence of the CRLF with successful implementation of the conservation measures.

*Steelhead – Central California Coast Distinct Population Segment (DPS) (Oncorhynchus mykiss irideus), Federal Threatened.*

The steelhead Central California Coast DPS includes all naturally spawned populations of steelhead (and their progeny) in California streams from the Russian River to Aptos Creek, and the drainages of San Francisco and San Pablo Bays eastward to the Napa River (inclusive), excluding the Sacramento-San Joaquin River Basin. Steelhead typically migrate to marine waters after spending two years in freshwater, though they may stay up to seven years. They then reside in marine waters for two or three years prior to returning to their natal stream to spawn as 4-or 5-year-olds. Steelhead adults typically spawn between December and June. In California, females typically spawn two times before they die. Preferred spawning habitat for steelhead is in perennial streams with cool to cold water temperatures, high dissolved oxygen

levels and fast flowing water. Abundant riffle areas (shallow areas with gravel or cobble substrate) for spawning and deeper pools with sufficient riparian cover for rearing are necessary for successful breeding.

Numerous young salmonids, presumably *O. mykiss*, were observed throughout the Biological Study Area. Hagar Environmental Sciences (2002) performed a watershed scale assessment of steelhead and found that the middle fork of San Pedro Creek (upstream of the proposed project site) supports high densities of young steelhead and contains the best spawning habitat in the watershed, but also indicated that the main stem (where the proposed project site is located) contains suitable spawning habitat. Johnson (2005) performed a watershed scale snorkel survey for steelhead and found them to be most abundant in the main stem of San Pedro Creek.

In September 2020, NMFS prepared a Biological Opinion that the project would not likely jeopardize the continued existence of CCC steelhead nor destroy or adversely modify its designated critical habitat. Additionally, NMFS concluded the project is not likely to destroy or adversely modify CCC coho salmon designated critical habitat.

The City and their contractors shall implement the conservation measures in the Programmatic Biological Opinion to avoid and minimize effects on CCC Steelhead and its habitats during construction of the proposed project with the following measures summarized below.

1. The City of Pacifica shall retain a qualified biologist with expertise in the areas of anadromous salmonid biology, including handling, collecting, relocating salmonids; salmonid/habitat relationships; and biological monitoring of salmonids. The City of Pacifica shall ensure that all fisheries biologists working on this project be qualified to conduct fish collections in a manner which minimizes all potential risks to ESA-listed salmonids.

2. The fisheries biologist shall monitor the construction site during placement and removal of cofferdams and channel diversions to ensure that any adverse effects to salmonids are minimized. The biologist shall be on site during all dewatering events to ensure that all ESA-listed salmonids are captured, handled, and relocated safely. The Corps, the City, or the fisheries biologist shall notify a NMFS biologist one week prior to capture activities in order to provide an opportunity for NMFS staff to observe the activities. During fish relocation activities the fisheries biologist shall contact NMFS staff at the above number if mortality of CCC steelhead exceeds 3 percent of total steelhead collected, at which time NMFS will stipulate measures to reduce the take of CCC steelhead. If any CCC steelhead are found dead or injured, the fisheries biologist shall contact NMFS staff at the above number immediately. The purpose of the contact is to review the activities resulting death or injury and to determine if additional protective measures are required. All salmonid mortalities shall be retained, placed in an appropriately sized sealable plastic bag, labeled with the date and location of collection, fork length measured, and frozen as soon as possible. Frozen samples shall be retained by the biologist until specific instructions are provided by NMFS.

3. Non-native fish that are captured during fish relocation activities shall not be relocated to anadromous streams, or areas where they could access anadromous habitat.

4. To ensure that crews shall not work in San Pedro Creek until flows have subsided following a storm event between June 15 and October 31, the City shall contact NMFS Biologist on September 15, to provide a 7-day forecast relevant to the action area. Additionally, this notification shall:
    a. Be provided on a weekly basis;
    b. Be used by NMFS to determine that conditions remain suitable for construction;
    c. Include a short description on remaining work to be completed, and an estimate of the number of days needed to complete remaining work

5. The City shall allow any NMFS employee(s) or any other person(s) designated by NMFS to accompany field personnel to visit the project site during activities described in this opinion.

## ***Regulatory Setting***

### *Sensitive Biological Communities*

Sensitive biological communities include habitats that fulfill special functions or have special values, such as wetlands, streams, or riparian habitat. These habitats are protected under federal regulations such as the Clean Water Act; state regulations such as the Porter-Cologne Act, the CDFW Streambed Alteration Program, and CEQA; or local ordinances or policies such as city or county tree ordinances, Special Habitat Management Areas, and General Plan Elements.

### *Special-Status Species*

No special-status plant species have potential to be affected by the proposed project. Special-status wildlife species include those species that are formally listed or are candidates for listing under the ESA or the CESA. These acts afford protection to both listed species and those that are formal candidates for listing. The federal Bald and Golden Eagle Protection Act also provides broad protections to both eagle species that in some regards are similar to those provided by ESA. Additionally, CDFW Species of Special Concern or California Fully Protected Species are considered special-status species. Although these aforementioned species generally have no special legal status, they are given special consideration under CEQA. Furthermore, bat species are evaluated for conservation status by the WBWG, a non-governmental entity. Bats named as a "High Priority" or "Medium Priority" species for conservation by the WBWG are typically considered special-status under CEQA.

In addition to regulations for species that carry a special designation, most native birds in the U.S. (including non-status species) are protected by the federal Migratory Bird Treaty Act of 1918 and the California Fish and Game Code (CFGS) Sections 3503, 3503.5, and 3513. Under these laws, deliberately destroying active bird nests, eggs, and/or young is illegal.

### *Waters of the United States*

The United States Army Corps of Engineers (Corps) regulates "Waters of the United States" under Section 404 of the Clean Water Act (CWA). The Clean Water Act's definition of "Waters of the United States" was amended on April 21, 2020. The federal changes are significant and will affect the majority of wetlands in California. However, the new state regulations have made clear that the areas not covered by the federal government are covered by the state. Also, there was a change in the CEQA checklist at the end of last year that makes the federal changes moot for CEQA purposes, so the federal changes in the end do not affect the analysis in the IS/MND. Though the two interact, CEQA analyses are made separate from permitting analyses. The following explanation reflects the changes in policy.

Waters of the United States are defined in the Code of Federal Regulations (CFR) as including the territorial seas, and waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, such as tributaries, lakes and ponds, impoundments of waters of the U.S., and wetlands that are hydrologically connected with these navigable features (33 CFR 328.3). Potential wetland areas, according to the three criteria used to delineate wetlands as defined in the Corps Wetlands Delineation Manual (Environmental Laboratory 1987), are identified by the presence of (1) hydrophytic vegetation, (2) hydric soils, and (3) wetland hydrology. Unvegetated waters including lakes, rivers, and streams may also be subject to Section 404 jurisdiction and are characterized by an ordinary high water mark (OHWM) identified based on field indicators such as the lack of vegetation, sorting of sediments, and other indicators

of flowing or standing water. The placement of fill material into Waters of the United States generally requires a permit from the Corps under Section 404 of the CWA.

The Corps also regulates construction in navigable waterways of the U.S. through Section 10 of the Rivers and Harbors Act (RHA) of 1899 (33 USC 403). Section 10 of the RHA requires Corps approval and a permit for excavation or fill, or alteration or modification of the course, location, condition, or capacity of, any port, roadstead, haven, harbor, canal, lake, harbor or refuge, or enclosure within the limits of any breakwater, or of the channel of any navigable water of the United States. Section 10 requirements apply only to navigable waters themselves, and are not applicable to tributaries, adjacent wetlands, and similar aquatic features not capable of supporting interstate commerce.

### *Waters of the State*

The term "Waters of the State" (WOTS) is defined by the Porter-Cologne Act as "any surface water or groundwater, including saline waters, within the boundaries of the state". The RWQCB protects all waters in its regulatory scope and has special responsibility for wetlands, riparian areas, and headwaters. These waterbodies have high resource value, are vulnerable to filling, and are not systematically protected by other programs. RWQCB jurisdiction includes "isolated" wetlands and waters that may not be regulated by the Corps under Section 404. WOTS are regulated by the RWQCB under the State Water Quality Certification Program which regulates discharges of fill and dredged material under CWA Section 401 and the Porter-Cologne Water Quality Control Act. Proposed projects that require a Corps permit, or fall under other federal jurisdiction, and have the potential to impact WOTS, are required to comply with the terms of the Water Quality Certification determination. If a proposed project does not require a federal permit but involves dredge or fill activities that may result in discharge to WOTS, the RWQCB has the option to those activities under its state authority in the form of Waste Discharge Requirements.

### *Other Sensitive Biological Communities*

Other sensitive biological communities not discussed above include habitats that fulfill special functions or have special values. Natural communities considered sensitive are those identified in local or regional plans, policies, regulations, or by the CDFW (formerly California Department of Fish and Game [CDFG]). The CDFW ranks sensitive communities as "threatened" or "very threatened" and keeps records of their occurrences in its California Natural Diversity Database (CNDDB) (CDFW 2013). Sensitive plant communities are also identified by CDFW (CDFG 2003, 2007, 2009). CNDDB vegetation alliances are ranked 1 through 5 based on NatureServe's (2010) methodology, with those alliances ranked globally (G) or statewide (S) as 1 through 3 considered sensitive. Impacts to sensitive natural communities identified in local or regional plans, policies, or regulations or those identified by the CDFW or USFWS must be considered and evaluated under CEQA (14 CCR Div. 6, Chap. 3, Appendix G). Specific habitats may also be identified as sensitive in city or county general plans or ordinances.

A draft Lake or Streambed Alteration Agreement (LSAA) has been issued by CDFW based on an application submitted by WRA, Inc. on behalf of the City. This permit would further protect any sensitive biological communities within the project area. The LSAA includes extensive avoidance and minimization measures that would require training for on-site personal, special-status fish and wildlife surveys, nesting bird surveys, the presence of qualified biological monitors during project activities, active nest protection, and limitations on vegetation removal. Additionally, the LSAA dictates strict documentation procedures that would ensure compliance with all regulatory standards.

### *Critical Habitat*

Critical habitat is a term defined in the ESA as a specific and designated geographic area that contains features essential for the conservation of a threatened or endangered species and that may require special management and protection. Section 7 of the ESA requires federal agencies to consult with the USFWS

and/or NMFS to conserve listed species on their lands and to ensure that any activities or proposed projects they fund, authorize, or carry out will not jeopardize the survival of a threatened or endangered species. In consultation for those species with critical habitat, federal agencies must also ensure that their activities or proposed projects do not adversely modify critical habitat to the point that it will no longer aid in the species' recovery. In many cases, this level of protection is similar to that already provided to species by the ESA jeopardy standard. However, areas that are currently unoccupied by the species but are needed for the species' recovery are protected by the prohibition against adverse modification of critical habitat. Designated critical habitat for central coast steelhead and central California coast coho salmon (*Oncorhynchus kisutch*) is present in San Pedro Creek, within the proposed project site.

## ***Discussion of Impacts***

***a)*** ***Less than Significant with Mitigation Incorporated.*** The proposed project would not change the existing operation and maintenance activities and therefore these phases of the project would not have an impact on special status species. A significant impact would occur if project activities would directly, or through habitat modifications, adversely affect a special status species. In this context, an adverse effect is one that would contribute to a declining population within the portion of a particular special status species geographic range occupied by the project site. As discussed above in *Special-Status Species*, of the 83 special-status plant species documented in the vicinity of the proposed project site, none have the potential to occur based on various habitat and life cycle factors.

Special-status wildlife species with potential to occur in the proposed project site include western red bat, fringed Myotis, San Francisco dusky-footed woodrat, CRLF, and steelhead. As discussed in *Special-Status Wildlife* in the Biological Resources Assessment (Appendix A), western red bat and fringed Myotis may forage within the proposed project site, but there is no vegetation or other features present of suitable structure or density to support roosting of either species. Similarly, for the dusky-footed woodrat, the proposed project site is eroded and does not support vegetation of suitable density as required by the species. Further, no woodrats or nest structures were observed within the proposed project site during the biological site assessment.

Proposed project activities have the potential to significantly impact CRLF and steelhead. The dewatering of the stream during construction is anticipated to result in the temporary exclusion of both species. In addition to effects that could result from dewatering, CRLF or steelhead could be crushed by equipment operating within occupied habitat if individuals are not detected and safely relocated. CRLF could be entrapped in trenches if trenches are not covered to prevent CRLF from entering them. Certain erosion control devices, particularly those that incorporate monofilament mesh could entrap wildlife, including CRLF and steelhead either during or after the implementation of the proposed project. Predators of CRLF and steelhead, particularly raccoons, could be attracted to the work area if trash is not adequately contained and removed from the site. Sediment could be detrimental to steelhead if it is liberated in large quantities and is allowed to fill pools occupied by steelhead. This would be a potentially significant impact because steelhead are sensitive to increases in suspended sediments. Sedimentation negatively impacts steelhead development. Additionally, increased sediment could cover the rocky stream strata that steelhead require for successful egg rearing.

In order to clear the area for work, take in the form of capture and relocation of individuals of either species may also be necessary to ensure their safety. Mitigation Measures BIO-1a through BIO-1k (for CRLF) and Mitigation Measure BIO-2 (for steelhead) would minimize impact on these species. In combination with the existing legal requirement for consultation with federal wildlife agencies and subsequent issuance of incidental take permits per section 10a(1)(B) of the ESA,

implementation of these regulatory requirements as detailed in Mitigation Measure BIO-4 would avoid having substantial adverse effects, thus reducing impacts to these species to less than significant levels.

Additionally, while no nests of raptors or other birds were observed on the proposed project site, there is potential for new nests to be established prior to proposed project implementation. If new nests are established prior to construction, vegetation clearing or disturbance in the immediate vicinity of a nest in active use could result in abandonment of the nest or loss of eggs and young. This could be a violation of the Migratory Bird Treaty Act and California Department of Fish and Game Code (CFGC), which would be a potentially significant impact. Impacts on nesting birds with potential to occur at the proposed project site would be reduced to less than significant with incorporation of mitigation measures as described below in Mitigation Measure BIO-3.

The construction of the proposed project could result in the temporary loss of nesting, foraging, roosting, burrowing, and breeding habitat for a variety of wildlife species and the temporary loss of associated plant species habitat. However, due to the temporary nature (less than 1 month) and the small extent of the proposed project (about 0.07 acres), impacts to habitat for non-listed species would be less than significant.

Implementation of the below-listed mitigation measures would ensure that any substantial adverse effect, either direct or through habitat modification, on any special-status species is less than significant.

**Mitigation Measure BIO-1a: Work Windows**

To avoid impacts to aquatic habitat, ground-disturbing activities shall occur during the summer dry season when flows are low, or streams are dry. Work shall be restricted to the period of June 1 through October 31. If work is not completed by October 31, and significant precipitation is not forecast within 48 hours, work may extend beyond this date with USFWS, NMFS, and CDFW agreement. Initial ground-disturbing activities shall be avoided between November 1 and March 31, the time period when CRLF are most likely to be moving through upland areas. All concrete within the high flow line shall be poured before September 15 to ensure adequate curing time prior to precipitation events. Furthermore, no construction activities shall occur during rain events or within 24 hours following a rain event. To minimize the potential for impacts, daily work shall commence no less than 30 minutes after sunrise and shall cease no less than 30 minutes before sunset.

**Mitigation Measure BIO-1b: Access Areas**

The contractor shall demarcate access and work area limits with wooden lathe stakes and flagging prior to the start of construction. Demarcation of the work area shall be maintained by the contractor in good repair for the duration of proposed project activities. No areas beyond the identified work area limits shall be disturbed.

**Mitigation Measure BIO-1c: Workers Environmental Awareness Program**

Prior to commencement of grading for the proposed project, environmental professionals shall conduct a worker environmental awareness program (WEAP) to educate all construction personnel of the area's environmental concerns and conditions, including special-status species, site contamination prevention, and other relevant environmental protection measures. The WEAP shall constitute the conveyance of environmental concerns and appropriate work practices, including spill prevention, emergency response

measures, protection of special-status resources, and proper implementation of BMPs to all construction and maintenance personnel. Instruction shall consist of a presentation by the CDFW-approved qualified biologist that includes a discussion of the biology and general behavior of any sensitive species which may be in the area, how they may be encountered within the work area, and procedures to follow when they are encountered. All on-site personnel shall be trained under the WEAP prior to working on-site. Contractor shall be responsible for maintaining a log of the WEAP of on-site personnel. The log shall be submitted to the City upon City's request.

**Mitigation Measure BIO-1d: Disposal of Trash**

During all proposed project activities, all trash that may attract predators shall be properly contained and removed from the work site by the contractor daily. Following construction, all trash and construction debris shall be removed from work areas.

**Mitigation Measure BIO-1e: Stormwater Discharges**

The contractor shall develop and implement erosion control BMPs prior to construction to minimize any wind or water-related erosion and include provisions in construction contracts for measures to protect sensitive areas and prevent and minimize stormwater and non-stormwater discharges. Erosion control structures shall not include monofilament mesh or be of types that may entrap and/or kill wildlife. The BMPs shall be consistent with the San Mateo Countywide Pollution Prevention Program.

**Mitigation Measure BIO-1f: Preconstruction Surveys**

No more than 24 hours prior to the date of initial ground disturbance, a USFWS-approved biologist shall conduct a pre-construction survey for CRLF within the proposed project site. The survey shall consist of walking the proposed project site to ascertain the possible presence of the species. The USFWS-approved biologist shall investigate all potential areas that could be used by the CRLF for feeding, breeding, sheltering, movement, and other essential behaviors; this includes an adequate examination of small mammal burrows. If any adults, subadults, juveniles, tadpoles, or eggs are found, and cannot be avoided by proposed project activities, the biologist shall contact the USFWS to determine if moving of the individuals is appropriate. If relocation is determined to be appropriate, the USFWS-approved biologist shall relocate the individual to a suitable location. In making this determination, the USFWS will consider if an appropriate relocation site exists. If relocation is determined to not be appropriate, work in the proposed project site shall only continue in areas where no harm to CRLF could result from the proposed project activities.

**Mitigation Measure BIO-1g: Biological Monitor**

USFWS-approved biologists shall evaluate habitat within the Project site to determine what areas have potential to support CRLF and will provide guidance to the contractor with respect to procedural methods for advancing the Project while also ensuring no take of CRLF occurs. For this Project, areas within 300 feet of aquatic habitat, except developed areas, are potentially suitable. Prior to working in these areas, the biologist shall survey the area for CRLF prior to vegetation removal or ground disturbance. Once cleared, work may commence under the supervision of the biologist. If an exclusion fence is used, work may occur within the exclusion fence after the biologist has determined that there is no potential for CRLF to be present in the excluded area (within the fence perimeter). If the fence perimeter is compromised overnight, no work shall occur without the presence of the

biologist until the biologist has cleared the area and verified that the fence perimeter is no longer compromised. Vegetation removal and ground disturbing activities that occur in areas that are not excluded (via an exclusion fence) shall require a supervision by a biologist.

A USFWS-approved biologist shall be on-site during all construction activities that may result in take of the CRLF (equipment operation, grading, installation or removal of structures, dewatering or any other activity that could result in crushing of a CRLF) in areas where the species has potential to occur (any areas within the proposed project site except developed areas) except in areas that are protected by an exclusion fence (if applicable; see Mitigation Measure BIO-1K for information about exclusion fences). The biologist shall provide oversight and have the authority and responsibility to stop proposed project activities if impacts to CRLF are posed. If workers need to remove or disturb vegetation, the biologist(s) shall first inspect the vegetation for any individual CRLFs.

**Mitigation Measure BIO-1h: Covering of Trenches**

During construction, contractor shall securely cover with boards or other material trenches or pits 1-foot deep or deeper that are going to be left unfilled for more than 48 hours to prevent individual CRLF from falling into them. If covering a trench is not possible, an escape ramp with a maximum 30-degree angle will be installed to allow CRLF to exit the trench.

**Mitigation Measure BIO-1i: Work within Creek**

During construction, the contractor shall not allow equipment tracks, treads and tires to enter the live stream; all work shall be performed from the top of bank. To the maximum extent feasible, workers shall avoid disturbing and removing vegetation in the work area.

**Mitigation Measure BIO-1j: Use of Screens on Pumps**

Pumping for temporary dewatering is not anticipated, but if needed, the contractor (under the oversight of the USFWS-approved biologist) shall completely screen intakes with wire mesh not larger than 1/8 inch to prevent CRLF and salmonids, if present, from entering the pump system. Water shall be released or pumped downstream at rate that will maintain active downstream flows with minimal sediment loads during construction, as dictated by a NMFS-approved biologist. Upon completion of construction activities, any barriers to flow shall be removed (with the oversight of the USFWS and NMFS-approved biologist) in a manner that would allow flow to resume with the least disturbance to the substrate to minimize liberation of sediment.

**Mitigation Measure BIO-1k: CRLF Exclusion Fence**

The contractor shall install an exclusion fence shall around work areas after vegetation removal is complete if a biological monitor will not be present during work in those areas. The USFWS-approved biologist shall oversee the installation of the fence, which shall be at least 30 inches high and be buried at least 4 inches deep. The USFWS-approved biologist shall perform a clearance survey within the excluded area prior to the commencement of additional proposed project activities and shall establish that the excluded area is clear of CRLF before the commencement of further proposed project activities that could harm CRLF. Once an area is excluded from areas potentially occupied by CRLF and the area has been surveyed by the USFWS-approved biologist, and if no CRLF have been found within

the enclosed area, work may proceed within the excluded area without the oversight of the USFWS-approved biologist as long as the integrity of the fence is maintained. The fence shall be inspected at least once per week by the USFWS-approved biologist or by a qualified person. A qualified person is defined as a City or proposed project employee that is trained by the USFWS-approved biologist.

If conditions prevent an exclusion fence from being able to be fully enclose the proposed project site for any reason (e.g., conditions such as the presence of open waters prevents installation of a fence around part of the work area), the proposed project site shall be surveyed by a USFWS-approved biologist before the commencement of work each day.

**Mitigation Measure BIO-2: Fish Relocation**

Prior to the installation of water diversion structures (e.g., cofferdams), a NMFS-approved fisheries biologist shall capture and relocate salmonids and other native fish within the proposed project site. The biologist shall place exclusion nets to prevent fish from temporarily occupying waters that may be impacted by liberated sediment. The exclusion nets shall be of sufficient height to span the water column and small enough in size (1/8 inch or less) to exclude juvenile fish from areas that may be subject to disturbance during excavation. This would apply to placement of cofferdams for the creek bypass system. A NMFS-approved qualified fisheries biologist shall perform all seining, electrofishing, and fish relocation activities. The biologist shall note the number of salmonids observed in the affected area, the number of salmonids relocated, and the date and time of collection and relocation. This information shall be provided to NMFS and/or CDFW upon their request or in compliance with proposed project permits. The biologist shall adhere to the following requirements for capture and transport of salmonids:

The qualified fisheries biologist shall determine the most efficient means for capturing fish. Complex stream habitat generally requires the use of electrofishing equipment, whereas in outlet pools, fish may be concentrated by pumping down the pool and then seining or dip netting fish.

Initial fish relocation efforts shall be conducted at least two days prior to the start of construction within the live stream, providing the fisheries biologist an opportunity to return to the work area to perform additional electrofishing passes immediately prior to construction if there is water in the isolated construction area.

Relocation activities shall be conducted during morning periods and may be halted at the discretion of the fisheries biologist if water temperatures rise and continued relocation presents a health risk to fish.

Prior to capturing fish, the most appropriate release location(s) shall be determined by the qualified fisheries biologist, based on the following guidelines: similar water temperature as capture location; ample habitat for captured fish; and low likelihood of fish reentering work site or becoming impinged on exclusion net or screen.

Air and water temperatures shall be periodically measured, and captured fish monitored by the qualified fisheries biologist. Temperatures shall be measured at the head of riffle tail of pool interface. Activities shall cease if health of fish is compromised owing to high water temperatures, or if mortality exceeds three percent of captured salmonids.

The qualified biologist shall temporarily hold fish and amphibians in cool, shaded, aerated water in a flow-through live car or buckets with water aeration devices. The qualified biologist shall protect fish and amphibians from jostling and noise and shall not remove fish from this container until the time of release.

**Mitigation Measure BIO-3: Nesting Birds**

Proposed project activities shall be conducted during the dry season, which partially overlaps with nesting bird season (February 1 to September 15). A qualified biologist shall conduct a pre-construction nesting bird survey no more than 7 days prior to vegetation removal or initial ground disturbance, whichever occurs first. The survey shall include the proposed project site and a 250 feet buffer around the proposed project site to identify the location and status of any nests that could potentially be affected either directly or indirectly by proposed project activities.

If active nests of native nesting bird species are located during the nesting bird survey, the qualified biologist shall establish a work exclusion zone around each nest. Established exclusion zones shall remain in place until all young in the nest have fledged or the nest otherwise becomes inactive (e.g., due to predation). The qualified biologist shall determine appropriate exclusion zone sizes. The exclusion zone sizes will vary based on species, nest location, existing visual buffers, noise levels, and other factors. An exclusion zone radius may be as small as 50 feet for common, disturbance-adapted species, such as house finches, or as large as 1000 feet for large raptors. A qualified biologist can reduce exclusion zone size from established levels if nest monitoring findings indicate that proposed project activities do not adversely impact the nest (e.g., the birds do not respond to baseline and punctuated proposed project noise), and if a reduced exclusion zone would not adversely affect the nest. If the nest buffer to be reduced is a raptor, the qualified biologist shall consult with and get approval from the CDFW prior to reduction of the buffer.

**Mitigation Measure BIO-4: Section 7 Consultation pursuant to the ESA.**

Section 7 of the Federal Endangered Species Act (ESA) (Section 7) is an interagency consultation framework that allows the Corps to issue permits for proposed projects in their jurisdiction that have constraints that are under the administration of other federal agencies. In this case, the Corps consulted with the U.S. Fish and Wildlife Service USFWS and NMFS and issued Biological Opinions (BOs) for the proposed project. The BOs determined the effects on Federal-listed species and proscribed additional measures to mitigate for any loss incurred through the conduct of the proposed project. The project will abide by the terms of the BOs and Incidental Take Permits.

**Mitigation Measure BIO-5: Lake or Streambed Alteration Agreement**

Prior to the start of construction within riparian areas, the City shall obtain CDFW's approval of the final Lake and Streambed Alteration Agreement (LSAA). The project shall abide by the terms of the LSAA and shall implement measures detailed in the LSAA that would include, but would not be limited to, protections for CRLF and other species, erosion and sediment control, and other administrative directions. The project shall implement the terms of the LSAA in compliance with the timing prescribed in the measures.

***b)*** ***Less than Significant with Mitigation Incorporated.*** The proposed project would not change the existing operation and maintenance activities and therefore these phases of the project would not have an impact on riparian habitats or other natural sensitive communities. As discussed above

under *Sensitive and Non-sensitive Biological Communities*, San Pedro Creek is considered a perennial stream, and riparian woodland occurs on the banks of San Pedro Creek, above the OHWM. Critical habitat for the south Central California Coast DPS of steelhead trout and Central California Coast coho salmon is present in the proposed project site, though coho salmon are extirpated from San Pedro Creek. The proposed project proposes to permanently impact approximately 0.002 acres and temporarily impact 0.003 acres of riparian woodland. These construction impacts would be potentially significant. However, impacts to this community would require a Lake and Streambed Alteration Agreement (LSAA) from CDFW as stipulated by Section 1600 of the California Fish and Game Code. By obtaining an LSAA (mitigation measure BIO-5) for the project and incorporating mitigation measures BIO-1a through BIO-1j and BIO-2 through BIO-4, the impact would be less than significant.

A Lake and Streambed Alteration Agreement application for impacts to habitat regulated by the CDFW has been prepared and submitted to the CDFW. Areas of temporary impact would be mitigated on-site via revegetation. The main approach for revegetation would be to rely on natural regeneration and native seeding and willow stake installation. Natural recruitment of native vegetation is expected to occur and would be augmented through seeding with a native seed mix. Six willow poles would be added at the downstream edge of the rip-rapped sections of the bank to improve stability and enhance habitat. Permanent impact areas are very small and would not substantially reduce the amount of riparian habitat. Although they would not be vegetated at the ground level, they are expected to eventually be covered by the canopy of adjacent vegetation. In addition, the small reduction in vegetated surface would increase bank stability, and the overall situation would be a benefit to riparian habitat.

***c)*** ***Less than Significant with Mitigation Incorporated.*** The proposed project would not change the existing operation and maintenance activities and therefore these phases of the project would not have an impact on wetlands. Streams potentially jurisdictional under the CWA and/or the CFGC were delineated using a mix of surveyed topography data, high resolution aerial photographs, and a mapping grade GPS unit. A formal wetland delineation was not conducted, and thus the Army Corps of Engineers Wetland Delineation Manual was not followed. Rather, a general survey of wetland defining features was performed. A formal delineation would consist of a site evaluation according to the Corps Wetlands Delineation Manual (Environmental Laboratory 1987). The manual defines a wetland as an area identified by the presence of hydrophytic vegetation, hydric soils, and wetland hydrology.

Regarding San Pedro Creek, the OHWM was used to determine the extent of potential Section 404 jurisdiction. The proposed project would permanently impact 0.007 acres and 11 linear feet of San Pedro Creek, which is classified as perennial stream and is protected under state and federal wetland regulations. The proposed project would impact 0.0003 acres of perennial stream under Corps jurisdiction. Critical habitat for the south central California Coast DPS of steelhead trout and Central California Coast coho salmon is present in the proposed project site, though coho salmon are extirpated from San Pedro Creek. Proposed project activities would also temporarily impact 0.022 acres and 52 linear feet of San Pedro Creek.

Permanent impacts to San Pedro Creek would involve grading and excavation for the construction of a new concrete headwall and the placement of rip-rap adjacent to and below the headwall. However, the existing headwall and concrete spillway are partially located below San Pedro Creek's OHWM and are fully below San Pedro Creek's top of bank, as is rip-rap on the south side of the existing spillway. Additional rip-rap outside of this footprint would occupy a very small area and would not alter channel width or flow capacity. The additional placement of rip-rap within the streambed is considered placement of fill material under the regulations listed above in the Waters of the United States and Waters of the State sections. As such, the placement of rip rap is considered a permanent impact.

Areas that would be graded would be returned to existing grade. Areas that would be cleared of vegetation would be re-vegetated as described in the *Project Description*. The main approach for revegetation would be to rely on natural regeneration and native seeding and willow stake installation. Natural recruitment of native vegetation is expected to occur and would be augmented through seeding with a native seed mix. Six willow poles would be added at the downstream edge of the rip-rapped sections of the bank to improve stability and enhance habitat. Permanent impacts to a small area outside the existing headwall/spillway footprint would occur, but proposed project activity would result in improved bank stability. Although proposed project activity within the channel and bank is not expected to have a substantial effect on the stream, to further improve the channel, existing debris, such as tires and large pieces of concrete, would be removed from the channel following construction.

Mapping done by WRA based on the OHWM and top of bank indicated that there are no wetlands in the proposed project site, just San Pedro Creek. Temporary impacts to San Pedro Creek would involve the placement of coffer dams at the upstream end of temporary work limits and a temporary bypass pipe, as well as potential clearing of vegetation. The coffer dams would result in the temporary dewatering of the work area, but flows would be restored to pre-construction conditions following removal of the coffer dams and bypass pipes.

The construction impacts to the perennial stream, San Pedro Creek, would be potentially significant if the project did not include measures to protect and improve the habitat. Given the small area of impact and the on-site revegetation, in combination with the general avoidance and minimization measures described in the *Project Description*, impacts to federal and state protected wetlands would be less than significant. Avoidance and minimization measures 1 through 4 and 7 through 16 in the *Project Description* ensure that impacts to wetlands would remain less than significant. These avoidance and minimization measures are not required by law, but have been incorporated into the project description at the discretion of the client. Additionally, by adhering to the mitigation measures below, all impacts to wetlands or streams would be approved by the appropriate regulatory agencies.

**Mitigation Measure BIO-6: Clean Water Act 404 Permit/401 Water Quality Certification**

The City shall obtain a Clean Water Act Section 404 permit and a Section 401 Water Quality Certification. All conditions listed in the permit and certification shall be adhered to during project activities.

d) ***Less than Significant with Mitigation Incorporated.*** A significant impact would occur if a project would interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors or impede the use of native wildlife nursery sites. The proposed project would not change the existing operation and maintenance activities and therefore these phases of the project would not have an impact on wildlife movement or use of native wildlife nursery sites.

San Pedro Creek likely facilitates the movements of wildlife adjacent to the site. However, the proposed project is not proposing to alter the stream in a substantial way. Construction activities may result in a temporary disruption to local wildlife movement during the construction period, but the disruption is not expected to result in any permanent or substantial changes in use or movement patterns once construction is complete.

Wildlife species presently using the proposed project site, including Federal-listed steelhead, are expected to continue moving through the proposed project site and within the stream's riparian corridor after proposed project build-out. The proposed project schedule and steelhead protection measures dictate that construction activities would not occur at times when steelhead are migrating

through the proposed project site. Likewise, the proposed project would not be active during the spawning and egg incubation season for steelhead. A small section of San Pedro Creek would be dewatered during the time when steelhead are rearing, but steelhead would be removed from this section of the creek prior to dewatering and the habitat value of the creek would return to pre-project habitat values within one week of completion.

CRLF are not expected to be present within the work areas during construction but would be relocated if encountered. The proposed project site does not support breeding habitat for CRLF, and no eggs or larval frogs are expected to be encountered. Adequate non-breeding habitat to relocate metamorphosed CRLF is available immediately adjacent to the work areas, and the small amount of habitat within work areas that would be temporarily unavailable to the species would not have a substantial impact. Due to the developed nature of the proposed project site in areas above the top of bank, and the larger home range or territory of local wildlife, few (if any) individuals of the various vertebrate species presently occupying the proposed project site would be lost from the impact area of the proposed project.

A potentially significant impact on the movement of special status wildlife could occur if project work were completed outside of the summer dry season and if no mitigation measures were outlined. The measures that are ultimately contained in the Biological Opinions for steelhead and CRLF would ensure that the proposed project avoids having a substantial adverse effect on these special status species. With implementation of Mitigation Measures BIO-1a through BIO-1j, BIO-2, and BIO-4 (for the protection of CRLF and steelhead), impacts to native wildlife movement resulting from the proposed project would be less than significant.

e) ***No Impact.*** A significant impact would occur if a project would conflict with any local policies or ordinances protecting biological resources, such as tree preservation policy or ordinance. The proposed project would not change the existing operation and maintenance activities and therefore these phases of the project would not have an impact on policies or ordinances protecting biological resources. The City has a Heritage Tree ordinance which defines a Heritage Tree as any tree within the City, with the exception of eucalyptus, which has a trunk with a circumference of 50 inches or greater, approximately 16 inches in diameter or more when measured 2 feet above natural grade. In addition, the City Council may designate any tree or grove of trees of special historical, environmental, or aesthetic value as a Heritage Tree. Heritage Trees may not be removed, destroyed, or damaged beyond repair without a Heritage Tree Permit. No tree removal would occur as a result of the proposed project, though trimming of one or more willow bushes may be necessary to allow for equipment access. Trimming of trees does not conflict with the City tree ordinance and no proposed project work would remove or occur within the dripline of a Heritage Tree. The proposed project would not conflict with any local policies or ordinances that protect biological resources; therefore, no further analysis is required.

f) ***No Impact.*** A significant impact would occur if a project would conflict with the provisions of an adopted Habitat Conservation Plan (HCP), Natural Community Conservation Plan (NCCP), or other approved local, regional, or state habitat conservation plan. The proposed project would not change the existing operation and maintenance activities and therefore these phases of the project would not have an impact on an adopted Habitat Conservation Plan (HCP) or Natural Community Conservation Plan (NCCP).). However, the proposed project site is not subject to a HCP, NCCP, or any other habitat plan. Therefore, development of the proposed project would not conflict with any habitat conversion plan.

## 7.5 CULTURAL RESOURCES

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

This section examines the potential impacts of the proposed project on cultural resources. Tribal cultural resources are addressed in Section XVIII, *Tribal Cultural Resources*. For the purposes of this analysis, the term cultural resource is defined as follows:

> *Indigenous and historic-era sites, structures, districts, and landscapes, or other evidence associated with human activity considered important to a culture, a subculture, or a community for scientific, traditional, religious, or another reason. These resources include the following types of CEQA-defined resources: historical resources, archaeological resources, and human remains.*

The term indigenous, rather than prehistoric, is used in this section as a synonym for "Native American–related". This section relies on the information and findings presented in *Cultural Resources Survey Report: Serra Drive Outfall Repair Proposed Project, Pacifica, San Mateo County, California* (Hoffman 2020). That report, provided in Appendix B, details the results of the cultural resources study, which examined the environmental, ethnographic, and historic background of the proposed project site, emphasizing aspects of human occupation.

### *Environmental Setting*

#### *Records Search*

On February 28, 2020, WRA staff conducted a cultural resources records search of the proposed project site and vicinity at the Northwest Information Center (NWIC) at Sonoma State University, Rohnert Park. The NWIC maintains the official CHRIS (California Historical Resources Information System) records of previous cultural resources studies and recorded cultural resources for the proposed project site and vicinity. The study area for the records search consisted of the proposed project site and areas within 0.5 mile.

The NWIC has record of five previously recorded cultural resources in the records search area, none of which are in the proposed project site. Of these five resources, two are (historic-era) architectural resources (P-41-002208 [Sanchez Art Center], P-41-002217 [Shamrock Ranch]), while the other three consist of the Sánchez Adobe Park Historic District (P-41-000646) and two resources considered components of P-41-000646: archaeological site P-41-000074 (Sánchez Adobe Shell Midden) and architectural resource P-41-001487 (Sánchez Adobe [building]). The Sánchez Adobe (P-41-000074, -000646, -001487) is approximately 0.25 mile northwest of the proposed project site.

The NWIC has record of 28 reports from previous cultural resources studies that have been conducted in the records search study area, one of which (S-3082) covered the proposed project site. The majority of these previous studies were conducted in or adjacent to the Sánchez Adobe, approximately 0.25 mile northwest of the proposed project site.

### *Native American Correspondence*

WRA contacted the California Native American Heritage Commission (NAHC) on February 26, 2020 in request of a search of the NAHC's Sacred Lands File (SLF) and a list of Native American representatives who may have interest in the proposed project. The NAHC replied to WRA on February 28, 2020, in which they stated that the SLF has record of sacred sites in the vicinity of the proposed project site and that the Amah Mutsun Tribal Band of Mission San Juan Bautista, and The Ohlone Indian Tribe should be contacted regarding the sacred sites. The reply also included a list of six Native American representatives to contact regarding these resources and who may be interested in the proposed project.

On March 23, 2020, WRA archaeological Robin Hoffman sent letters, via email due to the Covid-19 disruptions, to the six Native American contacts provided in the NAHC response. The letters provided information on the proposed project and requested that the recipients provide information on cultural resources that may be impacted by the proposed project, if they would like to do so. The letters to representatives of the Amah Mutsun Tribal Band of Mission San Juan Bautista, and The Ohlone Indian Tribe specifically provided the SLF positive results and that the NAHC recommended that their tribes be contacted in reference to the positive results.

Michelle Zimmer (Amah Mutsun Tribal Band of Mission San Juan Bautista) replied to Hoffman by email on March 23, 2020, stating that the proposed project was near the Sánchez Adobe and that burials had been identified at the Adobe; her reply also inquired whether or not the "clearing house" had information on known resources in the proposed project site or vicinity. The same day, Hoffman replied to Zimmer via email, stating that proposed project site is approximately 0.25 mile from the Adobe, the proposed project involves replacement of an existing outfall, and the results of the CHRIS records search (negative) and NAHC SLF search (positive). Charlene Nijmeh, Chairperson of the Muwekma Ohlone Indian Tribe of the SF Bay Area, sent an email to Hoffman on March 30, 2020 with ten attachments, which provided background on the proposed project site and vicinity and stated that her tribe is not aware of any sites at the proposed project location but does know of several in the vicinity; Nijmeh also requested the results of any surface surveys. Hoffman replied to Nijmeh via email on March 30, 2020, providing a summary of the results of the pedestrian survey and asking to notify him if Nijmeh had any additional concerns.

To date, no other responses have been received and no other communications with Native American representatives have been conducted for the proposed project. Documentation of the proposed project correspondence with Native American representatives to date is provided in Appendix B of the *Cultural Resources Survey Report*, in Appendix B.

No California Native American tribes previously requested notification regarding City proposed projects for potential consultation under PRC Section 21080.3 (i.e., AB 52). Therefore, no formal consultation pursuant to PRC Section 21080.3 (see AB 52), was required for the proposed project.

### *Field Survey*

On March 20, 2020, WRA conducted a cultural resources pedestrian survey of the proposed project site. Intensive pedestrian survey methods were used, consisting of walking parallel transects spaced at no more than 5 meters apart and inspecting the surface for cultural material (archaeological or architectural) or evidence thereof. When ground visibility was poor, cleared areas and areas disturbed by rodents along and between the transect lines were checked with special attention.

All portions of the proposed project site were covered during the pedestrian survey. During the survey, ground visibility in the proposed project site varied, with the following averages: 100% on the (paved) street portion of the access path; 90% along the west bank of the creek; 75% in the residential yard portion of the access path; and 50% on the east bank of the creek. Virtually the entire areal extent of the proposed project site appears to have been previously disturbed from activities associated with creek armoring (e.g., rip-rap, concrete), installation of the existing outfall, and residential landscaping and general development (e.g., road construction).

During the pedestrian survey, WRA identified no cultural resources, or indicators thereof, in the proposed project site.

### *Summary of Cultural Resources Identification Efforts*

Through background research, outreach to Native American representatives, and a field survey, no cultural resources were identified in the proposed project site. Therefore, no historical resources or unique archaeological resources, as defined by CEQA, appear to be present in the proposed project site.

## ***Regulatory Setting***

### *California Environmental Quality Act*

CEQA (codified at PRC Section 21000 *et seq.*) is the principal statute governing environmental review of proposed projects occurring in the state. CEQA requires lead agencies to determine if a project would have a significant effect on historical resources, unique archaeological resources, or tribal cultural resources.

The state implements provisions in CEQA through its statewide comprehensive cultural resources surveys and preservation programs. Typically, a resource must be more than 50 years old to be considered as a potential historical resource. The State of California Office of Historic Preservation advises recordation of any resource 45 years or older, since there is commonly a five-year lag between resource identification and the date that planning decisions are made.

### *Historical Resources*

CEQA Guidelines recognize that a historical resource includes: 1) a resource in the California Register of Historical Resources (California Register); 2) a resource included in a local register of historical resources, as defined in PRC Section 5020.1(k) or identified as significant in a historical resource survey meeting the requirements of PRC Section 5024.1(g); and 3) any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California by the lead agency, provided the lead agency's determination is supported by substantial evidence in light of the whole record.

If a lead agency determines that an archaeological site is a historical resource, the provisions of PRC Section 21084.1 and CCR Section 15064.5 apply. If an archaeological site does not meet the criteria for a historical resource contained in the CEQA Guidelines, then the site may be treated in accordance with the provisions of PRC Section 21083, pertaining to unique archaeological resources.

### *Unique Archaeological Resources*

As defined in PRC Section 21083.2 a "unique archaeological resource" is an archaeological artifact, object, or site, about which it can be clearly demonstrated that without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

- Contains information needed to answer important scientific research questions and there is a demonstrable public interest in that information;

- Has a special and particular quality such as being the oldest of its type or the best available example of its type; or,

- Is directly associated with a scientifically recognized important prehistoric or historic event or person.

CEQA Guidelines note that if an archaeological resource is not a unique archaeological, historical resource, or tribal cultural resource, the effects of the proposed project on those cultural resources shall not be considered a significant effect on the environment (CCR Section 15064.5[c][4]).

### *Tribal Cultural Resources*

Impacts to tribal cultural resources also are considered under CEQA (PRC Section 21084.2, also see AB 52). PRC Section 21074(a) defines a tribal cultural resource as any of the following:

- Sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe that are either of the following:

    - included or determined to be eligible for inclusion in the California Register; or

    - included in a local register of historical resources, as defined in PRC Section 5020.1(k).

- 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 [PRC] Section 5024.1. In applying these criteria, the lead agency would consider the significance of the resource to a California Native American tribe.

Tribal cultural resources are addressed in Section 4.17, *Tribal Cultural Resources*.

### *California Register of Historical Resources*

The California Register is "an authoritative listing and guide to be used by State and local agencies, private groups, and citizens in identifying the existing historical resources of the State and to indicate which resources deserve to be protected, to the extent prudent and feasible, from substantial adverse change" (PRC Section 5024.1[a]). The criteria for eligibility for the California Register are based upon the criteria for listing on the National Register of Historic Places (National Register) (PRC Section 5024.1[b]). Certain resources are determined by the statute to be automatically included in the California Register, including California properties formally determined eligible for, or listed in, the National Register.

To be eligible for the California Register, a cultural resource must be significant at the local, State, and/or federal level under one or more of the following four criteria:

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

2. Is associated with the lives of persons important in our past;

3. Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or

4. Has yielded, or may be likely to yield, information important in prehistory or history.

A resource eligible for the California Register must be of sufficient age and retain enough of its historic character or appearance (integrity) to convey the reason for its significance. Additionally, the California Register consists of resources that are listed automatically and those that must be nominated through an application and public hearing process. The California Register automatically includes the following:

- California properties listed on the National Register and those formally Determined Eligible for the National Register;
- California Registered Historical Landmarks from No. 770 onward; and
- Those California Points of Historical Interest that have been evaluated by the OHP and have been recommended to the State Historical Commission for inclusion on the California Register.

Other resources that may be nominated to the California Register include:

- Historical resources with a significance rating of Category 3 through 5 (those properties identified as eligible for listing in the National Register, the California Register, and/or a local jurisdiction register);
- Individual historic resources;
- Historic resources contributing to historic districts; and
- Historic resources designated or listed as local landmarks, or designated under any local ordinance, such as an historic preservation overlay zone.

### *California Public Resources Code Section 5097*

PRC Section 5097.99, as amended, states that no person shall obtain or possess any Native American artifacts or human remains that are taken from a Native American grave or cairn. Any person who knowingly or willfully obtains or possesses any Native American artifacts or human remains is guilty of a felony, which is punishable by imprisonment. Any person who removes, without authority of law, any such items with an intent to sell or dissect or with malice or wantonness is also guilty of a felony which is punishable by imprisonment.

### *California Native American Historic Resource Protection Act*

The California Native American Historic Resources Protection Act of 2002 imposes civil penalties, including imprisonment and fines up to $50,000 per violation, for persons who unlawfully and maliciously excavates upon, removes, destroys, injures, or defaces a Native American historic, cultural, or sacred site that is listed or may be listed in the California Register.

### *California Health and Safety Code Section 7050.5*

Section 7050.5 of the California Health and Safety Code (HSC) protects human remains by prohibiting the disinterring, disturbing, or removing of human remains from any location other than a dedicated cemetery. PRC Section 5097.98 (and reiterated in CCR Section 15064.59[e]) also identifies steps to follow in the event of the accidental discovery or recognition of any human remains in any location other than a dedicated cemetery.

## ***Discussion of Impacts***

a-c) ***Less than Significant with Mitigation Incorporated.*** The proposed project would not change the existing operation and maintenance activities and therefore these phases of the project would not have an impact on cultural resources. A records search of the CHRIS conducted on February 28, 2020 identified five previously recorded cultural resources within 0.5 mile of the proposed project site, none of which are in or adjacent to the proposed project site. Of these five resources, two are historic-era architectural resources (P-41-002208 [Sanchez Art Center], P-41-002217 [Shamrock Ranch]). The other three consist of the Sánchez Adobe Park Historic District (P-41-000646) and two resources considered components of it (P-41-000074 [Sánchez Adobe Shell Midden] and P-41-001487 [Sánchez Adobe building]). The Sánchez Adobe (P-41-000074, -000646, -001487) is approximately 0.25-mile northwest of the proposed project site. The land use designations for the proposed project site do not include cemetery uses, and no known human remains exist within the proposed project site.

The NAHC's SLF has record of sacred sites in the vicinity of the proposed project site, and the NAHC recommended that the Amah Mutsun Tribal Band of Mission San Juan Bautista and The Ohlone Indian Tribe be contacted regarding the sacred sites. WRA sent letters to the Native American contacts provided in the NAHC response with information on the proposed project and requests to provide information on cultural resources that may be impacted by the proposed project. The letters to representatives of the Amah Mutsun Tribal Band of Mission San Juan Bautista and The Ohlone Indian Tribe specifically provided the SLF positive results. Michelle Zimmer (Amah Mutsun Tribal Band of Mission San Juan Bautista) stated that the proposed project was near the Sánchez Adobe and that burials had been identified at the Adobe. WRA replied to Zimmer stating that the proposed project site is approximately 0.25-mile from the Adobe and shared the results of the CHRIS records search and NAHC SLF search. To date, no other communications with Native American representatives have been conducted for the proposed project. Appendix B provides documentation of the proposed project correspondence with Native American representatives to date.

WRA conducted an archaeological sensitivity analysis for the proposed project (see Hoffman 2020) based on previously recorded cultural resources, surficial geology, soil data, proximity to perennial natural waterbodies, and previous ground disturbance of the proposed project site. The analysis concluded that the proposed project site has a low sensitivity for both surficial and buried indigenous and historic-era archaeological resources. WRA conducted a cultural resources pedestrian survey of the proposed project site on March 23, 2020. No cultural resources were identified during the survey.

In summary, through background research, outreach to Native American representatives, and a field survey conducted for the proposed project, no architectural resources older than 50 years of age or archaeological resources have been identified in the proposed project site. As such, there are no known historical resources as defined in CEQA Guidelines Section 15064.5, archaeological resources that may qualify as historical resources (as defined in CEQA Guidelines Section 15064.5) or unique archaeological resources (as defined in PRC Section 21083.2[g]), or human remains present in the proposed project site. Therefore, the proposed project is not anticipated to impact any historical resources, archaeological resources, or human remains.

However, because the proposed project would involve ground-disturbing activities, there remains the possibility that the proposed project could unearth, expose, or disturb previously unknown archaeological resources and human remains. If such archaeological deposits are present in the proposed project site and were found to qualify as archaeological resources pursuant to CEQA Guidelines Section 15064, impacts of the proposed project on archaeological resources could be potentially significant. If such previously unknown human remains are present in the proposed

project site, any impacts on the human remains resulting from the proposed project would be potentially significant if those remains were disturbed or damaged.

Such potentially significant impacts would be reduced to a less-than-significant level with implementation of Mitigation Measures CUL-1 and CUL-2, outlined below.

**Mitigation Measure CUL-1: Accidental Discovery of Archaeological Resources**

If indigenous or historic-era archaeological resources are encountered during proposed project development or operation, all activity within 100 feet of the find shall cease and the find shall be flagged for avoidance. The City and a qualified archaeologist, defined as one meeting the U.S. Secretary of the Interior's Professional Qualifications Standards for Archeology, shall be immediately informed of the discovery. The qualified archaeologist shall inspect the find within 24 hours of discovery and notify the City of their initial assessment.

If the City determines, based on recommendations from the qualified archaeologist, that the resource may qualify as a historical resource or unique archaeological resource (as defined in CEQA Guidelines Section 15064.5), or a tribal cultural resource (as defined in PRC Section 21074), the resource shall be avoided if feasible. Avoidance means that no activities associated with the proposed project that may affect cultural resources shall occur within the boundaries of the resource or any defined buffer zones. If avoidance is not feasible, the City shall consult with appropriate Native American tribes (if the resource is indigenous), and other appropriate interested parties to determine treatment measures to avoid, minimize, or mitigate any potential impacts to the resource pursuant to PRC Section 21083.2, CEQA Guidelines Section 15126.4. This shall include documentation of the resource and may include data recovery or other measures. Treatment for most resources would consist of (but would not be limited to sample excavation, artifact collection, site documentation, and historical research, with the aim to target the recovery of important scientific data contained in the portion(s) of the significant resource. The resource and treatment method shall be documented in a professional-level technical report to be filed with the California Historical Resources Information System. Work in the area may commence upon completion of approved treatment and under the direction of the qualified archaeologist.

**Mitigation Measure CUL-2: Accidental Discovery of Human Remains**

If human remains are uncovered during proposed project construction, all work shall immediately halt within 100 feet of the find and the San Mateo County Coroner shall be contacted to evaluate the remains and follow the procedures and protocols set forth in CEQA Guidelines Section 15064.5(e)(1). If the county coroner determines that the remains are Native American, the County shall contact the California Native American Heritage Commission, in accordance with California Health and Safety Code Section 7050.5(c) and PRC Section 5097.98. As required by PRC Section 5097.98, the City shall ensure that further development activity avoids damage or disturbance in the immediate vicinity of the Native American human remains, according to generally accepted cultural or archaeological standards or practices, until the City has conferred with the most likely descendants regarding their recommendations, if applicable, taking into account the possibility of multiple human remains.

## 7.6 ENERGY

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

### *Environmental Setting*

Energy usage is typically quantified using the British thermal unit (BTU). As a point of reference, the approximate amount of energy contained in common energy sources are as follows: gasoline, 115,000 BTUs per gallon; diesel, 138,500 BTUs per gallon; natural gas, 21,000 BTUs per pound; electricity, 3,414 BTUs per kilowatt-hour (kWh).[7]

Total energy usage in California was 7,640.8 trillion BTUs in 2012, which equates to an average of 201 million BTUs per capita. Of California's total energy usage, the breakdown by sector is 39 percent transportation, 23 percent industrial, 19 percent residential, and 19 percent commercial. Petroleum satisfies 55 percent of California's energy demand, natural gas 32 percent, and electricity 12 percent. Coal fuel accounts for less than one percent of California's total energy demand.[8] Electric power and natural gas in California are generally consumed by stationary users, whereas petroleum consumption is generally accounted for by transportation-related energy use.[9] The other sources are made up of renewable energy sources, which include wind and solar power, among other uses.

Given the nature of the proposed project, the main uses of energy would occur via construction vehicle fuel. These two sources of energy are discussed in further detail in the impacts discussion below.

### *Regulatory Setting*

Federal and state agencies regulate energy use and consumption through various means and programs. At the federal level, the United States Department of Transportation, the United States Department of Energy, and the EPA are three federal agencies with substantial influence over energy policies and programs. Generally, federal agencies influence and regulate transportation energy consumption through establishment and enforcement of fuel economy standards for automobiles and light trucks, through funding of energy related research and development proposed projects, and through funding for transportation infrastructure improvements.

[7] *U.S. Department of Energy, 2014. Alternative Fuels Data Center – Fuel Properties Comparison. http://www.afdc.energy.gov/fuels/fuel_comparison_chart.pdf*

[8] *U.S. Department of Energy, Energy Information Administration, 2014. "Official Energy Statistics from the U. S. Government," http://tonto.eia.doe.gov/state/state_energy_profiles.cfm?sid=CA.*

[9] *Ibid.*

At the state level, the California Public Utilities Commission (CPUC) and the California Energy Commission (CEC) are two agencies with authority over different aspects of energy. The CPUC regulates privately owned utilities in the energy, rail, telecommunications, and water fields. The CEC collects and analyzes energy-related data, prepares statewide energy policy recommendations and plans, promotes, and funds energy efficiency programs, and adopts and enforces appliance and building energy efficiency standards. California is exempt under federal law from rules that otherwise would preempt setting state fuel economy standards for new on-road motor vehicles. Some of the more relevant federal and state energy-related laws and plans are discussed below.

### *Federal Regulations*

#### Energy Policy Act of 2005

Passed by Congress in July 2005, the Energy Policy Act includes a comprehensive set of provisions to address energy issues. The act includes tax incentives for: energy conservation improvements in commercial and residential buildings; fossil fuel production and clean coal facilities; and construction and operation of nuclear power plants, among other things.

#### Energy Independence and Security Act of 2007

Signed into law in December 2007, this broad energy bill included an increase in auto mileage standards, and also addressed biofuels, conservation measures, and building efficiency. The EPA administers the Corporate Average Fuel Economy (CAFE) program, which determines vehicle manufacturers' compliance with existing fuel economy standards. The bill amended the CAFE standards to mandate significant improvements in fuel efficiency (i.e., average fleet-wide fuel economy of 35 miles per gallon [mpg] by 2020, versus the previous standard of 27.5 mpg for passenger cars and 22.2 mpg for light trucks).[10]

### *State Regulations*

#### Title 24 (California Energy Code)

The California Energy Code (24 CCR Part 6, California's Energy Efficiency Standards for Residential and Nonresidential Buildings) provides energy conservation standards for all new and renovated commercial and residential buildings constructed in California. The provisions of the California Energy Code apply to the building envelope, space-conditioning systems, and water-heating and lighting systems of buildings and appliances; they also give guidance on construction techniques to maximize energy conservation. Minimum efficiency standards are given for a variety of building elements, including appliances; water and space heating and cooling equipment; and insulation for doors, pipes, walls, and ceilings. The CEC adopted the 2005 changes to the Building Efficiency Standards, which emphasized saving energy at peak periods and seasons, and improving the quality of installation of energy-efficiency measures. It is estimated that implementation of the 2005 Title 24 standards have resulted in an increased energy savings of 8.5 percent relative to the previous Title 24 standards. Compliance with Title 24 standards is verified and enforced through the local building permit process.[11] The 2008 Title 24 Standards, which had an effective date beginning August 1, 2009, include added provisions that require, for example: "cool roofs" on commercial buildings; increased efficiency in heating, ventilating, and air conditioning systems; and increased use of

[10] *EPA. 2007. Summary of the Energy Independence and Security Act. Available online at: https://www.epa.gov/laws-regulations/summary-energy-independence-and-security-act*

[11] *California Energy Commission (2016) Web site (Building Efficiency Standards), http://www.energy.ca.gov/title24*

skylights and more efficient lighting systems.[12] Title 24 Standards were further updated with the 2013 Building Energy Efficiency Standards, which are estimated to lead to 25 percent less energy consumption for residential buildings and 30 percent savings for nonresidential buildings over 2008 Energy Standards. 2013 standards, which updated codes for lighting, space heating and cooling, ventilation, and water heating, took effect on July 1, 2014.

### California Global Warming Solutions Act of 2006

In September 2006, the governor signed AB 32, the Global Warming Solutions Act of 2006, which mandates that California's Greenhouse Gas (GHG) emissions be reduced to 1990 levels by 2020. The act directs the California EPA to work with state agencies to implement a cap on GHG emissions (primarily carbon dioxide) from stationary sources of such as electric power generation facilities, and industrial, commercial, and waste-disposal sectors. Since carbon dioxide emissions are directly proportional to fossil fuel consumption, the cap on emissions is expected to have the incidental effect of forcing a reduction in fossil fuel consumption from these stationary sources. Specifically, AB 32 directs the CEPA to work with other state agencies to accomplish the following: 1) promulgate and implement GHG emissions cap for the electric power, industrial, and commercial sectors through regulations in an economically efficient manner; 2) institute a schedule of greenhouse gas reductions; 3) develop an enforcement mechanism for reducing GHG; and 4) establish a program to track and report GHG emissions.[13]

### Senate Bill 32

Enacted in 2016, Senate Bill (SB) 32 (Pavley 2016) codifies the 2030 GHG emissions reduction goal of Executive Order B-30-15 by requiring CARB to ensure that state-wide GHG emissions are reduced to 40 percent below 1990 levels by 2030. Similar to AB 32, a reduction in GHG emissions typically corresponds with a reduction in energy usage as the bulk of GHGs result from the combustion of fossil fuel.

SB 32 was coupled with a companion bill, AB 197 (Garcia 2016). Designed to improve the transparency of CARB's regulatory and policy-oriented processes, AB 197 created the Joint Legislative Committee on Climate Change Policies, a committee with the responsibility to ascertain facts and make recommendations to the Legislature concerning state-wide programs, policies and investments related to climate change. AB 197 also requires CARB to make certain GHG emissions inventory data publicly available on its web site; consider the social costs of GHG emissions when adopting rules and regulations designed to achieve GHG emission reductions; and include specified information in all Scoping Plan updates for the emission reduction measures contained therein.

### *Local Regulations*

In addition to federal and state regulations and guidelines, there are City GP goals and policies relevant to energy usage found in the Conservation Element and Housing Element, and in the Climate Action Plan the City adopted in 2014.

