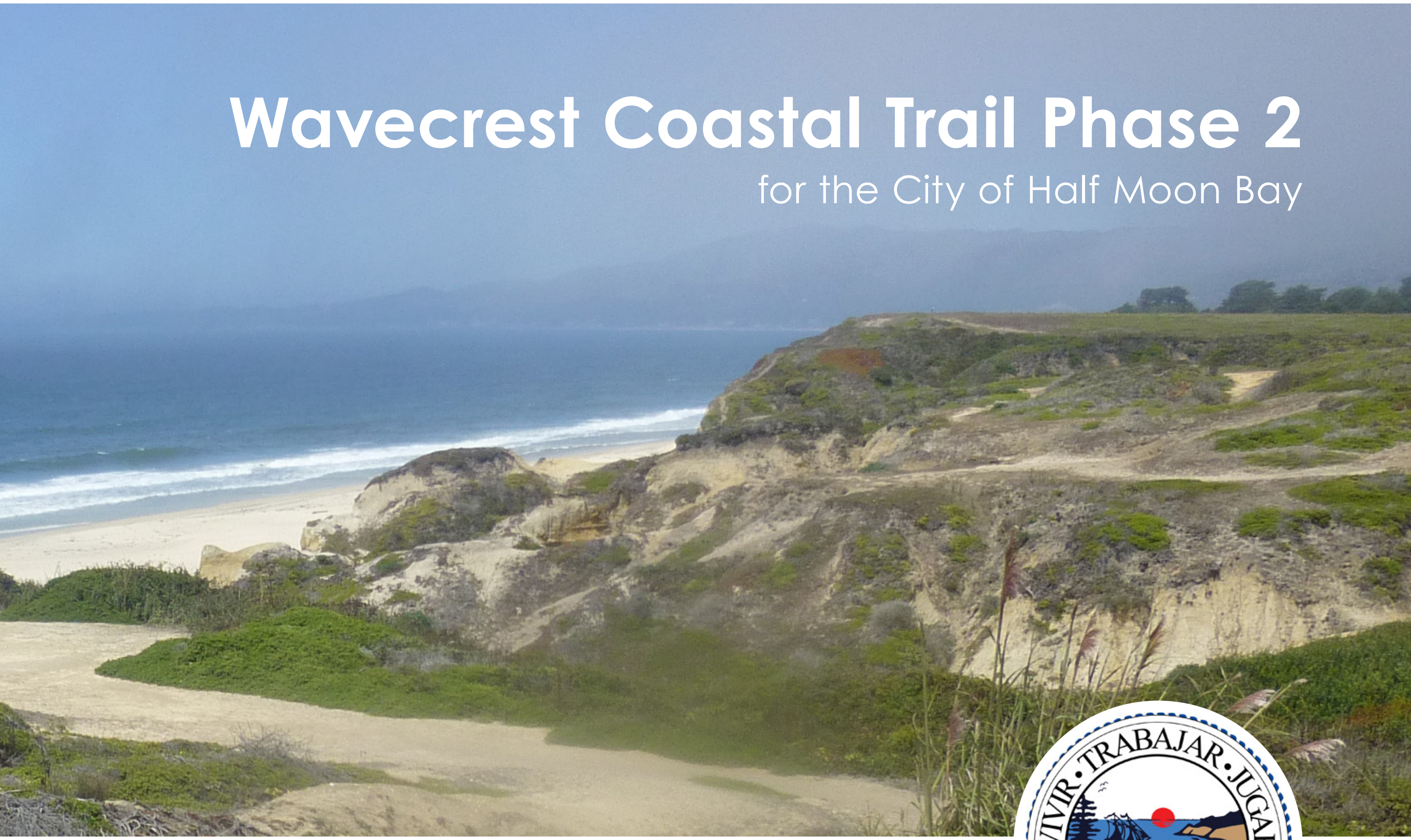
PLACEWORKS

June 2021

Initial Study and Mitigated Negative Declaration

Wavecrest Coastal Trail Phase 2

for the City of Half Moon Bay



City File No. PDP-16-032

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Initial Study and Mitigated Negative Declaration

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In Association With:

WRA

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1. Introduction

This document is an Initial Study for the Wavecrest Coastal Trail Phase 2 project (proposed project) prepared by PlaceWorks for the City of Half Moon Bay (City) to determine if the proposed project may have a significant effect on the environment as defined in the California Environmental Quality Act (CEQA) (Public Resources Code Sections 21000 *et seq.*). Pursuant to Sections 15050 and 15051 of the State CEQA Guidelines,[1] the City is the lead agency for the proposed project.

The proposed project would construct a total of 2.8 miles (12,032 linear feet) of trails; 0.4 miles (1,892 linear feet) of service road improvements, which will also be used for trail access; and two sets of stairs totaling 0.05 miles (267 feet) each connecting the trail and beach. The proposed project would also develop a formal vista point, with three trailhead staging areas and a restroom area with two flush toilets. The proposed project would also restore roughly 1 acre (46,663 square feet) of the project site, which is currently eroded, by regrading and reseeding these areas. The proposed trail and associated amenities would be located on an approximately 87-acre site within the city of Half Moon Bay.

In general, the project will primarily include moving earth and gravel to create the trail and staging areas, as well as construction of wooden fences and stairs. Construction vehicles will travel along dirt or gravel pathways to access the job site. All construction activity would be subject to mitigation measures which will reduce all impacts to less than significant levels. For protection of biological resources, applicable mitigation measures discussed in Section IV, BIO 1a-1d, BIO-2, BIO 3a-3g, BIO 4a-4b, BIO-5, BIO-6, BIO-7, and BIO8a-8, would be integrated into the construction schedule to ensure that all requisite biological resources protocols are followed. This includes the presence of an on-site biological resource monitor during the construction period.

1.1 INITIAL STUDY

Pursuant to Section 15063 of the CEQA Guidelines, an Initial Study is a preliminary environmental analysis that is used by the lead agency as a basis for determining what form of environmental review is required for a project. The CEQA Guidelines require that an Initial Study contain a project description, identification of environmental setting, identification of environmental effects by checklist or other similar form, explanation of the lead agency's conclusions about environmental effects, discussion of mitigation for any significant environmental effects (if necessary), evaluation of the project's consistency with applicable plans and land use controls, and the name of persons who prepared the document.

[1] The CEQA Guidelines are found in California Code of Regulations, Title, 14, Sections 15000 *et seq*.

1.2 REPORT ORGANIZATION

This Initial Study is organized into the following chapters:

- **Chapter 1: Introduction.** This chapter provides an introduction and overview of the Initial Study document.
- **Chapter 2: Initial Study Checklist.** This chapter summarizes pertinent details of the proposed project, including lead agency contact information, proposed project location, project applicant contacts information, and General Plan and Zoning designations.
- **Chapter 3: Project Description.** This chapter describes the location and setting of the proposed project, along with its principal components, as well as a description of the required permits and approvals for the proposed project.
- **Chapter 4: Environmental Analysis.** Making use of the CEQA Guidelines Appendix G, Environmental Checklist, this chapter identifies and discusses anticipated impacts of the proposed project on the environment and provides substantiation for the findings made.
- **Chapter 5: Mitigation Monitoring and Reporting Program.** This chapter lists the impacts found to be significant and identifies the recommended mitigation measures categorized by impact area.
- **Chapter 6: Organizations and Persons Consulted.** This chapter presents a list of City and other agencies and consultant team members that contributed to the preparation of the Initial Study.

2. *Initial Study Checklist Form*

2.1 INITIAL STUDY CHECKLIST FORM

1. **Project Title:**	Wavecrest Coastal Trail Phase 2
2. **Lead Agency Name and Address:**	City of Half Moon Bay 501 Main Street Half Moon Bay, CA 94019
3. **Contact Person and Phone Number:**	Scott Phillips Associate Planner (650) 726-8299
4. **Project Location:**	Half Moon Bay, California
5. **Project Sponsor's Name and Address:**	Jo Chamberlain, Coastside Land Trust 788 Main Street Half Moon Bay, CA 94019
6. **General Plan Land Use Designations:**	The City of Half Moon Bay's 2020 Local Coastal Land Use Plan designates the project site as Planned Development (PD), and Open Space for Conservation.
7. **Zoning:**	Planned Unit Development (PUD) North Wavecrest
8. **Description of Project:**	See Chapter 3, Project Description
9. **Surrounding Land Uses and Setting:**	See Chapter 3, Project Description
10. **Other Required Approvals:**	See Chapter 3, Project Description

11. **Have California Native American Tribes traditionally and culturally affiliated with the project area requested consultation pursuant to Public Resources Code section 201080.3.1? If so, has consultation begun?:** The City of Half Moon Bay has not received any request from any Native America Tribes in the geographic area of Half Moon Bay. to be notified about projects in the City of Half Moon Bay

2.2 ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a potentially significant impact, as indicated by the checklist on the following pages.

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

2.3 DETERMINATION:

On the basis of this initial evaluation:

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

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

☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL ASSESSMENT will be prepared.

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

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

Signature: *Phillips* — Date: 06/23/21

3. Project Description

The Coastside Land Trust (CLT), the project proponent, is proposing the Wavecrest Coastal Trail Phase 2 project (proposed project) to construct a total of 2.8 miles (12,032 linear feet) of trails; 0.4 miles (1,892 linear feet) of service road improvements; and two sets of stairs totaling 0.05 miles (267 linear feet). The proposed project would occur on an approximately 87-acre site comprised of lands owned by CLT, other privately-owned parcels, parcels and undeveloped City right-of-way located within the city of Half Moon Bay. The proposed project would reduce informal footpaths and provide formal public access through the area, protecting coastal resources by directing foot and bicycle traffic away from or safely through wetlands and other sensitive resources and reducing coastal erosion. The proposed project would result in a California Coastal Trail segment that would connect to the existing California Coastal Trail segments located to the north and south of the project site and develop spur trails to overlooks (vista points) and beach access points. The proposed service road improvements would occur along the paper street[2] referred to as "Park Avenue," and the two sets of stairs would provide beach access by connecting the trail and beach. The proposed project would also develop three trailhead staging areas with an estimated capacity to accommodate up to 72 vehicle parking spaces and two trucks with horse trailers within the two new parking lots, and one restroom building with two flush toilets. All of the staging areas will be enclosed with a split rail wooden fence. The proposed project would also restore roughly 1 acre (46,663 square feet) of the project site, which is currently eroded, by regrading and reseeding these areas with native plant seed. The proposed project components would only occur on 5.91 acres of CLT-owned parcels and areas designated as public rights of way and would not result in disturbance on the entire 87-acre project site. CLT will maintain the project, including conducting weed abatement to ensure establishment of native plants. CLT will also schedule volunteer workdays to monitor trail conditions, including general cleanup of the project area, and note and any potential erosion, along the trails. [3]

This chapter provides a detailed description of the proposed project, including the location, setting, characteristics of the project site, and required permits and approvals. Additional descriptions of the environmental setting are included in the discussions in Chapter 4, Environmental Analysis, of this Initial Study.

3.1 PROJECT BACKGROUND

In 2014, the City of Half Moon Bay approved the Coastal Development Permit and Use Permit for the first phase of the Wavecrest Coastal Trail Project (Phase 1 Trail). The Phase 1 Trail formalized a 0.3-mile (1,698-

[2] A paper street or paper road is a street or road that appears on recorded subdivision maps but has not been built. Paper streets generally occur when city planners or subdivision developers lay out and dedicate streets that are never built. [Consider replacing the second sentence of this footnote with something like: The paper street discussed in this Initial Study, "Park Avenue," was dedicated to the City on [INSERT map reference].]

[3] The privately-owned parcels historically tie to subdividing the land into residential lots.

linear-foot) segment of the California Coastal Trail and developed spur trails to coastal overlooks, provided split-rail fencing and signage, and restored roughly 0.46 acres (19,834 square feet) of informal trail areas on a 30-acre parcel located directly north of the proposed project. Similar to the Phase 1 Trail, the proposed project would develop a segment of the California Coastal Trail and spur trails to re-route public access away from the eroding bluffs, reducing damage from informal footpaths, and improving the existing conditions.

3.2 PROJECT SITE LOCATION AND SITE CHARACTERISTICS

3.2.1 REGIONAL LOCATION

As shown on Figure 3-1, Regional and Vicinity Map, the proposed project is located along the Pacific Ocean within the city of Half Moon Bay. Half Moon Bay is bounded by unincorporated San Mateo County to the north, east, and south, and by the Pacific Ocean to the west. Regional access to Half Moon Bay is provided via Highway 1, Highway 92, State Route 35, and Interstate 280. Direct access to the project site is provided via Redondo Beach Road and Wavecrest Road. The closest public airport to project site is the Half Moon Bay County Airport, located at 9850 Cabrillo Highway, approximately 8 miles north of the proposed project site. Station 40 of the Coastside Fire Protection District located across Highway 1 from the project site includes an emergency helicopter landing area.

3.2.2 LOCAL SETTING

As shown on Figure 3-2, Aerial of Project Site and Surrounding Area, the project site is located west of Highway 1 on a terrace above scenic coastal bluffs approximately 83 feet above mean sea level (AMSL). The project site is bounded by the Phase 1 Trail to the north, undeveloped land to the east and south, and the Pacific Ocean to the west. Developed land uses in the project site vicinity include the Smith Field Little League Park located approximately 0.5 miles to the northeast, a recreational vehicle (RV) park and commercial land uses located approximately 1 mile directly to the east, a golf course adjacent to the south, and single-family housing approximately 1 mile to the south and southeast.

3.2.3 EXISTING SITE CONDITIONS

The 87-acre project site consists of a gently sloping landscape, including seven gullies and one ravine. As shown on Figure 3-3, Existing Site Conditions, these gullies and ravine are identified as Gully 3, 4, 5, 6, 7, 8, 10, and 11 and Ravine 9. Ravine 9 is a steep-sided large canyon that originates on the terrace and spills down the bluffs onto the beach. The project site is currently informally used for public recreation as demonstrated by a series of well-worn, informal foot trails that range from approximately 1- to 14-feet wide and have a complete lack of groundcover in comparison to the densely-vegetated areas immediately adjacent to the informal trails.[4] The use of informal trails and resulting lack of vegetation has created significant erosion on the project site and along the bluff edge.

[4] "Informal" trails, also called social trails or desire paths, are footpaths created unintentionally by visitors repeatedly using the exact same path for crossing terrain. Informal trails form when visitors cross through an area lacking an official path, and can be problematic, depending on their alignment. Sensitive natural resources, such as delicate plants, ground nesting animals, or highly erodible ground, can be damaged or even destroyed by trampling. Another related issue is visitor safety, as informal trails may be routed through hazardous locations, such as a cliff or ravine edge, or areas that are slippery or unstable, or may be aligned in such a way as to be extremely steep and hazardous to cross.

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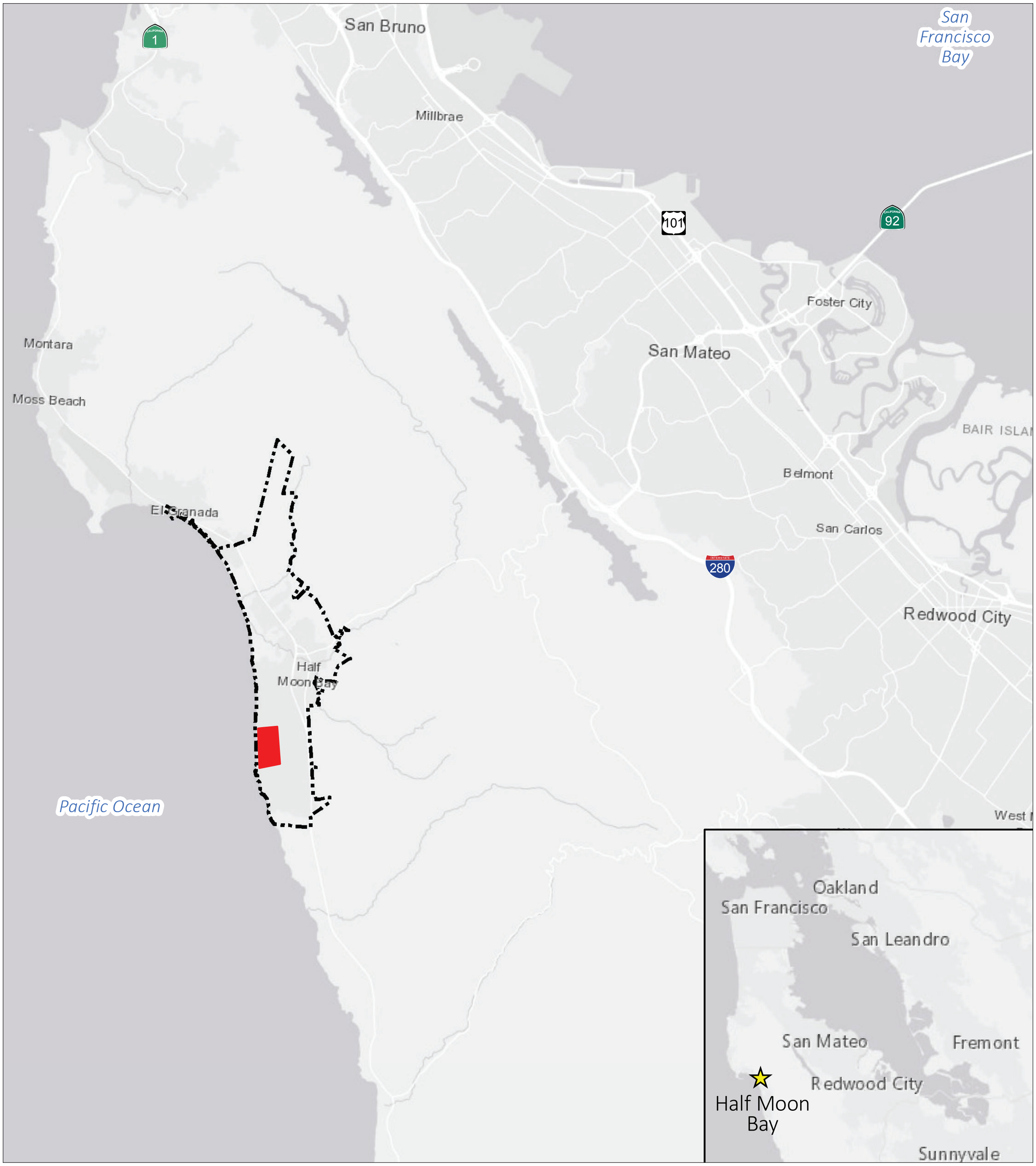
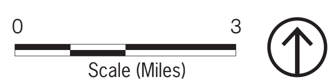


Source: City of Half Moon Bay; PlaceWorks, 2021; ESRI 2021.



Project Site

City Limit

Figure 3-1

Regional Location and Vicinity Map

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Source: Google Earth Professional, 2018. PlaceWorks, 2018.

Figure 3-2
Aerial of Project Site and Surrounding Area

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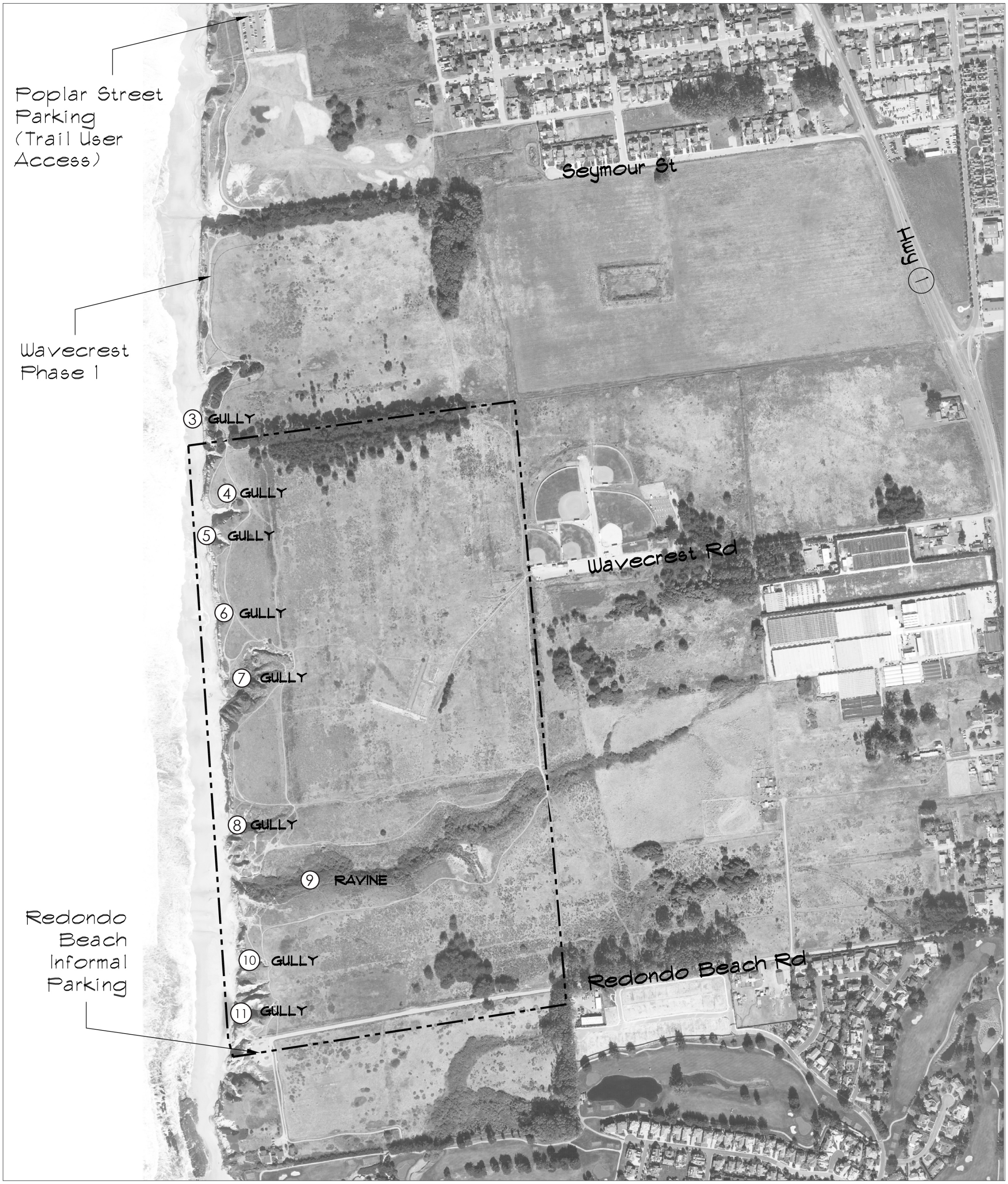

Source: PlaceWorks, 2018.

Project Site Boundary

Figure 3-3
Existing Site Conditions

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Existing vegetation is predominantly comprised of non-native grassland, with sections of central dune scrub, central coast scrub, coastal freshwater marsh, and central coast riparian scrub. .[5] On-site sensitive biological communities, which meet the California Coastal Commission's definition of an Environmentally Sensitive Habitat Area (ESHA),[6] consist of sea cliffs, central coast riparian scrub, and marine environment (beaches). Sea cliffs, beaches, and the Pacific Ocean form the western boundary of the project site, while non-native grassland, developed/disturbed areas, central coast riparian scrub, and seasonal wetlands form the eastern boundary. The northern and southern portions of the project site include large stands of Monterey cypress originally planted as windbreaks, with the southern portion also including Redondo Beach Road. The project site is locally known as one of the most important habitat sites for wintering raptors in San Mateo County, supporting high population density and diversity of raptors.[7]

3.2.4 LOCAL COASTAL LAND USE PLAN AND ZONING DESIGNATION

Pursuant to the California Coastal Act, each of the cities and counties along the California Coast is required to prepare a Local Coastal Program (LCP) that provides a framework to protect and enhance coastal areas for their irreplaceable environmental values and for the public enjoyment. The City of Half Moon Bay Local Coastal Land Use Plan (LUP) the Zoning Ordinance, Subdivision Ordinance and zoning map together constitute the LCP for the City's coastal zone. The LCLUP is the policy component of the LCP; and the Zoning Ordinance, which is the City's Local Coastal Implementation Plan (LCIP), provides standards and requirements that implement the LCLUP.

The City's LCLUP was comprehensively updated in 2020, as adopted by City Council in October 2020 and certified by the California Coastal Commission in April 2021. The 2020 LCLUP supersedes and replaces the former 1996 LCLUP. The discussion of land use designations, policies and programs below and in Section 4, Environmental Analysis is based on a review of the new Half Moon Bay LCLUP.

The LUP land use designation for the project site is Planned Development (PD). The PD land use designation was established to ensure comprehensive planning for the city's undeveloped lands. The intent of this designation is to allow for appropriately sited and scaled development including all associated infrastructure while maintaining community character and protecting the area's coastal resources and environmental attributes, including scenic resources, environmentally sensitive habitat areas, and viable farmland. The designation requires that each PD be master planned comprehensively as a whole with the inclusion of any possible residential uses, neighborhood recreational facilities, commercial recreation, and office or industrial uses determined prior to approval of any development within the PD area, with phasing of development also made part of the overall planning consideration.

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[5] WRA Environmental Consultants, 2020, Wavecrest Coastal Trail: Southern Alignment Project, Biological Resources Evaluation, Table 1, Biological Community Acreages, page 26.

[6] "Environmentally sensitive habitat area" means any area in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which could be easily disturbed or degraded by human activities and developments.

[7] WRA Environmental Consultants, 2020, Wavecrest Coastal Trail: Southern Alignment Project, Biological Resources Evaluation.

The LUP Plan provides for a limited range of uses in PD areas in advance of master plan certification such as trails, agriculture, and habitat restoration.

The project is subject to the provisions off the Half Moon Bay Municipal Code, Title 18, Zoning Ordinance. Pertinent sections of Title 18 are discussed below in Chapter 4, Environmental Analysis, including Chapter 18.38, Coastal Resource Conservation Standards which provides specific regulations governing analysis of biological resources, which are followed in this Initial Study.

The project site is zoned Planned Unit Development (PUD). Pursuant to the Half Moon Bay Municipal Code (Municipal Code) Section 18.15.010, the intent of the PUD zoning district is to provide for a variety of land uses, including attached and detached single-family residential development, multiple-family housing development, professional and administrative areas, commercial and industrial uses, institutional uses, public and private open space, and recreation opportunities.

3.3 PROPOSED PROJECT

As previously described, this Initial Study evaluates the construction and operation of the proposed project, which would serve an estimated user population of 40 daily and 160 weekend visitors. At completion, Phase 2 would result in trails, a vista point viewing area, trailhead staging areas, trail stairs, restoration improvements, and maintenance of the new improvements. The proposed improvements would disturb 5.91 acres of the 87-acre project site and would be located exclusively on CLT-owned parcels and areas designated as public right of ways.

In accordance with LUP Policy 2-51, Uses Allowed Prior to Master Planning, existing and new uses allowed in advance of master plan certification for PD areas include:

a. Existing conforming and non-conforming uses;

b. Existing, new, and/or expanded agriculture and agriculture compatible uses consistent with the Rural Coastal land use designation including residential development consistent with the Workforce Housing Overlay land use designation, Chapter 4 requirements for agricultural accessory and supporting uses, and Chapter 6 requirements;

c. Habitat restoration and conservation projects;

d. Lateral and vertical coastal accessways;

e. Multi-use trails including the California Coastal Trail which may be located within the 300-foot setback from the blufftop edge;

f. Environmental hazard mitigation;

g. Ancillary facilities to support resource dependent uses and coastal access including small parking areas, restrooms, wildlife viewing facilities, and similar amenities; and

h. Accessory dwelling units with existing single-family homes consistent with State law.

The proposed project would be consistent with Policy 2.51, by including improvements that would facilitate public access while reducing erosion of the bluff edge by (1) creating a sufficient set back from the bluff edge, and (2) revegetating the existing informal trails that are located closed to the bluff edge. In addition, the proposed staging areas and restroom component and overall site restoration activities would also be consistent with the intent of Policy 2.51.

The proposed improvements are shown on Figure 3-4, Proposed Improvements, and described in more detail below.

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Source: Coast Side Land Trust.

Figure 3-4
Proposed Improvements

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3.3.1 TRAIL

The proposed trail would be comprised of multiple sections to provide formal public access throughout the project site and would respect coastal resources by directing foot, equestrian and bicycle traffic away from wetlands and other sensitive areas, reducing multiple informal footpaths, and reducing erosion caused by informal recreation; thus, providing improvements over existing conditions.

The proposed trail would be constructed with compacted rock to ensure durability and provide a firm and pervious surface. Of the total 2.8 miles (12,032 linear feet) of proposed trail, 1.9 miles (10,252 linear feet) would be 8-feet wide and 0.3 miles (1,780 linear feet) would be 6 feet wide. All proposed trail sections would also feature a 2-foot-wide compacted dirt shoulder on either side to provide for equestrian use. No impervious materials would be used for trail construction. Trail features would include 3.5-foot (42-inch) tall split-rail fencing in hazardous areas and/or sensitive habitat areas; two 4-foot by 3-foot (48- by 36-inch) signs to provide directions at each trail end, mounted on redwood posts; one interpretive sign, one bench, and warning signs at various locations along the trail to alert users of dangerous hazards such as eroding cliffs and provide appropriate protocol to protect sensitive habitat.

The proposed trail would adhere to a 60-foot setback from the edges of the sea cliff and ravines, with the exception of spur trails that connect to the bluff overlooks or stairs to the beach. As shown on Figure 3-4, Proposed Improvements, the proposed trail would provide recreational access to various points of interest within the project site, including the Phase 1 Trail site located directly north of the project site and Wavecrest Beach via the two sets of proposed stairs. The primary trail alignment would also avoid sensitive riparian areas adjacent to all seven gullies, the ravine, and seasonal wetlands. In areas where the proposed trail alignment has the potential to disturb wetlands, the trail would be elevated using 12-foot-long short boardwalk,[8] sections that would be 6-feet wide with a 7-foot total footing. The footings would be 3-inches above ground and extend a minimum of 2 feet on either side.

3.3.2 VISTA POINT

As shown on Figure 3-4, Proposed Improvements, the proposed project includes a formal vista point in the coastal area between Gully 6 and Gully 7. The proposed vista point would include a warning sign to alert the public to the dangerous eroding cliff. The warning sign would be mounted at a height of 4 feet, 2 inches on redwood posts to educate trail users. The vista point would also include one interpretive sign to educate trail users about the native plants and animals in the area and a bench.

3.3.3 TRAILHEAD STAGING AREAS

The proposed project includes a main trailhead staging area and two secondary trailhead staging areas located on the southern boundary of the project site along Redondo Beach Road. As shown on Figure 3-4, Proposed Improvements, the main staging area includes a restroom facility and roughly 0.29 acres (12,600 square feet) of pervious surface for parking. The restroom facility would include a prefabricated one-story

[8] A puncheon is a wooden walkway used to cross bogs or marsh, to bridge boulder fields, or to cross small streams.

(approximately 10 feet tall) building with two flush toilets and potable water. Utilities for the restroom would include an extension of the potable water line along Redondo Beach Road right of way and a connection to the existing sewer main line along Park Avenue, which as previously described is a paper street and not an actual street.

The two additional trailhead staging areas would have pervious surface for parking totaling 0.34 acres (14,600 square feet) and 0.26 acres (11,200 square feet), respectively. The parking areas would be gravel and would not have parking lines. Collectively, the three trailhead staging areas would provide enough pervious surface area to park up to 72 vehicles and two trucks with horse trailers. A trailhead sign would be added in the main staging area.

3.3.4 TRAIL STAIRS

The proposed project includes two sets of above grade trail stairs connecting the trail and beach. The two sets of stairs would be constructed of wood and would be 0.05 miles (267 feet) each. The stairs would be located on both the northern and southern side of Ravine 9 on the southwestern corner of the project site, as shown on Figure 3-4, Proposed Improvements. Informal pathways have eroded the mouth of Ravine 9. Once constructed, the proposed trail stairs would facilitate access from the north and south sides of Ravine 9, reducing erosion by directing trail users along a designated route. The proposed trail stairs would be routed down the ravine walls at a slightly oblique angle to prevent direct runoff down the hillslope. Trail stairs would be constructed in an interlocking crib style with wooden timbers cribbed together to form risers and backfilled with compacted native earth. The proposed stairs would have a handrail along one side. Stair construction would require recontouring existing eroded areas and filling existing gullies with engineered fill to stabilize the bluff edge. New stormwater runoff pipes would be installed to prevent water from flowing down the trail stairs and would discharge at the bottom of Ravine 9 or along the beach. A short crib wall would be constructed along the south side of Ravine 9 to support the bottom of the stairs on this side.

3.3.5 RESTORATION

In general, the project site is not a pristine or undisturbed area. As previously stated, the project site has multiple existing informal and unauthorized trails that have resulted in significant erosion from lack of vegetation. In an effort to reduce erosion and correct the damaged areas, the proposed project would restore informal trail areas within property owned by CLT or in the public right of way. Restoration of informal trails would involve site preparation measures, including topsoil treatment, soil de-compaction, erosion control, and/or other measures as appropriate. These damaged areas would be ripped (tilled to aerate the topsoil) and reseeded with a Native Coastal seed mix (e.g., seed potted nursery stock and other materials collected from within 5 miles of the restoration site), as well as Choris' popcorn flower (*Plagiobothrys chorisianus* var. *chorisianus*) seeds harvested by biologists on site and provided to the Contractor. In addition, removal of non-native plants would be conducted by mowing, hand weeding, and raking, with minimal (if any) application of herbicides or burning. (No herbicides were used in the Phase 1 trail construction, and the same is anticipated for Phase 2.)

3.3.6 SITE ACCESS

Vehicle access to the project site would be provided via Redondo Beach Road and Wavecrest Road. Pedestrian, cyclist, and equestrian access to the project site would be provided from the Phase 1 Trail to the north or the existing segment of the California Coastal Trail to the south.