### ***Discussion of Impacts***

a) ***Less than Significant Impact.*** The proposed project would require the use of diesel and other fuels for trucks and equipment during construction, but these activities would be short-term and completed as efficiently as possible for practical and financial reasons, among other considerations. In 2011, gasoline and diesel consumption for San Mateo County totaled to roughly 311 million

[12] *Ibid.*

[13] *Assembly Bill 32, Passed August 31, 2006, http://www.arb.ca.gov/cc/docs/ab32text.pdf.*

gallons.[14] Fuel consumption associated with the proposed project would mostly result from using a mini excavator, cement pump truck, and drill rig. The total fuel consumption from these three pieces of equipment adds up to approximately 4,205 gallons, which is equivalent to roughly 0.001% of the total gasoline and diesel consumption for San Mateo County in 2011. Furthermore, there would be no ongoing energy consumption in the operational phase of the proposed project in excess of the current baseline condition. Fuel consumption associated with the proposed project would therefore be negligible relative to the total fuel consumption in San Mateo County and construction and operation of the proposed project would not result in wasteful, inefficient, or unnecessary consumption of energy resources. Without the Energy Independence and Security Act of 2007, emissions from trucks and construction equipment would be unchecked and could result in a potentially significant impact. Since all vehicles will adhere to the act's fuel economy standards, impacts in this regard would be less than significant.

b) ***Less than Significant Impact.*** The proposed project would repair an existing storm drain outfall. The City 2014 Climate Action Plan (CAP) addresses the climate change impacts associated with increased flooding and severe weather events that involve risks to public health, private property, public infrastructure, and ecosystems. The CAP provides adaptation measures to mediate these climate change impacts:

- Integrate local flood management plans with adaptation planning;
- Identify vulnerable communities and develop emergency preparedness plans;
- Establish local land use policies that decrease flood risk; avoid building in high-risk areas;
- Modifications to storm water system routing and storage; Develop storage areas for peak flows;
- Maximize use of bioswales and permeable surfaces in both greenscape and hardscape areas to improve aquifer recharge & mitigate flooding from stormwater;[15]

The proposed project would indirectly address four of these five these adaptive measures and it would not hinder or obstruct any other energy or energy efficiency plans. The degree of operational energy consumption due to the repaired outfall would not be changed from current baseline conditions. The proposed project would not change the existing operation and maintenance activities and therefore these phases of the project would not have an impact on energy. energy. If the proposed project did not adhere to the CAP, the construction impacts could be potentially significant. The proposed project involves repairing the outfall which would maintain existing stormwater conveyance and flood control in the surrounding residential areas, which is aligned with the adaptation measures listed in the CAP. Impacts would be less than significant.

[14] *Plan Bay Area 2040. Draft Environmental Impact Report. April 2017. Available at: <http://2040.planbayarea.org/sites/default/files/2017-07/PBA%202040%20DEIR_0_1.pdf> Accessed May 20, 2020*

[15] *The City of Pacifica 2014 Climate Action Plan.*

## 7.7 GEOLOGY AND SOILS

| *Would the proposed project:* | Potentially Significant Impact | Less-Than-Significant with Mitigation Incorporated | Less-Than-Significant Impact | No Impact |
|---|---|---|---|---|
| a. Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving: | | | | |
| i. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42. | ☐ | ☐ | ☐ | ✖ |
| ii. Strong seismic ground shaking? | ☐ | ☐ | ✖ | ☐ |
| iii. Seismic-related ground failure, including liquefaction? | ☐ | ☐ | ✖ | ☐ |
| iv. Landslides? | ☐ | ☐ | ✖ | ☐ |
| b. Result in substantial soil erosion or the loss of topsoil? | ☐ | ☐ | ✖ | ☐ |
| c. Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the proposed project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse? | ☐ | ☐ | ✖ | ☐ |
| d. Be located on expansive soil, as defined in Table 18-1B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property? | ☐ | ☐ | ✖ | ☐ |
| e. Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater? | ☐ | ☐ | ☐ | ✖ |
| f. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature? | ☐ | ☐ | ✖ | ☐ |

The following analysis is based on the Geotechnical Investigation prepared by Cotton, Shires, and Associates, Inc. in support of design for the proposed project; the report is provided in Appendix C.

## ***Environmental Setting***

### *Regional Geologic Setting*

The proposed project site is located on the western side of the Santa Cruz Mountains within the Coast Range Geomorphic Province, not far from the transform fault boundary between the Pacific and North American tectonic plates.

### *Terrain*

The proposed project site is located in a northwest trending valley between elevations of 45 and 66 feet. The site is situated between the Pacific Ocean to the northwest and the Santa Cruz Mountains to the southeast. The surrounding area away from the creek channel is relatively level with a gentle slope down towards the southwest. The creek channel generally flows from the southeast to the northwest and has steep, up to 20-foot-high banks extending from the lowest elevation line of the channel at 45 feet to the backyard at 1411 Serra Drive, which is at 66 feet. Generally, this area consists of steep hills and narrow valleys to the north, south and east, and tidal estuary and a beach to the west.

### *Soils*

Two exploratory borings were conducted, drilled to depths of 35 feet and 50 feet. The borings showed that subsurface conditions were comprised of fill overlying coarse grained alluvium. The fill was 10 to 14 feet thick and consisted of medium-stiff to very stiff, moderate to high plasticity clays and silts, and medium-dense to dense clayey gravely sand. Underlying the fill, alluvial soils consisting of medium-dense to very dense clayey gravely sands and medium-stiff to stiff silty clay were encountered. Clayey, gravely sands were also exposed in the creek bank downstream of the existing spillway structure.

### *Seismicity*

The proposed project site is situated in an area of high seismicity. The nearest and controlling active faults, with respect to site seismicity, are the San Gregorio Fault located approximately 3 miles to the southwest, and the San Andreas Fault located 3.5 miles to the northwest. The Pilarcitos Fault is mapped through the proposed project site. The Pilarcitos Fault is considered to be either potentially active or inactive.

### *Liquefaction and Lateral Spreading*

Soil liquefaction is a phenomenon primarily associated with saturated, cohesionless soil layers located close to the ground surface. During liquefaction, soils lose strength and ground failure may occur. According to the ABAG Resilience Program hazards map, the proposed project site has moderate potential for liquefaction, despite its gravelly soils.

### *Landslide*

The City does not have any records of landslides mapped in the creek. However, there may have been erosion during past flooding events resulting in streambank erosion which damaged the existing outlet structure.

## ***Regulatory Setting***

Safety standards and building specifications relating to earthquakes, seismic-related ground failure, landslides, geology, and soils are mainly regulated via the Alquist-Priolo Earthquake Fault Zoning Act, as amended in 1994, as well as the California Building Code (CBC).

The Alquist-Priolo Act's main purpose is to prevent the construction of buildings used for human occupancy on the surface trace of active faults. The Act requires the state's California Geological Survey agency to compile and maintain up-to-date maps of surface traces of known active earthquake faults. Before a new project is permitted, cities and counties require a geologic investigation to demonstrate that proposed buildings will not be constructed on active Alquist-Priolo fault zones.

The CBC, based on the International Code Council, requires specific tests for masonry and other building elements of newly constructed buildings to ensure structures can adequately resist seismic forces during earthquakes.

## ***Discussion of Impacts***

a-i,) ***No Impact.*** The proposed project site is not located within a State of California designated Alquist-Priolo Earthquake Fault Zone (California Department of Conservation 1974). Earthquake fault zones are regulatory zones that encompass surface traces of active faults that have a potential for future surface fault rupture. The closest active faults to the site are the San Gregorio Fault located approximately 3 miles to the southwest and the San Andreas Fault located 3.5 miles to the northwest. The Pilarcitos Fault is mapped through the proposed project site but is considered to be either potentially active or inactive. Surface rupture associated with a fault is not anticipated in the City. The proposed project would not construct residences or any other buildings in an area where surface rupture might occur. No impacts would occur.

a-ii) ***Less than Significant Impact***. The proposed project would not change the existing operation and maintenance activities and therefore these phases of the project would not have an impact on seismic ground shaking. The potential for seismic ground-shaking at the proposed project site ranges from "strong" (associated with the Hayward Fault) to "severe" (associated with the San Andreas Fault and San Gregorio Fault) according to ABAG's Resilience Program hazards map. The proposed project site's proximity to two active bay area faults (San Andreas and San Gregorio) leaves it vulnerable to some degree of ground shaking, which is common in the Bay Area. The proposed project would not create a need or opportunity for people to reside on-site and thus be exposed to such ground shaking long-term. If an earthquake were to occur during the construction phase, it could create a risk for workers on-site, but under the obligation of the Occupational Safety and Health Act (OSHA), construction workers would be trained to take the necessary precautions to maintain worker safety in the event of an earthquake. If workers did not adhere to OSHA standards, there would be potential for a significant impact due to strong ground shaking. Given the construction contractor must adhere to these existing legal obligations, the impacts related to this topic would be less than significant.

a-iii) ***Less than Significant Impact.*** The proposed project would not change the existing operation and maintenance activities and therefore these phases of the project would not have an impact on seismically related ground failure. Liquefaction occurs when a saturated or partially saturated soil substantially loses strength and stiffness in response to an applied stress, such as seismic shaking, which causes a solid to behave like a liquid. Soils susceptible to liquefaction are saturated, loose, granular deposits. Liquefaction can result in flow failure, lateral spreading, ground movement, settlement, and other related effects. Buried pipelines embedded within liquefied soils may also experience uplift due to buoyancy.

According to ABAG's Resilience Program hazards map, the proposed project site has a moderate susceptibility to liquefaction; however, according to the proposed project's Geotechnical Investigation report, the potential for liquefaction and lateral spreading at the proposed project site is low due to the high plasticity of the clayey soils. Seismic design features from the Geotechnical

Investigation have been incorporated into the proposed project design and, in addition, the proposed project would be subject to all federal, state, and local regulations for seismic conditions, including the CBC. Without the design features from the Geotechnical Investigation and the CBC, construction impacts from seismic-related ground failure would be potentially significant. By adhering to regulations and design standards, impacts would be less than significant.

a-iv) ***Less than Significant Impact.*** The proposed project would not change the existing operation and maintenance activities and therefore these phases of the project would not have an impact on landslides. Landslides are frequently triggered by strong ground motions. They are an important secondary earthquake hazard. The term landslide includes a wide range of ground movement, such as rock falls, deep failure of slopes, and shallow debris flows. According to the proposed project's Geotechnical Investigation, due to steep creek bank slopes surrounding the proposed project site combined with the undocumented fill, the potential for landslides is considered to be high.

If the proposed project were to proceed without any consideration of the geotechnical study, there would be the potential for significant impacts. However, seismic design features from the Geotechnical Investigation have been incorporated into the proposed project design, specifically that the headwall and wing walls be supported by drilled pier foundations. Additionally, the proposed project would be subject to all federal, state, and local regulations for seismic conditions, including the CBC. Given these design features and the legal obligations associated with seismic building design, impacts associated with seismic landslides would be less than significant.

***b)*** ***Less than Significant Impact.*** The proposed project would not change the existing operation and maintenance activities and therefore these phases of the project would not have an impact on erosion. Proposed project development, including soil and slope stabilization, may require grading which could leave the soils of operation zones barren of vegetation and, therefore, vulnerable to sheet, rill, or gully erosion. Eroded soil is generally carried as sediment in surface runoff to be deposited in natural creek beds, canals, and adjacent wetlands. This erosion could cause a potentially significant impact in the absence of any regulation. However, the proposed project would not cause a substantial change to erosion and accretion patterns of the area long-term because the improvements would not alter the overall existing drainage pattern of the area. Compliance with the San Mateo Countywide Water Pollution Prevention Program would minimize the potential for erosion and indirect effects associated with soil erosion (i.e., water quality impacts, fugitive dust). This program requires City staff to complete the portion of the C.3 and C.6 Development Review Checklist pertaining to special proposed projects that would minimal erosion related impacts. Impacts on soil would therefore be less than significant.

c, d) ***Less than Significant Impact.*** The proposed project would not change the existing operation and maintenance activities and therefore these phases of the project would not have an impact on unstable or expansive soils. As discussed above in a-iii and a-iv, the potential for liquefaction and lateral spreading at the proposed project site is low due to the high plasticity of the clayey soils, and the potential for landslides is considered high. The near-surface fill material is moderately to highly plastic and is potentially moderately expansive as well. Highly expansive earth materials could be subjected to large volume changes due to seasonal fluctuations in moisture content or removal of overburden materials. Moderate plasticity soils also have a moderate potential to creep when located on steep slopes, such as the location of the outfall. Without adhering to the design stipulations put forth in the Geotechnical Investigation or adhering to the CBC, there would be potential for significant construction impacts. The proposed project's design includes a deep, pier-supported foundation that should bear well below the moderate to high plasticity fill, and consequently will alleviate the potential for differential foundation movement due to expansive or unstable soils.

Furthermore, the proposed project is subject to all federal, state, and local regulations and standards for seismic conditions including the CBC and would be designed to conform to all building requirements. Therefore, the proposed project's impacts would not destabilize the soil or expose human life or structures to increased risk of on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse. Impacts in these areas would be less than significant.

e) ***No Impact.*** The proposed project does not involve construction of septic tanks or alternative wastewater disposal systems.

f) ***Less than Significant Impact.*** The proposed project site is adjacent and within a highly disturbed creek channel. Excavation of soil would be required, but the soil would be non-native fill and is unlikely to contain any paleontological resources. There would be the potential for a significant impact to paleontological resources if the soil had never been previously disturbed or if a search of museum records indicated the presence of paleontological resources. The ground disturbance associated with the proposed project would not change the topography or geologic substructures of the vicinity and would therefore not change any unique geologic features. The proposed project would not change the existing operation and maintenance activities and therefore these phases of the project would not have an impact on paleontological resources. Unique paleontological or geologic features would therefore only exist in the deeper layers of soil and would remain undisturbed. Impacts would be less than significant.

## 7.8 GREENHOUSE GAS EMISSIONS

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

### *Environmental Setting*

GHGs are heat-trapping gases that, when emitted to the earth's atmosphere, contribute to an abnormally fast rate of planetary warming. The consequences of these warming patterns include rising sea levels and increased frequency and intensity of natural disasters, among other issues. The major GHGs released by human activity are carbon dioxide ($CO_2$), methane, and nitrous oxide. The primary sources of GHGs are vehicles (including planes and trains), energy plants, and industrial and agricultural activities (such as dairies and hog farms). Although less potent than other GHGs such as methane, $CO_2$ is the most common and therefore the greatest contributor to man-made global warming. Accordingly, GHGs are expressed in terms of annual metric tons of $CO_2$ equivalents ($MTCO_2e$/yr.).

Assembly Bill 32, adopted in 2006, established the Global Warming Solutions Act of 2006 which requires the State to reduce GHG emissions to 1990 levels by 2020. Senate Bill 97, adopted in 2007, required the Governor's Office of Planning and Research to develop CEQA guidelines for the mitigation of greenhouse gas emissions, and the Resources Agency certified and adopted the amendments to the guidelines on December 30, 2009. According to CEQA Guidelines Section 15064.4, the lead agency may quantitatively or qualitatively assess the project's impact on GHGs. The lead agency should consider the project's reasonably foreseeable incremental contribution to the effects of climate change using evolving scientific knowledge, state regulatory schemes, and an appropriate timeframe for the proposed project

### *Discussion of Impacts*

a) ***Less than Significant Impact.*** The proposed project would not directly or indirectly generate GHG emissions in the long-term. The proposed project would not change the existing operation and maintenance activities and therefore these phases of the project would not have an impact on generation of greenhouse gas emissions. The proposed project would repair an existing storm drain outfall. The repaired outfall would not require the use of any pumps or other electrical equipment that would emit GHGs during operation. Accordingly, there would be little to no change from the baseline condition where negligible GHGs are generated.

In the short-term, the proposed project would require the use of gasoline and/or diesel-powered equipment during construction. Excess soils and vegetation removed during site preparation and solid waste from stormwater infrastructure removal would require off-site hauling. Construction would take place over a span of roughly 20 workdays and would cover a small geographic area. The proposed project site is approximately 0.07 acres in size. Solid waste would travel approximately 14.7 miles from the site to Ox Mountain Sanitary Landfill. Given these short

distances, the small size of the proposed project site, and the short duration of construction, proposed project construction would not generate significant GHGs.

During construction, equipment use and material hauling would generate GHGs, which are estimated to be in the range of 250 to 300 MT $CO_2e$. Without the limits on GHG emissions set forth by the Global Warming Solutions Act of 2006, the construction equipment and trucks used for hauling would have the potential to emit much higher $CO_2e$ levels. This could create a potentially significant impact. The City's 2005 GHG inventory reported an estimate of 5,461 MT $CO_2e$ for off-road activity, which represented about three percent of the City's estimated annual GHG emissions. A less than significant impact would occur based on the emissions generated through construction activities.

b) ***Less than Significant Impact.*** The proposed project would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions. The proposed project would not change the existing operation and maintenance activities and therefore these phases of the project would not have an impact on greenhouse gases. As stated above, project activities are expected to produce 250 to 300 MT $CO_2e$. This amount of $CO_2e$ emissions is far below the BAAQMD threshold of 1,000 MT $CO_2e$.[16]

Given the proposed project's relatively minimal contribution to the region's GHGs and the fact that the proposed project would not be growth-inducing, the proposed project would not impede the attainment of AB 32 goals. As such, the proposed project would not conflict with any applicable plans, policies, or regulations adopted for the purpose of reducing GHG emissions, and impacts would be less than significant.

[16] *BAAQMD. California Environmental Quality Act Air Quality Guidelines. May 2017.*

## 7.9 HAZARDS AND HAZARDOUS MATERIALS

| *Would the proposed project:* | Potentially Significant Impact | Less-Than-Significant with Mitigation Incorporated | Less-Than-Significant Impact | No Impact |
|---|---|---|---|---|
| a. Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials? | ☐ | ☐ | ✖ | ☐ |
| b. Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the likely release of hazardous materials into the environment? | ☐ | ☐ | ✖ | ☐ |
| c. Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school? | ☐ | ☐ | ✖ | ☐ |
| d. Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment? | ☐ | ☐ | ☐ | ✖ |
| e. For a proposed project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the proposed project result in a safety hazard or excessive noise for people residing or working in the proposed project area? | ☐ | ☐ | ☐ | ✖ |
| f. Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan? | ☐ | ✖ | ☐ | ☐ |
| g. Expose people or structures, either directly or indirectly, to the risk of loss, injury or death involving wildland fires? | ☐ | ✖ | ☐ | ☐ |

### *Environmental Setting*

A material is considered hazardous if it appears on a list of hazardous materials prepared by a federal, state, or local agency or if it has characteristics defined as hazardous by such an agency. A hazardous material is defined in 22 CCR Section 66261.10 as a substance with physical, chemical, or infectious characteristics which may cause or contribute to mortality or illness or pose a threat to human health or the environment when mismanaged. Chemical and physical properties which may cause a substance to be considered hazardous include toxicity, ignitability, corrosivity, and reactivity.

Under California Government Code Section 65962.5, the California Department of Toxic Substances Control (DTSC) maintains a list of hazardous substance sites. This list, referred to as the "Cortese List",

includes CALSITE hazardous material sites, sites with leaking underground storage tanks, and landfills with evidence of groundwater contamination. The State Water Resource Control Board (State Water Board) GeoTracker database similarly documents hazardous waste sites throughout the state but focuses on groundwater contamination. There are no sites in the City listed on the Cortese List.[17] The nearest site, Camp Montara, is approximately 1.5 miles southwest of the proposed project site and was classified as a Formerly Used Defense Site (FUDS). Cleanup of the site was deemed complete upon issuance of a No Further Action Letter by DTSC on September 13, 2012.[18]

## ***Regulatory Setting***

Throughout construction, the contractor shall comply with San Mateo County's Water Pollution Prevention Program stormwater BMPs. Implementation of BMPs shall be verified by the City through, at minimum, one site inspection during construction. Stormwater BMPs to be implemented during construction include the following:

- The contractor shall perform all major maintenance, repair, and vehicle and equipment washing off-site;
- If refueling or vehicle maintenance must be performed on-site, it shall be conducted in a bermed area away from storm drains and over a drip pan or drop cloths large enough to collect fluids. Fluids shall be recycled or disposed of as hazardous waste;
- If vehicle or equipment cleaning must be done on-site, it shall be performed with water only in a bermed area that will not allow rinse water to run into gutters, streets, storm drains, or surface waters;
- Vehicle and equipment on-site shall not be cleaned using soaps, solvents, degreasers, or steam cleaning equipment;
- Spill cleanup materials shall be available at the construction site at all times;
- Vehicles and equipment shall be inspected frequently, and leaks repaired promptly. Drip pans shall be used to catch any leaks until repairs are made;
- Spills or leaks shall be immediately cleaned and properly disposed of;
- Dry cleanup methods shall be used in the event of a fluid spill; and
- Significant spills shall be reported to a local emergency response entity or the Governor's Office of Emergency Services Warning Center immediately.

## ***Discussion of Impacts***

a, b) ***Less than Significant Impact.*** In the long-term, the proposed storm drain outfall replacement would not require the use, transport, or disposal of any hazardous materials. Upon proposed project completion, the proposed project site would contain a concrete headwall and a 7.5-foot-wide rock

[17] *Department of Toxic Substances Control, Hazardous Waste and Substances Site List – Site Cleanup (Cortese List), Accessed April 2, 2020. https://dtsc.ca.gov/dtscs-cortese-list/*

[18] *Department of Toxic Substances Control, "EnviroStor Database," Accessed April 2, 2020. https://www.envirostor.dtsc.ca.gov/public/map/*

rip-rap energy dissipater, none of which would create the need for hazardous material use or transport. The proposed project would not change the existing operation and maintenance activities and therefore these phases of the project would not have an impact from the transport, use, or disposal of hazardous materials. As such, there would be no long-term risks associated with the use, transportation, or disposal of hazardous materials, nor would there be any long-term risks of accident and upset conditions releasing hazardous materials into the environment.

Construction would require use of motorized equipment, creating the need for routine use of small quantities of hazardous materials such as fuels and lubricants during the construction period. Construction would take place during the dry season and equipment would be staged off-site, minimizing the risk of hazardous material spills adversely affecting the downstream environment. Nonetheless, use of hazardous materials in close proximity to aquatic resources and a residential community could create a potentially significant impact by releasing hazardous materials into the environment. The contractor would implement equipment management and spill procedures provided by San Mateo County's Water Pollution Prevention Program in order to comply and to ensure that construction impacts remain less than significant. These procedures dictate where and how equipment may be stored and how spills should be handled. The BMP's that the San Mateo County Water Pollution Prevention Program recommends for handling and use of hazardous materials are as follows:

- 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 water tight containers, store in appropriate secondary containment, and cover them at the end of every work day 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.[19]

As the proposed project will incorporate the above referenced stormwater BMP's associated with the Water Pollution Prevention Program, the proposed project would not create a significant hazard through the routine transport, use, or disposal of hazardous materials, nor would it create a significant hazard to the public through reasonably foreseeable accident and upset conditions involving hazardous materials. Accordingly, impacts would be less than significant.

c) ***Less than Significant Impact.*** The proposed project would not change the existing operation and maintenance activities and therefore these phases of the project would not have an impact from hazardous emissions. The closest school building to the proposed project site is the Pacific Bay Christian School (formerly known as the Alma Heights Christian Academy), located 0.15 miles northwest of the outfall. If large quantities of hazardous substances were being transported within the school's vicinity without any regulatory oversight, there would be the potential for a significant impact. Fuels, lubricants, and any other potentially hazardous materials used during proposed project construction would be in such small quantities and handled carefully in compliance with all applicable laws and regulations such as the San Mateo County Water Pollution Prevention Program that it would have little to no chance of affecting the school. Although the Pacific Bay Christian School is within a 0.25 mile of the proposed project site, there is very low potential that the school

[19] *San Mateo Countywide Water Pollution Prevention Program. Construction Best Management Practices (BMPs). June 2014.*

would be affected by the use of fuels, lubricants, and other chemicals on the proposed project site. Therefore, this potential impact is considered less than significant.

d) ***No Impact.*** According to the California DTSC EnviroStor and State Water Board GeoTracker databases, the proposed project site is not included on the list of hazardous material sites compiled pursuant to Government Code Section 65962.5. Furthermore, there are no such sites in the vicinity of the proposed project site. As there are no hazardous waste sites in or near the proposed project site, the proposed project would not create a hazard to the public or environment through location on a hazardous materials site and no impact would occur.

e) ***No Impact.*** The nearest airport relative to the proposed project site is San Francisco International Airport (SFO), located approximately 5 miles to the east. In addition, the proposed project site is approximately 5 miles north of Half Moon Bay Airport. The proposed project would not introduce any tall structures, sources of light, or habitat which may attract more birds to the area. As such, the proposed project would not create a hazard to flight. Per the Comprehensive Airport Land Use Plan for the Environs of San Francisco International Airport (SFO Plan), the proposed project site does not lie within designated Safety Compatibility Zones or forecasted noise contours for SFO.[20] According to the San Mateo County Comprehensive Airport Land Use Compatibility Plan (ALUCP), the site is not located within an Airport Safety Zone for Half Moon Bay Airport, and, thus, would not be significantly affected by the airport.[21] As such, the proposed project would not create excessive noise for people living in the vicinity of an airport. As the proposed project would not create hazards or excessive noise for people living in the vicinity of an airport, no impact would occur.

f) ***Less than Significant with Mitigation Incorporated.*** The proposed project would not change the existing operation and maintenance activities and therefore these phases of the project would not have an impact on an adopted emergency response or evacuation plan. The proposed project site is in a residential neighborhood in the City. The streets are therefore designed to accommodate minimal through-traffic. In the vicinity of the proposed project site, most streets have one lane in each direction and do not have a shoulder or parking spaces. Construction equipment would be staged off-site when not in use, minimizing the risk of obstructing emergency response during evenings and weekends, when construction would not occur. Given the narrow design of adjacent roadways, it is possible that on-site construction equipment could obstruct emergency response in the event of an evacuation should emergency vehicles require passage during construction hours, , resulting in a potentially significant impact. There are two ingress/egress points from the proposed project site, so if one point is blocked by construction equipment/activity there is still an alternate access point available. Moreover, Mitigation Measure HAZ-1 requires notification of emergency service providers 72 hours prior to the start of construction and compliance with the City's recommended traffic BMPs during construction, minimizing the risk of obstructing emergency access. Through the implementation of Mitigation Measure HAZ-1, the construction impact would be reduced to less than significant. Following construction, the proposed project would not interfere with an emergency response plan, as proposed project modifications would generally be confined to a creek bed which does not contain any emergency response infrastructure. The proposed project would, therefore, not lead to physical modification or obstruction of emergency response infrastructure such as communication systems or roadways. As such, the proposed project would not impair implementation of or physically interfere with implementation of an emergency

[20] *City/County Association of Governments of San Mateo County, California. Comprehensive Airport Land Use Plan for the Environs of San Francisco International Airport. November 2012.*

[21] *San Mateo County. Comprehensive Airport Land Use Compatibility Plan. December 1996.*

response or evacuation plan, and impacts would be less than significant with mitigation incorporated.

**Mitigation Measure HAZ-1:**

The contractor shall implement the following actions throughout the duration of construction to maintain adequate emergency access to the site and through the adjacent neighborhood:

- Traffic controls, flag persons, signage, and/or safety site controls shall be used at all times when work is being done in the City's right-of-way or equipment is obstructing the right-of-way;
- The contractor shall obtain all clearances and permits required by the City for work within its right-of-way prior to the start of construction;
- The contractor shall comply with truck routes specified in the grading application, if any;
- The City or a representative of the City shall prepare a parking plan. The contractor shall comply with the parking plan and shall not damage adjoining or nearby parking strips;
- If any other construction proposed projects are being implemented in the vicinity of the proposed project site, the contractor shall coordinate all parking, construction processes, and deliveries with other nearby construction sites; and
- The contractor shall notify the City Police Department and Fire Department Station No. 72 of construction at minimum 72 hours prior to its start.

g) ***Less than Significant with Mitigation Incorporated.*** Fire risk near the proposed project site is pronounced due to the presence of dense vegetation that may serve as potential fuel sources throughout residential communities. The proposed project would not increase fire risk in the operational phase, as no new structures or fuel sources would be introduced to the proposed project site and the proposed project would not draw new people who would be exposed to fire risk to the area. During construction, the presence of motorized equipment in the creek bed during the dry season may lead to a temporary increase in fire risk. This could create a significant impact if no mitigation measures were set forth. Mitigation Measure HAZ-2 requires that the contractor remove potential fuel sources such as dried vegetation and requires provision of fire extinguishers for service trucks, among other fire risk reducing measures. With implementation of Mitigation Measure HAZ-2, the proposed project would not expose people or structures to risk of loss, injury, or death involving wildland fires. Impacts would accordingly be less than significant with mitigation incorporated.

**Mitigation Measure HAZ-2:**

During construction activities, the construction contractor shall implement the following BMPs to prevent fire hazards:

- Staging areas, welding areas, or areas slated for development using spark producing equipment shall be cleared of dried vegetation or other materials that

could serve as fire fuel. To the extent feasible, the contractor shall keep these areas clear of combustible materials in order to maintain a firebreak.

- No smoking, open flames, or welding shall be allowed in refueling or service areas.
- Service trucks shall be provided with fire extinguishers. A minimum of two fire extinguishers shall be kept on site during proposed project construction.
- Any construction equipment that normally includes a spark arrester shall be equipped with an arrester in good working order.

## 7.10 HYDROLOGY AND WATER QUALITY

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

### *Environmental Setting*

The proposed project site is within a 100-year floodplain, but not a dam inundation zone, or tsunami inundation area.[22] According to the FEMA Flood Insurance Rate Map, San Pedro Creek is identified as Zone A which is defined as an area inundated by 1% annual chance flooding, for which no Base Flood

[22] *Association of Bay Area Governments and California Geological Survey, "Bay Area Hazards," April 2020, http://gis.abag.ca.gov/website/Hazards/?hlyr=concordGV&co=6013.*

Elevations (BFE[s]) have been determined. The residential area outside of creek limits is identified as Zone X, which is defined as areas determined to be outside 500-year floodplain and determined to be outside the 1% and 0.2% annual chance floodplains. The proposed project site is adjacent to San Pedro Creek, in the San Pedro Creek Watershed, a portion of the greater San Francisco Bay Watershed. The San Francisco Bay watershed covers 4,600 square miles, of which the Bay itself encompasses 1,600 square miles. Historically, the watershed had about 300 square miles of tidal marsh with 6,000 miles of channels and 12 square miles of shallow pan. Following the 1850s, large amounts of sediment from upstream erosion and hydraulic mining flowed in the Bay, and surrounding tidal wetlands were diked for salt production, hayfields, or filled in. The proposed project includes repair of a storm drain that picks up drainage from the surrounding streets and discharges to San Pedro Creek, which in turn discharges to the Pacific Ocean.

## ***Regulatory Setting***

Pacifica is part of the San Mateo Countywide Water Pollution Prevention Program (Countywide Program). The Countywide Program is a collaboration between 22 member agencies, which include the County of San Mateo and various towns and cities on the Peninsula. The Countywide Program holds a Municipal Regional Permit (MRP) that covers countywide stormwater discharges pursuant to the National Pollutant Discharge Elimination System (NPDES) program under CWA. The MRP is part of NPDES permit CAS612008, administered by the San Francisco Regional Water Quality Control Board (SF Water Board). MRP implementation programs include pesticide, mercury, polychlorinated biphenyl, and copper controls; construction site control; water quality monitoring; and others. Construction site control measures include erosion control, run-on and run-off control, sediment control, active treatment systems, and non-stormwater management.[23]

The City Storm Water Management and Discharge Control Ordinance prohibits discharge of non-stormwater discharges to the City stormwater system and requires that all discharges of material other than stormwater be in compliance with a NPDES permit issued for the discharge. Section 6-12.206 outlines BMPs for construction activities to minimize run-off.[24]

## ***Discussion of Impacts***

a) ***Less than Significant Impact.*** The proposed project would not change the existing operation and maintenance activities and therefore these phases of the project would not have an impact on water quality standards or waste discharge requirements. The proposed project entails repair of the outfall for an 18-inch-diameter reinforced concrete pipe storm drain. Construction activities would require ground disturbance with a mini excavator and hand tools, such as rebar cutters and circular saws. Grading for the headwall would involve approximately 8 CY of excavation and 14 CY of fill behind the headwall at the top of the bank. Additionally, approximately 10 CY of 15-inch-diameter, partially grouted rip-rap, and 15 CY of 15-inch-diameter rip-rap would be placed around the new headwall once completed. Exclusion fencing would be provided around the work area adjacent to the existing vegetation to be protected in place, but some vegetation may still be cleared as necessary to facilitate bank stabilization. In the course of these activities, soil particles and other

[23] *California Regional Water Quality Control Board - San Francisco Bay Region, "Municipal Regional Stormwater NPDES Permit, Order No. R2-2015-0049, NPDES Permit CAS612008," November 19, 2015, https://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/stormwater/Municipal/R2-2015-0049.pdf.*

[24] *City of Pacifica Code of Ordinances, Chapter 12 – Storm Water Management and Discharge Control, Article 2 – Discharge Regulations and Requirements. Accessed 4/2/2020: https://librarystage.municode.com/ca/pacifica/codes/code_of_ordinances?nodeId=TIT6SAHE_CH12STWAMADICO_ART1TIPUGEPR*

materials could be carried in stormwater runoff to drainage facilities, which could degrade water quality in the area.

As described in the *Project Description*, the contractor would be required to develop and submit a dewatering and flow bypass plan, in coordination with the proposed project engineer. Earthwork within the stream would only occur in the dry season, from June 1 to October 31. Dewatering and flow bypassing would convey baseflows only, not stormflows. Any rainfall runoff events that happen during the in-channel work window would not be controlled by the bypass system; therefore, in the unlikely event of stormflows in San Pedro Creek in the summer months or early fall, crews would not work in the creek until flows have subsided. The contractor would monitor weather conditions throughout the proposed project. If more than 0.5 inch of rain is forecast within 2 days, the contractor would cease grading and stabilize the site. The contractor would continue work 24 hours after the end of the precipitation event.

During construction, the introduction of additional soil particles and other materials into stormwater drainage facilities has the potential to produce a significant impact. In addition to the design features and BMPs described above, the proposed project would be required to comply with the San Mateo Countywide Water Pollution Prevention Program. The requirements of this program ensure that the project will comply with the stipulations set forth in NPDES permit CAS612008. The proposed project would, therefore, not have any short- or long-term impacts on water quality and impacts would be less than significant.

b) ***Less than Significant Impact.*** The proposed project would not change the existing operation and maintenance activities and therefore these phases of the project would not have an impact on groundwater supply and recharge. The proposed project would repair an existing storm drain outfall. These improvements would not require introduction of any new impervious surfaces in areas previously penetrable for groundwater recharge purposes. Furthermore, the proposed project would not require any use of groundwater. Impacts would be less than significant.

c-i-iv) ***Less than Significant Impact***. The proposed project would not permanently alter the course of a stream or river, nor would it add substantial impervious surface. The proposed project would not change the existing operation and maintenance activities and therefore these phases of the project would not have an impact on hydrology and water quality. The proposed project would repair an existing storm drain outfall in a previously disturbed creek channel. Therefore, the proposed project would not result in an increase in impermeable surfaces or an increase in runoff compared to existing conditions. The proposed project would not cause a substantial change to the erosion and accretion patterns long-term because the repaired outfall would not alter the existing drainage pattern of the area. Temporary construction impacts related to runoff from grading and cut and fill activities could occur and create a significant impact if not addressed. Proposed project design features, compliance with the San Mateo Countywide Water Pollution Prevention Program, and the City regulations requiring construction BMPs and a NPDES permit for all non-stormwater discharge to the City stormwater system would ensure impacts from runoff would remain less than significant. Moreover, the proposed project would need to comply with Mitigation Measure BIO-1a, which states, in part, "…ground-disturbing activities shall occur during the summer dry season where flows are low or streams are dry…Furthermore, no construction activities shall occur during rain events or within 24 hours following a rain event". The proposed project would not add impervious surface or impede flood flows. Both construction and operationally related impacts in these areas would be less than significant.

d, e) ***Less than Significant Impact.*** The proposed project would not have other water quality or groundwater sustainability impacts beyond those discussed above under items a) and b). The proposed project site is not located in a tsunami inundation area or seiche zone. The proposed

project would comply with the San Mateo Countywide Water Pollution Prevention Program. There would be no operational impacts, and construction impacts would be less than significant.

## 7.11 LAND USE AND PLANNING

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

### *Environmental Setting*

The proposed project site is located in the City of Pacifica in San Mateo County, California. The proposed project is designated as Low Density Residential by the City Linda Mar Neighborhood Land Use Plan[25] and zoned Single Family Residential (R-1) in the City Planning and Zoning Code.[26] Areas designated as Low Density Residential are defined by the City GP to include areas with 3 to 9 dwelling units per acre.

The proposed project site is surrounded by other single-family residences directly to the north and south. A parcel designated as Public Facilities (P-F) exists 0.04 miles to the west-northwest, housing Pacifica Fire Department Station No. 72 and outdoor facilities associated with the Pacific Bay Christian School and the Coastside Community Church. The proposed project would repair a storm drain outfall in the bank of San Pedro Creek (Figure 3).

The primary land use documents and regulations with jurisdiction over the proposed project site are the City GP and Zoning Ordinance. There are no HCPs or NCCPs applicable to the proposed project. The provisions of the City GP and Zoning Ordinance discussed below are designed to avoid or mitigate environmental impacts and are relevant to the proposed project:

### *Regulatory Setting*

The following policies from the City GP are considered applicable to the proposed project:

#### *City of Pacifica General Plan*

#### Conservation Element

- **Policy 1**. Conserve trees and encourage native forestation.
- **Policy 2.** Require the protection and conservation of indigenous rare and endangered species.
- **Policy 3.** Protect significant trees of neighborhood or area importance and encourage planting of appropriate trees and vegetation.

[25] *City of Pacifica General Plan 1980, Linda Mar Land Use Plan (revised 8/6/1996). Accessed 3/30/19 at: https://www.cityofpacifica.org/civicax/filebank/blobdload.aspx?t=75298.48&BlobID=15615*

[26] *City of Pacifica Zoning Maps, Edited December 2017. Accessed 3/30/19 at: https://www.cityofpacifica.org/civicax/filebank/blobdload.aspx?BlobID=13644*

- **Policy 5.** Local year-round creeks and their riparian habitat shall be protected.

### Open Space Element

- **Policy 1.** Retain open space which preserves natural resources, protects visual amenities, prevents inappropriate development, provides for the manages use of resources, and protects the public health and safety.

### Noise Element

- **Policy 2.** Establish and enforce noise emission standards for Pacifica which are consistent with the residential character of the City and environmental, health, and safety needs of the residents.

### Community Design Element

- **Policy 2.** Encourage the upgrading and maintenance of existing neighborhoods.

### Community Facilities Element

- **Policy 1.** Maintain and improve the present level of City services.

### Land Use Element

- **Policy 4.** Continue to cooperate with other public agencies and utilities in applying compatible uses for their lands, rights-of-way, and easements.

### ***Discussion of Impacts***

a) ***No Impact.*** The proposed project involves repair of a storm drain outfall in a previously disturbed creek, within much the same footprint as the existing outfall and headwall. The proposed project would not physically divide an established community. No impacts would occur.

b) ***Less than Significant Impact.*** The proposed project would not change the existing operation and maintenance activities and therefore these phases of the project would not have an impact on land use planning. The proposed project would have a significant impact if it were to conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect. The proposed project is subject to several local policies, plans, and regulations, as described above. The primary objective of the proposed project is to repair the existing storm drain outfall and provide energy dissipation for erosion control so that the storm drain may continue functioning properly. The proposed project would not conflict with the City GP or other applicable land use plans or policies. Impacts would be less than significant.

## 7.12 MINERAL RESOURCES

| *Would the proposed project:* | Potentially Significant Impact | Less-Than-Significant with Mitigation Incorporated | Less-Than-Significant Impact | No Impact |
|---|---|---|---|---|
| a. Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state? | ☐ | ☐ | ☐ | ✖ |
| b. Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan? | ☐ | ☐ | ☐ | ✖ |

### *Environmental Setting*

The State Surface Mining and Reclamation Act of 1975 requires the State Geologist to classify mineral areas in the state, and the State Mining and Geology Board to designate mineral deposits of regional or statewide significance. The City GP identifies Pacifica Quarry (formerly known as Rockaway Quarry) and Mori Point as the only two areas of regional mineral significance. Historically, the Pacifica Quarry supplied limestone from 1776 until 1987, when mining operations in the area closed.[27] Pacifica Quarry and Mori Point are not located on or near the proposed project site.

### *Discussion of Impacts*

a, b) ***No Impact.*** The proposed project site is not in or adjacent to any important mineral resource areas. Pacifica Quarry and Mori Point were designated in 1987 as areas of regional mineral significance.[28] Pacifica Quarry is roughly 1.5 miles northwest of the proposed project site and Mori Point is approximately 2.3 miles northwest of the proposed project site. These are the only areas of the City with such a designation, and they are not located on or near the proposed project site. Furthermore, the development of the proposed project would not preclude future excavation of oil or minerals should such extraction become viable. As such, there would be no loss of availability of known mineral resources and no impacts to mineral resources.

[27] *https://thepacificaquarry.com/history/*

[28] *City of Pacifica General Plan, Conservation Element, 1980*

## 7.13 NOISE

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

### *Environmental Setting*

#### *Basics of Noise*

Sound is described in terms of loudness and pitch. The standard unit for measuring loudness is the decibel (dB), which is quantified on a logarithmic scale. The human ear is not equally sensitive to a given sound level at all pitches. A special pitch-dependent rating scale has been devised to relate noise to human sensitivity. The A-weighted decibel scale (dBA) provides this compensation by approximating the sensitivity of the human ear.

Noise is typically defined as unwanted sound. A typical noise environment consists of a base of steady background noise from many distant and indistinguishable noise sources. Superimposed on this background noise is sound from individual local sources, which may be intermittent or continuous. Several rating scales have been developed to analyze the adverse effect of noise on people. Since environmental noise fluctuates over time, these scales consider that the effect of noise upon people is dependent on the energy of noise itself as well as time of day. Noise scales that are applicable to this analysis are as follows:

- $L_{eq}$ – An $L_{eq}$, or equivalent energy noise level, is the average acoustic energy content of noise for a stated period of time. The $L_{eq}$ of a time-varying noise and that of a steady noise are the same if they deliver the same acoustic energy to the ear during exposure. For evaluating community impacts, this rating scale does not vary, regardless of whether the noise occurs during the day or the night.

- CNEL – The Community Noise Equivalent Level is a 24-hour average $L_{eq}$ with a 5 dBA "weighting" during the hours of 7:00 P.M. to 10:00 P.M. and a 10 dBA "weighting" added to noise during the hours of 10:00 P.M. to 7:00 A.M. to account for noise sensitivity in the evening and nighttime, respectively. The logarithmic effect of these additions is that a 60 dBA 24-hour $L_{eq}$ would result in a measurement of 66.7 dBA CNEL.

- For residential uses, environmental noise levels are generally considered low when the CNEL is below 60 dBA, moderate in the 60 to 70 dBA range, and high above 70 dBA.[29] Noise levels greater than 85 dBA can cause temporary or permanent hearing loss. Examples of low daytime levels are isolated, natural settings with noise levels as low as 20 dBA and quiet suburban residential streets with noise levels around 40 dBA. Noise levels above 45 dBA at night can disrupt sleep. Examples of moderate level noise environments are urban residential or semi-commercial areas (typically 55 to 60 dBA) and commercial locations (typically 60 dBA). People may consider louder environments adverse, but most will accept the higher levels associated with noisier urban residential or residential-commercial areas (60 to 75 dBA) or dense urban or industrial areas (65 to 80 dBA).

It is widely accepted that in the community noise environment the average healthy ear can barely perceive CNEL noise level changes of 3 dBA. CNEL changes from 3 to 5 dBA may be noticed by some individuals who are extremely sensitive to changes in noise. A 5 dBA CNEL increase is readily noticeable, while the human ear perceives a 10 dBA CNEL increase as a doubling of sound.

Noise levels from a particular source generally decline as distance to the receptor increases. Other factors, such as the weather and reflecting or barriers, also help intensify or reduce the noise level at any given location. A commonly used rule of thumb for roadway noise is that for every doubling of distance from the source, the noise level is reduced by about 3 dBA at acoustically "hard" locations (i.e., the area between the noise source and the receptor is nearly complete asphalt, concrete, hard-packed soil, or other solid materials) and 4.5 dBA at acoustically "soft" locations (i.e., the area between the source and receptor is normal earth or has vegetation, including grass). Noise from stationary or point sources is reduced by about 6 to 7.5 dBA for every doubling of distance at acoustically hard and soft locations, respectively. Noise levels are also generally reduced by 1 dBA for each 1,000 feet of distance due to air absorption. Noise levels may also be reduced by intervening structures; generally, a single row of buildings between the receptor and the noise source reduces the noise level by about 5 dBA, while a solid wall or berm reduces noise levels by 5 to 10 dBA. The normal noise attenuation within residential structures with open windows is about 17 dBA, while the noise attenuation with closed windows is about 25 dBA.[30]

### *Noise Environment*

The City of Pacifica has no Noise Ordinance. Serra Drive is in a relatively quiet residential neighborhood in the City. Primary sources of noise in the area would be from: vehicular traffic; school playing field activities from the Pacific Bay Christian School, which is approximately 0.15 miles northwest of the proposed project site; occasional fire engines and associated sirens from Station 72, which is approximately 0.06 miles northwest of the proposed project site; and San Pedro Creek. The other primary source of noise would be a result of aircraft traffic from SFO.

### ***Discussion of Impacts***

a) ***Less than Significant with Mitigation Incorporated.*** In the long term, the proposed project would not generate any noise. The proposed project would not change the existing operation and maintenance activities and therefore these phases of the project would not have an impact on temporary increases in ambient noise. Storm drain replacement would maintain existing infrastructure and habitat and would not introduce any new noise-generating land uses.

[29] *Office of Planning and Research, State of California General Plan Guidelines, October 2003 (in coordination with the California Department of Health Services).*

[30] *National Cooperative Highway Research Program Report 117, Highway Noise: A Design Guide for Highway Engineers, 1971.*

During construction, the proposed project would require the use of motorized equipment such as a mini excavator, circular saws, a pumper truck, and a portable drill rig. The City has not adopted construction noise impact thresholds, but rather requires that all construction be completed during weekdays between 8 A.M. and 4 P.M, as noted in the Project Description. The proposed project would comply with these working hours. Municipal Code Section 8-1.08. There are two residences located less than 50 feet away from proposed project work activities and staging, without topography or other obstacles to buffer the noise from this equipment. Construction equipment would generate temporary noise in excess of 75 dBA at these residences. This level of noise is generally considered high for residential areas. As noted above, the City does not have an established noise level limit. Nonetheless, to minimize construction-related noise, Mitigation Measure NOISE-1 requires use of proper muffling equipment and prohibits unnecessary vehicle idling, among other noise-reducing procedures. Furthermore, construction would be limited to weekday, daytime hours, resulting in minimal disturbance to nearby residents. With implementation of Mitigation Measure NOISE-1, adherence to construction work windows, and due to the short-term nature of the impacts (construction is anticipated to be completed in 20 workdays), the proposed project would not result in a substantial temporary or permanent increase in ambient noise in excess of established standards. Impacts would be less than significant with mitigation incorporated.

**Mitigation Measure NOISE-1:**

The Contractor shall implement the following noise BMPs throughout the duration of construction:

- Construction hours shall be clearly posted on a sign at the entrance to the construction site.
- Residences adjacent to the construction site shall be notified of construction in writing 72 hours prior to the start of construction and shall include City contact information for reporting concerns.
- All equipment used on-site shall be muffled and maintained in good working condition. All internal combustion engine-drive equipment shall be fitted with mufflers in good condition.
- Unnecessary idling of internal combustion engines shall be prohibited, and all equipment shall be turned off when not in use.

b) ***Less than Significant Impact.*** There would be a significant impact if project activities created excessive groundborne vibration or groundborne noise levels. The newly replaced storm drain would not produce any noise or vibration. The proposed project would therefore not create any groundborne noise or vibration in operational phase. No pile driving or other activities that would create vibration or groundborne noise impacts are included as part of the proposed project. As the proposed project would not generate groundborne noise or vibration in the short or long-term, a less than significant impact would occur.

c) ***Less than Significant Impact.*** The nearest airport relative to the proposed project site is SFO, approximately 5 miles to the east. In addition, the proposed project site is approximately 5 miles north of Half Moon Bay Airport. Per the SFO Plan, the proposed project site does not lie within

designated Safety Compatibility Zones or forecasted noise contours for the airport.[31] According to the ALUCP, the proposed project site is not within an Airport Safety Zone for Half Moon Bay Airport, and, thus, would not be significantly affected by the airport.[32] As such, the proposed project would not create excessive noise for people living in the vicinity of an airport.

Storm drain outfall repair would not result in any operational noise in the vicinity of the proposed project site beyond baseline conditions. During construction, noise would predominately originate from the use of motorized equipment. Although this would expose people living near the proposed project site to a temporary increase in ambient noise, airport noise in the vicinity of the proposed project site is negligible. If the project area were closer to the airports, there would be the potential for a significant impact on workers from airport noise. As the proposed project site experiences minimal airport noise, the proposed project would not expose people residing or working in the vicinity of the proposed project site and near a public use airport or private airstrip to excessive noise levels, and a less than significant impact would occur.

[31] *City/County Association of Governments of San Mateo County, California. Comprehensive Airport Land Use Plan for the Environs of San Francisco International Airport. November 2012.*

[32] *San Mateo County. Comprehensive Airport Land Use Compatibility Plan. December 1996.*

## 7.14 POPULATION AND HOUSING

| *Would the proposed project:* | Potentially Significant Impact | Less-Than-Significant with Mitigation Incorporated | Less-Than-Significant Impact | No Impact |
|---|---|---|---|---|
| a. Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (e.g., through proposed projects in an undeveloped area or extension of major infrastructure)? | ☐ | ☐ | ☐ | ✖ |
| b. Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere? | ☐ | ☐ | ☐ | ✖ |

### *Environmental Setting*

The proposed project site is in a residential land use area of the City. The proposed project site is zoned R-1, Single-Family Residential, and is accordingly surrounded by such homes.[33]

### *Discussion of Impacts*

a, b) ***No Impact.*** The proposed project would repair the outfall for the 18-inch-diameter reinforced concrete pipe storm drain in an easement at 1411 Serra Drive in the City. The proposed project would remove the existing damaged headwall and spillway and construct a new concrete headwall and partially grouted rock riprap energy dissipater in its place. Repairing the outfall would maintain existing stormwater conveyance and flood control in the surrounding residential areas. The proposed project would be constructed within creek limits and would not displace people or housing. The proposed project repairs existing infrastructure and does not increase service capacity that would induce unplanned population growth. As the proposed project does not include new housing, nor induce population growth, it would not result in a substantial increase in population or housing units in the City. No impacts would occur.

[33] *City of Pacifica Zoning Maps, Edited 2017. Zoning Map #40. Prepared by the City of Pacifica Planning Department*

## 7.15 PUBLIC SERVICES

| *Would the proposed project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:* | Potentially Significant Impact | Less-Than-Significant with Mitigation Incorporated | Less-Than-Significant Impact | No Impact |
|---|---|---|---|---|
| a. Fire protection? | ☐ | ☐ | ✖ | ☐ |
| b. Police protection? | ☐ | ☐ | ✖ | ☐ |
| c. Schools? | ☐ | ☐ | ☐ | ✖ |
| d. Parks? | ☐ | ☐ | ☐ | ✖ |
| e. Other Public Facilities? | ☐ | ☐ | ☐ | ✖ |

### *Environmental Setting*

#### *North County Fire Authority*

Fire protection services for the proposed project site and surrounding area are provided by the North County Fire Authority (NCFA). The NCFA is a Joint Powers Authority that serves the communities of Pacifica, Daily City, and Brisbane. The proposed project site would be served by Pacific Fire Station 72, at 1100 Linda Mar Boulevard, Pacifica. Station 72 is a staffed three-person Type I Paramedic-Engine Company. The terrain of the City and confined neighborhoods in steep valleys causes some delay in fire response times. However, in most cases, it is within the acceptable range of six minutes.[34] Station 72 is approximately 360 feet north of the proposed project site. Due to the close proximity of the station to the proposed project site, response times at the proposed project site would be extremely short.

#### *The Pacifica Police Department*

The proposed project site would be served by the Pacifica Police Department. The Pacifica Police Department (PPD) operates out of the main station located at 2075 Pacific Coast Highway and provides police protection throughout the City. The PPD has not established a specific response time or staffing ratio standard. However, the PPD headquarters are located approximately 3 miles north of the proposed project site.

#### *City of Pacifica Schools*

The proposed project site is served by the Pacifica School District (PSD). PSD operates elementary schools (grades K through 5) and middle schools (grades 6 through 8). Jefferson Union High School District operates high school (grades 9 through 12). The City is also home to three private schools. The closest

[34] *The City of Pacifica General Plan. Seismic Safety and Safety Element.1983.*

school building to the proposed project site is the Pacific Bay Christian School (formerly known as the Alma Heights Christian Academy), 0.15 miles northwest of the outfall.

### *Parks and Recreational Facilities*

The City provides a variety of parks and playfields totaling approximately 250 acres, which include district parks, neighborhood parks, pocket parks, special facilities, and school grounds. The City also has roughly 2,930 acres of regional parks and beaches.[35] Additionally, over six miles of coastline and beaches also offer open space and recreation opportunities.[36]

### ***Discussion of Impacts***

a,b) ***Less than Significant Impact.*** The proposed project would not change the existing operation and maintenance activities and therefore these phases of the project would not have an impact on police or fire protection public services. The purpose of the proposed project is to repair an outfall to an existing storm drain to improve conveyance and flood control in the surrounding commercial and residential areas. There is some potential for construction activities to slow emergency response times in a temporary and minor way, which could create a significant impact. However, this is very unlikely given the proposed project's location is in an area away from major roads or emergency routes. Additionally, the mitigation measures set for in the hazards section would minimize any impact to traffic flow. Impacts to public services would therefore be less than significant.

c-e) ***No Impact.*** Given the proposed project would not permanently increase the existing residential or employment population in the City, the proposed project would not result in a long-term increase in the demand for public services such as schools, parks, or other public facilities or require construction of new facilities. No impact would occur.

[35] *The City of Pacifica Draft General Plan, Open Space and Community Facilities. https://www.cityofpacifica.org/civicax/filebank/blobdload.aspx?blobid=6555*

[36] *The City of Pacifica General Plan, Open Space and Recreation Element. 1984.*

## 7.16 RECREATION

| *Would the proposed project:* | Potentially Significant Impact | Less-Than-Significant with Mitigation Incorporated | Less-Than-Significant Impact | No Impact |
|---|---|---|---|---|
| a. Would the proposed project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated? | ☐ | ☐ | ☐ | ✖ |
| b. Does the proposed project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment? | ☐ | ☐ | ☐ | ✖ |

### *Environmental Setting*

No parks or recreational facilities are located within the proposed project site. The proposed project would occur in and around San Pedro Creek at 1411 Serra Drive in the City. The proposed project involves repair to an existing storm drain that collects drainage from the surrounding streets and discharges into San Pedro Creek. The nearest neighborhood park is Sanchez Dog Park, approximately 1,200 feet to the southeast. There is also a park associated with the Pacific Bay Christian School approximately 280 feet northwest of the proposed project site.

### *Discussion of Impacts*

a, b) ***No Impact.*** Given that the proposed project would not permanently increase the existing residential or employment population in the City, the proposed project would not increase the use of nearby recreational facilities. The purpose of the proposed project is to improve stormwater conveyance and flood control in the surrounding commercial and residential areas, and it does not include recreational facilities or require the construction or expansion of recreational facilities. Construction activities include the removal of the existing damaged headwall and spillway and construction of a new concrete headwall and partially grouted rock rip-rap energy dissipater within San Pedro Creek. These activities would be temporary and would not disrupt or preclude any recreational activities or cause frequent recreators to seek other recreational outlets. No impacts would occur.

## 7.17 TRANSPORTATION

| *Would the proposed project:* | Potentially Significant Impact | Less-Than-Significant with Mitigation Incorporated | Less-Than-Significant Impact | No Impact |
|---|---|---|---|---|
| a. Conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities? | ☐ | ☐ | ✖ | ☐ |
| b. Conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)? | ☐ | ☐ | ✖ | ☐ |
| c. Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)? | ☐ | ☐ | ☐ | ✖ |
| d. Result in inadequate emergency access? | ☐ | ✖ | ☐ | ☐ |

### *Environmental Setting*

Three major routes connect the City to the rest of the region. State Route 1 (or the Coast Highway) traverses the City from north to south, connecting Pacifica to Daly City and San Francisco to the north, and to Half Moon Bay and the San Mateo County coastline to the south. This route is 0.79 mile west-northwest of the proposed project site. State Route 35 (or Skyline Boulevard) generally runs along the eastern edge of the City, is a major north-south route connecting to Santa Clara County and San Francisco and is 3.65 miles northeast of the proposed project site. Sharp Park Road follows a southwest-northeast route through the center of Pacifica, connecting State Route 1 with State Route 35, and is 2.81 miles north of the proposed project site. Each of these major roadways intersects with I-280, an eight-lane major regional freeway on the Bay peninsula between 0.5 mile and 2 miles from the City Planning Area.[37]

Pacifica's roadway network comprises freeways and multi-lane highways, two-lane highways, arterials, collectors, and pedestrian priority zones. Each classification reflects the character of the roadway as well as its function within the context of the entire circulation system. Each classification has standards that take into account a facility's relation to surrounding land uses, existing right-of-way, accessibility via other roadways, and appropriate travel speeds. It prioritizes travel modes for each road, and how to accommodate multiple travel modes.

The proposed project site is situated in a creek bed behind residential properties in the City. The road nearest to the proposed project site is Serra Drive, which is an average, two-lane residential road that connects via South Solano Drive to Linda Mar Boulevard, the only main thoroughfare in the vicinity of the proposed project site, approximately 0.17 miles northeast of the proposed project site. Linda Mar Boulevard connects to State Highway 1 approximately 1 mile northwest of the proposed project site.

The 2020 City Bicycle Plan designates portions of Rosita Road, 0.15 miles to the south of the proposed project site, as a proposed Class IIIB and Class IIB bicycle facility. This is the only existing or proposed bicycle facility within 0.25 mile of the proposed project site. Class IIB facilities are Buffered Bicycle Lanes that include a striped "buffer" area either between the bicycle lane and the driving lane or between the

[37] *City of Pacifica General Plan Transportation Element, Draft Environmental Impact Report. Accessed 4/2/2020: https://www.cityofpacifica.org/civicax/filebank/blobdload.aspx?blobid=6566*

bicycle lane and parking. Class IIIB facilities are bicycle routes enhanced with traffic calming features to prioritize bicyclist comfort.[38] The closest pedestrian facility to the proposed project site is the Pedro Mountain Road Trail, approximately 0.25 miles to the southwest. Local service bus route 14 runs along Linda Mar Boulevard 0.17 miles northeast of the proposed project site.

## ***Discussion of Impacts***

a) ***Less than Significant Impact.*** The proposed project would not change the existing operation and maintenance activities and therefore these phases of the project would not have an impact on an ordinance, policy, or program regarding the city's circulation system. A significant impact may occur if the proposed project were to conflict with the policies adopted in the City GP Circulation Element or the City Bicycle Plan. The proposed project is a storm drain outfall repair and would not permanently increase traffic on local roads or highways. The proposed project would maintain all lanes of traffic on all main roads at all times during construction and would not block designated bike or transit facilities. During construction hours, given the narrow design of residential roadways it is possible that on-site construction equipment could obstruct emergency response in the event of an evacuation or should emergency vehicles require passage. However, this delay would be temporary and minimal. The proposed project would not result in long-term traffic increases. Impacts would be less than significant.

b) ***Less than Significant Impact.*** A significant impact may occur if the proposed project were to be inconsistent with provisions outlined in CEQA Guidelines Section 15064.3(b), which sets forth criteria for analyzing transportation impacts. Under the CEQA Guidelines, a lead agency has discretion to choose the most appropriate methodology to evaluate a proposed project's vehicle miles traveled, including a qualitative analysis.

The proposed project would have no impacts whatsoever on vehicle miles traveled in and around the proposed project site since there would not be any change to the operational and maintenance activity from existing conditions. The repaired outfall would require no maintenance once it is operational, consistent with current baseline conditions.

Construction traffic (equipment and materials transport and daily worker traffic) would slightly increase traffic on local roads during the temporary construction phase of the proposed project. Temporary construction traffic including the vehicles for up to five construction workers would be limited to equipment delivery and material transport. The temporary construction-related traffic would not result in a noticeable increase in traffic on local roads; there would be up to five construction workers on a proposed project site at one time. Vehicles transporting equipment and materials to the proposed project site could cause slight delays for travelers as the construction vehicles slow to turn onto South Solano Drive from Linda Mar Boulevard, to reach Serra Drive, but no temporary lane closures or detours would be required. Given the temporary nature of construction-related travel, impacts related to VMT would be less than significant.

c) ***No Impact.*** A significant impact may occur if a proposed project were to include a new roadway design, introduce a new land use or permanent proposed project features into an area with specific transportation requirements and characteristics that have not been previously experienced in that area, or if proposed project access or other features were designed in such a way as to create hazardous conditions. The proposed project does not require features or structures that are not already characteristic of the baseline condition. The proposed project site already contains a storm drain outfall, and the repair would happen in the footprint of the exiting outfall. The proposed work would not bring new traffic or travel to the area or introduce design features that are not already

[38] *Pacifica Bicycle and Pedestrian Master Plan. 2020. Available at: https://walkbikepacifica.com/. Accessed April 28, 2020.*

present, and the proposed uses are the same as those that area already in place and are therefore compatible. No impacts would occur in this area.

d) ***Less than Significant with Mitigation Incorporated.*** The proposed project would not change the existing operation and maintenance activities and therefore these phases of the project would not have an impact on transportation. The proposed project is located behind residential homes, but staging will occur between and on the road in front of these homes. During the temporary construction period, minor delays due to slower moving construction vehicle traffic may be experienced for emergency access to the residences in the immediate vicinity of the proposed project site. All lanes would remain open on all roads and no detours would be required, as all work is contained in the creek bank where the existing outfall is located. During construction hours, given the narrow design of residential roadways it is possible that on-site construction equipment could obstruct emergency response in the event of an evacuation or should emergency vehicles require passage. This would possibly create a significant impact. Implementation of Mitigation Measure HAZ-1, which requires notifying emergency service providers 72 hours in advance of construction activity, would ensure these short-term potential impacts to emergency access are less than significant.

## 7.18 TRIBAL CULTURAL RESOURCES

| *Would the proposed project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American Tribe, and that is:* | Potentially Significant Impact | Less-Than-Significant with Mitigation Incorporated | Less-Than-Significant Impact | No Impact |
|---|---|---|---|---|
| a. Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code Section 5020.1(k). | ☐ | ✖ | ☐ | ☐ |
| b. A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe. | ☐ | ✖ | ☐ | ☐ |

This section examines the potential impacts of the proposed project on tribal cultural resources. Much of the background context and methods used for the analysis of potential impacts from the proposed project on tribal cultural resources and cultural resources are the same.

For the purposes of this analysis, the term *tribal cultural resource* is defined as follows:

> *Sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe that are listed, or determined to be eligible for listing, in the National Register, California Register, or a local register of historical resources.*

The term indigenous, rather than prehistoric, is used in this section as a synonym for "Native American–related". This section relies on the information and findings presented in *Cultural Resources Survey Report: Serra Drive Outfall Repair Proposed project, Pacifica, San Mateo County, California* (Hoffman 2020). That report, provided in Appendix B, details the results of the cultural resources study, which examined the environmental, ethnographic, and historic background of the proposed project site, emphasizing aspects of human occupation.

### *Environmental Setting*

#### *Native American Correspondence*

WRA contacted the NAHC on February 26, 2020 in request of a search of the NAHC's SLF and a list of Native American representatives who may have interest in the proposed project. The NAHC replied to WRA on February 28, 2020, in which they stated that the SLF has record of sacred sites in the vicinity of the proposed project site and that the Amah Mutsun Tribal Band of Mission San Juan Bautista, and The Ohlone Indian Tribe should be contacted regarding the sacred sites. The reply also included a list of six

Native American representatives to contact regarding these resources and who may be interested in the proposed project.

On March 23, 2020, WRA archaeological Robin Hoffman sent letters, via email due to the Covid-19 disruptions, to the six Native American contacts provided in the NAHC response. The letters provided information on the proposed project and requested that the recipients provide information on cultural resources that may be impacted by the proposed project if they would like to do so. The letters to representatives of the Amah Mutsun Tribal Band of Mission San Juan Bautista, and The Ohlone Indian Tribe specifically provided the SLF positive results and that the NAHC recommended that their tribes be contacted in reference to the positive results.

Michelle Zimmer (Amah Mutsun Tribal Band of Mission San Juan Bautista) replied to Hoffman by email on March 23, 2020, stating that the proposed project was near the Sánchez Adobe and that burials had been identified at the Adobe; her reply also inquired whether or not the "clearing house" had information on known resources in the proposed project site or vicinity. The same day, Hoffman replied to Zimmer via email, stating that proposed project site is approximately 0.25 mile from the Adobe, the proposed project involves replacement of an existing outfall, and the results of the CHRIS records search (negative) and NAHC SLF search (positive). Charlene Nijmeh, Chairperson of the Muwekma Ohlone Indian Tribe of the SF Bay Area, sent an email to Hoffman on March 30, 2020 with ten attachments, which provided background on the proposed project site and vicinity and stated that her tribe is not aware of any sites at the proposed project location but does know of several in the vicinity; Nijmeh also requested the results of any surface surveys. Hoffman replied to Nijmeh via email on March 30, 2020, providing a summary of the results of the pedestrian survey and asking to notify him if Nijmeh had any additional concerns.

To date, no other responses have been received and no other communications with Native American representatives have been conducted for the proposed project. Documentation of the proposed project correspondence with Native American representatives to date is provided in Appendix B of the *Cultural Resources Survey Report*, in Appendix B.

No California Native American tribes previously requested notification regarding City proposed projects for potential consultation under PRC Section 21080.3 (i.e., AB 52). Therefore, no formal consultation pursuant to PRC Section 21080.3 (see AB 52), was required for the proposed project.

### *Records Search*

On February 28, 2020, WRA staff conducted a cultural resources records search of the proposed project site and vicinity at the NWIC at Sonoma State University, Rohnert Park. The NWIC maintains the official CHRIS records of previous cultural resources studies and recorded cultural resources for the proposed project site and vicinity. The study area for the records search consisted of the proposed project site and areas within 0.5 mile.

The NWIC has record of five previously recorded cultural resources in the records search area, none of which are in the proposed project site. Of these five resources, three are associated with indigenous peoples of the area: the Sánchez Adobe Park Historic District (P-41-000646) and two resources considered components of P-41-000646, archaeological site P-41-000074 (Sánchez Adobe Shell Midden) and architectural resource P-41-001487 (Sánchez Adobe [building]). The Sánchez Adobe (P-41-000074, -000646, -001487) is approximately 0.25 mile northwest of the proposed project site.

The NWIC has record of 28 reports from previous cultural resources studies that have been conducted in the records search study area, one of which (S-3082) covered the proposed project site. The majority of these previous studies were conducted in or adjacent to the Sánchez Adobe, approximately 0.25 mile northwest of the proposed project site.

### *Field Survey*

On March 20, 2020, WRA conducted a cultural resources pedestrian survey of the proposed project site. Intensive pedestrian survey methods were used, consisting of walking parallel transects spaced at no more than 5 meters apart and inspecting the surface for cultural material (archaeological or architectural) or evidence thereof. When ground visibility was poor, cleared areas and areas disturbed by rodents along and between the transect lines were checked with special attention.

All portions of the proposed project site were covered during the pedestrian survey. During the survey, ground visibility in the proposed project site varied, with the following averages: 100% on the (paved) street portion of the access path; 90% along the west bank of the creek; 75% in the residential yard portion of the access path; and 50% on the east bank of the creek. Virtually the entire areal extent of the proposed project site appears to have been previously disturbed from activities associated with creek armoring (e.g., rip-rap, concrete), installation of the existing outfall, and residential landscaping and general development (e.g., road construction).

During the pedestrian survey, WRA identified no cultural resources, including any indigenous archaeological material, in the proposed project site.

### *Summary of Tribal Cultural Resources Identification Efforts*

Through outreach to Native American representatives, background research, and a field survey, no tribal cultural resources, including any archaeological resources or human remains that may qualify as tribal cultural resources, were identified in the proposed project site. Therefore, no tribal cultural resources, as defined by CEQA, appear to be present in the proposed project site.

## ***Regulatory Setting***

### *California Environmental Quality Act*

CEQA (**codified at PRC** Section **21000** ***et seq.***) is the principal statute governing environmental review of proposed projects occurring in California. CEQA requires lead agencies to determine whether a project would have a significant effect on the environment, including a significant effect on tribal cultural resources. Under CEQA (PRC Section 21084.1), a project that may cause a substantial adverse change in the significance of a tribal cultural resource is a project that may have a significant effect on the environment.

### *Assembly Bill 52 and Tribal Cultural Resources*

AB 52, enacted in September 2014, recognizes that California Native American Tribes have expertise with regard to their tribal history and practices. The law established a new category of cultural resources, **tribal cultural resources**, in CEQA to consider tribal cultural values when determining the impacts of proposed projects on cultural resources (PRC Section 21080.3.1, 21084.2, and 21084.3). PRC Section 21074(a) defines a tribal cultural resource as any of the following:

- Sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe that are either of the following:
    - included or determined to be eligible for inclusion in the California Register; or
    - included in a local register of historical resources, as defined in PRC Section 5020.1(k).

- 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 [PRC] Section 5024.1. In applying these criteria, the lead agency would consider the significance of the resource to a California Native American tribe.

A cultural landscape that meets the criteria of PRC Section 21074(a) is also a tribal cultural resource if the landscape is geographically defined in terms of the size and scope. A historical resource as described in PRC Section 21084.1, a unique archaeological resource as defined in PRC Section 21083.2, or a non-unique archaeological resource as defined in PRC Section 21083.2 may also be a tribal cultural resource under CEQA if it meets the criteria identified in PRC Section 21074(a).

AB 52 requires CEQA lead agencies to analyze the impacts of proposed projects on tribal cultural resources separately from impacts on archaeological resources (PRC Section 21074 and 21083.09) because archaeological resources have cultural values beyond their ability to yield data important to prehistory or history. AB 52 also defines tribal cultural resources in a new section of the PRC (Section 21074; see above). Lead agencies must engage in additional consultation with California Native American Tribes (PRC Section 21080.3.1, 21080.3.2, and 21082.3).

The provisions of AB 52 apply to proposed projects for which a notice of preparation or notice of negative declaration/mitigated negative declaration was filed on or after July 1, 2015. As such, AB 52 applies to the proposed project.

### *California Register of Historical Resources*

The California Register is "an authoritative listing and guide to be used by State and local agencies, private groups, and citizens in identifying the existing historical resources of the State and to indicate which resources deserve to be protected, to the extent prudent and feasible, from substantial adverse change" (PRC Section 5024.1[a]). The criteria for eligibility for the California Register are based upon the criteria for listing on the National Register (PRC Section 5024.1[b]). Certain resources are determined by the statute to be automatically included in the California Register, including California properties formally determined eligible for, or listed in, the National Register.

To be eligible for the California Register, a cultural resource must be significant at the local, State, and/or federal level under one or more of the following four criteria:

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

2. Is associated with the lives of persons important in our past;

3. Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or

4. Has yielded, or may be likely to yield, information important in prehistory or history.

A resource eligible for the California Register must be of sufficient age and retain enough of its historic character or appearance (integrity) to convey the reason for its significance. Additionally, the California Register consists of resources that are listed automatically and those that must be nominated through an application and public hearing process. The California Register automatically includes the following:

- California properties listed on the National Register and those formally Determined Eligible for the National Register;

- California Registered Historical Landmarks from No. 770 onward; and
- Those California Points of Historical Interest that have been evaluated by the OHP and have been recommended to the State Historical Commission for inclusion on the California Register.

Other resources that may be nominated to the California Register include:

- Historical resources with a significance rating of Category 3 through 5 (those properties identified as eligible for listing in the National Register, the California Register, and/or a local jurisdiction register);
- Individual historic resources;
- Historic resources contributing to historic districts; and
- Historic resources designated or listed as local landmarks, or designated under any local ordinance, such as an historic preservation overlay zone.

### *California Public Resources Code Section 5097*

PRC Section 5097.99, as amended, states that no person shall obtain or possess any Native American artifacts or human remains that are taken from a Native American grave or cairn. Any person who knowingly or willfully obtains or possesses any Native American artifacts or human remains is guilty of a felony, which is punishable by imprisonment. Any person who removes, without authority of law, any such items with an intent to sell or dissect or with malice or wantonness is also guilty of a felony which is punishable by imprisonment.

### *California Native American Historic Resource Protection Act*

The California Native American Historic Resources Protection Act of 2002 imposes civil penalties, including imprisonment and fines up to $50,000 per violation, for persons who unlawfully and maliciously excavates upon, removes, destroys, injures, or defaces a Native American historic, cultural, or sacred site that is listed or may be listed in the California Register.

### *California Health and Safety Code § 7050.5*

HSC Section 7050.5 protects human remains by prohibiting the disinterring, disturbing, or removing of human remains from any location other than a dedicated cemetery. PRC Section 5097.98 (and reiterated in CCR Section 15064.59[e]) also identifies steps to follow in the event of the accidental discovery or recognition of any human remains in any location other than a dedicated cemetery.

### ***Discussion of Impacts***

a-b) ***Less than Significant with Mitigation Incorporated***. The proposed project would not change the existing operation and maintenance activities and therefore these phases of the project would not have an impact on tribal cultural resources. Outreach to Native American representatives, background research, and a field survey conducted for the proposed project identified no tribal cultural resources, as defined in PRC Section 21074, in the proposed project site. Therefore, the proposed project is not anticipated to impact any tribal cultural resources.

Although the proposed project is not anticipated to impact any tribal cultural resources, there remains the possibility that previously unrecorded archaeological deposits, including human remains, are present in the proposed project site. If such deposits are present and were found to

qualify as tribal cultural resources, as defined in PRC Section 21074, any impacts of the proposed project on the resource would be potentially significant. Such potentially significant impacts would be reduced to less-than-significant with implementation of Mitigation Measures CUL-1 and CUL-2.

## 7.19 UTILITIES AND SERVICE SYSTEMS

| *Would the proposed project:* | Potentially Significant Impact | Less-Than-Significant with Mitigation Incorporated | Less-Than-Significant Impact | No Impact |
|---|---|---|---|---|
| a. Require or result in the relocation or construction of new or expanded water, wastewater treatment, or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects? | ☐ | ☐ | ✖ | ☐ |
| b. Have sufficient water supplies available to serve the proposed project and reasonably foreseeable future development during normal, dry, and multiple dry years? | ☐ | ☐ | ✖ | ☐ |
| c. Result in a determination by the wastewater treatment provider which serves or may serve the proposed project that it has adequate capacity to serve the proposed project's proposed projected demand in addition to the provider's existing commitments? | ☐ | ☐ | ✖ | ☐ |
| d. Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals? | ☐ | ☐ | ✖ | ☐ |
| e. Comply with federal, state, and local management and reduction statutes and regulations related to solid waste? | ☐ | ☐ | ✖ | ☐ |

### *Discussion of Impacts*

a) ***Less than Significant Impact.*** The proposed project would not change the existing operation and maintenance activities and therefore these phases of the project would not have an impact on utilities and service systems. There would be the potential for a significant impact if the proposed project resulted in the expansion of wastewater systems, stormwater drainages, electric power, natural gas, or telecommunications facilities that would produce an environmental effect. The proposed project entails the repair of the outfall for the 18-inch-diameter reinforced concrete pipe storm drain that picks up drainage from the surrounding streets and discharges to San Pedro Creek. The existing concrete headwall at the outfall has detached from the pipe due to erosion of the surrounding slope. The proposed project, therefore, does not require or result in the relocation or construction of new or expanded water, wastewater treatment, or storm water drainage, and no other utilities or telecommunication facilities would be required or affected. Less than significant impacts would occur.

b, c) ***Less than Significant Impact.*** There would be the possibility of a significant impact if the proposed project impacted the availability of water supplies or would exceed the capabilities of the wastewater treatment provider to adequately manage additional wastewater. Construction of the proposed project would not generate a significant amount of wastewater or consume a significant

amount of potable water. The proposed project would repair the outfall for the storm drain, and there would not be any operational activities. As the proposed project does not have an element that would increase the residential or employment population of the area and, in essence, replaces structures and function that are currently present and operational, there would be less than significant impacts related to water supply, wastewater treatment capacity, or infrastructure.

d, e) ***Less than Significant Impact.*** The proposed project would not change the existing operation and maintenance activities and therefore these phases of the project would not have an impact on utilities and service systems. The proposed project would generate soil spoils and solid waste from removing the existing spillway and earthwork. If not properly disposed of, the soil spoils and solid waste would have the capability of producing a potentially significant impact. All solid waste would be disposed of in the Ox Mountain Sanitary landfill. Any materials used during construction would be properly disposed of in accordance with federal, state, and local regulations, and there would be no operational activities. Impacts related to solid waste facilities, statutes, and regulations would be less than significant.

## 7.20 WILDFIRE

| *If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the proposed project:* | Potentially Significant Impact | Less-Than-Significant with Mitigation Incorporated | Less-Than-Significant Impact | No Impact |
|---|---|---|---|---|
| a. Substantially impair an adopted emergency response plan or emergency evacuation plan? | ☐ | ✖ | ☐ | ☐ |
| b. Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose proposed project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire? | ☐ | ✖ | ☐ | ☐ |
| c. Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment? | ☐ | ☐ | ✖ | ☐ |
| d. Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes? | ☐ | ✖ | ☐ | ☐ |

### *Environmental Setting*

Fire hazards in Pacifica consist of wildland fires, inadequate water supply in a few areas of older development, the steep terrain of the City, narrow streets, and the increasing cost of fire suppression. Generally, water supply and storage capacity are adequate for firefighting.[39], Approximately two-thirds of the City is undeveloped, and roughly half is protected open space. The predominant vegetation type on the undeveloped land is coastal scrub, with annual grassland dispersed in between. Significant areas of eucalyptus forest and mixed woodland are also present in eastern Sharp Park and on Cattle Hill and San Pedro Mountain.[40] According to the Cal Fire Very High Fire Severity Zone (VHFHSZ) Map for San Mateo County, the City is outside of the VHFHSZ zone.[41] There is risk of wildfire due to the proposed project site being within San Pedro Creek where there is extensive presence of vegetation in close proximity to homes; this risk is further amplified by the narrow residential roadways. Fire protection services for the proposed project site are provided by City Fire Station 72, the nearest station, approximately one driving minute away from the proposed project site.

[39] *The City of Pacifica General Plan. 1980.*

[40] *The City of Pacifica Draft General Plan, Safety. https://www.cityofpacifica.org/civicax/filebank/blobdload.aspx?blobid=6557*

[41] *Cal Fire Very High Fire Severity Zone Map. San Mateo County. 2007. Available at: https://planning.smcgov.org/sites/planning.smcgov.org/files/documents/files/Fire%20Hazard%20Severity%20Zones.pdf. Accessed May 15, 2020.*

## ***Discussion of Impacts***

a) ***Less than Significant with Mitigation Incorporated.*** The proposed project would not change the existing operation and maintenance activities and therefore these phases of the project would not have an impact on wildfire. The proposed project site is in a residential neighborhood in the City. The streets are, therefore, designed to accommodate minimal through-traffic. In the vicinity of the proposed project site, most streets have one lane in each direction and do not have a shoulder or parking spaces. Construction equipment would be staged off-site when not in use, minimizing the risk of obstructing emergency response during evenings and weekends, when construction would not occur. During construction hours, however, given the narrow design of adjacent roadways it is possible that on-site construction equipment could obstruct emergency response in the event of an evacuation or should emergency vehicles require passage, creating a potentially significant impact. Mitigation Measure HAZ-1 requires notification of emergency service providers 72 hours prior to the start of construction and compliance with the City recommended traffic BMPs during construction, minimizing the risk of obstructing emergency access. The mitigation measure would ensure that the project remains compliant with the Local Hazard Mitigation Plan which serves as the emergency response and evacuation plan in the City. Following construction, the proposed project would not interfere with an emergency response plan, as proposed project modifications would generally be confined to a creek bed which does not contain any emergency response infrastructure. The proposed project would, therefore, not lead to physical modification or obstruction of emergency response infrastructure such as communication systems or roadways. As such, the proposed project would not impair implementation of or physically interfere with implementation of an emergency response or evacuation plan in a very high fire hazard severity zone, and impacts would be less than significant with mitigation incorporated.

b) ***Less than Significant with Mitigation Incorporated.*** Fire risk within and adjacent to the proposed project site is pronounced due to the presence of dense vegetation in the creek bed and on adjoining parcels. This risk is further exacerbated by the presence of narrow residential roadways that could slow down evacuation procedures in the event of a fire. The proposed project would not increase fire risk in the operational phase, as no new structures or fuel sources would be introduced to the proposed project site and the proposed project would not draw new people who would be exposed to fire risk to the area.

In the short-term, the presence of motorized equipment in the creek bed during the dry season may lead to a small, temporary increase in fire risk. This would have the potential to cause a significant impact if a fire were to start in the creek bed and spread to other areas unchecked. Mitigation Measure HAZ-3 requires that the contractor remove potential fuel sources such as dried vegetation and requires provision of fire extinguishers for service trucks, among other fire risk-reducing measures. This mitigation measure would ensure that impact potential is abated. With implementation of Mitigation Measure HAZ-3, the proposed project would not exacerbate wildfire risks, and thereby expose proposed project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire. Impacts would accordingly be less than significant with mitigation incorporated

c) ***Less than Significant.*** The proposed project would not require installation of any infrastructure that may exacerbate fire risk such as power lines or utilities; nor would it require installation of infrastructure intended to reduce wildfire risk or facilitate emergency response such as rods, fuel breaks, or emergency water sources. The proposed project is a storm drain outfall repair which would not have any long-term impact on wildfire risk. Short-term increases in wildfire risk during construction would not be sufficiently severe or occur over a long enough period to require installation of risk attenuating infrastructure. As the proposed project would not require installation

or maintenance of associated infrastructure that may exacerbate fire risk or result in temporary or ongoing environmental impacts, there would be a less than significant impact.

d) ***Less than Significant with Mitigation Incorporated.*** The proposed project would not change the existing operation and maintenance activities and therefore these phases of the project would not have an impact on wildfire. The proposed project site is located within a steep creek bed. In the event of a fire, downstream locations may be susceptible to flooding and/or landslides due to slope instability within San Pedro Creek, which could create a potentially significant impact. Although no long-term impact would occur, by temporarily exacerbating fire risk during construction through the use of motorized equipment in the creek bed, the proposed project would consequently lead to a temporarily increased risk in downstream flooding or landslide. With implementation of Mitigation Measure HAZ-2, the proposed project's impact on on-site fire risk would be minimal. As such, the proposed project's impact on downstream landslide and flooding that could result following a wildfire would also be minimal; and impacts would be less than significant with mitigation incorporated.

## 7.21 MANDATORY FINDINGS OF SIGNIFICANCE

| | Potentially Significant Impact | Less-Than-Significant with Mitigation Incorporated | Less-Than-Significant Impact | No Impact |
|---|---|---|---|---|
| a. Does the proposed project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory? | ☐ | ✖ | ☐ | ☐ |
| b. Does the proposed project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a proposed project are considerable when viewed in connection with the effects of past proposed projects, the effects of other current proposed projects, and the effects of probable future proposed projects)? | ☐ | ✖ | ☐ | ☐ |
| c. Does the proposed project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly? | ☐ | ✖ | ☐ | ☐ |

### *Discussion of Impacts*

a) ***Less than Significant with Mitigation Incorporated.*** The incorporation of the mitigation measures included in Section 7 would reduce potential biological impacts to a less-than-significant level. The proposed project site does not contain any resource listed in or eligible for listing in the California Register of Historical Resource, a local register of historic resources, or identified as significant in a historical resource survey. Additionally, the proposed project site does not contain any object, building, structure, site, area, place, record, or manuscript that a lead agency determined to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California. However, cultural resources could potentially be uncovered during construction. Mitigation measures included in Section 7 would reduce potential impacts to a less-than-significant level.

b) ***Less than Significant with Mitigation Incorporated.*** Cumulatively considerable means that the incremental effects of an individual project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects. The analysis within this IS/MND demonstrates that the proposed project would not have any individually limited, but cumulatively considerable impacts. As presented in the analysis in the Biological Resources, Cultural Resources, Hazards and Hazardous Materials, Noise, and Tribal

Cultural Resources sections, any potentially significant impacts would be less than significant after mitigation. Due to the limited scope of direct physical impacts to the environment associated with construction, the proposed project's impacts are project-specific in nature. There are no current or recently constructed storm drain outfall projects that were recently constructed in the proposed project vicinity; nor are there any future planned such projects. The City has confirmed that there are currently no other public works projects within San Pedro Creek. Consequently, the proposed project would create a less than significant cumulative impact with respect to all environmental issues.

c) ***Less than Significant Impact with Mitigation Incorporated.*** Construction-related impacts to Geology and Soils, Hazardous and Hazardous Materials, Noise, and Transportation have the potential to adversely affect human beings. With implementation of the various construction measures, BMPs, and Mitigation Measures included in this IS/MND, the proposed project would not result in substantial adverse effects to human beings, either directly or indirectly. This impact would therefore be less than significant with mitigation incorporated.

# 8.0 REFERENCES


1. Association of Bay Area Governments (ABAG). *Earthquake and Hazards Program*. http://gis.abag.ca.gov/website/Hazards/?hlyr=femaZones. Accessed March 2020.

2. Bay Area Air Quality Management District (BAAQMD), 2017. *Clean Air Plan, BAAQMD, Planning Rules and Research Division, Plans*. April 19.

3. Bay Area Air Quality Management District (BAAQMD), 2010. *Source Inventory of Bay Area Greenhouse Gas Emissions, San Francisco, CA*. February.

4. CAL FIRE, 2007. Fire Hazard Severity Zones in SRA. Adopted November 7.

5. California Department of Conservation, 2015. State of California Seismic Hazard map. Available at: https://maps.conservation.ca.gov/cgs/informationwarehouse/regulatorymaps/. Accessed April 2019.

6. California Department of Conservation, 2016. *Farmland Mapping and Monitoring Program: Marin County Important Farmland 2016*. Accessed April 2019.

7. California Department of Transportation, 2012. *Scenic highways: San Mateo County*. Accessed April 2020.

8. California Native Plant Society. 2018. *Online Rare Plant Inventory*. Available at: http://rareplants.cnps.org/.

9. City of Pacifica General Plan, 1980. Available at: https://www.cityofpacifica.org/civicax/filebank/blobdload.aspx?t=75298.48&BlobID=15615. Accessed March 2020.

10. City of Pacifica Zoning Maps, 2017. Available at: https://www.cityofpacifica.org/civicax/filebank/blobdload.aspx?BlobID=13644. Accessed March 2020.

11. Cotton, Shires, and Associates, Inc., 2019. *Geotechnical Investigation for the Serra Drive Outfall Repair Proposed Project*. Prepared for Woodard & Curran, December.

12. Federal Emergency Management Agency (FEMA), 2016. Flood Insurance Rate Map 06041C0478E. Available at: https://p4.msc.fema.gov/arcgis/rest/directories/arcgisjobs/nfhl_print/nfhlprinttool2_gpserver/j11e81a32ed724f87b495f4b445e76200/scratch/FIRMETTE_36546f70-71c5-11e9-b8c0-001b21b31e35.pdf. Accessed March 2020.

13. Governor's Office of Planning and Research, 2008. *Technical advisory: CEQA and climate change: Addressing climate change through California Environmental Quality Act Review*. June 19. Available at: http://opr.ca.gov/docs/june08-ceqa.pdf. Accessed March 2020.

14. Nationwide Environmental Title Research, Historical Aerials, 2020. Available at: https://www.historicaerials.com/. Accessed March 2020.

15. U.S. Fish and Wildlife Service (USFWS), 2018. *Information for Planning and Consultation*. Available at: https://ecos.fws.gov/ipac/. Accessed March 2020.

16. Spicher, Doug, 2020. *Biological Resources Assessment Report: Serra Drive Outfall Repair Project, Pacifica, San Mateo County, California*. Prepared by WRA, Inc., Petaluma, California. Prepared for the City of Pacifica, California. March.

17. Hoffman, Robin, 2020. *Cultural Resources Survey Report: Serra Drive Outfall Repair Project, Pacifica, San Mateo County, California*. Prepared by WRA, Inc., Petaluma, California. Prepared for the City of Pacifica, California. March.

# 9.0 REPORT PREPARATION

**WRA, Inc. – CEQA Consultant**

- John Baas, Senior Open Space Planner
- Brian Freiermuth, Wildlife Biologist
- Robin Hoffman, Cultural Resources Program Manager
- Eliza Schlein, Biologist
- Reida Khan, Assistant Environmental Planner
- Geoff Reilly, Senior Associate Environmental Planner

# APPENDIX A – BIOLOGICAL RESOURCES ASSESSMENT

# Biological Resources Assessment Report

## SERRA DRIVE OUTFALL REPAIR PROJECT
## PACIFICA, SAN MATEO COUNTY, CALIFORNIA

**Prepared For:**
City of Pacifica
151 Milagra Dr.
Pacifica, CA 94044

**Contact:**
Sam Bautista, P.E., QSD/P
bautistas@ci.pacifica.ca.us

**Prepared By:**
WRA, Inc.
2169-G East Francisco Boulevard
San Rafael, California 94901

**Contact:**
Doug Spicher
(415) 608-9648
spicher@wra-ca.com





**WRA Project:** 29115

**Date:** March 2020

ENVIRONMENTAL CONSULTANTS

*This Page Left Intentionally Blank*

## TABLE OF CONTENTS


1.0 INTRODUCTION AND PROJECT DESCRIPTION ..... 1
1.1 Project Description ..... 1
1.1.1 Staging Locations ..... 1
1.1.2 Tree Removal and Vegetation Clearing ..... 2
1.1.3 Construction Access ..... 2
1.1.4 Outfall Replacement and Bank Stabilization ..... 2
1.1.5 Bypass Pipe and Temporary Coffer Dam Upstream of the Project ..... 2
1.1.6 Revegetation Plan ..... 3
2.0 REGULATORY BACKGROUND ..... 3
2.1 Land Cover Types ..... 3
2.2 Special-status Plants ..... 4
2.3 Special-status Wildlife ..... 5
2.3 Protected Trees ..... 6
3.0 METHODS ..... 6
3.1 Special-status Species ..... 7
3.1.1 Literature Review ..... 7
3.1.2 Site Assessment ..... 7
3.2 Land Cover Types ..... 8
3.2.1 Terrestrial Land Cover Types ..... 8
3.2.2 Aquatic Resources ..... 8
3.3 Protected Trees ..... 9
4.0 RESULTS ..... 9
4.1 Soils ..... 9
4.2 Hydrology and Topography ..... 9
4.3 Land Cover Types ..... 9
4.3.1 Non-sensitive Land Cover Types ..... 10
4.3.2 Sensitive Land Cover Types ..... 10
4.4 Special-status Species ..... 10
4.4.1 Plants ..... 11
4.4.2 Wildlife ..... 11
4.4.3 Critical Habitat ..... 14
4.5 Protected Trees ..... 14
5.0 PROJECT IMPACTS AND MITIGATION MEASURES ..... 14
5.1 General Avoidance and Minimization Measures ..... 15
5.2 Impact Analysis ..... 17
5.2.1 Special-Status Species ..... 17
5.2.2 Sensitive Communities ..... 22
5.2.3 Jurisdictional Aquatic Features ..... 23
5.2.4 Wildlife Movement ..... 25
5.2.5 Conflicts with Local Policies ..... 25
5.2.6 Conflicts with an Adopted Habitat Conservation Plan ..... 25
5.7 Cumulative Impacts ..... 26
6.0 REFERENCES ..... 27

Table 1. Land Cover Types within the Study Area.....10

Table 2. Project Impacts to Sensitive Land Cover Types.....15

Table 3. Summary of Impacts to Perennial Stream within the Project Area .....23

## LIST OF APPENDICES

Appendix A – Figures
- Figure 1. Study Area Regional Location Map
- Figure 2. Project Components
- Figure 3. Land Cover Types
- Figure 4. Special-status Plant Species Documented in the CNDDB within 5 Miles of the Study Area
- Figure 5. Special-status Wildlife Species Documented in the CNDDB within 5 Miles of the Study Area
- Figure 6. Project Impacts to Land Cover Types
- Figure 7. Project Impacts to Corps-Jurisdictional Aquatic Features
- Figure 8. Project Impacts to RWQCB/CDFW-Jurisdictional Aquatic Features

Appendix B – List of Observed Species
Appendix C – Special-Status Plant and Wildlife Species Potentials Table
Appendix D – Photographs

## LIST OF PREPARERS

Doug Spicher, Principal-in-Charge
Brian Freiermuth, Project Manager, Wildlife Biologist
Scott Batiuk, Plant Biologist
Molly Brewer, Wildlife Biologist

## LIST OF ABBREVIATIONS AND ACRONYMS

| | |
|---|---|
| BMP | Best Management Practices |
| CCR | California Code of Regulations |
| CDFW | California Department of Fish and Wildlife |
| CEQA | California Environmental Quality Act |
| CESA | California Endangered Species Act |
| CFGC | California Fish and Game Code |
| CFR | Code of Federal Regulations |
| CFS | Cubic Feet per Second |
| CNDDB | California Natural Diversity Database |
| Corps | U.S. Army Corps of Engineers |
| CNPS | California Native Plant Society |
| CRLF | California Red-legged Frog |
| CWA | Clean Water Act |
| CY | Cubic Yards |
| ESA | Federal Endangered Species Act |
| HCP | Habitat Conservation Plan |
| NMFS | National Marine Fisheries Service |
| OHWM | Ordinary High Water Mark |
| RWQCB | Regional Water Quality Control Board |
| USFWS | United States Fish and Wildlife Service |
| WBWG | Western Bat Working Group |
| WRA Inc. | WRA |

# 1.0 INTRODUCTION AND PROJECT DESCRIPTION

On September 20, 2019, WRA, Inc. (WRA) performed a biological resources assessment at the Serra Drive Outfall Repair Project (Project) site located in Pacifica, San Mateo County, California. The Project is located in and around San Pedro Creek (Figure 1), on and immediately adjacent to two privately owned parcels (Assessor's Parcel Number: 023-261-320, 023-261-310; Project Area). The site visit covered the 0.07 acre Project Area encompassing the Project footprint, as well as adjacent areas upstream and downstream that may be indirectly affected by the Project (Study Area; Appendix A, Figure 1).

The purpose of this assessment is to gather information necessary to complete a review of biological resources under the California Environmental Quality Act (CEQA). This report describes the results of the site visit, which assessed the Project Area and Study Area for: (1) the potential to support special-status plant and wildlife species; (2) the potential presence of sensitive biological communities such as wetlands or riparian habitats; and (3) the potential presence of other sensitive biological resources protected by local, state, and federal laws and regulations.

This report provides general information on the potential presence of sensitive species and habitats. This assessment is not an official protocol-level survey for listed species that may be required for project approval by local, state, or federal agencies. Our determinations regarding the potential of the Project Area and Study Area to support special-status plant and wildlife species were based primarily on the suitability of habitats within the Project Area and Study Area, the proximity of known occurrences, and an on-site inspection. This assessment is based on information available at the time of the study and on-site conditions that were observed on September 2019.

## 1.1 Project Description

The Project consists of the repair of the outfall for the 18-inch diameter reinforced concrete pipe storm drain located in an easement at 1411 Serra Drive in the City of Pacifica, California. The storm drain picks up drainage from the surrounding streets and discharges to San Pedro Creek. The existing concrete headwall at the outfall has detached from the pipe due to erosion of the surrounding slope. The Project components include the removal of the existing damaged headwall and spillway and construction of a new concrete headwall and partially grouted rock rip-rap energy dissipator (Appendix A, Figure 2). The new headwall will be founded on a pier foundation to support the headwall. The rock rip-rap energy dissipator will be 7.5 feet wide and located downstream of the concrete headwall, and it will be partially grouted to provide appropriate energy dissipation prior to flows reaching the creek. Approximately 4 feet of rip-rap will be provided on each side of the grouted rip-rap energy dissipator to provide a transition from the grouted rip-rap to the existing natural slope. The outfall is sized for a 100-year discharge from the pipe of 17 cubic feet per second (CFS). At the bottom of the slope, rip-rap extends 4 feet into the creek bottom to provide stability at the toe of the slope and to prevent a scour hole from forming at the end of the partially grouted rock rip-rap energy dissipator at the toe of the embankment.

### *1.1.1 Staging Locations*

On-site staging locations are proposed in the backyard of the residence adjacent to the work area and on Serra Drive.

*1.1.2 Tree Removal and Vegetation Clearing*

No trees are anticipated to be removed as a part of the Project, though some willows will be trimmed. Additional vegetation clearing may occur as necessary to facilitate bank stabilization.

*1.1.3 Construction Access*

All site access shall be from Serra Drive via access points designated by the Project engineer and as shown in Appendix A, Figure 2. No access is permitted from adjoining properties. Any public roadways affected by the Project will be repaired to original condition upon completion of work. Where appropriate, temporary facilities will be provided during construction.

*1.1.4 Outfall Replacement and Bank Stabilization*

Construction within creek limits will be completed using a mini excavator for demolition of the existing spillway and earthwork. Hand tools including rebar cutters, circular saws, etc. will be used for the rest of the demolition and preparatory construction activities. The grading for the headwall will involve approximately 8 cubic yards (CY) of excavation and 14 CY of fill behind the headwall at the top of the bank. Once the area has been graded and prepared, the mini excavator will be removed, and a pumper truck will be used to convey concrete to the site. The pumper truck will be parked in the staging area located in the street. A portable drill rig will be used for construction of the support piles. It will be kept out of the limits of the creek and will be parked in the backyard of the homeowner upslope from the improvements. The stream will be diverted using a coffer dam at the upstream end of the temporary work limits shown in the design plan. Approximately 10 CY of 15-inch diameter partially grouted rip-rap and 15 CY of 15-inch diameter rip-rap will be placed around the new headwall. All construction activities will take place within the temporary work limits shown on this plan. Exclusion fencing will be provided around the work area adjacent to the existing vegetation to be protected in place. The construction will take place over 20 work days between 8 A.M. and 4 P.M. All work will take place between April 1 and October 31, with in-channel work occurring from June 1 through October 31.

*1.1.5 Bypass Pipe and Temporary Coffer Dam Upstream of the Project*

The contractor will be required to develop and submit a dewatering and flow bypass plan, in coordination with the project engineer. The in-channel work window will be from June 1 through October 31 in the upstream reach. Dewatering and flow bypassing will convey baseflows only, not stormflows. Any rainfall runoff events that happen during the in-channel work window will not be controlled by the bypass system. Earthwork within the stream will only occur in the dry season as defined above. In the unlikely event of stormflows in San Pedro Creek in the summer months or early fall, crews will not work in the creek until flows have subsided. The contractor shall monitor weather conditions throughout the project. If more than 0.5 inch of rain is forecast within 2 days, the contractor shall cease grading and stabilize the site. The contractor will continue work 24 hours after the end of the precipitation event.

There are no stream gages on San Pedro Creek. However, based on a flow depth of about 6 inches, summer flows are estimated to be about 3 to 6 CFS or less throughout the summer months.

The bypass system may need to safely convey flows as large as 6 CFS, but baseflows may be significantly lower if the preceding winter has had low levels of precipitation. Flow will be collected at the upstream end of the bypass system by constructing a temporary sandbag or earthen coffer dam. The coffer dam will have a crest elevation high enough above the channel bottom to provide

enough pressure head and freeboard for the bypass pipe inlet, with the bypass pipe set in the channel invert, for gravity flow bypassing the portion of the Project Area where earthwork and hard structure installation will occur.

*1.1.6 Revegetation Plan*

The main approach for revegetation on the site will be to rely on natural regeneration and native seeding and willow stake installation. Natural recruitment of native vegetation is expected to occur and will be augmented through seeding with a native seed mix. Six willow poles will be added at the downstream edge of the rip-rapped sections of the bank to improve stability and enhance habitat. Access areas and other disturbed areas will be stabilized and re-seeded to promote natural recruitment of native vegetation.

Willow poles will be obtained from arroyo willow (*Salix lasiolepis*) obtained on-site or from adjacent areas within San Pedro Creek. Poles will be 3 to 4 feet long, with all side branches removed. Each pole will have a minimum diameter of 0.75 inch. Poles will be planted using a sand-filled mallet or 2-inch soil auger, such that at least 80 percent of the pole is buried.

# 2.0 REGULATORY BACKGROUND

The following sections explain the regulatory context of the biological resources assessment, including applicable laws and regulations that were applied to the field investigations and analysis of potential impacts.

## 2.1 Land Cover Types

Land cover types are herein defined as those areas of a particular vegetation type, soil or bedrock formation, aquatic features, and/or other distinct phenomenon. Typically, land cover types have identifiable boundaries that can be delineated based on changes in plant assemblages, soil or rock types, soil surface or near-surface hydroperiod, anthropogenic or natural disturbance, topography, elevation, etc. Many land cover types are not considered sensitive or otherwise protected under the environmental regulations discussed here. However, these land cover types may provide essential ecological and biological functions for plants and wildlife, including special-status species. Land cover types that are considered protected under one or more environmental regulations are discussed below.

Waters of the United States: The United States Army Corps of Engineers (Corps) regulates "Waters of the United States" under Section 404 of the Clean Water Act (CWA). Waters of the United States are defined in the Code of Federal Regulations (CFR) as waters susceptible to use in commerce, including interstate waters and wetlands, all other waters (intrastate waterbodies, including wetlands), and their tributaries (33 CFR 328.3). Potential wetland areas, according to the three criteria used to delineate wetlands as defined in the Corps Wetlands Delineation Manual (Environmental Laboratory 1987), are identified by the presence of (1) hydrophytic vegetation, (2) hydric soils, and (3) wetland hydrology. Areas that are inundated at a sufficient depth and for a sufficient duration to exclude growth of hydrophytic vegetation are subject to Section 404 jurisdiction as "other waters" and are often characterized by an ordinary high water mark (OHWM). Other waters, for example, generally include lakes, rivers, and streams. The placement of fill material into waters of the United States generally requires an individual or nationwide permit from the Corps under Section 404 of the CWA.

Waters of the State: The term “Waters of the State” is defined by the Porter-Cologne Act as “any surface water or groundwater, including saline waters, within the boundaries of the state.” The Regional Water Quality Control Board (RWQCB) protects all waters in its regulatory scope and has special responsibility for wetlands, riparian areas, and headwaters. These waterbodies have high resource value, are vulnerable to filling, and are not systematically protected by other programs. RWQCB jurisdiction includes “isolated” wetlands and waters that may not be regulated by the Corps under Section 404. Waters of the State are regulated by the RWQCB under the State Water Quality Certification Program, which regulates discharges of fill and dredged material under Section 401 of the CWA and the Porter-Cologne Water Quality Control Act. Projects that require a Corps permit, or fall under other federal jurisdiction, and have the potential to impact Waters of the State, are required to comply with the terms of the Water Quality Certification determination. If a project does not require a federal permit, but does involve dredge or fill activities that may result in a discharge to Waters of the State, the RWQCB has the option to regulate the dredge and fill activities under its state authority in the form of Waste Discharge Requirements.

Streams, Lakes, and Riparian Habitat: Streams and lakes, as habitat for fish and wildlife species, are subject to jurisdiction by the California Department of Fish and Wildlife (CDFW) under Sections 1600-1616 of California Fish and Game Code (CFGC). Alterations to or work within or adjacent to streambeds or lakes generally require a 1602 Lake and Streambed Alteration Agreement. The term “stream”, which includes creeks and rivers, is defined in the California Code of Regulations (CCR) as “a body of water that flows at least periodically or intermittently through a bed or channel having banks and supports fish or other aquatic life [including] watercourses having a surface or subsurface flow that supports or has supported riparian vegetation” (14 CCR 1.72). In addition, the term “stream” can include ephemeral streams, dry washes, watercourses with subsurface flows, canals, aqueducts, irrigation ditches, and other means of water conveyance if they support aquatic life, riparian vegetation, or stream-dependent terrestrial wildlife (CDFG 1994). “Riparian” is defined as “on, or pertaining to, the banks of a stream.” Riparian vegetation is defined as “vegetation which occurs in and/or adjacent to a stream and is dependent on, and occurs because of, the stream itself” (CDFG 1994). Removal of riparian vegetation may also require a Section 1602 Lake and Streambed Alteration Agreement from CDFW.

Sensitive Natural Communities: Sensitive natural communities not discussed above include habitats that fulfill special functions or have special values. Natural communities considered sensitive are those identified in local or regional plans, policies, regulations, or by CDFW. CDFW ranks sensitive communities as "threatened" or "very threatened" (CDFW 2019) and keeps records of their occurrences in its California Natural Diversity Database (CNDDB; CDFW 2020). CNDDB vegetation alliances are ranked 1 through 5 based on NatureServe's (2020) methodology, with those alliances ranked globally (G) or statewide (S) as 1 through 3 considered sensitive. Impacts to sensitive natural communities identified in local or regional plans, policies, or regulations or those identified by the CDFW or U.S. Fish and Wildlife Service (USFWS) must be considered and evaluated under CEQA (CCR Title 14, Div. 6, Chap. 3, Appendix G). Specific habitats may also be identified as sensitive in city or county general plans or ordinances.

## 2.2 Special-status Plants

Special-status species include those taxa that have been formally listed, are proposed as endangered or threatened, or are candidates for such listing under the Federal Endangered Species Act (ESA) or California Endangered Species Act (CESA). The ESA affords protection to federally listed species. The CESA affords protection to both state-listed species and those that are formal candidates for state listing. Plant species on the California Native Plant Society

(CNPS) Rare and Endangered Plant Inventory (CNPS 2020a) with California Rare Plant Ranks of 1, 2, and sometimes 3 are also considered special-status plant species and must be considered under CEQA. Rank 4 species and some Rank 3 species are typically only afforded protection under CEQA when such species are particularly unique to the locale (e.g., range limit, low abundance/low frequency, limited habitat) or are otherwise considered locally rare.

California Native Plant Protection Act

The California Native Plant Protection Act affords protection to plant species designated rare or endangered by the Fish and Game Commission through prohibition of "take," with some exceptions. Plants designated as rare or endangered through the California Native Plant Protection Act are subject to review through CEQA.

## 2.3 Special-status Wildlife

Special-status wildlife species include those species that are formally listed, or are candidates for listing under the ESA or CESA. These acts afford protection to both listed species and those that are formal candidates for listing. The federal Bald and Golden Eagle Protection Act also provides broad protections to both eagle species that in some regards are similar to those provided by ESA. Additionally, CDFW Species of Special Concern or California Fully Protected Species are considered special-status species. Although these aforementioned species generally have no special legal status, they are given special consideration under CEQA. Bat species are evaluated for conservation status by the Western Bat Working Group (WBWG), a non-governmental entity. Bats named as a "High Priority" or "Medium Priority" species for conservation by the Western Bat Working Group are typically considered special-status under CEQA.

In addition to regulations for species that carry a special designation, most native birds in the United States (including non-status species) are protected by the federal Migratory Bird Treaty Act of 1918 and the CFGC under sections 3503, 3503.5 and 3513. Under these laws, deliberately destroying active bird nests, eggs, and/or young is illegal.

Critical Habitat

Critical habitat is a term defined in the ESA as a specific and designated geographic area that contains features essential for the conservation of a threatened or endangered species and that may require special management and protection. The ESA requires federal agencies to consult with the USFWS to conserve listed species on their lands and to ensure that any activities or projects they fund, authorize, or carry out will not jeopardize the survival of a threatened or endangered species. In consultation for those species with critical habitat, federal agencies must also ensure that their activities or projects do not adversely modify critical habitat to the point that it will no longer aid in the species' recovery. In many cases, this level of protection is similar to that already provided to species by the ESA jeopardy standard. However, areas that are currently unoccupied by the species but which are needed for the species' recovery are protected by the prohibition against adverse modification of critical habitat.

Wildlife Corridors

Wildlife movement between suitable habitat areas typically occurs via wildlife movement corridors. The primary function of wildlife corridors is to connect two larger habitat blocks, also referred to as core habitat areas (Beier and Loe 1992; Soulé and Terbough 1999). Core habitat areas are important for wildlife that may travel between different types of habitat in order to complete various stages of their lifecycle. Wildlife corridors must be considered under CEQA.

## 2.3 Protected Trees

City of Pacifica Tree Ordinance

Chapter 12 of the Pacifica Municipal Code (Preservation of Heritage Trees) stipulates regulations designed to preserve and protect heritage trees on private or City-owned property. The ordinance defines a heritage tree as being any tree within the City of Pacifica, exclusive of eucalyptus, which has a trunk with a minimum circumference of 50 inches, equivalent to a diameter of 16 inches, when measured at 2 feet above the natural grade. In addition, the City Council may designate any tree or grove of trees of special historical, environmental, or aesthetic value as a heritage tree.

Because of their value to the City of Pacifica, heritage trees may not be removed, destroyed, or damaged beyond repair without a Heritage Tree Permit. Substantial trimming which threatens the healthy growth of the tree and new construction within the dripline of a heritage tree shall not be allowed without the issuance of a permit. Development projects affecting heritage trees which require approval from the Planning Commission must be accompanied by a tree protection plan, which is processed via planning permits.

Removal of vegetation or any tree which is not a heritage tree does not require a City tree removal permit. However, a permit shall be required for the removal or harvesting of major vegetation other than for agricultural purposes, kelp harvesting, and timber operations which are in accordance with a timber harvesting plan and if located within one or more of the resource areas defined by the City, in association with other permits required by the City for the project.

City of Pacifica Logging Operations

Logging operations within the City of Pacifica are defined as any removal, destruction or harvesting of 20 or more trees in one year from any parcel or contiguous parcel under the same ownership. In reference to logging regulations, a tree is defined as any tree 6 inches in diameter as measured 12 inches from the ground. City of Pacifica Ordinance No. 636-C.S. prohibits logging operations unless one of the following conditions is met:

(a) Said operations are in conjunction with a City permit(s) requiring planning commission and/or City Council approval, at which time said operations shall be evaluated and approved or denied at a duly noticed public hearing by the Commission and /or Council, concurrently with other permit(s).

(b) Said operations are necessary immediately for the safety of life or property, as determined by the Director of Public Works or his/her designee.

(c) Said operations occur on City-owned property and are necessary immediately to maintain public health and safety.

# 3.0 METHODS

On September 20, 2019, the Study Area was traversed on foot to determine: (1) if existing conditions provide suitable habitat for any special-status plant or wildlife species, (2) plant

communities present within the Study Area, and (3) if sensitive habitats are present. All observed plant species are listed in Appendix B.

## 3.1 Special-status Species

### *3.1.1 Literature Review*

Potential occurrence of special-status species in the Project Area was evaluated by first determining which special-status species occur in the vicinity of the Project Area through a literature and database search. Database searches for known occurrences of special-status species focused on the Montara Mountain and five surrounding 7.5-minute U.S. Geological Survey quadrangles, including San Francisco South, Hunters Point, San Mateo, Half Moon Bay, and Woodside. The following sources were reviewed to determine which special-status plant and wildlife species have been documented to occur in the vicinity of the Project Area:

- CNDDB records (CDFW 2020)
- USFWS Information for Planning and Conservation Species Lists (USFWS 2019)
- CNPS Inventory records (CNPS 2020a)
- CDFG publication "California's Wildlife, Volumes I-III" (Zeiner et al. 1990)
- CDFG publication *California Bird Species of Special Concern* (Shuford and Gardali 2008)
- CDFW and University of California Press publication *California Amphibian and Reptile Species of Special Concern* (Thomson et al. 2016)
- *A Field Guide to Western Reptiles and Amphibians* (Stebbins 2003)

### *3.1.2 Site Assessment*

A site visit was conducted in the Project Area to search for suitable habitats for special-status species. Habitat conditions observed in the Project Area were used to evaluate the potential for presence of special-status species based on these searches and the professional expertise of the investigating biologist. The potential for each special-status species to occur in the Project Area was then evaluated according to the following criteria:

- No Potential. Habitat on and adjacent to the site is clearly unsuitable for the species requirements (e.g., foraging, breeding, cover, substrate, elevation, hydrology, plant community, site history, disturbance regime).
- Unlikely. Few of the habitat components meeting the species requirements are present, and/or the majority of habitat on and adjacent to the site is unsuitable or of very poor quality. The species is not likely to be found on the site.
- Moderate Potential. Some of the habitat components meeting the species requirements are present, and/or only some of the habitat on or adjacent to the site is unsuitable. The species has a moderate probability of being found on the site.
- High Potential. All of the habitat components meeting the species requirements are present and/or most of the habitat on or adjacent to the site is highly suitable. The species has a high probability of being found on the site.
- Present. The species is observed on the site or has been recorded (i.e., CNDDB, other reports) on the site recently.

The site assessment was intended to identify the presence or absence of suitable habitat for each special-status species known to occur in the vicinity to determine its potential to occur in the Study

Area. The site visit did not constitute a protocol-level survey and was not intended to determine the actual presence or absence of a species; however, if a special-status species was observed during the site visit, its presence was recorded and is discussed in the Results section of this document.

Appendix C presents the evaluation of the potential for occurrence of each special-status plant and wildlife species known to occur in the vicinity of the Study Area with their habitat requirements, potential for occurrence, and rationale for the classification based on criteria listed above. Recommendations for further surveys for species present or with moderate or high potential to occur in the Project Area are provided in Section 5.0 below.

## 3.2 Land Cover Types

Prior to the site visit, the Soil Survey of San Mateo County, California (USDA 1961) and a Web Soil Survey for the Study Area (CSRL 2020) was examined to determine if any unique soil types that could support sensitive plant communities and/or aquatic features were present in the Project Area. Land Cover Types present in the Project Area were classified based on existing plant community descriptions described in *A Manual of California Vegetation, Online Edition* (CNPS 2020b). However, in some cases it was necessary to identify variants of community types or to describe non-vegetated areas that are not described in the literature. Land cover types were classified as sensitive or non-sensitive as defined by CEQA and other applicable laws and regulations.

### *3.2.1 Terrestrial Land Cover Types*

The Study Area's terrestrial land cover types were evaluated to determine if such areas have the potential to support special-status plants or wildlife. In most instances, communities are delineated based on distinct shifts in plant assemblage (vegetation). Vegetation alliances (natural communities) with a CDFW Rank of 1 through 3 (globally critically imperiled (S1/G1), imperiled (S2/G2), or vulnerable (S3/G3), were considered sensitive as part of this evaluation.[1]

Non-sensitive land cover types are those that are not afforded special protection under CEQA, and other state, federal, and local laws, regulations and ordinances. These land cover types may, however, provide suitable habitat for some special-status plant or wildlife species and are identified or described in Section 4.3 below.

### *3.2.2 Aquatic Resources*

Aquatic resources include Waters of the U.S., Waters of the State, and Streams, Lakes, and Riparian Habitat as defined in the CWA, Porter-Cologne Act, and CFGC, respectively. This site assessment does not constitute a formal wetland delineation; however, the surveys looked for superficial indicators of wetlands such as hydrophytic vegetation (i.e., plant communities dominated by species with a wetland indicator status of obligate, facultative wetland, or facultative as provided on the National Wetlands Plant List (Lichvar et al. 2016), evidence of inundation or flowing water, saturated soils and seepage, and topographic depressions/swales.

Streams potentially jurisdictional under the CWA and/or the CFGC were delineated using a mix of surveyed topography data, high resolution aerial photographs, and a mapping grade GPS unit.

The OHWM was used to determine the extent of potential Section 404 jurisdiction, while the top-of-bank would be used to determine the extent of CFGC Section 1602 and 401. Woody vegetation associated with streams was assessed to determine if these areas would be considered riparian habitat by the CDFW following *A Field Guide to Lake and Streambed Alteration Agreements, Section 1600-1607, California Fish and Game Code* (CDFG 1994).

### 3.3 Protected Trees

The Study Area was preliminarily assessed to determine whether any potential protected trees were present. However, a formal arborist survey was not conducted.

## 4.0 RESULTS

The following sections present the results of the biological resources assessment conducted within the Study Area. Plant and wildlife species observed in the Study Area during the site visit are listed in Appendix B. An evaluation of the potential for occurrence of each special-status plant and wildlife species known to occur in the vicinity of the Study Area is provided as Appendix C. Representative photographs of the Study Area and Project Area are provided in Appendix D.

The approximately 7-acre Study Area is located in the Linda Mar neighborhood of the City of Pacifica. Based on historic aerial imagery, with the exception of San Pedro Creek, the entirety of the Study Area was historically agricultural fields. Between 1946 and 1956, agricultural production ceased, and the fields were converted to same residential developments existing today. The baseball fields were created sometime between 1956 and 1968 (NETR 2020).

### 4.1 Soils

Soils within the Project Area have been altered due to urban development. The Project Area contains two soil mapping units (CSRL 2020): Urban land-Orthents, cut and fill complex, 0 to 5 percent slopes and Orthents, cut and fill, 0 to 15 percent slopes. Study Area soils have been heavily disturbed by urban development and are a complex of impervious surfaces, fill soil, and disturbed native substrate that is derived from sandstone and shale.

### 4.2 Hydrology and Topography

The Study Area is comprised of the steep-banked, perennial San Pedro Creek bordered by flat, terrain characterized primarily by residential development with a small area occupied by a middle and high school baseball field and the Pacifica Fire Department Station 72. Elevations range from approximately 45 to 70 feet. The primary hydrologic sources are direct precipitation and subsequent sheet and in-channel flow. San Pedro Creek also receives groundwater.

The western portion of the Project Area is located below top of bank of San Pedro Creek and includes the storm drain outfall; the central portion of the Project Area is the easement at 1411 Serra Drive; and the eastern portion is located within Serra Drive.

### 4.3 Land Cover Types

The Study Area contains perennial stream, riparian woodland, and developed/landscaped areas. Land cover types are described below, summarized in Table 1, and depicted in Appendix A, Figure 4.

Table 1. Land Cover Types within the Study Area

| Land Cover Type | Acres / Linear Feet |
|---|---|
| **Non-sensitive** | |
| Developed/Landscaped | 5.56 |
| **Subtotal** | **5.56** |
| **Sensitive** | |
| Perennial Stream | 0.27 / 803 |
| Riparian Woodland | 1.33 |
| **Subtotal** | **1.60 / 803** |
| **Total** | **7.16** |

*4.3.1 Non-sensitive Land Cover Types*

**Developed/Landscaped (no vegetation alliance). CDFW Rank: None.** Developed/landscaped areas include built structures such as houses, asphalt roads, landscaping associated with houses, and the baseball fields associated with the middle and high school. Developed/landscaped areas comprise the entirety of the Study Area outside of the San Pedro Creek channel and its associated riparian woodland.

*4.3.2 Sensitive Land Cover Types*

**Perennial Stream (no vegetation alliance). CDFW Rank: None.** Perennial stream is comprised of San Pedro Creek and was mapped to the OHWM of the creek. The channel bottom is earthen, though large debris such as pieces of concrete are present throughout. The banks of the creek are partially earthen and partially armored with rip-rap, concrete, and other manmade materials. The bottom of the creek was generally unvegetated to sparsely vegetated, while the unarmored banks were dominated by dense woody and herbaceous vegetation such as arroyo willow (*Salix lasiolepis*), American dogwood (*Cornus sericea*), California blackberry (*Rubus ursinus*), thimbleberry (*R. parviflorus*), stinging nettle (*Urtica dioica*), and English ivy (*Hedera helix*). Vegetation within perennial stream was composed of elements of several vegetation alliances, but none were large or consistent enough to map individually.

**Riparian Woodland (no vegetation alliance). CDFW Rank: None.** Riparian woodland was mapped on the banks of San Pedro Creek, above the OHWM, and was bordered on all sides by developed/landscaped areas. The overstory canopy was open to dense and was comprised of a mix of species such as arroyo willow and Pacific willow (*Salix lasiandra*). The understory was a diverse, dense assemblage of woody and herbaceous species such as American dogwood, California blackberry, thimbleberry, stinging nettle, and English ivy. Vegetation within perennial stream was composed of elements of several vegetation alliances, but none were large or consistent enough to map individually.

## 4.4 Special-status Species

### *4.4.1 Plants*

Based on a review of the resources and databases discussed in Section 3.1.1, 83 special-status plant species have been documented in the vicinity of the Project Area. Appendix C summarizes the potential occurrence for each special-status plant species located in the vicinity of the Study Area. Special-status plant species documented in the CNDDB within 5 miles of the Study Area are depicted in Appendix A, Figure 4.