3.3.7 UTILITIES

The proposed project would require connections to municipal water and sewer utilities but would not require any electrical or gas connections. Sewer Authority Mid-Coastside would provide sewer services and potable water would be provided by Coastside County Water District. There is an existing sanitary sewer line that runs through the project site along Park Avenue, which is a paper street and not an actual street. The project would require installation of a new sewer lateral to connect the proposed restroom building to this existing sanitary sewer line. The project would also require a water line extension to connect the restroom building to the existing water line located along Redondo Beach Road. The new water line extension would be approximately 0.25 miles in length and be located within the right of way of Redondo Beach Road.

3.3.8 TEMPORARY CONSTRUCTION REQUIREMENTS

Construction of the proposed project would require the establishment of temporary construction access and construction equipment staging areas, as well as the use of wildlife exclusion fencing, as described below and shown on Figure 3-5, Construction Access Map. To ensure implementation of the actions described in this section, detailed mitigation measures are described in Chapter 4, Environmental Checklist, of this Initial Study, and are included in the Mitigation Monitoring and Reporting Program Report for the proposed project.

3.3.8.1 CONSTRUCTION ACCESS AND STAGING

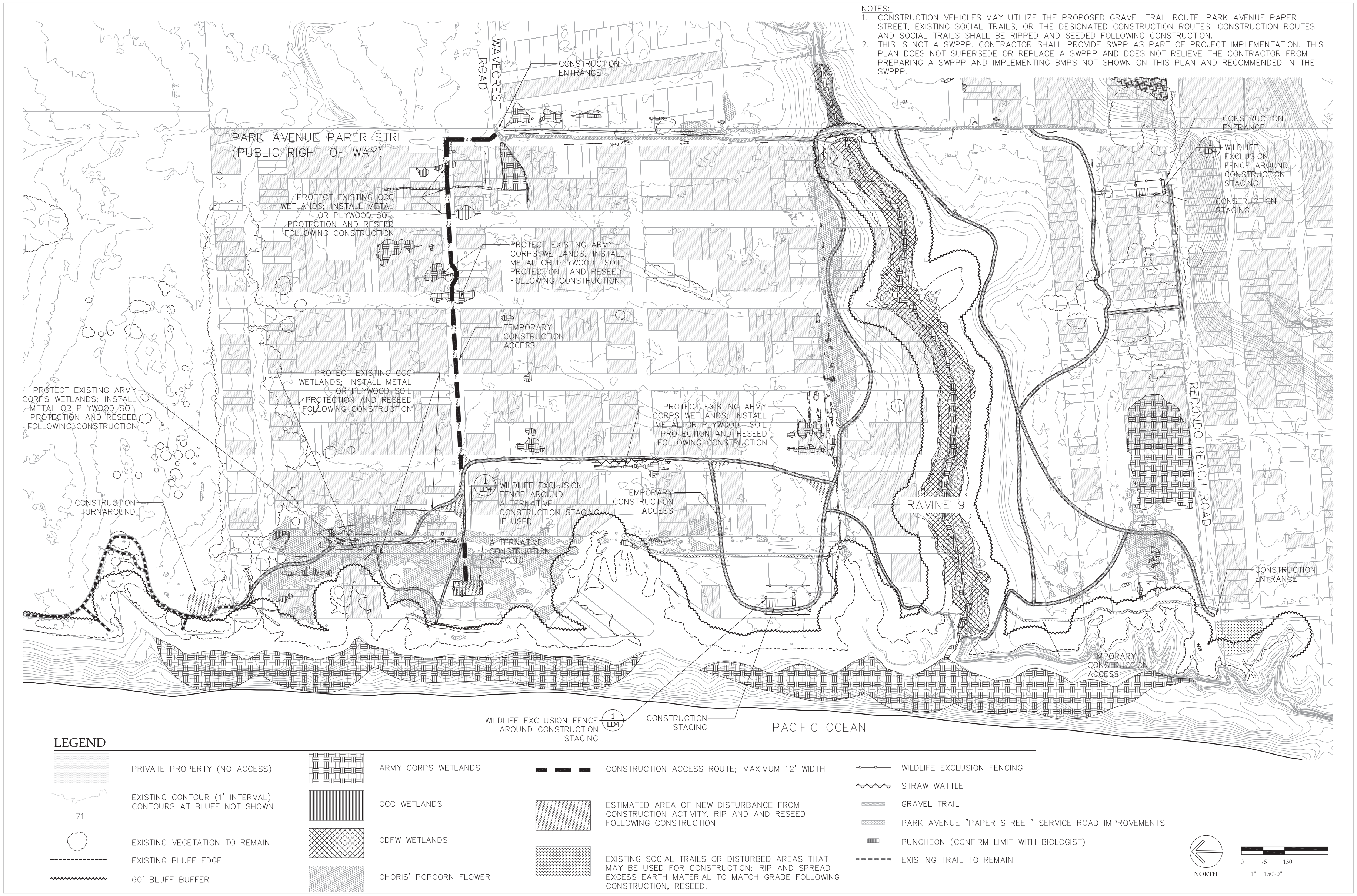
Construction would occur over the course of one year. Construction-related trips would come from Highway 1 and access the project site from various access points depending on the phase of the project. Construction vehicles could access the site from Wavecrest Road or Redondo Beach Road and temporary access routes that would traverse the project site to a designated construction staging area. The access routes are anticipated to be temporary 12-foot-wide compacted dirt roads. It is anticipated that the temporary access roads would see an average of 10 inbound vehicle trips and 10 outbound vehicle trips each day. Construction is expected to occur over a 5-day period; during this time, it is anticipated that 16 additional inbound and 16 additional outbound trips would be required to deliver the rock for the trail surface. At the end of the construction period, the access route would be ripped and reseeded with a Native Coastal seed mix except in areas where the proposed trail is utilized for construction access. All construction staging areas shown on Figure 3-5 are roughly 0.11 acres (5,000 square feet) and would provide adequate space for two 20-foot-long storage containers and up to 10 parking spaces as well as an optional access through the Phase 1 Trail for construction crew members. No staging would occur in the public right-of-way. The construction site and staging areas would be clearly marked, and construction/wildlife exclusion fencing would be installed to prevent disturbance and safety hazards and protect wildlife.

3.3.8.2 BIOLOGICAL RESOURCES PROTECTION

As stated above, wildlife exclusion fencing would be erected and maintained around the perimeter of the proposed construction staging areas to prevent San Francisco garter snake (SFGS) and California red-legged frog (CRLF) from entering the site overnight. Wetland areas near the proposed project components would be protected by silt fencing. The vehicle access points would have a temporary silt fence gate, which is opened to allow construction vehicle access while the contractor's trained personnel are present. At night the seal on the temporary gate would be augmented by sandbags. Installation of fencing would be performed under the supervision of a United States Fish and Wildlife Service (USFWS)-approved biologist. In addition to fencing, to prevent CRLF and SFGS from taking refuge and becoming trapped in cavity-like and den-like structures such as pipes and stored pipes, all construction pipes, culverts, or similar structures that are stored at the site for one or more overnight periods would be either securely capped prior to storage or thoroughly inspected by the on-site monitor and/or the construction foreman/manager for these animals before the pipe is subsequently buried, capped, or otherwise used or moved in any way. Furthermore, to prevent inadvertent entrapment of CRLF or SFGS during construction, the full-time on-site biological monitor and/or construction foreman/manager would ensure that all excavated, steepwalled holes or trenches more than one foot deep are completely covered at the close of each working day by plywood or similar materials, or provided with one or more escape ramps constructed of earth fill or wooden planks and inspected by the on-site biologist. Before such holes or trenches are filled, they would be thoroughly inspected for trapped animals by the on-site biologist and/or construction foreman/manager.

3.4 REQUIRED APPROVALS

The proposed project would require approval of the Mitigated Negative Declaration and the project by the City of Half Moon Bay Planning Commission. The City would be responsible for issuing all required permits to allow for the construction and operation of the proposed project. The following permits are also required: Coastal Development Permit, Use Permit, Building Permit and authorized use of public right-of-way.



Source: PlaceWorks, 2021.

Figure 3-5
Construction Diagram

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4. *Environmental Analysis*

4.1 DISCUSSION OF ENVIRONMENTAL EVALUATION

This section describes the environmental impacts that could occur with implementation of the proposed project pursuant to CEQA Guidelines Appendix G, Environmental Checklist. In addition, environmental impacts are evaluated consistent with the California Supreme Court in a December 2015 opinion (*California Building Industry Association (CBIA) v. Bay Area Air Quality Management District (BAAQMD)*, 62 Cal. 4th 369 (No. S 213478)), herein referred to as CBIA v. BAAQMD. Here the California Supreme Court confirmed that CEQA, with several specific exceptions, is concerned with the impacts of a project on the environment, and not the effects the existing environment may have on a project. Therefore, the evaluation of the significance of project impacts under CEQA in the following sections focuses on impacts of the project on the environment, including whether a project may exacerbate existing environmental hazards.

Items identified in each section of the environmental checklist below are discussed following that section. Required mitigation measures are identified where necessary to reduce a projected impact to a level that is determined to be less than significant. All impacts were found to be less than significant or less than significant with mitigation. While no significant, unavoidable impacts were identified as part of the analysis for this Initial Study, impacts to air quality, biological resources, cultural resources, and transportation and traffic could be potentially significant without implementation of the mitigation measures identified within this Initial Study and Mitigated Negative Declaration (IS/MND).

4.2 SOURCES

All documents cited in this analysis and used in its preparation are hereby incorporated by reference into this Initial Study. Copies of documents referenced herein are available for review at the following website: https://www.half-moon-bay.ca.us/475/Biological-Reports-Environmental-Documen, and at the City of Half Moon Bay Planning Division, 501 Main Street, Half Moon Bay, CA 94019.

4.3 ENVIRONMENTAL ANALYSIS AND FINDINGS

I. AESTHETICS

Would the 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 project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?	❐	❐	■	❐
d) Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?	❐	❐	❐	■

DISCUSSION

a) Would the proposed project have a substantial adverse effect on a scenic vista?

The City's LUP identifies existing visual resources in the city in a Visual Resources Overlay Map.[9] There are no officially recognized scenic vistas in the project study area. Views from the project study area are of the Pacific Ocean to the west, Monterey cypress to the north, coastal scrub and Half Moon Bay Golf Course to the south, and a eucalyptus grove and the Santa Cruz Mountains to the east. Components of the proposed project that could affect scenic views would include signage, fencing, restrooms, parking areas, and the construction of trails suitable for multiple non-motorized user types, including establishment of vista points of the Pacific Ocean. Signage, fencing, restroom structure, and parking areas would not be of a scale to be visible from locations outside of the immediate vicinity of proposed improvements and would not be of a height that would affect views. Proposed trails would formalize access paths through the project site but would not include any structures that would affect scenic views. The proposed project would not include any components that would block scenic vistas from, across, or to the project site. Rather, the project would enhance and increase public access to scenic views. The proposed project

[9] City of Half Moon Bay, 1993, Half Moon Bay Local Coastal Program, page 225.

would enhance scenic vistas of the Pacific Ocean from the project study area but would not affect scenic vistas from other locations. **Less-than-Significant Impact**.

b) Would the proposed project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a State scenic highway?

Portions of Highway 1 are designated as a State scenic highway. However, the officially-designated scenic portion begins 26 miles south of the city limit; the portion of Highway 1 near the project site is eligible, but not officially designated, as a scenic highway.[10] In addition, improvements included in the proposed project would not be visible from Highway 1. **No Impact.**

c) Would the proposed project substantially degrade the existing visual character in non-urbanized areas, or quality of public views of the site and its surroundings? Is the project in an urbanized area, and would the project conflict with applicable zoning and other regulations governing scenic quality?

As described under criterion a), the proposed project does not propose any new buildings or structures that would affect scenic views. Proposed improvements would enhance and improve access within the project site but would not degrade the character of the project site. The formalized trails would facilitate views of scenic resources in the surrounding area. The proposed connection to the California Coastal Trail would require minor thinning of a stand of cypress trees but would otherwise leave the cypress stand intact. Proposed improvements, including the one-story prefabricated restroom building, signage and the split-rail fence, would be small in relation to the natural surroundings and adjacent single-family homes, and not would affect the existing rural character. The construction access road would temporarily affect visual character of the site during construction activities, but it would be removed, and the area would be replanted following construction. **Less-than-Significant Impact.**

d) Would the proposed project create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?

With the exception of vehicle lights, the proposed project does not include any sources of artificial lighting or any features with the potential to create glare. **No Impact.**

[10] Caltrans State Scenic Highway, https://dot.ca.gov/programs/design/lap-landscape-architecture-and-community-livability/lap-liv-i-scenic-highways, accessed on September 20, 2020.

II. AGRICULTURE AND FORESTRY RESOURCES

Would the 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 of conversion of forest land to non-forest use?	❒	❒	❒	■

DISCUSSION

a) Would the project 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?

The project study area does not include Prime Farmland, Unique Farmland, or Farmland of Statewide Importance per the Farmland Mapping and Monitoring Program of the California Resources Agency.[11] **No impact.**

[11] California Department of Conservation, 2014, San Mateo County Important Farmland Map, https://planning.smcgov.org/sites/planning.smcgov.org/files/documents/files/smt14.pdf, accessed on September 20, 2020.

b) Would the project conflict with existing zoning for agricultural use, or a Williamson Act contract?

No properties affected by the proposed project within San Mateo County are under the Williamson Act.[12] **No impact.**

c) – d) Would the project conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code [PRC] Section 12220(g)), timberland (as defined by PRC Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104(g)) or result in the loss of forest land or conversion of forest land to non-forest use?

According to 2003 mapping data from the California Department of Forestry and Fire Protection, the project study area does not contain woodland or forest land cover;[13] thus the project study area contains no land zoned for Timberland Production and no impact would occur. **No impact.**

e) Would the project 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?

As described under criteria b), c), and d) above. The proposed project would not lead to conversion of farmland or forest land to different uses. **No impact.**

III. AIR QUALITY

Would the 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 project area is in non-attainment under applicable federal or State ambient air quality standards?	❐	■	❐	❐
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?	❐	❐	■	❐

[12] California Department of Conservation, 2016, California Land Conservation (Williamson) Act 2016-17 Status Report, https://www.conservation.ca.gov/dlrp/wa/Documents/stats_reports/2018%20WA%20Status%20Report.pdf, accessed on September 20, 2020.

[13] California Department of Forestry and Fire Protection Fire and Resource Assessment Program, Land Cover map, https://frap.fire.ca.gov/media/10311/fveg_19_ada.pdf, accessed on September 20, 2020.

DISCUSSION

The Air Quality section addresses the impacts of the proposed project on ambient air quality and the exposure of people, especially sensitive individuals, to unhealthful pollutant concentrations. A background discussion on the air quality regulatory setting, meteorological conditions, existing ambient air quality in the vicinity of the project site, and air quality modeling can be found in Appendix A. The construction health risk assessment (HRA) is included in Appendix B, Health Risk Assessment.

The primary air pollutants of concern for which ambient air quality standards (AAQS) have been established are ozone (O_3), carbon monoxide (CO), coarse inhalable particulate matter (PM_{10}), fine inhalable particulate matter ($PM_{2.5}$), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), and lead (Pb). Areas are classified under the federal and California Clean Air Act as either in attainment or nonattainment for each criteria pollutant based on whether the AAQS have been achieved. The San Francisco Bay Area Air Basin (SFBAAB), which is managed by the Bay Area Air Quality Management District (BAAQMD or Air District), is a nonattainment area for California and National O_3, California and National $PM_{2.5}$, and California PM_{10} AAQS.

Furthermore, BAAQMD has identified thresholds of significance for criteria pollutant emissions and criteria air pollutant precursors, including ROG, NO_x, PM_{10}, and $PM_{2.5}$. Development projects below the regional significance thresholds are not expected to generate sufficient criteria pollutant emissions to violate any air quality standard, contribute substantially to an existing or projected air quality violation, or substantially contribute to health impacts. Where available, the significance criteria established by BAAQMD are relied upon to make the following determinations.

a) Would the project conflict with or obstruct implementation of the applicable air quality plan?

The BAAQMD is directly responsible for reducing emissions from area, stationary, and mobile sources in the SFBAAB to achieve National and California AAQS. In April 2017, BAAQMD adopted its 2017 Clean Air Plan, which is a regional and multiagency effort to reduce air pollution in the SFBAAB. Regional growth projections are used by BAAQMD to forecast future emission levels in the SFBAAB. For the Bay Area, these regional growth projections are provided by the Association of Bay Area Governments (ABAG) and transportation projections are provided by the Metropolitan Transportation Commission (MTC) and are partially based on land use designations in city/county general plans. Typically, only large, regionally significant projects have the potential to affect the regional growth projections.

The proposed project, a coastal trail with associated improvements (i.e. restrooms, parking areas, fencing, and signage), is not considered a regionally significant project under CEQA Guidelines Section 15206 that would affect regional vehicle miles traveled (VMT) and warrant intergovernmental review by ABAG and MTC. Due to the scope and nature of the project, it would not directly result in an increase in population or housing within the City or by regional planning efforts (Plan Bay Area) through 2040. It would not have the potential to substantially affect housing, employment, and population projections within the region, which is the basis of the 2017 Clean Air Plan projections. Furthermore, because project operation is not anticipated to change from existing conditions, the proposed project would not generate additional emissions that would exceed the BAAQMD's emissions thresholds (see criterion (b) below). These thresholds were established to identify projects that have the potential to generate a substantial amount of criteria air pollutants. The proposed project would not be considered by the BAAQMD to be a substantial emitter of criteria air pollutants. Therefore, the proposed project would not conflict with or obstruct implementation of the 2017 Clean Air Plan. **No Impact.**

b) *Result in a cumulatively considerable net increase of any criteria pollutant for which the project area is in non-attainment under applicable federal or State ambient air quality standards?*

The following describes project-related impacts from regional short-term construction activities and regional long-term operation of the proposed project.

Regional Short-Term Construction Impacts

The entire Bay Area is in "non-attainment" for PM_{10}, $PM_{2.5}$, and ozone.[14] Construction activities produce combustion emissions from various sources, such as on-site heavy-duty construction vehicles, vehicles hauling materials to and from the site, and motor vehicles transporting the construction crew. Site preparation activities produce fugitive dust emissions (PM_{10} and $PM_{2.5}$) from soil-disturbing activities, such as grading and excavation. Air pollutant emissions from construction activities on site would vary daily as construction activity levels change. Construction activities associated with the project would result in emissions of ROG, NOx, CO, PM_{10}, and $PM_{2.5}$.

Construction Fugitive Dust

Ground disturbing activities during construction would generate fugitive dust (PM_{10} and $PM_{2.5}$). The amount of dust generated during construction would be highly variable and is dependent on the amount of material being disturbed, the type of material, moisture content, and meteorological conditions. If uncontrolled, PM_{10} and $PM_{2.5}$ levels downwind of actively disturbed areas could possibly exceed State standards. Fugitive dust (PM_{10} and $PM_{2.5}$) generated by the proposed project during construction could potentially result in significant regional short-term air quality impacts without implementation of the Bay Area Air Quality Management District's best management practices related to reducing fugitive dust emissions.

Mitigation Measure AIR-1: The project's construction contractor shall comply with the following best management practices for reducing construction emissions of fugitive dust (PM_{10} and $PM_{2.5}$) as required by the Bay Area Air Quality Management District Revised California Environmental Quality Act Air Quality Guidelines:

- Water all active construction areas at least twice daily, or more if needed to control dust emissions. Watering must be sufficient to prevent airborne dust from leaving the site. Increased watering frequency may be necessary whenever wind speeds exceed 15 miles per hour. Reclaimed water should be used whenever possible.

[14] Bay Area Air Quality Management District, Air Quality Standards and Attainment Status, http://www.baaqmd.gov/research-and-data/air-quality-standards-and-attainment-status, accessed on June 23, 2018.

- Pave, apply water twice daily or more if necessary to prevent airborne dust from leaving the site, or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas, and staging areas at construction sites.
- Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least 2 feet of freeboard (i.e., the minimum required space between the top of the load and the top of the trailer).
- Sweep daily (with water sweepers using reclaimed water if possible) or as often as needed all paved access roads, parking areas and staging areas at the construction site to prevent airborne dust from leaving the site.
- Sweep public streets daily (with water sweepers using reclaimed water if possible) in the vicinity of the project site, or as often as needed, to keep streets free of visible soil material.
- Hydroseed or apply non-toxic soil stabilizers to inactive construction areas.
- Enclose, cover, water twice daily, or apply non-toxic soil binders to exposed stockpiles (dirt/sand).
- Limit vehicle traffic speeds on unpaved roads to 15 miles per hour.
- Replant vegetation in disturbed areas as quickly as possible.
- Install sandbags or other erosion control measures to prevent silt runoff from public roadways.

The Air District considers all impacts related to fugitive dust emissions from construction to be less than significant with implementation of BAAQMD's best management practices, which are prescribed in Mitigation Measure AQ-1. Incorporation of Mitigation Measure AQ-1 would ensure that required fugitive dust control measures are implemented to control project-related fugitive dust generated during construction activities. **Less-than-Significant Impact with Mitigation.**

Construction Exhaust Emissions

Construction emissions are based on the preliminary construction duration and normalized CalEEMod default schedule developed for the proposed project. The proposed project would result in site preparation, grading, utilities, gravel import, and installation of site improvement features such as restrooms, signage, and fencing that would occur near existing sensitive land uses. Construction emissions were quantified using the California Emissions Estimator Model (CalEEMod) Version 2016.3.2.25 based on information provided by the project applicant. Although the project could occur over a one-year period, for purposes of this analysis a seven-month construction period was assumed for activities involving construction equipment as opposed to later restoration activity. Construction could begin after approval of this Initial Study and when the construction contract is issued. Potential construction-related air quality impacts are determined by comparing the average daily criteria air pollutants emissions generated by the proposed project-related construction activities to the BAAQMD significance thresholds in Table 4-1. Average daily emissions are based on the annual construction emissions divided by the total number of active construction days. As shown in Table 4-1, criteria air pollutant emissions from construction equipment exhaust would not exceed the BAAQMD average daily thresholds and, thus, would not cumulatively contribute to the nonattainment designations of the SFBAAB. **Less-than-Significant Impact.**

TABLE 4-1 CONSTRUCTION-RELATED CRITERIA AIR POLLUTANT EMISSIONS ESTIMATES

	Criteria Air Pollutants (tons/year)[a]					
Year	VOC	NO_x	Fugitive PM_{10}[b]	Exhaust PM_{10}	Fugitive $PM_{2.5}$[b]	Exhaust $PM_{2.5}$[b]
2021	<1	1	1	<1	<1	<1
	Criteria Air Pollutants (average lbs./day)[a]					
Average Daily Emissions[c]	1	12	9	1	2	<1
BAAQMD Average Daily Project-Level Threshold	54	54	BMPs	82	BMPs	54
Exceeds Average Daily Threshold	**No**	**No**	**N/A**	**No**	**N/A**	**No**

Notes: BMP = Best Management Practices; N/A = not applicable; "<1"=A value greater than 0, but less than 1.

a. Construction phasing and equipment mix are based on the preliminary information provided by the project applicant. Where specific information regarding project-related construction activities was not available, construction assumptions were based on CalEEMod defaults, which are based on construction surveys conducted by South Coast Air Quality Management District of construction equipment and phasing for comparable projects.

b. Includes implementation of BMPs for fugitive dust control required by BAAQMD as mitigation, including watering disturbed areas a minimum of two times per day, reducing speed limit to 15 miles per hour on unpaved surfaces, and street sweeping.

c. Average daily emissions are based on the total construction emissions divided by the total number of active construction days. The total number of construction days is estimated to be about 147 workdays.

Source: California Emissions Estimator Model (CalEEMod), Version 2016.3.2.25

Operational Impacts

Typical long-term air pollutant emissions are generated by area sources (e.g., landscape fuel use, aerosols, architectural coatings, and asphalt pavement), energy use (natural gas), and mobile sources (i.e., on-road vehicles). Here, the Project is a trail for walking, biking, and equestrian use. None of these uses emit criteria pollutants. Because the proposed project includes a new gravel parking lot, new restrooms, and vista point with signage, it will likely attract visitors in cars. Typically, transportation emissions generate the majority of GHG emissions associated with a project. However, Half Moon Bay already attracts many recreational visitors on a daily basis. The addition of these facilities is not likely to increase the overall number of visitors to Half Moon Bay trails and beaches. Thus, project implementation would not increase trips from existing conditions and would not have a significant effect on VMT.

In addition, while project implementation would generate additional criteria pollutant emissions from area sources as a result of operation of the new restrooms, these emissions would be nominal. The proposed project would also be much smaller in scale than screening criteria for a city park.[15] Thus, the proposed project would not generate emissions that exceed the BAAQMD daily pounds per day or annual tons per year project level threshold and, thus, would not cumulatively contribute to the nonattainment designations of the SFBAAB. **Less-than-Significant Impact.**

[15] Bay Area Air Quality Management District (BAAQMD). 2017, May. California Environmental Quality Act Air Quality Guidelines. https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en

c) *Expose sensitive receptors to substantial pollutant concentrations?*

Development that would be accommodated by the proposed project could expose sensitive receptors to elevated pollutant concentrations. Unlike the construction emissions shown above in Table 4-1 under criterion (b), described in pounds per day (PPD), localized concentrations refer to an amount of pollutant in a volume of air (ppm or $\mu g/m^3$) and can be correlated to potential health effects.

Construction Off-Site Community Risk and Hazards

The proposed project would elevate concentrations of TACs and $PM_{2.5}$ in the vicinity of sensitive land uses during construction activities. The Air District has developed *Screening Tables for Air Toxics Evaluation During Construction* (2017) that evaluate construction-related health risks associated with residential, commercial, and industrial projects. According to the screening tables, the nearest off-site residences are closer than the distance of 100 meters (328 feet) that would screen out potential health risks and, therefore, could be potentially impacted from the proposed construction activities. The nearest sensitive receptors to the project site are the residents to the south along Carnoustie Drive. Consequently, a site-specific construction health risk assessment (HRA) of TACs and $PM_{2.5}$ was prepared (see Appendix B of this Initial Study).

A quantified analysis of the project's construction emissions was conducted using the CalEEMod, Version 2016.3.2.25. Construction emissions were based on 147 working days of the total 7-month construction duration. The United States Environmental Protection Agency (USEPA) AERMOD, Version 9.9, dispersion modeling program was used to estimate excess lifetime cancer risk, chronic non-cancer hazard index for non-carcinogenic risk, and the $PM_{2.5}$ maximum annual concentrations at the nearest sensitive receptors. The results of the analysis are shown in Table 4-2.

TABLE 4-2 CONSTRUCTION RISK SUMMARY – UNMITIGATED

Receptor	Cancer Risk (per million)	Chronic Hazards	$PM_{2.5}$ ($\mu g/m^3$)
Maximum Exposed Receptor – Off-site Resident	2.0	0.008	0.03
BAAQMD Threshold	10	1.0	0.30
Exceeds Threshold?	**No**	**No**	**No**

Note: Cancer risk calculated using 2015 Office of Environmental Health Hazard Assessment Health Risk Assessment Guidance Manual.
Source: Lakes AERMOD View, 9.5 (2017).

The results of the HRA are based on the maximum receptor concentration over a 7-month construction exposure duration for off-site receptors.[16] Risk is based on the updated Office of Environmental Health Hazard Assessment (OEHHA) Guidance Manual:[17]

- Cancer risk for the maximum exposed off-site resident from construction activities related to the proposed project were calculated to be 2.0 in a million and would not exceed the 10 in a million-significance threshold. Utilizing the latest 2015 OEHHA Guidance Manual, the calculated total cancer risk conservatively assumes that the risk for the maximum exposed receptor (MER) consists of a pregnant woman in the third trimester that subsequently gives birth to an infant during the approximately 7-month construction period; therefore, all calculated risk values were multiplied by a factor of 10. In addition, it was conservatively assumed that the residents were outdoors 8 hours a day, 260 construction days per year and exposed to all of the daily construction emissions.
- For non-carcinogenic effects, the chronic hazard index identified for each toxicological endpoint totaled less than one for all the off-site sensitive receptors. Therefore, chronic non-carcinogenic hazards are within acceptable limits.
- For the residential MER, the maximum annual $PM_{2.5}$ concentration of 0.03 would not exceed the BAAQMD significance threshold of 0.3 micrograms per cubic meter (μg/m^3).

Consequently, prior to mitigation, the project would not expose sensitive receptors to substantial concentrations of air pollutant emissions during construction. **Less-than-Significant Impact.**

Operation Phase Community Risk and Hazards

Types of land uses that typically generate substantial quantities of criteria air pollutants and TACs include industrial (stationary sources), manufacturing, and warehousing (truck idling) land uses. These types of major air pollutant emissions sources are not included as part of the proposed project. The proposed project would not include stationary sources that emit TACs and would not generate a significant amount of heavy-duty truck trips (a source of diesel particulate matter [DPM]).]). Passenger vehicles trips would not fall under these categories of uses and would not generate substantial quantities of criteria air pollutants. In addition, vehicles visiting the trail are not likely to idle in the parking lot or along the road. Therefore, the proposed project would not expose sensitive receptors to substantial concentrations of air pollutant emissions during operation. **Less-than-Significant Impact.**

CO Hotspot Analysis

Areas of vehicle congestion have the potential to create pockets of carbon monoxide (CO) called hotspots. These pockets have the potential to exceed the State 1-hour standard of 20 parts per million (ppm) or the

[16] The 2015 Office of Environmental Health Hazard Assessment Air Toxics Hot Spots Program Guidance Manual identified that exposure duration has changed from 70 years to 30 years for operational risk to residents; however, the risk is still averaged over a 70-year lifetime.

[17] Office of Environmental Health Hazard Assessment, 2015. Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments.

8-hour standard of 9 ppm. The proposed project would not conflict with the City/County Association of Governments of San Mateo County (C/CAG's) Congestion Management Program (CMP) because it would not hinder the capital improvements outlined in the CMP or alter regional travel patterns. C/CAG's CMP must be consistent with Metropolitan Transportation Commission's (MTC)/Association of Bay Area Governments' (ABAG) *Plan Bay Area*. An overarching goal of the regional plan is to concentrate development in areas where there are existing services and infrastructure rather than allocate new growth in outlying areas where substantial transportation investments would be necessary to achieve the per capita passenger vehicle VMT and associated GHG emissions reductions. The proposed project would develop more coastal trail space, a gravel parking lot, and additional structures and would be consistent with the overall goals of *Plan Bay Area 2040*.

Furthermore, under existing and future vehicle emission rates, a project would have to increase traffic volumes at a single intersection by more than 44,000 vehicles per hour—or 24,000 vehicles per hour where vertical and/or horizontal mixing is substantially limited—in order to generate a significant CO impact. Because implementation of the proposed project would not generate additional trips, the proposed project, which creates 72 parking spaces for trail and beach access, would not increase traffic volumes at affected intersections by more than 44,000 vehicles per hour or 24,000 vehicles per hour where vertical and/or horizontal mixing is substantially limited.[18] The proposed project would not have the potential to substantially increase CO hotspots at intersections in the project vicinity. **Less-than-Significant Impact**.

d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?

Construction and operation of the proposed project would not generate odors that would affect a substantial number of people. The type of facilities that are considered to have objectionable odors include wastewater treatments plants, compost facilities, landfills, solid waste transfer stations, fiberglass manufacturing facilities, paint/coating operations (e.g., auto body shops), dairy farms, petroleum refineries, asphalt batch plants, chemical manufacturing, and food manufacturing facilities. The proposed project would result in a gravel parking lot, new restrooms, and vista point with signage and would not be the type of land use that is associated with generating objectionable odors, as it would include flush toilets connected to the sewer system. Furthermore, nuisance odors are regulated under BAAQMD Regulation 7, Odorous Substances, which requires abatement of any nuisance generating an odor complaint. BAAQMD's Regulation 7, Odorous Substances, places general limitations on odorous substances and specific emission limitations on certain odorous compounds. Additionally, odors are also regulated under BAAQMD Regulation 1, Rule 1-301, Public Nuisance, which states that "no person shall discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance or annoyance to any considerable number of persons or the public; or which endangers the comfort, repose, health or safety of any such persons or the public, or which causes, or has a natural tendency to cause, injury or damage to business or property."

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[18] Bay Area Air Quality Management District (BAAQMD), 2011 Revised. California Environmental Quality Act Air Quality Guidelines.

During construction activities, construction equipment exhaust and application of asphalt and architectural coatings would temporarily generate odors. Any construction-related odor emissions would be temporary and intermittent. Additionally, odors would typically be confined to the immediate vicinity of the construction equipment. By the time such emissions reach any sensitive receptor sites, they would be diluted to well below any level of air quality concern.

In summary, due to the nature of the proposed project, existing BAAQMD rules pertaining to the control of odors, and because construction-related odor emissions would be temporary and intermittent, implementation of the proposed project is not anticipated to result in odors that would adversely affect a substantial number of people. **Less-than-Significant Impact.**

IV. BIOLOGICAL RESOURCES

Would the 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 a plant or animal population, or essential habitat, defined as a candidate, sensitive or special-status species?	❒	■	❒	❒
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community type?	❒	■	❒	❒
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, their wildlife corridors or nursery sites?	❒	❒	■	❒
e) Conflict with any local ordinances or policies protecting biological resources?	❒	❒	❒	■
f) Conflict with an adopted Habitat Conservation Plan, Natural Community Conservation Plan or other approved local, regional, or State habitat conservation plan?	❒	❒	❒	■

The discussion below reflects the findings of the *Wavecrest Coastal Trail: Southern Alignment Project Biological Resources Evaluation* (BRE), prepared by WRA Environmental Associates in June 2020. This report is included in Appendix C of this Initial Study. The biological resources assessment was based on field reconnaissance conducted on foot on January 26 and 27 and February 9 and 16, 2016, as well as protocol-level rare plant surveys conducted on April 15 and June 22, 2016 within the area to be affected within the project site as well as a 200-foot buffer (herein referred to as the "project study area"). On

January 14, 2020, the location of the stairway areas were observed and compared to prior conditions documented in the 2016 BRE. Additionally, on January 14, 2020, a BRE was conducted on the utility area. The field visits resulted in observations of the habitat types and conditions within the project study area, identification of present plant and wildlife species, and a professional biologist opinion of the suitability of the project study area for special-status plant and wildlife species.