No special-status plant species were observed in the Study Area during the site visits. All 83 special-status plant species documented in the vicinity of the Study Area are unlikely or have no potential to occur due to the following reasons:

- Absence of specific soil types (e.g., serpentine soils)
- Absence of suitable habitat (e.g., chaparral, grassland, coastal salt marsh)
- Dominance of invasive, non-native species
- Dense understory vegetation that would outcompete the special-status species

### *4.4.2 Wildlife*

Based on a review of the resources and databases listed in Section 3.1.1, 46 special-status wildlife species have been documented in the vicinity of the Study Area. Appendix C summarizes the potential for each of these species to occur within the Study Area. The locations of special-status wildlife species in the CNDDB within 5 miles of the Study Area are depicted in Appendix A, Figure 5. Of the 46 special-status species, 41 are unlikely or have no potential to occur in the Study Area for one or more of the following reasons:

- The Study Area is outside of the known or historical range of the species
- The Study Area lacks suitable foraging habitat (e.g., marshes, pond, grassland)
- The Study Area lacks suitable nesting structures (e.g., old growth redwood, cliffs)
- The Study Area lacks suitable soil for den development
- No mine shafts, caves, or abandoned buildings are present
- There is a lack of connectivity with suitable occupied habitat

While the aforementioned factors contribute to the absence of many special-status wildlife species, the Study Area was determined to have adequate conditions and locality to warrant a moderate or high potential for four special-status species to occur. In addition, one species was determined to be present in the Study Area. Native nesting birds protected by the CFGC may also occur in the Study Area. These species are discussed below.

*Wildlife Species Present or with Moderate or High Potential to Occur in the Study Area*

**Western red bat (*Lasiurus blossevillii*), CDFW Species of Special Concern, WBWG High Priority. Moderate Potential.** This species is highly migratory and broadly distributed, ranging from southern Canada through much of the western United States. Western red bats are believed to make seasonal shifts in their distribution, although there is no evidence of mass migrations (Pierson et al. 2006). They are typically solitary, roosting primarily in the foliage of broad-leafed trees or shrubs. Day roosts are commonly in edge habitats adjacent to streams or open fields, in orchards, and sometimes in urban areas possibly and association with riparian trees (particularly willows, cottonwoods, and sycamores; Pierson et al. 2006). It is believed that males and females

maintain different distributions during pupping, where females take advantage of warmer inland areas and males occur in cooler areas along the coast.

Western red bat may roost within riparian vegetation within the Study Area and has moderate potential to occur. However, the Project Area does not contain vegetation of suitable structure or density to support roosting by this species. Western red bat may forage within the Project Area.

**Fringed myotis (*Myotis thysanodes*), WBWG High Priority. Moderate Potential.** The fringed myotis ranges throughout much of western North America from southern British south to southern Mexico. This species is most common in drier woodlands (e.g. oaks, pinyons-junipers); a variety of other habitats are used including desert scrubland, grassland, and coniferous and mixed (coniferous-deciduous) forests. Maternity roosting occurs in colonies of 10 to 2,000 individuals, although large colonies are rare (WBWG 2020). Caves, buildings, mines, rock crevices in cliff faces, and bridges are used for maternity and night roosts; tree cavities/hollows are also commonly used (WBWG 2020).

The Study Area contains low to moderately dense stands of trees which may provide roosting opportunities for fringed myotis. However, the Project Area does not have vegetation of suitable structure or density to support roosting by this species. Fringed myotis may forage within the Project Area.

**San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*), CDFW Species of Special Concern. Moderate Potential.** This subspecies of the dusky-footed woodrat occurs in the Coast Ranges between San Francisco Bay and the Salinas River (Matocq 2003). Occupied habitats are variable and include forest, woodland, riparian areas, and chaparral. Woodrats feed on woody plants, but will also consume fungi, grasses, flowers and acorns. Foraging occurs on the ground and in bushes and trees. This species constructs robust stick houses/structures in areas with moderate cover and a well-developed understory containing woody debris. Breeding takes place from December to September. Individuals are active year-round, and generally nocturnal.

The Study Area contains areas of moderately dense riparian vegetation that may support San Francisco dusky-footed woodrat. However, the bank within the Project Area is eroded and vegetation is not suitably dense to support this species. No nest structures (middens) were observed within the Project Area.

**California red-legged frog (*Rana draytonii*), Federal Threatened Species, CDFW Species of Special Concern. Moderate Potential.** The California red-legged frog (CRLF) is dependent on suitable aquatic, estivation, and upland habitat. During periods of wet weather, starting with the first rainfall in late fall, CRLF disperse away from their estivation sites to seek suitable breeding habitat. Aquatic and breeding habitat is characterized by dense, shrubby, riparian vegetation and deep, still or slow-moving water. Breeding occurs between late November and late April. CRLF estivate (period of inactivity) during the dry months in small mammal burrows, moist leaf litter, incised stream channels, and large cracks in the bottom of dried ponds.

San Pedro Creek runs through the Study Area, and the creek corridor contains potential aquatic and upland habitat. A combination of factors including barriers associated with dense residential development and reduced extent of upland habitat, frequency and duration of scouring flows, and lack of emergent vegetation make the habitat within the Study Area unsuitable for CRLF breeding and larval development.

Dominant substrates within the portion of San Pedro Creek that runs through the Study Area consist of mostly small grains such as sand and small gravel with smaller cobble and larger gravel being less abundant. The stream is generally incised by about 10 feet in and around the Project Area, and numerous revetment structures are present both upstream and downstream of the Project Area. As a result, the flows in the creek are relatively flashy and do not support emergent macrophytes that would in turn support oviposition by CRLF in the Study Area. Pools and runs are heavily scoured during the winter, making CRLF breeding unlikely to be successful. Downstream of the Study Area, where the stream is of lower gradient and less confined, especially near the mouth, some potential breeding sites are present, and there are also some potential breeding sites associated with off-channel aquatic features. It is expected that if CRLF do occur in the Study Area, the source for individuals would be these downstream areas, more than 0.75 miles from the Project Area. The stream is in a relatively low position in the watershed and has a moderate overall gradient, resulting in a flow regime that is punctuated by peak flows that attenuate rapidly and reduce the capacity to naturally maintain backwater areas. Due to CRLF's breeding season correlating with the rainy season, these scouring peak flows would subject CRLF eggs and larvae to water velocities that they are not adapted to endure. As a combined result of these factors, suitable breeding habitat for CRLF is absent from the Study Area.

The upland areas surrounding the narrow riparian corridor contain dense residential housing and are not likely to support upland dwelling CRLF, if they occur in the area. Similarly, beyond the banks of San Pedro Creek, dispersal habitat is unavailable due to the presence of dense housing.

There are multiple documented occurrences of CRLF in the San Pedro Creek watershed, though none have been documented within 0.5 miles of the Study Area (CDFW 2020). Additional occurrences documented within 5 miles of the Project Area are included on Figure 5.

The Study Area does not contain aquatic breeding habitat. The Study Area does contain potential non-breeding aquatic and upland habitat, although use of these habitats by CRLF has not been documented. If CRLF is present, it is likely to be at low densities due to the lack of suitable aquatic breeding habitat and the presence of barriers associated with residential development that surround the Study Area.

**Steelhead - Central California Coast DPS (*Oncorhynchus mykiss irideus*), Federal Threatened**. The Central California Coast DPS includes all naturally spawned populations of steelhead (and their progeny) in California streams from the Russian River to Aptos Creek, and the drainages of San Francisco and San Pablo Bays eastward to the Napa River (inclusive), excluding the Sacramento-San Joaquin River Basin. Steelhead typically migrate to marine waters after spending 2 years in freshwater, though they may stay up to 7. They then reside in marine waters for 2 or 3 years prior to returning to their natal stream to spawn as 4-or 5-year-olds. Steelhead adults typically spawn between December and June. In California, females typically spawn two times before they die. Preferred spawning habitat for steelhead is in perennial streams with cool to cold water temperatures, high dissolved oxygen levels and fast flowing water. Abundant riffle areas (shallow areas with gravel or cobble substrate) for spawning and deeper pools with sufficient riparian cover for rearing are necessary for successful breeding.

During the 2019 site visit by WRA biologists, numerous young salmonids, presumably *O. mykiss*, were observed throughout the Study Area. Hagar Environmental Sciences (2002) performed a watershed scale assessment of steelhead and found that the middle fork of San Pedro Creek (upstream of where the Project Area is located) supports high densities of young steelhead and indicated that the middle fork also contains the best spawning habitat in the watershed, but also indicated that the main stem, where the Project Area is located, also contains suitable spawning

habitat. Johnson (2005) performed a watershed scale snorkel survey for steelhead and found them to be most abundant in the main stem of San Pedro Creek.

#### *4.4.3 Critical Habitat*

San Pedro Creek runs through the Study Area and is coho Central California Coast ESU and steelhead Central California Coast DPS Critical Habitat as designated by the National Marine Fisheries Service (NMFS). The extent of critical habitat for these species is defined as "the width of the stream channel defined by the Ordinary High Water line" (70 FR 52488). Areas mapped as perennial stream were defined using the ordinary high water line (Appendix A – Figure 3). Therefore, any perennial stream habitat within the Study Area is critical habitat for these two species.

No other critical habitat is designated within in the Project Area.

### 4.5 Protected Trees

Within the Study Area as a whole, some trees were present that may meet the definition of a protected tree under the City of Pacifica tree ordinance. However, within the Project Area, few trees are present, and none are large enough to meet the definition of a protected tree.

## 5.0 PROJECT IMPACTS AND MITIGATION MEASURES

The State CEQA Guidelines provide direction for assessing the impacts of projects on biological resources and determining which impacts will be significant. CEQA defines a "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 State CEQA Guidelines Section 15065, a project's impacts on biological resources are deemed significant if the project would:

A. substantially reduce the habitat of a fish or wildlife species
B. cause a fish or wildlife population to drop below self-sustaining levels
C. threaten to eliminate a plant or animal community
D. reduce the number or restrict the range of a rare or endangered plant or animal

Additionally, Appendix G of State CEQA Guidelines provides a checklist of other potential impacts to consider when analyzing the significance of project effects. The impacts listed in Appendix G may or may not be significant, depending on the level of the impact. For biological resources, these impacts include whether the project would:

a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFW or USFWS
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the CDFW or USFWS
c) Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means

d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance
f) Conflict with the provisions of an adopted Habitat Conservation Plan (HCP), Natural Community Conservation Plan, or other approved local, regional, or state HCP

This report uses these thresholds in the analysis of impacts and determination of the significance of those impacts. The assessment of impacts under CEQA is based on the change caused by the Project relative to the CEQA baseline, which in this case are the existing conditions in the Project Area. In applying CEQA Appendix G, the terms "substantial" and "substantially" are used as the basis for significance determinations in many of the thresholds but are not defined qualitatively or quantitatively in CEQA or in technical literature. In some cases, the determination of a substantial adverse effect (i.e., significant impact) may be relatively straightforward. For instance, "take" or other direct adverse impacts to special-status species listed under the CESA or the ESA, or their habitat, without implementation of appropriate mitigation is considered a significant impact. In other cases, the determination of a substantial adverse effect (i.e., significant impact) requires application of best professional judgment based on knowledge of site conditions, as well as the ecology and physiology of biological resources present in a given area and the type of effect that would be caused by a project. Determinations of whether or not Project activities will result in a substantial adverse effect to biological resources are discussed in the following sections.

Potential impacts on existing biological resources were evaluated by comparing the quantity and quality of habitats present in the Project Area under baseline conditions to the anticipated conditions after implementation of proposed Project activities and are depicted on Figure 9 in Appendix A. Direct and indirect impacts on special-status species and sensitive natural communities were assessed based on the potential for the species, their habitat, or the natural community in question to be disturbed or enhanced by construction or operation of the proposed Project. Table 2, summarizes temporary and permanent impacts that would result from Project activities are summarized in Table 2 and depicted in Appendix A, Figure 6

Table 2. Project Impacts to Sensitive Land Cover Types

| Land Cover Type | Permanent (acres / linear feet) | Temporary (acres / linear feet) |
|---|---|---|
| Riparian Woodland | 0.002 | 0.03 |
| Perennial Stream | 0.003 / 11 | 0.16 / 52 |
| **Total** | **0.005** | **0.19** |

## 5.1 General Avoidance and Minimization Measures

General avoidance and minimization measures that will be implemented during the proposed Project are outlined below. All permit conditions, legal requirements, and appropriate excavation and engineering practices associated with the proposed Project will be followed. Best Management Practices (BMPs) as identified by RWQCB, Corps, and CDFW will be adhered to.

General measures to be implemented as part of the Project include:

- Erosion control measures will be utilized throughout all phases of the Project where sediment runoff from construction may potentially enter waters. Erosion control structures will be monitored for effectiveness and will be repaired or replaced as needed. Appropriate erosion control measures will be installed around any stockpiles of soil or other materials that could be mobilized by rainfall or runoff.
- Prior to construction, an Accidental Spill Prevention and Cleanup Plan will be prepared. This plan will include required spill control absorbent material, for use beneath stationary equipment, to be present on-site and available at all times.
- No fueling, cleaning, or maintenance of vehicles or equipment will take place within any areas where an accidental discharge may cause hazardous materials to enter waterways.
- Any equipment or vehicles used for the Project will be checked and maintained daily to prevent leaks of fluids that could be deleterious to aquatic habitats.
- All equipment will be cleaned before arriving on the site and before removal from the site to prevent spread of invasive plants.
- Construction disturbance or removal of vegetation will be restricted to the minimum footprint necessary to complete the work. The work area will be delineated where necessary to minimize impacts to vegetated habitats beyond the work limit, or to protect vegetation within the work area.
- Prior to construction, locations and equipment access points that minimize riparian disturbance will be determined. Pre-existing access points will be used whenever possible. Unstable areas, which may increase the risk of channel instability, will be avoided.
- Staging and storage areas for equipment, materials, fuels, lubricants and solvents, will be located outside of the stream channel banks and outside of seasonal wetlands.
- Stationary equipment such as motors, pumps, and generators, located adjacent to aquatic features will be positioned over secondary containment sufficient to arrest a catastrophic failure.
- All activities performed near aquatic features will have absorbent materials designated for spill containment and cleanup activities on-site for use in an accidental spill.
- Stockpiles of excavated soil or other will be covered when not in active use (i.e. will not be used, or moved for 72 hours). All trucks hauling soil, sand, and other loose materials will be covered.
- No construction debris of any type will be allowed to enter or be placed where it may be washed into any aquatic features.
- At the end of the project all temporary flagging, fencing, or other materials will be removed from the project site and vicinity of the channel.
- No equipment will be washed down where runoff could enter the creek.
- No motorized equipment will be left within the channel overnight.
- All refueling and maintenance of equipment, other than stationary equipment, will occur outside of the top-of-bank. Refueling of stationary equipment within the channel (top of bank to top of bank) will only occur when secondary containment sufficient to eliminate escape of all potential fluids is in place.

## 5.2 Impact Analysis

### *5.2.1 Special-Status Species*

This section addresses whether the project would have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFW or USFWS.

The following impact analysis describes the Project's adverse effects on special-status species. Appendix C lists the potentially occurring special-status species, along with their listing status and basis for the determination of their presence or potential to occur within the Project Area.

***Potential Impact BIO-1: Special-Status Plant Species***

All special-status plant species documented in the vicinity of the Study Area are unlikely or have no potential to occur within the Study Area. As such, the Project is not anticipated to result in substantial or adverse effects to special-status plant species.

*Level of Significance: No Impact*

***Potential Impact BIO-2: San Francisco Dusky-footed Woodrat***

San Francisco dusky-footed woodrat has moderate potential to occur within riparian habitat in the Study Area. However, no woodrat middens were observed within or immediately adjacent to the Project Area. As such, the Project is not anticipated to directly affect dusky-footed woodrat. The majority of the Project will occur within existing disturbed and developed areas. The Project will enhance riparian habitat within the Project Area through bank stabilization and revegetation. Impacts to San Francisco dusky-footed woodrat would be considered less than significant under CEQA.

*Level of significance: Less than Significant*

***Potential Impact BIO-3: Roosting Bats***

Special-status and non-status bats, including western red bat and fringed myotis, have potential to occur within the Study Area in riparian habitat including large trees and dense vegetation. Common bats protected under the CFGC may also roost within the Study Area. Bats may forage within the Project Area. However, vegetation of suitable density and structure to support roosting is not present within the Project Area. As such, the Project is not anticipated to directly affect roosting bats. The majority of the Project will occur within existing disturbed and developed areas. The Project will enhance riparian habitat within the Project Area through bank stabilization and revegetation. Impacts to roosting bats from Project activities would be considered less than significant under CEQA.

*Level of Significance: Less Than Significant*

***Potential Impact BIO-4: California Red-legged Frog***

The Project will result in the temporary disturbance of 0.041 acres of potential upland/ dispersal habitat and 0.016 acres of aquatic non-breeding habitat, and no impacts to aquatic breeding

habitat for CRLF. Approximately 0.003 acres of aquatic non-breeding habitat permanent impacts will result from the Project. Off-road access of equipment may result in soil compaction and the collapsing of burrows that could provide refugia for CRLF. The disturbance of potential upland habitat will temporarily remove habitat the CRLF could use for sheltering if CRLF are present; however, these effects are expected to be almost discountable, discrete and temporary. The stream is anticipated to maintain its current functionality, though the distribution and depth of some individual pools, runs and riffles, especially in and immediately downstream from the Project Area may change.

Any CRLFs present within the Project Area during access by heavy equipment could be injured or killed if they were run over by the heavy equipment or sheltering in burrows that are collapsed during off-road access. CRLFs could also be crushed if they are in the creek when hardscape structures are installed. Similar risks are likely during the installation of water diversion structures (cofferdams). Potential aquatic habitat for the CRLF could be degraded if the proposed project resulted in a spill of fuel or other hazardous materials or increased sedimentation in San Pedro Creek. The Project is designed to minimize the potential adverse impacts to the existing non-breeding aquatic habitat and upland habitat in the Project Area and to enhance upland habitat by improving bank stability and increasing the density of vegetative structure that can be used as refugia by CRLF. Impacts to CRLF from Project activities would be considered significant under CEQA and any take of CRLF would require a permit under section 7 of the ESA. The Project will seek a biological opinion to provide take coverage through consultation with the Army Corps of Engineers.

*Level of Significance: Potentially Significant*

The following measures are examples of those expected to be implemented to avoid impacts to CRLF. Final measures will be described in the biological opinion for the Project.

Mitigation Measure BIO-4a: Work Windows

To avoid impacts to aquatic habitat, ground disturbing activities shall occur during the summer dry season where flows are low or streams are dry. Work shall be restricted to the period of June 1 through October 31. If work is not completed by October 31, and significant precipitation is not forecast within 48 hours, work may extend beyond this date with USFWS agreement. Initial ground-disturbing activities shall be avoided between November 1 and March 31, the time period when CRLF are most likely to be moving through upland areas. Further, no construction activities shall occur during rain events or within 24 hours following a rain event. To minimize the potential for impacts, daily work shall commence no less than 30 minutes after sunrise and shall cease no less than 30 minutes before sunset.

Mitigation Measure BIO-4b: Access Areas

The access and work area limits shall be identified with wooden lathe stakes and flagging. Demarcation of the work area shall be maintained in good repair for the duration of Project activities. No areas beyond the identified work area limits shall be disturbed.

Mitigation Measure BIO-4c: Workers Environmental Awareness Program

Prior to Project commencement, a worker environmental awareness program shall be implemented to educate all construction personnel of the area's environmental concerns and conditions, including special-status species, site contamination prevention, and other relevant environmental protection measures. The worker environmental awareness program will constitute the conveyance of environmental concerns and appropriate work practices, including spill prevention, emergency response measures, protection of special-status resources, and proper implementation of BMPs to all construction and maintenance personnel. All new workers that arrive after construction has started shall be trained under the worker environmental awareness program within 2 days' time.

Mitigation Measure BIO-4d: Disposal of Trash

During all Project activities, all trash that may attract predators shall be properly contained, removed from the work site, and disposed of regularly. Following construction, all trash and construction debris will be removed from work areas.

Mitigation Measure BIO-4e: Stormwater Discharges

Erosion control BMPs shall be developed and implemented to minimize any wind- or water-related erosion, and include provisions in construction contracts for measures to protect sensitive areas and prevent and minimize stormwater and non-stormwater discharges. Erosion control structures shall not include monofilament or be of types that may entrap and kill wildlife.

Mitigation Measure BIO-4f: Preconstruction Surveys

No more than 24 hours prior to the date of initial ground disturbance, a preconstruction survey for CRLF will be conducted within the Project Area. The survey will consist of walking the Project Area to ascertain the possible presence of the species. The USFWS-approved biologist will investigate all potential areas that could be used by the CRLF for feeding, breeding, sheltering, movement, and other essential behaviors. This includes an adequate examination of small mammal burrows. If any adults, subadults, juveniles, tadpoles, or eggs are found, the biologist will contact the USFWS to determine if moving of the individuals is appropriate.

Mitigation Measure BIO-4g: Biological Monitor

A biologist will be on-site during all activities that may result in take of the CRLF in areas where the species has potential to occur except in areas that are protected by an exclusion fence (if applicable). The biologist shall provide oversight and have the authority and responsibility to stop Project activities if impacts to CRLF are posed, and consistent with the measures above. If workers need to remove or disturb vegetation, the biologist(s) shall first inspect the vegetation for any individual CRLFs.

Mitigation Measure BIO-4h: Covering of Trenches

Trenches or pits 1-foot-deep or deeper that are going to be left unfilled for more than 48hours shall be securely covered with boards or other material to prevent individuals from falling into them.

Mitigation Measure BIO-4i: Work within Creek

Equipment tracks, treads and tires will not be allowed to enter the live stream; all work shall be performed from the top of bank. To the maximum extent feasible, workers shall avoid disturbing and removing vegetation in the work area.

Mitigation Measure BIO-4j: Use of Screens on Pumps

For portions of the work site that will be temporarily dewatered by pumping, intakes shall be completely screened with wire mesh not larger than five millimeters to prevent CRLF, if present, from entering the pump system. Water will be released or pumped downstream at an appropriate rate to maintain downstream flows during construction. Upon completion of construction activities, any barriers to flow will be removed in a manner that would allow flow to resume with the least disturbance to the substrate.

*Level of Significance After Mitigation: Less Than Significant*

***Potential Impact BIO-5: Steelhead***

Steelhead have potential to occur within San Pedro Creek during Project activities. The Project would divert creek flows during Project work. Work within the Project Area will occur during the dry season, when adult steelhead are not expected to be present. Adult resident rainbow trout could be present, and juvenile *O. mykiss* are expected to occur in the Project Area. The Project may impact steelhead during cofferdam installation and stream diversion. Impacts to steelhead would be considered significant under CEQA. Similar to CRLF, impacts to steelhead, a Federal-threatened species, will be assessed through the Section 7 process of the ESA. The Project will enter consultation with the Army Corps of Engineers and seek a biological opinion to permit take under the ESA.

*Level of Significance: Potentially Significant*

In addition to general avoidance and minimization measures described in Section 5.1 and adhering to work windows described above, the following measures are examples of those expected to be implemented to avoid impacts to steelhead. Final measures will be described in the biological opinion for the Project.

Mitigation Measure BIO-5: Fish Relocation

Prior to the installation of water diversion structures (e.g., cofferdams), a qualified fisheries biologist will capture and relocate salmonids and other native fish within the Project Area. The biologist will place exclusion nets to prevent fish from temporarily occupying waters that may be impacted by liberated sediment. The exclusion nets shall be of sufficient height to span the water column and small enough in size (1/8 inch or less) to exclude juvenile fish from areas that may be subject to disturbance during excavation. This would apply to placement of cofferdams for the creek bypass system. A qualified fisheries biologist will perform all seining, electrofishing, and fish relocation activities. The biologist will note the number of salmonids observed in the affected area, the number of salmonids relocated, and the date and time of collection and relocation. The biologist will adhere to the following requirements for capture and transport of salmonids:

a. Determine the most efficient means for capturing fish. Complex stream habitat generally requires the use of electrofishing equipment, whereas in outlet pools, fish may be concentrated by pumping down the pool and then seining or dip netting fish.

b. Initial fish relocation efforts will be conducted several days prior to the start of construction, providing the fisheries biologist an opportunity to return to the work area to perform additional electrofishing passes immediately prior to construction if there is water in the isolated construction area. If water is left in the construction area, dissolved oxygen levels sufficient for salmonid survival will be maintained.
c. If high summer water temperatures are present at the work site, relocation activities will be conducted during morning periods.
d. Prior to capturing fish, the most appropriate release location(s) will be determined, based on the following guidelines: similar water temperature as capture location; ample habitat for captured fish; low likelihood of fish reentering work site or becoming impinged on exclusion net or screen.
e. Air and water temperatures will be periodically measured, and captured fish monitored. Temperatures will be measured at the head of riffle tail of pool interface. Activities will cease if health of fish is compromised owing to high water temperatures, or if mortality exceeds three percent of captured salmonids.

*Level of Significance After Mitigation: Less Than Significant*

***Potential Impact BIO-6: Critical Habitat***

The Project will impact waters within the ordinary high water line that are designated Critical Habitat by NMFS for steelhead and coho salmon. Potential adverse temporary impacts to habitat could occur as a result of cofferdam installation and subsequent dewatering of the channel and increased sediment loads resulting from removal of the coffer dam and diversion structure. Loss or reduction in quality of rearing sites can occur through dewatering of habitat and the filling of pools with sediment. However, most adverse effects are expected to occur during one construction period during the summer, and wetted habitat will be typically be restored within one to four weeks. Following Project implementation, the stream is anticipated to maintain its current functionality. Habitat quality within the Project Area may improve as a result of bank stabilization and reduced sedimentation. Impacts to Critical Habitat from Project implementation would be less than significant.

*Level of significance: Less than Significant*

***Potential Impact BIO-7: Nesting Birds***

The Project has the potential to impact native nesting birds protected by the CFGC. Project activities, such as vegetation removal and ground disturbance, have the potential to impact these species by causing direct mortality of eggs or young, or by causing auditory, vibratory, and/or visual disturbance of a sufficient level to cause abandonment of an active nest. If Project activities occur during the nesting season, which generally extends from February 1 through August 31, nests of native birds could be impacted by construction and other ground-disturbing activities. The Project will revegetate following ground disturbance, so no permanent loss of habitat is anticipated for nesting birds. Impacts to nesting birds would be considered significant under CEQA.

*Level of Significance: Potentially Significant*

Mitigation Measure BIO-7: Nesting Birds

Project activities, such as vegetation removal, grading, or initial ground-disturbance, will be conducted between September 1 and January 31 (outside of the February 1 to August 31 nesting season) to the greatest extent feasible.

If Project activities must be conducted during the nesting season, a pre-construction nesting bird survey will be conducted by a qualified biologist no more than 14 days prior to vegetation removal or initial ground disturbance. The survey will include the Project Area and surrounding 250 feet to identify the location and status of any nests that could potentially be affected either directly or indirectly by Project activities.

If active nests of native nesting bird species are located during the nesting bird survey, a work exclusion zone will be established around each nest by the qualified biologist. Established exclusion zones will remain in place until all young in the nest have fledged or the nest otherwise becomes inactive (e.g., due to predation). Appropriate exclusion zone sizes will be determined by a qualified biologist and will vary based on species, nest location, existing visual buffers, noise levels, and other factors. An exclusion zone radius may be as small as 50 feet for common, disturbance-adapted species, or as large as 250 feet or more for raptors. Exclusion zone size will be reduced from established levels by a qualified biologist if nest monitoring findings indicate that Project activities do not adversely impact the nest, and if a reduced exclusion zone would not adversely affect the nest.

*Level of Significance After Mitigation: Less Than Significant*

### *5.2.2 Sensitive Communities*

The CDFW defines sensitive natural communities and vegetation alliances using NatureServe's standard heritage program methodology, as described above in Section 2.1. Project impacts to CDFW sensitive natural communities, vegetation alliances/associations, or any such community identified in local or regional plans, policies, and regulations, were considered and evaluated. Furthermore, aquatic, wetland, and riparian habitats are also protected under applicable federal, state, or local regulations, and are generally subject to regulation, protection, or consideration by the Corps, RWQCB, CDFW, and/or the USFWS.

***Potential Impact BIO-8: Riparian Woodland***

The Project proposes to permanently impact approximately 0.002 acre of riparian woodland and temporarily impact 0.003 acres. Riparian woodland is under the jurisdiction of the CDFW, and impacts to this community would require a Lake and Streambed Alteration Agreement from the CDFW.

*Level of Significance: Potentially Significant*

Mitigation Measure BIO-8: Lake and Streambed Alteration Agreement and Revegetation

A Lake and Streambed Alteration Agreement application for impacts to habitat regulated by the CDFW will be prepared and submitted to the CDFW. Areas of temporary impact will be mitigated on-site via revegetation. The main approach for revegetation will be to rely on natural regeneration and native seeding and willow stake installation. Natural recruitment of native vegetation is expected to occur and will be augmented through seeding with a native seed mix.

Six willow poles will be added at the downstream edge of the rip-rapped sections of the bank to improve stability and enhance habitat. Permanent impact areas are very small and will not substantially reduce the amount of riparian habitat. Although they will not be vegetated at the ground level, they are expected to eventually be covered by the canopy of adjacent vegetation. In addition, the small reduction in vegetated surface will increase bank stability, and the overall situation will be a benefit to riparian habitat.

With the above measures, in combination with the general avoidance and minimization measures described in section 5.1, impacts to riparian woodland will be less than significant.

*Level of Significance After Mitigation: Less Than Significant*

*5.2.3 Jurisdictional Aquatic Features*

Within the Project Area, a single perennial stream (San Pedro Creek) was mapped. This feature is potentially under the jurisdiction of the Corps, RWQCB, and CDFW. However, the lateral extent of jurisdiction over this feature by the different agencies varies. Potential Corps jurisdiction would extend to the OHWM. Potential RWQCB and CDFW jurisdiction would extend to top of bank. As a result, the impact quantities for Corps jurisdiction differ from those of the RWQCB and CDFW. Impacts to perennial stream are summarized in Table 3.

Table 3. Summary of Impacts to Perennial Stream within the Project Area

| | Temporary Impacts | | | Permanent Impacts | | |
|---|---|---|---|---|---|---|
| **Agency** | **Acre** | **Square Ft.** | **Linear Ft.** | **Acre** | **Square Ft.** | **Linear Ft.** |
| Corps (to OHWM) | 0.016 | 681 | 52 | 0.003 | 149 | 11 |
| RWQCB (to top of bank) | 0.022 | 995 | 52 | 0.007 | 287 | 11 |
| CDFW (to top of bank) | 0.022 | 995 | 52 | 0.007 | 287 | 11 |

***Potential Impact BIO-9: Perennial Stream***

The Project proposes to permanently impact 0.003 acres (149 square feet) and 11 linear feet of perennial stream within Corps jurisdiction and temporarily impact 0.016 acres (681 square feet) and 52linear feet. The Project proposes to permanently impact 0.007 acres (287 square feet) and 11 linear feet of perennial stream within RWQCB and CDFW jurisdiction and temporarily impact 0.022 acres (995 square feet) and 52 linear feet.

Permanent impacts below OHWM will involve grading and excavation for the construction of a new concrete headwall and the placement of rip-rap adjacent to the headwall. Temporary impacts below OHWM involve the placement of coffer dams at the upstream end of temporary work limits and a temporary bypass pipe.

Permanent impacts below top of bank and above OHWM will involve grading and excavation for the construction of a new concrete headwall and the placement of rip-rap below the headwall. Temporary impacts below top of bank and above OHWM will involve potential clearing of vegetation.

Impacts to perennial stream are potentially significant under CEQA and may require a Section 404 nationwide permit from the Corps, a Section 401 Water Quality Certification from the RWQCB, and a Lake and Streambed Alteration Agreement from the CDFW.

*Level of Significance: Potentially Significant*

Mitigation Measure BIO-9: Regulatory Agency Permits and Revegetation

Permanent impacts below OHWM will involve the construction of a new concrete headwall and the placement of rip-rap below the headwall. However, the existing concrete spillway is partially located below OHWM, as is rip-rap on the south side of the existing spillway. The replacement of these features as well as the placement of new rip-rap will not reduce the width of the channel and will not have a substantial effect on stream flow. Although activity below OHWM is not expected to have a substantial effect on the stream, to further improve the channel, existing debris, such as tires and large pieces of concrete, will be removed from the channel following construction.

Temporary impacts below OHWM involve the placement of coffer dams at the upstream end of temporary work limits. The coffer dams will result in the temporary dewatering of the work area, but flows will be restored to pre-construction conditions following removal of the coffer dams and bypass pipes. In addition, the contractor will be required to develop and submit a dewatering and flow bypass plan, in coordination with the project engineer. The in-channel work window will be from June 1 through October 31 in the upstream reach. Dewatering and flow bypassing will convey baseflows only, not stormflows. Any rainfall runoff events that happen during the in-channel work window will not be controlled by the bypass system. Earthwork within the stream will only occur in the dry season as defined above. In the unlikely event of stormflows in San Pedro Creek occur in the summer months or early fall, crews will not work in the creek until flows have subsided. The contractor shall monitor weather conditions throughout the project. If more than 0.5 inch of rain is forecast within 2 days, the contractor shall cease grading and stabilize the site. The contractor will continue work 24 hours after the end of the precipitation event.

Permanent impacts below top of bank and above OHWM will involve grading and excavation for the construction of a new concrete headwall and the placement of rip-rap below the headwall. The existing headwall and concrete spillway are below top of bank, and their replacement with a new headwall and rip-rap will not alter the channel width or flow capacity. As such, Project activity within the existing headwall/spillway footprint is self-mitigating. Additional rip-rap outside of this footprint will occupy a very small area and will not alter channel width or flow capacity. Areas that will be graded will be returned to existing grade. Areas that will be cleared of vegetation will be mitigated on-site via revegetation. The main approach for revegetation will be to rely on natural regeneration and native seeding and willow stake installation. Natural recruitment of native vegetation is expected to occur and will be augmented through seeding with a native seed mix. Six willow poles will be added at the downstream edge of the rip-rapped sections of the bank to improve stability and enhance habitat. Permanent impact areas outside the existing headwall/spillway footprint, but Project activity will result in improved bank stability.

Temporary impacts below top of bank and above OHWM will involve potential clearing of vegetation. The temporary impact areas will be returned to existing grade and will be revegetated as per the above paragraph.

Finally, applications for a Section 404 nationwide permit from the Corps, a Section 401 Water Quality Certification from the RWQCB, and a Lake and Streambed Alteration Agreement from the CDFW will be prepared and submitted.

With the above measures, in combination with the general avoidance and minimization measures described in section 5.1, impacts to perennial stream will be less than significant.

*Level of Significance After Mitigation: Less Than Significant*

*5.2.4 Wildlife Movement*

***Potential Impact BIO-10: Wildlife Movement***

For many species, the landscape is a mosaic of suitable and unsuitable habitat types. Environmental corridors are segments of land that provide a link between these different habitats while also providing cover. Development that fragments natural habitats (i.e., breaks them into smaller, disjunct pieces) can have a twofold impact on wildlife: (1) as habitat patches become smaller they are unable to support as many individuals (patch size), and (2) the area between habitat patches may be unsuitable for wildlife species to traverse (connectivity). San Pedro Creek likely serves as a movement corridor for several aquatic and/or terrestrial wildlife species. The Project will replace an existing outfall, and following Project implementation, the stream is anticipated to maintain its current functionality for local movement of wildlife species. The duration of the Project is expected to be very brief and will occur in the dry season. Impacts to wildlife movement from the Project would be less than significant.

*Level of Significance: Less than Significant*

*5.2.5 Conflicts with Local Policies*

Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.

***Potential Impact BIO-11: Heritage Trees***

No trees that qualify as heritage trees are present within the Project Area. Of the trees that are present, none will be removed, minor trimming will occur on an arroyo willow adjacent to the outfall, and a coffer dam will be temporarily installed under the dripline of another willow (*Salix* sp.) Because there are no heritage trees within the Project Area, the Project will not conflict with the City of Pacifica tree ordinance or logging operations ordinance.

*Level of Significance: No Impact*

*5.2.6 Conflicts with an Adopted Habitat Conservation Plan*

***Potential Impact BIO-12: Conflicts with an Adopted Habitat Conservation Plan***

The Project would not conflict with the provisions of an adopted HCP, natural community conservation plan, or other approved local, regional, or state habitat conservation plan. The Project Area is not within a geographic area covered by an adopted HCP or a natural community conservation plan.

*Level of Significance: No Impact*

### *5.7 Cumulative Impacts*

***Potential Impact BIO-13: Cumulative Impacts***

Cumulative impacts on the biological resources that could be affected by the Project may result from a number of past, current, and reasonably foreseeable future projects that occur in the area. Although such projects could result in impacts on these sensitive habitats and species, it is expected that most current and future projects that impact these species and their habitats would be required to mitigate these impacts through the CEQA, Section 1602, or Section 404/401 permitting process, as well as through the ESA Section 7 consultation process. As a result, most projects in the region will mitigate their impacts on these resources, minimizing cumulative impacts on these species.

Through implementation of the avoidance and minimization measures incorporated into the Project, it will not result in a cumulatively considerable contribution to any significant cumulative impacts to biological resources.

*Level of Significance: No Impact*

## 6.0 REFERENCES


Beier, P and S. Loe. 1992. A checklist for evaluating impacts to wildlife movement corridors. Wildlife Society Bulletin. 20: 434-440.

[CDFG] California Department of Fish and Game. 1994. A Field Guide to Lake and Streambed Alteration Agreements, Sections 1600-1607, California Fish and Game Code. Environmental Services Division, Sacramento, CA.

[CDFG]. 1998. California Salmonid Stream Habitat Restoration Manual. Third Edition. Sacramento, California.

[CDFW] California Department of Fish and Wildlife. 2019. California Natural Community List. Biogeographic Data Branch. Vegetation Classification and Mapping Program, Sacramento, CA. November 8.

[CDFW] California Department of Fish and Wildlife. 2020. California Natural Diversity Database. Biogeographic Data Branch, Vegetation Classification and Mapping Program, Sacramento, California. Available online at: https://wildlife.ca.gov/Data/CNDDB/Maps-and-Data; most recently accessed: January 2020.

[CNPS] California Native Plant Society. 2020a. Inventory of Rare and Endangered Plants (online edition, v8-03 0.39). Sacramento, California. Online at: http://rareplants.cnps.org/. Accessed: January 2020.

[CNPS] California Native Plant Society. 2020b. A Manual of California Vegetation, Online Edition. Sacramento, California. Online at: http://vegetation.cnps.org/; most recently accessed: February 2020.

[CSRL] California Soil Resources Lab. 2020. Online Soil Survey. Online at: http://casoilresource.lawr.ucdavis.edu/drupal. Accessed: February 2020.

Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual. Department of the Army, Waterways Experiment Station, Vicksburg, Mississippi 39180-0631.

Gallagher, S. and C. Gallagher. 2005. Discrimination of Chinook Salmon, Coho Salmon, and Steelhead Redds and Evaluation of the Use of Redd Data for Estimating Escapement in Several Unregulated Streams in Northern California. *North American Journal of Fisheries Management* 25:284-300.

Google Earth. 2020. Aerial Imagery 1993-2019. Accessed: February 2020.

Hager Environmental Sciences. 2002. Steelhead habitat assessment for the San Pedro Creek watershed. Prepared for San Pedro Creek Watershed Coalition. Pacifica, California.

Hayes, S., M. Bond, C. Hanson, E. Freund, J. Smith, E. Anderson, A. Ammann, and R. MacFarlane. 2008. Steelhead Growth in a Small Central California Watershed: Upstream and Estuarine Rearing Patterns. *Transactions of the American Fisheries Society* 137:114-128.

Jeffres C., J. Opperman, and P. Moyle. 2008. Ephemeral floodplain habitats provide best growth conditions for juvenile Chinook salmon in a California river. *Environmental Biology of Fishes* (2008) 83:449–458

Johnson, R. M. 2005. A Basin-wide snorkel survey of the San Pedro Creek steelhead (*Oncorhynchus mykiss*) population. MS Thesis. San Francisco State University.

Lichvar, R.W., D.L. Banks, W.N. Kirchner, and N.C. Melvin. 2016. The National Wetland Plant List: 2016 wetland ratings. Phytoneuron 2016-30: 1-17.

Matocq, M. 2003. Dusky-footed Woodrats (Neotoma fuscipes) at Hastings: A Research Tradition. Hastings Natural History Reservation. Available online: http://www.hastingsreserve.org/Woodrats/DFwoodrats.html

Moyle, P. 2002. Inland Fishes of California Revised and Expanded. University of California Press. Berkeley, California.

NatureServe. 2020. NatureServe Conservation Status. Available online at: http://explorer.natureserve.org/ranking.htm

[NETR] Nationwide Environmental Title Research. 2020. Historic Aerials. Available online at https://www.historicaerials.com/; Accessed: February 2020.

NMFS. 2007. Federal Recovery Outline for the Distinct Population Segment of Central California Coast Steelhead. Prepared by NMFS Southwest Regional Office. Long Beach, California.

Pierson, E.D., W.E. Rainey and C. Corben. 2006. Distribution and status of Western red bats (Lasiurus blossevillii) in California. Calif. Dept. Fish and Game, Habitat Conservation Planning Branch, Species Conservation and Recovery Program Report 2006-04, Sacramento, CA 45 pp.

Shuford, WD, and T Gardali (eds). 2008. California Bird Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation concern in California. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California, and CDFG, Sacramento.

Sommer, T., M. Nobriga, W. Harrell, W. Batham, and W. Kimmerer. 2001. Floodplain rearing of juvenile chinook salmon: evidence of enhanced growth and survival. Canadian Journal of Fisheries and Aquatic Sciences 58: 325-333.

Soulé, M.E. and J. Terbough. 1999. Conserving nature at regional and continental scales - a scientific program for North America. Bioscience 49:809-817.

Stebbins, R.C. A Field Guide to Western Reptiles and Amphibians, 3rd Edition. 2003. The Peterson Field Guide Series, Houghton Mifflin Company, New York.

Thomson, R.C., A.N. Wright, and H.B. Shaffer. 2016. California Amphibian and Reptile Species of Special Concern. Co-published by the California Department of Fish and Wildlife and University of California Press. Oakland, California.

[USDA] U.S. Department of Agriculture, Soil Conservation Service. 1961. Soil Survey of San Mateo County. In cooperation with the University of California Agricultural Experiment Station.

[USFWS] United States Fish and Wildlife Service. 1986. Species Profile: Life Histories and Environmental Requirements of Coastal Fishes and Invertebrates (Pacific Northwest) Steelhead Trout. Biological Report 82 (11.82).

[USFWS] United States Fish and Wildlife Service. 2019. Information for Planning and Conservation Database. Available online at: https://ecos.fws.gov/ipac/; most recently accessed: September 2019.

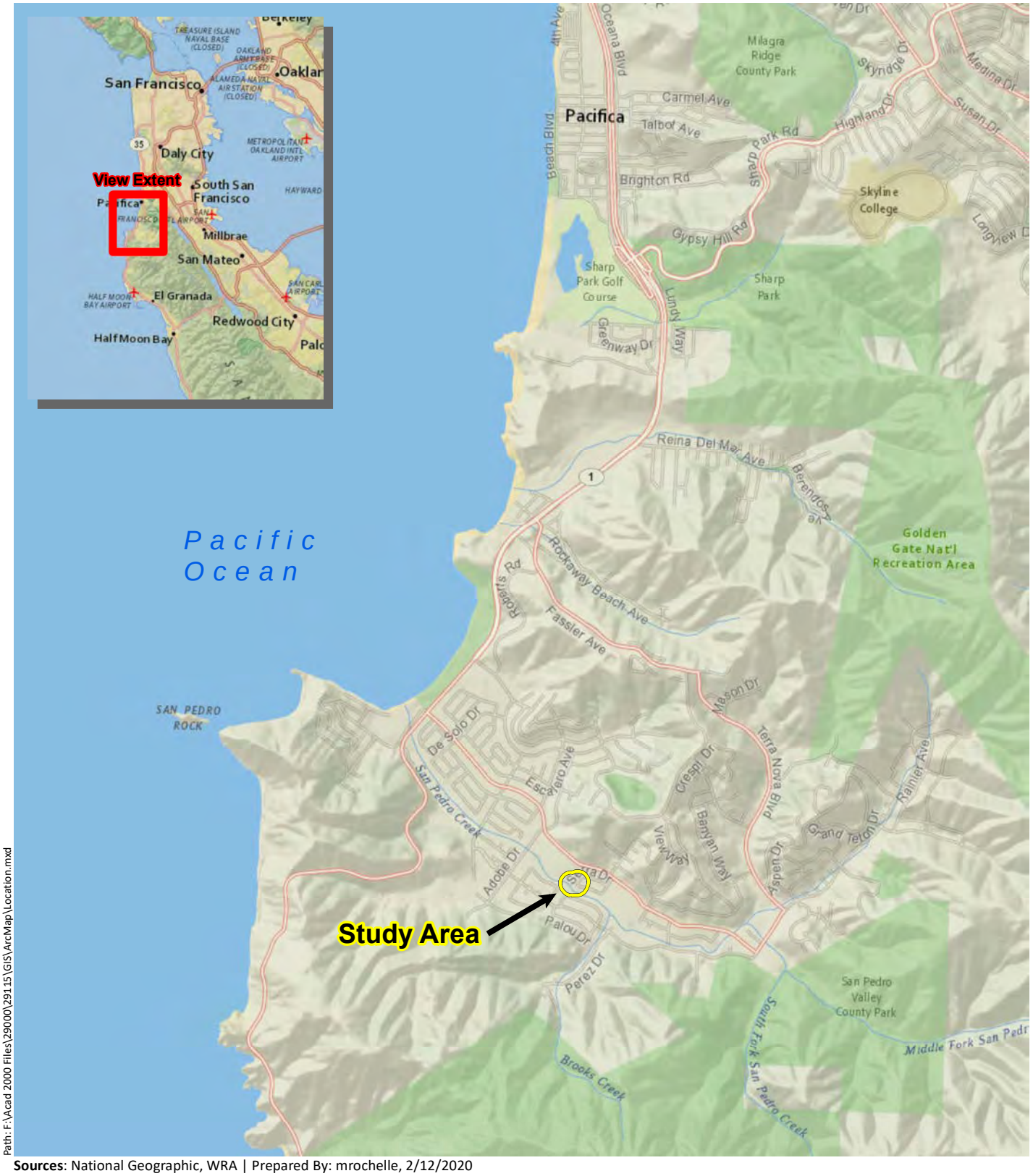
[USFWS] U.S. Fish and Wildlife Service. 2020. Threatened & Endangered Species Active Critical Habitat Report Online Mapper. Accessed: February 2020.

[WBWG] Western Bat Working Group. 2020. Species Accounts. Available online at: http://wbwg.org/western-bat-species/; Accessed February 2020.

Zeiner, D. C., W. F. Laudenslayer, Jr., K. E. Mayer, and M. White. 1990. California's Wildlife, Volume I-III: Amphibians and Reptiles, Birds, Mammals. California Statewide Wildlife Habitat Relationships System, California Department of Fish and Game, Sacramento.

# APPENDIX A

# FIGURES




Path: F:\Acad 2000 Files\29000\29115\GIS\ArcMap\Location.mxd

**Sources**: National Geographic, WRA | Prepared By: mrochelle, 2/12/2020

# Figure 1. Study Area Regional Location Map

Serra Drive Outfall Repair Project
Pacifica, California

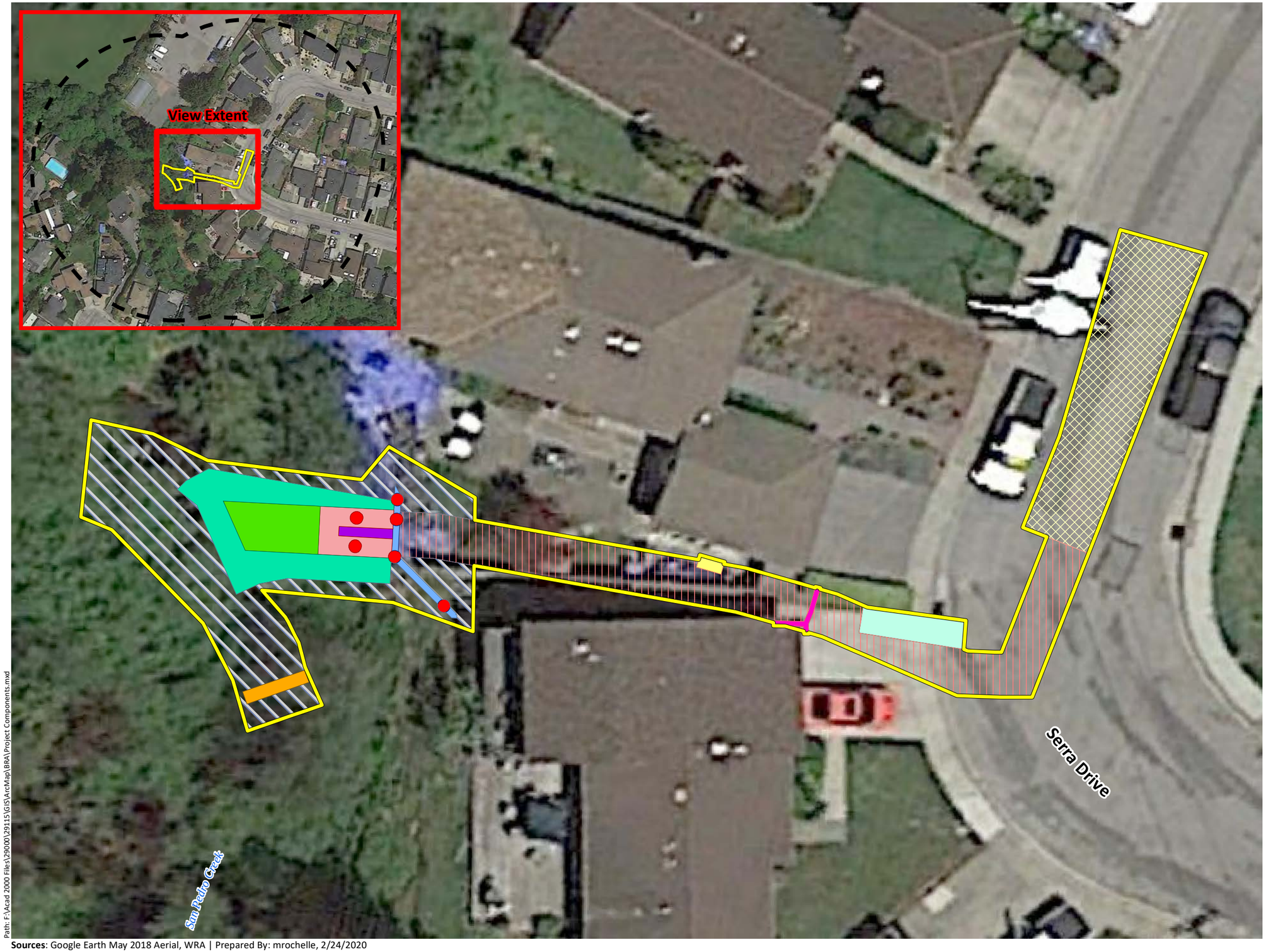
0 0.5 1 Miles

N

wra
ENVIRONMENTAL CONSULTANTS

# Figure 2.
# Project Components

Sierra Drive Outfall Repair Project
Pacifica, California




Study Area - 7.16 ac.

Project Area - 0.07 ac.

**Temporary Impacts - 0.06 ac./ 2,572 sq.ft.**

- Construction Access Path
- Install Coffer Dam
- Remove and Replace Gate
- Remove and Replace Hedge
- Remove and Replace Shed
- Remove Existing Concrete, Install Partially Grouted Rip Rap
- Remove Existing HDPE Pipe
- Spillway
- Staging Area
- Temporary Contractor Work Limits

**Permanent Impacts - 0.01 ac./ 291 sq.ft.**

- Headwall Piers
- Install Rip Rap and Cobbles
- Wingwall

N

0 10 20
Feet

wra
ENVIRONMENTAL CONSULTANTS

Path: F:\Acad 2000 Files\29000\29115\GIS\ArcMap\BRA\Project Components.mxd

**Sources**: Google Earth May 2018 Aerial, WRA | Prepared By: mrochelle, 2/24/2020

# Figure 3.
# Land Cover Types

Sierra Drive Outfall Repair Project
Pacifica, California




Study Area - 7.16 ac.

Project Area - 0.07 ac.

Ordinary High Water Mark

Top of Bank

**Non-sensitive Land Cover Types within Study Area**

Developed/Landscaped - 5.56 ac.

**Sensitive Land Cover Types within Study Area**

Riparian Woodland - 1.33 ac.

Perennial Stream - 0.27 ac. & 803 LF

N

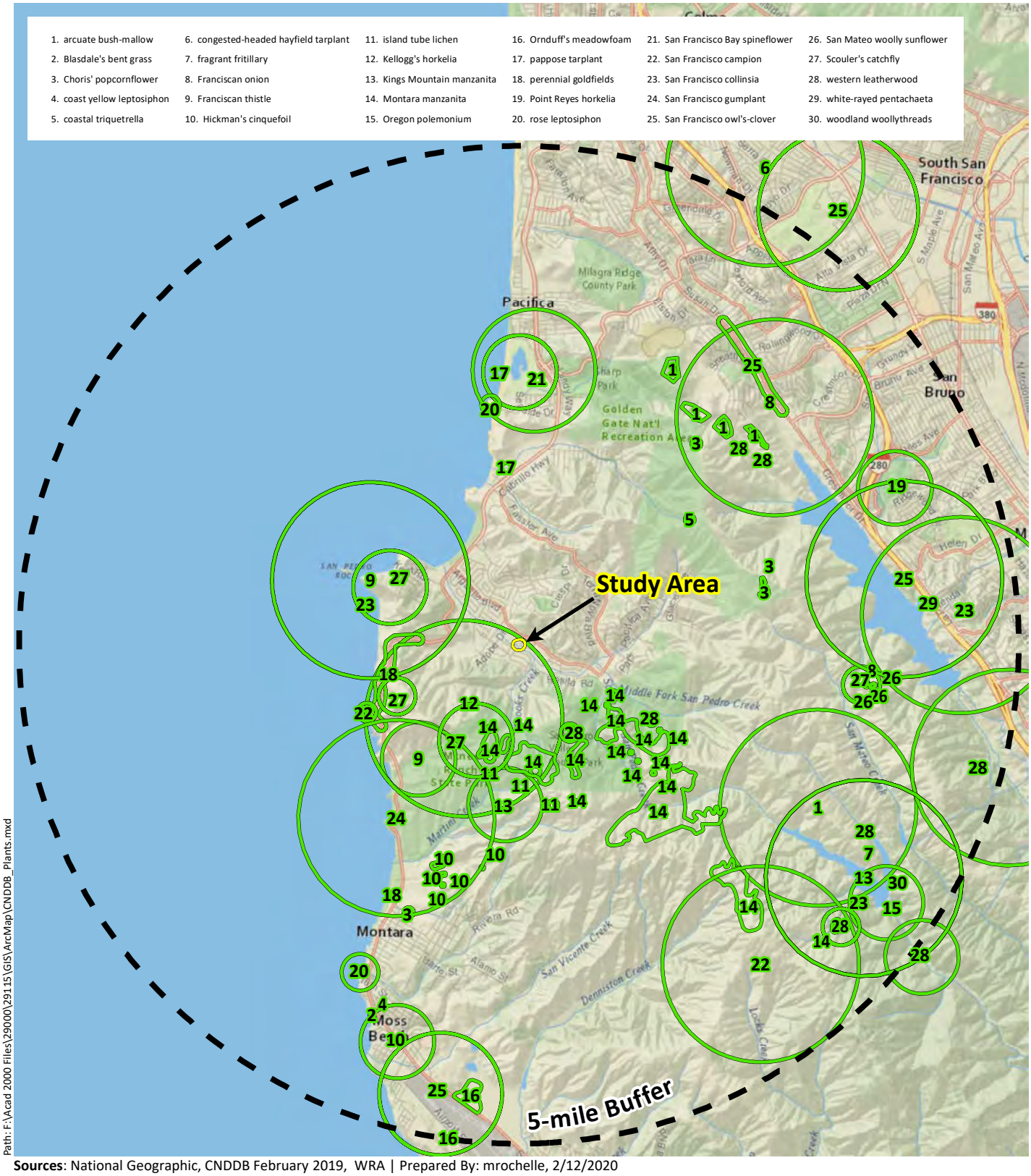
0 50 100

Feet

wra
ENVIRONMENTAL CONSULTANTS

Path: F:\Acad 2000 Files\29000\29115\GIS\ArcMap\BRA\Land Cover.mxd

**Sources**: Google Earth May 2018 Aerial, WRA | Prepared By: mrochelle, 2/24/2020




**Sources**: National Geographic, CNDDB February 2019, WRA | Prepared By: mrochelle, 2/12/2020

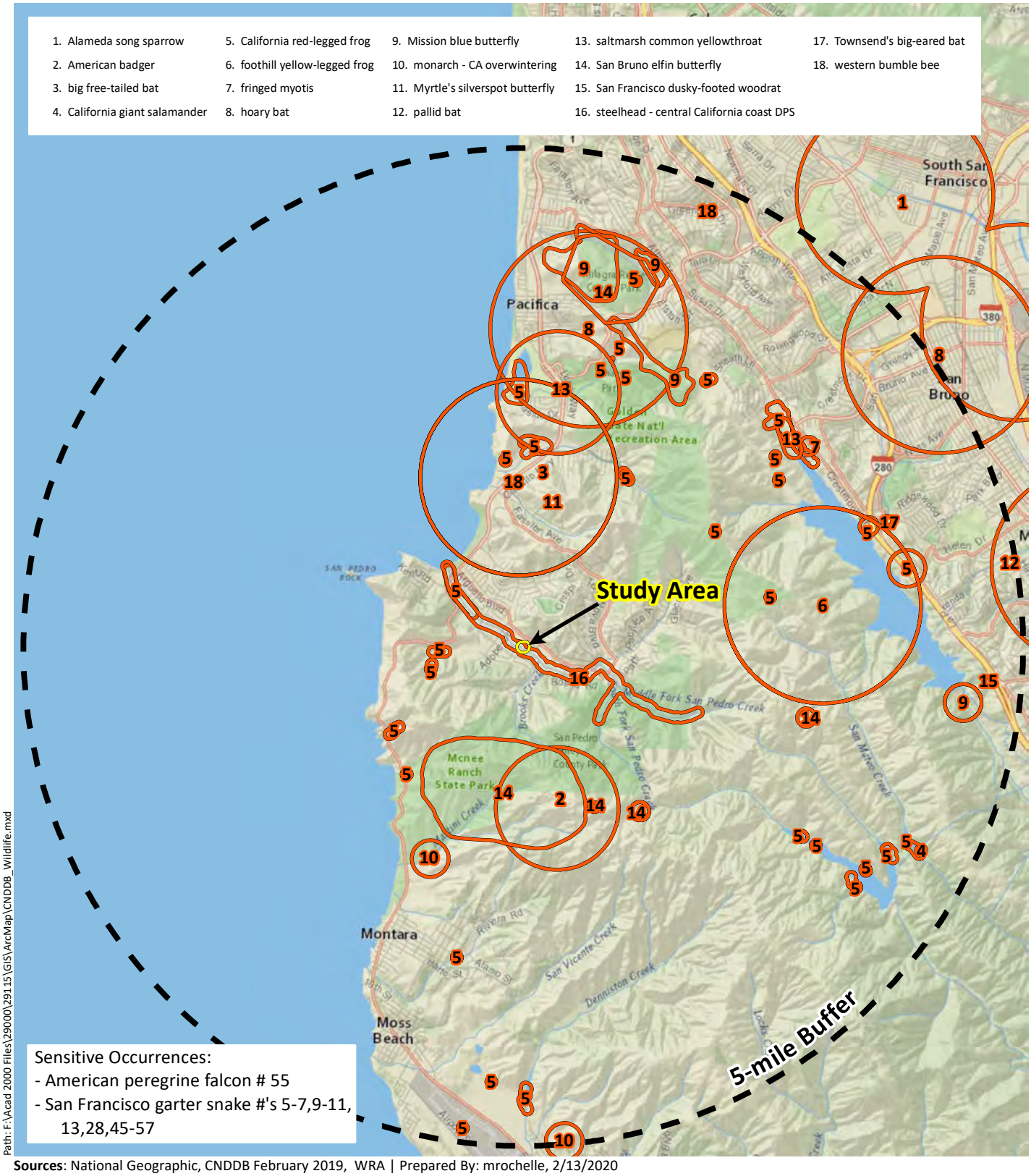
# Figure 4. Special-Status Plant Species Documented in the CNDDB within 5-miles of the Study Area

Serra Drive Outfall Repair Project
Pacifica, California

0 1 2 Miles

N

ENVIRONMENTAL CONSULTANTS




Path: F:\Acad 2000 Files\29000\29115\GIS\ArcMap\CNDDB_Wildlife.mxd

**Sources**: National Geographic, CNDDB February 2019, WRA | Prepared By: mrochelle, 2/13/2020

# Figure 5. Special-Status Wildlife Species Documented in the CNDDB within 5-miles of the Study Area

Serra Drive Outfall Repair Project
Pacifica, California

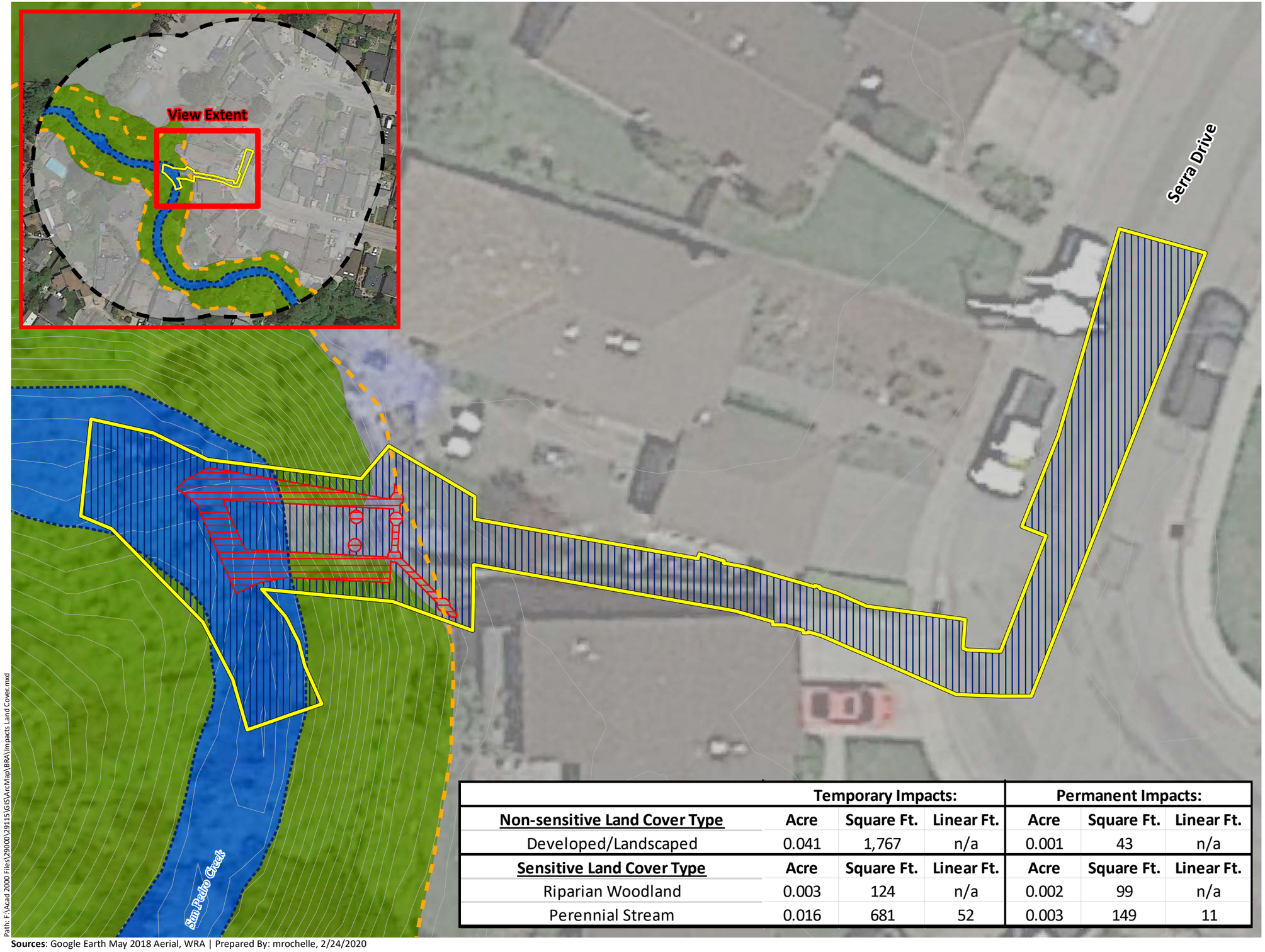
0 1 2 Miles

N

wra
ENVIRONMENTAL CONSULTANTS

# Figure 6.
# Project Impacts to Land Cover Types

Sierra Drive Outfall Repair Project
Pacifica, California




Study Area - 7.16 ac.

Project Area - 0.07 ac.

Contours - 1' interval

Ordinary High Water

Top of Bank

**Impact Type**

Temporary Impacts - 0.06 ac./ 2,572 sq.ft.

Permanent Impacts - 0.01 ac./ 291 sq.ft.

**Non-sensitive Land Cover Types within Study Area**

Developed/Landscaped - 5.56 ac.

**Sensitive Land Cover Types within Study Area**

Riparian Woodland - 1.33 ac.

Perennial Stream - 0.27 ac. & 803 LF

N

0 10 20

Feet

| | Temporary Impacts: | | | Permanent Impacts: | | |
|---|---|---|---|---|---|---|
| **Non-sensitive Land Cover Type** | **Acre** | **Square Ft.** | **Linear Ft.** | **Acre** | **Square Ft.** | **Linear Ft.** |
| Developed/Landscaped | 0.041 | 1,767 | n/a | 0.001 | 43 | n/a |
| **Sensitive Land Cover Type** | **Acre** | **Square Ft.** | **Linear Ft.** | **Acre** | **Square Ft.** | **Linear Ft.** |
| Riparian Woodland | 0.003 | 124 | n/a | 0.002 | 99 | n/a |
| Perennial Stream | 0.016 | 681 | 52 | 0.003 | 149 | 11 |

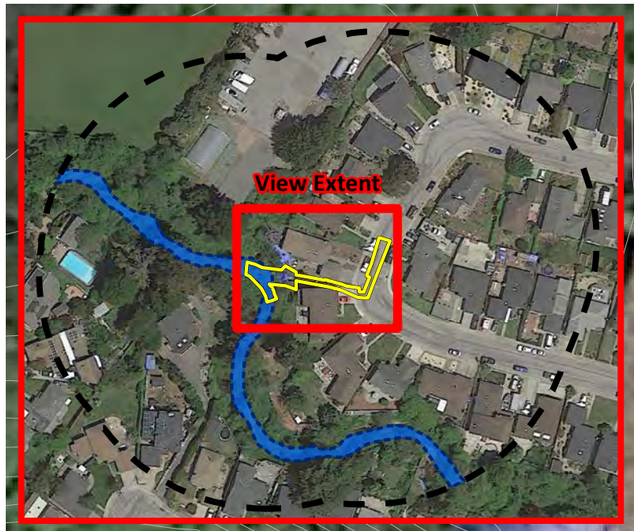
Path: F:\Acad 2000 Files\29000\29115\GIS\ArcMap\BRA\Impacts Land Cover.mxd

**Sources**: Google Earth May 2018 Aerial, WRA | Prepared By: mrochelle, 2/24/2020

wra
ENVIRONMENTAL CONSULTANTS

# Figure 7.
# Project Impacts to Corps-Jurisdictional Aquatic Features

Sierra Drive Outfall Repair Project
Pacifica, California




Serra Drive

San Pedro Creek

Study Area - 7.16 ac.

Project Area - 0.07 ac.

Contours - 1' interval

Ordinary High Water Mark

**Impact Type**

Temporary Impacts - 0.06 ac./ 2,572 sq.ft.

Permanent Impacts - 0.01 ac./ 291 sq.ft.

**Corps Jurisdictional Waters within Study Area**

Perennial Stream - 0.27 ac. & 803 LF

N

0 10 20

Feet

| | Temporary Impacts: | | | Permanent Impacts: | | |
|---|---|---|---|---|---|---|
| **Waters of the U.S. (Ordinary High Water Mark)** | **Acre** | **Square Ft.** | **Linear Ft.** | **Acre** | **Square Ft.** | **Linear Ft.** |
| Perennial Stream | 0.016 | 681 | 52 | 0.003 | 149 | 11 |

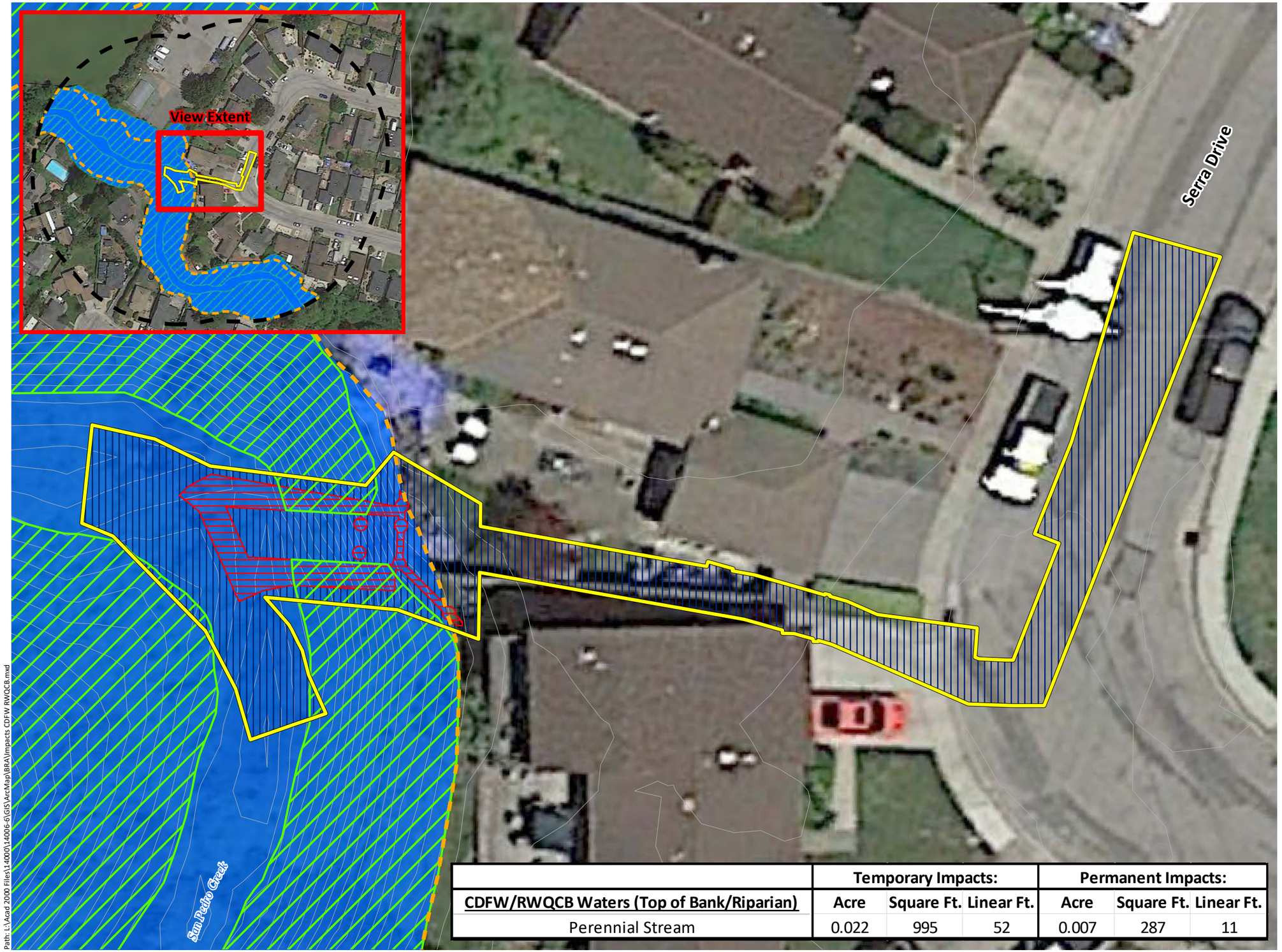
wra
ENVIRONMENTAL CONSULTANTS

Path: F:\Acad 2000 Files\29000\29115\GIS\ArcMap\BRA\Impacts Waters.mxd

**Sources**: Google Earth May 2018 Aerial, WRA | Prepared By: mrochelle, 2/24/2020

# Figure 8.
# Project Impacts to RWQCB/CDFW-Jurisdictional Aquatic Features

Sierra Drive Outfall Repair Project
Pacifica, California




Study Area - 7.16 ac.

Project Area - 0.07 ac.

Contours - 1' interval

Top of Bank

Riparian Woodland

**Impact Type**

Temporary Impacts - 0.06 ac./ 2,572 sq.ft.

Permanent Impacts - 0.01 ac./ 291 sq.ft.

**CDFW/RWQCB Jurisdictional Waters within Study Area**

Perennial Stream - 1.62 ac. & 803 LF

N

0 10 20

Feet

| | Temporary Impacts: | | | Permanent Impacts: | | |
|---|---|---|---|---|---|---|
| **CDFW/RWQCB Waters (Top of Bank/Riparian)** | **Acre** | **Square Ft.** | **Linear Ft.** | **Acre** | **Square Ft.** | **Linear Ft.** |
| Perennial Stream | 0.022 | 995 | 52 | 0.007 | 287 | 11 |

wra
ENVIRONMENTAL CONSULTANTS

Path: L:\Acad 2000 Files\14000\14006-6\GIS\ArcMap\BRA\Impacts CDFW RWQCB.mxd

**Sources**: Google Earth May 2018 Aerial, WRA | Prepared By: mrochelle, 2/24/2020

# APPENDIX B

# LIST OF OBSERVED SPECIES

**Appendix B.** Plant and wildlife species observed during the September 20, 2019, site visit.

| SCIENTIFIC NAME | COMMON NAME |
|---|---|
| **Plants** | |
| *Alnus rubra* | Red alder |
| *Athyrium filix-femina* var. *cyclosorum* | Western lady fern |
| *Chasmanthe floribunda* | Chasmanthe |
| *Conium maculatum* | Poison hemlock |
| *Cornus sericea* | American dogwood |
| *Cortaderia jubata* | Andean pampas grass |
| *Cyclospermum leptophyllum* | Marsh parsley |
| *Delairea odorata* | Cape ivy |
| *Ehrharta erecta* | Upright veldt grass |
| *Equisetum* sp. | Horsetail |
| *Erigeron canadensis* | Canada horseweed |
| *Fumaria* sp. | Fumitory |
| *Hedera helix* | English ivy |
| *Lonicera japonica* | Japanese honeysuckle |
| *Nasturtium officinale* | Watercress |
| *Parietaria judaica* | Spreading pellitory |
| *Passiflora* sp. | Passionflower |
| *Pinus radiata* | Monterey pine |
| *Poa annua* | Annual blue grass |
| *Raphanus sativus* | Wild radish |
| *Rubus parviflorus* | Thimbleberry |
| *Rubus ursinus* | California blackberry |
| *Rumex crispus* | Curly dock |
| *Salix lasiandra* | Pacific willow |
| *Salix lasiolepis* | Arroyo willow |
| *Sambucus racemosa* var. *racemosa* | Red elderberry |
| *Stachys rigida* | Rough hedgenettle |
| *Taraxacum officinale* | Common dandelion |
| *Tropaeolum majus* | Garden nasturtium |
| *Urtica dioica* | Stinging nettle |
| *Woodwardia fimbriata* | Western chain fern |
| **Wildlife** | |
| *Calypte anna* | Anna’s hummingbird |
| *Corvus brachyrhynchos* | American crow |
| *Setophaga townsendi* | Townsend’s warbler |
| *Odocoileus hemionus* | mule deer |
| *Pacifastacus leniusculus* | Signal crayfish |
| *Psaltriparus minimus* | American bushtit |

# APPENDIX C

# SPECIAL-STATUS PLANT AND WILDLIFE SPECIES POTENTIALS TABLE

**Appendix C.** Potential for special-status plant and wildlife species to occur in the Study Area. List compiled from the California Department of Fish and Wildlife (CDFW) Natural Diversity Database (CDFW 2020), U.S. Fish and Wildlife Service (USFWS) Species Lists (USFWS 2019), and California Native Plant Society (CNPS) Electronic Inventory (CNPS 2020a) searches of the Montara Mountain, San Francisco South, Hunters Point, San Mateo, Woodside, and Half Moon Bay USGS 7.5' quadrangles.

| SPECIES | STATUS* | HABITAT | POTENTIAL FOR OCCURRENCE** | RECOMMENDATIONS |
|---|---|---|---|---|
| **Plants** | | | | |
| San Mateo thorn-mint *Acanthomintha duttonii* | FE, SE, Rank 1B.1 | Chaparral, valley and foothill grassland. Elevation ranges from 160 to 985 feet (50 to 300 meters). Blooms Apr-Jun. | **No Potential.** This species is endemic to serpentine substrate, which is absent from the Study Area. | No further actions are recommended for this species. |
| Blasdale's bent grass *Agrostis blasdalei* | Rank 1B.2 | Coastal bluff scrub, coastal dunes, coastal prairie. Elevation ranges from 0 to 490 feet (0 to 150 meters). Blooms May-Jul. | **No Potential.** Coastal bluff scrub, coastal dunes, and coastal prairie habitats are absent from the Study Area. | No further actions are recommended for this species. |
| Franciscan onion *Allium peninsulare var. franciscanum* | Rank 1B.2 | Cismontane woodland, valley and foothill grassland. Elevation ranges from 170 to 1000 feet (52 to 305 meters). Blooms (Apr)May-Jun. | **Unlikely.** The Study Area lacks valley and foothill grassland habitat and clay substrate. In addition, vegetation is either heavily disturbed by anthropogenic activity or is comprised of dense vegetation (such as blackberry and ivy) that would outcompete this species. | No further actions are recommended for this species. |

| SPECIES | STATUS* | HABITAT | POTENTIAL FOR OCCURRENCE** | RECOMMENDATIONS |
|---|---|---|---|---|
| bent-flowered fiddleneck *Amsinckia lunaris* | Rank 1B.2 | Coastal bluff scrub, cismontane woodland, valley and foothill grassland. Elevation ranges from 5 to 1640 feet (3 to 500 meters). Blooms Mar-Jun. | **Unlikely.** The Study Area lacks coastal bluff scrub and valley and foothill grassland. In addition, vegetation is either heavily disturbed by anthropogenic activity or is comprised of dense vegetation (such as blackberry and ivy) that would outcompete this species. | No further actions are recommended for this species. |
| coast rockcress *Arabis blepharophylla* | Rank 4.3 | Broadleafed upland forest, coastal bluff scrub, coastal prairie, coastal scrub. Elevation ranges from 5 to 3610 feet (3 to 1100 meters). Blooms Feb-May. | **No Potential.** The Study Area lacks natural, rocky substrate. | No further actions are recommended for this species. |
| Anderson's manzanita *Arctostaphylos andersonii* | Rank 1B.2 | Broadleafed upland forest, chaparral, north coast coniferous forest. Elevation ranges from 195 to 2495 feet (60 to 760 meters). Blooms Nov-May. | **Unlikely.** The Study Area lacks chaparral and north coast coniferous forest habitats. In addition, vegetation is either heavily disturbed by anthropogenic activity or is comprised of dense vegetation (such as blackberry and ivy) that would outcompete this species. | No further actions are recommended for this species. |
| Franciscan manzanita *Arctostaphylos franciscana* | FE, Rank 1B.1 | Coastal scrub (serpentine). Elevation ranges from 195 to 985 feet (60 to 300 meters). Blooms Feb-Apr. | **No Potential.** This species is endemic to serpentine substrate, which is absent from the Study Area. | No further actions are recommended for this species. |

| SPECIES | STATUS* | HABITAT | POTENTIAL FOR OCCURRENCE** | RECOMMENDATIONS |
|---|---|---|---|---|
| San Bruno Mountain manzanita *Arctostaphylos imbricata* | SE, Rank 1B.1 | Chaparral, coastal scrub. Elevation ranges from 900 to 1215 feet (275 to 370 meters). Blooms Feb-May. | **No Potential.** This species is known from sandstone outcrops, which are absent from the Study Area, and is only known from San Bruno Mountain. In addition, the Study Area lacks chaparral and coastal scrub habitats. | No further actions are recommended for this species. |
| Presidio manzanita *Arctostaphylos montana ssp. ravenii* | FE, SE, Rank 1B.1 | Chaparral, coastal prairie, coastal scrub. Elevation ranges from 145 to 705 feet (45 to 215 meters). Blooms Feb-Mar. | **No Potential.** This species is endemic to serpentine substrate, which is absent from the Study Area. | No further actions are recommended for this species. |
| Montara manzanita *Arctostaphylos montaraensis* | Rank 1B.2 | Chaparral (maritime), coastal scrub. Elevation ranges from 260 to 1640 feet (80 to 500 meters). Blooms Jan-Mar. | **Unlikely.** The Study Area lacks chaparral and coastal scrub habitats. In addition, this species is not known from riparian habitats. | No further actions are recommended for this species. |
| Pacific manzanita *Arctostaphylos pacifica* | SE, Rank 1B.1 | Chaparral, coastal scrub. Elevation ranges from 1080 to 1085 feet (330 to 330 meters). Blooms Feb-Apr. | **No Potential.** This species is highly restricted in range, comprised entirely of two individuals in a single rocky area on San Bruno Mountain. Rocky habitat is absent from the Study Area. | No further actions are recommended for this species. |
| Kings Mountain manzanita *Arctostaphylos regismontana* | Rank 1B.2 | Broadleafed upland forest, chaparral, north coast coniferous forest. Elevation ranges from 1000 to 2395 feet (305 to 730 meters). Blooms Dec-Apr. | **No Potential.** This species is known from granitic or sandstone outcrops, which are absent from the Study Area. | No further actions are recommended for this species. |

| SPECIES | STATUS* | HABITAT | POTENTIAL FOR OCCURRENCE** | RECOMMENDATIONS |
|---|---|---|---|---|
| ocean bluff milk-vetch *Astragalus nuttallii var. nuttallii* | Rank 4.2 | Coastal bluff scrub, coastal dunes. Elevation ranges from 5 to 395 feet (3 to 120 meters). Blooms Jan-Nov. | **No Potential.** Coastal bluff scrub and coastal dune habitats are absent from the Study Area. | No further actions are recommended for this species. |
| coastal marsh milk-vetch *Astragalus pycnostachyus var. pycnostachyus* | Rank 1B.2 | Coastal dunes (mesic), coastal scrub, marshes and swamps (coastal salt, streamsides). Elevation ranges from 0 to 100 feet (0 to 30 meters). Blooms (Apr)Jun-Oct. | **Unlikely.** The Study Area lacks coastal dune, coastal scrub, marsh, or swamp habitats. In addition, vegetation is either heavily disturbed by anthropogenic activity or is comprised of dense vegetation (such as blackberry and ivy) that would outcompete this species. | No further actions are recommended for this species. |
| alkali milk-vetch *Astragalus tener var. tener* | Rank 1B.2 | Playas, valley and foothill grassland (adobe clay), vernal pools. Elevation ranges from 0 to 195 feet (1 to 60 meters). Blooms Mar-Jun. | **No Potential.** The Study Area does not contain playas, vernal pools, or alkaline, clay substrate. | No further actions are recommended for this species. |
| Brewer's calandrinia *Calandrinia breweri* | Rank 4.2 | Chaparral, coastal scrub. Elevation ranges from 30 to 4005 feet (10 to 1220 meters). Blooms (Jan)Mar-Jun. | **Unlikely.** The Study Area does not contain chaparral or coastal scrub habitats. In addition, vegetation is either heavily disturbed by anthropogenic activity or is comprised of dense vegetation (such as blackberry and ivy) that would outcompete this species. | No further actions are recommended for this species. |

| SPECIES | STATUS* | HABITAT | POTENTIAL FOR OCCURRENCE** | RECOMMENDATIONS |
|---|---|---|---|---|
| Oakland star-tulip *Calochortus umbellatus* | Rank 4.2 | Broadleafed upland forest, chaparral, cismontane woodland, lower montane coniferous forest, valley and foothill grassland. Elevation ranges from 325 to 2295 feet (100 to 700 meters). Blooms Mar-May. | **Unlikely.** The Study Area does not contain chaparral, lower montane coniferous forest, or valley and foothill grassland habitats. In addition, vegetation is either heavily disturbed by anthropogenic activity or is comprised of dense vegetation (such as blackberry and ivy) that would outcompete this species. | No further actions are recommended for this species. |
| bristly sedge *Carex comosa* | Rank 2B.1 | Coastal prairie, marshes and swamps (lake margins), valley and foothill grassland. Elevation ranges from 0 to 2050 feet (0 to 625 meters). Blooms May-Sep. | **Unlikely.** The Study Area does not contain coastal prairie, marshes and swamps on lake margins, or grassland habitats. | No further actions are recommended for this species. |
| johnny-nip *Castilleja ambigua var. ambigua* | Rank 4.2 | Coastal bluff scrub, coastal prairie, coastal scrub, marshes and swamps, valley and foothill grassland, vernal pools margins. Elevation ranges from 0 to 1425 feet (0 to 435 meters). Blooms Mar-Aug. | **No Potential.** The Study Area does not contain coastal bluff scrub, coastal prairie, marsh, swamp, grassland, or vernal pool habitats. | No further actions are recommended for this species. |

| SPECIES | STATUS* | HABITAT | POTENTIAL FOR OCCURRENCE** | RECOMMENDATIONS |
|---|---|---|---|---|
| pappose tarplant *Centromadia parryi ssp. parryi* | Rank 1B.2 | Chaparral, coastal prairie, meadows and seeps, marshes and swamps (coastal salt), valley and foothill grassland (vernally mesic). Elevation ranges from 0 to 1380 feet (0 to 420 meters). Blooms May-Nov. | **Unlikely.** The Study Area does not contain chaparral, coastal prairie, meadow and seep, coastal salt marsh or swamp, or grassland habitats or alkaline substrate. Vegetation outside of developed areas is typically shady and/or dense (comprised of species such as blackberry and ivy) that would outcompete this species. | No further actions are recommended for this species. |
| Point Reyes bird's-beak *Chloropyron maritimum ssp. palustre* | Rank 1B.2 | Marshes and swamps (coastal salt). Elevation ranges from 0 to 35 feet (0 to 10 meters). Blooms Jun-Oct. | **No Potential.** The Study Area lacks coastal salt marsh habitat. | No further actions are recommended for this species. |
| San Francisco Bay spineflower *Chorizanthe cuspidata var. cuspidata* | Rank 1B.2 | Coastal bluff scrub, coastal dunes, coastal prairie, coastal scrub. Elevation ranges from 5 to 705 feet (3 to 215 meters). Blooms Apr-Jul(Aug). | **Unlikely.** This species typically occurs in sandy substrate such as dunes, and such substrate is absent from the Study Area. In addition, the Study Area lacks coastal bluff scrub, coastal dunes, coastal prairie, and coastal scrub habitats. | No further actions are recommended for this species. |

| SPECIES | STATUS* | HABITAT | POTENTIAL FOR OCCURRENCE** | RECOMMENDATIONS |
|---|---|---|---|---|
| robust spineflower *Chorizanthe robusta var. robusta* | FE, Rank 1B.1 | Chaparral (maritime), cismontane woodland (openings), coastal dunes, coastal scrub. Elevation ranges from 5 to 985 feet (3 to 300 meters). Blooms Apr-Sep. | **Unlikely.** This species typically occurs in sandy or gravelly substrate such as dunes, and such habitat is absent from the Study Area. In addition, maritime chaparral and coastal scrub habitats are absent from the Study Area. Forested areas are present, but they have a dense understory that has no openings needed to support this species. | No further actions are recommended for this species. |
| Franciscan thistle *Cirsium andrewsii* | Rank 1B.2 | Broadleafed upland forest, coastal bluff scrub, coastal prairie, coastal scrub. Elevation ranges from 0 to 490 feet (0 to 150 meters). Blooms Mar-Jul. | **Unlikely.** The Study Area lacks coastal bluff scrub, coastal prairie, and coastal scrub habitats and serpentine substrate. In addition, vegetation is either heavily disturbed by anthropogenic activity or is comprised of dense vegetation (such as blackberry and ivy) that would outcompete this species. | No further actions are recommended for this species. |
| Crystal Springs fountain thistle *Cirsium fontinale var. fontinale* | FE, SE, Rank 1B.1 | Chaparral (openings), cismontane woodland, meadows and seeps, valley and foothill grassland. Elevation ranges from 145 to 575 feet (45 to 175 meters). Blooms (Apr)May-Oct. | **No Potential.** This species is endemic to serpentine substrate, which is absent from the Study Area. | No further actions are recommended for this species. |

| SPECIES | STATUS* | HABITAT | POTENTIAL FOR OCCURRENCE** | RECOMMENDATIONS |
|---|---|---|---|---|
| compact cobwebby thistle *Cirsium occidentale var. compactum* | Rank 1B.2 | Chaparral, coastal dunes, coastal prairie, coastal scrub. Elevation ranges from 15 to 490 feet (5 to 150 meters). Blooms Apr-Jun. | **No Potential.** The Study Area lacks chaparral, dune, coastal prairie, or coastal scrub habitats and clay substrate. | No further actions are recommended for this species. |
| round-headed Chinese-houses *Collinsia corymbosa* | Rank 1B.2 | Coastal dunes. Elevation ranges from 0 to 65 feet (0 to 20 meters). Blooms Apr-Jun. | **No Potential.** The Study Area lacks coastal dune habitat. | No further actions are recommended for this species. |
| San Francisco collinsia *Collinsia multicolor* | Rank 1B.2 | Closed-cone coniferous forest, coastal scrub. Elevation ranges from 95 to 820 feet (30 to 250 meters). Blooms (Feb)Mar-May. | **Unlikely.** The Study Area lacks closed-cone coniferous forest and coastal scrub habitats. In addition, vegetation is either heavily disturbed by anthropogenic activity or is comprised of dense vegetation (such as blackberry and ivy) that would outcompete this species. | No further actions are recommended for this species. |
| clustered lady's-slipper *Cypripedium fasciculatum* | Rank 4.2 | Lower montane coniferous forest, north coast coniferous forest. Elevation ranges from 325 to 7990 feet (100 to 2435 meters). Blooms Mar-Aug. | **No Potential.** The Study Area lacks coniferous forest habitat. Forested areas in the Study Area have an understory that is either heavily disturbed by anthropogenic activity or is comprised of dense vegetation (such as blackberry and ivy) that would outcompete this species. | No further actions are recommended for this species. |

| SPECIES | STATUS* | HABITAT | POTENTIAL FOR OCCURRENCE** | RECOMMENDATIONS |
|---|---|---|---|---|
| western leatherwood *Dirca occidentalis* | Rank 1B.2 | Broadleafed upland forest, closed-cone coniferous forest, chaparral, cismontane woodland, north coast coniferous forest, riparian forest, riparian woodland. Elevation ranges from 80 to 1395 feet (25 to 425 meters). Blooms Jan-Mar(Apr). | **Unlikely.** The Study Area lacks coniferous forest and chaparral habitats. Forested areas in the Study Area have an understory is either heavily disturbed by anthropogenic activity or is comprised of dense vegetation (such as blackberry and ivy) that would outcompete this species. | No further actions are recommended for this species. |
| California bottle-brush grass *Elymus californicus* | Rank 4.3 | Broadleafed upland forest, cismontane woodland, north coast coniferous forest, riparian woodland. Elevation ranges from 45 to 1540 feet (15 to 470 meters). Blooms May-Aug(Nov). | **Unlikely.** The Study Area lacks coniferous forest habitat. Forested areas in the Study Area have an understory is either heavily disturbed by anthropogenic activity or is comprised of dense vegetation (such as blackberry and ivy) that would outcompete this species. | No further actions are recommended for this species. |
| marsh horsetail *Equisetum palustre* | Rank 3 | Marshes and swamps. Elevation ranges from 145 to 3280 feet (45 to 1000 meters). Blooms unk. | **Unlikely.** The Study Area lacks marsh or swamp habitat. | No further actions are recommended for this species. |

| SPECIES | STATUS* | HABITAT | POTENTIAL FOR OCCURRENCE** | RECOMMENDATIONS |
|---|---|---|---|---|
| San Mateo woolly sunflower *Eriophyllum latilobum* | FE, SE, Rank 1B.1 | Cismontane woodland (often serpentine, on roadcuts), coastal scrub, lower montane coniferous forest. Elevation ranges from 145 to 1085 feet (45 to 330 meters). Blooms May-Jun. | **Unlikely.** The Study Area contains forested areas, but the understory is either heavily disturbed by anthropogenic activity or is comprised of dense vegetation (such as blackberry and ivy) that would outcompete this species. In addition, this species often occurs on serpentine substrate, which is absent from the Study Area. | No further actions are recommended for this species. |
| San Francisco wallflower *Erysimum franciscanum* | Rank 4.2 | Chaparral, coastal dunes, coastal scrub, valley and foothill grassland. Elevation ranges from 0 to 1805 feet (0 to 550 meters). Blooms Mar-Jun. | **Unlikely.** The Study Area lacks chaparral, coastal dune, coastal scrub, and grassland habitats. In addition, vegetation is either heavily disturbed by anthropogenic activity or is comprised of dense vegetation (such as blackberry and ivy) that would outcompete this species. | No further actions are recommended for this species. |
| Hillsborough chocolate lily *Fritillaria biflora var. ineziana* | Rank 1B.1 | Cismontane woodland, valley and foothill grassland. Elevation ranges from 490 to 490 feet (150 to 150 meters). Blooms Mar-Apr. | **No Potential.** This species is only known from serpentine substrate, which is absent from the Study Area. | No further actions are recommended for this species. |

| SPECIES | STATUS* | HABITAT | POTENTIAL FOR OCCURRENCE** | RECOMMENDATIONS |
|---|---|---|---|---|
| Marin checker lily *Fritillaria lanceolata var. tristulis* | Rank 1B.1 | Coastal bluff scrub, coastal prairie, coastal scrub. Elevation ranges from 45 to 490 feet (15 to 150 meters). Blooms Feb-May. | **Unlikely.** The Study Area lacks coastal bluff scrub, coastal prairie, and coastal scrub habitats. In addition, vegetation is either heavily disturbed by anthropogenic activity or is comprised of dense vegetation (such as blackberry and ivy) that would outcompete this species. | No further actions are recommended for this species. |
| fragrant fritillary *Fritillaria liliacea* | Rank 1B.2 | Cismontane woodland, coastal prairie, coastal scrub, valley and foothill grassland. Elevation ranges from 5 to 1345 feet (3 to 410 meters). Blooms Feb-Apr. | **Unlikely.** The Study Area lacks coastal prairie, coastal scrub, and grassland habitats and clay substrates. In addition, vegetation is either heavily disturbed by anthropogenic activity or is comprised of dense vegetation (such as blackberry and ivy) that would outcompete this species. | No further actions are recommended for this species. |
| blue coast gilia *Gilia capitata ssp. chamissonis* | Rank 1B.1 | Coastal dunes, coastal scrub. Elevation ranges from 5 to 655 feet (2 to 200 meters). Blooms Apr-Jul. | **No Potential.** The Study Area does not contain dune habitat. | No further actions are recommended for this species. |
| dark-eyed gilia *Gilia millefoliata* | Rank 1B.2 | Coastal dunes. Elevation ranges from 5 to 100 feet (2 to 30 meters). Blooms Apr-Jul. | **No Potential.** The Study Area does not contain dune habitat. | No further actions are recommended for this species. |

| SPECIES | STATUS* | HABITAT | POTENTIAL FOR OCCURRENCE** | RECOMMENDATIONS |
|---|---|---|---|---|
| San Francisco gumplant *Grindelia hirsutula var. maritima* | Rank 3.2 | Coastal bluff scrub, coastal scrub, valley and foothill grassland. Elevation ranges from 45 to 1310 feet (15 to 400 meters). Blooms Jun-Sep. | **Unlikely.** The Study Area does not contain coastal bluff scrub, coastal scrub, or grassland habitats. In addition, vegetation is either heavily disturbed by anthropogenic activity or is comprised of dense vegetation (such as blackberry and ivy) that would outcompete this species. | No further actions are recommended for this species. |
| Diablo helianthella *Helianthella castanea* | Rank 1B.2 | Broadleafed upland forest, chaparral, cismontane woodland, coastal scrub, riparian woodland, valley and foothill grassland. Elevation ranges from 195 to 4265 feet (60 to 1300 meters). Blooms Mar-Jun. | **Unlikely.** The Study Area does not contain coastal scrub or grassland habitats. In addition, vegetation is either heavily disturbed by anthropogenic activity or is comprised of dense vegetation (such as blackberry and ivy) that would outcompete this species. | No further actions are recommended for this species. |
| congested-headed hayfield tarplant *Hemizonia congesta ssp. congesta* | Rank 1B.2 | Valley and foothill grassland. Elevation ranges from 65 to 1835 feet (20 to 560 meters). Blooms Apr-Nov. | **Unlikely.** The Study Area does not contain grassland habitat. In addition, vegetation is either heavily disturbed by anthropogenic activity or is comprised of dense vegetation (such as blackberry and ivy) that would outcompete this species. | No further actions are recommended for this species. |

| SPECIES | STATUS* | HABITAT | POTENTIAL FOR OCCURRENCE** | RECOMMENDATIONS |
|---|---|---|---|---|
| short-leaved evax *Hesperevax sparsiflora var. brevifolia* | Rank 1B.2 | Coastal bluff scrub (sandy), coastal dunes, coastal prairie. Elevation ranges from 0 to 705 feet (0 to 215 meters). Blooms Mar-Jun. | **No Potential.** The Study Area does not contain coastal bluff scrub, dune, or coastal prairie habitats. | No further actions are recommended for this species. |
| Marin western flax *Hesperolinon congestum* | FT, ST, Rank 1B.1 | Chaparral, valley and foothill grassland. Elevation ranges from 15 to 1215 feet (5 to 370 meters). Blooms Apr-Jul. | **No Potential.** This species is endemic to serpentine substrate, which is absent from the Study Area. | No further actions are recommended for this species. |
| water star-grass *Heteranthera dubia* | Rank 2B.2 | Marshes and swamps (alkaline, still or slow-moving water). Elevation ranges from 95 to 4905 feet (30 to 1495 meters). Blooms Jul-Oct. | **No Potential.** The Study Area does not contain marsh or swamp habitats or alkaline, still or slow-moving water. | No further actions are recommended for this species. |
| Kellogg's horkelia *Horkelia cuneata var. sericea* | Rank 1B.1 | Closed-cone coniferous forest, chaparral (maritime), coastal dunes, coastal scrub. Elevation ranges from 30 to 655 feet (10 to 200 meters). Blooms Apr-Sep. | **Unlikely.** The Study Area does not contain coniferous forest, chaparral, dune, or coastal scrub habitats. In addition, vegetation is either heavily disturbed by anthropogenic activity or is comprised of dense vegetation (such as blackberry and ivy) that would outcompete this species. | No further actions are recommended for this species. |

| SPECIES | STATUS* | HABITAT | POTENTIAL FOR OCCURRENCE** | RECOMMENDATIONS |
|---|---|---|---|---|
| Point Reyes horkelia *Horkelia marinensis* | Rank 1B.2 | Coastal dunes, coastal prairie, coastal scrub. Elevation ranges from 15 to 2475 feet (5 to 755 meters). Blooms May-Sep. | **Unlikely.** The Study Area does not contain coastal dune, coastal prairie, or coastal scrub habitats. In addition, vegetation is either heavily disturbed by anthropogenic activity or is comprised of dense vegetation (such as blackberry and ivy) that would outcompete this species. | No further actions are recommended for this species. |
| island rock lichen *Hypogymnia schizidiata* | Rank 1B.3 | Closed-cone coniferous forest, chaparral. Elevation ranges from 1180 to 1330 feet (360 to 405 meters). | **No Potential.** The Study Area does not contain coniferous forest or chaparral habitats. | No further actions are recommended for this species. |
| coast iris *Iris longipetala* | Rank 4.2 | Coastal prairie, lower montane coniferous forest, meadows and seeps. Elevation ranges from 0 to 1970 feet (0 to 600 meters). Blooms Mar-May. | **Unlikely.** The Study Area does not contain coastal prairie, coniferous forest, meadows, or seep habitats or heavy soils. In addition, vegetation is either heavily disturbed by anthropogenic activity or is comprised of dense vegetation (such as blackberry and ivy) that would outcompete this species. | No further actions are recommended for this species. |

| SPECIES | STATUS* | HABITAT | POTENTIAL FOR OCCURRENCE** | RECOMMENDATIONS |
|---|---|---|---|---|
| perennial goldfields *Lasthenia californica ssp. macrantha* | Rank 1B.2 | Coastal bluff scrub, coastal dunes, coastal scrub. Elevation ranges from 15 to 1705 feet (5 to 520 meters). Blooms Jan-Nov. | **No Potential.** The Study Area does not contain coastal bluff scrub, coastal dune, or coastal scrub habitats. In addition, vegetation is either heavily disturbed by anthropogenic activity or is comprised of dense vegetation (such as blackberry and ivy) that would outcompete this species. | No further actions are recommended for this species. |
| beach layia *Layia carnosa* | SE, FE, Rank 1B.1 | Coastal dunes, coastal scrub (sandy). Elevation ranges from 0 to 195 feet (0 to 60 meters). Blooms Mar-Jul. | **No Potential.** This species is restricted to sand substrate such as that found in dunes, and such substrate is absent from the Study Area. | No further actions are recommended for this species. |
| serpentine leptosiphon *Leptosiphon ambiguus* | Rank 4.2 | Cismontane woodland, coastal scrub, valley and foothill grassland. Elevation ranges from 390 to 3705 feet (120 to 1130 meters). Blooms Mar-Jun. | **No Potential.** This species is restricted to serpentine substrate, which is absent from the Study Area. | No further actions are recommended for this species. |
| coast yellow leptosiphon *Leptosiphon croceus* | SS, Rank 1B.1 | Coastal bluff scrub, coastal prairie. Elevation ranges from 30 to 490 feet (10 to 150 meters). Blooms Apr-Jun. | **No Potential.** The Study Area does not contain coastal bluff scrub or coastal prairie habitats. | No further actions are recommended for this species. |
| rose leptosiphon *Leptosiphon rosaceus* | Rank 1B.1 | Coastal bluff scrub. Elevation ranges from 0 to 330 feet (0 to 100 meters). Blooms Apr-Jul. | **No Potential.** The Study Area does not contain coastal bluff scrub habitat. | No further actions are recommended for this species. |

| SPECIES | STATUS* | HABITAT | POTENTIAL FOR OCCURRENCE** | RECOMMENDATIONS |
|---|---|---|---|---|
| Crystal Springs lessingia *Lessingia arachnoidea* | Rank 1B.2 | Cismontane woodland, coastal scrub, valley and foothill grassland. Elevation ranges from 195 to 655 feet (60 to 200 meters). Blooms Jul-Oct. | **No Potential.** This species is restricted to serpentine substrate, which is absent from the Study Area. | No further actions are recommended for this species. |
| San Francisco lessingia *Lessingia germanorum* | FE, SE, Rank 1B.1 | Coastal scrub (remnant dunes). Elevation ranges from 80 to 360 feet (25 to 110 meters). Blooms (Jun)Jul-Nov. | **No Potential.** The Study Area does not contain remnant dune habitat. | No further actions are recommended for this species. |
| woolly-headed lessingia *Lessingia hololeuca* | Rank 3 | Broadleafed upland forest, coastal scrub, lower montane coniferous forest, valley and foothill grassland. Elevation ranges from 45 to 1000 feet (15 to 305 meters). Blooms Jun-Oct. | **Unlikely.** The Study Area lacks coastal scrub, lower montane coniferous forest, and grassland habitats. In addition, vegetation is either heavily disturbed by anthropogenic activity or is comprised of dense vegetation (such as blackberry and ivy) that would outcompete this species. | No further actions are recommended for this species. |

| SPECIES | STATUS* | HABITAT | POTENTIAL FOR OCCURRENCE** | RECOMMENDATIONS |
|---|---|---|---|---|
| coast lily<br>*Lilium maritimum* | Rank 1B.1 | Broadleafed upland forest, closed-cone coniferous forest, coastal prairie, coastal scrub, marshes and swamps (freshwater), north coast coniferous forest. Elevation ranges from 15 to 1560 feet (5 to 475 meters). Blooms May-Aug. | **Unlikely.** The Study Area lacks coniferous forest, coastal prairie, coastal scrub, marsh, and swamp habitats. Forested areas in the Study Area have an understory is either heavily disturbed by anthropogenic activity or is comprised of dense vegetation (such as blackberry and ivy) that would outcompete this species, and the understory is upland. | No further actions are recommended for this species. |
| Ornduff's meadowfoam<br>*Limnanthes douglasii ssp. ornduffii* | Rank 1B.1 | Meadows and seeps. Elevation ranges from 30 to 65 feet (10 to 20 meters). Blooms Nov-May. | **No Potential.** This taxon is restricted to wetland habitat in an active agricultural field, and similar habitat is absent from the Study Area. | No further actions are recommended for this species. |
| San Mateo tree lupine<br>*Lupinus arboreus var. eximius* | Rank 3.2 | Chaparral, coastal scrub. Elevation ranges from 295 to 1805 feet (90 to 550 meters). Blooms Apr-Jul. | **Unlikely.** The Study Area lacks chaparral and coastal scrub habitats. In addition, vegetation is either heavily disturbed by anthropogenic activity or is comprised of dense vegetation (such as blackberry and ivy) that would outcompete this species. | No further actions are recommended for this species. |
| Indian Valley bush-mallow<br>*Malacothamnus aboriginum* | Rank 1B.2 | Chaparral, cismontane woodland. Elevation ranges from 490 to 5575 feet (150 to 1700 meters). Blooms Apr-Oct. | **Unlikely.** The Study Area lacks chaparral habitat. This is known from granitic outcrops and sandy, bare soil, and such substrate is absent from the Study Area. | No further actions are recommended for this species. |

| SPECIES | STATUS* | HABITAT | POTENTIAL FOR OCCURRENCE** | RECOMMENDATIONS |
|---|---|---|---|---|
| arcuate bush-mallow *Malacothamnus arcuatus* | Rank 1B.2 | Chaparral, cismontane woodland. Elevation ranges from 45 to 1165 feet (15 to 355 meters). Blooms Apr-Sep. | **Unlikely.** The Study Area lacks chaparral habitat. This species is known from gravelly alluvium, which is absent from the Study Area. In addition, vegetation is either heavily disturbed by anthropogenic activity or is comprised of dense vegetation (such as blackberry and ivy) that would outcompete this species. | No further actions are recommended for this species. |
| Davidson's bush-mallow *Malacothamnus davidsonii* | Rank 1B.2 | Chaparral, cismontane woodland, coastal scrub, riparian woodland. Elevation ranges from 605 to 3740 feet (185 to 1140 meters). Blooms Jun-Jan. | **Unlikely.** The Study Area lacks chaparral and coastal scrub habitats. This species is known to occur in sandy washes, which are absent from the Study Area. In addition, vegetation is either heavily disturbed by anthropogenic activity or is comprised of dense vegetation (such as blackberry and ivy) that would outcompete this species. | No further actions are recommended for this species. |
| Hall's bush-mallow *Malacothamnus hallii* | Rank 1B.2 | Chaparral, coastal scrub. Elevation ranges from 30 to 2495 feet (10 to 760 meters). Blooms (Apr)May-Sep(Oct). | **Unlikely.** The Study Area lacks chaparral and coastal scrub habitats. In addition, vegetation is either heavily disturbed by anthropogenic activity or is comprised of dense vegetation (such as blackberry and ivy) that would outcompete this species. | No further actions are recommended for this species. |

| SPECIES | STATUS* | HABITAT | POTENTIAL FOR OCCURRENCE** | RECOMMENDATIONS |
|---|---|---|---|---|
| northern curly-leaved monardella<br>*Monardella sinuata ssp. nigrescens* | Rank 1B.2 | Chaparral (scr co.), coastal dunes, coastal scrub, lower montane coniferous forest (scr co., ponderosa pine sandhills). Elevation ranges from 0 to 985 feet (0 to 300 meters). Blooms (Apr)May-Jul(Aug-Sep). | **No Potential.** This species is restricted to strongly sandy habitats such as dunes and sandhills, and such habitat is absent from the Study Area. | No further actions are recommended for this species. |
| woodland woolythreads<br>*Monolopia gracilens* | Rank 1B.2 | Broadleafed upland forest (openings), chaparral (openings), cismontane woodland, north coast coniferous forest (openings), valley and foothill grassland. Elevation ranges from 325 to 3935 feet (100 to 1200 meters). Blooms (Feb)Mar-Jul. | **Unlikely.** The Study Area lacks chaparral, coniferous forest, and grassland habitats. Forested areas in the Study Area have an understory that is either heavily disturbed by anthropogenic activity or is comprised of dense vegetation (such as blackberry and ivy) that would outcompete this species. | No further actions are recommended for this species. |
| Dudley's lousewort<br>*Pedicularis dudleyi* | SR, Rank 1B.2 | Chaparral (maritime), cismontane woodland, north coast coniferous forest, valley and foothill grassland. Elevation ranges from 195 to 2955 feet (60 to 900 meters). Blooms Apr-Jun. | **Unlikely.** The Study Area lacks chaparral, coniferous forest, and grassland habitats. Forested areas in the Study Area have an understory that is either heavily disturbed by anthropogenic activity or is comprised of dense vegetation (such as blackberry and ivy) that would outcompete this species. | No further actions are recommended for this species. |

| SPECIES | STATUS* | HABITAT | POTENTIAL FOR OCCURRENCE** | RECOMMENDATIONS |
|---|---|---|---|---|
| white-rayed pentachaeta *Pentachaeta bellidiflora* | FE, SE, Rank 1B.1 | Cismontane woodland, valley and foothill grassland (often serpentine). Elevation ranges from 110 to 2035 feet (35 to 620 meters). Blooms Mar-May. | **Unlikely**. The Study Area lacks valley and foothill grassland and serpentine substrate. The Study Area contains forested areas, but the understory is either heavily disturbed by anthropogenic activity or is comprised of dense vegetation (such as blackberry and ivy) that would outcompete this species. | No further actions are recommended for this species. |
| Choris' popcornflower *Plagiobothrys chorisianus var. chorisianus* | Rank 1B.2 | Chaparral, coastal prairie, coastal scrub. Elevation ranges from 5 to 525 feet (3 to 160 meters). Blooms Mar-Jun. | **No Potential.** The Study Area lacks chaparral, coastal prairie, and coastal scrub habitats. In addition, vegetation is either heavily disturbed by anthropogenic activity or is comprised of dense vegetation (such as blackberry and ivy) that would outcompete this species. | No further actions are recommended for this species. |
| Oregon polemonium *Polemonium carneum* | Rank 2B.2 | Coastal prairie, coastal scrub, lower montane coniferous forest. Elevation ranges from 0 to 6005 feet (0 to 1830 meters). Blooms Apr-Sep. | **Unlikely.** The Study Area lacks coastal prairie, coastal scrub, and coniferous forest habitats. In addition, vegetation is either heavily disturbed by anthropogenic activity or is comprised of dense vegetation (such as blackberry and ivy) that would outcompete this species. | No further actions are recommended for this species. |

| SPECIES | STATUS* | HABITAT | POTENTIAL FOR OCCURRENCE** | RECOMMENDATIONS |
|---|---|---|---|---|
| Marin knotweed *Polygonum marinense* | Rank 3.1 | Marshes and swamps (coastal salt or brackish). Elevation ranges from 0 to 30 feet (0 to 10 meters). Blooms (Apr)May-Aug(Oct). | **No Potential.** The Study Area lacks coastal salt or brackish marsh habitat. | No further actions are recommended for this species. |
| Hickman's cinquefoil *Potentilla hickmanii* | FE, SE, Rank 1B.1 | Coastal bluff scrub, closed-cone coniferous forest, meadows and seeps (vernally mesic), marshes and swamps (freshwater). Elevation ranges from 30 to 490 feet (10 to 149 meters). Blooms Apr-Aug. | **Unlikely.** The Study Area lacks coastal bluff scrub, closed-cone coniferous forest, meadows and seeps, marsh, and swamp habitats. In addition, vegetation is either heavily disturbed by anthropogenic activity or is comprised of dense vegetation (such as blackberry and ivy) that would outcompete this species. | No further actions are recommended for this species. |
| Lobb's aquatic buttercup *Ranunculus lobbii* | Rank 4.2 | Cismontane woodland, north coast coniferous forest, valley and foothill grassland, vernal pools. Elevation ranges from 45 to 1540 feet (15 to 470 meters). Blooms Feb-May. | **No Potential.** This species occurs in non-riverine, seasonlaly inundated areas, and such habitat is absent from the Study Area. | No further actions are recommended for this species. |
| adobe sanicle *Sanicula maritima* | SR, Rank 1B.1 | Chaparral, coastal prairie, meadows and seeps, valley and foothill grassland. Elevation ranges from 100 to 785 feet (30 to 240 meters). | **No Potential.** This species occurs on clay or ultramafic substrates, which are absent from the Study Area. | No further actions are recommended for this species. |
| chaparral ragwort *Senecio aphanactis* | Rank 2B.2 | Chaparral, cismontane woodland, coastal scrub. Elevation ranges from 45 to 2625 feet (15 to 800 meters). Blooms Jan-Apr(May). | **No Potential.** This species occurs on drying, alkaline flats, and such habitat is absent from the Study Area. | No further actions are recommended for this species. |

| SPECIES | STATUS* | HABITAT | POTENTIAL FOR OCCURRENCE** | RECOMMENDATIONS |
|---|---|---|---|---|
| Scouler's catchfly *Silene scouleri ssp. scouleri* | Rank 2B.2 | Coastal bluff scrub, coastal prairie, valley and foothill grassland. Elevation ranges from 0 to 1970 feet (0 to 600 meters). Blooms (Mar-May)Jun-Aug(Sep). | **Unlikely.** The Study Area lacks coastal bluff scrub, coastal prarire, and grassland habitats. In addition, vegetation is either heavily disturbed by anthropogenic activity or is comprised of dense vegetation (such as blackberry and ivy) that would outcompete this species. | No further actions are recommended for this species. |
| San Francisco campion *Silene verecunda ssp. verecunda* | Rank 1B.2 | Coastal bluff scrub, chaparral, coastal prairie, coastal scrub, valley and foothill grassland. Elevation ranges from 95 to 2115 feet (30 to 645 meters). Blooms (Feb)Mar-Jun(Aug). | **Unlikely.** The Study Area lacks coastal bluff scrub, chaparral, coastal scrub, coastal praririe, and grassland habitats. In addition, vegetation is either heavily disturbed by anthropogenic activity or is comprised of dense vegetation (such as blackberry and ivy) that would outcompete this species. | No further actions are recommended for this species. |
| California seablite *Suaeda californica* | FE, Rank 1B.1 | Marshes and swamps (coastal salt). Elevation ranges from 0 to 50 feet (0 to 15 meters). Blooms Jul-Oct. | **No Potential.** The Study Area lacks tidal salt marsh and swamp habitat. | No further actions are recommended for this species. |

| SPECIES | STATUS* | HABITAT | POTENTIAL FOR OCCURRENCE** | RECOMMENDATIONS |
|---|---|---|---|---|
| two-fork clover *Trifolium amoenum* | FE, Rank 1B.1 | Coastal bluff scrub, valley and foothill grassland (sometimes serpentine). Elevation ranges from 15 to 1360 feet (5 to 415 meters). Blooms Apr-Jun. | **Unlikely.** The Study Area does not contain mesic coastal bluff scrub, valley and foothill grassland, or serpentine soils. In addition, vegetation is either heavily disturbed by anthropogenic activity or is comprised of dense vegetation (such as blackberry and ivy) that would outcompete this species. | No further actions are recommended for this species. |
| saline clover *Trifolium hydrophilum* | Rank 1B.2 | Marshes and swamps, valley and foothill grassland (mesic, alkaline), vernal pools. Elevation ranges from 0 to 985 feet (0 to 300 meters). Blooms Apr-Jun. | **No Potential.** The Study Area lacks mesic to seasonally wet, alkaline habitat. | No further actions are recommended for this species. |
| San Francisco owl's-clover *Triphysaria floribunda* | Rank 1B.2 | Coastal prairie, coastal scrub, valley and foothill grassland. Elevation ranges from 30 to 525 feet (10 to 160 meters). Blooms Apr-Jun. | **Unlikely.** The Study Area lacks coastal prairie, coastal scrub, and grassland habitats. In addition, vegetation is either heavily disturbed by anthropogenic activity or is comprised of dense vegetation (such as blackberry and ivy) that would outcompete this species. | No further actions are recommended for this species. |
| coastal triquetrella *Triquetrella californica* | Rank 1B.2 | Coastal bluff scrub, coastal scrub. Elevation ranges from 30 to 330 feet (10 to 100 meters). | **No Potential.** This species occurs on thin soils in scrub habitat with sparse cover, and such conditions are absent from the Study Area. | No further actions are recommended for this species. |

| SPECIES | STATUS* | HABITAT | POTENTIAL FOR OCCURRENCE** | RECOMMENDATIONS |
|---|---|---|---|---|
| Methuselah's beard lichen<br>*Usnea longissima* | Rank 4.2 | Broadleafed upland forest, north coast coniferous forest. Elevation ranges from 160 to 4790 feet (50 to 1460 meters). | **Unlikely.** This species typically occurs in the coast redwood zone on mature to old-growth trees, and such habitat is absent from the Study Area. | No further actions are recommended for this species. |
| **Mammals** | | | | |
| pallid bat<br>*Antrozous pallidus* | SSC, WBWG High Priority | Occupies a variety of habitats at low elevation including grasslands, shrublands, woodlands, and forests. Most common in open, dry habitats with rocky areas for roosting. | **Unlikely.** The Study Area does not contain dry or open forest, woodland, grassland, or shrubland habitat that is typically associated with this species. | No further actions are recommended for this species. |
| Townsend's big-eared bat<br>*Corynorhinus townsendii* | SSC, WBWG High Priority | Primarily found in rural settings in a wide variety of habitats including oak woodlands and mixed coniferous-deciduous forest. Day roosts highly associated with caves and mines. Building roost sites must be cave like. Very sensitive to human disturbance. | **Unlikely.** The Study Area does not contain caves, mines, or abandoned buildings to support roosting by this species. | No further actions are recommended for this species. |
| southern sea otter<br>*Enhydra lutris nereis* | FT, CFP | Nearshore marine environments from about Año Nuevo, San Mateo County. To Point Sal, Santa Barbara County. Needs canopies of giant kelp and bull kelp for rafting and feeding. Prefers rocky substrates with abundant invertebrates. | **No Potential.** The Study Area does not contain ocean habitat required to support this species. | No further actions are recommended for this species. |

| SPECIES | STATUS* | HABITAT | POTENTIAL FOR OCCURRENCE** | RECOMMENDATIONS |
|---|---|---|---|---|
| western red bat *Lasiurus blossevillii* | SSC, WBWG High Priority | Roosts primarily in trees often are in edge habitats adjacent to streams, fields, or urban areas. | **Moderate Potential.** The Study Area contains riparian habitat that may be suitable for roosting by this species. However, the Project Area does not contain suitable trees to support roosting by this species. | No suitable roosting habitat is present in the Project Area. No tree removal is planned. As such, no further actions are recommended. See section 5.1 for further details. |
| hoary bat *Lasiurus cinereus* | WBWG Medium | Prefers open forested habitats or habitat mosaics, with access to trees for cover and open areas or habitat edges for feeding. Roosts in dense foliage of medium to large trees. Feeds primarily on moths. | **Unlikely.** The Study Area does not contain the dense forested habitat typically used for roosting by this species. | No further actions are recommended for this species. |
| fringed myotis *Myotis thysanodes* | WBWG High Priority | Associated with a wide variety of habitats including mixed coniferous-deciduous forest and redwood/sequoia groves. Buildings, mines, and large snags are important day and night roosts. | **Moderate Potential.** The Study Area contains low to moderately dense stands of trees which may provide roosting opportunities. However, the Project Area does not have vegetation of suitable structure or density to support roosting by this species. | No suitable roosting habitat is present in the Project Area. No tree removal is planned. As such, no further actions are recommended. See section 5.1 for further details. |
| San Francisco dusky-footed woodrat *Neotoma fuscipes annectens* | SSC | Typically occurs in forest habitats of moderate canopy and moderate to dense understory, especially redwood. Also found in chaparral habitats. | **Moderate Potential.** This species is common in coastal San Mateo County and habitat exists within the Study Area. However, no nest structures (middens) were observed within the Project Area. | No nest structures were observed within the Project Area and no tree removal is planned. As such, no further actions are recommended. See section 5.1 for further recommendations. |