Prior to field reconnaissance, the following literature sources were reviewed to determine which sensitive habitat types and special-status plant and wildlife species have documented occurrences in the vicinity of the project study area, and thus may have potential to occur in the project site:

- California Natural Diversity Database (CNDDB).
- USFWS species lists for the following quadrangles: Half Moon Bay, Montara Mountain OE W, Montara Mountain, San Mateo, Woodside, La Honda, and San Gregorio.
- California Native Plant Society (CNPS) Electronic Inventory records.
- California Department of Fish and Wildlife (CDFW) publication "California's Wildlife, Volumes I-III".
- CDFW publication "Amphibians and Reptile Species of Special Concern in California".
- "A Field Guide to Western Reptiles and Amphibians".
- "San Mateo County Soil Survey".

The results of the BRE are tabulated in Appendix E (p. 229) of Appendix C of this Initial Study. Of the 48 special-status plant and 73 special-status wildlife species known to occur in the vicinity of the project site, 16 plants and 11 animal species were determined to have a moderate to high potential to occur in the project site. The special-status species with a high potential to occur in the project site include the Choris' popcorn flower (*Plagiobothrys chorisianus* var. *chorisianus*), (Brewster's) Yellow warbler (*Setophaga petechia brewsteri*), and Bryant's savannah sparrow *(Passerculus sandwichensis alaudinus)*.

DISCUSSION

a) Have a substantial adverse effect, either directly or through habitat modifications, on a plant or animal population, or essential habitat, defined as a candidate, sensitive or special-status species?

The BRE identifies habitat for the 11 special-status animal species and 18 special-status plant species with a moderate to high potential to occur on the project site, including species listed as candidate, threatened, or endangered under either the federal or California law. The Choris' popcorn flower (*Plagiobothrys chorisianus* var. *chorisianus*) was directly observed during the field reconnaissance visits.

Special-Status Animals

General

Eleven special-status animal species were determined to have moderate to high probability to occur in the project study area due to presence of suitable habitat. If general measures to protect sensitive species and their habitat is not taken during construction, adverse impacts could occur.

Construction activities could generally occur over a one-year period. These activities, including clearing of vegetation or the initiation of construction, occurring during the breeding season from February through August, for these species, as well as the special-status species listed below, that have high to moderate potential to be on the site could be adversely affected:

> **Mitigation Measure BIO-1a:** Prior to the start of groundbreaking activities, all construction personnel shall receive training by a qualified biologist on listed species and their habitats. The importance of these species and their habitat shall be described to all employees as well as the minimization and avoidance measures that are to be implemented as part of the proposed project. An educational brochure containing color photographs of all listed species in the work area(s) shall be distributed to all employees working within the project site. The original list of employees who attend the training sessions shall be maintained by the project applicant and be made available for review by the USFWS and the CDFW upon request.

> **Mitigation Measure BIO-1b:** The project applicant or contractor shall designate a qualified biologist to monitor on-site compliance with all minimization measures. The on-site monitor(s) shall remain on-site for the duration of the proposed project, including vegetation removal, grading, and cleanup activities.

> **Mitigation Measure BIO-1c:** Designated construction staging areas shall be utilized as the staging areas for the trail construction activities. All vehicles associated with project activities shall be clustered within these areas at the end of each workday or when not in use to minimize habitat disturbance and water quality degradation. Wildlife exclusion fencing shall be installed surrounding the staging area to prevent CRLF or SFGS from entering these areas overnight. Fueling and maintenance of equipment shall be conducted off-site, and at least 50 feet from any wetland or designated ESHA, unless a request for on-site fueling is approved by the Community Development Department.

> **Mitigation Measure BIO-1d:** No trash shall be deposited on the project site during construction activities. All trash shall be placed in trash receptacles with secure lids, stored in vehicles, and removed nightly from the project site.

> **Mitigation Measure BIO-1e:** The project applicant shall post signs at each trail end and along the trail at various locations near areas of sensitive habitat to inform users of appropriate protocol to protect sensitive habitat, including directions to stay on the trail and to walk bicycles or ride very slowly. Signs shall be 48- by 36-inches in size and shall be mounted at eye level on redwood posts.

Implementation of Mitigation Measures BIO-1a though BIO-1e would reduce these general impacts to the natural habitat to a less-than-significant level. **Less-than-Significant Impact with Mitigation.**

Birds

Nearly all the habitats within the project study area have the potential to support nesting birds, and the LUP considers raptors unique species. Nesting birds, including red-tailed hawks, short-eared owls, and white-tailed kites, are known to use the project study area and have been documented in the vicinity by both expert scientists and other observers.[19] These nesting birds use trees such as the Monterey cypress on the project site and the immediate vicinity for nesting during winter. These specific birds are special-status species protected by the Migratory Bird Treaty Act (MBTA), as well other regulations and the LUP.[20] Additionally, the nests of most native birds are protected under the MBTA.

If construction activities, including clearing of vegetation or the initiation of construction, were to occur during the bird breeding season from February through August, these species, as well as the special-status species listed below, that have high to moderate potential to be on the site could be adversely affected:

- White-tailed Kite (*Elanus leucurus*) (CDFW Fully Protected Species; LUP Unique Species). Kites occur in low elevation grassland, agricultural, wetland, oak woodland, and savannah habitats. Riparian zones adjacent to open areas are also used. Vegetative structure and prey availability seem to be more important than specific associations with plant species or vegetative communities. Lightly grazed or ungrazed fields generally support large prey populations and are often preferred to other habitats. Kite primarily feed on small mammals, although birds, reptiles, amphibians, and insects are also taken. Nest trees range from single isolated trees to trees within large contiguous forests. Preferred nest trees are extremely variable, ranging from small shrubs (less than 10 feet tall), to large trees (greater than 150 feet tall). Suitable foraging habitat is present and trees in the project site provide potential nesting habitat. White-tailed kite was observed within the project site during the January 27, 2016 site visit and Monterey cypress stands provide suitable sites where this species has a moderate potential to nest.
- Allen's hummingbird (*Selasphorus sasin*) (USFWS Bird of Conservation Concern). Allen's hummingbird, common in many portions of its range, is a summer resident along the majority of California's coast and a year-round resident in portions of coastal southern California and the Channel Islands. Breeding occurs in association with the coastal fog belt, and typical habitats used include coastal scrub, riparian, woodland and forest edges, and eucalyptus and cypress groves. This species feeds on nectar, as well as insects and spiders. There are a variety of suitable habitats for this species within the project site and this species is known to nest in this region. Monterey cypress, willow, and coyote brush provide suitable nesting habitat for Allen's hummingbird within the project site.
- Olive-sided flycatcher (*Contopus cooperi)* (CDFW Species of Special Concern; USFWS Bird of Conservation Concern). This species is found within the coniferous forest biome, most often associated with forest openings, forest edges near natural openings (e.g., meadows, canyons, rivers) or human-made openings (e.g., harvest units), or open to semi-open forest stands. Although this species typically nests at higher elevations and more protected areas from the coastline, the Monterey cypress in project site provide suitable nesting habitat. There is a moderate potential for this species to nest in the Monterey cypress stands within the project site.

[19] Half Moon Bay Patch, 2011, Boutell, A. Winter Is a Hot Time for Hawks and Other Raptors in Half Moon Bay, International bird expert Alvaro Jaramillo gives a talk and leads a bird walk at Wavecrest with fellow local resident and biologist Gary Deghi, http://patch.com/california/halfmoonbay/winter-is-a-hot-time-for-hawks-and-other-raptors-in-h5e80b41532, accessed on September 20, 2020.

[20] City of Half Moon Bay, 1993, Local Coastal Program, page 62.

- Loggerhead shrike (*Lanius ludovicianus*) (CDFW Species of Special Concern; USFWS Bird of Conservation Concern). Loggerhead shrike is a common resident and winter visitor in lowlands and foothills throughout California. It prefers open habitats with scattered trees, shrubs, posts, fences, utility lines, or other perches. Nests are usually built on a stable branch in a densely-foliaged shrub or small tree and are usually well concealed. The highest densities occur in open-canopied valley foothill hardwood, valley foothill hardwood-conifer, valley foothill, riparian, pinyon-juniper, juniper, and desert riparian habitats. While this species eats mostly arthropods, they also take amphibians, small to medium-sized reptiles, small mammals, and birds. They are also known to scavenge on carrion. Suitable foraging habitat is present and suitable nesting habitat may be present in the trees and shrubs within the project site. Therefore, this species has a moderate potential to occur within the project site.
- San Francisco (saltmarsh) common yellowthroat (*Geothlypis trichas sinuosa*) (USFWS Bird of Conservation Concern; CDFW Species of Special Concern). This subspecies of the common yellowthroat is found in freshwater marshes, coastal swales, riparian thickets, brackish marshes, and saltwater marshes. Their breeding range extends from Tomales Bay in the north, Carquinez Strait to the east, and Santa Cruz County to the south. This species requires thick, continuous cover such as tall grasses, tule patches, or riparian vegetation down to the water surface for foraging and prefers willows for nesting. Although this species is more typically associated with nesting near open water, the willow riparian habitat is suitable for nesting by this species. There is a moderate potential for this species to nest within the riparian habitat in the project site.
- (Brewster's) Yellow warbler (*Setophaga petechia brewsteri*) (CDFW Species of Special Concern; USFWS Bird of Conservation Concern). The yellow warbler is a neotropical migrant bird that is widespread in North America, but has declined throughout much of its California breeding range. The Brewster's (*brewsteri*) subspecies is a summer resident and represents the vast majority of yellow warblers that breed in California. West of the Central Valley, typical yellow warbler breeding habitat consists of dense riparian vegetation along watercourses, including wet meadows, with willow growth especially being favored. Insects comprise the majority of the diet. The riparian scrub habitat within the project site is suitable for nesting by this species, and this species is known to nest in the vicinity of the project site. There is a high potential for this species to nest within the riparian habitat within the project site.
- Bryant's savannah sparrow *(Passerculus sandwichensis alaudinus*) (CDFW Species of Special Concern). The Bryant's is a savannah sparrow subspecies and California endemic whose range extends along the fog belt from Monterey County north to Del Norte County. It is most often associated with salt marsh habitat but will also use moist grasslands. Suitable foraging habitat is present and suitable nesting habitat may be present in the grassland habitat within the project site. This species was observed on the January 27, 2016 site visit and based upon location and habitat, it is assumed to be the protected subspecies *P. s. alaudinus*. The moist grassland habitat with scattered shrubs within the project site provide suitable nesting habitat for this species. This subspecies is present and has a high potential to nest within the project site.

As currently proposed, construction of the proposed project could occur over a one-year period. Because this window could overlap with certain nesting periods, the following mitigation measure is required to ensure that impacts would be less than significant.

> **Mitigation Measure BIO-2**: If ground disturbance or removal of vegetation occurs between February 1 and June 30, preconstruction surveys shall be performed by a qualified biologist no more than 14 days prior to commencement of such activities to determine the presence and location of nesting bird species. If ground disturbance or removal of vegetation occurs between July 1 and August 31, preconstruction surveys shall be performed within 30 days prior to such activities. If active nests are present, temporary protective breeding season buffers shall be established to avoid direct mortality of these birds, nests, or young. The appropriate buffer distance is dependent on the species, surrounding vegetation, and topography, and shall be determined by a qualified biologist to prevent nest abandonment and direct mortality during construction.

Implementation of Mitigation Measure BIO-2 would reduce impacts to nesting birds, including raptors, to a less-than-significant level. **Less-than-Significant Impact with Mitigation.**

Amphibians and Reptiles

The CRLF and SFGS are known to use the project site vicinity but are unlikely to occur within the project site. This is because of the absence of preferred habitat components and distance from suitable and/or occupied habitats and because of the suitability of nearby habitats. No suitable breeding habitat is found within the project study area; however, CRLF and SFGS could occasionally disperse through the project site under certain conditions. A description of these special-status species is listed below:

- CRLF (*Rana draytonii*) (Federal Threatened; State Species of Special Concern; LUP Unique Species). The historic range of CRLF extended along the coast from the vicinity of Point Reyes National Seashore in Marin County and inland from Redding, Shasta County southward to northwestern Baja California, Mexico. The current distribution of this species includes only isolated localities in the Sierra Nevada, northern Coast and Northern Traverse Ranges. It is still common in the San Francisco Bay Area and along the Central Coast and it is now believed extirpated from the southern Transverse and Peninsular Ranges. The nearest documented occurrences of CRLF are at an agricultural ditch over 1,000 feet north and 0.9 miles south of the project site. Based on the description of the habitat for the nearest occurrence to the northeast, it is likely that the observed frog was a dispersing individual. Only one individual was observed at this location and no subsequent observations at this location have been made since 2004. There is also a pond on a golf course 630 feet south of the project site with potential to support CRLF. Additionally, seasonal pools in proximity to the project site have been reported to potentially contain larvae (tadpoles).

  The seasonal wetland depressions and swales within the project study area are only inundated for brief periods immediately after storm events and do not support a population of ranid frog species. Two seasonal wetlands and ditches do support Sierran tree frog breeding; however, these wetlands and ditches are not of sufficient depth to maintain a sufficient inundation period to support CRLF breeding. The maximum potential depth of these features is 18 inches, and the average depth was 12 inches or less at the time of the January 27, 2016 site visit. This is at the lower limit of potential depths within which CRLF breed, and these are small wetlands and ditches that do not remain inundated for a suitable length to support development. An additional site visit was conducted on March 16, 2016 to verify the presence of CRLF larvae. No CRLF of any life stage (eggs, larvae, or adults) were observed at this time. All amphibians present were Pacific treefrog (*Pseudacris regilla*), and this species was observed at each pool. All life stages (egg masses, larvae, and adult frogs) of the Pacific treefrog were observed. The four pools that were observed were also not of typical depth or inundated for a sufficient length of time to support CRLF breeding and successful metamorphosis.

The project study area is greater than 600 feet from all potential breeding habitat; therefore, the project study area is unlikely to be used as upland refugia by CRLF and almost no burrows of suitable sized were observed within the project study area. In addition, the riparian scrub habitat is not connected to habitats to the east nor does it appear to contain potential breeding habitat based upon a review of the areas in the vicinity of the existing trail and the mouth at the beach. There was only a minimal amount of flow despite recent heavy rains in the area in previous weeks. Although the project site is unlikely to be used by CRLF for breeding or upland refugia, the project site is within 0.6 miles of breeding habitats. CRLF dispersing from nearby breeding habitats to the north and south of the project site may occasionally use the riparian habitat, ditches, and seasonal wetlands; however, CRLF are only likely to use the project site when these habitats are inundated or during rain events because CRLF are unlikely to travel over dry land. This species is unlikely to occur within the project site but could disperse through the project site.

- San Francisco garter snake (*Thamnophis sirtalis tetrataenia*) (Federal Endangered; State Endangered; CDFW Fully Protected; LUP Rare Species). Historically, SFGS occurred in scattered wetland areas on the San Francisco Peninsula from approximately the San Francisco County line south along the eastern and western bases of the Santa Cruz Mountains, at least to the Upper Crystal Springs Reservoir, and along the coast south to Año Nuevo Point, San Mateo County, and Waddell Creek, Santa Cruz County. The preferred habitat of the SFGS is a densely vegetated pond near an open hillside where they can sun themselves, feed, and find cover in rodent burrows; however, considerably less ideal habitats can be successfully occupied. Temporary ponds and other seasonal freshwater bodies are also used. Emergent and bankside vegetation such as cattails (*Typha spp*.), bulrushes (*Scirpus spp*.) and spike rushes (*Juncus spp. and Eleocharis spp*.) apparently are preferred and used for cover. The area between stream and pond habitats and grasslands or bank sides is used for basking, while nearby dense vegetation or water often provide escape cover. Snakes also use floating algal or rush mats, if available.

  The seasonal wetland depressions and swales within the project study area are only inundated for brief periods immediately after storm events and do not support a population of ranid frog species. Two seasonal wetlands and ditches do support Sierran tree frogs; however, these ditches do not support prey items beyond winter and early spring, and the distance to potentially occupied habitats by SFGS are of sufficient distance to greatly reduce the potential for SFGS to use the habitats within the project study area even on a seasonal basis. In the late spring through fall months, the project study area is unlikely to support any prey items of SFGS, especially CRLF, which are more heavily dependent upon as a food source of SFGS during the late spring and summer months. The nearest potential year-round suitable habitat for SFGS is 0.75 miles east of the project site and Highway 1 runs between the project site and this potential habitat. A potential early season pond is present to the northeast of the project site; however, this pond is over 1,000 feet from the project site and unlikely to be inhabited by SFGS. Currently, there is no suitable aquatic habitat for SFGS within or in proximity to the project site. Longer travel distances have potential only when SFGS are most probably following prey items, and there is no riparian linkage to provide a likely dispersal pathway in this situation. This species is unlikely to occur within the project site but could disperse through the project site.

Construction activities would have the potential to adversely affect CRLF and SFGS. The following mitigation measures would be required to ensure that impacts would be less than significant.

Mitigation Measure BIO-3a: To reduce potential for CRLF and SFGS to disperse through the project study area, all ground disturbance activities should be restricted to the dry season (May 1 through October 15) or when all habitats have dried.

Mitigation Measure BIO-3b: To verify if species are present and all habitats are dry, a qualified biologist shall survey the work site immediately before the onset of vegetation clearing or ground disturbance activities. If CRLF are found and do not move out of the work area on their own, the contractor shall contact the USFWS to determine if relocation is appropriate. In making this determination, the USFWS will consider if an appropriate relocation site exists. If the USFWS approves moving animals, a USFWS-approved biologist shall move them from the work site before work activities begin. Any SFGS shall be allowed to leave the work area on their own and shall be monitored by the biologist to ensure they do not reenter the work area.

Mitigation Measure BIO-3c: No work may occur within 48 hours of a rain event (defined as over 0.25 inches in a 24-hour period). Following a rain event, a qualified biologist should survey the work site immediately before reinitiating ground disturbance activities to verify if species are present. If CRLF or SFGS are observed, then the stairs described in Mitigation Measure BIO-3b shall be followed.

Mitigation Measure BIO-3d: Any erosion control materials used shall be made of tightly woven fiber netting, or similar material, to ensure that the CRLF and SFGS do not get trapped. This limitation shall be communicated to the contractor. Plastic mono-filament netting (erosion control matting), rolled erosion control products, or similar material shall not be used at the project site because CRLF, SFGS, and other species may become entangled or trapped in it.

Mitigation Measure BIO-3e: CRLF and SFGS may take refuge in cavity-like and den-like structures such as pipes and may enter stored pipes and become trapped. Therefore, all construction pipes, culverts, or similar structures that are stored at the site for one or more overnight periods shall be either securely capped prior to storage or thoroughly inspected by the on-site monitor and/or the construction foreman/manager for these animals before the pipe is subsequently buried, capped, or otherwise used or moved in any way. It is also recommended that these structures, if stored, are kept within the staging areas either in developed areas or within wildlife exclusion fencing. If CRLF are found and do not move out of the work area on their own, the USFWS shall be contacted to determine if relocation is appropriate. In making this determination, the USFWS will consider if an appropriate relocation site exists. If the USFWS approves moving animals, a USFWS-approved biologist shall be allowed sufficient time to move them from the work site before work activities begin. If SFGS is found, it should be allowed to passively leave the work area on its own, as determined by the on-site monitor, except in circumstances where the animal is determined to be trapped (see Mitigation Measure BIO-3f).

Mitigation Measure BIO-3f: To prevent inadvertent entrapment of CRLF or SFGS during construction, the on-site biologist and/or construction foreman/manager shall ensure that all excavated, steep-walled holes or trenches more than one foot deep are completely covered at the close of each working day by plywood or similar materials, or provided with one or more escape ramps constructed of earth fill or wooden planks and inspected by the on-site biologist. Before such holes or trenches are filled, they shall be thoroughly inspected for trapped animals by the on-site biologist and/or construction foreman/manager. If at any time a trapped CRLF or SFGS is discovered by the on-site biologist or anyone else, the animal shall be allowed to passively leave the work area on its own, as determined by the on-site biologist. If a CRLF or SFGS is trapped, only a USFWS-approved biologist shall move the individual under the direction of USFWS and CDFW.

Mitigation Measure BIO-3g: Implement Mitigation Measures BIO-1a through BIO-1e.

Implementation of Mitigations Measures BIO-3a through BIO-3g would reduce impacts to CRLF and SFGS to a less-than-significant level. **Less-than-Significant Impact with Mitigation.**

Insects

Monarch butterflies' roost sites are afforded special status from CDFW and there is a moderate potential for monarchs to roost in the Monterey cypress stands in the project site. A description of this insect is as follows:

- Monarch butterfly (*Danaus plexippus*) (CDFW Roost Protected). Winter roost sites extend along the coast from northern Mendocino to Baja California, Mexico. Roosts are located in wind-protected tree groves, with nectar and water sources nearby, and are often on south-, southwest-, or west-facing slopes, which may provide more favorable temperature regimes and wind protection. Monarch butterflies typically arrive in mid-October to overwintering sites along the California coast and remain until late February or March. No documented roosts are known within the project study area, which is a public open space with a high number of daily visitors. Potentially suitable winter roost sites exist for this species in the Monterey cypress stands within the project site; however, roost sites are typically in more sheltered locations from the coastline. Monarch butterflies were not observed within the project study area or adjacent eucalyptus groves during the January 26 and 27, 2016 site visit; however, monarch butterflies were observed in small numbers foraging within the project study area during the February 9 and 16, 2016 site visits. No roosting by monarchs was observed in the Monterey cypress stands within the project study area; however, foraging habitat it present. Although the Monterey cypress stands are exposed and no monarchs were observed roosting during the BRE site visits, roost sites may change from year to year.

Implementation of the proposed project would have the potential to adversely affect monarch butterflies. The following mitigation measures would be required to ensure that impacts would be less than significant.

Mitigation Measure BIO-4a: If project activities are to remove or trim trees within the Monterey cypress stands within the project site during the winter roost season (October 1 through March 15), a preconstruction survey for roosting monarch butterflies shall be conducted within 7 days of tree removal or trimming activities. If tree removal or trimming is conducted March 16 through September 31, no preconstruction surveys for roosting monarch butterflies are necessary.

If monarch butterflies are detected roosting in trees to be removed or trimmed, consultation with the CDFW shall be required and construction activities shall not proceed until either the butterflies have left the trees or additional mitigation measures are implemented to ensure impacts to monarch butterflies are less than significant.

Mitigation Measure BIO-4b: Soil disturbance and vegetation removal shall be minimized to the extent feasible in order to reduce the impact to nectar plants for monarch butterfly.

Implementation of Mitigations Measures BIO-4a and BIO-4b would reduce impacts to the monarch butterfly to a less-than-significant level. **Less-than-Significant Impact with Mitigation.**

Mammals

San Francisco Dusky-Footed Woodrat

The San Francisco dusky-footed woodrat is afforded special status from CDFW and this species has moderate potential to establish in the riparian scrub habitats within the project site. A description of this mammal is as follows:

- San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*) (CDFW Species of Special Concern). 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. The Monterey cypress stands within the project study area do not have understory vegetation and are unlikely to be used by woodrats based upon lack of suitable vegetation and high disturbance by humans and off-leash pets. No woodrat houses were observed in the Monterey cypress stands or within the project study area during the BRE site visits. The dense central coast riparian scrub habitat is suitable for woodrat and a house was observed within the 200-foot buffer during the BRE site visit in central coast riparian scrub along the western portion of the existing informal trail crossing.

Implementation of the proposed project would have the potential to adversely affect dusky-footed woodrats. The following mitigation measures would be required to ensure that impacts would be less than significant.

> **Mitigation Measure BIO-5:** A pre-construction survey for woodrat houses shall be conducted by a qualified biologist within 30 days of the start of work. If houses are observed, they shall be avoided if feasible. If avoidance is not feasible, the houses shall be dismantled by hand under the supervision of a biologist. If young are encountered during the dismantling process, the material shall be placed back on the house and the house shall remain unmolested for two to three weeks in order to give the young enough time to mature and leave the house. After two to three weeks, the nest dismantling process may begin again. Nest material shall be moved to suitable adjacent areas (riparian, woodland, scrub) that shall not be impacted.

With implementation of Mitigation Measure BIO-5, impacts to the San Francisco dusky-footed woodrat would be less than significant. **Less-than-Significant Impact with Mitigation.**

Bats

Two special-status bat species, western red bat and hoary bat, may utilize trees within the project site for roosting during the non-hibernation season. A description of these bats is as follows:

- Western red bat (*Lasiurus blossevillii*) (CDFW Species of Special Concern; Western Bat Working Group High Priority). 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 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 riparian habitat (particularly willows, cottonwoods, and sycamores). 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. The Monterey cypress present within the project site may provide suitable roost habitat for this species; however, the density of the willow branches reduces the potential for the riparian scrub habitat to be used for roost sites because of obstruction to initiation of flight. The project study area does not provide suitable conditions for hibernating bats because of its location at the coastline and lack of hibernacula. The project site has a moderate potential to support western red bat roosting in the Monterey cypress during the active season.
- Hoary bat (*Lasiurus cinereus*) (Western Bat Working Group Medium Priority). Hoary bats are highly associated with forested habitats in the western United States, particularly in the Pacific Northwest. They are a solitary species and roost primarily in foliage of both coniferous and deciduous trees, near the ends of branches, usually at the edge of a clearing. Roosts are typically 10 to 30 feet above the ground. They have also been documented roosting in caves, beneath rock ledges, in woodpecker holes, in grey squirrel nests, under driftwood, and clinging to the side of buildings, though this behavior is not typical. Hoary bats are thought to be highly migratory; however, wintering sites and migratory routes have not been well documented. This species tolerates a wide range of temperatures and has been captured at air temperatures between 0 and 22 degrees Celsius. Hoary

bats probably mate in the fall, with delayed implantation leading to birth in May through July. They usually emerge late in the evening to forage, typically from just over one hour after sunset to after midnight. This species reportedly has a strong preference for moths, but is also known to eat beetles, flies, grasshoppers, termites, dragonflies, and wasps. The Monterey cypress and willows in the riparian habitat within the project site may provide suitable roost habitat for this species. The project study area does not provide suitable conditions for hibernating bats because of location at the coastline and lack of hibernacula. The project site has a moderate potential to support hoary bat roosting in the Monterey cypress and willow trees during the active season.

Implementation of the proposed project would have the potential to adversely western red bats and hoary bats. The following mitigation measures would be required to ensure that impacts would be less than significant.

Mitigation Measure BIO-6: If project activities have the potential to disturb trees within the project site during the maternity roosting season (April 1 through August 31) of bats, preconstruction surveys for bats shall take place. Surveys shall be conducted by a qualified biologist no less than 14 days prior to those activities that have the potential to disturb bat roosting and foraging habitats within the project site. Ultrasonic acoustic surveys and/or other site appropriate survey methods shall be performed to determine the presence or absence of bats utilizing the project site as roosting or foraging habitat.

If special-status bat species are detected during surveys, species- and roost-specific mitigation measures that prevent significant impacts shall be developed by a qualified biologist. Such measures may include postponing removal of trees, snags, or structures until the end of the maternity roosting season or construction of species-appropriate roosting habitat within the project site. Consultation with CDFW is required to determine appropriate mitigation measures if roosts are disturbed or destroyed.

Trees may be removed outside of the maternity roosting season without performing preconstruction bat surveys.

With implementation of Mitigation Measure BIO-6, impacts to roosting bats would be less than significant. **Less-than-Significant Impact with Mitigation.**

Special-Status Plants

Of the 46 special-status plant species known to occur in the vicinity of the project study area, one has been documented within the project study area and 17 were determined to have a moderate potential to occur in the project study area. One plant species was observed throughout the project study area during the January and February 2016 BRE site visits that was potentially Choris' popcorn flower (*Plagiobothrys chorisianus var. chorisianus*) and presence was confirmed on April 15, 2016 by WRA. A description of this plant is as follows:

- Choris' Popcorn Flower (*Plagiobothrys chorisianus* var. *chorisianus*) (CNPS Rank 1B). Choris' popcorn flower is an annual herbaceous species in the family Boraginaceae. Typical habitat for this species includes chaparral, coastal prairie, and coastal scrub. Choris' popcorn flower has been recorded in Alameda, San Francisco, San Mateo, and Santa Cruz Counties at elevations ranging from 15 to 160 meters and blooms from March through June. Choris' popcorn flower has documented occurrences within the Wavecrest property during 1995 and 2004, 2013 and 2015 plant surveys and field visits conducted by T. Corelli and D. Lake, respectively. The reported population estimates were in the hundreds in 1995, 85 plants in 2013, and 3,000 plants in 2015. Three areas containing Choris' popcorn flower were documented within the study area during the 1995 survey. This species was observed in northern coastal scrub, coyote brush/western brush, seasonal wetland, and coastal wetland habitats within the project study area. Choris' popcorn flower was observed in early vegetative stages during the January and February 2016 site visits; however, due to lack of flowering parts, these plant individuals were not identifiable to variety at this time. A subsequent protocol-level special-status plant survey on April 15, 2016 surveyed the proposed trail alignment and associated 200-foot buffer and confirmed individuals of Choris' popcorn flower are present within the project study area. Based on 2016 survey estimates, the project study area contains approximately 7.5 acres of Choris' popcorn flower or roughly 43,000 individuals. The Choris' popcorn flower extent from the 2016 survey as well as the 1995 survey mapped extent is depicted on Figure 5 of the BRE included as Appendix C of this Initial Study.

- Ocean bluff milk-vetch (*Astragalus nuttallii* var. *nuttallii*) (CNPS Rank 4.2). Ocean bluff milkvetch is a perennial herb in the Fabaceae family that occurs in coastal bluff scrub and coastal dunes at elevations ranging from 10 to 390 feet (3 to 120 meters). This species blooms from January to November and is known in Alameda, Monterey, Marin, Santa Barbara, San Francisco, San Luis Obispo, and San Mateo Counties. The nearest documented occurrence is located 6.63 miles from the project site in San Gregorio in 2007 and is presumed extant at that location. Given that the project site contains coastal scrub and dune habitats, this species was determined to have a moderate potential to be present.

- Coastal marsh milk-vetch (*Astragalus pycnostachyus* var. *pycnostachyus*) (CNPS Rank 1B.2). Coastal marsh milk-vetch is a perennial herb in Fabaceae family that occurs in the coastal dunes (mesic), coastal scrub, coastal salt, and streamside marshes and swamps. This species typically occurs at elevations ranging from 0 to 100 feet (0 to 30 meters) in Humboldt, Marin, and San Mateo Counties. Coastal marsh milk-vetch blooms between April and October. The nearest documented occurrence is located 4.97 miles from the project site at Pillar Point and was recorded in 1902, but is presumed extant at that location. This species has a moderate potential to occur in the project site due to the presence of suitable coastal habitats, such as coastal dunes and scrub.

- Johnny-nip (*Castilleja ambigua* var. *ambigua*), (CNPS Rank 4.2). Johnny-nip is an annual (hemiparasitic) herb in the Orobanchaceae family that occurs in coastal bluff scrub, coastal prairie, coastal scrub, marshes and swamps, and valley and foothill grassland, and along vernal pools margins. It can be found at elevation ranges typically from 0 to 1,430 feet (0 to 435 meters) during its bloom period between March and August. Limited occurrence information has been documented for this species and the closest occurrence was seen at Moss Beach in 1905. The project site was determined to have moderate potential to support this species due to the presence of suitable coastal scrub habitat.