| SPECIES | STATUS* | HABITAT | POTENTIAL FOR OCCURRENCE** | RECOMMENDATIONS |
|---|---|---|---|---|
| big free-tailed bat *Nyctinomops macrotis* | SSC, WBWG med-high | Occurs rarely in low-lying arid areas. Requires high cliffs or rocky outcrops for roosting sites. | **Unlikely.** The Study Area does not contain cliffs or rocky outcrops to support roosting by this species. | No further actions are recommended for this species. |
| salt-marsh harvest mouse *Reithrodontomys raviventris* | FE, SE, CFP | Endemic to emergent salt and brackish wetlands of the San Francisco Bay Estuary. Pickleweed marshes are primary habitat; also occurs in various other wetland communities with dense vegetation. Does not burrow, builds loosely organized nests. Requires higher areas for flood escape. | **No Potential.** The Study Area is outside of the known range for this species. No salt marsh habitat is present to support the species. | No further actions are recommended for this species. |
| American badger *Taxidea taxus* | SSC | Most abundant in drier open stages of most shrub, forest, and herbaceous habitats, with friable, uncultivated soils. Prey on burrowing rodents. | **No Potential.** The Study Area does not contain suitable grassland or dry forest habitat for this species and is not contiguous with occupied habitat. High development and disturbance levels preclude badger from the Study Area. | No further actions are recommended for this species. |
| **Birds** | | | | |
| tricolored blackbird *Agelaius tricolor* | SSC, ST | Usually nests over or near freshwater in dense cattails, tules, or thickets of willow, blackberry, wild rose or other tall herbs. Nesting area must be large enough to support about 50 pairs. | **No Potential.** The Study Area does not contain suitable expanses of marsh or dense patches of freshwater vegetation to support nesting by a colony of this species. | No further actions are recommended for this species. |

| SPECIES | STATUS* | HABITAT | POTENTIAL FOR OCCURRENCE** | RECOMMENDATIONS |
|---|---|---|---|---|
| burrowing owl *Athene cunicularia* | SSC | Open, dry annual or perennial grasslands, deserts, and scrublands characterized by low-growing vegetation. Subterranean nester, dependent upon burrowing mammals, most notably, the California ground squirrel. | **No Potential.** The Study Area does not contain suitable open dry annual grassland or scrubland, and no ground squirrels were observed within the Study Area. | No further actions are recommended for this species. |
| golden eagle *Aquila chrysaetos* | CFP, BGEPA | Year-round resident in rolling foothills with open grasslands, scattered trees, and cliff-walled canyons. | **Unlikely.** The Study Area does not contain trees or cliffs large enough to support nesting by the species. In addition, the high level of development in the surrounding area reduces the potential for golden eagles to forage in the Study Area. | No further actions are recommended for this species. |
| marbled murrelet *Brachyramphus marmoratus* | FT, SE | Breed in old-growth redwood stands containing platform-like branches along the coast. Winters in coastal waters. | **No Potential.** The Study Area does not contain suitable old growth redwood or fir trees to support nesting by this species. | No further actions are recommended for this species. |
| western snowy plover *Charadrius alexandrinus nivosus* | FT, SSC | Federal listing applies only to the Pacific coastal population. Found on sandy beaches, salt pond levees, and shores of large alkali lakes. Requires sandy, gravelly, or friable soils for nesting. | **No Potential.** There is no sand, dune or beach habitat present within the Study Area to support nesting by the species. | No further actions are recommended for this species. |
| northern harrier *Circus cyaneus* | SSC | Coastal salt and freshwater marsh. Nest and forage in grasslands, from salt grass in desert sink to mountain cienagas. Nests on ground in shrubby vegetation, usually at marsh edge. | **No Potential.** The Study Area does not contain annual grassland or open habitat to support nesting or foraging by this species. The urban nature of the site further reduces the potential for northern harrier to nest within or adjacent to the Study Area. | No further actions are recommended for this species. |

| SPECIES | STATUS* | HABITAT | POTENTIAL FOR OCCURRENCE** | RECOMMENDATIONS |
|---|---|---|---|---|
| short-tailed albatross *Diomedea albatrus* | FE, SSC | Nests on Japanese islands. Very rare winter visitor to offshore California waters. | **No Potential.** The Study Area is outside the typical breeding range for this species. The Study Area does not contain offshore islands required for nesting by the species. | No further actions are recommended for this species. |
| white-tailed kite *Elanus leucurus* | CFP | Year-long resident of coastal and valley lowlands. Preys on small diurnal mammals and occasional birds, insects, reptiles, and amphibians. | **Unlikely.** The Study Area is primarily residential development and lacks open grasslands and prey base to support this species. | No further actions are recommended for this species. |
| American peregrine falcon *Falco peregrinus* | CFP | Resident and winter visitor to region. Occurs near wetlands, lakes, rivers, or other water; on cliffs, banks, dunes, mounds; also, human-made structures. Nest consists of a scrape on a depression or ledge in an open site. | **No Potential.** The Study Area does not contain suitable cliffs or tall structures to support nesting by the species. | No further actions are recommended for this species. |
| San Francisco (saltmarsh) common yellowthroat *Geothlypis trichas sinuosa* | SSC | Resident of San Francisco bay region fresh and salt-water marshes. Requires thick, continuous cover down to water surface for foraging, tall grasses, tule patches, willows for nesting. | **Unlikely**. The Study Area does not contain marsh habitat to support nesting and foraging by the species. This species may occasionally be seen in the Study Area during migrations. | No further actions are recommended for this species. |
| bald eagle *Haliaeetus leucocephalus* | SE, CFP, BGEPA | Frequents ocean shores, lake margins, and rivers for both nesting and wintering. Requires abundant fish and adjacent snags or other perches. Nests in large, old-growth, or dominant live tree with open branch-work. | **No Potential.** The Study Area does not contain suitable large trees or open water to support nesting and foraging by this species. | No further actions are recommended for this species. |

| SPECIES | STATUS* | HABITAT | POTENTIAL FOR OCCURRENCE** | RECOMMENDATIONS |
|---|---|---|---|---|
| California black rail *Laterallus jamaicensis coturniculus* | ST, CFP | Year-round resident in marshes (saline to freshwater) with dense vegetation within four inches of the ground. Prefers larger, undisturbed marshes that have an extensive upper zone and are close to a major water source. Extremely secretive and cryptic. | **No Potential.** The Study Area does not contain marsh habitat to support nesting by this species. | No further actions are recommended for this species. |
| Alameda song sparrow *Melospiza melodia pusillula* | SSC | Year-round resident in tidal-influenced marshes along the eastern and southern portions of San Francisco Bay. | **Unlikely.** The Study Area is outside the typical range of this subspecies and does not contain marsh or tidal habitats. | No further actions are recommended for this species. |
| California brown pelican *Pelecanus occidentalis californicus* | CFP | Nests colonially on coastal islands of small to moderate size, which afford immunity from attack by ground-dwelling predators. Does not breed north of the Channel Islands. Winter visitor and post-breeding disperser to San Francisco Bay region. | **No Potential.** The Study Area does not contain coastal island habitat and is out of the breeding range for this species. | No further actions are recommended for this species. |
| California Ridgway's (clapper) rail *Rallus obsoletus (longirostris) obsoletus* | FE, SE, CFP | Associated with tidal salt marsh and brackish marshes supporting emergent vegetation, upland refugia, and incised tidal channels. | **No Potential.** The Study Area does not contain marsh habitat to support nesting by this species. | No further actions are recommended for this species. |

| SPECIES | STATUS* | HABITAT | POTENTIAL FOR OCCURRENCE** | RECOMMENDATIONS |
|---|---|---|---|---|
| bank swallow<br>*Riparia riparia* | ST | Migrant in riparian and other lowland habitats in western California. Colonial nester in riparian areas with vertical cliffs and bands with fine-textured or fine-textured sandy soils near streams, rivers, lakes or the ocean. | **Unlikely.** The Study Area does not contain cliff habitat required for nesting by this species. | No further actions are recommended for this species. |
| California least tern<br>*Sterna antillarum browni* | FE, SE, CFP | Nests along the coast from San Francisco bay south to northern Baja California. Colonial breeder on bare or sparsely vegetated, flat substrates: sand beaches, alkali flats, landfills, or paved areas. | **No Potential.** There is no sand, dune or beach habitat present within the Study Area to support nesting by the species. | No further actions are recommended for this species. |
| **Reptiles and Amphibians** | | | | |
| western pond turtle<br>*Actinemys [Emys] marmorata* | SSC | Occurs in perennial ponds, lakes, rivers and streams with suitable basking habitat (mud banks, mats of floating vegetation, partially submerged logs) and submerged shelter. | **Unlikely.** The Study Area does not contain marshes, ponds, or slow moving streams suitable to support breeding by the species. The majority of the Study Area is surrounded by urban development which represent complete barriers to dispersal for nearby populations. This species could use San Pedro Creek for dispersal during periods of low flow; however there is no nearby pond habitat known to support this species (CDFW 2020). As such, this species is unlikely to occur in the Study Area. | No further actions are recommended for this species. |

| SPECIES | STATUS* | HABITAT | POTENTIAL FOR OCCURRENCE** | RECOMMENDATIONS |
|---|---|---|---|---|
| California tiger salamander<br>*Ambystoma californiense* | FT, ST | Populations in Santa Barbara and Sonoma counties currently listed as endangered; threatened in remainder of range. Inhabits grassland, oak woodland, ruderal and seasonal pool habitats. Adults are fossorial and utilize mammal burrows and other subterranean refugia. Breeding occurs primarily in vernal pools and other seasonal water features. | **No Potential.** The Study Area does not contain grassland or seasonal wetland habitat to support this species. In addition, the Study Area is within an area of residential development which serves as a dispersal barrier. There are no nearby documented occurrences (CDFW 2020). | No further actions are recommended for this species. |
| Santa Cruz black salamander<br>*Aneides flavipunctatus niger* | SSC | Climbing salamanders of the genus *Aneides* frequent damp woodlands and are usually found hiding under various debris (i.e. bark, woodrat nests, logs). The Santa Cruz black salamander exists south of the San Francisco Bay and was only recently recognized as a separate and protected species. Santa Cruz black salamander is highly sedentary, preferring to stay hidden under riparian debris. Prey items include millipedes, spiders, and other insects (Stebbins and McGinnis 2012). | **Unlikely.** The Study Area contains riparian habitat. However, the Study Area is north of this species typical range. There are no nearby documented occurrences (CDFW 2020). | No further actions are recommended for this species. |

| SPECIES | STATUS* | HABITAT | POTENTIAL FOR OCCURRENCE** | RECOMMENDATIONS |
|---|---|---|---|---|
| Green sea turtle<br>*Chelonia mydas* | FT | Wide-ranging ocean-dwelling turtle that forages in a variety of open habitats. Nests on sandy beaches in warm climates suitable for incubation of eggs. | **No Potential.** The Study Area does not contain oceans or beaches. | No further actions are recommended for this species. |
| California giant salamander<br>*Dicamptodon ensatus* | SSC | Occurs in the north-central Coast Ranges. Moist coniferous and mixed forests are typical habitat; also uses woodland and chaparral. Adults are terrestrial and fossorial, breeding in cold, permanent, or semi-permanent streams. Larvae usually remain aquatic for over a year. | **Unlikely.** Aquatic habitat within the Study Area is surrounded by dense urban development and does not contain the forested or chaparral habitat typically associated with terrestrial forms of this species. The Study Area is located north of the Santa Cruz Mountains' population of *Dicamptodon*. There are no documented occurrences in the vicinity of the Study Area (CDFW 2020). | No further actions are recommended for this species. |
| foothill yellow-legged frog (FYLF)<br>*Rana boylii* | SC, SSC | Found in or adjacent to rocky streams in a variety of habitats. Prefers partly-shaded, shallow streams and riffles with a rocky substrate; requires at least some cobble-sized substrate for egg-laying. Needs at least 15 weeks to attain metamorphosis. Feeds on both aquatic and terrestrial invertebrates. | **Unlikely.** WRA performed a habitat assessment and visual encounter surveys for FYLF during suitable conditions in 2019. Surveys included the Project Area and 500 feet upstream and 500 feet downstream of the Project Area. No FYLF were detected and no records of FYLF exist for the species within or near San Pedro Creek. Due to the incised and flashy nature of the current geomorphology, most of San Pedro Creek does not provide suitable breeding habitat for FYLF and no nearby habitats would support them. | No further actions are recommended for this species. |

| SPECIES | STATUS* | HABITAT | POTENTIAL FOR OCCURRENCE** | RECOMMENDATIONS |
|---|---|---|---|---|
| California red-legged frog (CRLF)<br>*Rana draytonii* | FT, SSC | Associated with quiet perennial to intermittent ponds, stream pools, and wetlands with adjacent upland habitat containing refugia. Prefers shorelines with extensive vegetation. Documented to disperse through upland habitats after rains. | **Moderate Potential.** The Study Area does not contain marshes, ponds, or slow moving streams suitable to support breeding by the species. The majority of the Study Area is surrounded by urban development which represent complete barriers to dispersal for nearby populations. However, San Pedro Creek has been documented to support CRLF about 1 mile downstream from the Study Area and individual CRLF may use the Study Area occasionally for non-breeding aquatic habitat. | See section 5.1 for further recommendations. |
| San Francisco garter snake<br>*Thamnophis sirtalis tetrataenia* | FE, SE, CFP | Vicinity of freshwater marshes, ponds, and slow moving streams in San Mateo County and extreme northern Santa Cruz County. Prefers dense cover and water depths of at least one foot. Uses gopher burrows for refuge. | **Unlikely.** The Study Area does not contain still or slow-moving aquatic habitats that would support a sufficient prey-base for SFGS. The surrounding area is too urbanized to provide habitat for this species and presents obstacles to dispersal. Due to lack of suitable habitat, compromised connectivity, and the Study Area's urban surroundings, SFGS are not likely to be present in the Study Area. | No further actions are recommended for this species. |

| SPECIES | STATUS* | HABITAT | POTENTIAL FOR OCCURRENCE** | RECOMMENDATIONS |
|---|---|---|---|---|
| **Fish** | | | | |
| tidewater goby *Eucyclogobius newberryi* | FE, SSC | Brackish water habitats along the California coast from Agua Hedionda Lagoon, San Diego County to the mouth of the Smith River. Found in shallow lagoons and lower stream reaches, they need fairly still but not stagnant water and high oxygen levels. | **No Potential.** The Study Area does not contain suitable brackish waters to support this species. | No further actions are recommended for this species. |
| delta smelt *Hypomesus transpacificus* | FT, SE | Lives in the Sacramento-San Joaquin estuary in areas where salt and freshwater systems meet. Occurs seasonally in Suisun Bay, Carquinez Strait and San Pablo Bay. Seldom found at salinities > 10 ppt; most often at salinities < 2 ppt. | **No Potential.** The Study Area is outside of the species known range and does not contain suitable estuary habitat. | No further actions are recommended for this species. |
| hardhead *Mylopharodon conocephalus* | SSC | Low to mid-elevation streams with clear, deep pools with sand-gravel-boulder bottoms and slow water velocity. Not found where exotic centrarchids predominate. | **Unlikely.** The Study Area is outside the known range of this species. The nearest reported occurrence is for Lake Merced in San Francisco and may represent a transplant as the habitat at Lake Merced is atypical for the species. | No further actions are recommended for this species. |

| SPECIES | STATUS* | HABITAT | POTENTIAL FOR OCCURRENCE** | RECOMMENDATIONS |
|---|---|---|---|---|
| Coho salmon - Central CA Coast ESU *Oncorhynchus kisutch* | FE, SE | Federal listing includes populations between Punta Gorda and San Lorenzo River. State listing includes populations south of San Francisco Bay only. Occurs inland and in coastal marine waters. Requires beds of loose, silt-free, coarse gravel for spawning. Also needs cover, cool water and sufficient dissolved oxygen. | **Unlikely.** The Project Area no longer supports Coho salmon, which were last observed in San Pedro Creek in the 1950s (Davis 2004, Chan 2002). | No further actions are recommended for this species. |
| steelhead, Central California Coast ESU *Oncorhynchus mykiss irideus* | FT | Occurs from the Russian River south to Soquel Creek and Pajaro River. Also in San Francisco and San Pablo Bay Basins. Adults migrate upstream to spawn in cool, clear, well-oxygenated streams. Juveniles remain in fresh water for 1 or more years before migrating downstream to the ocean. | **Present.** The Study Area is located in and adjacent to San Pedro Creek. Steelhead are documented to occur in the Creek (CDFW 2020) and salmonids, presumed to be resident rainbow trout or juvenile steelhead were observed by WRA during the 2019 site visit. | See section 5.1 for further recommendations. |
| longfin smelt *Spirinchus thaleichthys* | FC, ST | Found in open waters of estuaries, mostly in the middle or bottom of the water column. This species prefers salinities of 15 to 30 ppt, but can be found in completely freshwater to almost pure seawater. | **No Potential.** The Study Area does not contain estuarine habitat. | No further actions are recommended for this species. |

| SPECIES | STATUS* | HABITAT | POTENTIAL FOR OCCURRENCE** | RECOMMENDATIONS |
|---|---|---|---|---|
| **Invertebrates** | | | | |
| western bumblebee *Bombus occidentalis* | SC | Once widespread in the western United States and Canada, populations of this insect have drastically declined in recent decades. Pollinates a variety of wild flowering plants and crops. Nests in the ground, usually in association with small mammal burrows with sunny aspects. Current populations are thought to be restricted to high elevation sights in the Sierras with scattered occurrences on the northern California coast (Xerces, 2018). | **Unlikely**. The Study Area is outside of this species known current distribution. In addition, no small mammal burrows were observed within the Study Area to support ground nesting. | No further actions are recommended for this species. |

| SPECIES | STATUS* | HABITAT | POTENTIAL FOR OCCURRENCE** | RECOMMENDATIONS |
|---|---|---|---|---|
| San Bruno elfin butterfly *Callophrys mossii bayensis* | FE | Inhabits coastal mountainous areas with grassy ground cover, mainly in the vicinity of San Bruno Mountain, San Mateo County. Colonies are located on steep, north-facing slopes above 200 feet within the fog belt. Larval host plant is *Sedum spathulifolium*. | **Unlikely.** The Study Area is either developed or dominated by willow riparian. is below 200 feet elevation, and its slopes are predominantly southwest facing. The larval host plant for this species was not observed in the Study Area during site visits by WRA in 2019. The Study Area is more than one mile away from the nearest known occurrence for the species and this far exceeds the 0.15-mile distance that San Bruno elfin butterfly is known to forage between host plants (SBM HCP 2014). This species has no potential to use the site for reproduction, and is unlikely to occur within the Study Area. | No further actions are recommended for this species. |
| Monarch butterfly *Danaus plexippus* | (winter roosting sites monitored by CDFW) | Winter roost sites located in wind-protected tree groves (Eucalyptus, Monterey pine, cypress), with nectar and water sources nearby. Winter roosts monitored by CDFW. | **Unlikely.** The Study Area does not contain eucalyptus, monterey pine, or cypress groves to support winter roosting. No known winter roosts are documented in the vicinity of the Study Area. This species may be observed during migration. | No further actions are recommended for this species. |
| Bay checkerspot butterfly *Euphydryas editha bayensis* | FT | Restricted to native grasslands on outcrops of serpentine soil in the vicinity of San Francisco Bay. *Plantago erecta* is the primary host plant; *Orthocarpus densiflorus* and *O. purpurscens* are the secondary host plants. | **No Potential.** The Study Area is outside the accepted range of the species and does not contain the larval host plant for this species. | No further actions are recommended for this species. |

| SPECIES | STATUS* | HABITAT | POTENTIAL FOR OCCURRENCE** | RECOMMENDATIONS |
|---|---|---|---|---|
| Mission blue butterfly *Plebejus icarioides missionensis* | FE | Inhabits grasslands of the San Francisco peninsula. Three larval host plants: *Lupinus albifrons*, *L. variicolor*, and *L. formosus*, of which *L. albifrons* is favored. | **No Potential.** The Study Area does not contain grasslands to support this species and the larval host plant was not observed during site visits. | No further actions are recommended for this species. |
| Callippe silverspot butterfly *Speyeria callippe callippe* | FE | Two populations in San Bruno mountain and the Cordelia Hills are recognized. Hostplant is *Viola pedunculata*, which is found on serpentine soils. | **No Potential.** The Study Area does not contain the larval host plant for this species and the Study Area is outside the known range for the species. | No further actions are recommended for this species. |
| Myrtle's silverspot butterfly *Speyeria zerene myrtleae* | FE | Foggy, coastal dunes and hills of the Point Reyes Peninsula. | **No Potential.** This species has been extirpated from San Mateo County (USFWS 2016). | No further actions are recommended for this species. |

*** Key to status codes:**

| | |
|---|---|
| CFP | CDFW Fully Protected |
| BGEPA | Bald and Golden Eagle Protection Act |
| FE | Federal Endangered |
| FT | Federal Threatened |
| SC | State Candidate for listing |
| SE | State Endangered |
| SSC | California Department of Fish and Wildlife Species of Special Concern |
| ST | State Threatened |
| WBWG | Western Bat Working Group High Priority Species |
| | |
| Rank 1A | California Native Plant Society (CNPS) Rank 1A: Plants presumed extirpated in California and rare or extinct elsewhere |
| Rank 1B.1 | California Native Plant Society (CNPS) Rank 1B.1: Plants rare, threatened or endangered in California and elsewhere (seriously threatened in California) |
| Rank 1B.2 | California Native Plant Society (CNPS) Rank 1B.2: Plants rare, threatened, or endangered in California and elsewhere( moderately threatened in California) |
| Rank 2B.2 | California Native Plant Society (CNPS) Rank 2B.2: Plants rare, threatened, or endangered in California, but more common elsewhere (moderately threatened in California) |

Rank 4.3 California Rare Plant Rank 4.3: Plants of Limited Distribution - A Watch List (not very threatened in California)

****Potential species occurrence definitions:**
Present. Species was observed on the site during site visits or has been recorded (i.e. CNDDB, other reports) on the site recently.

High Potential. All of the habitat components meeting the species requirements are present and/or most of the habitat on or adjacent to the site is highly suitable. The species has a high probability of being found on the site.

Moderate Potential. Some of the habitat components meeting the species requirements are present, and/or only some of the habitat on or adjacent to the site is unsuitable. The species has a moderate probability of being found on the site.

Unlikely. Few of the habitat components meeting the species requirements are present, and/or the majority of habitat on and adjacent to the site is unsuitable or of very poor quality. The species has a low probability of being found on the site.

No Potential. Habitat on and adjacent to the site is clearly unsuitable for the species requirements (foraging, breeding, cover, substrate, elevation, hydrology, plant community, site history, disturbance regime).

# APPENDIX D

# PHOTOGRAPHS



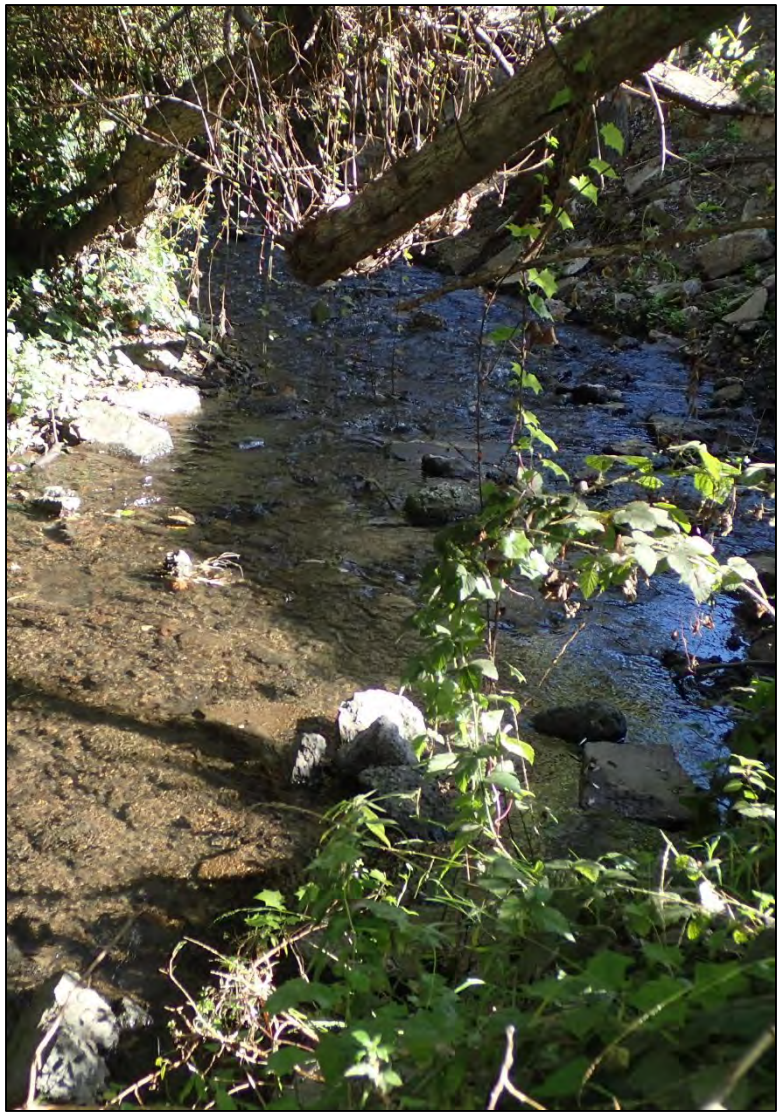
Photograph 1. View of bank stabilization adjacent to the project area. Photo taken from the north bank facing upstream from culvert (09/20/2019).



Photograph 2. View of the existing outfall and concrete from the north bank facing downstream (taken 09/20/2019).



Photograph 3. View of the existing outfall and concrete from San Pedro Creek (taken 09/20/2019).



Photograph 4. San Pedro Creek upstream of the outfall location, facing downstream (taken 09/20/2019)



Photograph 5. View of the existing outfall structure from above (taken 09/20/2019).

# APPENDIX B – CULTURAL RESOURCES SURVEY REPORT

**Due to the sensitive nature of the information contained within, the Cultural Resources Report is not available for public review.**

# GEOTECHNICAL INVESTIGATION

SERRA DRIVE OUTFALL REPAIR PROJECT
Pacifica, California



Prepared for:
**WOODARD & CURRAN**
**2175 N. California Boulevard**
**Walnut Creek, California 94596**
**December 2019**

**COTTON, SHIRES AND ASSOCIATES, INC.**
**CONSULTING ENGINEERS AND GEOLOGISTS**

330 Village Lane, Los Gatos, California 95030 (408) 354-5542 Fax (408) 354-1852
6417 Dogtown Road, San Andreas, California 95249 (209) 736-4252 Fax (209) 736-1212
699 Hampshire Road, Suite 101, Thousand Oaks, California 91361-2352 (805) 370-9710

**COTTON, SHIRES AND ASSOCIATES, INC.**
CONSULTING ENGINEERS AND GEOLOGISTS

December 18, 2019
E5529

Ms. Kathleen Higgins
WOODARD & CURRAN
2175 N. California Boulevard
Walnut Creek, California 94596

SUBJECT: **Geotechnical Investigation**
RE: City of Pacifica, Serra Drive Outfall Repair Project
Pacifica, California

Dear Ms. Higgins:

Cotton, Shires and Associates, Inc. (CSA) is pleased to submit the following report in which we describe the findings, conclusions and recommendations of our geotechnical investigation for the proposed Serra Drive Outfall Repair Project, located at 1411 Serra Drive, Pacifica, California. This investigation was performed in accordance with our revised proposal to you dated July 15, 2019.

In this report, we characterize the geotechnical conditions surrounding the site and underlying the proposed outfall and provide conclusions and recommendations regarding geotechnical hazards, foundation type and design criteria, and site grading.

We appreciate the opportunity to have been of service to you on this project. If you have any questions regarding this report, please feel free to call us.

Sincerely,
**COTTON, SHIRES AND ASSOCIATES, INC.**

David T. Schrier
Principal Geotechnical Engineer
GE 2334

REGISTERED PROFESSIONAL ENGINEER
DAVID T. SCHRIER
NO. 2334
EXP. 12/31/19
GEOTECHNICAL
STATE OF CALIFORNIA

Andrew T. Mead
Principal Engineering Geologist
CEG 2560

PROFESSIONAL GEOLOGIST
Andrew T. Mead
No. 2560
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

DTS:AM:MJD:TRH:st

**GEOTECHNICAL INVESTIGATION**
**CITY OF PACIFICA**
**SERRA DRIVE OUTFALL REPAIR PROJECT**
**Pacifica, California**

## Table of Contents


| | | Page |
|---|---|---|
| **EXECUTIVE SUMMARY** | | 1 |
| | Conclusions | 1 |
| | Recommendations | 2 |
| **1.0** | **INTRODUCTION** | 4 |
| | 1.1 Project Description | 4 |
| | 1.2 Purpose and Scope of Work | 4 |
| **2.0** | **PHYSICAL AND GEOLOGIC SETTING** | 5 |
| | 2.1 Terrain | 5 |
| | 2.2 Geologic Setting | 5 |
| | 2.3 Seismic Setting | 6 |
| | 2.3.1 Probabilistic Analysis | 6 |
| **3.0** | **SITE CONDITIONS** | 6 |
| | 3.1 Surface Conditions | 6 |
| | 3.2 Subsurface Conditions | 7 |
| | 3.2.1 Laboratory Testing | 7 |
| | 3.3 Groundwater Conditions | 8 |
| **4.0** | **POTENTIAL GEOTECHNICAL HAZARDS** | 8 |
| | 4.1 Seismic Hazards | 8 |
| | 4.2 Settlement Behavior | 9 |
| | 4.3 Slope Stability | 9 |
| | 4.4 Expansive Soils | 10 |
| | 4.5 Corrosivity and Sulfate Attack on Concrete | 10 |
| **5.0** | **FOUNDATION EVALUATION AND RECOMMENDATIONS** | 10 |
| | 5.1 Foundation Design Considerations | 10 |
| | 5.2 Foundation Type and Design Criteria | 11 |
| | 5.2.1 Cast-in-Place Piers | 11 |

**Table of Contents** (cont.)


| | | Page |
|---|---|---|
| 5.3 | Headwall Slab and Spillway | 12 |
| 5.4 | Site Grading | 13 |
| 5.4.1 | Site Preparation | 13 |
| 5.4.2 | Compacted Fill | 14 |
| 5.4.3 | Utility Trench Backfill | 14 |
| 5.4.4 | Cut Slope Design | 14 |
| 5.4.5 | Fill Slope Design | 15 |
| 5.4.6 | Keyway Design | 15 |
| 5.5 | Surface Drainage | 15 |
| 5.6 | Seismic Design | 15 |
| 5.7 | Retaining Wall Design | 16 |
| 5.7.1 | Retaining Walls | 16 |
| 5.7.2 | Backdrain | 16 |
| 5.8 | Technical Review | 16 |
| 5.9 | Earthwork Construction Inspection and Testing | 17 |
| **6.0** | **INVESTIGATION LIMITATIONS** | 17 |
| **7.0** | **REFERENCES** | 19 |

**APPENDIX A - Field Investigation and Logs of Exploratory Borings**

| | |
|---|---|
| Field Investigation | A-1 |
| Logs of Exploratory Borings | Follows A-1 |

| | |
|---|---|
| **APPENDIX B - Laboratory Testing** | B-1 |
| Triaxial Compression Shear Strength Testing | Follows B-1 |

| **FIGURES** | | **Follows Page** |
|---|---|---|
| 1 | Site Location Map | 4 |
| 2 | Regional Geologic Map | 5 |
| 3 | San Francisco Bay Area Fault Map | 6 |
| 4 | Engineering Geologic Map | 7 |
| 5 | Engineering Geologic Cross Sections A-A′ and B-B′ | 7 |

## EXECUTIVE SUMMARY

In this Executive Summary, Cotton, Shires and Associates, Inc. (CSA) is providing a summary of the pertinent conclusions and recommendations resulting from our Geotechnical Investigation performed for the City of Pacifica's Serra Drive Outfall Repair project, located in the backyard of 1411 Serra Drive in Pacifica, California. We understand that the proposed project consists of removing the remnants of the old outfall (headwall, apron and spillway) and replacing it with a new outfall structure. A more detailed discussion of our findings, conclusions and recommendations is presented in the main body of this technical report.

### Conclusions

- Proposed construction of a new outfall structure is feasible from a geotechnical standpoint provided that the recommendations of this report are incorporated into the design and construction of the project.

- The site should be subjected to strong seismic ground shaking within the life of the structures. The Serra Drive Outfall Repair site is located approximately 3.5 miles southwest of the mapped main trace of the San Andreas Fault and peak horizontal ground accelerations of up to 0.89g should be anticipated at the site.

- The Serra Drive Outfall Repair site is situated on a northeastern bank of San Pedro Creek. The site is underlain by fill and alluvium. During our investigation, we mapped a shallow landslide along the northern bank of San Pedro Creek.

- Groundwater was encountered in both borings at a depth of 17 feet.

- The site is located within a California Geological Survey Liquefaction Hazard Zone.

- The creek bank in the area of the proposed outlet structure repair is comprised of undocumented, relatively weak fill. In order to adequately support the structure, and the creek bank directly above the pipe, we have recommended that the outlet structure be supported on a deep foundation consisting of cast-in-drilled-hole (CIDH) piers bearing in the underlying alluvial soils. The proposed headwall of

the outlet structure will support/retain undocumented fill material consisting of stiff to very stiff clay and medium dense clayey sand. The apron of the outlet structure will be directly underlain by medium dense to dense clayey gravely sand, and the deep foundations will develop skin friction in medium dense to very dense clayey gravely sand and medium stiff to stiff alluvial soils.

- Assuming that the recommendations in this report are followed, we anticipate that the outlet structure supported by the recommended deep, drilled pier foundations bearing in alluvium should settle less than 1/2-inch total (maximum settlement).

**Recommendations**

- To adequately support the new outlet and retain the very steep creek bank directly above the pipe, the outlet should be supported by deep, CIDH piers bearing in the underlying alluvial soils.

- The deep foundations should consist of at least 24-inch diameter reinforced concrete piers.

- Based on collected geotechnical data, site grading for the outlet, including drilling pier foundations and excavating, should be within the capabilities of heavy-duty excavation equipment (i.e., drill rigs with auger bits, dozer, backhoes and excavators); excavations/drilling below El. 49 feet will require dewatering and more torque to achieve the design pier depths. During the dry season, temporary cut slopes of 2:1 (H:V) in fill and alluvium should be satisfactory (depending on field observations and monitoring) for temporary stability. Permanent cuts in the fill should not exceed 2.5:1 (H:V), and 2:1 (H:V) in alluvium.

- The final drawings and specifications should be reviewed and approved by a representative of this office to confirm that the recommendations of this report have been incorporated into the design of the project.

- Earthwork construction activities should be inspected and tested by a representative of our office to confirm that the recommendations of this report are

incorporated into the construction of the project, and to address potential unanticipated soil conditions not encountered during site investigation.

**GEOTECHNICAL INVESTIGATION**
**CITY OF PACIFICA**
**SERRA DRIVE OUTFALL REPAIR PROJECT**
**Pacifica, California**

## 1.0 INTRODUCTION

### 1.1 Project Description

In this report, Cotton, Shires and Associates, Inc. (CSA) is pleased to present the results of our geotechnical investigation for the new outfall in the backyard of 1411 Serra Drive in Pacifica, California. We understand that the proposed project consists of demolishing the existing headwall and spillway structure and constructing a new outlet structure in their place.

The site is located in the Linda Mar neighborhood of Pacifica, near the Sanchez Adobe Park, along the northern bank of San Pedro Creek as shown on the attached Site Location Map, Figure 1. We performed this investigation between November and December of 2019 in accordance with our revised proposal dated July 15, 2019.

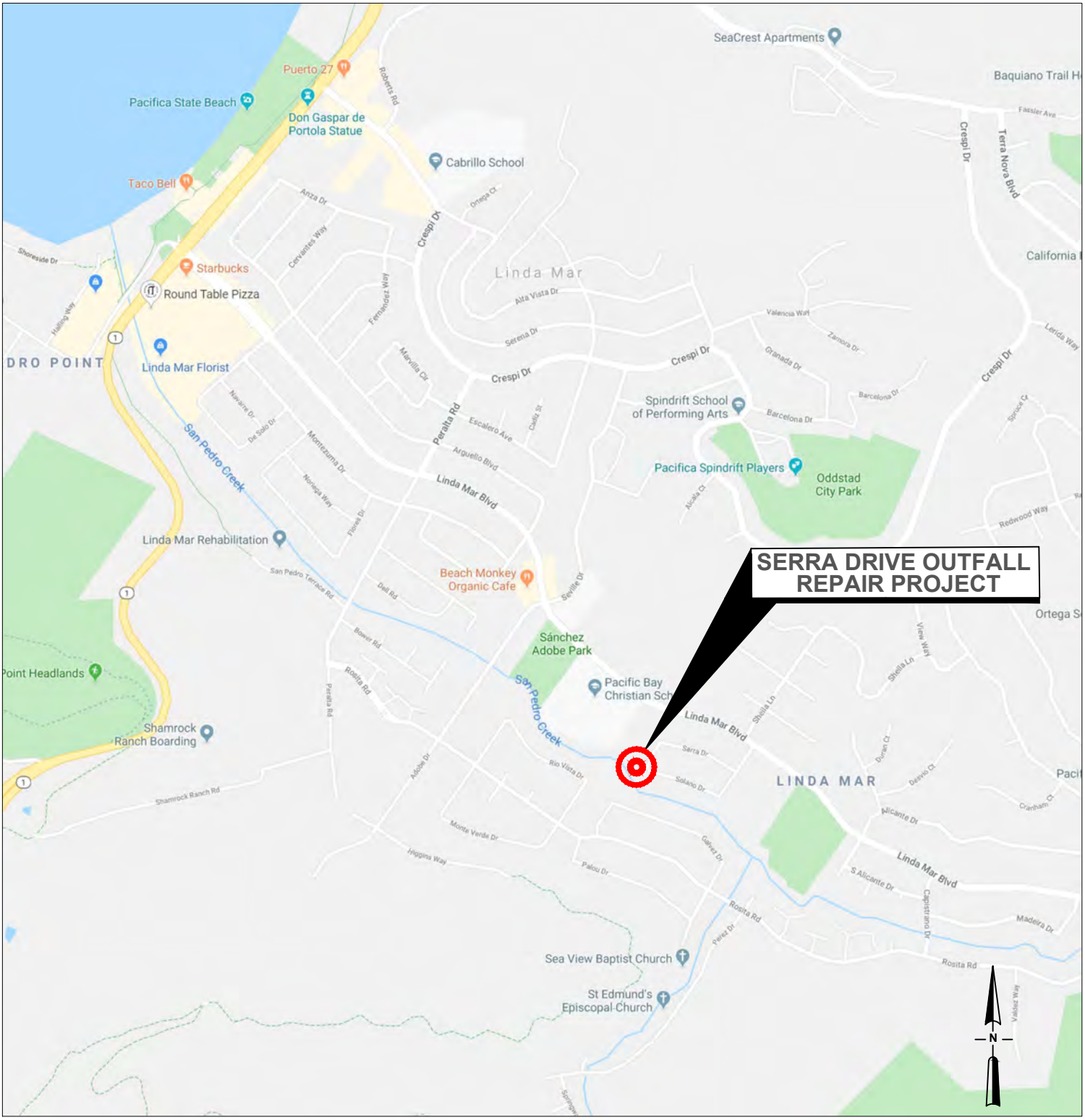
The new outfall structure should be supported on deep foundations. Proposed site grading will include excavating to remove the existing headwall and spillway.

### 1.2 Purpose and Scope of Work

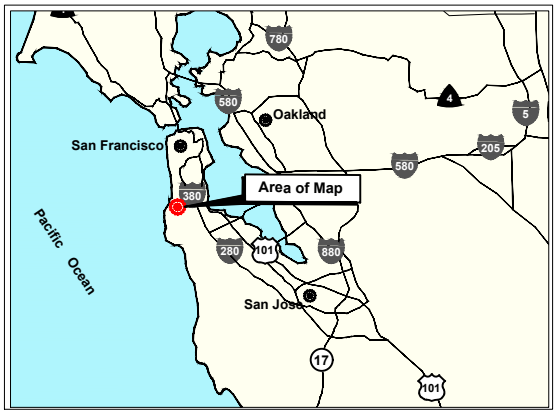
The purpose of our investigation was to develop geotechnical data for project design. Our objectives were to: 1) evaluate surface and subsurface conditions; and 2) develop conclusions and recommendations regarding: geotechnical hazards, site grading, foundation type and design criteria, and recommendations for support of the new outlet structure.

The specific scope of work performed for our investigation included the following tasks:

1) Review of in-house geologic data;
2) Geotechnical reconnaissance;
3) Topographic surveying and engineering geologic mapping;




**Reference: Google Maps**




**COTTON, SHIRES AND ASSOCIATES, INC.**
CONSULTING ENGINEERS AND GEOLOGISTS

# SITE LOCATION MAP

## SERRA DRIVE OUTFALL REPAIR PROJECT

Pacifica, CALIFORNIA

| | | |
|---|---|---|
| GEO/ENG BY<br>TRH | SCALE<br>NTS | PROJECT NO.<br>E5529 |
| APPROVED BY<br>DTS | DATE<br>DECEMBER 2019 | FIGURE NO.<br>1 |

4) Subsurface exploration, logging, testing and sampling;
5) Laboratory testing;
6) Geotechnical engineering analyses;
7) Formulation of conclusions and recommendations; and
8) Preparation of this report.

## 2.0 PHYSICAL AND GEOLOGIC SETTING

### 2.1 Terrain

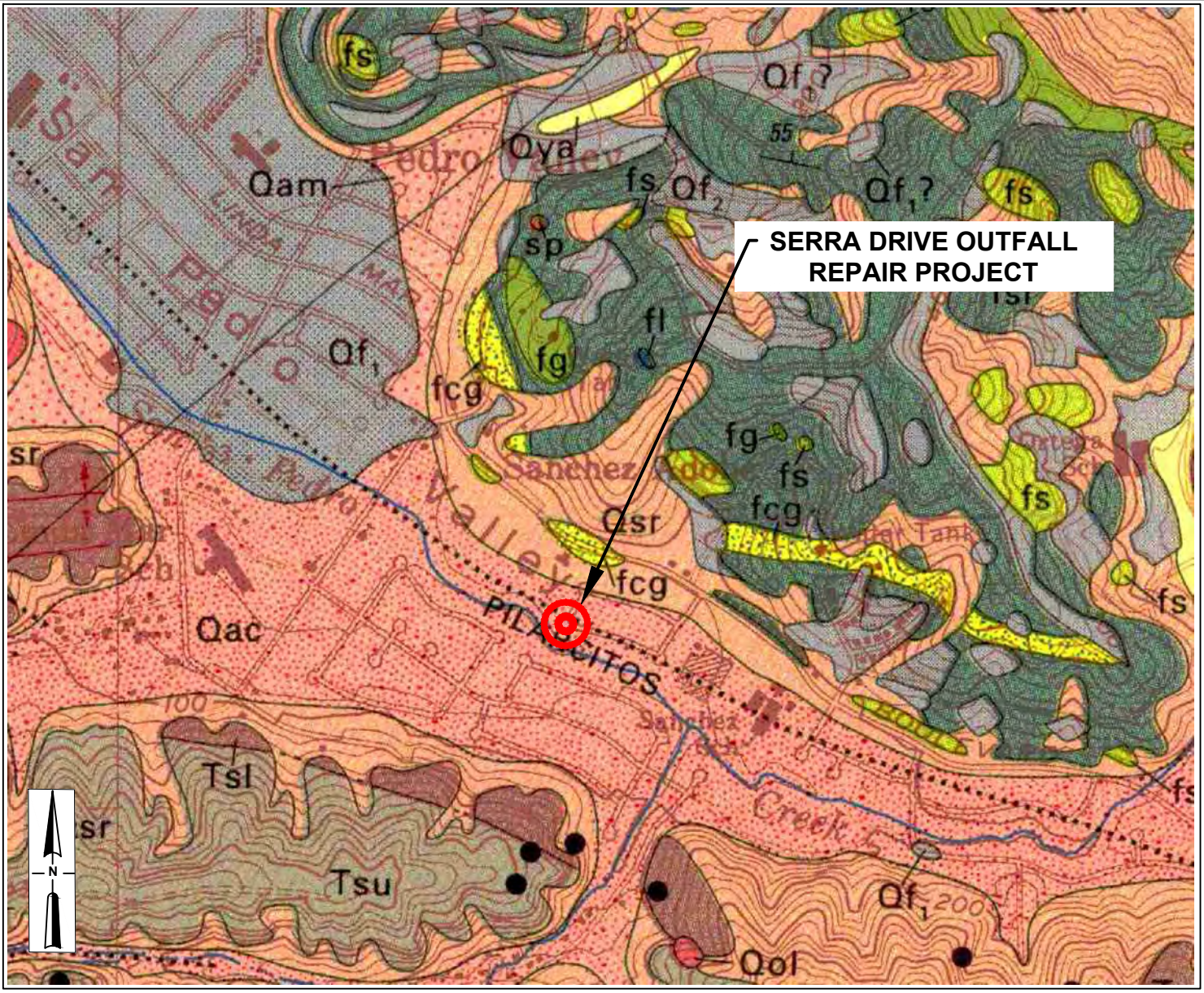
The outlet structure site is located in a northwest trending valley between El. 45 and 66 feet. The site is situated between the Pacific Ocean to the northwest and the Santa Cruz Mountains to the southeast. The surrounding area away from the creek channel is relatively level with a gentle slope down towards the southwest, and the creek channel. The creek channel generally flows from the southeast to the northwest, and has steep, up to 20-foot high banks extending from the thalweg at El. 45 feet to the backyard at 1411 Serra Drive at El. 66 feet. Generally, this area consists of steep hills and narrow valleys to the north, south and east, and tidal estuary and a beach to the west.

### 2.2 Geologic Setting

The project site is mapped as being underlain by coarse grained alluvium (Pampeyan; see attached Figure 2, Regional Geologic Map).

The site is located on the western side of the Santa Cruz Mountains within the Coast Range Geomorphic Province, not far from the transform fault boundary between the Pacific and North American tectonic plates.

We mapped a landslide in the creek bank at the site, and extending upstream. It appears that this landslide damaged the previous outlet structure.




0' 1000' 2000'

Scale 1" = 1000'

## GEOLOGIC UNITS

| | |
|---|---|
| Qf | Artificial Fill |
| Qya | Younger Alluvium |
| Qac | Coarse-Grained Alluvium |
| Qam | Medium-Grained Alluvium |
| Qsr | Slope wash, ravine fill, and colluvium |
| Qol | Older landslide deposits |
| Ts | Sandstone, shale, and conglomerate |
| fs | Sandstone |
| fcg | Conglomerate |
| fg | Greenstone |
| fl | Limestone |
| sp | Serpentinite |

Reference: Pampeyan, E.H., 1994, Geologic Map of the Montara Mountain and San Mateo 7-1/2' Quadrangles, San Mateo County, California

COTTON, SHIRES AND ASSOCIATES, INC.
CONSULTING ENGINEERS AND GEOLOGISTS

**REGIONAL GEOLOGIC MAP**
**SERRA DRIVE OUTFALL**
**REPAIR PROJECT**
Pacifica, CALIFORNIA

| | | |
|---|---|---|
| GEO/ENG BY TRH | SCALE 1"=1000' | PROJECT NO. E5529 |
| APPROVED BY DTS | DATE DECEMBER 2019 | FIGURE NO. 2 |

## 2.3 Seismic Setting

The outlet is situated in an area of high seismicity. The nearest and controlling active fault, with respect to site seismicity, is the San Gregorio Fault located approximately 3.0 miles (4.8 km) to the southwest, and the San Andreas Fault, located 3.5 miles (5.7 km) to the northwest (see attached San Francisco Bay Area Fault Map, Figure 3). The Pilarcitos Fault is mapped through the project site. The Pilarcitos Fault is considered to be either potentially active or inactive.

**2.3.1 Probabilistic Analysis** - We performed a peak ground acceleration analysis of the site employing the online ASCE 7 Hazard Tool for ASCE/SEI 7-16 Seismic Design Code. The results of our analysis indicate an appropriate Maximum Considered Earthquake Geometric Mean ($MCE_G$) Peak Ground Acceleration ($PGA_M$) of **0.89g**.

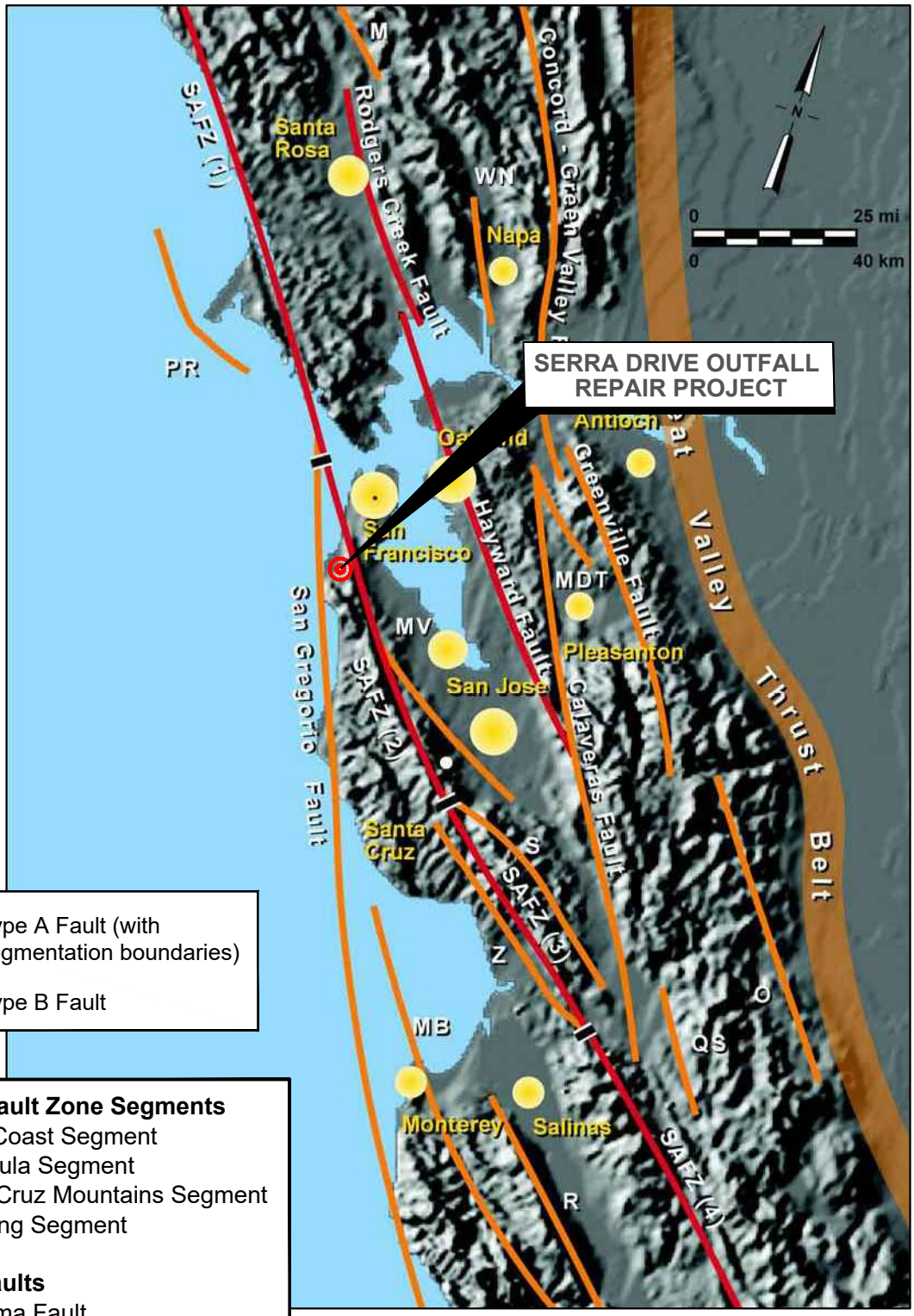
Taking into account the faults described above, the 2016 California Building Code (CBC), the ASCE 7-16 code coefficients presented in Section 5.8, and the results of the peak ground acceleration, it is our opinion that the proposed new outfall could experience a peak horizontal ground acceleration ($PGA_M$) as high as **0.89g**.

# 3.0 SITE CONDITIONS

## 3.1 Surface Conditions

The project site is presently improved with a 15-inch diameter RCP pipe connected to a temporary 18-inch HDPE pipe, and a large cast-in-place concrete spillway. We also observed the remnants of the old headwall and apron structures. Other improvement in the backyard of 1411 Serra Drive include a concrete patio, new wooden bulkhead retaining walls, a gravel patio, fences, landscaping and the buried RCP 15-inch diameter pipe.

Recent improvements made by the neighbors to the southeast (1407 Serra Drive) include three terraced walls, the lowest of which constrains the low flow creek. The lower two appear to be rock walls, and the upper a formed concrete wall supporting a new concrete patio. We have no information about the foundation type supporting the concrete wall or




Type A Fault (with segmentation boundaries)

Type B Fault

**San Andreas Fault Zone Segments**

**SAFZ-1** North Coast Segment
**SAFZ-2** Peninsula Segment
**SAFZ-3** Santa Cruz Mountains Segment
**SAFZ-4** Creeping Segment

**Abbreviated Faults**

| | |
|---|---|
| **M** | Maacama Fault |
| **MB** | Monterey Bay - Tularcitos Fault |
| **MDT** | Mount Diablo Thrust Fault |
| **MV** | Monta Vista - Shannon Fault |
| **O** | Ortigalita Fault |
| **PR** | Point Reyes Fault |
| **QS** | Quien Sabe Fault |
| **R** | Rinconada Fault |
| **S** | Sargent - Berrocal Fault |
| **WN** | West Napa Fault |
| **Z** | Zayante - Vergeles Fault |

COTTON, SHIRES AND ASSOCIATES, INC.
CONSULTING ENGINEERS AND GEOLOGISTS

**SAN FRANCISCO BAY AREA FAULT MAP**
**SERRA DRIVE OUTFALL REPAIR PROJECT**
Pacifica, CALIFORNIA

| | | |
|---|---|---|
| GEO/ENG BY TRH | SCALE 1"=25 mi | PROJECT NO. E5529 |
| APPROVED BY DTS | DATE DECEMBER 2019 | FIGURE NO. 3 |

if it was designed to resist the underlying landslide. Similarly, we have no information about the rock walls or if they are designed to resist the landslide and the upper terraced walls.

### 3.2 Subsurface Conditions

We explored subsurface conditions in the backyard of 1411 Serra Drive, on November 20 and 21, 2019 by means of 2 exploratory borings drilled to depths of 35.5 feet 50.0 feet at the locations shown on the attached Engineering Geologic Map, Figure 4. In the borings, we encountered fill overlying alluvium, which extended to the bottom of our borings (see attached Engineering Geologic Cross Sections A-A' and B-B', Figure 5). The fill was 10 to 14 feet thick and consisted of medium stiff to very stiff, moderate to high plasticity clays and silts, and medium dense to dense clayey gravely sand. Underlying the fill, we encountered alluvial soils consisting of medium dense to very dense clayey gravely sands and medium stiff to stiff silty clay. Clayey gravely sands were also exposed in the creekbank downstream of the existing spillway structure. A detailed description of the exploration program and logs of the borings are presented in Appendix A of this report.

**3.2.1 Laboratory Testing** - We performed laboratory tests on several of the relatively undisturbed soil samples obtained from our borings. Those tests included Atterberg limits, in-situ unit weight, natural moisture content, No. 200 sieve wash, and consolidated, undrained triaxial compression shear strength testing. Based on the results of these tests, the fill has moderate to high plasticity (Liquid Limits = 47 and 50, Plasticity Indices = 20 and 20), moderate to high moisture contents (16.1 percent to 29.1 percent), and low to high dry unit weights (93.7 pcf to 110.6 pcf). Our laboratory test results also showed that the alluvium has low plasticity (Liquid Limits = 26 and 29, Plasticity Indices = 7 and 10), moderate moisture contents (11.7 percent to 23.6 percent), moderate to high dry unit weights (104.9 pcf to 128.9 pcf), moderate fines content for the sand (20.2%), and high effective shear strength (C = 0 psf, $\phi = 39.5^0$). The results of the laboratory tests performed on representative samples are presented on the boring logs in Appendix A (Field Investigation) and in Appendix B (Laboratory Testing).

# EXPLANATION

**Earth Materials**

- Af — Artificial Fill
- Qya — Young Alluvium

**Map Symbols**

- A — A' — Engineering Geologic Cross Section
- SD-2 — Small-Diameter Boring
- Tree — Trees
- Vegetation
- Fenceline
- Limits of 2017 Landslide

Af
Qya
Wood Lagging Walls
4"Ø Cleanouts
Wood Retaining Walls
Area Drains
Utility Pole
Utility Pole Guyline
Spigot
Roofline
House Outline
Gates
Gas Meter
Concrete Patio
Downspouts
1411
4"Ø Cleanout
Irrigation Head
Gravel Patio
Spigot
Irrigation Valves
Downspout
Utility Pole Guyline
Utility Pole
Overhead Lines
Sidewalk
Serra Drive
A
18"Ø HDPE Outfall
Invert Elev. 55.3'
Heavy Vegetation
SD-1
15" RCP Buried
Concrete Patio
SD-2
Downspout
4"Ø Cleanout
Fence
Irrigation Head
Concrete Driveway
Downspout
Drop Inlet
Invert Elev. 58.5'
Heavy Vegetation
8"Ø HDPE Outfall
Invert Elev. 52.8'
B
B'
Trees
Gates
A'
Downspout
Spigot
Concrete Driveway
Concrete Patio
Sidewalk
Manhole
Tree
Fence
Concrete Retaining Wall
1407
Downspout
Roofline
House Outline
Downspout
Limits of 2017 Landslide
Area Drains
Hand Stacked Rock Wall
Hand Stacked Rock Wall
Utility Pole
North
0 5 10 20
(feet)

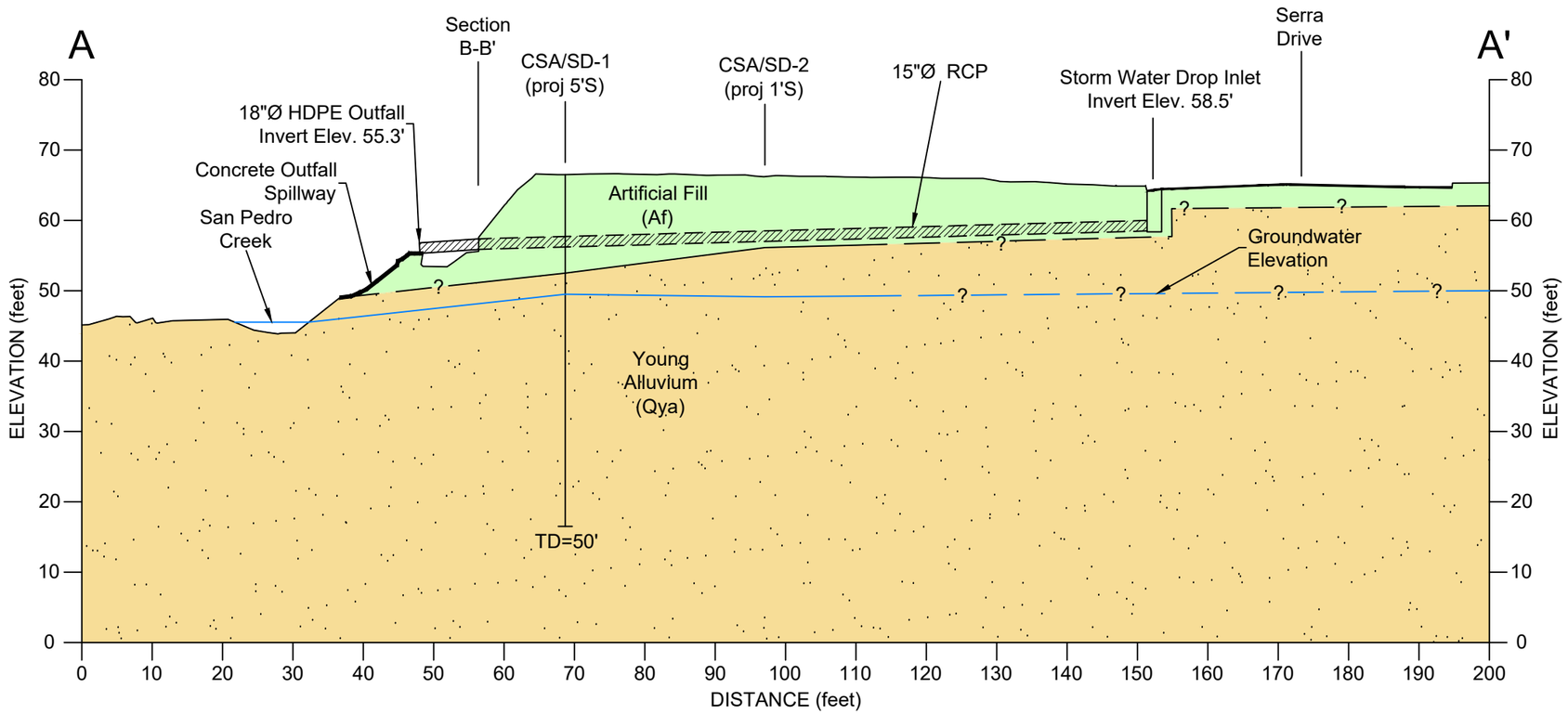
Notes: Base map compiled from detailed (2-foot contour interval) topographic survey by Cotton, Shires and Associates, Inc. on September 25, 2019 and November 21, 2019. Elevation datum is NAD88.