- San Francisco Bay spineflower (*Chorizanthe cuspidate* var. *cuspidata*) (CNPS Rank 1B.2). San Francisco Bay spineflower is an annual herbaceous species in the family Polygonaceae. It occurs in coastal bluff scrub, coastal dunes, coastal prairie, and coastal scrub, and often on sandy soils. It is recorded from 3 to 215 meters in elevation in Alameda, Marin, San Francisco, San Mateo, and possibly Sonoma Counties, and blooms between April and August. The nearest documented occurrence of this species is greater than 5 miles from the project site and is presumed extant at that location. This species has moderate potential to occur within the project site since suitable coastal scrub habitat for this species is present.
- San Francisco gumplant (*Grindelia hirsutula* var. *maritima*) (CNPS Rank 3.2). San Francisco gumplant is a perennial herb in the family Asteraceae. It occurs on bluffs or in sandy or serpentine soils in coastal scrub, coastal bluff scrub, and valley and foothill grassland communities. It is recorded from 15 to 400 meters in elevation in Marin, San Francisco, San Luis Obispo, and San Mateo Counties, with possible additional occurrences in Monterey and Santa Cruz Counties. It blooms between June and September. The nearest documented occurrence is over 7 miles north of the project site from 1985 and is presumed extant. Within the project site, this species could occur within coastal scrub or grassland communities and therefore has moderate potential to occur.
- Short-leaved evax (*Hesperevax sparsiflora* var. *brevifolia*) (CNPS Rank 1B.2). Short-leaved evax is a small annual herb in the family Asteraceae. It occurs in sandy or rocky bluffs and flats in coastal bluff scrub and coastal dunes. Short-leaved evax is recorded from 0 to 200 meters in elevation in all coastal counties from Del Norte to Santa Cruz County, but is presumed extirpated from San Francisco County. It blooms between March and June. The nearest documented occurrence is from 1970, located over 7 miles northeast from the project site, and has never been verified at this location. The project site contains sandy coastal scrub and dune habitats that have moderate potential to support this species.
- Kellogg's horkelia (*Horkelia cuneata* var. *sericea*) (CNPS Rank 1B.1). Kellogg's horkelia is a perennial herb in the family Rosaceae. It occurs on gravelly or sandy soils in closed-cone coniferous forest, maritime chaparral, and openings in coastal scrub habitat. It is recorded from 10 to 200 meters in elevation in Alameda, Monterey, Santa Barbara, Santa Cruz, San Mateo, and San Luis Obispo Counties, and is presumed extirpated from Marin and San Francisco Counties. Kellogg's horkelia blooms between April and September. The nearest documented occurrence is from 2000 and was mapped 3 miles northeast of the project site on a ridgetop in Half Moon Bay and is presumed extant at that location. The project site has moderate potential to provide suitable habitat for this species within coastal scrub and coastal dune habitat.
- Point Reyes horkelia (*Horkelia marinensis*) (CNPS Rank 1B.2). Point Reyes horkelia is a perennial herb in the family Rosaceae. It occurs in sandy flats, coastal prairie, and coastal scrub. It is recorded from 5 to 30 meters in elevation in Mendocino, Marin, Santa Cruz, San Mateo, and Sonoma Counties. It blooms between May and September. The nearest documented occurrence is from 1962, located approximately 11.5 miles from the project site in Junipero Serra Park, and is presumed extant at that location. Within the project site, this species has moderate potential to occur within the coastal scrub community.
- Perennial goldfields (*Lasthenia californica* ssp. *macrantha*) (CNPS Rank 1B.2). Perennial goldfields is a perennial herb in the Asteraceae family. This species typically occurs in coastal bluff scrub, coastal

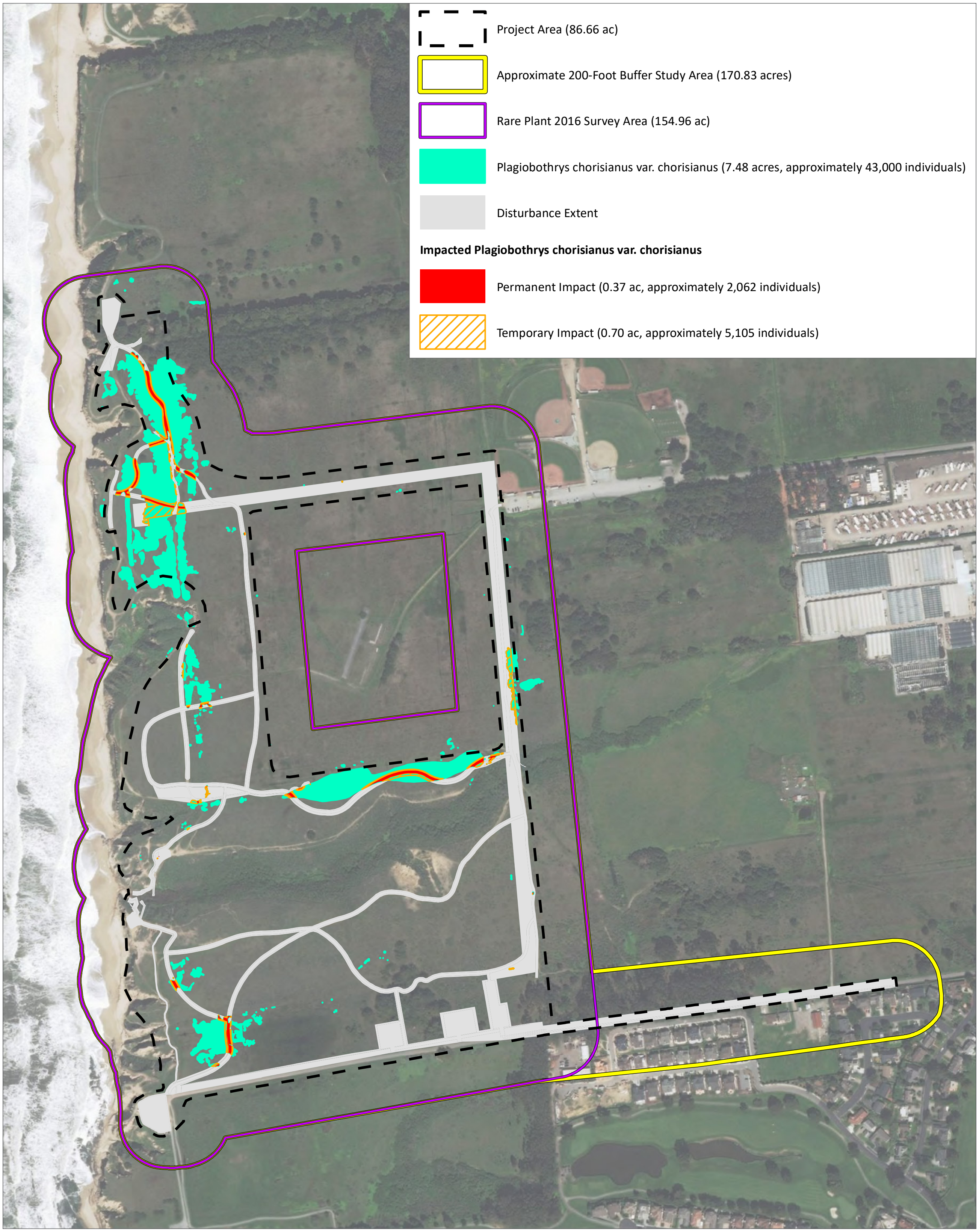
dunes, and coastal scrub communities at elevations ranging between 5 and 520 meters. It blooms between January and November. Perennial goldfields has been recorded in Mendocino, Marin, San Luis Obispo, San Mateo, and Sonoma Counties. The nearest documented occurrence from 1921 is located 12.5 miles from the project site at Pescadero State Beach is presumed extant. Within the project site, this species could occur within the coastal dune and coastal scrub habitat.

- Coast yellow leptosiphon (*Leptosiphon croceus*) (CNPS Rank 1B.1). Coast yellow leptosiphon is an annual herb in the Polemoniaceae family that grows in coastal bluff scrub and coastal prairie habitats at elevations ranging from 30 to 490 feet (10 to 150 meters). This species blooms between April and May. The nearest documented occurrence is from 2015 and is located 10.8 miles from the project site in Moss Beach. This species was determined to have moderate potential to occur within the project site due to known nearby populations and given that suitable coastal scrub habitat is present.
- San Mateo tree lupine (*Lupinus arboreus* var. *eximius*) (CNPS Rank 3.2). San Mateo tree lupine is a perennial evergreen shrub that occurs in the Fabaceae family. This species typically occurs in chaparral and coastal scrub habitats at elevations ranging from 300 to 1,800 feet (90 to 550 meters). It blooms between April and July and has been recorded in San Mateo and Sonoma Counties. There is limited occurrence information available for this species. San Mateo tree lupine was determined to have moderate potential to occur within the project site due to the presence of coastal scrub habitat and sandy soils that may be suitable for this species.
- Davidson's bushmallow (*Malacothamnus davidsonii*) (CNPS Rank 1B.2). Davidson's bushmallow is a perennial deciduous shrub from the Malvaceae family. This species typically occurs in chaparral, cismontane woodland, coastal scrub, and riparian woodland communities at elevations ranging from 185 to 855 meters. Davidson's bushmallow blooms between June and January and has been recorded in Los Angeles, Monterey, Santa Clara, San Luis Obispo, and San Mateo Counties. The nearest documented occurrence is from Crystal Spring Reservoir from 1912. Within the project site, this species could occur within the coastal scrub community.
- Marsh microseris (*Microseris paludosa*) (CNPS Rank 1B.2). Marsh microseris is a perennial herb in the family Asteraceae. It occurs in closed-cone coniferous forest, cismontane woodland, coastal scrub, and valley and foothill grassland, often where grasses are low-growing. It is recorded from 5 to 300 meters in elevation in Mendocino, Monterey, Marin, San Benito, Santa Cruz, San Luis Obispo, and Sonoma Counties, and is presumed extirpated from San Francisco and San Mateo Counties. It blooms between April and June. The nearest documented occurrence is from 2004 and is located 14 miles from the project site in Pescadero State Beach. Within the project site, this species could occur within coastal scrub or grassland communities.
- Oregon polemonium (*Polemonium carneum*) (CNPS Rank 2B.2). Oregon polemonium is a perennial herb in the family Polemoniaceae. It occurs in coastal prairie, coastal scrub, and lower montane coniferous forest. Oregon polemonium is recorded from 0 to 1,830 meters in elevation in Del Norte, Siskiyou, Humboldt, Sonoma, Marin, Alameda, San Francisco, and San Mateo Counties. It blooms between April and September. The nearest documented occurrence is from 1916 and is located 7.23 miles from the project site in Pilarcitos Dam and is presumed extant at that location. Within the project site, this species could occur within the coastal scrub community.

- Hickman's cinquefoil (*Potentilla hickmanii*) (Federal Endangered; State Endangered; CNPS Rank 1B.2). Hickman's cinquefoil is a perennial herb in the family Rosaceae. It occurs in coastal bluff scrub, closed-cone coniferous forest, vernally mesic meadows and seeps, and freshwater marshes and swamps. It is recorded from 10 to 149 meters in elevation in Monterey, San Mateo, and Sonoma Counties. It blooms between April and August. The nearest documented occurrence of this species is from 2008 over 7.8 miles north from the project site at Moss Beach. Within the project site, this species could occur in the coastal scrub community.
- San Francisco campion (*Silene verecunda* ssp. *verecunda*) (CNPS Rank 1B.2). San Francisco campion is a perennial herb in the family Caryophyllaceae. It occurs in sandy soils in coastal bluff scrub, chaparral, coastal prairie, coastal scrub, and valley and foothill grassland. It is recorded from 30 to 645 meters in elevation in San Francisco, San Mateo, Santa Cruz, and Sutter Counties. It blooms between March and August. The nearest documented occurrence is from 1994 and is located 6.6 miles from the project site on Montara Mountain and is presumed extant at that location. Within the project site, this species could occur within coastal scrub or grassland communities.
- Coastal triquetrella (*Triquetrella californica*) (CNPS Rank 1B.2). Coastal triquetrella is a moss in the Pottiaceae family that occurs in coastal bluff scrub and coastal scrub on soil at elevations ranging from 30 to 330 feet (10 to 100 meters). The project site contains suitable habitat such as coastal scrub and areas of exposed soils. The nearest documented occurrence is from 2006 and is located 11 miles from the project site in Golden Gate National Recreation Area and is presumed extant at that location. This species has moderate potential to occur in coastal scrub habitat within the project site.

Implementation of the proposed project would have the potential to adversely affect special-status plant species. As shown on Figure 4.3-1, construction of the project could temporarily affect .07 acres of Choris' Popcorn Flower (*Plagiobothrys chorisianus* var. *chorisianus*) habitat, and permanently affect .37 acres within the same area. The following mitigation measures would be required to ensure that impacts would be less than significant.

Mitigation Measure BIO-7: Rare plant surveys shall be conducted during the blooming periods for Choris' popcorn flower and species with a moderate potential to occur on the project site (i.e., ocean bluff milk-vetch, coastal marsh milk-vetch, johnny-nip, San Francisco Bay spineflower, San Francisco gumplant, short-leaved evax, Kellogg's horkelia, Point Reyes horkelia, perennial goldfields, coast yellow leptosiphon, San Mateo tree lupine, Davidson's bushmallow, marsh microseris, Oregon polemonium, Hickman's cinquefoil, San Francisco campion, and coastal triquetrella); these surveys shall include one during the months of April to May and one during the months of June to September. If it is determined that construction-related activities would impact Choris' popcorn flower or any species with a moderate potential to occur, a mitigation plan for protecting this species shall be developed by a qualified biologist. Mitigation measures may include additional



Source: WRA, 2020.

Figure 4.3-1
Rare Plant Impacts

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avoidance measures, salvaging and transplanting of plants within disturbance areas, and collection and storage of seeds for future re-establishment efforts. Seeds shall be collected and preserved from areas of disturbance to special-status species prior to the disturbance and used for reseeding efforts in late fall (i.e., November) to suitable areas on site that are no longer subject to human disturbance through the trail realignment.

With implementation of Mitigation Measure BIO-7, impacts to special-status plant species would be less than significant. **Less-than-Significant Impact with Mitigation.**

b) – c) Have a substantial adverse effect on any riparian habitat or other sensitive natural community type? 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?

The types of ESHA in the project study area include non-wetland waters in the form of: 1) an unnamed drainage and tidal waters associated with the Pacific Ocean; 2) sea cliffs; 3) central coast riparian scrub; 4) seasonal wetlands; 5) beaches; and 6) coastal seasonal wetlands, as defined by the California Coastal Act, 2013, Public Resources Code Section 30107.5, and identified by the CDFW or USFWS. Additionally, Chapter 18.38.020.A of the Half Moon Bay Municipal Code identifies Coastal Scrub as a "sensitive habitat." These habitat types, and their locations and sizes, are described as follows:

- Non-Wetland Waters (ESHA). Approximately 8.67 acres of non-wetland waters occur within the project study area as an unnamed intermittent to perennial drainage located centrally, draining from east to west; and as tidal waters associated with the Pacific Ocean. Both types of non-wetland waters are regulated by the United States Army Corps of Engineers, Regional Water Quality Control Board (RWQCB), and the California Coastal Commission (CCC). Additionally, streams are regulated by the CDFW. Therefore, non-wetland waters associated with the intermittent to perennial drainage and the Pacific Ocean are considered sensitive under CEQA.
- Sea Cliffs (ESHA). Approximately 7.65 acres of sea cliffs occur along the western portion of the project study area. As defined by the CCC, a sea cliff is a cliff of which the toe is or may be subject to marine erosion. In addition, a sea cliff is a scarp or steep face of rock, weathered rock, sediment, or soil resulting from erosion, faulting, folding, or excavation of the land mass. The cliff or bluff may be simple planar or curved surface or it may be step-like in section. Sea cliffs occur within the project study area along the westernmost boundary, where the distinct cypress grove ends and elevation drops to the beach.
- Central Coast Riparian Scrub (ESHA). Approximately 4.80 acres of central coast riparian scrub occurs within the project study area. Central coast riparian scrub is a scrubby streamside thicket varying from open to impenetrable and dominated by willow with characteristic species, including coyote brush. This community occurs on sand and gravel bars close to groundwater. In the project study area, approximately 4.80 acres of central coast riparian scrub occurs within an intermittent to perennial drainage in a ravine that drains to the Pacific Ocean. Central coast riparian scrub was dominated by arroyo willow (*S. lasiolepis*, Faculative wetland (FACW)) with coyote brush (*B. pilularis* ssp. *consanguinea*, Obligate upland (UPL)) encroaching along the edges and filling in gaps of arroyo willow. A sample point (SP 7) was taken within the edge of riparian habitat along the western side of the

project study area to document the conditions of the riparian floodplain. The central coast riparian scrub is rated as apparently secure globally and statewide; however, because this habitat occurs as a riparian community, it is regulated by the CDFW and RWQCB and is therefore considered sensitive under CEQA. Additionally, riparian communities are regulated under the City LUP and are therefore considered an ESHA.

- Seasonal Wetland (ESHA). Seasonal wetlands in the project study area included seasonally wetted depressions and swales formed from past human disturbance. Some seasonal wetland swales appear to be remnant irrigation ditches from historic agricultural practices within the project study area from the 1940s, based on historic aerial photographs. Additionally, several areas of seasonal wetland marshes did not contain obvious concave topographical relief but were comprised of plant hummocks and undulating microtopography. Within the project study area, approximately 3.46 acres of seasonal wetlands occur in association with northern coastal scrub and non-native grassland communities. Seasonal wetlands contained wetland hydrology, including the presence of surface water in many cases. While hydric soils were not observed within many seasonal wetland features, seasonally ponded soils in depressions with shallow restrictive layers and saline conditions are known to be naturally problematic. Seasonal wetland areas are typically dominated by pennyroyal (*Mentha pulegium,* Obligate wetland (OBL)), spike rush (*Eleocharis macrostachya,* OBL), popcorn flower (OBL), curly dock (*Rumex crispus,* Facultative (FAC)), brown headed rush (*Juncus phaeocephalus*, FACW), and rabbitsfoot grass (*Polypogon monspeliensis,* FACW), with sparse amounts of tall cyperus (C*yperus eragrostis*, FACW).
- Beaches (ESHA). The project study area includes approximately 2.45 acres of beaches. Beaches consist of barren, mobile sand accumulations the size and shape of which are determined by abiotic factors such as wind, rather than by stabilizing vegetation. Section 18.38.020.A of the Municipal Code regulates beaches (marine habitats) and this community is therefore considered sensitive under CEQA.
- Coastal Seasonal Wetland (ESHA). Coastal seasonal wetlands include seasonal wetland depressions, swales, and meadows, which met one or two of the criteria outlined in the Corps Delineation manual but not all three; these areas are considered coastal wetlands as they meet the definition of a wetland pursuant to Section 18.38.020.E of the Municipal Code. Approximately 0.7 acre of coastal seasonal wetlands was observed within the project study area.
- Northern Coyote Brush Scrub (LUP). The Half Moon Bay Municipal Code, Chapter 18.38, Section 18.38.020, Coastal Resources Areas, describes a "coastal scrub community, associated with coastal bluffs and gullies." The BRE identifies 0.88 acres of Northern Coyote Brush Scrub in the project study area, which is a variant of coastal scrub dominated by the plant Coyote bush (*Baccharis pilularis*). This habitat is located in the southern and eastern portions of the project study area, and is not located within the proposed trail alignment or construction access corridor. Many of the special-status plant species that may occur within the project site are to some degree associated with coastal scrub. The LUP requires a biological assessment to be carried out, any development to be sited and designed to

prevent impacts which would significantly degrade ESHAs, and development to be compatible with the maintenance of the biological productivity of such areas.[21]

Construction of the trail would not involve disturbance of the Northern Coyote brush scrub/Coastal scrub, habitat. However, the CCC and LUP generally prohibit land use or development which would have significant adverse impact on ESHAs. The LUP defines specific criteria for allowable development areas in ESHAs, requires ESHA impacts to be minimized to the maximum extent feasible through siting and design, and requires that mitigation measures be implemented where impacts to ESHAs may occur. As noted in Policy 6-16: Permitted Uses in Terrestrial ESHA and Terrestrial ESHA Buffers in the LUP, only uses dependent on the resources within these areas and their buffer zones (i.e. habitat management and restoration, scientific research and educational activities, and low-intensity public access and recreation) shall be allowed there. As aforementioned, ESHAs within the project study area include non-wetland waters in the form of unnamed drainage ditches, and tidal waters associated with the Pacific Ocean; sea cliffs; beaches, and riparian corridor. The majority of the existing seasonal wetlands is not naturally derived and has developed consequent to historical and ongoing anthropogenic disturbance, including the informal development of social trails. The construction of a formalized trail would reduce human disturbance to existing seasonal wetlands by focusing traffic to the developed trail and alleviating foot traffic through wetland habitat, which would allow vegetation to establish in areas currently disturbed and compacted by recreational use. In addition, social trails being abandoned through project implementation would be fenced off, ripped, and seeded. Some of these occur in wetland habitats, which would be restored through these actions. Figure 4.3-2 Project Impacts to Corps, RWQCB, CCC/LCP, and CDFW Jurisdictional Features, lists the permanent and temporary impacts associated with project construction. The following measures are recommended to minimize adverse effects of development or other activity near ESHAs in accordance with Section 18.38.080.E of the Municipal code:

Mitigation Measure BIO-8a: Construction activities and proposed improvements near wetlands shall adhere to the following requirements:

- The removal of vegetation shall be minimized.
- Enhance or replace habitat as defined by required agency permits.
- Development shall conform to natural topography and minimize erosion potential.
- Runoff and sedimentation shall not exceed predevelopment levels.
- Native vegetation shall be used for replanting, where appropriate.
- Toxic substances, such as fertilizers and pesticides, shall not be used.

Mitigation Measure BIO-8b: Implementation of the proposed project shall adhere to the following general avoidance measures and specific performance criteria for ESHAs to reduce potential impacts to sensitive habitats:

[21] City of Half Moon Bay, 1993, Local Coastal Program, page 67 to 68.

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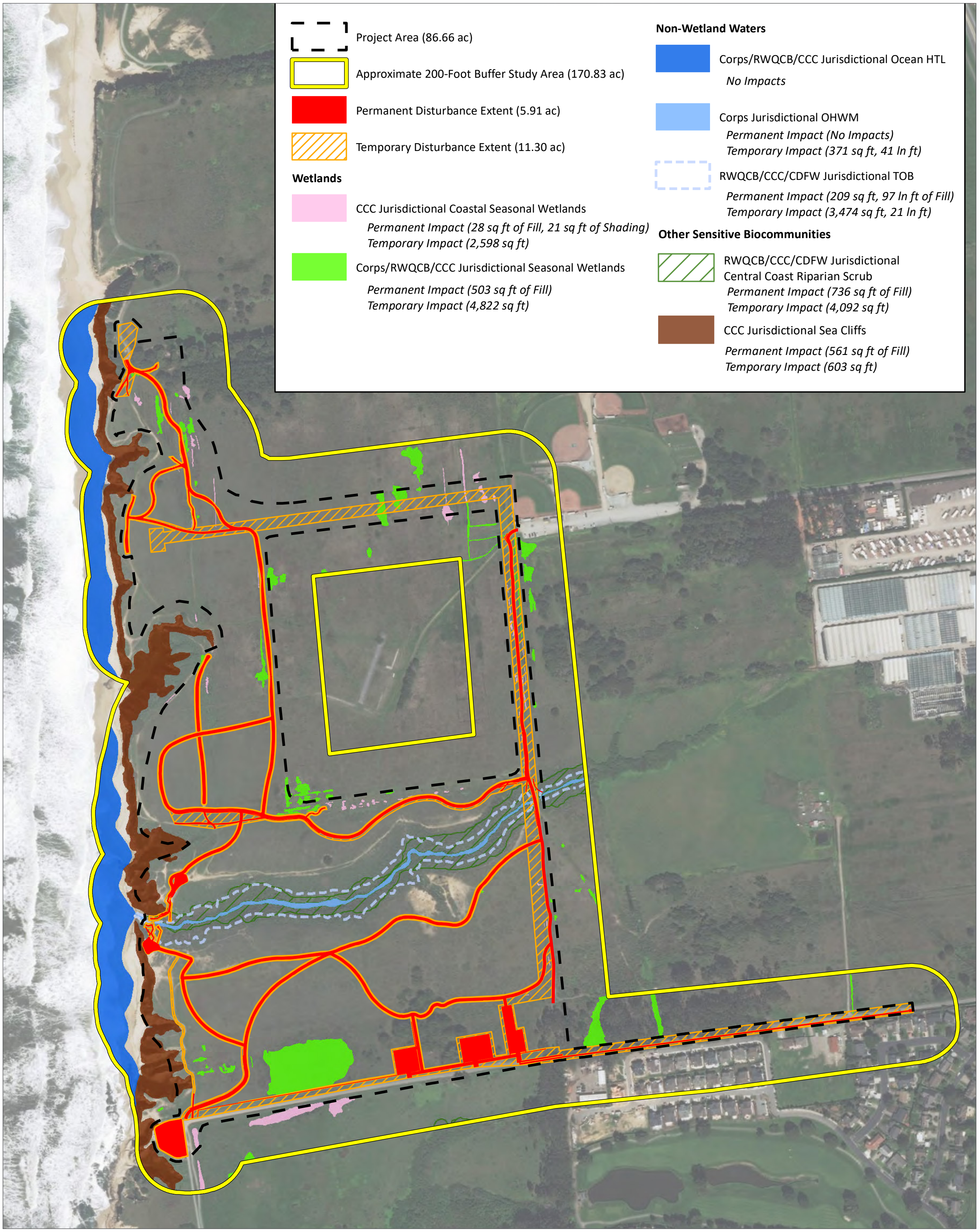

Source: WRA, 2020.

Figure 4.3-2
Jurisdictional Wetland Impacts

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- Any site grading activities shall be restricted to the period between approximately April 15 and October 15. Site grading during these dryer months will reduce the possibility of soil erosion and sediments flowing into natural habitats.
- The project contractor shall install temporary silt fencing along the perimeter of ESHAs adjacent to project activities.
- Soil disturbance around wetland areas shall be minimized to the maximum extent practicable. This will reduce the impact to existing soils and vegetation that will remain as natural habitat and reduce the potential for soil erosion. Perimeter erosion and sediment control measures (i.e., silt fencing, straw waddles) shall be installed as an extra precaution to reduce the possibility of sediments entering the adjacent potential ESHAs.
- Solid materials, including wood, masonry/rock, glass, paper, and other materials, shall not be stored or placed near wetland areas. Solid waste materials shall be properly disposed of off-site. Fluid materials, including concrete, wash water, fuels, lubricants, and other fluid materials used during construction, shall not be disposed of on-site and shall be stored or contained as necessary to prevent spillage into natural habitats. If a spill of such materials occurs, the area shall be cleaned and contaminated materials disposed of properly, and the affected area shall be restored to its natural condition.

Mitigation Measure BIO-8c: To minimize permanent impacts to seasonal wetlands, disturbance to seasonal wetlands from construction access shall be reduced to the maximum extent feasible. Minimization measures shall be employed, including the installation of construction fencing to minimize the extent of disturbance to wetlands, the installation of “swamp-matting” to prevent rutting and compaction of wetland soils, and the reseeding of wetlands following construction to ensure that impacts are temporary in nature.

Implementation of Mitigations Measures BIO-8a and BIO-8c would reduce impacts to the sensitive habitats to a less-than-significant level. **Less-than-Significant Impact with Mitigation.**

d) *Interfere substantially with the movement of any native resident or migratory fish or wildlife species, their wildlife corridors or nursery sites?*

The proposed project is not located on wildlife dispersal routes such as riparian corridors and would not be expected to contribute to habitat fragmentation that would interfere with wildlife migration. **Less-than-Significant Impact.**

e) *Conflict with any local ordinances or policies protecting biological resources?*

As described in Section 3.2.4 above, the proposed project complies with the City Half Moon Bay LUP’s polices for biological resources, including conducting biological reports for sensitive habitats and species, and designing a proposed project that avoids sensitive natural habitats. Additionally, the City of Half Moon Bay Heritage Tree Ordinance, Municipal Code Chapter 7.40 Section 7.40.020, Heritage Trees, requires a tree removal permit for any tree with a trunk diameter of 12 inches or more, or a circumference of 38 inches measured at 48 inches above ground level. The proposed project would involve limbing of

Monterey cypress trees but it is not anticipated that removal of any trees would be necessary. However, if removal were to become necessary the proposed project applicant would obtain a permit from the City. In addition, mitigation, including surveys and appropriate scheduling of work would be conducted prior to any tree removal or limbing as discussed above.

Section 18.38.085 of the Half Moon Bay Municipal Code includes a listing of rare and endangered species with potential to be found within the county coastal area. Of the listed animal species, one animal, the San Francisco garter snake (Thamnophis sirtalis tetrataenia) was documented to have occurred in the vicinity of the project site. The species was determined to have no potential to occur, or are unlikely to occur because of a lack of suitable habitat such as stream, or pond habitats. Species may have been omitted due to lack of available habitat or the distance of the Study Area from documented occurrences.

Of the listed plant species, in Section 18.38.085, one plant, Hickman's cinquefoil (Potentilla hickmanii), was documented to occur in the general vicinity of the project site but was found to be unlikely or have no potential to occur due to lack of suitable habitat. **Less than Significant Impact.**

f) Conflict with an adopted Habitat Conservation Plan, Natural Community Conservation Plan or other approved local, regional, or State habitat conservation plan?

No Habitat Conservation Plan or Natural Community Conservation Plan has been adopted by the City of Half Moon Bay. Therefore, there is no impact. **No Impact.**

V. CULTURAL RESOURCES

Would the 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 as defined in §15064.5?	❐	❐	❐	■
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	❐	■	❐	❐
c) Disturb any human remains, including those interred outside of formal cemeteries?	❐	■	❐	❐

The following discussion is based on a cultural resources survey conducted for the project site by Tom Origer & Associates in February 2016. This survey included field inspection of the project site, contact with Native American representatives, and examination of the library and files of Tom Origer & Associates. An archival record search at the Northwest Information Center, Sonoma State University (NWIC File No.15-1108), was also completed for archaeological site base maps and records, survey reports, and other materials on file. This report is included as Appendix D of this Initial Study.

DISCUSSION

a) *Would the project cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?*

A cultural resources survey of the project site was conducted by personnel meeting the Secretary of the Interior's standards for archaeology, history, and architectural history. Sources of information included a field survey in 2016, as well as listings of properties on the National Register of Historic Places, California Historical Landmarks, California Register of Historical Resources, and California Points of Historical Interest, as listed in the Office of Historic Preservation's Historic Property Directory. No buildings, structures, or other man-made features that could be considered historic resources were found within the study of the project site. **No Impact**.

b) *Would the project cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?*

No known archaeological resources exist within the project site. The Native American Heritage Commission (NAHC) stated in a January 26, 2016 letter that it had no information about the presence of Native American cultural resources in the immediate project area. Additionally, contact with the appropriate Native American individuals or groups yielded no comments. A log of contact efforts and copies of correspondence contained in the report is included in cultural resources survey in Appendix D of this Initial Study. While there are no known archaeological resources within the project site, discovery of unknown resources is possible in the course of proposed project implementation. In the event that archaeological resources are discovered, compliance with Mitigation Measure CULT-1 would reduce the impact.

Mitigation Measure CULT-1: If an archaeological site(s) is encountered during grading or other soil disturbing activities, project managers and project contractors shall comply with the provisions set forth in Sections 15064.5(c) or (e) of the CEQA Guidelines, depending on the type of resource encountered. The site(s) shall be recorded by a qualified archaeologist, including the extent of the site boundaries. The trail alignment(s) and/or associated features shall be relocated away from the archaeological site(s), unless the site(s) is evaluated and determined not to be eligible for listing on the California Register of Historical Resources. The archaeologist shall determine the required distance from the resource. If the eligible site(s) cannot be avoided, the proposed trail shall be designed with protective elements that would provide for trail use with minimal effect on the archeological site(s). These protective elements may include fencing, or placement of the trail on a bridge, boardwalk, or earthen berm. Prior to construction, data recovery and testing shall be conducted as needed. A final report, including the results of the surveys and evaluations, shall be provided to the State Historic Preservation Officer for review.

Furthermore, in the event that an archaeological resource is discovered during project construction activities (e.g., excavation, grading), the following provisions of Section 15064.5(c) of the CEQA Guidelines are to be followed:

(1) A lead agency shall first determine whether the site is a historical resource, as defined in subdivision (a).

(2) If a lead agency determines that the archaeological site is a historical resource, it shall refer to the provisions of Section 21084.1 of the Public Resources Code, and this section, Section 15126.4 of the Guidelines, and the limits contained in Section 21083.2 of the Public Resources Code do not apply.

(3) If an archaeological site does not meet the criteria defined in subdivision (a), but does meet the definition of a unique archeological resource in Section 21083.2 of the Public Resources Code, the site shall be treated in accordance with the provisions of Section 21083.2. The time and cost limitations described in Public Resources Code Sections 21083.2 (c) through (f) do not apply to surveys and site evaluation activities intended to determine whether the project location contains unique archaeological resources.

(4) If an archaeological resource is neither a unique archaeological nor a historical resource, the effects of the proposed project on those resources shall not be considered a significant effect on the environment.

Implementation of Mitigation Measure CULT-1 would reduce impacts to archeological resources to a less-than-significant level. **Less-than-Significant Impact with Mitigation.**

d) Would the project disturb any human remains, including those interred outside of dedicated cemeteries?

Based on the response from the NAHC inquiry, it is not anticipated that Native American or historic burials are present in the project site. However, in the event that human remains are encountered, Mitigation Measure CULT-2 would reduce impacts.

Mitigation Measure CULT-2: If human remains are encountered during grading or other soil disturbing activities, work shall halt within 50 feet of the remains and the County Coroner shall be notified immediately. An archaeologist shall also be contacted to evaluate the find. In accordance with Section 7050.5(c) of the CHSC, if the Coroner recognizes the human remains to be of Native American origin or has reason to believe they are, the Coroner must notify the NAHC within 24 hours of this identification. Subsequently, pursuant to Section 5097.98 of the Public Resources Code, the NAHC will identify a Native American Most Likely Descendent to inspect the site and provide recommendations for the proper treatment of the remains and associated grave goods.

Implementation of Mitigation Measure CULT-2 would reduce impacts to human remains to a less-than-significant level. **Less-than-Significant Impact with Mitigation.**

I. Energy

Would the proposed project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant	No Impact
a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?	❐	❐	■	❐
b) Conflict with or obstruct a State or local plan for renewable energy or energy efficiency?	❐	❐	❐	■

DISCUSSION

a) Would the project result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?

Construction activities use energy from various sources, such as on-site heavy-duty construction vehicles, vehicles hauling materials to and from the site, and motor vehicles transporting the construction crew and vendors. Construction activities are estimated to generate 16 inbound and 16 outbound trips per day, five days a week during the seven-month construction period. Project implementation would not increase trips from existing conditions and would not have a significant effect on VMT. Given the nominal increase in trips during construction and no change in VMT during project implementation, unnecessary energy consumption is not anticipated. Less-than-Significant Impact.

b) Would the project conflict with or obstruct a State or local plan for renewable energy or energy efficiency?

As discussed below in criterion (b) of Section VII, Greenhouse Gas Emissions, the proposed project would not conflict with the current CARB 2017 *Climate Change Scoping Plan* or the *Plan Bay Area 2040*, all of which involve planning for use of renewable energy planning and energy efficiency standards. No Impact.

VI. GEOLOGY AND SOILS

Would the 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?	❐	❐	■	❐

Would the project:	Potentially Significant Impact	Less-than-Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
ii) Strong seismic ground shaking?	☐	☐	■	☐
iii) Seismic-related ground failure, including liquefaction?	☐	☐	■	☐
iv) Landslides, mudslides or other similar hazards?	☐	☐	■	☐
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	■	☐
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on-or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	■	☐
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?	☐	☐	■	☐
e) Have soils incapable of adequately supporting the use of septic tanks or alternative 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?	☐	☐	☐	■

Information in the discussion below is from the technical study, *Engineering Geologic Review: Wavecrest Coastal Trail Phase II Project* (Geologic Review), dated March 19, 2017 by Timothy C. Best, State of California Certified Engineering Geologist. This geologic review is included as Appendix E of this Initial Study.

DISCUSSION

a) Would the project 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; (ii) Strong seismic ground shaking; (iii) Seismic-related ground failure, including liquefaction; (iv) Landslides, mudslides or other similar hazards?