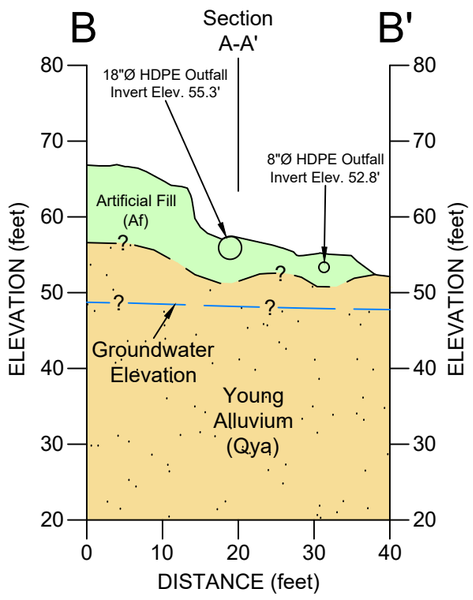
1. This is not a map of a boundary survey. No property corners have been set as part of this work.
2. Survey monuments found in the course of this mapping are set by others, and have been used only as a reference for the purpose of topographic mapping, without our verification of their agreement with applicable legal descriptions and seniority of deeds.
3. Relation of topographic features (i.e., fences, walls, trees, power poles, etc.) to property lines as shown on this map is subject to the adjustments that a boundary survey may require.
4. This survey was prepared without the benefit of a Title Report. Easements, if any, are not shown on this map.
5. If this map is provided in an electronic format as a courtesy to client, delivery of the electronic file does not constitute delivery of a professional work product. The signed paper print delivered with this electronic file constitutes our professional work product and, in the event the electronic file is altered, the print must be referred to for the original and correct survey information. We shall not be responsible for any modifications made to the electronic file or for any products derived from the electronic file which are not reviewed, signed and sealed by us.

COTTON, SHIRES AND ASSOCIATES, INC.
CONSULTING ENGINEERS AND GEOLOGISTS

**ENGINEERING GEOLOGIC MAP**
**Serra Drive Outfall Repair Project**
PACIFICA, CALIFORNIA

| | | |
|---|---|---|
| GEO/ENG BY AM/JD | SCALE 1"=10' | PROJECT NO. E5529 |
| APPROVED BY DTS | DATE DECEMBER 2019 | FIGURE NO. 4 |




# EXPLANATION

**Earth Materials**

| | |
|---|---|
| Af | Artificial Fill |
| Qya | Young Alluvium |

**Symbols**

| | |
|---|---|
| CSA/SD-2 (proj 1'S) | Small-Diameter Boring Projected on to the Engineering Geologic Cross Section |
| TD | Total Depth |
| HDPE | High-Density Polyethylene |
| RCP | Reinforced Concrete Pipe |
| Elev. | Elevation |

COTTON, SHIRES AND ASSOCIATES, INC.
CONSULTING ENGINEERS AND GEOLOGISTS

**ENGINEERING GEOLOGIC CROSS SECTIONS A-A' AND B-B'**
**Serra Drive Outfall Repair Project**
PACIFICA, CALIFORNIA

| | | |
|---|---|---|
| GEO/ENG BY AM/JD | SCALE 1"=10' | PROJECT NO. E5529 |
| APPROVED BY DTS | DATE DECEMBER 2019 | FIGURE NO. 5 |

### 3.3 Groundwater Conditions

Groundwater was encountered in both borings at a depth of 17 feet (El. 49 feet). It should be understood that fluctuations in groundwater levels could occur from variations in rainfall, flooding and other factors. Groundwater levels may be different at different times, climatic conditions and locations.

## 4.0 POTENTIAL GEOTECHNICAL HAZARDS

In the following section, we identify potential geotechnical hazards at the outfall site along with the corresponding degrees of determined potential risk, and provide recommendations for possible mitigation measures.

### 4.1 Seismic Hazards

Seismic ground shaking associated with a large earthquake on the San Andreas, or San Gregorio Faults is considered to be a **high** potential hazard in the project area. Peak ground accelerations of up to **0.89g** should be anticipated at the site (see report Section 2.3).

No active faults have been recognized on, or mapped through the subject property; however, as we previously mentioned the potentially active or inactive Pilarcitos Fault is mapped through the project site. The potential for surface faulting and ground rupture on the property is considered to be **low**. The San Gregorio Fault is the closest mapped active fault to the site, located approximately 3.0 miles to the southwest.

Seismically-induced ground failure mechanisms include: landsliding, lurching, differential compaction, liquefaction and lateral spreading. Due to the steep creek bank slopes surrounding the outlet site combined with the undocumented fill, the potential for landsliding is considered to be **high**. Similarly, there is a **moderate** potential that the fill material could lurch and compress under seismic loads, settle differently and could result in differential movement/compaction and possible distress the structure. The potential for liquefaction and lateral spreading at the outlet site (CSA/SD-1) is **low** due to the high plasticity clayey soils and the high blow count cohesionless materials encountered in the

in CSA/SD-1. We calculated that there is a **moderate** potential that the clayey sandy soil between a depth of 10 and 12.5 feet, could experience dry densification under seismic ground shaking and settle up to 1/4".

In order to mitigate these moderate to high potential geotechnical seismic hazards, we have recommended that the proposed outlet structure including wing walls be supported on a deep foundation bearing in the underlying alluvium. We estimate that new outlet structure supported on deep foundations will have **low** potential to be impacted by a seismically triggered landslide, and that there will be a **low** potential that the structure could settle or experience differential compaction due to seismic ground shaking or dry densification.

### 4.2 Settlement Behavior

Due to presence of undocumented fill underlying and surrounding the proposed outlet site, there is a **high** potential that an outlet structure supported by a shallow foundation could settle differentially. Consequently, we have provided recommendations to support the outlet structure on a deep foundation of drilled cast-in-place piers bearing in the underlying alluvium. Assuming that the outlet structure is supported on a deep, pier foundation, we calculate that total settlement would be less than 1/2 inch (total and differential) due to an assumed static dead plus long term live load equal to approximately 40 kips per pier. We can calculate potential settlement for alternative loading once they have been determined.

### 4.3 Slope Stability

As we previously mentioned the subject section of creek bank previously failed as a landslide, and based on the roughly 10 to 14 feet of undocumented fill combined with a very steep slope, the potential for future creek bank failures/landsliding in the vicinity of the proposed new outlet structure is considered to be **high**. The recommended deep, pier-supported headwall and wing walls should reduce the potential for slope instability to impact the proposed outlet structure. However, there will still be a **high** potential for future creek bank failures upstream and downstream of the outlet structure.

### 4.4 Expansive Soils

Based on the results of our laboratory testing, the near surface fill material is moderately to highly plastic and is potentially **moderately** expansive. Highly expansive earth materials could be subjected to large volume changes due to seasonal fluctuations in moisture content or removal of overburden material. Moderate plasticity soils also have a **moderate** potential to creep when located on steep slopes.

The deep, pier-supported foundation should bear well below the moderate to high plasticity fill, and consequently mitigate the potential for differential foundation movement due to expansive soils.

### 4.5 Corrosivity and Sulfate Attack on Concrete

We recommend that corrosivity/sulfate testing be completed on the near surface site earth materials prior to completing the concrete mix design in order to determine the potential for corrosivity to metallic and concrete structures at the site. Alternatively, the concrete could be designed assuming the soils are highly corrosive.

## 5.0 FOUNDATION EVALUATION AND RECOMMENDATIONS

### 5.1 Foundation Design Considerations

The principal factors affecting foundation type selection for the headwall, wing walls and spillway are the underlying layer of compressible fill and the associated potential for differential foundation movement, and the steep undocumented fill slope with high active pressures. The recommended deep, cast-in-place pier foundation should provide adequate headwall and wing wall support. We do not anticipate that micropiles will have sufficient lateral capacity to be considered a viable alternative.

Our recommendations for deep foundations are presented in the following section of this report.

## 5.2 Foundation Type and Design Criteria

**5.2.1 Cast-in-Place Piers -** The new headwall and wing walls can be supported by reinforced concrete pier foundation. The drilled, cast-in-drill-hole (CIDH) piers should derive vertical support from adhesion (skin friction) in firm alluvium as determined in the field by the Project Geotechnical Engineer at the time of construction. Piers should be sized according to the following criteria:

Vertical Capacity - minimum three (3) pier diameter spacing

Minimum pier diameter ..... 24 inches

Minimum pier embedment below the creek channel (~El. 45 feet) ... 15 Feet

(Total pier lengths of at least 25 feet to 30 feet as measured from existing ground surface at the RCP pipe outlet should be anticipated, and could be longer depending on the structural engineer).

Allowable adhesion (skin friction) for reinforced concrete dead-plus-live-loads:

In fill material (~El. 55 feet to ~El. 49 feet) ..... 0 psf

In alluvial materials (below ~El. 49 feet) ..... 350 psf

Lateral Passive Resistance - piers [equivalent fluid pressure applied over an effective width of two (2) pier diameters]

In fill material ..... 0 pcf

0 to 6 feet depth in alluvium ..... 0 pcf

Below ~6 feet in alluvium material ..... 500 pcf

Below ~6 feet in alluvium material for seismic loading ..... 625 pcf

Equivalent Fluid Active Pressure – the walls should be designed to resist lateral equivalent fluid active pressure acting on the headwall and wing walls within the fill material equal to:

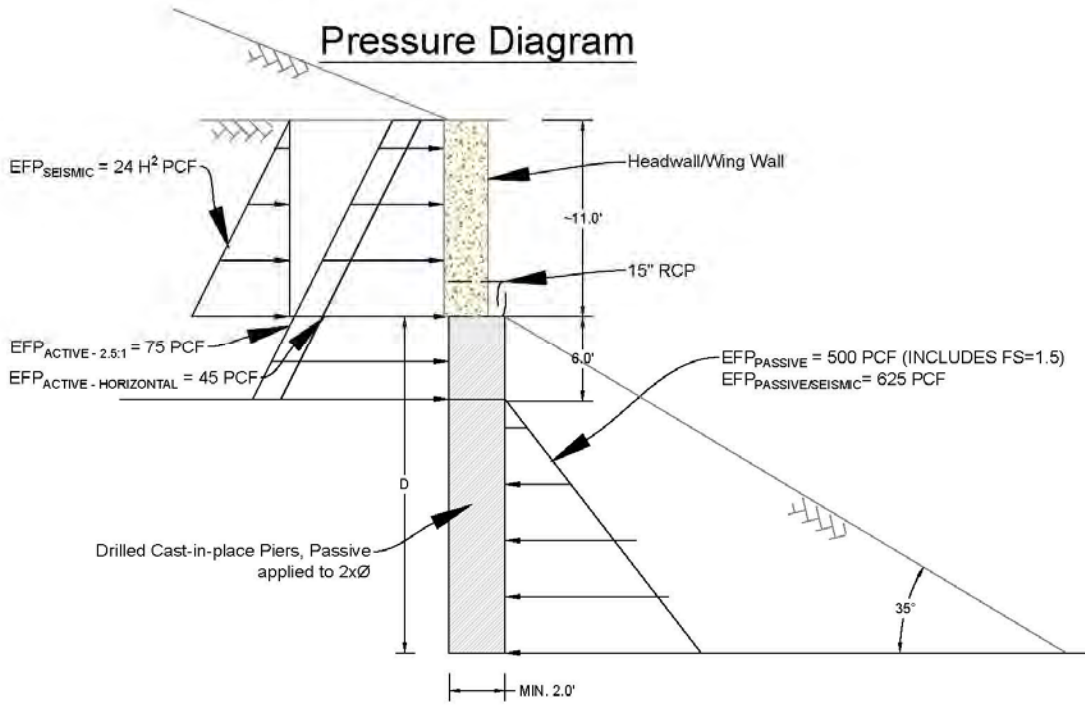
For horizontal backfill ..... 45 pcf

For 2:1 sloped backfill ..... 75 pcf

Seismic Load – the walls should be designed to resist a triangular seismic earth pressure acting on the headwall and wing walls within fill material equal to:

From Backyard (~El. 66 feet) to the top of the piers (~El. 55 feet) ..... $24\ H^2$ pcf

The following Pressure Diagram summarizes the above described lateral loading:




The above adhesion value (skin friction) can be increased by 1/3 for seismic loading and should be decreased by 25% for uplift. The upper portion of the piers should be formed to create vertical surfaces, and "mushrooming" of pier tops and over-pours around grade beams should be prevented. Drilled pier holes should be machine cleaned of all loose material prior to the placement of steel and concrete. Piers should be steel reinforced with a circular cage including a minimum of 4, No. 5 bars vertical (with greater reinforcement as required by the project Structural Engineer). Casing could be necessary to prevent the pier holes from caving.

We anticipate that water will be present in the pier holes. Prior to placing concrete, the water should be pumped out until the pier holes are dry, or alternatively, the concrete should be poured by tremie methods to displace the water. The displaced water should be collected and not allowed to discharge into the creek channel.

### 5.3 Headwall Slab and Spillway

The subgrade for the headwall slab and spillway should be prepared as recommended under Site Grading (Section 5.4). The headwall slab should be entirely supported on the drilled pier foundation; while the spillway can be supported by a combination of drilled

piers and a continuous cutoff wall extending at least 3 feet below the creek channel into undisturbed alluvium and across the bottom of the spillway. Both the headwall slab and the spillway should be reinforced with minimum No. 4 steel reinforcing bars at maximum 16 inches on center, both ways. Steel reinforcement should be increased above this as required by the Project Civil or Structural Engineer. The cutoff wall should be designed as a continuous footing with a minimum width of 2 feet, a minimum embedment depth of 3 feet below the bottom of the channel in undisturbed alluvium, and may be designed for an allowable bearing pressure of 4,500 pounds per square foot (psf) for dead-plus-total loads. Resistance to lateral forces should be calculated using a base coefficient of friction of 0.40. A passive resistance of 500 pcf equivalent fluid pressure can be applied to cutoff wall below a depth of 2 feet below the bottom of the creek channel.

### 5.4 Site Grading

Based on our field investigation, site grading, including drilling pier foundations and excavating, should be within the capabilities of heavy-duty excavation equipment (i.e., dedicated drill rigs with auger bits, dozers, backhoes and excavators); casing may be required to prevent caving. Excavations/drilling below El. 49 feet will likely require significant dewatering.

**5.4.1 Site Preparation** - All loose material, vegetation, old concrete foundations, remnants of the previous outlet structure, abandoned utilities, asphalt, debris, and other deleterious material should be stripped and removed from the area to be occupied by the new outlet structure. This material should be disposed of in a suitable location off-site.

The site should be excavated in the outlet areas to remove all of the topsoil, and to create a level pad. The headwall slab and spill subgrade should be compacted firm and unyielding to support temporary construction loads. Soft and yielding areas should be removed and replaced with compacted fill.

In areas to be filled, the exposed surface should be scarified to at least an 8-inch depth, moisture conditioned to at least optimum moisture content and compacted to at least 90 percent relative compaction based on ASTM D-1557-12.

**5.4.2** **Compacted Fill** – The excavated on-site material can be re-used as structural fill provided it is free of organic material and garbage/debris and contains no material larger than 4" inches. Imported fill should also be free of organic material; it should also contain no material larger than 4 inches and should have a plasticity index (PI) of less than 20. The fill should be placed in horizontal lifts not exceeding 8 inches in loose thickness, moisture conditioned to at least optimum moisture content, and compacted to at least 95 percent relative compaction beneath structures and 18 inches below the aggregate base rock for pavements, and 90 percent relative compaction elsewhere, all based on ASTM D-1557-12.

**5.4.3** **Utility Trench Backfill** - Planned pipelines should be placed at least 3 feet below final ground surface (where feasible). Utility trenches should be backfilled with approved, on-site soil. Bedding materials for pipes should be graded and placed in accordance with the manufacturer's recommendations. The backfill should be compacted to at least 90 percent relative compaction based on based on ASTM D-1557-12. Equipment and methods should be used that are suitable for work in confined areas without damaging trench walls or conduits.

Where pipelines are located on slopes or roadways steeper than 12° (21 percent gradient), impervious clay (or low slump, 5-sack concrete) trench plugs (minimum 3 feet horizontal dimension) should be provided at minimum 50-foot intervals to avoid pop-outs due to high hydrostatic pressures developing in pervious trench bedding.

**5.4.4** **Cut Slope Design** - Permanent cuts in the fill should not exceed an inclination of 2.5:1 (H:V), while cuts up to 2:1 (H:V) should perform reasonably well in the undisturbed alluvium.

During the dry season, temporary cut slopes of 2:1 (H:V) in the fill should generally be satisfactory for construction purposes, provided that they are inspected and approved by our field representative at the time of construction and monitored daily during construction. Excavation methods, shoring, bracing and safety of excavations are the responsibility of the contractor. All excavations should comply with applicable local, State and Federal safety regulations.

**5.4.5 Fill Slope Design** – Fill slopes are not recommended below the anticipated high creek flow elevation. All new permanent fill slopes should have a maximum inclination of 2:1 (H:V).

**5.4.6 Keyway Design** - Fill materials placed on slopes steeper than 6:1 should have a keyway at the toe no less than 12 feet wide and be continuously benched at least 2 foot into the undisturbed alluvium. The resulting subgrade should be inspected by our representative for firmness prior to placement of any new fill materials.

## 5.5 Surface Drainage

We recommend that all surface drainage be permanently diverted away from the planned structures at a minimum 2% grade into an appropriate catch basin/storm drain system.

## 5.6 Seismic Design

A peak ground acceleration of 0.89g should be anticipated for design purposes at the tank(s) site. Based on our geotechnical investigation, the site location, our interpretation of the ASCE 7 Hazards Report for ASCE/SEI 7-16 related to Earthquake Loads and using the online tool, we are providing the following parameter recommendations from the corresponding figures and tables:

| Parameter | Value |
|---|---|
| Site Classification | D |
| Mapped Spectral Acc. 0.2 Sec. (g) | $S_S$ = 1.92 |
| Mapped Spectral Acc. 1 Sec. (g) | $S_1$ = 0.764 |
| Fa – Site Coefficient | 1.0 |
| Fv – Site Coefficient | N/A |
| $S_{MS}$ = FaSs | 1.92 |
| $S_{M1}$ = $F_vS_1$ | N/A |
| $S_{DS}$=2/3 $S_{MS}$ | 1.28 |
| $S_{D1}$=2/3 $S_{M1}$ | N/A |
| $T_L$ | 12 |
| $F_{PGA}$ | 1.1 |
| Ie | 1 |
| Cv | 1.484 |

## 5.7 Retaining Wall Design

The following section provides our recommendations for site retaining walls.

**5.7.1 Retaining Walls** – Retaining walls should be designed to resist an active lateral equivalent fluid earth pressure as provided in Section 5.2.1. The lateral loads on the retaining wall can be resisted by passive pressure against the side of the piers (designed and constructed in accordance with Section 5.2.1). For seismic loading, the headwall and wing walls should also be designed to resist a seismic earth pressure equal to an equivalent fluid pressure (typical triangular loading) in addition to the static active earth pressure loading (See Section 5.2.1).

The headwall and wing walls should be supported by drilled pier foundations in accordance with the design criteria provided in Section 5.2.1

**5.7.2 Backdrain** – Backdrains should be constructed behind all retaining walls. The backdrains should be a minimum 12-inch wide continuous blanket of either Caltrans Class 2 Permeable Material or 3/4-inch x 1/2-inch clean crushed drainrock enclosed in Mirafi 140N (or approved equivalent) filter fabric, and extended to within 1 to 1-1/2 feet of the ground surface where a low permeable fill should cap the drainrock. A minimum 4-inch diameter PVC Schedule 40 perforated drain pipe should be placed near the bottom of the drainrock (perforations down), surrounded by a minimum of 4 inches of drainrock with at least 2 inches of drainrock underlying the pipe. All backdrain pipes should be sloped to drain at a minimum of 1/2 percent and collected in 4-inch diameter non-perforated Schedule 40 PVC pipes that are sloped a minimum of 2 percent and discharged into the creek channel

## 5.8 Technical Review

Supplemental geotechnical design recommendations should be provided by our firm based on specific design needs developed by the other project design professionals. This report, and any supplemental recommendations, should be reviewed by the contractor as part of the bid process. It is strongly recommended that no construction be started nor grading undertaken until the final drawings, specifications, and calculations have been

reviewed and approved in writing by a representative of **Cotton, Shires and Associates, Inc.**

### 5.9 Earthwork Construction Inspection and Testing

All excavations should be inspected by a representative of **Cotton, Shires and Associates, Inc.** prior to filling or pouring of concrete foundations. Any grading should also be inspected and tested as appropriate to assure adequate stripping and compaction. Our office should be contacted with a minimum of 48 hours advance notice of construction activities requiring inspection and/or testing services and a minimum of 72 hours advance notice and provision of representative laboratory compaction curve samples for testing of fill.

## 6.0 INVESTIGATION LIMITATIONS

Our services consist of professional opinions and recommendations made in accordance with generally accepted engineering geology and geotechnical engineering principles and practices. No warranty, expressed or implied, or merchantability of fitness, is made or intended in connection with our work, by the proposal for consulting or other services, or by the furnishing of oral or written reports or findings.

Any recommendations and/or design criteria presented in this report are contingent upon our firm being retained to review the final drawings and specifications, to be consulted when any questions arise with regard to the recommendations contained herein, and to provide testing and inspection services for earthwork and construction operations. Unanticipated soil and geologic conditions are commonly encountered during construction that cannot be fully determined from existing exposures or by limited subsurface investigation. Such conditions may require additional expenditures during construction to obtain a properly constructed project. Some contingency fund is recommended to accommodate these possible extra costs.

This report is issued with the understanding that it is the responsibility of the owner, or of his representative, to ensure that the information and recommendations contained herein are called to the attention of the project architect and/or engineer and incorporated into the plans. Furthermore, it is also the responsibility of the owner, or of his

representative, to ensure that the contractor and subcontractors carry out such recommendations in the field.

## 7.0 REFERENCES


ASCE 7 Hazard Tool, Online Application, ASCE/SEI 7-16.

Bowles, J.E., Foundation Analysis and Design, Third Edition, 1982, McGraw-Hill Book Company, Page 184, and Tables 2-6 and 2-7.

Brabb, E.E., Pampeyan E.H., Preliminary Map of Landslide Deposits in San Mateo County, California, MF-344, 1972.

Bray, J.D., Sancio, R.B., Assessment of Liquefaction Susceptibility of fine-Grained Soils, Journal of Geotechnical and Geoenvironmental Engineering, September 2006, Volume 132, No. 9.

California Department of Conservation, Division of Mines and Geology, 1996, Probabilistic Seismic Hazard Assessment For the State of California, DMG Open File Report 96-08.

Idriss I.M., Boulanger R.W., Soil Liquefaction During Earthquakes monograph, Earthquake Engineering Research Institute, 2008.

Pampeyan E.H., 1994, Geologic Map of Montara Mountain and San Mateo 7-1/2' Quadrangles, San Mateo County, California.

Ooi, P.S.K., Rojiani, K.B., Duncan, J.M., and Barker, R.M., Engineering Manual for Drilled Shafts, Virginia Polytechnic Institute and State University, May 1991.

Lew, M., Sitar, N., Atik L. A., Pourzanjani, M., Hudson, M. B., Seismic Earth Pressures on Deep Building Basements, SEAOC 2010.

U. S. Department of the Navy, 1982, Design Manual Soil Mechanics, Foundations, and Earth Structures, NAVFAC DM-7.2.

U.S.G.S. Design Maps Web Application, ASCE 7-10, errata March 2013.

# APPENDIX A

## Field Investigation
## Logs of Exploratory Borings

## APPENDIX A
## FIELD INVESTIGATION

We explored subsurface conditions at the Serra Drive Outfall Repair Project site in Pacifica, California on November 20 and 21, 2019 by means of two borings drilled to depths of 35.5 to 50 feet using portable solid stem drilling equipment. The locations of the borings are shown on the attached Site Plan and Boring Location Map, Figure 4. The engineer who logged the borings visually classified the soils in accordance with ASTM D-2487. We obtained relatively undisturbed samples of the materials encountered at selected depths. These samples were obtained in brass liners that were 2.5 inches in outside diameter and 6 inches long; the liners were placed inside a 3-inch diameter modified split-barrel California Sampler for sampling. The sampler was driven with a 140-pound hammer that was raised by an automatic hammer and allowed to freely fall about 30 inches. We also performed Standard Penetration Tests at selected depths. The depths of the sampling are shown on the boring logs. The circled number at the conclusion of the sampling interval represents the corrected blow count from a modified California sampler to Standard Penetration Test value accomplished by multiplying the blow count by a factor of 0.68.

Descriptive logs of the borings are presented in this appendix. These logs depict our interpretation of the subsurface conditions at the dates and locations indicated, based on representative samples collected at roughly five-foot sampling intervals. It is not warranted that they are representative of subsurface conditions at other times and locations. The contacts on the logs represent the approximate boundaries between earth materials, and the transitions between these materials may be gradual.

# COTTON, SHIRES AND ASSOCIATES, INC.

## LOG OF EXPLORATORY DRILLING

**Project** Serra Drive Outfall Repair Project | **Boring** CSA / SD-1

**Location** Survey | **Project No.** E5529

**Drilling Contractor/Rig** Clear Heart / Portable Hydraulic | **Date of Drilling** 11/21/2019

**Ground Surface Elev.** 66' | **Logged By** TRH | **Hole Diameter** 4" Solid Stem

**Surface** Landscape area, bark over loose surficial | **Weather** Sunny, Clear

| Depth (feet) | Graphic Log | USCS Class. | Geotechnical Description | Sample Desig. | Dry Unit Weight(pcf) | Moisture Content (%) | SPT Blows/ft | Sample Type | Recov. (%) | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | CL | **0.0'-14.0': ARTIFICIAL FILL**<br>0.0'-1.0' **Clay** - Dark brown, very stiff, moist | | | | | | | Driller: Ricky<br>Helpers: Victor + Mario<br>Start Time = 09:40 |
| 1 | | | | | | | 7 | | | |
| | | | | T-1 | | | 8 | MC | | |
| 2 | | CL | 2.0'-3.7' **Clay** - Brown with light gray, stiff, moist | T-2 | 93.8 | 23.8 | 9 | | | |
| | | | | | | | (12) | | | |
| 3 | | | | | | | 6 | | | |
| | | | | T-3 | | | 10 | MC | | |
| 4 | | ML-MH | 3.7'-5.2' **Clayey Silt** - Gray mottled with brown tan and white, very stiff, moist | T-4 | 95.8 | 25.5 | 14 | | | T-3: LL=50, PI=20 |
| | | | | | | | (16) | | | |
| 5 | | | | T-5 | | | 6 | | | 10:13 |
| | | CL | 5.2'-7.0' **Silty Clay** - Gray mottled with brown, very stiff, moist, trace sand | T-6 | 101.7 | 23.8 | 12 | MC | | |
| 6 | | | | | | | 16 | | | |
| | | | | | | | (19) | | | |
| 7 | | | | | | | 8 | | | |
| | | | | T-7 | | | 12 | MC | | T-7: LL=47, PI=20 |
| 8 | | ML-CL | 7.0'-10.0' **Clayey Silt**- Gray mottled with brown and red, very stiff, moist, trace sand | T-8 | 95.1 | 26.8 | 19 | | | |
| 9 | | | | | | | (21) | | | |
| 10 | | SC | | | | | 8 | | | |
| | | | 10.0'-15.0' **Clayey Gravely Sand** - Mottled gray tan and white, medium dense, moist, brick fragment | T-9 | | | 15 | MC | | |
| 11 | | | | T-10 | 110.6 | 16.1 | 22 | | | |
| | | | | | | | (12) | | | 10:45 |
| 12 | | | -- Very hard drilling | | | | | | | V. hard drilling |
| 13 | | | | | | | | | | |
| 14 | | | **14.0'-BOH: ALLUVIUM** | SPT-1 | | | 12<br>15<br>22 | SPT | | |
| | | | | | | | (37) | | | |

Project Serra Drive Outfall Repair Project / E5529 Date 11/21/2019 Boring CSA / SD-1

| Depth (feet) | Graphic Log | Parent Material (USCS) | Geotechnical Description | Sample Desig. | Dry Unit Weight(pcf) | Moisture Content (%) | SPT Blows/ft | Sample Type | Recov. (%) | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|
| 16 | | SC | 15.0'-17.0' **Clayey Gravely Sand** - Brown mottled with white gray and red, dense, wet | T-11 | | | 25<br>25 | MC | | |
| | | | | T-12 | 123.3 | 12.0 | 23 | | | |
| 17 | | | -- 17' Groundwater | | | | (33) | | | |
| 18 | | SC | 17.0'-25.0' **Clayey Gravely Sand** - Blue-gray, medium dense, wet to saturated | | | | | | | |
| 19 | | | | | | | | | | |
| 20 | | | | SPT-2 | | | 4 | SPT | | 26.2% Fines |
| 21 | | | | | | | 10<br>11 | | | 12:20<br>13:20 |
| 22 | | | | | | | (21) | | | |
| 23 | | | | | | | | | | |
| 24 | | | | | | | | | | |
| 25 | | CL | 25.0'-26.5' **Clay** - Blue-gray, medium stiff to stiff, saturated, trace sand | SPT-3 | | | 7<br>8 | SPT | | SPT-3: LL=29, PI=10 |
| 26 | | | | | | | 7 | | | |
| 27 | | SC | 26.5'-29.0' **Clayey Gravelly Sand** - Blue-gray, medium dense, saturated | | | | (15) | | | |
| 28 | | | | | | | | | | |
| 29 | | CL-ML | 29.0'-31.0' **Silty Clay** - Blue-gray, medium stiff to stiff, saturated, trace fine sand | | | | | | | |
| 30 | | | | SPT-4 | | | 9<br>10 | SPT | | SPT-4: LL=26, PI=7 |
| 31 | | SC | 31.0'-39.0' **Clayey Sand** - Blue-gray, medium dense, saturated | | | | 11 | | | |
| | | | | | | | (21) | | | |

Project Serra Drive Outfall Repair Project / E5529 Date 11/21/2019 Boring CSA / SD-1

| Depth (feet) | Graphic Log | Parent Material (USCS) | Geotechnical Description | Sample Desig. | Dry Unit Weight(pcf) | Moisture Content (%) | SPT Blows/ft | Sample Type | Recov. (%) | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|
| 33 | | SC | | | | | | | | 33 |
| 34 | | | | | | | | | | 34 |
| 35 | | | -- Dense | SPT-5 | | | 24<br>16<br>17 | SPT | | 35 |
| 36 | | | | | | | | | | 36 |
| 37 | | | | | | | (33) | | | 37 |
| 38 | | | | | | | | | | 38 |
| 39 | | SC | 39.0'-45.0' **Clayey Sand** - Mottled brown with gray white and red, very dense, wet to saturated | | | | | | | 39 |
| 40 | | | | SPT-6 | | | 26<br>41<br>42 | SPT | | 40 |
| 41 | | | | | | | | | | 41 15:15 |
| 42 | | | | | | | (83) | | | 42 |
| 43 | | | | | | | | | | 43 |
| 44 | | | | | | | | | | 44 |
| 45 | | CL | 45.0'-48.5' **Sandy Clay** - Blue-gray, stiff, saturated | SPT-7 | | | 8<br>9<br>11 | SPT | | 45 |
| 46 | | | | | | | | | | 46 |
| 47 | | | | | | | (20) | | | 47 |
| 48 | | | | | | | | | | 48 |
| | | SC | 48.5'-BOH **Clayey Gravely Sand** - Gray-blue, very dense, saturated | SPT-8 | | | 13 | SPT | | |

**Project** Serra Drive Outfall Repair Project / E5529 **Date** 11/21/2019 **Boring** CSA / SD-1

| Depth (feet) | Graphic Log | Parent Material (USCS) | Geotechnical Description | Sample Desig. | Dry Unit Weight(pcf) | Moisture Content (%) | SPT Blows/ft | Sample Type | Recov. (%) | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|
| 50 | | SC | 48.5'-BOH **Clayey Gravely Sand** - Olive-blue, very dense, saturated | SPT-8 | | | 30<br>50/4" | SPT | | 16:45 |
| | | | TD = 50.0'<br>Groundwater encountered at 17 feet at time of drilling | | | | | | | |
| 51 | | | | | | | | | | |
| 52 | | | | | | | | | | |
| 53 | | | | | | | | | | |
| 54 | | | | | | | | | | |
| 55 | | | | | | | | | | |
| 56 | | | | | | | | | | |
| 57 | | | | | | | | | | |
| 58 | | | | | | | | | | |
| 59 | | | | | | | | | | |
| 60 | | | | | | | | | | |
| 61 | | | | | | | | | | |
| 62 | | | | | | | | | | |
| 63 | | | | | | | | | | |
| 64 | | | | | | | | | | |
| 65 | | | | | | | | | | |



COTTON, SHIRES AND ASSOCIATES, INC.
CONSULTING ENGINEERS AND GEOLOGISTS

# COTTON, SHIRES AND ASSOCIATES, INC.

## LOG OF EXPLORATORY DRILLING

**Project** Serra Drive Outfall Repair Project — **Boring** CSA / SD-2

**Location** Survey — **Project No.** E5529

**Drilling Contractor/Rig** Clear Heart / Portable Hydraulic — **Date of Drilling** 11/20/2019

**Ground Surface Elev.** 66' — **Logged By** TRH — **Hole Diameter** 4" Solid Stem

**Surface** Landscape area, bark over loose surficial — **Weather** Sunny, Clear

| Depth (feet) | Graphic Log | USCS Class. | Geotechnical Description | Sample Desig. | Dry Unit Weight(pcf) | Moisture Content (%) | SPT Blows/ft | Sample Type | Recov. (%) | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | CL | **0.0'-10.0': ARTIFICIAL FILL**<br>0.0'-3.0' **Clay** - Dark brown, moist, medium stiff, trace fine sand | | | | | | | Driller: Ricky<br>Helpers: Victor + Mario<br>Start Time = 13:56 |
| 1 | | | | | | | 6 | | | |
| | | | | T-1 | | | 8 | MC | | |
| 2 | | | | T-2 | 93.7 | 25.1 | 11 | | | |
| | | | | | | | (13) | | | |
| 3 | | CL | 3.0'-5.0' **Clay** - Dark gray mottled with tan red and medium brown, medium stiff to stiff, moist | T-3 | | | 5 | | | |
| | | | | T-4 | | | 7 | MC | | |
| 4 | | | | | 93.7 | 26.2 | 10 | | | |
| | | | | | | | (12) | | | |
| 5 | | CL | 5.0'-7.0' **Clay** - Dark gray mottled with medium brown, medium stiff, moist to wet, trace medium sand | T-5 | | | 7 | | | |
| | | | | T-6 | 95.8 | 29.1 | 12 | MC | | |
| 6 | | | | | | | 16 | | | |
| | | | | | | | (19) | | | 14:17 |
| 7 | | CL | 7.0'-10.5' **Clay** - Dark gray mottled with brown red and white, medium stiff, moist to wet | | | | 6 | | | |
| | | | | T-7 | | | 10 | MC | | |
| 8 | | | | T-8 | 96.4 | 27.8 | 12 | | | |
| | | | | | | | (15) | | | |
| 9 | | | | | | | | | | |
| | | | | | | | | | | 14:30 |
| 10 | | | **10.0'-BOH: ALLUVIUM** | | | | 11 | | | |
| | | CL | 10.5'-15.0' **Sandy Clay** - Dark gray with white brown and tan, stiff, moist, fine to coarse sand | T-9 | | | 19 | MC | | |
| 11 | | | | T-10 | 119.2 | 16.3 | 25 | | | |
| | | | | | | | (30) | | | |
| 12 | | | | | | | | | | |
| 13 | | | | | | | | | | |
| 14 | | | | | | | | | | |

Project Serra Drive Outfall Repair Project / E5529 Date 11/20/2019 Boring CSA / SD-2

| Depth (feet) | Graphic Log | Parent Material (USCS) | Geotechnical Description | Sample Desig. | Dry Unit Weight(pcf) | Moisture Content (%) | SPT Blows/ft | Sample Type | Recov. (%) | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|
| 16 | | CL | 15.0'-18.0' **Sandy Clay** - Dark gray with white brown and tan, stiff, moist, fine to coarse sand | T-11 | | | 34 | MC | | |
| | | | | T-12 | 128.9 | 11.7 | 50/6" | | | |
| 17 | | | -- 17' Groundwater | | | | | | | |
| 18 | | SC | | | | | | | | |
| 19 | | | 18.0'-25.0' **Clayey Sand** - Blue-gray, medium dense, wet to saturated, fine to medium grain sand | | | | | | | |
| | | | | | | | | | | 15:08 |
| 20 | | | | SPT-1 | | | 7 | SPT | | |
| 21 | | | | | | | 6 | | | |
| | | | | | | | 6 | | | |
| 22 | | | | | | | (12) | | | |
| 23 | | | | | | | | | | |
| 24 | | | | | | | | | | |
| 25 | | SC | 25.0'-30.0' **Clayey Sand** - Blue-gray, medium dense, saturated, rootlets, fine to medium sand | | | | 12 | | | |
| | | | | T-13 | | | 16 | MC | | |
| 26 | | | | T-14 | 104.9 | 23.6 | 17 | | | TX/CU C=0, Ø' = 39.5° |
| | | | | | | | | | | 15:28 |
| 27 | | | | | | | (22) | | | |
| 28 | | | | | | | | | | |
| 29 | | | -- Very hard drilling | | | | | | | V. hard drilling |
| | | | | | | | | | | 15:58 |
| 30 | | SC | 30.0'-35.0' **Clayey Sand** - Blue-gray, medium dense, saturated, higher fines content than above, white mineralization | | | | 5 | | | |
| | | | | SPT-2 | | | 5 | SPT | | |
| 31 | | | | | | | 6 | | | |
| | | | | | | | (11) | | | |

**Project** Serra Drive Outfall Repair Project / E5529 **Date** 11/20/2019 **Boring** CSA / SD-2

| Depth (feet) | Graphic Log | Parent Material (USCS) | Geotechnical Description | Sample Desig. | Dry Unit Weight(pcf) | Moisture Content (%) | SPT Blows/ft | Sample Type | Recov. (%) | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|
| 33 | | SC | 30.0'-35.0' **Clayey Sand** - Blue-gray, medium dense, saturated, higher fines content than above, white mineralization | | | | | | | |
| 34 | | | | | | | | | | |
| 35 | | SC | 35.0'-BOH **Clayey Gravelly Sand** - Blue-gray, very dense, saturated | T-15 | | | 50/6" | MC | | 16:50 |
| 36 | | | TD = 35.5'<br>Groundwater encountered at 17 feet at time of drilling | | | | | | | |
| 37 | | | | | | | | | | |
| 38 | | | | | | | | | | |
| 39 | | | | | | | | | | |
| 40 | | | | | | | | | | |
| 41 | | | | | | | | | | |
| 42 | | | | | | | | | | |
| 43 | | | | | | | | | | |
| 44 | | | | | | | | | | |
| 45 | | | | | | | | | | |
| 46 | | | | | | | | | | |
| 47 | | | | | | | | | | |
| 48 | | | | | | | | | | |



COTTON, SHIRES AND ASSOCIATES, INC.
CONSULTING ENGINEERS AND GEOLOGISTS

**APPENDIX B**

**Laboratory Testing**
**Summary of Triaxial Compression Shear Strength Testing**

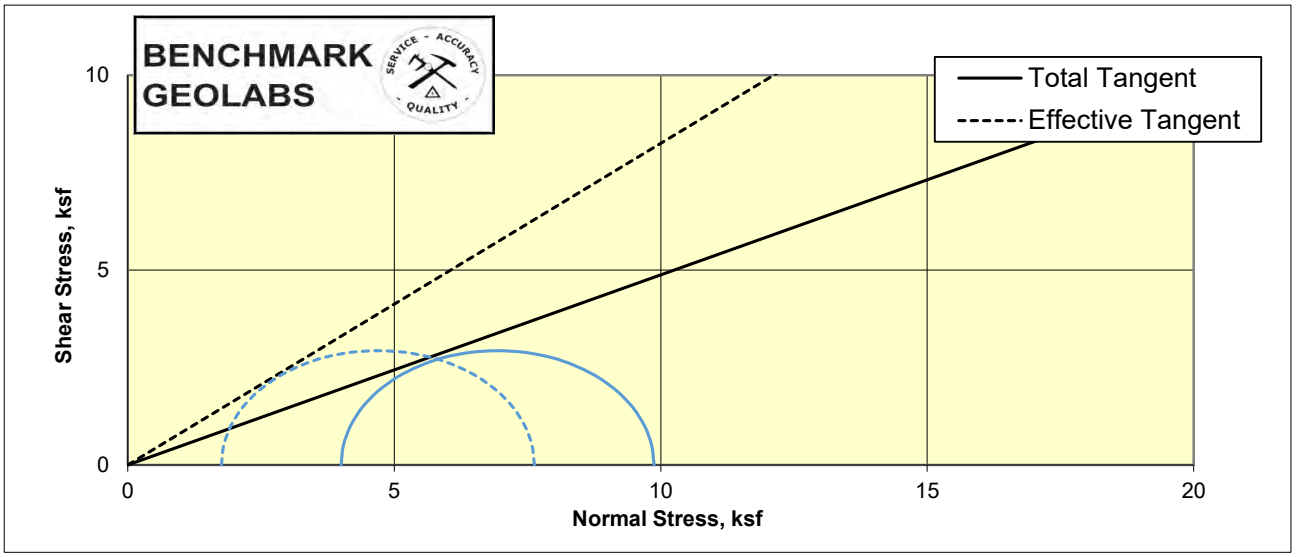
## APPENDIX B
## LABORATORY TESTING

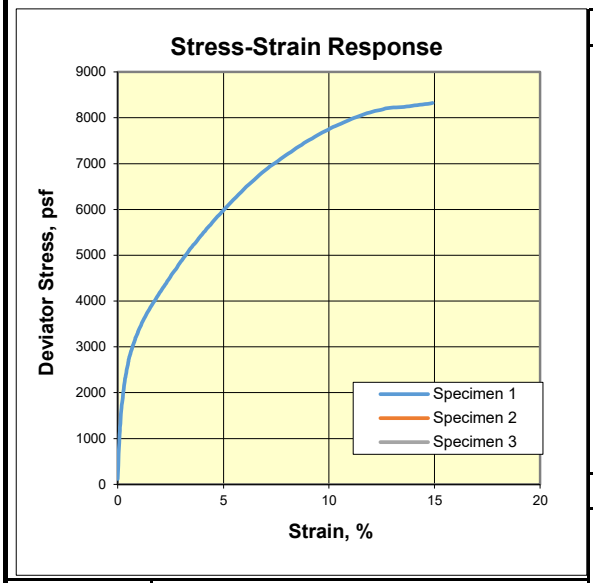
The laboratory analysis performed for the site consisted of limited testing of the principal soil types sampled during the field investigation to evaluate index properties and strength parameters of subsurface materials. The soil descriptions and the field and laboratory test results were used to assign parameters to the various materials at the site. The results of the laboratory testing program are presented in this appendix and on the boring logs.

The following laboratory tests were performed as part of this investigation:

1. Detailed soil description, ASTM D2487;
2. Natural moisture content of the soil, ASTM D2216;
3. In-situ unit weight of the soil (wet and dry);
4. No. 200 wash, ASTM D1140;
5. Atterberg limits determination: ASTM D 4318; and
6. Triaxial compression shear strength of the soil, ASTM D4767.

# Consolidated Undrained Triaxial Compression with Pore Pressure
ASTM D4767




| | |
|---|---|
| **BGL Number:** | 052-003 |
| **Client Name:** | Cotton, Shires & Associates, Inc. |
| **Project Name:** | Serra Drive |
| **Project Number:** | E5529 |
| **Date:** | 12/8/2019 **By:** PJ |
| **Total C** | **0.000** **ksf** |
| **Total phi** | **26.0** **degrees** |
| **Eff. C** | **0.000** **ksf** |
| **Eff. phi** | **39.5** **degrees** |

Remarks: Strength evaluated at the peak effective stress ratio. No C or phi is reported because only a single point was run.

| **Specimen** | **1** | **2** | **3** | **4** |
|---|---|---|---|---|
| **Boring** | SD-2 | | | |
| **Sample** | T-14 | | | |
| **Depth** | 26-26.5' | | | |
| **Visual Description** | Dark Gray SILT | | | |
| **MC, %** | 23.6 | | | |
| **Dry Dens, pcf** | 104.9 | | | |
| **Saturation, %** | 99.0 | | | |
| **Void Ratio** | 0.667 | | | |
| **Diameter, in.** | 2.41 | | | |
| **Height, in.** | 4.86 | | | |
| | **Final** | | | |
| **MC, %** | 21.2 | | | |
| **Dry Dens, pcf** | 109.3 | | | |
| **Saturation, %** | 99.0 | | | |
| **Void Ratio** | 0.599 | | | |
| **Diameter, in.** | 2.37 | | | |
| **Height, in.** | 4.80 | | | |
| **Cell Press, psi** | 77.7 | | | |
| **Back Press, psi** | 49.9 | | | |
| | **Effective Stresses At:** | | | |
| **Strain, %** | 4.8 | | | |
| **Deviator, ksf** | 5.871 | | | |
| **Excess PP, psi** | 15.6 | | | |
| **Sigma 1, ksf** | 7.630 | | | |
| **Sigma 3, ksf** | 1.759 | | | |
| **P, ksf** | 4.694 | | | |
| **Q, ksf** | 2.935 | | | |
| **Stress Ratio** | 4.338 | | | |
| **Rate, in/min** | 0.0004 | | | |

# APPENDIX D – HYDROLOGY REPORT

# TECHNICAL MEMORANDUM

TO: City of Pacifica

PREPARED BY: Ben Bass

REVIEWED BY: Kathleen Higgins

DATE: February 21, 2020

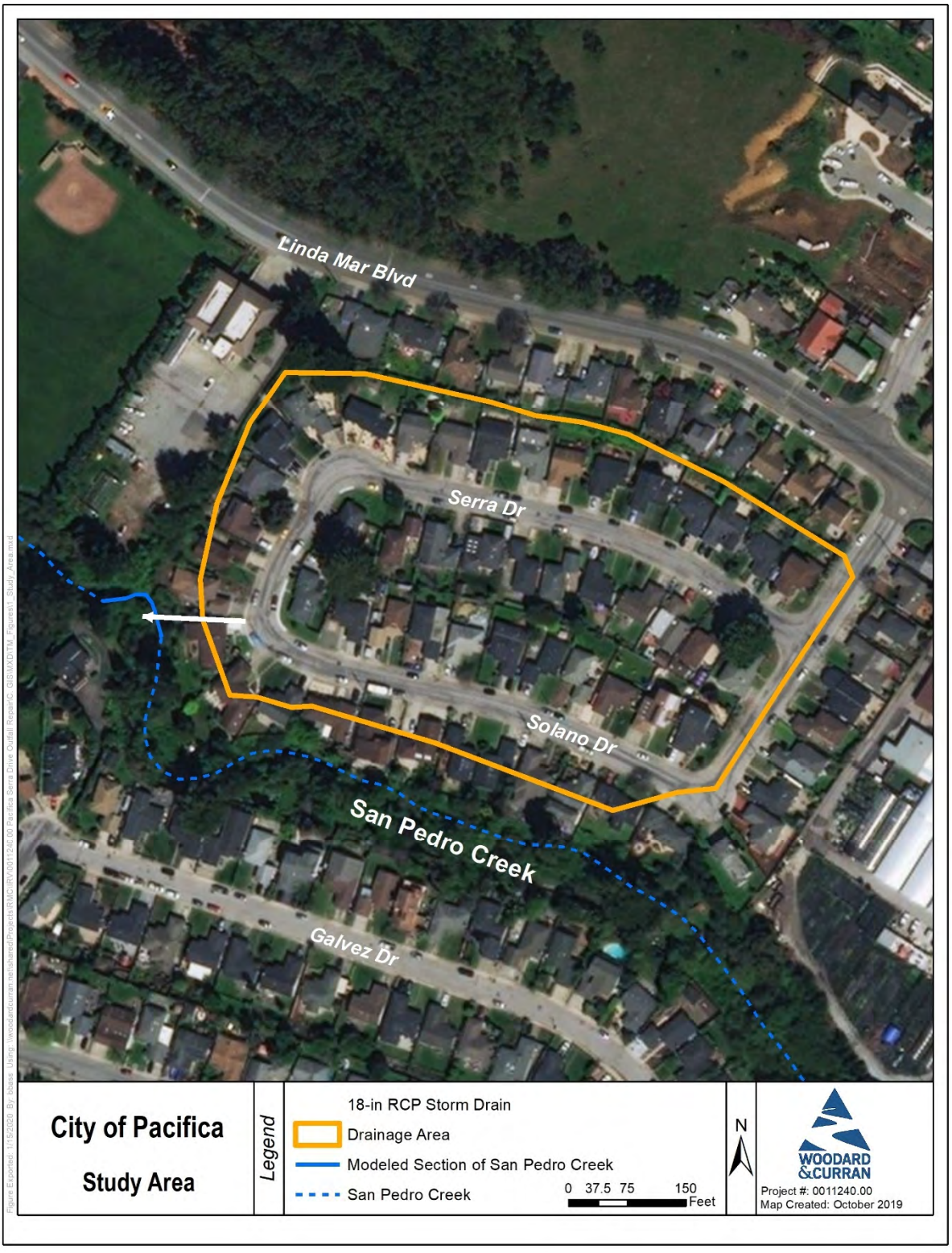
RE: Serra Drive Outfall Repair Project

## 1. INTRODUCTION

Woodard & Curran was hired by the City of Pacifica to design the Serra Drive Outfall Repair project which consists of the repair of the outfall for the 18-inch diameter RCP storm drain located in an easement at 1411 Serra Drive. The storm drain picks up drainage from the surrounding streets and discharges to San Pedro Creek as shown in **Figure 1.** The headwall at the outlet to the creek has detached from the pipe due to erosion of the surrounding slope. The project includes the analysis, design, plans, specifications, and construction cost estimates as well as environmental permits to repair the headwall and energy dissipator.

This Technical Memorandum (TM) includes discussion of the hydrology and hydraulics analysis performed to determine flow rates, depths and velocities at the outlet of the 18-inch storm drain and along San Pedro Creek adjacent to the storm drain's outfall. These calculations were subsequently used to design the energy dissipator at the outfall of the pipe. All elevations in this TM are in reference to the North American Vertical Datum 1988 (NAVD88).

## Figure 1: Study Area



# 2. HYDROLOGY

## 2.1 18-in Storm Drain (pipe)

To determine the hydraulic characteristics at the outlet of the 18-inch RCP, the 10-yr and 100-yr peak flows that drain to the pipe were calculated. Peak flows were determined using San Mateo County's rational method:

$$Qp = CIAF$$

Where Qp is the peak flow in cubic feet per second (cfs), C is the runoff coefficient based on land use in the drainage area (unitless), I is the rainfall intensity in inches per hour, A is the drainage area that drains to the pipe (acres), and F is an intensity factor (unitless) (San Mateo County Public Works). Ground elevations, catch basins, and land conditions were reviewed in Google Earth to delineate the pipe's drainage area shown in **Figure 1** and to determine the runoff coefficient. The drainage area was determined to be 7.3 acres. The runoff coefficient was determined to be 0.53 based on guidance from San Mateo County that relate the runoff coefficient to land uses which are approximately 80% residential and 20% paved for the study area's drainage area. The rainfall intensity (I) was determined using San Mateo County's relationship between time of concentration and rainfall intensity shown in **Appendix A**. A minimum time of concentration of 10 minutes was assumed for this study given the small size of the drainage area, resulting in a 10-yr rainfall intensity of 2.45 in/hr and a 100-yr rainfall intensity of 3.6 in/hr. The intensity factor (F) is based on the location of the study area within San Mateo County and was determined to be 1.2 (San Mateo County Public Works). The resulting 10-yr and 100-yr peak flow rates were determined to be 11.4 cfs and 16.8 cfs, respectively.

## 2.2 San Pedro Creek

In addition to determining the peak runoff that would enter the pipe for the 10-yr and 100-yr rainfall, peak flows were obtained for San Pedro Creek based on a 1998 San Pedro Creek Flood Control Study (USACE and City of Pacifica, 1998). Peak flows representative of future conditions were obtained from the flood control study at Peralta Road, which is located approximately 2,650 ft. downstream of the study area. The 10-yr and 100-yr peak flow in San Pedro Creek from the flood control study was found to be 2,000 cfs and 3,550 cfs, respectively. Since the flow rates were obtained at a location downstream of the study area, the peak flow is conservative.

# 3. HYDRAULICS

## 3.1 18-in Storm Drain

To determine the flow velocities and depths in the 18-inch storm drain for the 10-yr and 100-yr peak flows, manning's formula was used with a normal flow assumption. Manning's formula requires information regarding the pipe's diameter (18-inches), slope, and manning's n (assumed as 0.013). The slope is 0.04076 ft/ft based on the pipe's length of 78.5 ft. and its upstream invert of 58.5 and downstream invert of 55.3 ft. This pipe information is outlined in **Table 1**.

**Table 1: 18-inch Storm Drain Information**

| Parameter | Unit | |
|---|---|---|
| Length of Pipe | ft | 78.5 |
| Diameter | inches | 18 |
| Upstream Invert | ft, NAVD88 | 58.5 |
| Downstream Invert | ft, NAVD88 | 55.3 |
| Slope | % | 4.1 |
| Peak Flow (10-yr) from Rational Method for County | cfs | 11.4 |
| Peak flow (100-yr) from Rational Method for County | cfs | 16.8 |
| Assumed Manning's n (RCP) | unitless | 0.013 |
| Area of Pipe | $ft^2$ | 1.8 |

Using manning's equation:

$$Velocity\left(\frac{ft}{s}\right) = \frac{1.49}{n} * \sqrt{slope} * (R)^{\frac{2}{3}}$$

where R is the hydraulic radius which is equal to the pipes wetted perimeter divided by its area, the velocity in the pipe when flowing full is 12.0 ft/s. However, this pipe full velocity required an adjustment since the pipe was determined to flow partially full. For the 10-yr peak flow, the pipe flows at a depth of 0.78 ft., with a variable manning's n of 0.016. For the 100-yr peak flow, the pipe flows at a depth of 1 ft. and a variable manning's n of 0.015 (ASCE, 1969). The adjusted velocities for the partially full pipe was determined to be 9.84 ft/s and 11.2 ft/s, respectively, for the 10-yr and 100-yr peak flows. The calculations performed to determine partially full flow velocities in the pipe are shown in **Appendix B**.

## 3.2 San Pedro Creek

To determine flow velocities and depths for the 10-yr and 100-yr peak flows along San Pedro Creek, the Hydrologic Engineering Center's Riverine Analysis System (HEC-RAS v5.07) was used to develop a 1-Dimensional steady-state hydraulic model of the creek. A 115-foot stretch of San Pedro Creek was modeled using four surveyed cross-sections that were surveyed across the channel from roughly 30 feet upstream to 90 feet downstream of the pipe's outfall (Towill, 2019). The location of the cross sections is shown in **Figure 2**. Cross section E was modified to reflect the hand stacked rock walls that were placed along the right bank of the channel. The model's cross-sections are shown in **Appendix C**. For modeling purposes, an additional cross-section was interpolated between cross sections E and C and two cross sections were interpolated between cross sections B and A.

The roughness values defined for determining velocity and stage were based on values for "existing natural creek" conditions and overbank conditions per the USACE 1998 flood control study (USACE and City of Pacifica, 1998). A roughness of 0.036 and 0.08 were defined for evaluating velocity in the creek and overbanks, respectively. A roughness of 0.05 and 0.10 were defined for evaluating stage in the creek and overbanks, respectively.

A normal boundary condition was assumed for the downstream end of the creek and the peak flows along San Pedro Creek discussed in Section 2.2 were used as boundary conditions at the upstream end of the creek. The topography of cross-section C, which crosses the outfall of the pipe, is shown in **Figure 3** along with resulting water surface elevations for the 10-yr and 100-yr peak flows. As shown in **Figure 3**, the

water level in the creek for both the 10-yr and 100-yr flow events is above the crown of the 18-inch pipe. The maximum water velocity and water surface elevations along the channel are listed in **Table 2**. A HEC-RAS report is provided in **Appendix D**, which outlines details associated with model set-up and results.

**Table 2: Maximum Water Velocity along Cross-Section C**

| Design Flow | Max Velocity (ft/s) | Max Water Surface Elevation (ft, NAVD88) |
|---|---|---|
| 10-yr | 4.2 | 58.8 |
| 100-yr | 5.1 | 61.9 |

## Figure 2: Cross Sections

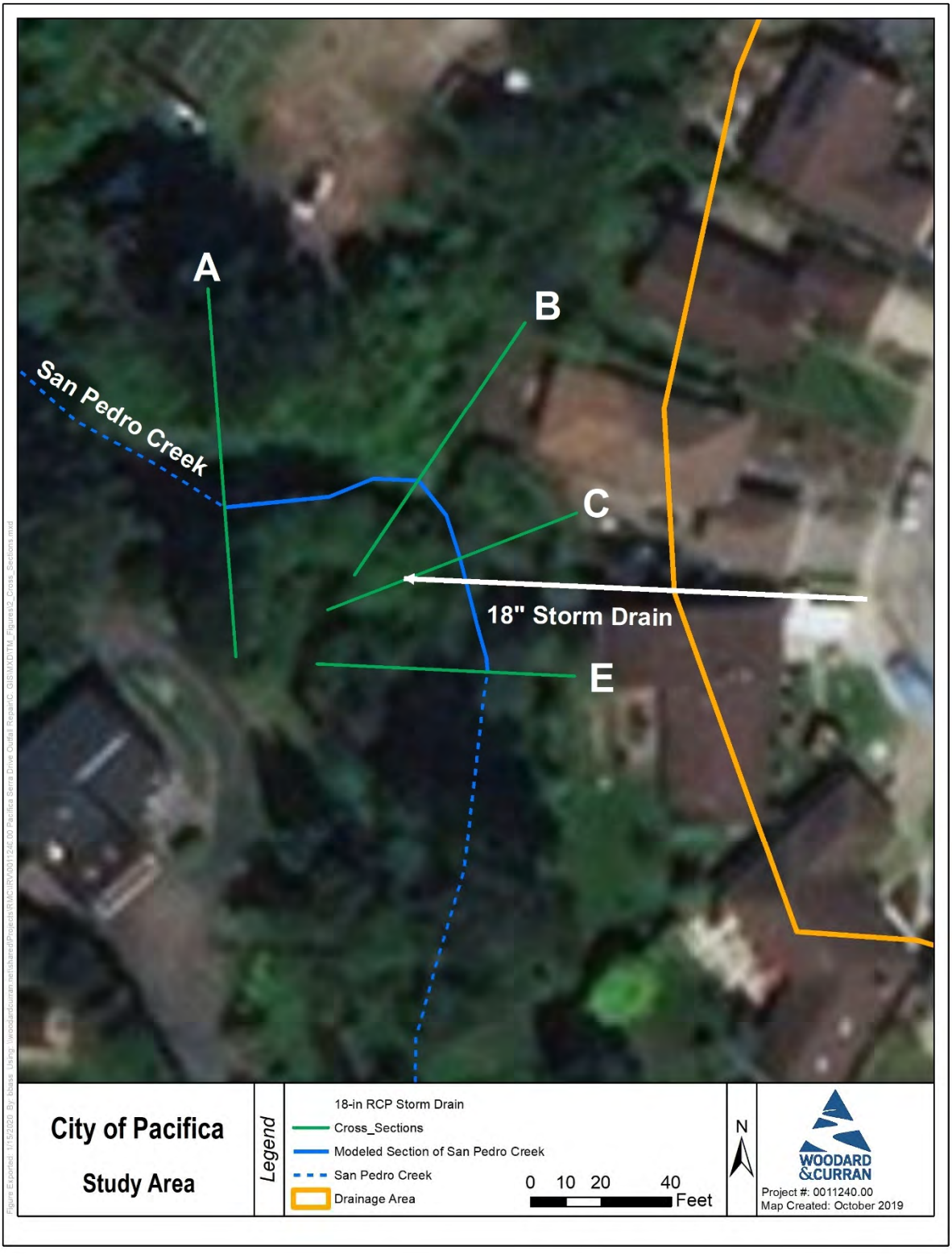
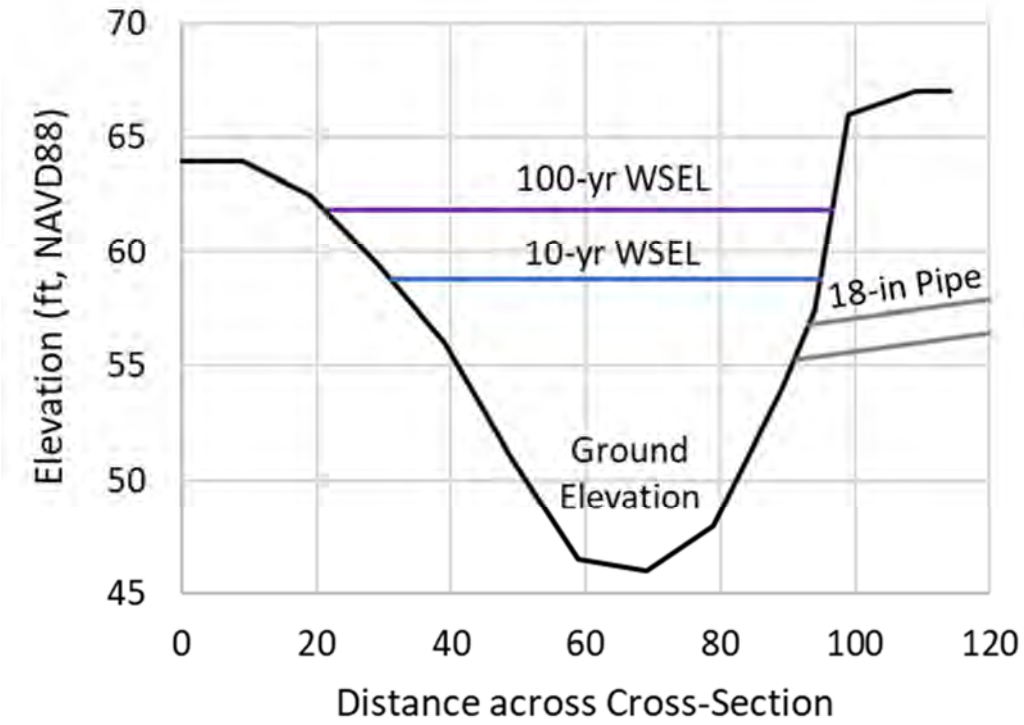


**Figure 3: Water Surface Elevation along Cross-Section C**



# 4. ENERGY DISSIPATOR

The energy dissipator consists of a combination of a concrete spillway and riprap apron sized in accordance to the guidelines of HEC-14, Hydraulic Design of Energy Dissipator's for Culverts and Channels, Section 10.2 Riprap Apron design, where:

> Several relationships have been proposed for riprap sizing for culvert aprons and several of these are discussed in greater detail in Appendix D. The independent variables in these relationships include one or more of the following variables: outlet velocity, rock specific gravity, pipe dimension (e.g. diameter), outlet Froude number, and tailwater. The following equation (Fletcher and Grace, 1972) is recommended for circular culverts:
>
> $$D_{50} = 0.2\,D\left(\frac{Q}{\sqrt{g}D^{2.5}}\right)^{4/3}\left(\frac{D}{TW}\right) \qquad (10.4)$$
>
> where,
>
> $D_{50}$ = riprap size, m (ft)
> Q = design discharge, $m^3/s$ ($ft^3/s$)
> D = culvert diameter (circular), m (ft)
> TW = tailwater depth, m (ft)
> g = acceleration due to gravity, 9.81 $m/s^2$ (32.2 $ft/s^2$)
>
> Tailwater depth for Equation 10.4 should be limited to between 0.4D and 1.0D. If tailwater is unknown, use 0.4D.
>
> Whenever the flow is supercritical in the culvert, the culvert diameter is adjusted as follows:
>
> $$D' = \frac{D + y_n}{2} \qquad (10.5)$$
>
> where,
>
> D' = adjusted culvert rise, m (ft)
> $y_n$ = normal (supercritical) depth in the culvert, m (ft)

The parameters for this equation are shown in **Table 3**.

**Table 3: Parameters used in Energy Dissipator Calculation**

| Q | D | $Y_n$ | D' | g | V | TW | $D_{50}$ |
|---|---|---|---|---|---|---|---|
| cfs | ft | ft | ft | $ft/s^2$ | ft/s | ft | ft |
| 17 | 1.5 | 1.00 | 1.25 | 32.2 | 15.3 | 0.6 | 1.26 |

Based on HEC-14 the $D_{50}$ stone size is 15 inches which is equivalent to 200 lb. rock. The USACE method was used as a check and resulted in similar size rock. Therefore, the 15-inch size rock is recommended.

# 5. REFERENCES

American Society of Civil Engineers (1969). Construction of Sanitary and Storm Sewers, p. 87.

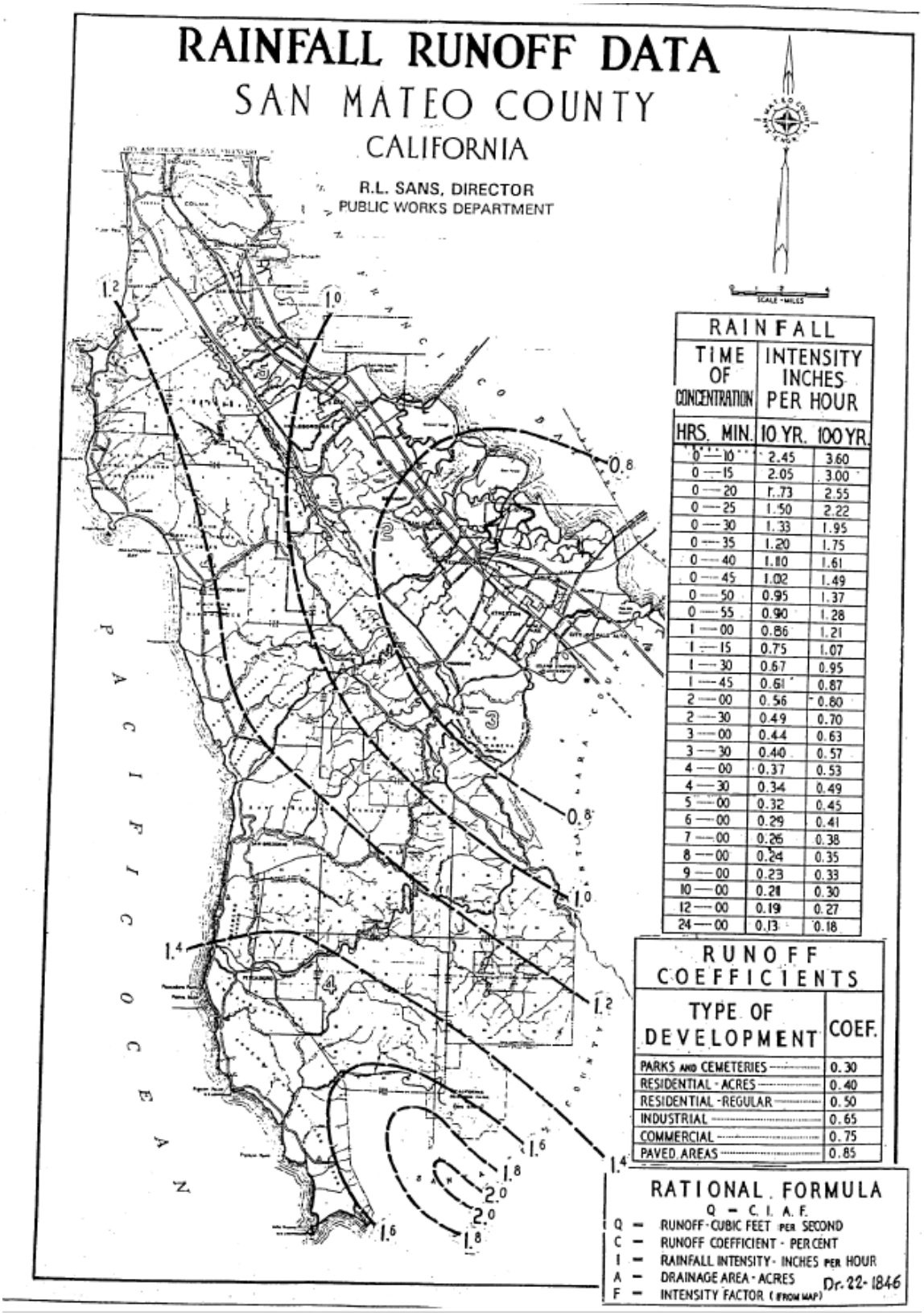
Federal Highway Administration, (2006 with Errata through 2012), HEC-14, Hydraulic Design of Energy Dissipator's for Culverts and Channels.

San Mateo County Public Works Department. Rainfall-Runoff Data: San Mateo County, CA.

Towill (2019). San Pedro Creek Linda Mar Subdivision Cross Sections.

U.S. Army Corps of Engineers (USACE) San Francisco District and City of Pacifica (1998). Final Detailed Project Report San Pedro Creek Flood Control Project.

## APPENDIX A: TIME OF CONCENTRATION




RAINFALL

| TIME OF CONCENTRATION | INTENSITY INCHES PER HOUR | |
|---|---|---|
| HRS. MIN. | 10 YR. | 100 YR. |
| 0 — 10 | 2.45 | 3.60 |
| 0 — 15 | 2.05 | 3.00 |
| 0 — 20 | 1.73 | 2.55 |
| 0 — 25 | 1.50 | 2.22 |
| 0 — 30 | 1.33 | 1.95 |
| 0 — 35 | 1.20 | 1.75 |
| 0 — 40 | 1.10 | 1.61 |
| 0 — 45 | 1.02 | 1.49 |
| 0 — 50 | 0.95 | 1.37 |
| 0 — 55 | 0.90 | 1.28 |
| 1 — 00 | 0.86 | 1.21 |
| 1 — 15 | 0.75 | 1.07 |
| 1 — 30 | 0.67 | 0.95 |
| 1 — 45 | 0.61 | 0.87 |
| 2 — 00 | 0.56 | 0.80 |
| 2 — 30 | 0.49 | 0.70 |
| 3 — 00 | 0.44 | 0.63 |
| 3 — 30 | 0.40 | 0.57 |
| 4 — 00 | 0.37 | 0.53 |
| 4 — 30 | 0.34 | 0.49 |
| 5 — 00 | 0.32 | 0.45 |
| 6 — 00 | 0.29 | 0.41 |
| 7 — 00 | 0.26 | 0.38 |
| 8 — 00 | 0.24 | 0.35 |
| 9 — 00 | 0.23 | 0.33 |
| 10 — 00 | 0.21 | 0.30 |
| 12 — 00 | 0.19 | 0.27 |
| 24 — 00 | 0.13 | 0.18 |

RUNOFF COEFFICIENTS

| TYPE OF DEVELOPMENT | COEF. |
|---|---|
| PARKS AND CEMETERIES | 0.30 |
| RESIDENTIAL - ACRES | 0.40 |
| RESIDENTIAL - REGULAR | 0.50 |
| INDUSTRIAL | 0.65 |
| COMMERCIAL | 0.75 |
| PAVED AREAS | 0.85 |

RATIONAL FORMULA

Q = C. I. A. F.

Q — RUNOFF - CUBIC FEET PER SECOND
C — RUNOFF COEFFICIENT - PERCENT
I — RAINFALL INTENSITY - INCHES PER HOUR
A — DRAINAGE AREA - ACRES
F — INTENSITY FACTOR (FROM MAP)

Dr. 22-1846

# APPENDIX B: MANNING'S CALCULATIONS

The following tables outline the formulas and results used to determine velocities in the partially full 18-inch storm drain pipe using manning's equation.

**Table B.1: 10-yr Partially Full Velocity Calculation**

| More than Half Full - 10yr | Formula | |
|---|---|---|
| (Q/(1.49*SQRT(Decimal Slope)) | =11.42/(1.49*SQRT(.041)) | 38.0 |
| (A*(R^2/3))/n | =(A*R^(2/3))/0.013 | 38.0 |
| y (ft) = Height of Pipe filled with water | 0.783 | 0.78 |
| r (ft) | =9/12 | 0.75 |
| y/D | =y/D | 0.52 |
| Theta | =2*ACOS((r-h)/r) | 3.05 |
| Area (A), ft2 | =(PI()*r^2)-r^2*(Theta-SIN(Theta))/2 | 0.93 |
| Wetted Perimeter (P), ft | =2*PI()*r-r*Theta | 2.42 |
| Hydraulic Radius (R), ft | =A/P | 0.39 |
| h (ft) = height of pipe not filled with water | =2*r-y | 0.72 |
| n for partial flow (obtained from Appendix 19.c CERM) | =0.013*(1+y/D^0.54-y/D^1.2) | 0.016 |
| **Velocity (ft/s)** | =(1.49/n)*SQRT(Decimal Slope)*R^(2/3) | 9.84 |

**Table B.2: 100-yr Partially Full Velocity Calculation**

| More than Half Full - 10yr | Formula | |
|---|---|---|
| (Q/(1.49*SQRT(Decimal Slope)) | =16.78/(1.49*SQRT(.041)) | 55.8 |
| (A*(R^2/3))/n | =(A*R^(2/3))/0.013 | 55.8 |
| y (ft) = Height of Pipe filled with water | 1.005 | 1.01 |
| r (ft) | =9/12 | 0.75 |
| y/D | =y/D | 0.67 |
| Theta | =2*ACOS((r-h)/r) | 2.45 |
| Area (A), ft2 | =(PI()*r^2)-r^2*(Theta-SIN(Theta))/2 | 1.26 |
| Wetted Perimeter (P), ft | =2*PI()*r-r*Theta | 2.88 |
| Hydraulic Radius (R), ft | =A/P | 0.44 |
| h (ft) = height of pipe not filled with water | =2*r-y | 0.50 |
| n for partial flow (obtained from Appendix 19.c CERM) | =0.013*(1+y/D^0.54-y/D^1.2) | 0.015 |
| **Velocity (ft/s)** | =(1.49/n)*SQRT(Decimal Slope)*R^(2/3) | 11.23 |

# APPENDIX C: CROSS-SECTIONS

**Figure C.1: Cross-Section E**

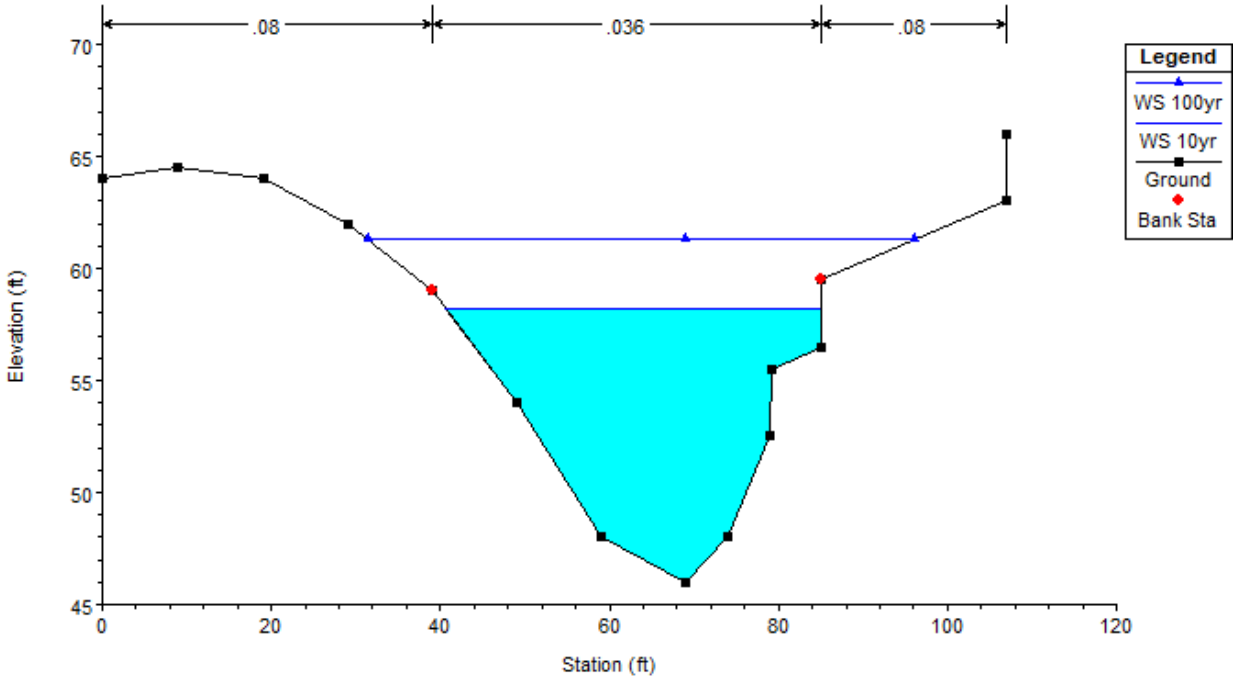



**Figure C.2: Cross-Section C**

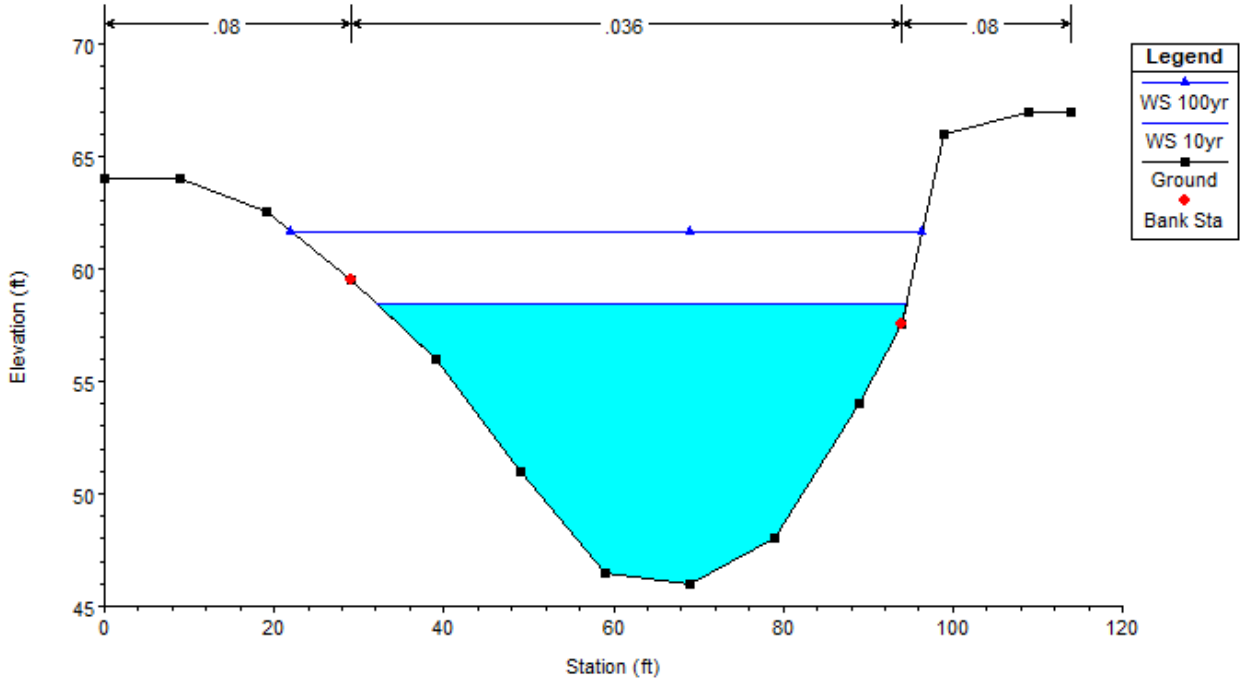


**Figure C.3: Cross-Section B**

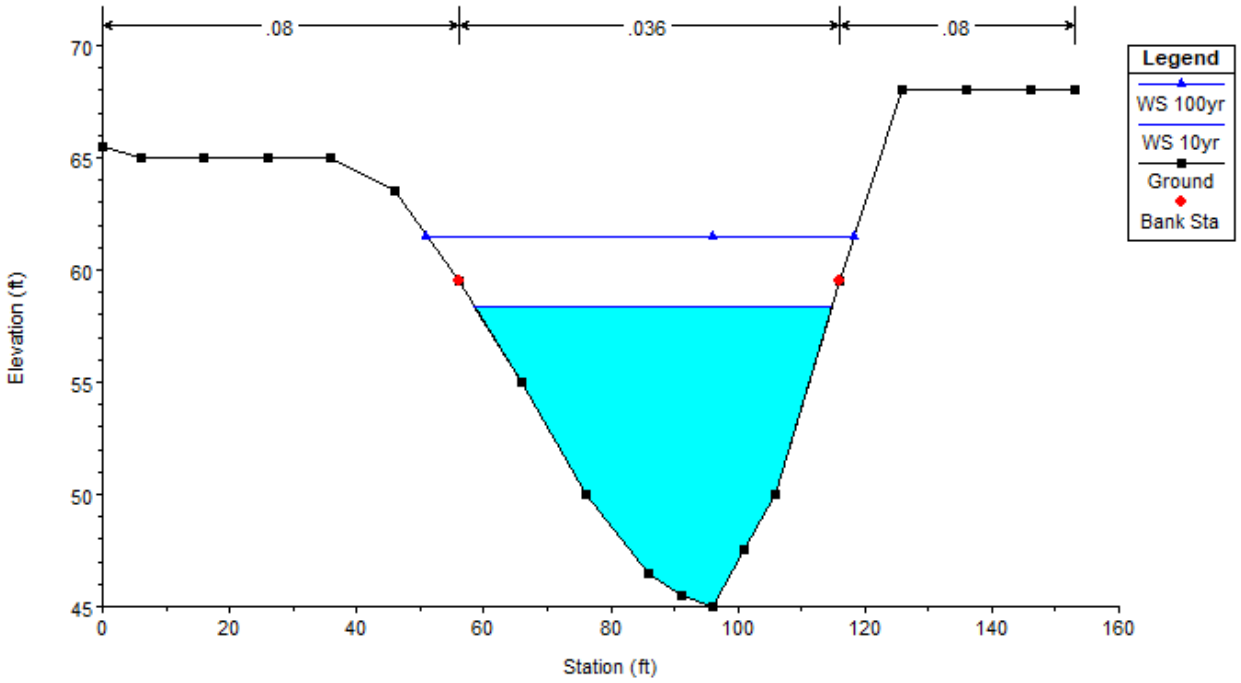
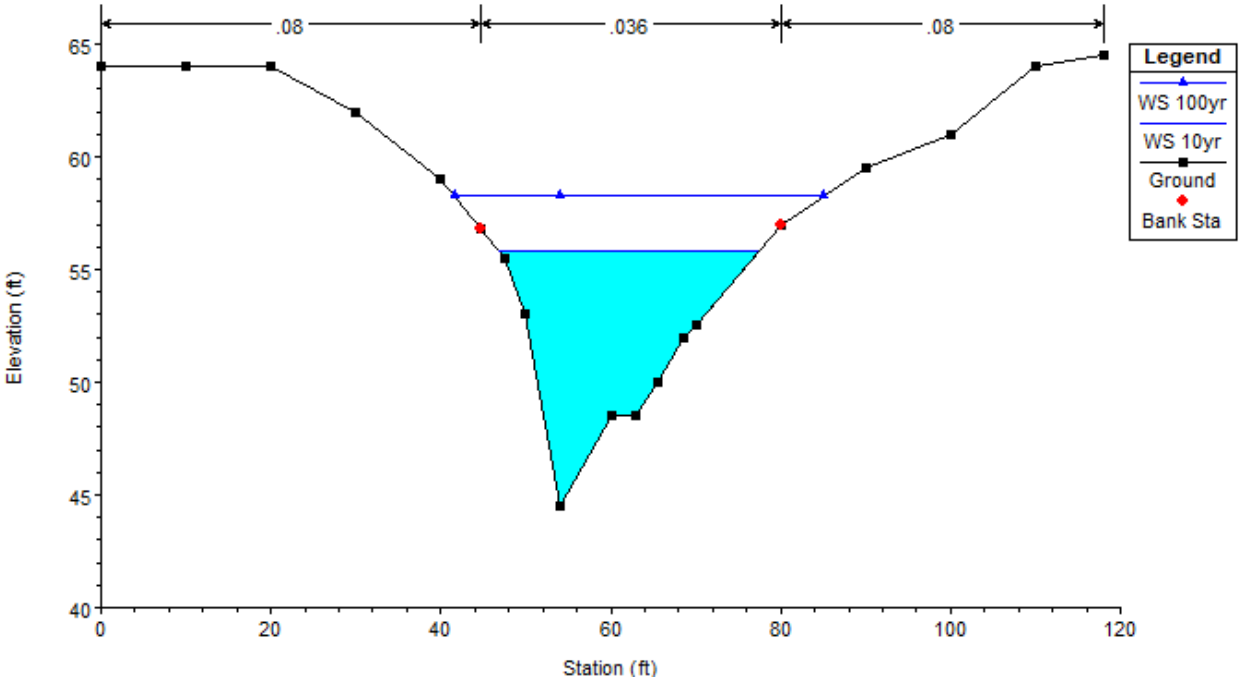



**Figure C.4: Cross-Section A**



# APPENDIX D: HEC-RAS REPORT

HEC-RAS HEC-RAS 5.0.7 March 2019
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

```
X   X XXXXXX  XXXX     XXXX    XX    XXXX
      X   X X    X  X    X X   X X  X
      X   X X    X       X X   X  X X
XXXXXXX XXXX   X    XXX XXXX   XXXXXX  XXXX
      X   X X    X       X X   X  X    X
      X   X X    X  X    X X   X  X    X
X   X XXXXXX  XXXX     X  X X  X  XXXXX
```

PROJECT DATA
Project Title: SanPedroCreek_2
Project File : SanPedroCreek_2.prj
Run Date and Time: 12/13/2019 2:32:00 PM

Project in English units

PLAN DATA

Plan Title: SanPedro_SS_Stage
Plan File : C:\Users\bbass\OneDrive - Woodard & Curran\2_Projects\ACTIVE\4_PACIFICA\HEC-RAS\SanPedroCreek_2.p08

Geometry Title: Geom_Interpolated_VelManningN_WithRock
Geometry File : C:\Users\bbass\OneDrive - Woodard & Curran\2_Projects\ACTIVE\4_PACIFICA\HEC-RAS\SanPedroCreek_2.g05

Flow Title : Steady_State_1
Flow File : C:\Users\bbass\OneDrive - Woodard & Curran\2_Projects\ACTIVE\4_PACIFICA\HEC-RAS\SanPedroCreek_2.f01

Plan Summary Information:
Number of: Cross Sections = 7 Multiple Openings = 0
Culverts = 0 Inline Structures = 0
Bridges = 0 Lateral Structures = 0

Computational Information

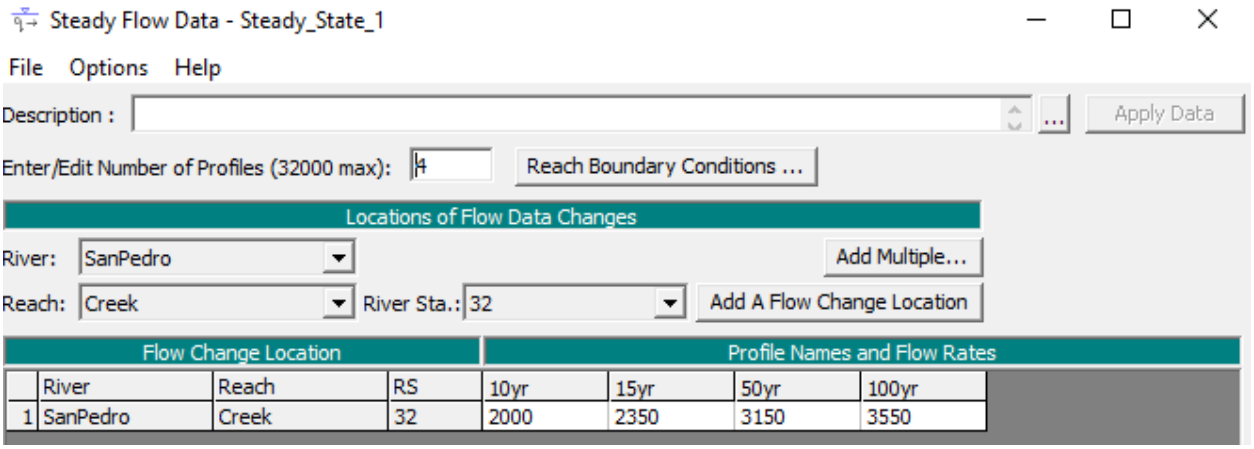
Water surface calculation tolerance = 0.01
Critical depth calculation tolerance = 0.01
Maximum number of iterations = 20
Maximum difference tolerance = 0.3
Flow tolerance factor = 0.001

Computation Options
Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Subcritical Flow

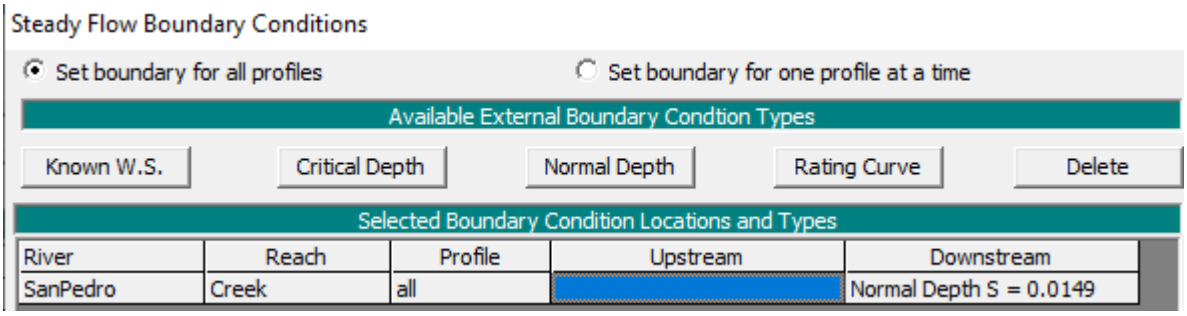
FLOW DATA

Flow Title: Steady_State_1
Flow File : C:\Users\bbass\OneDrive - Woodard & Curran\2_Projects\ACTIVE\4_PACIFICA\HEC-RAS\SanPedroCreek_2.f01

Flow Data (cfs)




Boundary Conditions



GEOMETRY DATA

Geometry Title: Geom_Interpolated_VelManningN_WithRock
Geometry File : C:\Users\bbass\OneDrive - Woodard & Curran\2_Projects\ACTIVE\4_PACIFICA\HEC-RAS\SanPedroCreek_2.g05

CROSS SECTION

RIVER: SanPedro
REACH: Creek RS: 32

INPUT
Description:
Station Elevation Data num= 15

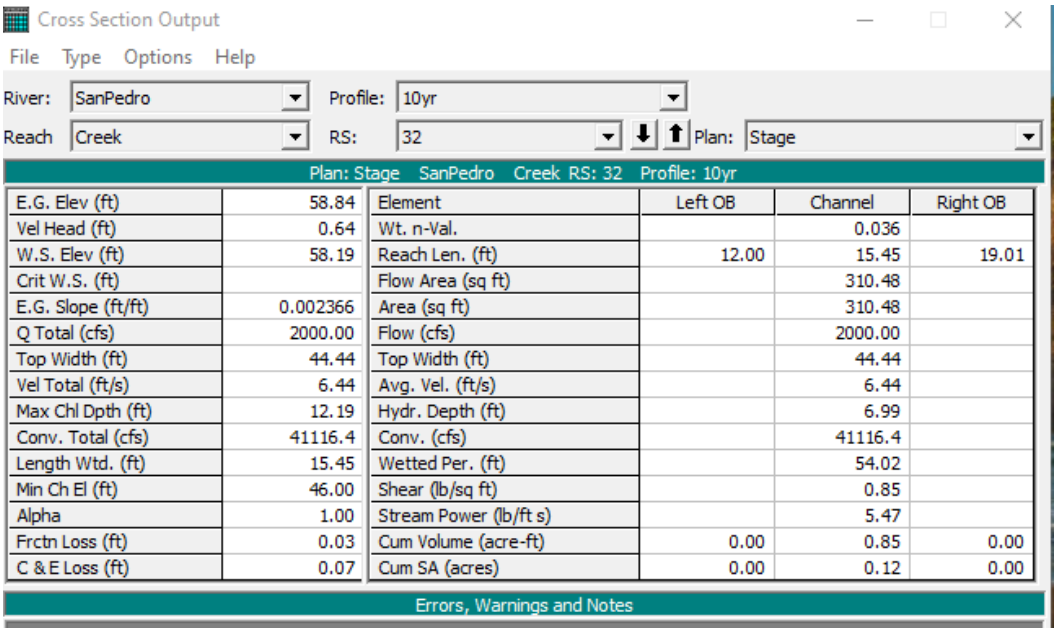
| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 64 | 9 | 64.5 | 19 | 64 | 29 | 62 | 39 | 59 |
| 49 | 54 | 59 | 48 | 69 | 46 | 74 | 48 | 79 | 52.5 |
| 79.1 | 55.5 | 85 | 56.5 | 85.1 | 59.5 | 106.9 | 63 | 107 | 66 |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 0 | .08 | 39 | .036 | 85.1 | .08 |

| Bank Sta: Left | Right | Lengths: Left Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|
| 39 | 85.1 | 12 | 15.45 | 19.01 | .1 | .3 |

CROSS SECTION OUTPUT Profile #10yr


Cross Section Output

File Type Options Help

River: SanPedro Profile: 10yr

Reach Creek RS: 32 Plan: Stage

Plan: Stage SanPedro Creek RS: 32 Profile: 10yr

| | | Element | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 58.84 | | | | |
| Vel Head (ft) | 0.64 | Wt. n-Val. | | 0.036 | |
| W.S. Elev (ft) | 58.19 | Reach Len. (ft) | 12.00 | 15.45 | 19.01 |
| Crit W.S. (ft) | | Flow Area (sq ft) | | 310.48 | |
| E.G. Slope (ft/ft) | 0.002366 | Area (sq ft) | | 310.48 | |
| Q Total (cfs) | 2000.00 | Flow (cfs) | | 2000.00 | |
| Top Width (ft) | 44.44 | Top Width (ft) | | 44.44 | |
| Vel Total (ft/s) | 6.44 | Avg. Vel. (ft/s) | | 6.44 | |
| Max Chl Dpth (ft) | 12.19 | Hydr. Depth (ft) | | 6.99 | |
| Conv. Total (cfs) | 41116.4 | Conv. (cfs) | | 41116.4 | |
| Length Wtd. (ft) | 15.45 | Wetted Per. (ft) | | 54.02 | |
| Min Ch El (ft) | 46.00 | Shear (lb/sq ft) | | 0.85 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 5.47 | |
| Frctn Loss (ft) | 0.03 | Cum Volume (acre-ft) | 0.00 | 0.85 | 0.00 |
| C & E Loss (ft) | 0.07 | Cum SA (acres) | 0.00 | 0.12 | 0.00 |

Errors, Warnings and Notes

CROSS SECTION OUTPUT  Profile #100yr

Cross Section Output

File  Type  Options  Help

River: SanPedro  Profile: 100yr

Reach: Creek  RS: 32  Plan: Stage

Plan: Stage  SanPedro  Creek RS: 32  Profile: 100yr

| | | | | | |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 62.22 | Element | Left OB | Channel | Right OB |
| Vel Head (ft) | 0.95 | Wt. n-Val. | 0.080 | 0.036 | 0.080 |
| W.S. Elev (ft) | 61.28 | Reach Len. (ft) | 12.00 | 15.45 | 19.01 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 8.64 | 452.03 | 9.84 |
| E.G. Slope (ft/ft) | 0.002276 | Area (sq ft) | 8.64 | 452.03 | 9.84 |
| Q Total (cfs) | 3550.00 | Flow (cfs) | 8.11 | 3533.90 | 7.99 |
| Top Width (ft) | 64.76 | Top Width (ft) | 7.59 | 46.10 | 11.07 |
| Vel Total (ft/s) | 7.54 | Avg. Vel. (ft/s) | 0.94 | 7.82 | 0.81 |
| Max Chl Dpth (ft) | 15.28 | Hydr. Depth (ft) | 1.14 | 9.81 | 0.89 |
| Conv. Total (cfs) | 74414.1 | Conv. (cfs) | 170.1 | 74076.6 | 167.4 |
| Length Wtd. (ft) | 15.45 | Wetted Per. (ft) | 7.93 | 57.14 | 11.21 |
| Min Ch El (ft) | 46.00 | Shear (lb/sq ft) | 0.15 | 1.12 | 0.12 |
| Alpha | 1.07 | Stream Power (lb/ft s) | 0.15 | 8.79 | 0.10 |
| Frctn Loss (ft) | 0.03 | Cum Volume (acre-ft) | 0.01 | 1.22 | 0.02 |
| C & E Loss (ft) | 0.10 | Cum SA (acres) | 0.01 | 0.12 | 0.01 |

Errors, Warnings and Notes

CROSS SECTION

RIVER: SanPedro
REACH: Creek  RS: 27.000*

INPUT
Description:
Station Elevation Data  num=  24

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 64 | 7.85 | 64.25 | 10.55 | 64.17 | 16.56 | 63.62 | 22.28 | 62.59 |
| 25.28 | 61.87 | 34 | 59.25 | 42.75 | 55.62 | 45.67 | 54.17 | 51.5 | 51 |
| 57.33 | 48 | 60.25 | 47 | 69 | 46 | 75.38 | 47.78 | 77.22 | 48.65 |
| 81.76 | 51.91 | 81.89 | 53.45 | 85.44 | 54.99 | 89.42 | 56.95 | 89.55 | 58.5 |
| 94.79 | 63.19 | 105.26 | 64.57 | 110.4 | 65 | 110.5 | 66.5 | | |

Manning's n Values  num=  3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 0 | .08 | 34 | .036 | 89.55 | .08 |

| Bank Sta: Left | Right | Lengths: Left Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|
| 34 | 89.55 | 12 | 15.45 | 19.01 | .1 | .3 |

CROSS SECTION

RIVER: SanPedro
REACH: Creek  RS: 22

INPUT
Description:
Station Elevation Data num= 14

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 64 | 9 | 64 | 19 | 62.5 | 29 | 59.5 | 39 | 56 |
| 49 | 51 | 59 | 46.5 | 69 | 46 | 79 | 48 | 89 | 54 |
| 94 | 57.5 | 99 | 66 | 109 | 67 | 114 | 67 | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 0 | .08 | 29 | .036 | 94 | .08 |

| Bank Sta: Left | Right | Lengths: Left Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|
| 29 | 94 | 12 20.35 | 35 | .1 | .3 |

CROSS SECTION OUTPUT Profile #10yr

Cross Section Output

File Type Options Help

River: SanPedro Profile: 10yr

Reach Creek RS: 22 Plan: Stage

Plan: Stage SanPedro Creek RS: 22 Profile: 10yr

| | | Element | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 58.68 | | | | |
| Vel Head (ft) | 0.27 | Wt. n-Val. | | 0.036 | 0.080 |
| W.S. Elev (ft) | 58.41 | Reach Len. (ft) | 12.00 | 20.35 | 35.00 |
| Crit W.S. (ft) | | Flow Area (sq ft) | | 477.16 | 0.24 |
| E.G. Slope (ft/ft) | 0.000759 | Area (sq ft) | | 477.16 | 0.24 |
| Q Total (cfs) | 2000.00 | Flow (cfs) | | 1999.95 | 0.05 |
| Top Width (ft) | 62.42 | Top Width (ft) | | 61.89 | 0.54 |
| Vel Total (ft/s) | 4.19 | Avg. Vel. (ft/s) | | 4.19 | 0.19 |
| Max Chl Dpth (ft) | 12.41 | Hydr. Depth (ft) | | 7.71 | 0.46 |
| Conv. Total (cfs) | 72601.5 | Conv. (cfs) | | 72599.8 | 1.7 |
| Length Wtd. (ft) | 20.35 | Wetted Per. (ft) | | 67.42 | 1.06 |
| Min Ch El (ft) | 46.00 | Shear (lb/sq ft) | | 0.34 | 0.01 |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 1.41 | 0.00 |
| Frctn Loss (ft) | 0.02 | Cum Volume (acre-ft) | 0.00 | 0.57 | 0.00 |
| C & E Loss (ft) | 0.00 | Cum SA (acres) | 0.00 | 0.08 | 0.00 |

Errors, Warnings and Notes

CROSS SECTION OUTPUT Profile #100yr

Cross Section Output

File Type Options Help

River: SanPedro Profile: 100yr

Reach Creek RS: 22 Plan: Stage

Plan: Stage SanPedro Creek RS: 22 Profile: 100yr

| | | Element | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 62.02 | Wt. n-Val. | 0.080 | 0.036 | 0.080 |
| Vel Head (ft) | 0.42 | Reach Len. (ft) | 12.00 | 20.35 | 35.00 |
| W.S. Elev (ft) | 61.61 | Flow Area (sq ft) | 7.40 | 683.19 | 4.96 |
| Crit W.S. (ft) | | Area (sq ft) | 7.40 | 683.19 | 4.96 |
| E.G. Slope (ft/ft) | 0.000767 | Flow (cfs) | 3.83 | 3543.55 | 2.62 |
| Q Total (cfs) | 3550.00 | Top Width (ft) | 7.02 | 65.00 | 2.42 |
| Top Width (ft) | 74.44 | Avg. Vel. (ft/s) | 0.52 | 5.19 | 0.53 |
| Vel Total (ft/s) | 5.10 | Hydr. Depth (ft) | 1.05 | 10.51 | 2.05 |
| Max Chl Dpth (ft) | 15.61 | Conv. (cfs) | 138.2 | 127912.0 | 94.6 |
| Conv. Total (cfs) | 128144.9 | Wetted Per. (ft) | 7.33 | 70.72 | 4.76 |
| Length Wtd. (ft) | 20.35 | Shear (lb/sq ft) | 0.05 | 0.46 | 0.05 |
| Min Ch El (ft) | 46.00 | Stream Power (lb/ft s) | 0.03 | 2.40 | 0.03 |
| Alpha | 1.03 | Cum Volume (acre-ft) | 0.01 | 0.82 | 0.01 |
| Frctn Loss (ft) | 0.02 | Cum SA (acres) | 0.01 | 0.08 | 0.01 |
| C & E Loss (ft) | 0.01 | | | | |

Errors, Warnings and Notes

CROSS SECTION

RIVER: SanPedro
REACH: Creek RS: 15

INPUT
Description:
Station Elevation Data num= 19

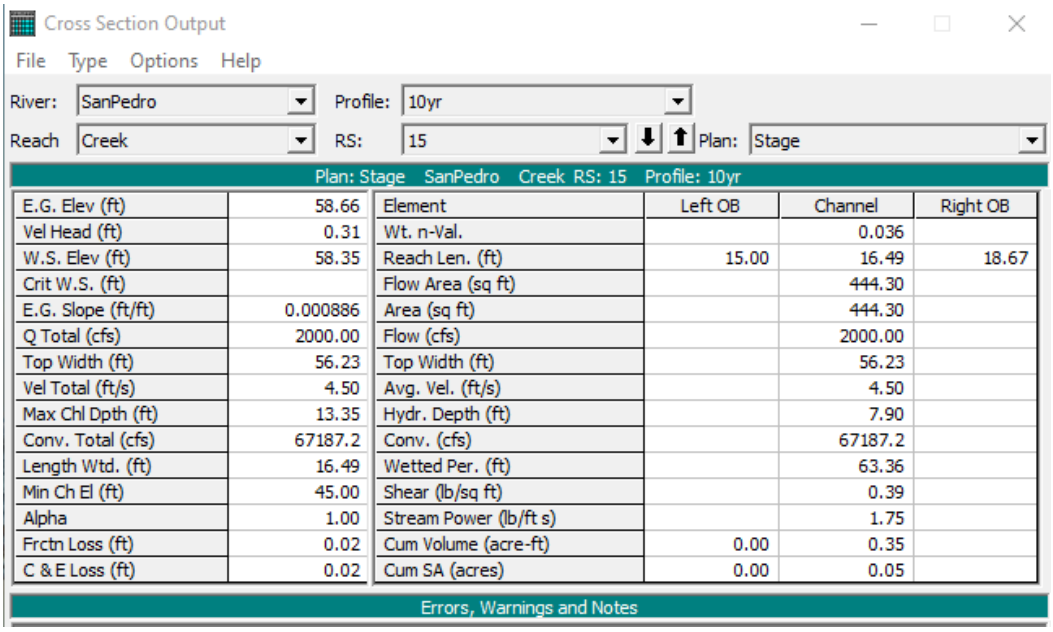
| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 65.5 | 6 | 65 | 16 | 65 | 26 | 65 | 36 | 65 |
| 46 | 63.5 | 56 | 59.5 | 66 | 55 | 76 | 50 | 86 | 46.5 |
| 91 | 45.5 | 96 | 45 | 101 | 47.5 | 106 | 50 | 116 | 59.5 |
| 126 | 68 | 136 | 68 | 146 | 68 | 153 | 68 | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 0 | .08 | 56 | .036 | 116 | .08 |

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
56 116 15 16.49 18.67 .1 .3

CROSS SECTION OUTPUT Profile #10yr



Cross Section Output

File Type Options Help

River: SanPedro Profile: 10yr

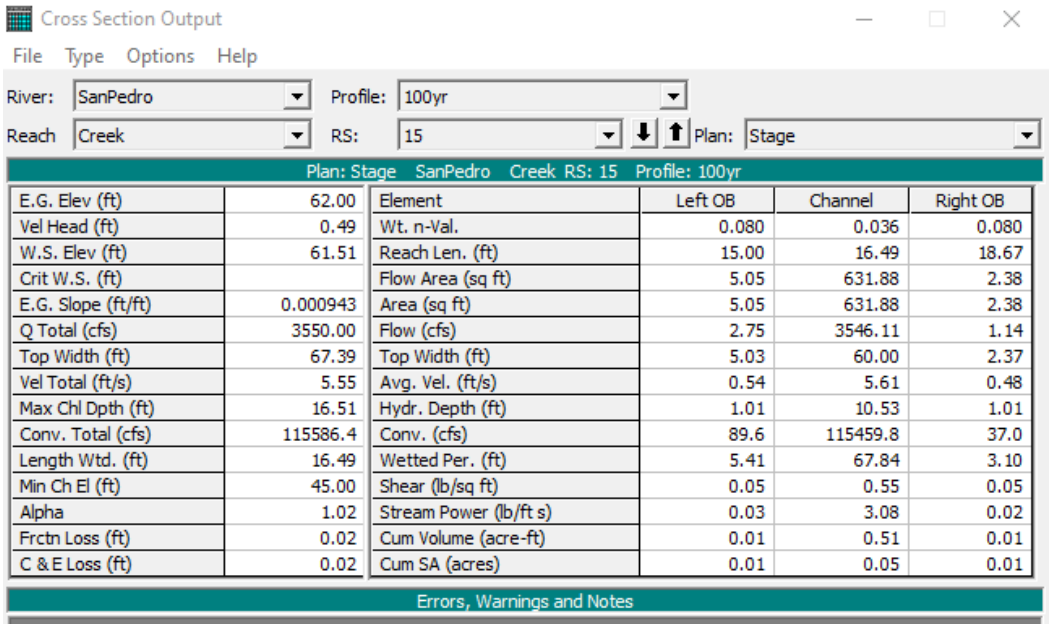
Reach Creek RS: 15 Plan: Stage

Plan: Stage SanPedro Creek RS: 15 Profile: 10yr

| | | Element | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 58.66 | | | | |
| Vel Head (ft) | 0.31 | Wt. n-Val. | | 0.036 | |
| W.S. Elev (ft) | 58.35 | Reach Len. (ft) | 15.00 | 16.49 | 18.67 |
| Crit W.S. (ft) | | Flow Area (sq ft) | | 444.30 | |
| E.G. Slope (ft/ft) | 0.000886 | Area (sq ft) | | 444.30 | |
| Q Total (cfs) | 2000.00 | Flow (cfs) | | 2000.00 | |
| Top Width (ft) | 56.23 | Top Width (ft) | | 56.23 | |
| Vel Total (ft/s) | 4.50 | Avg. Vel. (ft/s) | | 4.50 | |
| Max Chl Dpth (ft) | 13.35 | Hydr. Depth (ft) | | 7.90 | |
| Conv. Total (cfs) | 67187.2 | Conv. (cfs) | | 67187.2 | |
| Length Wtd. (ft) | 16.49 | Wetted Per. (ft) | | 63.36 | |
| Min Ch El (ft) | 45.00 | Shear (lb/sq ft) | | 0.39 | |
| Alpha | 1.00 | Stream Power (lb/ft s) | | 1.75 | |
| Frctn Loss (ft) | 0.02 | Cum Volume (acre-ft) | 0.00 | 0.35 | |
| C & E Loss (ft) | 0.02 | Cum SA (acres) | 0.00 | 0.05 | |

Errors, Warnings and Notes

CROSS SECTION OUTPUT Profile #100yr



Cross Section Output

File Type Options Help

River: SanPedro Profile: 100yr

Reach Creek RS: 15 Plan: Stage

Plan: Stage SanPedro Creek RS: 15 Profile: 100yr

| | | Element | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 62.00 | | | | |
| Vel Head (ft) | 0.49 | Wt. n-Val. | 0.080 | 0.036 | 0.080 |
| W.S. Elev (ft) | 61.51 | Reach Len. (ft) | 15.00 | 16.49 | 18.67 |
| Crit W.S. (ft) | | Flow Area (sq ft) | 5.05 | 631.88 | 2.38 |
| E.G. Slope (ft/ft) | 0.000943 | Area (sq ft) | 5.05 | 631.88 | 2.38 |
| Q Total (cfs) | 3550.00 | Flow (cfs) | 2.75 | 3546.11 | 1.14 |
| Top Width (ft) | 67.39 | Top Width (ft) | 5.03 | 60.00 | 2.37 |
| Vel Total (ft/s) | 5.55 | Avg. Vel. (ft/s) | 0.54 | 5.61 | 0.48 |
| Max Chl Dpth (ft) | 16.51 | Hydr. Depth (ft) | 1.01 | 10.53 | 1.01 |
| Conv. Total (cfs) | 115586.4 | Conv. (cfs) | 89.6 | 115459.8 | 37.0 |
| Length Wtd. (ft) | 16.49 | Wetted Per. (ft) | 5.41 | 67.84 | 3.10 |
| Min Ch El (ft) | 45.00 | Shear (lb/sq ft) | 0.05 | 0.55 | 0.05 |
| Alpha | 1.02 | Stream Power (lb/ft s) | 0.03 | 3.08 | 0.02 |
| Frctn Loss (ft) | 0.02 | Cum Volume (acre-ft) | 0.01 | 0.51 | 0.01 |
| C & E Loss (ft) | 0.02 | Cum SA (acres) | 0.01 | 0.05 | 0.01 |

Errors, Warnings and Notes

CROSS SECTION

RIVER: SanPedro
REACH: Creek RS: 10.000*

INPUT
Description:

Station Elevation Data num= 33

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 65 | 5.6 | 64.67 | 11.68 | 64.67 | 14.93 | 64.67 | 23.35 | 64.67 |
| 24.26 | 64.61 | 33.59 | 64.08 | 35.03 | 63.85 | 42.92 | 62.32 | 46.7 | 60.92 |
| 52.25 | 58.59 | 59.69 | 55.23 | 61.09 | 54.54 | 67.12 | 51.21 | 69.14 | 50.37 |
| 74.56 | 47.47 | 78.28 | 45.99 | 82 | 44.83 | 87.08 | 47.71 | 87.5 | 47.83 |
| 89.62 | 48.47 | 91.73 | 49.62 | 93 | 50.33 | 94.27 | 51.4 | 95.54 | 52.29 |
| 104 | 58.67 | 113.82 | 65.02 | 114.09 | 65.18 | 123.65 | 65.67 | 124.18 | 65.72 |
| 133.47 | 66.67 | 134.27 | 66.68 | 141.33 | 66.83 | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 0 | .08 | 52.25 | .036 | 104 | .08 |

| Bank Sta: Left | Right | Lengths: Left Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|
| 52.25 | 104 | 15 | 16.49 | 18.67 | .1 | .3 |

CROSS SECTION

RIVER: SanPedro
REACH: Creek RS: 5.000*

INPUT
Description:
Station Elevation Data num= 33

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 64.5 | 5.2 | 64.33 | 10.84 | 64.33 | 13.86 | 64.33 | 21.68 | 64.33 |
| 22.52 | 64.23 | 31.18 | 63.16 | 32.51 | 62.92 | 39.84 | 61.15 | 43.35 | 59.96 |
| 48.5 | 57.69 | 53.38 | 55.47 | 54.3 | 55.02 | 58.25 | 52.42 | 59.57 | 51.68 |
| 63.12 | 48.44 | 65.56 | 46.47 | 68 | 44.67 | 73.54 | 48.1 | 74 | 48.17 |
| 76.31 | 48.49 | 78.62 | 49.81 | 80 | 50.67 | 81.38 | 51.7 | 82.77 | 52.4 |
| 92 | 57.83 | 101.91 | 62.26 | 102.18 | 62.36 | 111.82 | 63.33 | 112.36 | 63.44 |
| 121.74 | 65.33 | 122.54 | 65.37 | 129.67 | 65.67 | | | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 0 | .08 | 48.5 | .036 | 92 | .08 |

| Bank Sta: Left | Right | Lengths: Left Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|
| 48.5 | 92 | 15 | 16.49 | 18.67 | .1 | .3 |

CROSS SECTION

RIVER: SanPedro
REACH: Creek RS: 0

INPUT
Description:
Station Elevation Data num= 19

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 64 | 10 | 64 | 20 | 64 | 30 | 62 | 40 | 59 |
| 44.75 | 56.78 | 47.5 | 55.5 | 50 | 53 | 54 | 44.5 | 60 | 48.5 |
| 63 | 48.5 | 65.5 | 50 | 68.5 | 52 | 70 | 52.5 | 80 | 57 |
| 90 | 59.5 | 100 | 61 | 110 | 64 | 118 | 64.5 | | |

Manning's n Values num= 3

| Sta | n Val | Sta | n Val | Sta | n Val |
|---|---|---|---|---|---|
| 0 | .08 | 44.75 | .036 | 80 | .08 |

| Bank Sta: Left | Right | Lengths: Left Channel | Right | Coeff Contr. | Expan. |
|---|---|---|---|---|---|
| 44.75 | 80 | 0 | 0 | 0 | .1 | .3 |

CROSS SECTION OUTPUT Profile #10yr

Cross Section Output

File Type Options Help

River: SanPedro Profile: 10yr

Reach Creek RS: 0 Plan: Stage

Plan: Stage SanPedro Creek RS: 0 Profile: 10yr

| | | Element | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 58.29 | Wt. n-Val. | | 0.036 | |
| Vel Head (ft) | 2.47 | Reach Len. (ft) | | | |
| W.S. Elev (ft) | 55.82 | Flow Area (sq ft) | | 158.55 | |
| Crit W.S. (ft) | 55.69 | Area (sq ft) | | 158.55 | |
| E.G. Slope (ft/ft) | 0.014925 | Flow (cfs) | | 2000.00 | |
| Q Total (cfs) | 2000.00 | Top Width (ft) | | 30.55 | |
| Top Width (ft) | 30.55 | Avg. Vel. (ft/s) | | 12.61 | |
| Vel Total (ft/s) | 12.61 | Hydr. Depth (ft) | | 5.19 | |
| Max Chl Dpth (ft) | 11.32 | Conv. (cfs) | | 16370.7 | |
| Conv. Total (cfs) | 16370.7 | Wetted Per. (ft) | | 40.07 | |
| Length Wtd. (ft) | | Shear (lb/sq ft) | | 3.69 | |
| Min Ch El (ft) | 44.50 | Stream Power (lb/ft s) | | 46.51 | |
| Alpha | 1.00 | Cum Volume (acre-ft) | | | |
| Frctn Loss (ft) | | Cum SA (acres) | | | |
| C & E Loss (ft) | | | | | |

Errors, Warnings and Notes

CROSS SECTION OUTPUT Profile #100yr

Cross Section Output

File Type Options Help

River: SanPedro Profile: 100yr

Reach Creek RS: 0 Plan: Stage

Plan: Stage SanPedro Creek RS: 0 Profile: 100yr

| | | Element | Left OB | Channel | Right OB |
|---|---|---|---|---|---|
| E.G. Elev (ft) | 61.58 | Wt. n-Val. | 0.080 | 0.036 | 0.080 |
| Vel Head (ft) | 3.31 | Reach Len. (ft) | | | |
| W.S. Elev (ft) | 58.27 | Flow Area (sq ft) | 2.37 | 242.49 | 3.22 |
| Crit W.S. (ft) | 58.27 | Area (sq ft) | 2.37 | 242.49 | 3.22 |
| E.G. Slope (ft/ft) | 0.013345 | Flow (cfs) | 3.92 | 3541.08 | 5.01 |
| Q Total (cfs) | 3550.00 | Top Width (ft) | 3.19 | 35.25 | 5.08 |
| Top Width (ft) | 43.51 | Avg. Vel. (ft/s) | 1.65 | 14.60 | 1.55 |
| Vel Total (ft/s) | 14.31 | Hydr. Depth (ft) | 0.74 | 6.88 | 0.63 |
| Max Chl Dpth (ft) | 13.77 | Conv. (cfs) | 33.9 | 30653.5 | 43.3 |
| Conv. Total (cfs) | 30730.7 | Wetted Per. (ft) | 3.52 | 45.24 | 5.23 |
| Length Wtd. (ft) | | Shear (lb/sq ft) | 0.56 | 4.47 | 0.51 |
| Min Ch El (ft) | 44.50 | Stream Power (lb/ft s) | 0.93 | 65.21 | 0.80 |
| Alpha | 1.04 | Cum Volume (acre-ft) | | | |
| Frctn Loss (ft) | | Cum SA (acres) | | | |
| C & E Loss (ft) | | | | | |

Errors, Warnings and Notes

Warning: Slope too steep for slope area to converge during supercritical flow calculations (normal depth is below critical depth). Water surface set to critical depth.

SUMMARY OF MANNING'S N VALUES

River:SanPedro

| Reach | River Sta. | n1 | n2 | n3 |
|---|---|---|---|---|
| Creek | 32 | .08 | .036 | .08 |
| Creek | 27.000* | .08 | .036 | .08 |
| Creek | 22 | .08 | .036 | .08 |
| Creek | 15 | .08 | .036 | .08 |
| Creek | 10.000* | .08 | .036 | .08 |
| Creek | 5.000* | .08 | .036 | .08 |
| Creek | 0 | .08 | .036 | .08 |

SUMMARY OF REACH LENGTHS

River: SanPedro

| Reach | River Sta. | Left | Channel | Right |
|---|---|---|---|---|
| Creek | 32 | 12 | 15.45 | 19.01 |
| Creek | 27.000* | 12 | 15.45 | 19.01 |
| Creek | 22 | 12 | 20.35 | 35 |
| Creek | 15 | 15 | 16.49 | 18.67 |
| Creek | 10.000* | 15 | 16.49 | 18.67 |
| Creek | 5.000* | 15 | 16.49 | 18.67 |
| Creek | 0 | 0 | 0 | 0 |