As previously discussed, the December 2015 CBIA v. BAAQMD California Supreme Court ruling held that CEQA, with several specific exceptions, is concerned with the impacts of a project on the environment, and not the effects the existing environment may have on a project. Therefore, the introduction of people or structures to existing seismic hazards would not be considered an impact under CEQA and this discussion focuses on the extent to which the project could generate or exacerbate geologic and seismic hazards.

i) The project study area is located within a seismically-active region of California between the Pacific and North American tectonic plates. The regional faults of significance include the San Andreas and San Gregorio faults. According to the Geologic Review, the San Andreas fault is located approximately 6.5 miles northeast of the project site, and the San Gregorio Fault is located approximately 1 mile to the west, offshore. As such, the project site does not contain any Alquist-Priolo "special studies" earthquake fault zones that could rupture in the event of an earthquake. Therefore, the proposed project would not exacerbate the risk of fault rupture. **No Impact.**

ii) The majority of earthquake activity in this region is along the San Andreas Fault. The San Andreas Fault was responsible for the 1906 San Francisco earthquake (moment magnitude (Mw) 7.9) and the 1989 Loma Prieta earthquake (Mw 7.0). The closest fault system to the project site is the San Gregorio Fault System, located approximately 1 mile west of the city. The probability of strong seismic ground shaking exists throughout the region. Although the project site and its vicinity would be subject to seismic shaking from these faults, potential substantial adverse effects would be unlikely. Trail users would be outside in an open area, as the proposed project does not include any habitable structures, and there are no existing structures on or near the project site that would pose a threat during a seismic event such as ground shaking or ground failure. Therefore, the proposed project would not exacerbate the risk of ground shaking or ground failure. **No Impact**.

iii) The coastal bluff edge of the project site consists primarily of weakly lithified beach and alluvial sand, gravel, and silt. According to the Geologic Review, the coastal bluff edge could potentially experience large slope failures extending up to 15 feet or more into the bluff face as a result of a large earthquake along the nearby San Gregorio Fault.

The proposed project would establish a formal trail alignment, and some trail segments would be in the vicinity of the coastal bluff edge. A 60-foot setback, or buffer space, between the coastal bluff edge and proposed trail segment would safely allow visitors to view the ocean scenery. The setback width of the formal trail must balance the tendency of visitors to walk as close to the bluff edge as possible, and discourage creation of an informal trail, with the stability of the coastal bluff in a seismic event. Spur trails to coastal overlooks would not adhere to the setback; however, these trails would be designed to reduce informal trails along the bluff edge and would include split-rail fencing and signage warning of potential hazards. Therefore, the proposed project would not exacerbate the risk of ground failure or liquefaction. **No Impact**.

iv) The project site consists of relatively flat land with a gentle slope of four percent situated on a terrace above scenic coastal bluffs up to approximately 83 feet AMSL. According to the Geologic Review, large-scale landslides have not occurred within the project site and, based on field observation conducted during the geological review, the risk of large-scale landslides impacting the trail is low. Therefore, the proposed project would not exacerbate the risk of landslides. **No Impact**.

b) *Would the project result in substantial soil erosion or the loss of topsoil?*

Implementation of the proposed project would result in an unpaved trail and trail staging area on a very gently sloping area situated on a terrace above scenic coastal bluffs up to approximately 83 feet above mean sea level that are subject to wave impact and coastal erosion during periods of high surf. The trail would cover a relatively small proportion of the site, leaving large areas vegetated and permeable, resulting in low runoff volume and velocity. Additionally, the proposed project would consolidate informal trails and re-route public access on the informal trails away from the eroding bluffs and improve the existing conditions through revegetation to safely accommodate a formal trail, particularly during wet conditions. The proposed trail would adhere to a 60-foot setback from the edges of the sea cliff and ravines, with the exception of spur trails to the bluff overlooks. Thus, implementation of the proposed project would not result in substantial erosion, but rather is expected to reduce existing erosion issues. **Less-than-Significant Impact**.

c) – d) Would the project be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse, or would the project be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risk to life of property?

In relation to landslides, see criterion a), item iv) above. The effects of expansive soils can damage foundations of above-ground structures, paved roads and streets, and concrete slabs. However, since the proposed project proposes trails and other trail features, and not construction of habitable facilities, there would be no substantial risks to life or property. **Less-than-Significant Impact**.

e) Would the project 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?

Two flush toilets are proposed as part of the proposed project. These facilities would require a sewer connection. However, there is an existing sanitary sewer line that runs through the project site along Park Avenue (a “paper” street), which is operated and maintained by Sewer Authority Mid-Coastside. The project would install a new sewer lateral to the existing sanitary sewer line. No septic tanks or alternative wastewater disposal systems are required. Thus, implementation of the proposed project would result in no impacts related to wastewater disposal. **No Impact.**

f) Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

No paleontological resources of known significance have been identified in Half Moon Bay, and they are extremely limited throughout the San Mateo County Coastal Zone.[22] A search through the University of California Museum of Paleontology revealed three invertebrate localities. These localities are all located over 2,000 feet from the southern edge of the project site. Fossils were from the Pliocene epoch, and Miocene epoch. Given these conditions and the fact that no excavation is proposed, the likelihood of uncovering paleontological resources is very low. However, in the event that paleontological resources are encountered, Mitigation Measure GEO-1 would reduce impacts.

Mitigation Measure GEO-1: If paleontological resources are encountered during grading or other soil disturbing activities, construction shall be halted within 50 feet of the site and a qualified paleontologist shall be contacted to investigate the find within 24 hours. If the find is deemed to be significant, a complete paleontological survey and removal of paleontological finds shall be warranted prior to resuming construction activities in the area.

Implementation of Mitigation Measure GEO-1 would reduce impacts to paleontological resources to a less-than-significant level. **Less-than-Significant Impact with Mitigation.**

VII. GREENHOUSE GAS EMISSIONS

Would the 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 of an agency adopted for the purpose of reducing the emissions of greenhouse gases?	❐	❐	■	❐

DISCUSSION

Scientists have concluded that human activities are contributing to global climate change by adding large amounts of heat-trapping gases, known as greenhouse gases (GHGs), into the atmosphere. The primary source of these GHG is fossil fuel use. The Intergovernmental Panel on Climate Change (IPCC) has identified four major GHGs—water vapor, carbon dioxide (CO_2), methane (CH_4), and ozone (O_3)—that are the likely cause of an increase in global average temperatures observed within the 20th and 21st centuries. Other GHG identified by the IPCC that contribute to global warming to a lesser extent include nitrous oxide (N_2O), sulfur hexafluoride (SF_6), hydrofluorocarbons, perfluorocarbons, and chlorofluorocarbons.[23]

Information on manufacture of cement, steel, and other "life cycle" emissions that would occur as a result of the project are not applicable and are not included in the analysis. Black carbon emissions are not included in the GHG analysis because the California Air Resources Board (CARB) does not include this pollutant in the state's Assembly Bill (AB) 32 inventory and treats this short-lived climate pollutant separately. A background discussion on the GHG regulatory setting and GHG modeling can be found in Appendix A to this Initial Study.

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[23] Water vapor (H_2O) is the strongest GHG and the most variable in its phases (vapor, cloud droplets, ice crystals). However, water vapor is not considered a pollutant, but part of the feedback loop rather than a primary cause of change.

a) *Would the project generate greenhouse gas (GHG) emissions, either directly or indirectly, that may have a significant impact on the environment?*

A project does not generate enough GHG emissions on its own to influence global climate change; therefore, this Section measures the project's contribution to the cumulative environmental impact associated with GHG emissions. Based on the nature and scope of the proposed improvements, the project would primarily contribute to climate change through the construction activities needed to implement the project, which would generate a short-term increase in GHG emissions. The emissions generated by the project were evaluated using CalEEMod, Version 2016.3.2.25. The GHG emissions associated with the proposed project are shown in Table 4-3.

Construction Impacts

The Air District does not have thresholds of significance for construction related GHG emissions, which are one-time, short-term emissions and therefore would not significantly contribute to the long-term cumulative GHG emissions impacts of the proposed project. One-time, short-term emissions are converted to average annual emissions by amortizing them over the service life of a building. For buildings in general, it is reasonable to look at a 30-year time frame.[24]

As shown in Table 4-3, when evaluated over an average 30-year project lifetime, average annual construction emissions from the proposed project would represent a nominal source of GHG emissions and would not exceed the BAAQMD *de minimis* bright-line threshold of 660 $MTCO_2e$/year. **Less-than-Significant Impact.**

TABLE 4-3 PROJECT GHG EMISSIONS

	GHG Emissions ($MTCO_2e$/Year)
Category	**Project Emissions**
Total Construction Emissions	95
30-Year Amortized Construction	3
BAAQMD Emissions Threshold ($MTCO_2e$)	**660[a]**
Exceeds BAAQMD Thresholds?	**No**

Notes:
a. Based on BAAQMD's 1,100 $MTCO_2e$/yr. bright-line threshold for AB 32 and the SB 32 GHG reduction target of 40 percent below 1990 levels by year 2030.
Source: California Emissions Estimator Model (CalEEMod), Version 2016.3.2.25.

Operational Impacts

Projects can contribute to global climate change through direct and indirect emissions of GHG from transportation sources (passenger vehicles, trucks), energy (natural gas and purchased energy), water use

[24] International Energy Agency, 2008. Energy Efficiency Requirements in Building Codes, Energy Efficiency Policies for New Buildings.

and wastewater generation, and solid waste generation. Typically, transportation emissions generate the majority of GHG emissions associated with a project. However, project implementation would not increase trips from existing conditions and would not have a significant effect on VMT. In addition, while there would be an increase in energy and water use as well as wastewater and solid waste generated by project operation, based on the scope of the project, and the estimated 40 weekday and 160 weekend visitors, using the restroom, these increases would be nominal. Thus, GHG emissions from operation of the project would be minor and operation of the proposed project would not result in emissions that exceed the BAAQMD bright-line screening threshold of 660 $MTCO_2e$. **Less-than-Significant Impact**.

b) *Would the project conflict with an applicable plan, policy, or regulation of an agency adopted for the purpose of reducing the emissions of GHGs?*

Applicable plans adopted for the purpose of reducing GHG emissions include the CARB Scoping Plan and *Plan Bay Area* 2040. A consistency analysis with these plans is presented below.

CARB's Scoping Plan

The CARB Climate Change Scoping Plan outlines the State's strategies to reduce GHG emissions in accordance with the targets established under AB 32 and Senate Bill (SB) 32. The Scoping Plan is applicable to State agencies and is not directly applicable to cities/counties and individual projects. Nonetheless, the Scoping Plan has been the primary tool that is used to develop performance-based and efficiency-based CEQA criteria and GHG reduction targets for climate action planning efforts.

Statewide strategies to reduce GHG emissions in the 2017 Climate Change Scoping Plan include: implementing SB 350, which expands the RPS to 50 percent by 2030 and doubles energy efficiency savings; expanding the Low Carbon Fuel Standards (LCFS) to 18 percent by 2030; implementing the Mobile Source Strategy to deploy zero-electric vehicle buses and trucks; implementing the Sustainable Freight Action Plan; implementing the Short-Lived Climate Pollutant Reduction Strategy, which reduces methane and hydrofluorocarbons to 40 percent below 2013 levels by 2030 and black carbon emissions to 50 percent below 2013 levels by 2030; continuing to implement SB 375; creating a post-2020 Cap-and-Trade Program; and developing an Integrated Natural and Working Lands Action Plan to secure California's land base as a net carbon sink.

Statewide strategies to reduce GHG emissions include the low carbon fuel standards, California Appliance Energy Efficiency regulations, California Renewable Energy Portfolio standard, changes in the Corporate Average Fuel Economy standards, and other early action measures as necessary to ensure the State is on target to achieve the GHG emissions reduction goals of AB 32 and SB 32. In addition, new buildings are required to comply with the current Building Energy Efficiency Standards and CALGreen. Because these GHG emissions reduction strategies are statewide measures, the proposed project would not interfere with their implementation. **No Impact.**

Plan Bay Area

Plan Bay Area 2040 is the Bay Area's Regional Transportation Plan/Sustainable Communities Strategy, which identifies the sustainable vision for the Bay Area. As part of the implementing framework for *Plan Bay Area* 2040, local governments have identified Priority Development Areas (PDAs) to focus growth. PDAs are transit-oriented, infill development opportunity areas in existing communities. The project site is not located in a PDA.[25] However, because the proposed project would entail development of a coastal trail and associated improvements, it would not directly affect the regional population and employment projects. Therefore, the proposed project would not conflict with the *Plan Bay Area* 2040. **No Impact**.

VIII. HAZARDS AND HAZARDOUS MATERIALS

Would the 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 release of hazardous materials into the environment?	❒	❒	■	❒
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances or waste within ¼-mile of an existing or proposed school?	❒	❒	❒	■
d) Be located on a site which is included on a list of hazardous material sites compiled pursuant to Government Code Section 65962.5 and, as a result, create a significant hazard to the public or the environment?	❒	❒	■	❒
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, would the proposed project result in a safety hazard for people residing or working in the project study area?	❒	❒	❒	■

[25] Metropolitan Transportation Commission (MTC) and Association of Bay Area Governments (ABAG). 2020, September 24 (accessed). Priority Development Areas (Plan Bay Area 2040) ArcGIS. https://www.arcgis.com/home/webmap/viewer.html?useExisting=1&layers=56ee3b41d6a242e5a5871b043ae84dc1.

Would the project:	Potentially Significant Impact	Less-than-Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
f) For a project within the vicinity of a private airstrip, would the proposed project result in a safety hazard for people residing or working in the project study area?	❐	❐	❐	■
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	❐	❐	■	❐
h) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires?	❐	❐	■	❐

DISCUSSION

a) – b) Would the project create a significant hazard to the public or the environment through the routine transport, use or disposal of hazardous materials, or would the project create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?

Small amounts of potentially hazardous materials associated with heavy mechanical equipment (e.g., diesel, gasoline, other automotive fluids) may be used during construction of the trail, or during routine maintenance. However, standard precautions and best management practices (BMPs) to prevent spills would be used to minimize exposure to people and the environment. Further, due to the relatively small scale of the proposed project, in the event of a spill the amount of such products would be in small quantities. The project site is also near an historic landfill, the Poplar Beach landfill, which closed in 1976[26] and was located approximately 0.5 miles north of the project site. However, the landfill is not considered a Federal Superfund or State Response Site[27] and therefore is not a potential hazard. Thus, the impacts to the public and environment from hazardous materials would be limited. **Less-than-Significant Impact**.

c) Would the project emit hazardous emissions or handle hazardous materials, substances or waste within one-quarter mile of an existing or proposed school?

The proposed project, a trail with associated improvements, would not emit or handle hazardous substances, and there are no schools located within one-quarter mile of the project site. Therefore, no hazardous emissions would impact schools as a result of the proposed project. **No Impact.**

[26] Half Moon Bay Review, Old Garbage Lingers for Local Officials, https://www.hmbreview.com/news/old-garbage-lingers-for-local-officials/article_e74a515a-be86-5b73-b308-3aa97924a31d.html, accessed on March 6, 2017.

[27] State of California, Department of Toxic Substances Control, EnviroStor, http://www.envirostor.dtsc.ca.gov/public/, accessed on February 10, 2017.

d) *Would the project be located on a site which is included on a list of hazardous material sites compiled pursuant to Government Code Section 65962.5 and, as a result, create a significant hazard to the public or the environment?*

The proposed project is not located on a site that has been listed per Government Code Section 65962.5 as a hazardous materials site. There are several Leaking Underground Storage Tank (LUST) clean-up sites in the vicinity of the project site that have been completed.[28] As a result, the proposed project would not expose people to existing sources of potential health hazards and the associated impacts. **Less-than-Significant Impact**.

e) *For a project within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people living or working in the project area?*

The nearest public airport is the Half Moon Bay County Airport, located approximately 5 miles north of the proposed project site. **No Impact.**

f) *For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people living or working in the project area?*

No private airstrips are within the vicinity of the proposed project. **No Impact.**

g) *Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?*

Implementation of the proposed project, which involves building a formal trail, would not impair or physically interfere with implementing an adopted emergency response plan or emergency evacuation plan. The proposed project proposes to build a formal trail within Half Moon Bay and would not alter existing emergency access routes. **Less-than-Significant Impact**.

h) *Expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires?*

The project site has been deemed as having "moderate" risk from wildland fire.[29] The proposed project would build a formal coastal trail in an area presently heavily used for hiking. No habitable structures would be exposed to wildland fire hazards, as no such structures currently exist and the only proposed structure is the prefabricated, single-story restroom building that would accommodate two flush toilets at the trailhead staging area. The loss of such a building during a wildfire would not be considered a

[28] State of California, Department of Toxic Substances Control, EnviroStor, http://www.envirostor.dtsc.ca.gov/public/, accessed on February 10, 2017.

[29] California Department of Forestry and Fire Protection, 2007, Fire and Resource Assessment Program: San Mateo County Fire Hazard Severity Zoning, http://frap.fire.ca.gov/webdata/maps/san_mateo/fhszs_map.41.pdf, accessed on February 10, 2017.

significant loss. The exposure of people to risks related to wildland fire would be limited due to the nature of the proposed project as an outdoor trail with associated amenities. Less-than-Significant Impact.

IX. HYDROLOGY AND WATER QUALITY

Would the 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 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 off-site; 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 a flood hazard, tsunami, or seiche zones, risk the release of pollutants due to project inundation?	☐	☐	☐	■
e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	☐	☐	☐	■

DISCUSSION

a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?

Construction Impacts

Clearing, grading, and construction activities associated with the trail improvement project have the potential to impact water quality through soil erosion and increasing the amount of silt and debris carried in runoff. However, the proposed trail improvements are intended to reduce erosion that is currently occurring near the bluff edge, to revegetate trails near the bluff edge, and reconstruct and regrade the existing informal trail area. Since the proposed project would disturb approximately 5.91 acres of land, it would be required to comply with the National Pollutant Discharge Elimination System (NPDES) General Construction Permit (GCP), and would require the preparation of a Storm Water Pollution Prevention Plan (SWPPP).

The proposed project would also comply with the applicable construction BMPs specified in the City of Half Moon Bay's *C.3 and C.6 Development Review Checklist* to reduce water quality impacts to less-than-significant levels. Some of the proposed BMPs for this project, as shown in the construction access drawings, include straw wattles, silt fencing, and construction staging areas. A water truck for dust control and immediate stabilization of disturbed areas by reseeding with native plant materials are also proposed as BMPs. With implementation of these BMPs, the impact to water quality during construction would be less than significant.

Operational Impacts

The operation and maintenance activities associated with the project would result in minimal impacts on water quality. Water quality in stormwater runoff is regulated locally by the San Mateo Countywide Water Pollution Prevention Program (SMCWPPP), which include the C.3 provisions set by the RWQCB. The project is exempt from the C.3 requirements for stormwater treatment, source controls, and site design measures, because it is a trail (with associated improvements) constructed of permeable surfaces. Nevertheless, the project would incorporate the following site design measures:

- Limit disturbance of natural water bodies and drainage systems.
- Minimize compaction of highly permeable soils.
- Protect slopes and channels.
- Minimize impacts from stormwater and urban runoff on the biological integrity of natural drainage systems and water bodies.
- Conserve natural areas, including existing trees, other vegetation and soils.

With the implementation of these BMPs and site design features, the project would result in a less than significant impact to water quality. **Less-than-Significant Impact.**

b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?

The proposed project includes development of an unpaved trail and unpaved parking in an undeveloped area, thus resulting in no changes to groundwater recharge. The proposed project would not construct any impermeable surfaces such as a paved trail or paved parking lot. In addition, the proposed project would include restoration of the existing informal trails that are currently compacted, which should result in a slight increase in groundwater recharge. The proposed project would require limited use of municipal water for the two flush toilets and potable water for trail users, therefore, would have no impact on groundwater supplies. **No Impact.**

c) *Would the project 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: result in substantial erosion, siltation, or flooding on- or off-site; substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site; 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 impede or redirect flood flows?*

The project proposes to reconstruct unpaved trails on a relatively flat marine terrace already characterized by numerous hard-packed trails. The proposed project would not alter the course of a stream or river. Ground disturbance during construction could result in a temporary alteration in drainage patterns. However, the goal of the trail reconstruction is to reduce the overall potential for erosion and siltation with regarding and proper construction of the informal trail system. Implementation of Mitigation Measure HYDRO-1 would minimize the potential for erosion, siltation, or changes in drainage patterns as a result of the proposed project.

Mitigation Measure HYDRO-1: The following construction best management practices (BMPs) recommended by San Mateo County (and other BMPs required by the Half Moon Bay City Engineer) shall be employed:

- Limiting construction activities to the dry season.
- Using (but not overusing) reclaimed water for dust control.
- Stabilizing construction sites, including entrances and exits.
- Following construction, stabilizing disturbed sites with native plant materials, hydroseeding, or similar measures.
- Storing stockpiled materials under tarps when they are not actively being used.
- Balancing cut and fill materials when possible.
- Disposing of all wastes and debris properly.
- Recycling materials and wastes that can be recycled (such as aggregate base materials, wood, etc.).
- Inspecting vehicles and equipment frequently for leaks and repairing promptly, and using drip pans to catch leaks until repairs are made.
- Cleaning up spills or leaks immediately and disposing of cleanup materials properly.

Once construction has been completed, there would be no significant alteration in existing drainage patterns. There would be improvements in erosion impacts with reconstruction of the trail resulting in a reduction in compacted soils and proper grading. There will be no construction of impervious surfaces and no significant change in drainage patterns or the rate and amount of surface runoff. Therefore, there is no potential for on-site or off-site flooding.

Runoff from the trail will drain via sheetflow to adjacent vegetated or undeveloped areas where it would infiltrate into the soil. Therefore, stormwater runoff does not require a connection to an existing storm drain system and the project would not create or contribute runoff water that would exceed the capacity of an existing or planned storm drain system.

The proposed project would not significantly change drainage patterns that would contribute to erosion, siltation, or flooding impacts, or create runoff that would exceed the capacity of the storm drain system. **Less-than-Significant Impact with Mitigation.**

d) *In flood hazard, tsunami, or seiche zones, would the project risk the release of pollutants due to project inundation?*

The proposed project site is not within a 100-year floodplain.[30] The proposed project is not sited in a dam inundation zone;[31] therefore, development of the project would not expose people or structures to hazards from dam inundation. Also, the project site is not in an area protected from 100-year floods by a levee. Therefore, the project would have the potential to exacerbate flooding as a result of the failure of a levee or dam.

A tsunami inundation map for San Mateo County coast, including the City of Half Moon Bay, was prepared by the California Office of Emergency Services. According to the map, the proposed project is not within the tsunami inundation area.[32]

A seiche is a surface wave generated in a closed or partially closed body of water, which can be compared to the back-and-forth sloshing in a bathtub. Seiches can be created by winds, underwater earthquakes, or tsunamis. Bodies of water such as bays, harbors, lakes, reservoirs, large aboveground storage tanks, and swimming pools can experience seiches. Because there are no large aboveground storage tanks or reservoirs in the vicinity of the site and the project site is near the Pacific Ocean and not an enclosed body of water, there would be no potential impact due to a seiche.

According to the ABAG interactive debris flow and landslide maps, the project site is not within an area susceptible to mudflows.[33] **No Impact.**

e) *Would the project conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?*

The proposed project would consolidate informal trails and re-route public access on the informal trails away from the eroding bluffs and improve the existing conditions through revegetation to safely accommodate a formal regulated and maintained trail, particularly during wet conditions. These improvements would reduce erosion and improve water quality. The project would not impede the implementation of a water quality control plan or sustainable management plan. **No Impact.**

[30] Federal Emergency Management Agency, FEMA Flood Map Service Center, https://msc.fema.gov/portal/search#, accessed on September 20, 2020.

[31] California Office of Emergency Services, 2009, *Dam Inundation Registered Images and Boundary Files in Shape File Format. Pilarcitos Dam. Version DVD 3*.

[32] California Emergency Management Agency, 2009, Tsunami Inundation Map for Emergency Planning Half Moon Bay Quadrangle.

[33] Association of Bay Area Governments, 2016, Interactive Map of Existing Landslide Distribution, http://gis.abag.ca.gov/website/Hazards/?hlyr=existingLndsld, accessed on June 27, 2018.

X. LAND USE AND PLANNING

Would the 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?	❐	❐	■	❐

DISCUSSION

a) Would the project physically divide an established community?

There is no established human community on the project site. The proposed project would not involve the construction of structures or barriers, with the exception of fencing as described in the project description. Proposed fencing would not hinder circulation within the project site. The proposed trail would run north to south and occupy only the western portion of the 87-acre project site. The trail would connect to the existing California Coastal Trail segment to the north. There are individual parcels within the project site, but the proposed project would occur on those that have been purchased for the purpose of open space preservation. **No Impact**.

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?

This project to build a Coastal Trail segment is consistent with the policies of the Half Moon Bay LUP, the Wavecrest Restoration Plan, and Chapter 18, Section 38.070.E, Coastal Access Ways- Bluff Edge Trails, of the City of Half Moon Bay Municipal Zoning Code.

The proposed trail alignment is consistent with the Access Improvements Map (1996 Local Coastal Program Chapter 18, Section 38.070, Coastal Access Ways, of the City of Half Moon Bay Municipal Code) and public access, including horses, within the project site would be limited to the previously described formalized trail and spur trails that constitute this project. Horses would be allowed on the compacted shoulders located on either side of the gravel trail, and signs would provide information indicating allowable uses.

The proposed trail alignment is also consistent with conceptual alignments identified by the Wavecrest Restoration Plan and would be responsive to the Wavecrest Restoration Plan's guidelines for protecting bluff edges and riparian corridors and minimizing runoff.[34]

No adopted habitat conservation or natural community conservation plans are applicable to Half Moon Bay.[35] Chapter 3, Environmentally Sensitive Habitat Areas, of the LUP addresses issues related to sensitive and rare habitat and species in Half Moon Bay. The chapter establishes policies related to permitted uses and development standards, and discusses the parameters of general permit conditions. The proposed project would be reviewed within the LUP framework and does not conflict with those plans.

In accordance with Chapter 18, Section 38.070.E, Coastal Access Ways- Bluff Edge Trails, of the City of Half Moon Bay Municipal Zoning Code, the Wavecrest Coastal Trail project would improve public access while reducing erosion of the bluff edge by (1) creating a sufficient set back from the bluff edge and (2) revegetating the existing informal trail that is located closed to the bluff edge. In addition, the Wavecrest Coastal Trail would be consistent with the intent of Chapter 18, Section 38.070, Coastal Access Ways, of the City of Half Moon Bay Municipal Zoning Code, in that it would provide additional connectivity to the existing beach access points located near the project site. The provision of beach access from the project study area is not feasible given topography and sensitivity of the bluff edge. **Less-than-Significant Impact.**

XI. MINERAL RESOURCES

Would the 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?	❒	❒	❒	■

[34] The Wavecrest Restoration Plan was reviewed by PlaceWorks in February 2017 as a PDF document. Although image quality of the document is substandard, the general intent of the plan and locations of key features remains legible.

[35] California Fish and Game, CDFW NCCPs as of October 2017, , https://www.wildlife.ca.gov/Conservation/Planning/NCCP/Plans, accessed on June 28, 2018.

DISCUSSION

a) – b) Would the project result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state or result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?

The proposed project does not propose development that would lead to loss of availability of known mineral resources of value to the State, region, or local area, according to the San Mateo County General Plan Mineral Resources Map.[36] Implementation of the proposed project to build formal trails would not affect mineral resources. **No Impact.**

XII. NOISE

Would the 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 project in excess of standards established in the local general plan or noise ordinance, or in other applicable local, state, or federal standards?	❐	❐	■	❐
b) Generation of excessive groundborne vibration or groundborne noise levels?	❐	❐	■	❐
c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	❐	❐	❐	■

DISCUSSION

a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or in other applicable local, state, or federal standards?

Operation of the completed proposed project would not generate loud noises, excessive groundborne vibration, or expose people to noise levels in excess of standards in general plan, local ordinance, or agency standards. No long-term significant increase in ambient noise levels is expected as a result of proposed project operation. The proposed project does not include a proposal for any urbanization or land intensification on the proposed project site. As discussed in Section XVI, overall vehicle trips within

[36] San Mateo County, 1986, San Mateo County General Plan, Mineral Resources Map, page 231. https://planning.smcgov.org/sites/planning.smcgov.org/files/SMC-GP%201986.pdf, accessed on March 6, 2017.

the City would not increase substantially in the long term due to proposed project implementation. Passive recreational activities of hikers and bicyclists are not a source of substantial noise.

Short-term construction activities for the proposed trail would result in a temporary increase in noise levels associated with trail and staging area construction equipment, truck hauling, excavation, and associated activities. Noise generated by on-site construction equipment is based on the type of equipment used, its location relative to sensitive receptors, and the timing and duration of noise-generating activities. Heavy equipment, such as a dozer or a loader, can have maximum, short-duration noise levels of up to 85 dBA at 50 feet. However, overall noise emissions vary considerably, depending on what specific activity is being performed at any given moment. Noise attenuation due to distance, the number and type of equipment, and the load and power requirements to accomplish tasks at each construction phase would result in different noise levels from construction activities at a given receptor. Since noise from construction equipment is intermittent and diminishes at a rate of at least 6 dBA per doubling of distance (conservatively ignoring other attenuation effects from air absorption, ground effects, and shielding effects), the average noise levels at noise-sensitive receptors could vary considerably, because mobile construction equipment would move around the site with different loads and power requirements.

Chapter 9.23, Noise, of the City of Half Moon Bay Municipal Code does not establish a construction noise limit. However, the Federal Transit Administration (FTA) limit of 80 dBA Leq is commonly used to assess construction noise impacts. The closest noise-sensitive receptors to project construction are residences located approximately 400 feet southeast of the proposed parking/staging area. At this distance, noise levels from project construction would attenuate to a level of 67 dBA or less, which would not exceed the FTA construction noise limit. Furthermore, project construction would not require any of the pieces of equipment such as pile drivers or pneumatic hammers listed in Section 9.23.020 of the Municipal Code as “unreasonably disturbing noises.”

In addition, the proposed project would minimize construction-related noise impacts by complying with construction activity time lime limits of 8:00 a.m. to 10:00 p.m., as set forth in the Municipal Code. Given that project construction noise would not exceed the FTA standard and the applicant would be required adhere to City time limits, project construction noise impacts would be less than significant. **Less-than-Significant Impact.**

b) Generation of excessive groundborne vibration or groundborne noise levels?

Construction can generate varying degrees of ground vibration, depending on the construction procedures and equipment. Operation of construction equipment generates vibrations that spread through the ground and diminish with distance from the source. The effect on buildings in the vicinity of the construction site varies depending on soil type, ground strata, and receptor-building construction. The effects from vibration can range from no perceptible effects at the lowest vibration levels, to low rumbling sounds and perceptible vibrations at moderate levels, to slight structural damage at the highest levels. Vibration from construction activities rarely reaches the levels that can damage structures.

The Municipal Code does not establish vibration limits. Therefore, the FTA-recommended limit of 0.2 inches per second peak particle velocity (in/sec PPV) is used to assess project construction vibration impacts. As discussed above, the project would not require the use of pile driving. Based on FTA 2018 guidance, construction vibration from typical equipment would attenuate below the 0.2 in/sec PPV limit beyond a distance of approximately 25 feet.[37] Because there are no vibration-sensitive receptors or structures within 25 feet of proposed construction activities, this impact would be less than significant. Less-than-Significant Impact.

c) *For a 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 project expose people residing or working in the project area to excessive noise levels?*

The proposed project site is not located within 2 miles of a public airport, nor is it within the vicinity of a private airstrip. The closest airport is the Half Moon Bay Airport, located over 2 miles northwest of the proposed project. Therefore, the proposed project would not expose people to excessive aircraft noise levels. No Impact.

XIII. POPULATION AND HOUSING

Would the project:	Potentially Significant Impact	Less-than-Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
a) Induce substantial unexpected population growth or growth for which inadequate planning has occurred, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	❒	❒	❒	■
b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?	❒	❒	❒	■

DISCUSSION

a) *Induce substantial unexpected population growth or growth for which inadequate planning has occurred, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?*

The proposed project proposes trails for recreational purposes. The proposed project does not propose housing or employment and would not directly or indirectly generate population growth in the area. No Impact.

[37] Federal Transit Administration, 2018. *Transit Noise and Vibration Impact Assessment Manual*.

b) *Would the project displace substantial numbers of existing people or housing units, necessitating the construction of replacement housing elsewhere?*

There are no housing units or other informal housing encampments within the project site; thus, implementation of the proposed project would not displace any existing housing units or people. **No Impact**.

XIV. PUBLIC SERVICES

Would the project:	Potentially Significant Impact	Less-than-Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
a) Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services: i) Fire protection? ii) Police protection? iii) Schools? iv) Libraries? v) Other public facilities?	❒	❒	■	❒

DISCUSSION

a) *Result in substantial adverse physical impacts associated with the provision of 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: fire protection, police protection, schools, and libraries?*

i) Fire protection in Half Moon Bay is provided by the Coastside Fire Protection District, which serves 30,000 residents in a 50-square-mile area from three fire stations.[38] District Fire Station 40 is located in Downtown Half Moon Bay and is staffed with one fire captain and two fire apparatus engineers (one of whom is a paramedic). In addition to traditional fire service, the District provides cliff rescue, water rescue, confined space rescue, advanced life support, and vehicle and residential lockout services. The District responds to 2,200 calls annually. Implementation of the proposed project, which formalizes trails within the city, would not result in an increase of the permanent population, nor result in a substantial increase in trail users. Therefore, implementation of the proposed project would

[38] Coastside Fire District, 2008, About Us, http://coastsidefire.org/about, accessed on February 2, 2017.

not result in the need for a new or altered fire facility to maintain existing levels of fire service. **Less-than-Significant Impact.**

ii) Police protection in Half Moon Bay has been provided by the San Mateo County Sherriff's Office since June 1, 2011. The San Mateo County Sherriff's Office operates an existing substation within the city.[39] The proposed project would formalize existing regularly used trails on the Wavecrest CLT Property, and proposed project implementation would not result in a substantial increase in the number of trail users, or result in an increased permanent population. No new or altered police facility would be needed in order to maintain existing levels of police service. **Less-than-Significant Impact**.

iii) Half Moon Bay's parks would not experience a substantial increase in the number of visitors from the proposed formalization of trails on the project study area. Project-related additional demand for service would not result in the need for new or altered facilities in order to maintain existing levels of service. **Less-than-Significant Impact**.

iv)- v) Half Moon Bay's schools, libraries, and other public facilities would not experience a substantial increase in the number of visitors, or an increase in the permanent population from the proposed formalization of trails on the project study area. **Less-than-Significant Impact**.

XV. PARKS AND RECREATION

Would the project:	Potentially Significant Impact	Less-than-Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	❒	❒	■	❒
b) Result in substantial adverse physical impacts associated with the provision of new or physically altered park and recreational facilities, or result in the need for new or physically altered park and recreational facilities, the construction of which could cause significant environmental impacts?	❒	❒	■	❒

[39] San Mateo County Sherriff's Office, Coastside Patrol Bureau. http://www.smcsheriff.com/patrol-services/coastside-patrol-bureau, accessed on June 28, 2018.

DISCUSSION

a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities, such that substantial physical deterioration of the facility would occur or be accelerated?

The proposed project would increase the quality of recreational options in the area, and thus could be considered a beneficial impact related to recreation. The existing footpaths provide a connection between the Smith Ball Fields and the beach area, and the formal trail may facilitate a small increase in the ball field usage but would not lead to substantial or accelerated facility deterioration. The proposed project would enhance, rather than degrade, recreational facilities. **Less-than-Significant Impact.**

b) Result in substantial adverse physical impacts associated with the provision of new or physically altered park and recreational facilities, or result in the need for new or physically altered park and recreational facilities, the construction of which could cause significant environmental impacts?

Implementation of the proposed project would not increase the permanent population and would therefore not require the expansion of recreational facilities. The proposed project would enhance recreational facilities. The potential physical impacts associated with the project are evaluated throughout this Initial Study. **Less-than-Significant Impact.**

XVI. TRANSPORTATION

Would the 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) Would the project conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?	☐	■	☐	☐
c) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	■	☐
d) Result in inadequate emergency access?	☐	☐	■	☐

DISCUSSION

a) – b) Would the project conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities? Would the project conflict or be inconsistent with CEQA Guidelines Section 15064.3, subdivision (b)?

The proposed project would remove several existing social trails and extend the California Coastal Trail to connect two dead-end sections of the Coastal Trail. The project also implements shared-use paths that are recommended within the City's adopted Bicycle and Pedestrian Master Plan.[40] Overall vehicle trips within the city would not increase substantially in the long term due to proposed project implementation. Project operation would have minimal impacts on congestion management programs for local and San Mateo County roads.

In the short term, during proposed project construction, construction equipment would be brought to the site, and numerous truck trips to bring gravel and other material to the proposed project site would occur. It is anticipated that there would be an average of 10 inbound vehicle trips and 10 outbound vehicle trips each day during each 2-month period construction phase. During five of the construction days, it is anticipated that 16 additional inbound and 16 additional outbound trips would be required to deliver materials. The short-term construction traffic related to delivery of equipment and import of material, as well as the daily transportation of construction workers to the site, is not expected cause a significant increase in traffic volume. Implementation of Mitigation Measures TRANS-1a and TRANS-1b would ensure that impacts would be less than significant.

Mitigation Measure TRANS-1a: The construction contractor shall be responsible for providing a Traffic Control Plan (TCP), approved by the City Traffic Engineer, prior to the start of construction. The TCP shall include traffic control measures in order to ensure traffic safety during all construction phases. The traffic control devices may involve signage, use of delineators, flashing arrows, and/or temporary lane lines at the discretion of the City Traffic Engineer. The TCP shall be approved by the City Traffic Engineer. The TCP shall include provisions for advanced notification (signage) of the proposed detour routes and coordination with emergency service providers.

Mitigation Measure TRANS-1b: The proposed project shall be constructed in a manner to avoid a substantial increase in construction-period traffic congestion through implementation of the following:

- The applicant shall identify locations for contractor parking on site for the duration of the construction period so that parking does not affect the operation of local roads.
- Vehicle trips to and from the project site for purposes of transporting cut and fill shall be prohibited during peak traffic morning and evening peak hours.
- In the event of lane closures due to deliveries, an adequate number of flaggers and appropriate signage shall be utilized to ensure the safe passage of vehicles, bicyclists, and pedestrians.

Implementation of Mitigation Measure TRANS-1a and TRANS-1b would reduce construction-related traffic impacts to a less-than-significant level. **Less-than-Significant Impact with Mitigation.**

[40] https://www.half-moon-bay.ca.us/DocumentCenter/View/2243/Bicycle-and-Pedestrian-Master-Plan-Final?bidId=

b) , e) Would the project substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment) or result in inadequate emergency access?

The proposed project would not include any hazardous design features, such as sharp curves or intersections with inadequate signalization, nor would it increase incompatible uses on local roads resulting in hazards. The proposed project would decrease conflicts of incompatible uses on local roads, offering an alternative coastal trail segment to non-motorized traffic on local roads. There are no parking requirements for a pedestrian/bicycle trail system contained in the City's Municipal Code, and the completed proposed project would not directly affect the level of service of local roads negatively. No emergency access routes would be affected, as the proposed project site is not in the immediate vicinity of emergency access routes, nor does it create obstructions to such routes. This proposed project would increase local coastal access, aligning with the goals of the City's LUP. **Less-than-Significant Impact.**

XVII. TRIBAL CULTURAL RESOURCES

Would the 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 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: ▪ 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), or ▪ 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 Resource Code Section 5024.1 for the purposes of this paragraph, the lead agency shall consider the significance of the resource to a California Native American tribe.	❐	■	❐	❐

DISCUSSION

a) 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:*

- *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), or*
- *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 Resource Code Section 5024.1 for the purposes of this paragraph, the lead agency shall consider the significance of the resource to a California Native American tribe.*

Assembly Bill (AB) 52, which took effect on July 1, 2015, amends CEQA and adds standards of significance that relate to Native American consultation and certain types of cultural resources. AB 52 requires the CEQA lead agency to begin consultation with a California Native American Tribe that is traditionally and culturally affiliated with the geographic area of the proposed project, if the Tribe requests in writing to be informed by the lead agency through formal notification of the proposed projects in the area. The consultation is required before the determination of whether a negative declaration, mitigated negative declaration, or EIR is required. In addition, AB 52 includes time limits for certain responses regarding consultation. AB 52 also adds “tribal cultural resources” (TCR) to the specific cultural resources protected under CEQA.[41] CEQA Section 21084.3 has been added, which states that “public agencies shall, when feasible, avoid damaging effects to any tribal cultural resources.” Information shared by tribes as a result of AB 52 consultation shall be documented in a confidential file, as necessary, and made part of a lead agencies administrative record. The City of Half Moon Bay has not received any request from any Tribes to be notified about projects in the City of Half Moon Bay.

A TCR is defined under AB 52 as a site, feature, place, or cultural landscape that is geographically defined in terms of size and scope, sacred place, and object with cultural value to a California Native American tribe that are either included or eligible for inclusion in the California Register of Historic Resources or included a local register of historical resources, or if the City of Half Moon Bay, acting as the lead agency, supported by substantial evidence, chooses at its discretion to treat the resource as a TCR. As discussed under criteria (b) and (d) in Section V, Cultural Resources, no known archeological resources, ethnographic sites, or Native American remains are located within the project site. As discussed under criterion (b) in Section V, Cultural Resources, implementation of Mitigation Measure CULT-1 would reduce impacts to unknown archaeological deposits, which include TCRs, to a less-than-significant level. As discussed under criterion (d) in Section V, Cultural Resources, implementation of Mitigation Measure CULT-3, and compliance with State and federal regulations, would reduce the likelihood of disturbing or discovering human remains, including those of Native Americans. Therefore, implementation of Mitigation Measure CULT-1 and CULT-3, together with compliance with State and federal regulations related to the protection of human remains, would reduce impacts to TCRs to a less-than-significant level.

[41] CEQA Guidelines Section 21074.

Mitigation Measure TCR-1: Implement Mitigation Measures CULT-1 and CULT-2.

Implementation of Mitigation Measure TCR-1 would reduce impacts to TCRs to a less-than-significant level. **Less-than-Significant Impact with Mitigation.**

XVIII. UTILITIES AND SERVICE SYSTEMS

Would the 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 stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?	❒	❒	■	❒
b) Have insufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?	❒	❒	■	❒
c) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	❒	❒	■	❒
d) Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?	❒	❒	■	❒
e) Comply with federal, state, and local statutes and regulations related to solid waste?	❒	❒	■	❒

DISCUSSION

a) – c) Require or result in the relocation or construction of new or expanded water, wastewater treatment or stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects? Have insufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years? Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments

The proposed project would connect to the available sewer and water lines. However, given the low visitor volumes (40 weekday and 160 weekend visitors) the project would not produce or create substantial wastewater, exceed wastewater treatment requirements, or require new or expanded wastewater treatment facilities. The proposed project would not require natural gas or electrical services. **Less-than-Significant Impact.**

d) – e) 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? Comply with federal, state, and local statutes and regulations related to solid waste?

Implementation of the proposed project would result in minimal, if any, solid waste that would require service by a landfill. Any excavation needed for trail construction would be used on site. As a result, the proposed project would not cause landfills or transfer stations to exceed permitted capacity and would not result in incompliance with related to statues and regulations related to solid waste and recycling. **Less-than-Significant Impact**.

XIX. WILDFIRE

If located in or near State responsibility areas or lands classified as very high fire hazard severity zones, would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant	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 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?	❐	❐	■	❐

DISCUSSION

a) Substantially impair an adopted emergency response plan or emergency evacuation plan?

The City of Half Moon Bay Emergency Preparedness Division, in partnership with San Mateo County Office of Emergency Services, is responsible for coordinating agency response to disasters or other large-scale emergencies in the city and establishes emergency planning, mitigation, response, and recovery policies within the city.

As stated in Section VIII, Hazards and Hazardous Materials, the proposed project would not interfere or impair with an adopted emergency response plan, or emergency evacuation plan. **Less-than-Significant Impact**.

b) *Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?*

The project does include any structures other than a restroom facility and would not have occupants to expose occupants to pollutant concentrations or the uncontrolled spread of wildfire. **Less-than-Significant Impact**.

c) *Require the installation of 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?*

The proposed project would not include new roads, fuel breaks, or sources of emergency water. Minor alterations to water and sewer piping would be installed to connect existing utilities. Therefore, installation and maintenance of infrastructure would not exacerbate wildfire risks and new infrastructure would not cause temporary or ongoing impacts on the environment. **Less-than-Significant Impact**.

d) *Expose people or structure to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire instability, or drainage changes?*

The project site consists of relatively flat land with a gentle slope of four percent situated on a terrace above scenic coastal bluffs up to approximately 83 feet AMSL. According to the Geologic Review, large-scale landslides have not occurred within the project site and, based on field observation conducted during the geological review, the risk of large-scale landslides impacting the trail is low. Therefore, the proposed project would not expose people or structures to flooding or landslides that result from post-fire instability and runoff. **Less-than-Significant Impact**.

XX. MANDATORY FINDINGS OF SIGNIFICANCE

Would the proposed project:	Potentially Significant Impact	Less-than-Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	❐	■	❐	❐

Would the proposed project:	Potentially Significant Impact	Less-than-Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	❐	❐	■	❐
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	❐	❐	■	❐

DISCUSSION

a) *Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?*

As described in this Initial Study, no new construction or physical changes proposed by the proposed project would degrade the quality of the environment. The design and methods of construction of the proposed project would ensure that trails avoid sensitive plant and animal habitats. The trail design ensures conservation of habitats and avoids impacts to sensitive wildlife and plants to the extent possible. However, as shown on Figures 4.3-1 and 4.3-2 above, some construction activities could potentially result in significant impacts to federally protected habitats or species. With the incorporation of mitigation measures BIO-1a through BIO-8c, which direct pre-construction surveys, biological monitors, and construction protocols, impacts would be reduced to a less-than-significant level. **Less-than-Significant with Mitigation**.

b) *Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?*

Future cumulative impacts would result in increased connectivity to the California Coastal Trail and increased recreational opportunities in Half Moon Bay through completion of the California Coastal Trail. Since the California Coastal Trail neither begins nor ends in Half Moon Bay, and these trail segments are presently heavily used, formalization of the trail within Half Moon Bay would cause only minor effects when taken into consideration cumulatively.

During construction, slight increases in noise and impacts to air quality may occur but would be minor and reduced further through construction-related mitigation measure AIR-1. Due to their minor, temporary nature, cumulative impacts would not be considered significant**. Less-than-Significant Impact.**

c) *Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?*

The proposed project would not create environmental effects that would cause physical changes to property that would result in adverse effects on humans, either directly or indirectly. The increased recreational opportunities proposed by the proposed project would be considered a beneficial impact. Therefore, implementation of the proposed project would have a less-than-significant impact on human beings. **Less-than-Significant Impact.**

5. Mitigation Monitoring and Reporting Program

This Mitigation Monitoring and Reporting Program (MMRP) has been prepared for the proposed project. The purpose of the MMRP is to ensure the implementation of project-specific mitigation measures identified as part of the environmental review for the proposed project. The MMRP includes the following information:

- The full text of the mitigation measures;
- The party responsible for implementing the mitigation measures;
- The timing for implementation of the mitigation measure;
- The agency responsible for monitoring the implementation; and
- The monitoring action and frequency.

The City of Half Moon Bay must adopt this MMRP, or an equally effective program, if it approves the proposed project with the mitigation measures that were adopted or made conditions of project approval.

TABLE 5-1 MITIGATION MONITORING AND REPORTING PROGRAM

Mitigation Measures	Party Responsible for Implementation	Implementation Timing	Agency Responsible for Monitoring	Monitoring Action	Monitoring Frequency
AIR QUALITY					
Mitigation Measure AIR-1: The project's construction contractor shall comply with the following best management practices for reducing construction emissions of fugitive dust (PM_{10} and $PM_{2.5}$) as required by the Bay Area Air Quality Management District Revised California Environmental Quality Act Air Quality Guidelines: ▪ Water all active construction areas at least twice daily, or more if needed to control dust emissions. Watering must be sufficient to prevent airborne dust from leaving the site. Increased watering frequency may be necessary whenever wind speeds exceed 15 miles per hour. Reclaimed water should be used whenever possible. ▪ Pave, apply water twice daily or more if necessary to prevent airborne dust from leaving the site, or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas, and staging areas at construction sites. ▪ Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least 2 feet of freeboard (i.e., the minimum required space between the top of the load and the top of the trailer). ▪ Sweep daily (with water sweepers using reclaimed water if possible) or as often as needed all paved access roads, parking areas and staging areas at the construction site to prevent airborne dust from leaving the site. ▪ Sweep public streets daily (with water sweepers using reclaimed water if possible) in the vicinity of the project site, or as often as needed, to keep streets free of visible soil material. ▪ Hydroseed or apply non-toxic soil stabilizers to inactive construction areas.	Project Contractor	During the construction period.	City of Half Moon Bay	Site inspections	During course of regular site inspections by City staff.

TABLE 5-1 MITIGATION MONITORING AND REPORTING PROGRAM

Mitigation Measures	Party Responsible for Implementation	Implementation Timing	Agency Responsible for Monitoring	Monitoring Action	Monitoring Frequency
■ Enclose, cover, water twice daily, or apply non-toxic soil binders to exposed stockpiles (dirt/sand). ■ Limit vehicle traffic speeds on unpaved roads to 15 miles per hour. ■ Replant vegetation in disturbed areas as quickly as possible. ■ Install sandbags or other erosion control measures to prevent silt runoff from public roadways.					
BIOLOGICAL RESOURCES					
Mitigation Measure BIO-1a: Prior to the start of groundbreaking activities, all construction personnel shall receive training by a qualified biologist on listed species and their habitats. The importance of these species and their habitat shall be described to all employees as well as the minimization and avoidance measures that are to be implemented as part of the proposed project. An educational brochure containing color photographs of all listed species in the work area(s) shall be distributed to all employees working within the project site. The original list of employees who attend the training sessions shall be maintained by the project applicant and be made available for review by the USFWS and the CDFW upon request.	Construction contractor	Prior to start of groundbreaking activity.	City of Half Moon Bay/USFWS	Review educational materials, and receive list of employees who received the initial training.	Once, prior to start of construction activity.
Mitigation Measure BIO-1b: The project applicant or contractor shall designate a qualified biologist to monitor on-site compliance with all minimization measures. The on-site monitor(s) shall remain on-site for the duration of the proposed project, including vegetation removal, grading, and cleanup activities.	Construction contractor	Prior to start of groundbreaking activity.	City of Half Moon Bay	Review biologist resume and approve the hire.	Once, prior to start of construction activity
Mitigation Measure BIO-1c: Designated construction staging areas shall be utilized as the staging areas for the trail construction activities. All vehicles associated with project activities shall be clustered within these areas at the end of each workday or when not in use to minimize habitat disturbance and water quality degradation. Wildlife exclusion fencing shall be installed surrounding the staging area to prevent CRLF or SFGS from	Construction contractor	Prior to start of groundbreaking activity on site, submit a plan showing staging areas. Daily after construction. Request for on-site fueling to	City of Half Moon Bay	Review and approve staging area plan. Verify through site inspections.	During the course of regular site inspections, and periodically after end of construction day.

TABLE 5-1 MITIGATION MONITORING AND REPORTING PROGRAM

Mitigation Measures	Party Responsible for Implementation	Implementation Timing	Agency Responsible for Monitoring	Monitoring Action	Monitoring Frequency
entering these areas overnight. Fueling and maintenance of equipment shall be conducted off-site, and at least 50 feet from any wetland or designated ESHA, unless a request for on-site fueling is approved by the Community Development Department.		City prior to start of groundbreaking activity.			
Mitigation Measure BIO-1d: No trash shall be deposited on the project site during construction activities. All trash shall be placed in trash receptacles with secure lids, stored in vehicles, and removed nightly from the project site.	Construction contractor.	Daily, for all activity on site, including pre-construction site visits.	City of Half Moon Bay	Site inspections.	During regular site inspections.
Mitigation Measure BIO-1e: The project applicant shall post signs at each trail end and along the trail at various locations near areas of sensitive habitat to inform users of appropriate protocol to protect sensitive habitat, including directions to stay on the trail and to walk bicycles or ride very slowly. Signs shall be 48- by 36-inches in size and shall be mounted at eye level on redwood posts.	Project applicant.	Prior to opening trails for public access.	City of Half Moon Bay	Review and approval of sign design prior to installation. Inspection after installation.	Once
Mitigation Measure BIO-2: If ground disturbance or removal of vegetation occurs between February 1 and June 30, preconstruction surveys shall be performed by a qualified biologist no more than 14 days prior to commencement of such activities to determine the presence and location of nesting bird species. If ground disturbance or removal of vegetation occurs between July 1 and August 31, preconstruction surveys shall be performed within 30 days prior to such activities. If active nests are present, temporary protective breeding season buffers shall be established to avoid direct mortality of these birds, nests, or young. The appropriate buffer distance is dependent on the species, surrounding vegetation, and topography, and shall be determined by a qualified biologist to prevent nest abandonment and direct mortality during construction.	Construction contractor	Between February 1 and June 30, surveys shall be conducted no more than 14 days prior to ground disturbance or vegetation removal. Between July 1 and August 31, surveys shall be conducted within 30 days of such activity.	City of Half Moon Bay	Review of survey report for each survey.	As needed depending on frequency of survey.
Mitigation Measure BIO-3a: To reduce potential for CRLF and SFGS to disperse through the project study area, all ground disturbance activities should be restricted to the dry season (May 1 through October 15.	Construction contractor/on-site biologist.	Between May 1 through October 15, or when habitats are dried, as determined by the on-site biological monito in	City of Half Moon Bay	Review construction schedule to verify that ground disturbing	Once, prior to start of ground disturbing activity, and as needed, during construction

TABLE 5-1 MITIGATION MONITORING AND REPORTING PROGRAM

Mitigation Measures	Party Responsible for Implementation	Implementation Timing	Agency Responsible for Monitoring	Monitoring Action	Monitoring Frequency
		compliance with BIO-3b.		activities will be conducted during dry season window, or verification of on-site biologist verification of dry habitat.	period when report is submitted.
Mitigation Measure BIO-3b: To verify if species are present and all habitats are dry, a qualified biologist shall survey the work site immediately before the onset of vegetation clearing or ground disturbance activities. If CRLF are found and do not move out of the work area on their own, the contractor shall contact the USFWS to determine if relocation is appropriate. In making this determination, the USFWS will consider if an appropriate relocation site exists. If the USFWS approves moving animals, a USFWS-approved biologist shall move them from the work site before work activities begin. Any SFGS shall be allowed to leave the work area on their own and shall be monitored by the biologist to ensure they do not reenter the work area.	Construction contractor/on-site biologist.	Immediately prior the onset of vegetation clearing or ground disturbing activities.	City of Half Moon Bay, and USFWS, if CRLF and SFGS are found on-site.	Review of survey report, site inspections.	As needed during construction period.
Mitigation Measure BIO-3c: No work may occur within 48 hours of a rain event (defined as over 0.25 inches in a 24-hour period). Following a rain event, a qualified biologist should survey the work site immediately before reinitiating ground disturbance activities to verify if species are present. If CRLF or SFGS are observed, then the stairs described in Mitigation Measure BIO-3b shall be followed.	Construction contractor/on-site biological monitor.	After a rain event as defined, immediately before reinitiating ground disturbance activities.	City of Half Moon Bay, and USFWS, if CRLF and SFGS are found on-site.	If CRLF or SFGS are found, implement MM BIO-3b.	As needed during construction period.
Mitigation Measure BIO-3d: Any erosion control materials used shall be made of tightly woven fiber netting, or similar material, to ensure that the CRLF and SFGS do not get trapped. This limitation shall be communicated to the contractor. Plastic mono-filament netting (erosion control matting), rolled erosion control products, or similar material shall not be used at the project site because CRLF, SFGS, and other species may become entangled or trapped in it.	Construction contractor/on-site biologist.	Whenever erosion control materials are used during and after the construction period.	City of Half Moon Bay	Site inspection	During regular site inspections.

TABLE 5-1 MITIGATION MONITORING AND REPORTING PROGRAM

Mitigation Measures	Party Responsible for Implementation	Implementation Timing	Agency Responsible for Monitoring	Monitoring Action	Monitoring Frequency
Mitigation Measure BIO-3e: CRLF and SFGS may take refuge in cavity-like and den-like structures such as pipes and may enter stored pipes and become trapped. Therefore, all construction pipes, culverts, or similar structures that are stored at the site for one or more overnight periods shall be either securely capped prior to storage or thoroughly inspected by the on-site monitor and/or the construction foreman/manager for these animals before the pipe is subsequently buried, capped, or otherwise used or moved in any way. It is also recommended that these structures, if stored, are kept within the staging areas either in developed areas or within wildlife exclusion fencing. If CRLF are found and do not move out of the work area on their own, the USFWS shall be contacted to determine if relocation is appropriate. In making this determination, the USFWS will consider if an appropriate relocation site exists. If the USFWS approves moving animals, a USFWS-approved biologist shall be allowed sufficient time to move them from the work site before work activities begin. If SFGS is found, it should be allowed to passively leave the work area on its own, as determined by the on-site monitor, except in circumstances where the animal is determined to be trapped (see Mitigation Measure BIO-3f).	Construction contractor/on-site biologist.	During construction period.	City of Half Moon Bay and USFWS if CRLF or SFGS are found.	Site inspection	During regular site inspections
Mitigation Measure BIO-3f: To prevent inadvertent entrapment of CRLF or SFGS during construction, the on-site biologist and/or construction foreman/manager shall ensure that all excavated, steep-walled holes or trenches more than one foot deep are completely covered at the close of each working day by plywood or similar materials, or provided with one or more escape ramps constructed of earth fill or wooden planks and inspected by the on-site biologist. Before such holes or trenches are filled, they shall be thoroughly inspected for trapped animals by the on-site biologist and/or construction foreman/manager. If at any time a trapped CRLF or SFGS is discovered by the on-site biologist or anyone else, the animal shall be allowed to passively leave the work area on its own, as determined by the on-site biologist. If a CRLF or SFGS is	Construction contractor/on-site biologist.	Daily, at the close of the working day.	City of Half Moon Bay and USGS if CRLF OR SFGS are trapped.	Site inspections	During regular site inspections

TABLE 5-1 MITIGATION MONITORING AND REPORTING PROGRAM

Mitigation Measures	Party Responsible for Implementation	Implementation Timing	Agency Responsible for Monitoring	Monitoring Action	Monitoring Frequency
trapped, only a USFWS-approved biologist shall move the individual under the direction of USFWS and CDFW.					
Mitigation Measure BIO-3g: Implement Mitigation Measures BIO-1a through BIO-1e.	Construction contractor/on-site biologist.	As defined in BIO 1a-BIO-1e above.	As defined in BIO 1a-BIO-1e above.	As defined in BIO 1a-BIO-1e above.	As defined in BIO 1a-BIO-1e above.
Mitigation Measure BIO-4a: If project activities are to remove or trim trees within the Monterey cypress stands within the project site during the winter roost season (October 1 through March 15), a preconstruction survey for roosting monarch butterflies shall be conducted within 7 days of tree removal or trimming activities. If tree removal or trimming is conducted March 16 through September 31, no preconstruction surveys for roosting monarch butterflies are necessary.	Construction contractor/on-site biologist.	If tree removal or trimming is planned during the winter roosting season (October 1 through March 15).	City of Half Moon Bay	Review pre-construction survey results.	As needed during tree removal or trimming activities.
Mitigation Measure BIO-4b: Soil disturbance and vegetation removal shall be minimized to the extent feasible in order to reduce the impact to nectar plants for monarch butterfly.	Construction contractor/on-site biologist.	During construction period.	City of Half Moon Bay	Site inspection to verify that construction areas staked to include only final trail and staging areas, and construction staging areas.	During regular site inspections.
Mitigation Measure BIO-5: A pre-construction survey for woodrat houses shall be conducted by a qualified biologist within 30 days of the start of work. If houses are observed, they shall be avoided if feasible. If avoidance is not feasible, the houses shall be dismantled by hand under the supervision of a biologist. If young are encountered during the dismantling process, the material shall be placed back on the house and the house shall remain unmolested for two to three weeks in order to give the young enough time to mature and leave the house. After two to three weeks, the nest dismantling process may begin again. Nest material shall be moved to suitable adjacent areas (riparian, woodland, scrub) that shall not be impacted.	Construction contractor/on-site biologist.	Within 30 days of start of any on site activity.	City of Half Moon Bay	Review initial survey. If houses are found, then report should verify absence/presence of young during dismantling and if young are found, verify two-three waiting period.	Once, prior to start of construction.

TABLE 5-1 MITIGATION MONITORING AND REPORTING PROGRAM

Mitigation Measures	Party Responsible for Implementation	Implementation Timing	Agency Responsible for Monitoring	Monitoring Action	Monitoring Frequency
Mitigation Measure BIO-6: If project activities have the potential to disturb trees within the project site during the maternity roosting season (April 1 through August 31) of bats, preconstruction surveys for bats shall take place. Surveys shall be conducted by a qualified biologist no less than 14 days prior to those activities that have the potential to disturb bat roosting and foraging habitats within the project site. Ultrasonic acoustic surveys and/or other site appropriate survey methods shall be performed to determine the presence or absence of bats utilizing the project site as roosting or foraging habitat. If special-status bat species are detected during surveys, species- and roost-specific mitigation measures that prevent significant impacts shall be developed by a qualified biologist. Such measures may include postponing removal of trees, snags, or structures until the end of the maternity roosting season or construction of species-appropriate roosting habitat within the project site. Consultation with CDFW is required to determine appropriate mitigation measures if roosts are disturbed or destroyed. Trees may be removed outside of the maternity roosting season without performing preconstruction bat surveys.	Construction contractor/on-site biologist.	April 1 - August 31, if project activities have the potential to disturb trees.	City of Half Moon Bay/CDFW, if species are found.	Review of preconstruction survey, and CDFW approval of mitigation plan	Once, prior to tree removal or trimming activity within maternity roosting season.
Mitigation Measure BIO-7: Rare plant surveys shall be conducted during the blooming periods for Choris' popcorn flower and species with a moderate potential to occur on the project site (i.e., <u>ocean bluff milk-vetch, coastal marsh milk-vetch, johnny-nip, San Francisco Bay spineflower, San Francisco gumplant, short-leaved evax, Kellogg's horkelia, Point Reyes horkelia, perennial goldfields, coast yellow leptosiphon, San Mateo tree lupine, Davidson's bushmallow, marsh microseris, Oregon polemonium, Hickman's cinquefoil, San Francisco campion, and coastal triquetrella)</u>; these surveys shall include one during the months of April to May and one during the months of June to September. If it is determined that construction-related activities would impact Choris' popcorn flower or any species with a moderate potential to occur, a	Construction contractor/on-site biologist.	Once during the months of April to May and June to September.	City of Half Moon Bay	Initial surveys, and species and implementation of appropriate mitigation if species found on site.	One time each during April to May and June to September.

TABLE 5-1 MITIGATION MONITORING AND REPORTING PROGRAM

Mitigation Measures	Party Responsible for Implementation	Implementation Timing	Agency Responsible for Monitoring	Monitoring Action	Monitoring Frequency
mitigation plan for protecting this species shall be developed by a qualified biologist. Mitigation measures may include additional avoidance measures, salvaging and transplanting of plants within disturbance areas, and collection and storage of seeds for future re-establishment efforts. Seeds shall be collected and preserved from areas of disturbance to special-status species prior to the disturbance and used for reseeding efforts in late fall (i.e., November) to suitable areas on site that are no longer subject to human disturbance through the trail realignment.					
Mitigation Measure BIO-8a: Construction activities and proposed improvements near wetlands shall adhere to the following requirements: ■ The removal of vegetation shall be minimized. ■ Enhance or replace habitat as defined by required agency permits. ■ Development shall conform to natural topography and minimize erosion potential. ■ Runoff and sedimentation shall not exceed predevelopment levels. ■ Native vegetation shall be used for replanting, where appropriate. ■ Toxic substances, such as fertilizers and pesticides, shall not be used.	Construction contractor/on-site biologist.	Prior to construction activity near wetlands.	City of Half Moon Bay	Review and verify on-site biologist report addressing the six listed requirements.	Once, prior to start of construction activities on site.
■ Mitigation Measure BIO-8b: Implementation of the proposed project shall adhere to the following general avoidance measures and specific performance criteria for ESHAs to reduce potential impacts to sensitive habitats: Any site grading activities shall be restricted to the period between approximately April 15 and October 15. Site grading during these dryer months will reduce the possibility of soil erosion and sediments flowing into natural habitats. ■ The project contractor shall install temporary silt fencing along the perimeter of ESHAs adjacent to project activities.	Construction contractor/on-site biologist.	Prior to construction activity and during construction period.	City of Half Moon Bay	Review and verify construction schedule.	Once, prior to start of construction activities on site. During regular site inspections through construction period.

TABLE 5-1 MITIGATION MONITORING AND REPORTING PROGRAM

Mitigation Measures	Party Responsible for Implementation	Implementation Timing	Agency Responsible for Monitoring	Monitoring Action	Monitoring Frequency
▪ Soil disturbance around wetland areas shall be minimized to the maximum extent practicable. This will reduce the impact to existing soils and vegetation that will remain as natural habitat and reduce the potential for soil erosion. Perimeter erosion and sediment control measures (i.e., silt fencing, straw waddles) shall be installed as an extra precaution to reduce the possibility of sediments entering the adjacent potential ESHAs. ▪ Solid materials, including wood, masonry/rock, glass, paper, and other materials, shall not be stored or placed near wetland areas. Solid waste materials shall be properly disposed of off-site. Fluid materials, including concrete, wash water, fuels, lubricants, and other fluid materials used during construction, shall not be disposed of on-site and shall be stored or contained as necessary to prevent spillage into natural habitats. If a spill of such materials occurs, the area shall be cleaned and contaminated materials disposed of properly, and the affected area shall be restored to its natural condition.					
Mitigation Measure BIO-8c: To minimize permanent impacts to seasonal wetlands, disturbance to seasonal wetlands from construction access shall be reduced to the maximum extent feasible. Minimization measures shall be employed, including the installation of construction fencing to minimize the extent of disturbance to wetlands, the installation of "swamp-matting" to prevent rutting and compaction of wetland soils, and the reseeding of wetlands following construction to ensure that impacts are temporary in nature.	Construction contractor/on-site biologist.	During construction period.	City of Half Moon Bay	Site inspection.	During regular site inspections through construction period.
CULTURAL RESOURCES					
Mitigation Measure CULT-1: If an archaeological site(s) is encountered during grading or other soil disturbing activities, project managers and project contractors shall comply with the provisions set forth in Sections 15064.5(c) or (e) of the CEQA	Construction contractor/qualified archaeologist.	Accidental discovery of an archaeological site during grading and other soil disturbing activities.	City of Half Moon Bay/State Historic Preservation Office if resources discovered.	Verify archaeologist report and recommendations based on	As needed during construction period.

TABLE 5-1 MITIGATION MONITORING AND REPORTING PROGRAM

Mitigation Measures	Party Responsible for Implementation	Implementation Timing	Agency Responsible for Monitoring	Monitoring Action	Monitoring Frequency
Guidelines, depending on the type of resource encountered. The site(s) shall be recorded by a qualified archaeologist, including the extent of the site boundaries. The trail alignment(s) and/or associated features shall be relocated away from the archaeological site(s), unless the site(s) is evaluated and determined not to be eligible for listing on the California Register of Historical Resources. The archaeologist shall determine the required distance from the resource. If the eligible site(s) cannot be avoided, the proposed trail shall be designed with protective elements that would provide for trail use with minimal effect on the archeological site(s). These protective elements may include fencing, or placement of the trail on a bridge, boardwalk, or earthen berm. Prior to construction, data recovery and testing shall be conducted as needed. A final report, including the results of the surveys and evaluations, shall be provided to the State Historic Preservation Officer for review. Furthermore, in the event that an archaeological resource is discovered during project construction activities (e.g., excavation, grading), the following provisions of Section 15064.5(c) of the CEQA Guidelines are to be followed: (1)A lead agency shall first determine whether the site is a historical resource, as defined in subdivision (a). (2) If a lead agency determines that the archaeological site is a historical resource, it shall refer to the provisions of Section 21084.1 of the Public Resources Code, and this section, Section 15126.4 of the Guidelines, and the limits contained in Section 21083.2 of the Public Resources Code do not apply. (3) If an archaeological site does not meet the criteria defined in subdivision (a), but does meet the definition of a unique archeological resource in Section 21083.2 of the Public Resources Code, the site shall be treated in accordance with the provisions of Section 21083.2. The time and cost				nature of resource.	

TABLE 5-1 MITIGATION MONITORING AND REPORTING PROGRAM

Mitigation Measures	Party Responsible for Implementation	Implementation Timing	Agency Responsible for Monitoring	Monitoring Action	Monitoring Frequency
limitations described in Public Resources Code Sections 21083.2 (c) through (f) do not apply to surveys and site evaluation activities intended to determine whether the project location contains unique archaeological resources. (4) If an archaeological resource is neither a unique archaeological nor a historical resource, the effects of the proposed project on those resources shall not be considered a significant effect on the environment.					
Mitigation Measure CULT-2: If human remains are encountered during grading or other soil disturbing activities, work shall halt within 50 feet of the remains and the County Coroner shall be notified immediately. An archaeologist shall also be contacted to evaluate the find. In accordance with Section 7050.5(c) of the CHSC, if the Coroner recognizes the human remains to be of Native American origin or has reason to believe they are, the Coroner must notify the NAHC within 24 hours of this identification. Subsequently, pursuant to Section 5097.98 of the Public Resources Code, the NAHC will identify a Native American Most Likely Descendent to inspect the site and provide recommendations for the proper treatment of the remains and associated grave goods.	Construction contractor/Archaeologist/County Coroner	Upon discovery of human remains during grading or other soil disturbing activity.	City of Half Moon Bay/County Coroner	Review archaeologist report/Determine if find is of Native American origin.	As necessary through construction period.
GEOLOGY AND SOILS					
Mitigation Measure GEO-1: If paleontological resources are encountered during grading or other soil disturbing activities, construction shall be halted within 50 feet of the site and a qualified paleontologist shall be contacted to investigate the find within 24 hours. If the find is deemed to be significant, a complete paleontological survey and removal of paleontological finds shall be warranted prior to resuming construction activities in the area.	Construction contractor/Paleontologist	Within 24 hours of discovery of paleontological resources during grading or other soil disturbing activity.	City of Half Moon Bay	Review preliminary finding and approve complete survey report, if required.	As necessary through construction period
HYDROLOGY AND WATER QUALITY					
Mitigation Measure HYDRO-1: The following construction best management practices (BMPs) recommended by San Mateo County (and other BMPs required by the Half Moon Bay City Engineer) shall be employed:	Construction contractor	During construction period.	City of Half Moon Bay	Site inspection	During regular site inspections through

TABLE 5-1 MITIGATION MONITORING AND REPORTING PROGRAM

Mitigation Measures	Party Responsible for Implementation	Implementation Timing	Agency Responsible for Monitoring	Monitoring Action	Monitoring Frequency
▪ Limiting construction activities to the dry season. ▪ Using (but not overusing) reclaimed water for dust control. ▪ Stabilizing construction sites, including entrances and exits. ▪ Following construction, stabilizing disturbed sites with native plant materials, hydroseeding, or similar measures. ▪ Storing stockpiled materials under tarps when they are not actively being used. ▪ Balancing cut and fill materials when possible. ▪ Disposing of all wastes and debris properly. ▪ Recycling materials and wastes that can be recycled (such as aggregate base materials, wood, etc.). ▪ Inspecting vehicles and equipment frequently for leaks and repairing promptly, and using drip pans to catch leaks until repairs are made. ▪ Cleaning up spills or leaks immediately and disposing of cleanup materials properly.					construction period.
TRANSPORTATION					
Mitigation Measure TRANS-1a: The construction contractor shall be responsible for providing a Traffic Control Plan (TCP), approved by the City Traffic Engineer, prior to the start of construction. The TCP shall include traffic control measures in order to ensure traffic safety during all construction phases. The traffic control devices may involve signage, use of delineators, flashing arrows, and/or temporary lane lines at the discretion of the City Traffic Engineer. The TCP shall be approved by the City Traffic Engineer. The TCP shall include provisions for advanced notification (signage) of the proposed detour routes and coordination with emergency service providers.	Construction contractor.	Once, prior to start of construction activity.	City of Half Moon Bay	Review and approval of TCP, and site inspections.	During regular site inspections through construction period.
Mitigation Measure TRANS-1b: The proposed project shall be constructed in a manner to avoid a substantial increase in construction-period traffic congestion through implementation of the following:	Construction contractor.	Prior to start of construction and during construction period.	City of Half Moon Bay	Approval of construction plan and site inspections.	During regular site inspections through

TABLE 5-1 MITIGATION MONITORING AND REPORTING PROGRAM

Mitigation Measures	Party Responsible for Implementation	Implementation Timing	Agency Responsible for Monitoring	Monitoring Action	Monitoring Frequency
▪ The applicant shall identify locations for contractor parking on site for the duration of the construction period so that parking does not affect the operation of local roads. ▪ Vehicle trips to and from the project site for purposes of transporting cut and fill shall be prohibited during peak traffic morning and evening peak hours. ▪ In the event of lane closures due to deliveries, an adequate number of flaggers and appropriate signage shall be utilized to ensure the safe passage of vehicles, bicyclists, and pedestrians.					construction period.

6. *Organizations and Persons Consulted*

This Initial Study was prepared by the following City staff and consultants.

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Appendix A: Air Quality Modeling

1. Air Quality

Ambient air quality standards (AAQS) have been adopted at State and federal levels for criteria air pollutants. In addition, both the State and federal government regulate the release of toxic air contaminants (TACs). The City of San Francisco is in the San Francisco Bay Area Air Basin (SFBAAB) and is subject to the rules and regulations imposed by the Bay Area Air Quality Management District (BAAQMD), as well as the California AAQS adopted by the California Air Resources Board (CARB) and national AAQS adopted by the United States Environmental Protection Agency (EPA). Federal, State, regional, and local laws, regulations, plans, or guidelines that are potentially applicable to the proposed project are summarized below. The discussion also identifies the natural factors in the air basin that affect air pollution.

1.1 REGULATORY FRAMEWORK

1.1.1 Ambient Air Quality Standards

The Clean Air Act (CAA) was passed in 1963 by the US Congress and has been amended several times. The 1970 Clean Air Act amendments strengthened previous legislation and laid the foundation for the regulatory scheme of the 1970s and 1980s. In 1977, Congress again added several provisions, including nonattainment requirements for areas not meeting National AAQS and the Prevention of Significant Deterioration program. The 1990 amendments represent the latest in a series of federal efforts to regulate the protection of air quality in the United States. The CAA allows states to adopt more stringent standards or to include other pollution species. The California Clean Air Act (CCAA), signed into law in 1988, requires all areas of the state to achieve and maintain the California AAQS by the earliest practical date. The California AAQS tend to be more restrictive than the National AAQS, based on even greater health and welfare concerns.

These National AAQS and California AAQS are the levels of air quality considered to provide a margin of safety in the protection of the public health and welfare. They are designed to protect "sensitive receptors" most susceptible to further respiratory distress, such as asthmatics, the elderly, very young children, people already weakened by other disease or illness, and persons engaged in strenuous work or exercise. Healthy adults can tolerate occasional exposure to air pollutant concentrations considerably above these minimum standards before adverse effects are observed.

Both California and the federal government have established health-based AAQS for seven air pollutants. As shown in Table 1, these pollutants include ozone (O_3), nitrogen dioxide (NO_2), carbon monoxide (CO), sulfur dioxide (SO_2), coarse inhalable particulate matter (PM_{10}), fine inhalable particulate matter ($PM_{2.5}$), and lead (Pb). In addition, the state has set standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles. These standards are designed to protect the health and welfare of the populace with a reasonable margin of safety.

Table 1 Ambient Air Quality Standards for Criteria Pollutants

Pollutant	Averaging Time	California Standard[1]	Federal Primary Standard[2]	Major Pollutant Sources
Ozone (O_3)[3]	1 hour	0.09 ppm	*	Motor vehicles, paints, coatings, and solvents.
	8 hours	0.070 ppm	0.070 ppm	
Carbon Monoxide (CO)	1 hour	20 ppm	35 ppm	Internal combustion engines, primarily gasoline-powered motor vehicles.
	8 hours	9.0 ppm	9 ppm	
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	0.030 ppm	0.053 ppm	Motor vehicles, petroleum-refining operations, industrial sources, aircraft, ships, and railroads.
	1 hour	0.18 ppm	0.100 ppm	
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	*	0.030 ppm	Fuel combustion, chemical plants, sulfur recovery plants, and metal processing.
	1 hour	0.25 ppm	0.075 ppm	
	24 hours	0.04 ppm	0.14 ppm	
Respirable Coarse Particulate Matter (PM_{10})	Annual Arithmetic Mean	20 µg/m3	*	Dust and fume-producing construction, industrial, and agricultural operations, combustion, atmospheric photochemical reactions, and natural activities (e.g., wind-raised dust and ocean sprays).
	24 hours	50 µg/m3	150 µg/m3	
Respirable Fine Particulate Matter ($PM_{2.5}$)[4]	Annual Arithmetic Mean	12 µg/m3	12 µg/m3	Dust and fume-producing construction, industrial, and agricultural operations, combustion, atmospheric photochemical reactions, and natural activities (e.g., wind-raised dust and ocean sprays).
	24 hours	*	35 µg/m3	
Lead (Pb)	30-Day Average	1.5 µg/m3	*	Present source: lead smelters, battery manufacturing & recycling facilities. Past source: combustion of leaded gasoline.
	Calendar Quarter	*	1.5 µg/m3	
	Rolling 3-Month Average	*	0.15 µg/m3	
Sulfates (SO_4)[5]	24 hours	25 µg/m3	*	Industrial processes.
Visibility Reducing Particles	8 hours	ExCo =0.23/km visibility of 10≥ miles	No Federal Standard	Visibility-reducing particles consist of suspended particulate matter, which is a complex mixture of tiny particles that consists of dry solid fragments, solid cores with liquid coatings, and small droplets of liquid. These particles vary greatly in shape, size and chemical composition, and can be made up of many different materials such as metals, soot, soil, dust, and salt.
Hydrogen Sulfide	1 hour	0.03 ppm	No Federal Standard	Hydrogen sulfide (H_2S) is a colorless gas with the odor of rotten eggs. It is formed during bacterial decomposition of sulfur-containing organic substances. Also, it can be present in sewer gas and some natural gas and can be emitted as the result of geothermal energy exploitation.

Table 1 Ambient Air Quality Standards for Criteria Pollutants

Pollutant	Averaging Time	California Standard[1]	Federal Primary Standard[2]	Major Pollutant Sources
Vinyl Chloride	24 hours	0.01 ppm	No Federal Standard	Vinyl chloride (chloroethene), a chlorinated hydrocarbon, is a colorless gas with a mild, sweet odor. Most vinyl chloride is used to make polyvinyl chloride (PVC) plastic and vinyl products. Vinyl chloride has been detected near landfills, sewage plants, and hazardous waste sites, due to microbial breakdown of chlorinated solvents.

Source: California Air Resources Board (CARB). 2016, October 1. Ambient Air Quality Standards. http://www.arb.ca.gov/research/aaqs/aaqs2.pdf.
Notes: ppm: parts per million; µg/m^3: micrograms per cubic meter

* Standard has not been established for this pollutant/duration by this entity.

1 California standards for O_3, CO (except 8-hour Lake Tahoe), SO_2 (1 and 24 hour), NO_2, and particulate matter (PM_{10}, $PM_{2.5}$, and visibility reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

2 National standards (other than O_3, PM, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The O_3 standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over three years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m^3 is equal to or less than one. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard.

3 On October 1, 2015, the national 8-hour ozone primary and secondary standards were lowered from 0.075 to 0.070 ppm.

4 On December 14, 2012, the national annual $PM_{2.5}$ primary standard was lowered from 15 µg/m^3 to 12.0 µg/m^3. The existing national 24-hour $PM_{2.5}$ standards (primary and secondary) were retained at 35 µg/m^3, as was the annual secondary standard of 15 µg/m^3. The existing 24-hour PM_{10} standards (primary and secondary) of 150 µg/m^3 also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.

5 On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. The 1-hour national standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the 1-hour national standard to the California standard the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.

California has also adopted a host of other regulations that reduce criteria pollutant emissions, including:

- AB 1493: Pavley Fuel Efficiency Standards
- Title 20 California Code of Regulations (CCR): Appliance Energy Efficiency Standards
- Title 24, Part 6, CCR: Building and Energy Efficiency Standards
- Title 24, Part 11, CCR: Green Building Standards Code

1.1.2 Air Pollutants of Concern

A substance in the air that can cause harm to humans and the environment is known as an air pollutant. Pollutants can be in the form of solid particles, liquid droplets, or gases. In addition, they may be natural or man-made.

1.1.2.1 CRITERIA AIR POLLUTANTS

The air pollutants emitted into the ambient air by stationary and mobile sources are regulated by federal and state law. Air pollutants are categorized as primary or secondary pollutants. Primary air pollutants are those that are emitted directly from sources. Carbon monoxide (CO), volatile organic compounds (VOC), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), coarse inhalable particulate matter (PM_{10}), fine inhalable particulate matter ($PM_{2.5}$), and lead (Pb) are primary air pollutants. Of these, CO, SO_2, NO_2, PM_{10}, and $PM_{2.5}$ are "criteria air pollutants," which means that ambient air quality standards (AAQS) have been established for them. VOC and oxides of nitrogen (NO_x) are air pollutant precursors that form secondary criteria pollutants through chemical and photochemical reactions in the atmosphere. Ozone (O_3) and NO_2 are the principal secondary pollutants. A description of each of the primary and secondary criteria air pollutants and their known health effects is presented below.

Carbon Monoxide (CO) is a colorless, odorless gas produced by incomplete combustion of carbon substances, such as gasoline or diesel fuel. CO is a primary criteria air pollutant. CO concentrations tend to be the highest during winter mornings with little to no wind, when surface-based inversions trap the pollutant at ground levels. The highest ambient CO concentrations are generally found near traffic-congested corridors and intersections. When inhaled at high concentrations, CO combines with hemoglobin in the blood and reduces its oxygen-carrying capacity. This results in reduced oxygen reaching the brain, heart, and other body tissues. This condition is especially critical for people with cardiovascular diseases, chronic lung disease, or anemia, as well as for fetuses. Even healthy people exposed to high CO concentrations can experience headaches, dizziness, fatigue, unconsciousness, and even death. [1]

Volatile Organic Compounds (VOC) are compounds composed primarily of hydrogen and carbon atoms. Internal combustion associated with motor vehicle usage is the major source of ROGs. Other sources of ROGs include evaporative emissions from paints and solvents, the application of asphalt paving, and the use of household consumer products such as aerosols. Adverse effects on human health are not caused directly by ROGs, but rather by reactions of ROGs to form secondary pollutants such as O_3. There are no AAQS established for ROGs. However, because they contribute to the formation of O_3, the Air District has established a significance threshold for this pollutant.

Nitrogen Oxides (NO_x) are a by-product of fuel combustion and contribute to the formation of O_3, PM_{10}, and $PM_{2.5}$. The two major components of NO_x are nitric oxide (NO) and NO_2. The principal component of NO_x produced by combustion is NO, but NO reacts with oxygen to form NO_2, creating the mixture of NO and NO_2 commonly called NO_X. NO_2 absorbs blue light; the result is a brownish-red cast to the atmosphere and reduced visibility. NO is a colorless, odorless gas formed from atmospheric nitrogen and oxygen when combustion takes place under high temperature and/or high pressure.[2] NO_2 acts as an acute irritant and in equal concentrations is more injurious than NO. At atmospheric concentrations, however, NO_2 is only potentially irritating. There is some indication of a relationship between NO_2 and chronic pulmonary fibrosis. Some increase in bronchitis in children (2 and 3 years old) has also been observed at concentrations below 0.3 parts per million (ppm). [3]

Sulfur Dioxide (SO_2) is a colorless, pungent, irritating gas formed by the combustion of sulfurous fossil fuels. It enters the atmosphere as a result of burning high-sulfur-content fuel oils and coal and from chemical processes at chemical plants and refineries. Gasoline and natural gas have very low sulfur content and do not release significant quantities of SO_2. When SO_2 forms sulfates (SO_4) in the atmosphere, together these pollutants are referred to as sulfur oxides (SO_x). Thus, SO_2 is both a primary and secondary criteria air pollutant. At sufficiently high concentrations, SO_2 may irritate the upper respiratory tract. At lower concentrations and when combined with particulates, SO_2 may do greater harm by injuring lung tissue. [4]

Suspended Particulate Matter (PM_{10} and $PM_{2.5}$) consists of finely divided solids or liquids such as soot, dust, aerosols, fumes, and mists. In the San Francisco Bay Area Air Basin (SFBAAB or Air Basin), most particulate matter is caused by combustion, factories, construction, grading, demolition, agricultural activities, and motor vehicles. Two forms of fine particulates are now recognized and regulated. Inhalable coarse

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1 Bay Area Air Quality Management District, 2017, Revised California Environmental Quality Act Air Quality Guidelines.
2 Bay Area Air Quality Management District, 2017, Revised California Environmental Quality Act Air Quality Guidelines.
3 Bay Area Air Quality Management District, 2017, Revised California Environmental Quality Act Air Quality Guidelines.
4 Bay Area Air Quality Management District, 2017, Revised California Environmental Quality Act Air Quality Guidelines.

particles, or PM_{10}, include the particulate matter with an aerodynamic diameter of 10 microns (i.e., 10 millionths of a meter or 0.0004 inch) or less. Inhalable fine particles, or $PM_{2.5}$, have an aerodynamic diameter of 2.5 microns or less (i.e., 2.5 millionths of a meter or 0.0001 inch). Diesel particulate matter (DPM) is also classified a carcinogen.

Extended exposure to particulate matter can increase the risk of chronic respiratory disease. PM_{10} bypasses the body's natural filtration system more easily than larger particles and can lodge deep in the lungs. The EPA scientific review concluded that $PM_{2.5}$ penetrates even more deeply into the lungs, and this is more likely to contribute to health effects—at concentrations well below current PM_{10} standards. These health effects include premature death in people with heart or lung disease, nonfatal heart attacks, irregular heartbeat, aggravated asthma, decreased lung function, and increased respiratory symptoms (e.g., irritation of the airways, coughing, or difficulty breathing). Motor vehicles are currently responsible for about half of particulates in the SFBAAB. Wood burning in fireplaces and stoves is another large source of fine particulates. [5]

Ozone (O_3) is commonly referred to as "smog" and is a gas that is formed when ROGs and NO_x, both by-products of internal combustion engine exhaust, undergo photochemical reactions in the presence of sunlight. O_3 is a secondary criteria air pollutant. O_3 concentrations are generally highest during the summer months when direct sunlight, light winds, and warm temperatures create favorable conditions to the formation of this pollutant. O_3 poses a health threat to those who already suffer from respiratory diseases as well as to healthy people. O_3 levels usually build up during the day and peak in the afternoon hours. Short-term exposure can irritate the eyes and cause constriction of the airways. Besides causing shortness of breath, it can aggravate existing respiratory diseases such as asthma, bronchitis, and emphysema. Chronic exposure to high ozone levels can permanently damage lung tissue. O_3 can also damage plants and trees and materials such as rubber and fabrics.[6]

Lead (Pb) is a metal found naturally in the environment as well as in manufactured products. The major sources of lead emissions have historically been mobile and industrial sources. As a result of the phasing out of leaded gasoline, metal processing is currently the primary source of lead emissions. The highest levels of lead in air are generally found near lead smelters. Other stationary sources are waste incinerators, utilities, and lead-acid battery manufacturers. Because emissions of lead are found only in projects that are permitted by the Air District, lead is not an air quality of concern for the proposed project.

1.1.2.2 TOXIC AIR CONTAMINANTS

The public's exposure to air pollutants classified as toxic air contaminants (TACs) is a significant environmental health issue in California. In 1983, the California Legislature enacted a program to identify the health effects of TACs and to reduce exposure to these contaminants to protect the public health. The California Health and Safety Code defines a TAC as "an air pollutant which may cause or contribute to an increase in mortality or in serious illness, or which may pose a present or potential hazard to human health." A substance that is listed as a hazardous air pollutant (HAP) pursuant to Section 112(b) of the federal Clean Air Act (42 United States Code §7412[b]) is a toxic air contaminant. Under state law, the California Environmental Protection Agency (Cal/EPA), acting through CARB, is authorized to identify a substance as

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5 Bay Area Air Quality Management District, 2017, Revised California Environmental Quality Act Air Quality Guidelines.

6 Bay Area Air Quality Management District, 2017. Revised California Environmental Quality Act Air Quality Guidelines.

a TAC if it determines that the substance is an air pollutant that may cause or contribute to an increase in mortality or to an increase in serious illness, or may pose a present or potential hazard to human health.

California regulates TACs primarily through Assembly Bill (AB) 1807 (Tanner Air Toxics Act) and AB 2588 (Air Toxics "Hot Spot" Information and Assessment Act of 1987). The Tanner Air Toxics Act sets forth a formal procedure for CARB to designate substances as TACs. Once a TAC is identified, CARB adopts an "airborne toxics control measure" for sources that emit designated TACs. If there is a safe threshold for a substance (i.e., a point below which there is no toxic effect), the control measure must reduce exposure to below that threshold. If there is no safe threshold, the measure must incorporate toxics best available control technology to minimize emissions. To date, CARB has established formal control measures for 11 TACs, all of which are identified as having no safe threshold.

Air toxics from stationary sources are also regulated in California under the Air Toxics "Hot Spot" Information and Assessment Act of 1987. Under AB 2588, toxic air contaminant emissions from individual facilities are quantified and prioritized by the air quality management district or air pollution control district. High priority facilities are required to perform a health risk assessment and, if specific thresholds are exceeded, are required to communicate the results to the public in the form of notices and public meetings.

By the last update to the TAC list in December 1999, CARB had designated 244 compounds as TACs.[7] Additionally, CARB has implemented control measures for a number of compounds that pose high risks and show potential for effective control. The majority of the estimated health risks from TACs can be attributed to relatively few compounds, the most important being particulate matter from diesel-fueled engines.

Diesel Particulate Matter

In 1998, CARB identified particulate emissions from diesel-fueled engines (diesel PM) as a TAC. Previously, the individual chemical compounds in diesel exhaust were considered TACs. Almost all diesel exhaust particle mass is 10 microns or less in diameter. Because of their extremely small size, these particles can be inhaled and eventually trapped in the bronchial and alveolar regions of the lung.

CARB has promulgated the following specific rules to limit TAC emissions:

- 13 CCR Chapter 10, Section 2485, Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling
- 13 CCR Chapter 10, Section 2480, Airborne Toxic Control Measure to Limit School Bus Idling and Idling at Schools
- 13 CCR Section 2477 and Article 8, Airborne Toxic Control Measure for In-Use Diesel-Fueled Transport Refrigeration Units (TRU) and TRU Generator Sets and Facilities Where TRUs Operate

Community Risk

In addition, to reduce exposure to TACs, CARB developed and approved the *Air Quality and Land Use Handbook: A Community Health Perspective*[8] to provide guidance regarding the siting of sensitive land uses in the vicinity of freeways, distribution centers, rail yards, ports, refineries, chrome-plating facilities, dry cleaners, and

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[7] California Air Resources Board (CARB). 1999. California Air Resources Board (CARB). Final Staff Report: Update to the Toxic Air Contaminant List. https://ww3.arb.ca.gov/toxics/id/finalstaffreport.htm.

[8] California Air Resources Board (CARB). 2005, April. Air Quality and Land Use Handbook: A Community Health Perspective. https://www.arb.ca.gov/ch/handbook.pdf.

gasoline-dispensing facilities. This guidance document was developed to assess compatibility and associated health risks when placing sensitive receptors near existing pollution sources. CARB's recommendations on the siting of new sensitive land uses were based on a compilation of recent studies that evaluated data on the adverse health effects from proximity to air pollution sources. The key observation in these studies is that proximity to air pollution sources substantially increases exposure and the potential for adverse health effects. There are three carcinogenic toxic air contaminants that constitute the majority of the known health risks from motor vehicle traffic, DPM from trucks, and benzene and 1,3-butadiene from passenger vehicles. CARB recommendations are based on data that show that localized air pollution exposures can be reduced by as much as 80 percent by following CARB minimum distance separations.

1.1.3 Bay Area Air Quality Management District

The Air District is the agency responsible for assuring that the National and California AAQS are attained and maintained in the Air Basin. Air quality conditions in the Air Basin have improved significantly since the Air District was created in 1955. The Air District prepares air quality management plans (AQMP) to attain ambient air quality standards in the Air Basin. The Air District prepares ozone attainment plans for the National O3 standard and clean air plans for the California O_3 standard. These air quality management plans are prepared in coordination with Association of Bay Area Governments (ABAG) and the Metropolitan Transportation Commission (MTC). The Air District adopted the 2017 Clean Air Plan, Spare the Air, Cool the Climate (2017 Clean Air Plan) on April 19, 2017, making it the most recent adopted comprehensive plan. The 2017 Clean Air Plan incorporates significant new scientific data, primarily in the form of updated emissions inventories, ambient measurements, new meteorological episodes, and new air quality modeling tools.

1.1.3.1 BAY AREA AIR QUALITY MANAGEMENT DISTRICT 2017 CLEAN AIR PLAN

2017 Spare the Air, Cool the Climate: A Blueprint for Clean Air and Climate Protection in the Bay Area

The 2017 Clean Air Plan serves as an update to the adopted Bay Area 2010 Clean Air Plan and continues in providing the framework for SFBAAB to achieve attainment of the California and National AAQS. The 2017 Clean Air Plan updates the Bay Area's ozone plan, which is based on the "all feasible measures" approach to meet the requirements of the California Clean Air Act. Additionally, it sets a goal of reducing health risk impacts to local communities by 20 percent by 2020. Furthermore, the 2017 Clean Air Plan also lays the groundwork for reducing GHG emissions in the Bay Area to meet the state's 2030 GHG reduction target and 2050 GHG reduction goal. It also includes a vision for the Bay Area in a post-carbon year 2050 that encompasses the following [9]:

- Construct buildings that are energy efficient and powered by renewable energy.
- Walk, bicycle, and use public transit for the majority of trips and use electric-powered autonomous public transit fleets.
- Incubate and produce clean energy technologies.

[9] Bay Area Air Quality Management District. 2017, April 19. Final 2017 Clean Air Plan, Spare the Air, Cool the Climate: A Blueprint for Clean Air and Climate Protection in the Bay Area. http://www.baaqmd.gov/plans-and-climate/air-quality-plans/plans-under-development.

- Live a low-carbon lifestyle by purchasing low-carbon foods and goods in addition to recycling and putting organic waste to productive use.

A comprehensive multipollutant control strategy has been developed to be implemented in the next three to five years to address public health and climate change and to set a pathway to achieve the 2050 vision. The control strategy includes 85 control measures to reduce emissions of ozone, particulate matter, TACs, and GHG from a full range of emission sources. These control measures cover the following sectors: 1) stationary (industrial) sources; 2) transportation; 3) energy; 4) agriculture; 5) natural and working lands; 6) waste management; 7) water; and 8) super-GHG pollutants. Overall, the proposed control strategy is based on the following key priorities:

- Reduce emissions of criteria air pollutants and toxic air contaminants from all key sources.
- Reduce emissions of "super-GHGs" such as methane, black carbon, and fluorinated gases.
- Decrease demand for fossil fuels (gasoline, diesel, and natural gas).
- Increase efficiency of the energy and transportation systems.
- Reduce demand for vehicle travel, and high-carbon goods and services.
- Decarbonize the energy system.
- Make the electricity supply carbon-free.
- Electrify the transportation and building sectors.

1.1.3.2 BAAQMD'S COMMUNITY AIR RISK EVALUATION PROGRAM (CARE)

The BAAQMD's Community Air Risk Evaluation (CARE) program was initiated in 2004 to evaluate and reduce health risks associated with exposure to outdoor TACs in the Bay Area. Based on findings of the latest report, DPM was found to account for approximately 85 percent of the cancer risk from airborne toxics. Carcinogenic compounds from gasoline-powered cars and light duty trucks were also identified as significant contributors: 1,3-butadiene contributed 4 percent of the cancer risk-weighted emissions, and benzene contributed 3 percent. Collectively, five compounds—DPM, 1,3-butadiene, benzene, formaldehyde, and acetaldehyde—were found to be responsible for more than 90 percent of the cancer risk attributed to emissions. All of these compounds are associated with emissions from internal combustion engines. The most important sources of cancer risk–weighted emissions were combustion-related sources of DPM, including on-road mobile sources (31 percent), construction equipment (29 percent), and ships and harbor craft (13 percent). A 75 percent reduction in DPM was predicted between 2005 and 2015 when the inventory accounted for CARB's diesel regulations. Overall, cancer risk from TACs dropped by more than 50 percent between 2005 and 2015, when emissions inputs accounted for State diesel regulations and other reductions.[10]

Modeled cancer risks from TAC in 2005 were highest near sources of DPM: near core urban areas, along major roadways and freeways, and near maritime shipping terminals. The highest modeled risks were found east of San Francisco, near West Oakland, and the Maritime Port of Oakland. BAAQMD has identified seven impacted communities in the Bay Area:

- Western Contra Costa County and the cities of Richmond and San Pablo

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[10] Bay Area Air Quality Management District. 2014. Improving Air Quality & Health in Bay Area Communities, Community Air Risk Program (CARE) Retrospective and Path Forward (2004–2013), April.

- Western Alameda County along the Interstate 880 (I-880) corridor and the cities of Berkeley, Alameda, Oakland, and Hayward
- San Jose
- Eastern side of San Francisco
- Concord
- Vallejo
- Pittsburgh and Antioch

The project site is not within a CARE-program impacted community. The closest CARE community to the project site is the Eastern side of San Francisco impacted community.

The major contributor to acute and chronic non-cancer health effects in the Air Basin is acrolein (C_3H_4O). Major sources of acrolein are on-road mobile sources and aircraft, and areas with high acrolein emissions are near freeways and commercial and military airports.[11] Currently CARB does not have certified emission factors or an analytical test method for acrolein. Since the appropriate tools needed to implement and enforce acrolein emission limits are not available, BAAQMD does not conduct health risk screening analysis for acrolein emissions.[12]

1.1.3.3 AB 617 COMMUNITY ACTION PLANS

In July of 2017, Governor Brown signed Assembly Bill 617 to develop a new community focused program to more effectively reduce exposure to air pollution and preserve public health in environmental justice communities. The bill directs CARB and all local air districts to take measures to protect communities disproportionally impacted by air pollution through monitoring and implementing air pollution control strategies.

On September 27, 2018, CARB approved BAAQMD's recommended communities for monitoring and emission reduction planning. The state approved communities for year 1 of the program, as well as communities that would move forward over the next five years. Bay Area recommendations included all the Community Air Risk Evaluation (CARE) areas, as well as areas with large sources of air pollution (refineries, seaports, airports, etc.), areas identified via statewide screening tools as having pollution and/or health burden vulnerability, and areas with low life expectancy.[13]

- Year 1 Communities:
  - West Oakland. The West Oakland community was selected for BAAQMD's first Community Action Plan. In 2017, cancer risk in from sources in West Oakland (local sources) was 204 in a million. The primary sources of air pollution in West Oakland include heavy truck and cars, port and rail sources,

[11] Bay Area Air Quality Management District (BAAQMD), 2006. Community Air Risk Evaluation Program, Phase I Findings and Policy Recommendations Related to Toxic Air Contaminants in the San Francisco Bay Area.

[12] Bay Area Air Quality Management District (BAAQMD), 2010. Air Toxics NSR Program, Health Risk Screening Analysis Guidelines.

[13] BAAQMD. 2019, April 16. San Francisco Bay Area Community Health Protection Program. https://www.baaqmd.gov/~/media/files/ab617-community-health/2019_0325_ab617onepager-pdf.pdf?la=en

large industries, and to a lesser extent other sources such as residential sources (i.e., woodburning). The majority (over 90 percent) of cancer risk is from diesel $PM_{2.5}$.[14]

- Richmond: Richmond was selected for a community monitoring plan in year 1 of the AB 617 program. The Richmond area is in western Contra Costa County and includes most of the City of Richmond and portions of El Cerrito. It also includes communities just north and east of Richmond, such as San Pablo and several unincorporated communities, including North Richmond. The primary goals of the Richmond monitoring effort are to leverage historic and current monitoring studies, to better characterize the area's mix of sources, and to more fully understand the associated air quality and pollution impact. [15]

■ Year 2-5 Communities:

- East Oakland/San Leandro, Eastern San Francisco, the Pittsburg-Bay Point area, San Jose, Tri-Valley, and Vallejo are slated for action in years 2-5 of the AB 617 program. [16]

1.1.3.4 REGULATION 7, ODOROUS SUBSTANCES

Sources of objectionable odors may occur within the City. BAAQMD's Regulation 7, Odorous Substances, places general limitations on odorous substances and specific emission limitations on certain odorous compounds. Odors are also regulated under BAAQMD Regulation 1, Rule 1-301, Public Nuisance, which states that "no person shall discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance or annoyance to any considerable number of persons or the public; or which endangers the comfort, repose, health or safety of any such persons or the public, or which causes, or has a natural tendency to cause, injury or damage to business or property." Under BAAQMD's Rule 1-301, a facility that receives three or more violation notices within a 30-day period can be declared a public nuisance.

1.1.3.5 OTHER BAAQMD REGULATIONS

In addition to the plans and programs described above, BAAQMD administers a number of specific regulations on various sources of pollutant emissions that would apply to individual development projects:

- BAAQMD, Regulation 2, Rule 2, New Source Review
- BAAQMD, Regulation 2, Rule 5, New Source Review of Toxic Air Contaminants
- BAAQMD Regulation 6, Rule 1, General Requirements
- BAAQMD Regulation 6, Rule 2, Commercial Cooking Equipment
- BAAQMD Regulation 8, Rule 3, Architectural Coatings
- BAAQMD Regulation 8, Rule 4, General Solvent and Surface Coatings Operations
- BAAQMD Regulation 8, Rule 7, Gasoline Dispensing Facilities
- BAAQMD Regulation 11, Rule 2, Asbestos, Demolition, Renovation and Manufacturing)

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[14] BAAQMD. 2019, October 2. West Oakland Community Action Plan.. https://www.baaqmd.gov/community-health/community-health-protection-program/west-oakland-community-action-plan

[15] BAAQMD. 2019, April 16. San Francisco Bay Area Community Health Protection Program. https://www.baaqmd.gov/~/media/files/ab617-community-health/2019_0325_ab617onepager-pdf.pdf?la=en

[16] BAAQMD. 2019, April 16. San Francisco Bay Area Community Health Protection Program. https://www.baaqmd.gov/~/media/files/ab617-community-health/2019_0325_ab617onepager-pdf.pdf?la=en

- BAAQMD Regulation 11, Rule 18, Reduction of Risk from Air Toxic Emissions at Existing Facilities

1.1.4 Plan Bay Area

Plan Bay Area is the Bay Area's Regional Transportation Plan/Sustainable Community Strategy. The 2040 update to Plan Bay Area was adopted jointly by the ABAG and MTC on July 26, 2017. The 2040 Plan Bay Area update serves as a limited and focused update to the 2013 Plan Bay Area, with updated planning assumptions that incorporate key economic, demographic, and financial trends from the last several years.[17] It lays out a development scenario for the region, which when integrated with the transportation network and other transportation measures and policies, would reduce GHG emissions from transportation (excluding goods movement) beyond the per capita reduction targets identified by the Air Resources Board.

1.1.5 City/County Association of Governments of San Mateo (C/CAG)

The City/County Association of Governments of San Mateo (C/CAG) is the designated congestion management agency for the county. C/CAG's congestion management plan (CMP) identifies strategies to respond to future transportation needs, identifies procedures to alleviate and control congestion, and promotes countywide solutions. Pursuant to the EPA's transportation conformity regulations and the Bay Area Conformity State Implementation Plan (also known as the Bay Area Air Quality Conformity Protocol), the CMP is required to be consistent with the MTC planning process, including regional goals, policies, and projects for the regional transportation improvement program (RTIP). MTC cannot approve any transportation plan, program, or project unless these activities conform to the State Implementation Plan (SIP).

ENVIRONMENTAL SETTING

1.1.6 San Francisco Bay Area Air Basin

The BAAQMD is the regional air quality agency for the SFBAAB, which comprises all of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, and Santa Clara counties; the southern portion of Sonoma County; and the southwestern portion of Solano County. Air quality in this area is determined by such natural factors as topography, meteorology, and climate, in addition to the presence of existing air pollution sources and ambient conditions.[18]

1.1.6.1 METEOROLOGY

The SFBAAB is characterized by complex terrain, consisting of coastal mountain ranges, inland valleys, and bays, which distort normal wind flow patterns. The Coast Range splits, resulting in a western coast gap, Golden Gate, and an eastern coast gap, Carquinez Strait, which allow air to flow in and out of the SFBAAB and the Central Valley.

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[17] Metropolitan Transportation Commission and Association of Bay Area Governments, 2017. Plan Bay Area 2040 Plan.

[18] This section describing the air basin is from Bay Area Air Quality Management District, 2017, May, Appendix C: Sample Air Quality Setting, in *California Environmental Quality Act Air Quality Guidelines*.

The climate is dominated by the strength and location of a semi-permanent, subtropical high-pressure cell. During the summer, the Pacific high-pressure cell is centered over the northeastern Pacific Ocean, resulting in stable meteorological conditions and a steady northwesterly wind flow. Upwelling of cold ocean water from below the surface because of the northwesterly flow produces a band of cold water off the California coast.

The cool and moisture-laden air approaching the coast from the Pacific Ocean is further cooled by the presence of the cold water band, resulting in condensation and the presence of fog and stratus clouds along the Northern California coast. In the winter, the Pacific high-pressure cell weakens and shifts southward, resulting in wind flow offshore, the absence of upwelling, and the occurrence of storms. Weak inversions coupled with moderate winds result in a low air pollution potential.

1.1.6.2 WIND PATTERNS

During the summer, winds flowing from the northwest are drawn inland through the Golden Gate and over the lower portions of the San Francisco Peninsula. Immediately south of Mount Tamalpais, the northwesterly winds accelerate considerably and come more directly from the west as they stream through the Golden Gate. This channeling of wind through the Golden Gate produces a jet that sweeps eastward and splits off to the northwest toward Richmond and to the southwest toward San Jose when it meets the East Bay hills.

Wind speeds may be strong locally in areas where air is channeled through a narrow opening, such as the Carquinez Strait, the Golden Gate, or the San Bruno gap. For example, the average wind speed at San Francisco International Airport in July is about 17 knots (from 3:00 p.m. to 4:00 p.m.), compared with only 7 knots at San Jose and less than 6 knots at the Farallon Islands.

The air flowing in from the coast to the Central Valley, called the sea breeze, begins developing at or near ground level along the coast in late morning or early afternoon. As the day progresses, the sea breeze layer deepens and increases in velocity while spreading inland. The depth of the sea breeze depends in large part upon the height and strength of the inversion. If the inversion is low and strong, and hence stable, the flow of the sea breeze will be inhibited and stagnant conditions are likely to result.

In the winter, the SFBAAB frequently experiences stormy conditions with moderate to strong winds, as well as periods of stagnation with very light winds. Winter stagnation episodes are characterized by nighttime drainage flows in coastal valleys. Drainage is a reversal of the usual daytime air-flow patterns; air moves from the Central Valley toward the coast and back down toward the Bay from the smaller valleys within the SFBAAB.

1.1.6.3 TEMPERATURE

Summertime temperatures in the SFBAAB are determined in large part by the effect of differential heating between land and water surfaces. Because land tends to heat up and cool off more quickly than water, a large-scale gradient (differential) in temperature is often created between the coast and the Central Valley, and small-scale local gradients are often produced along the shorelines of the ocean and bays. The temperature gradient near the ocean is also exaggerated, especially in summer, because of the upwelling of cold water from the ocean bottom along the coast. On summer afternoons the temperatures at the coast can be 35 degrees Fahrenheit (ºF) cooler than temperatures 15 to 20 miles inland. At night this contrast usually decreases to less than 10ºF.

In the winter, the relationship of minimum and maximum temperatures is reversed. During the daytime the temperature contrast between the coast and inland areas is small, whereas at night the variation in temperature is large. The climatological station nearest to the project site with temperature data is the Santa Clara University Monitoring Station (ID No. 043861). The lowest average temperature is reported at 38.2°F in January, and the highest average temperature is 81.7°F in August.[19]

1.1.6.4 PRECIPITATION

The SFBAAB is characterized by moderately wet winters and dry summers. Winter rains (November through March) account for about 75 percent of the average annual rainfall. The amount of annual precipitation can vary greatly from one part of the SFBAAB to another, even within short distances. In general, total annual rainfall can reach 40 inches in the mountains, but it is often less than 16 inches in sheltered valleys.

During rainy periods, ventilation (rapid horizontal movement of air and injection of cleaner air) and vertical mixing (an upward and downward movement of air) are usually high, and thus pollution levels tend to be low (i.e. air pollutants are dispersed more readily into the atmosphere rather than accumulate under stagnant conditions). However, during the winter, frequent dry periods do occur, when mixing and ventilation are low and pollutant levels build up. Rainfall historically averages 14.50 inches per year in the project area. [20]

1.1.6.5 WIND CIRCULATION

Low wind speed contributes to the buildup of air pollution because it allows more pollutants to be emitted into the air mass per unit of time. Light winds occur most frequently during periods of low sun (fall and winter, and early morning) and at night. These are also periods when air pollutant emissions from some sources are at their peak, namely, commuter traffic (early morning) and wood-burning appliances (nighttime). The problem can be compounded in valleys, when weak flows carry the pollutants up-valley during the day, and cold air drainage flows move the air mass down-valley at night. Such restricted movement of trapped air provides little opportunity for ventilation and leads to buildup of pollutants to potentially unhealthful levels.

1.1.6.6 INVERSIONS

An inversion is a layer of warmer air over a layer of cooler air. Inversions affect air quality conditions significantly because they influence the mixing depth, i.e. the vertical depth in the atmosphere available for diluting air contaminants near the ground. There are two types of inversions that occur regularly in the SFBAAB. Elevation inversions are more common in the summer and fall, and radiation inversions are more common during the winter. The highest air pollutant concentrations in the SFBAAB generally occur during inversions.

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[19] Western Regional Climate Center (WRCC). 2020, July 13 (accessed). Hayward Air Terminal, California ([Station ID] 043861): Period of Record Monthly Climate Summary, 09/19/1998 to 06/09/2016. Western U.S. Climate Summaries. https://wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca3861.

[20] Western Regional Climate Center (WRCC). 2020, July 13 (accessed). Hayward Air Terminal, California ([Station ID] 043861): Period of Record Monthly Climate Summary, 09/19/1998 to 06/09/2016. Western U.S. Climate Summaries. https://wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca3861.

1.1.7 Existing Ambient Air Quality

1.1.7.1 ATTAINMENT STATUS OF THE SFBAAB

Areas that meet AAQS are classified attainment areas, and areas that do not meet these standards are classified nonattainment areas. Severity classifications for O_3 range from marginal, moderate, and serious to severe and extreme. The attainment status for the air basin is shown in Table 2. The air basin is currently designated a nonattainment area for California and National O_3, California and National $PM_{2.5}$, and California PM_{10} AAQS.

Table 2 Attainment Status of Criteria Pollutants in the San Francisco Bay Area Air Basin

Pollutant	State	Federal[1]
Ozone – 1-hour	Nonattainment	Classification revoked (2005)
Ozone – 8-hour	Nonattainment (serious)	Nonattainment
PM_{10}	Nonattainment	Unclassified/Attainment
$PM_{2.5}$	Nonattainment	Unclassified/Attainment
CO	Attainment	Attainment
NO_2	Attainment	Unclassified
SO_2	Attainment	Attainment
Lead	Attainment	Attainment
Sulfates	Attainment	Unclassified/Attainment
All others	Unclassified/Attainment	Unclassified/Attainment

Source: California Air Resources Board, 2019, August, October. Area Designations Maps: State and National. https://ww2.arb.ca.gov/resources/documents/maps-state-and-federal-area-designations.
[1] Federal designations current as of June 30, 2020

1.1.7.2 EXISTING AMBIENT AIR QUALITY

Existing levels of ambient air quality and historical trends and projections in the vicinity of the project area have been documented and measured by the BAAQMD. BAAQMD has 24 permanent monitoring stations located around the Bay Area. The nearest station is the Redwood City Monitoring Station, which monitors O_3, NO_2, and $PM_{2.5}$. Data from this monitoring stations is summarized in Table 3. The data show regular violations of the State and federal O_3 standards and federal $PM_{2.5}$ standard.

Table 3 Ambient Air Quality Monitoring Summary

	Number of Days Threshold Were Exceeded and Maximum Levels during Such Violations				
Pollutant/Standard	2014	2015	2016	2017	2018
Ozone (O_3)					
State 1-Hour ≥ 0.09 ppm	0	0	0	2	0
State 8-hour ≥ 0.07 ppm	0	1	0	2	0
Federal 8-Hour > 0.075 ppm	0	0	0	2	0
Maximum 1-Hour Conc. (ppm)	0.086	0.086	0.075	0.115	0.067
Maximum 8-Hour Conc. (ppm)	0.065	0.071	0.060	0.086	0.049
Nitrogen Dioxide (NO_2)					
State 1-Hour ≥ 0.18 (ppm)	0	0	0	0	0

Table 3 Ambient Air Quality Monitoring Summary

Pollutant/Standard	Number of Days Threshold Were Exceeded and Maximum Levels during Such Violations				
	2014	2015	2016	2017	2018
Maximum 1-Hour Conc. (ppb)	0.0552	0.0478	0.0457	0.0674	0.0773
Fine Particulates ($PM_{2.5}$)					
Federal 24-Hour > 35 μg/m^3	0	0	0	6	13
Maximum 24-Hour Conc. (μg/m^3)	35.0	34.6	19.5	60.8	120.9

Source: California Air Resources Board, 2019, Air Pollution Data Monitoring Cards (2014, 2015, 2016, 2017, and 2018), Accessed August 20, 2020, https://www.arb.ca.gov/adam/topfour/topfour1.php.
Data from the Redwood City Monitoring Station for O_3, NO_2, PM_{10}, and $PM_{2.5}$.
Notes: ppm: parts per million; ppb: parts per billion; μg/m3: or micrograms per cubic meter

1.1.7.3 EXISTING EMISSIONS

The project site currently operates as a recreational trail, which currently generates criteria air pollutants emissions from transportation.

1.1.8 Sensitive Receptors

Some land uses are considered more sensitive to air pollution than others due to the types of population groups or activities involved. Sensitive population groups include children, the elderly, the acutely ill, and the chronically ill, especially those with cardiorespiratory diseases. Residential areas are also considered sensitive receptors to air pollution because residents (including children and the elderly) tend to be at home for extended periods of time, resulting in sustained exposure to any pollutants present. Other sensitive receptors include retirement facilities, hospitals, and schools. Recreational land uses are considered moderately sensitive to air pollution. Although exposure periods are generally short, exercise places a high demand on respiratory functions, which can be impaired by air pollution. In addition, noticeable air pollution can detract from the enjoyment of recreation. Industrial, commercial, retail, and office areas are considered the least sensitive to air pollution. Exposure periods are relatively short and intermittent, since the majority of the workers tend to stay indoors most of the time. In addition, the working population is generally the healthiest segment of the population. The nearest sensitive receptors to the project site are the residents along Redondo Beach Road to the south.

1.2 METHODOLOGY

The BAAQMD "CEQA Air Quality Guidelines" were prepared to assist in the evaluation of air quality impacts of projects and plans proposed in the Bay Area. The guidelines provide recommended procedures for evaluating potential air impacts during the environmental review process, consistent with CEQA requirements, and include recommended thresholds of significance, mitigation measures, and background air quality information. They also include recommended assessment methodologies for air toxics, odors, and greenhouse gas emissions. In June 2010, the BAAQMD's Board of Directors adopted CEQA thresholds of significance and an update of the CEQA Guidelines. In May 2011, the updated BAAQMD CEQA Air Quality Guidelines were amended to include a risk and hazards threshold for new receptors and modified procedures for assessing impacts related to risk and hazard impacts; however, this later amendment regarding risk and hazards was the subject of the December 17, 2015 Supreme Court decision (*California Building*

Industry Association v BAAQMD), which clarified that CEQA does not require an evaluation of impacts of the environment on a project.[21]

1.2.1 Criteria Air Pollutant Emissions

The proposed project qualifies as a project-level project under BAAQMD's criteria. For project-level analyses, BAAQMD has adopted screening criteria and significance criteria that would be applicable to the proposed project. If a project exceeds the screening level, it would be required to conduct a full analysis using BAAQMD's significance criteria.[22]

Regional Significance Criteria

The BAAQMD criteria for regional significance for projects that exceed the screening thresholds are shown in Table 4. Criteria for both construction and operational phases of the project are shown.

Table 4 BAAQMD Regional (Mass Emissions) Criteria Air Pollutant Significance Thresholds

Pollutant	Construction Phase	Operational Phase	
	Average Daily Emissions (lbs/day)	Average Daily Emissions (lbs/day)	Maximum Annual Emissions (Tons/year)
ROG	54	54	10
NO_x	54	54	10
PM_{10}	82 (Exhaust)	82	15
$PM_{2.5}$	54 (Exhaust)	54	10
PM_{10} and $PM_{2.5}$ Fugitive Dust	Best Management Practices	None	None

Source: Bay Area Air Quality Management District. 2017, May. California Environmental Quality Act Air Quality Guidelines, Appendix D: Threshold of Significance Justification.

The BAAQMD is the primary agency responsible for ensuring the health and welfare of sensitive individuals exposed to elevated concentrations of air pollutants in the Air Basin and has established thresholds that would be protective of these individuals. To achieve the health-based standards established by the EPA, BAAQMD prepares the Clean Air Plan that details regional programs to attain the AAQS. Mass emissions in Table 4 are not correlated with concentrations of air pollutants, but contribute to the cumulative air quality impacts in the Air Basin. The thresholds are based on the trigger levels for the federal New Source Review

21 On March 5, 2012, the Alameda County Superior Court issued a judgment finding that the BAAQMD had failed to comply with CEQA when it adopted the thresholds of significance in the BAAQMD CEQA Air Quality Guidelines. The court did not determine whether the thresholds of significance were valid on their merits, but found that the adoption of the thresholds was a project under CEQA. The court issued a writ of mandate ordering the BAAQMD to set aside the thresholds and cease dissemination of them until the BAAQMD complied with CEQA. Following the court's order, the BAAQMD released revised CEQA Air Quality Guidelines in May of 2012 that include guidance on calculating air pollution emissions, obtaining information regarding the health impacts of air pollutants, and identifying potential mitigation measures, and which set aside the significance thresholds. The Alameda County Superior Court, in ordering BAAQMD to set aside the thresholds, did not address the merits of the science or evidence supporting the thresholds, and in light of the subsequent case history discussed below, the science and reasoning contained in the BAAQMD 2011 CEQA Air Quality Guidelines provide the latest state-of-the-art guidance available. On August 13, 2013, the First District Court of Appeal ordered the trial court to reverse the judgment and upheld the BAAQMD's CEQA Guidelines. (*California Building Industry Association versus BAAQMD, Case No. A135335 and A136212 (Court of Appeal, First District, August 13, 2013*).)

22 Bay Area Air Quality Management District. 2017, May. California Environmental Quality Act Air Quality Guidelines.

(NSR) Program. The NSR Program was created to ensure projects are consistent with attainment of health-based federal AAQS. Regional emissions from a single project do not single-handedly trigger a regional health impact, and it is speculative to identify how many more individuals in the air basin would be affected by the health effects listed above. Projects that do not exceed the BAAQMD regional significance thresholds in Table 4 would not violate any air quality standards or contribute substantially to an existing or projected air quality violation.

If projects exceed the emissions in Table 4 emissions would cumulatively contribute to the nonattainment status and would contribute in elevating health effects associated to these criteria air pollutants. Known health effects related to ozone include worsening of bronchitis, asthma, and emphysema and a decrease in lung function. Health effects associated with particulate matter include premature death of people with heart or lung disease, nonfatal heart attacks, irregular heartbeat, decreased lung function, and increased respiratory symptoms. Reducing emissions would further contribute to reducing possible health effects related to criteria air pollutants. However, for projects that exceed the emissions in Table 4 it is speculative to determine how exceeding the regional thresholds would affect the number of days the region is in nonattainment since mass emissions are not correlated with concentrations of emissions or how many additional individuals in the air basin would be affected by the health effects cited above.

The BAAQMD has not provided methodology to assess the specific correlation between mass emissions generated and the effect on health in order to address the issue raised in *Sierra Club v. County of Fresno* (Friant Ranch, L.P.) (2018) 6 Cal.5th 502, Case No. S21978. Ozone concentrations are dependent upon a variety of complex factors, including the presence of sunlight and precursor pollutants, natural topography, nearby structures that cause building downwash, atmospheric stability, and wind patterns. Because of the complexities of predicting ground-level ozone concentrations in relation to the National AAQS and California AAQS, it is not possible to link health risks to the magnitude of emissions exceeding the significance thresholds. However, if a project in the Bay Area exceeds the regional significance thresholds, the project could contribute to an increase in health effects in the basin until such time the attainment standard are met in the Air Basin.

Local CO Hotspots

Congested intersections have the potential to create elevated concentrations of CO, referred to as CO hotspots. The significance criteria for CO hotspots are based on the California AAQS for CO, which is 9.0 ppm (8-hour average) and 20.0 ppm (1-hour average). However, with the turnover of older vehicles, introduction of cleaner fuels, and implementation of control technology, the SFBAAB is in attainment of the California and National AAQS, and CO concentrations in the SFBAAB have steadily declined. Because CO concentrations have improved, BAAQMD does not require a CO hotspot analysis if the following criteria are met:

- Project is consistent with an applicable congestion management program established by the County Congestion Management Agency for designated roads or highways, the regional transportation plan, and local congestion management agency plans.
- The project would not increase traffic volumes at affected intersections to more than 44,000 vehicles per hour.

- The project traffic would not increase traffic volumes at affected intersection to more than 24,000 vehicles per hour where vertical and/or horizontal mixing is substantially limited (e.g. tunnel, parking garage, bridge underpass, natural or urban street canyon, below-grade roadway).[23]

Odors

The BAAQMD thresholds for odors are qualitative based on BAAQMD's Regulation 7, Odorous Substances. This rule places general limitations on odorous substances and specific emission limitations on certain odorous compounds. In addition, odors are also regulated under BAAQMD Regulation 1, Rule 1-301, Public Nuisance, which states that no person shall discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance or annoyance to any considerable number of persons or the public; or which endangers the comfort, repose, health or safety of any such persons or the public, or which causes, or has a natural tendency to cause, injury or damage to business or property. Under BAAQMD's Rule 1-301, a facility that receives three or more violation notices within a 30-day period can be declared a public nuisance. In addition, BAAQMD has established odor screening thresholds for land uses that have the potential to generate substantial odor complaints, including wastewater treatment plants, landfills or transfer stations, composting facilities, confined animal facilities, food manufacturing, and chemical plants.[24]

1.2.2 Toxic Air Contaminants

The BAAQMD significance thresholds for local community risk and hazard impacts apply to the siting of a new source. Local community risk and hazard impacts are associated with TACs and $PM_{2.5}$ because emissions of these pollutants can have significant health impacts at the local level. The purpose of this environmental evaluation is to identify the significant effects of the proposed project on the environment, not the significant effects of the environment on the proposed project (*California Building Industry Association v. Bay Area Air Quality Management District [2015] 62 Cal.4th 369 [Case No. S213478]*). While CEQA does not require an environmental evaluation to analyze the environmental effects of attracting development and people to an area, the environmental evaluation must analyze the impacts of environmental hazards on future users when the proposed project exacerbates an existing environmental hazard or condition or if there is an exception to this exemption identified in the Public Resources Code. Schools, residential, commercial, and office uses do not use substantial quantities of TACs and typically do not exacerbate existing hazards, so these thresholds are typically applied to new industrial projects.

For assessing community risk and hazards, sources within a 1,000-foot radius are considered. Sources are defined as freeways, high volume roadways (with volume of 10,000 vehicles or more per day or 1,000 trucks per day), and permitted sources.[25,26]

The proposed project would generate TACs and $PM_{2.5}$ during construction activities that could elevate concentrations of air pollutants at the surrounding residential receptors. The BAAQMD has adopted

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23 Bay Area Air Quality Management District. 2017, May. California Environmental Quality Act Air Quality Guidelines, Appendix D: Threshold of Significance Justification.

24 Bay Area Air Quality Management District. 2017, May. California Environmental Quality Act Air Quality Guidelines.

25 Bay Area Air Quality Management District. 2017, May. California Environmental Quality Act Air Quality Guidelines, Appendix D: Threshold of Significance Justification.

26 Bay Area Air Quality Management District. 2012. Recommended Methods for Screening and Modeling Local Risks and Hazards.

screening tables for air toxics evaluation during construction.[27] Construction-related TAC and $PM_{2.5}$ impacts should be addressed on a case-by-case basis, taking into consideration the specific construction-related characteristics of each project and proximity to off-site receptors, as applicable.[28]

The project threshold identified below is applied to the proposed project's construction phase emissions:

Community Risk and Hazards – Project

Project-level construction emissions of TACs or $PM_{2.5}$ from the proposed project to individual sensitive receptors within 1,000 feet of the project site that exceed any of the thresholds listed below are considered a potentially significant community health risk:

- Non-compliance with a qualified Community Risk Reduction Plan;
- An excess cancer risk level of more than 10 in one million, or a non-cancer (i.e. chronic or acute) hazard index greater than 1.0 would be a significant cumulatively considerable contribution;
- An incremental increase of greater than 0.3 micrograms per cubic meter ($\mu g/m^3$) annual average $PM_{2.5}$ from a single source would be a significant, cumulatively considerable contribution.[29]

Community Risk and Hazards – Cumulative

Cumulative sources represent the combined total risk values of each of the individual sources within the 1,000-foot evaluation zone.

A project would have a cumulative considerable impact if the aggregate total of all past, present, and foreseeable future sources within a 1,000-foot radius from the fence line of a source or location of a receptor, plus the contribution from the project, exceeds the following:

- Non-compliance with a qualified Community Risk Reduction Plan; or
- An excess cancer risk levels of more than 100 in one million or a chronic non-cancer hazard index (from all local sources) greater than 10.0; or
- 0.8 $\mu g/m^3$ annual average $PM_{2.5}$.[30]

Current BAAQMD guidance recommends the determination of cancer risks using the Office of Environmental Health Hazard Assessment's (OEHHA) methodology, which was originally adopted in 2003.[31,32] In February 2015, OEHHA adopted new health risk assessment guidance which includes several efforts to be more protective of children's health. These updated procedures include the use of age sensitivity factors to account for the higher sensitivity of infants and young children to cancer causing chemicals, and

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27 Bay Area Air Quality Management District. 2010. Screening Tables for Air Toxics Evaluations during Construction.

28 Bay Area Air Quality Management District. 2017, May. California Environmental Quality Act Air Quality Guidelines, Appendix D: Threshold of Significance Justification.

29 Bay Area Air Quality Management District. 2017, May. California Environmental Quality Act Air Quality Guidelines, Appendix D: Threshold of Significance Justification.

30 Bay Area Air Quality Management District. 2017, May. California Environmental Quality Act Air Quality Guidelines, Appendix D: Threshold of Significance Justification.

31 Bay Area Air Quality Management District. 2012, Recommended Methods for Screening and Modeling Local Risks and Hazards.

32 Office of Environmental Health Hazard Assessment. 2003. Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments.

age-specific breathing rates.[33] However, BAAQMD has not formally adopted the new OEHHA methodology into their CEQA guidance. To be conservative, the cancer risks associated with project implementation and significance conclusions were determined using the new 2015 OEHHA guidance for risk assessments.

[33] Office of Environmental Health Hazard Assessment. 2015. Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments.

2. Greenhouse Gas Emissions

Scientists have concluded that human activities are contributing to global climate change by adding large amounts of heat-trapping gases, known as GHG, to the atmosphere. Climate change is the variation of Earth's climate over time, whether due to natural variability or as a result of human activities. The primary source of these GHG is fossil fuel use. The Intergovernmental Panel on Climate Change (IPCC) has identified four major GHG—water vapor,[34] carbon (CO_2), methane (CH_4), and ozone (O_3)—that are the likely cause of an increase in global average temperatures observed within the 20th and 21st centuries. Other GHG identified by the IPCC that contribute to global warming to a lesser extent include nitrous oxide (N_2O), sulfur hexafluoride (SF_6), hydrofluorocarbons, perfluorocarbons, and chlorofluorocarbons.[35, 36] The major GHG are briefly described below.

- **Carbon dioxide (CO_2)** enters the atmosphere through the burning of fossil fuels (oil, natural gas, and coal), solid waste, trees and wood products, and respiration, and also as a result of other chemical reactions (e.g. manufacture of cement). Carbon dioxide is removed from the atmosphere (sequestered) when it is absorbed by plants as part of the biological carbon cycle.
- **Methane (CH_4)** is emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from livestock and other agricultural practices and from the decay of organic waste in municipal landfills and water treatment facilities.
- **Nitrous oxide (N_2O)** is emitted during agricultural and industrial activities as well as during combustion of fossil fuels and solid waste.
- **Fluorinated gases** are synthetic, strong GHGs that are emitted from a variety of industrial processes. Fluorinated gases are sometimes used as substitutes for ozone-depleting substances. These gases are typically emitted in smaller quantities, but because they are potent GHGs, they are sometimes referred to as high global-warming-potential (GWP) gases.

  - ***Chlorofluorocarbons (CFCs)*** are GHGs covered under the 1987 Montreal Protocol and used for refrigeration, air conditioning, packaging, insulation, solvents, or aerosol propellants. Since they are not destroyed in the lower atmosphere (troposphere, stratosphere), CFCs drift into the upper atmosphere where, given suitable conditions, they break down ozone. These gases are also ozone-depleting gases and are therefore being replaced by other compounds that are GHGs covered under the Kyoto Protocol.

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34 Water vapor (H_2O) is the strongest GHG and the most variable in its phases (vapor, cloud droplets, ice crystals). However, water vapor is not considered a pollutant, but part of the feedback loop rather than a primary cause of change.

35 Black carbon contributes to climate change both directly, by absorbing sunlight, and indirectly, by depositing on snow (making it melt faster) and by interacting with clouds and affecting cloud formation. Black carbon is the most strongly light-absorbing component of particulate matter (PM) emitted from burning fuels such as coal, diesel, and biomass. Reducing black carbon emissions globally can have immediate economic, climate, and public health benefits. California has been an international leader in reducing emissions of black carbon, with close to 95 percent control expected by 2020 due to existing programs that target reducing PM from diesel engines and burning activities (California Air Resources Board (CARB). 2017, March 14. Final Proposed Short-Lived Climate Pollutant Reduction Strategy. https://www.arb.ca.gov/cc/shortlived/shortlived.htm). However, state and national GHG inventories do not yet include black carbon due to ongoing work resolving the precise global warming potential of black carbon. Guidance for CEQA documents does not yet include black carbon.

36 Intergovernmental Panel on Climate Change (IPCC). 2001. Third Assessment Report: Climate Change 2001. New York: Cambridge University Press. https://www.ipcc.ch/site/assets/uploads/2018/03/WGI_TAR_full_report.pdf.

- ***Perfluorocarbons (PFCs)*** are a group of human-made chemicals composed of carbon and fluorine only. These chemicals (predominantly perfluoromethane [CF_4] and perfluoroethane [C_2F_6]) were introduced as alternatives, along with HFCs, to the ozone-depleting substances. In addition, PFCs are emitted as by-products of industrial processes and are used in manufacturing. PFCs do not harm the stratospheric ozone layer, but they have a high global warming potential.

- ***Sulfur Hexafluoride (SF_6)*** is a colorless gas soluble in alcohol and ether, slightly soluble in water. SF_6 is a strong GHG used primarily in electrical transmission and distribution systems as an insulator.

- ***Hydrochlorofluorocarbons (HCFCs)*** contain hydrogen, fluorine, chlorine, and carbon atoms. Although ozone-depleting substances, they are less potent at destroying stratospheric ozone than CFCs. They have been introduced as temporary replacements for CFCs and are also GHGs.

- ***Hydrofluorocarbons (HFCs)*** contain only hydrogen, fluorine, and carbon atoms. They were introduced as alternatives to ozone-depleting substances to serve many industrial, commercial, and personal needs. HFCs are emitted as by-products of industrial processes and are also used in manufacturing. They do not significantly deplete the stratospheric ozone layer, but they are strong GHGs.[37,38]

GHGs are dependent on the lifetime or persistence of the gas molecule in the atmosphere. Some GHGs have stronger greenhouse effects than others. These are referred to as high GWP gases. The GWP of GHG emissions are shown in Table 5. The GWP is used to convert GHGs to CO_2-equivalence (CO_2e) to show the relative potential that different GHGs have to retain infrared radiation in the atmosphere and contribute to the greenhouse effect. For example, under IPCC's Fourth Assessment Report (AR4) GWP values for CH_4, a project that generates 10 MT of CH_4 would be equivalent to 250 MT of CO_2.[39,40]

[37] Intergovernmental Panel on Climate Change (IPCC). 2001. Third Assessment Report: Climate Change 2001. New York: Cambridge University Press. https://www.ipcc.ch/site/assets/uploads/2018/03/WGI_TAR_full_report.pdf.

[38] US Environmental Protection Agency (USEPA). 2019. Overview of Greenhouse Gases. http://www3.epa.gov/climatechange/ghgemissions/gases.html.

[39] CO_2-equivalence is used to show the relative potential that different GHGs have to retain infrared radiation in the atmosphere and contribute to the greenhouse effect. The global warming potential of a GHG is also dependent on the lifetime, or persistence, of the gas molecule in the atmosphere.

[40] Intergovernmental Panel on Climate Change (IPCC). 2013. Fifth Assessment Report: Climate Change 2013. New York: Cambridge University Press.

Table 5 GHG Emissions and Their Relative Global Warming Potential Compared to CO_2

GHGs	Carbon Dioxide (CO_2)	Methane[1] (CH_4)	Nitrous Oxide (N_2O)
Second Assessment			
Atmospheric Lifetime (Years)	50 to 200	12 (±3)	120
Global Warming Potential Relative to CO_2[2]	1	21	310
Fourth Assessment			
Atmospheric Lifetime (Years)	50 to 200	12	114
Global Warming Potential Relative to CO_2[2]	1	25	298
Fifth Assessment[3]			
Atmospheric Lifetime (Years)	50 to 200	12	121
Global Warming Potential Relative to CO_2[2]	1	28	265

Source: Intergovernmental Panel on Climate Change (IPCC). 1995. Second Assessment Report: Climate Change 1995 https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_sar_wg_I_full_report.pdf; Intergovernmental Panel on Climate Change (IPCC). 2007. Fourth Assessment Report: Climate Change 2007. New York: Cambridge University Press. https://www.ipcc.ch/site/assets/uploads/2018/02/ar4_syr_full_report.pdf; Intergovernmental Panel on Climate Change (IPCC). 2013. Fifth Assessment Report: Climate Change 2013. New York: Cambridge University Press.

Notes:

1 The methane GWP includes direct effects and indirect effects due to the production of tropospheric ozone and stratospheric water vapor. The indirect effect due to the production of CO_2 is not included.

2 Based on 100-year time horizon of the GWP of the air pollutant compared to CO_2.

3 The GWP values in the IPCC's Fifth Assessment Report (2013)[41] reflect new information on atmospheric lifetimes of GHGs and an improved calculation of the radiative forcing of CO_2.

2.1 CALIFORNIA'S GREENHOUSE GAS SOURCES AND RELATIVE CONTRIBUTION

In 2019, the statewide GHG emissions inventory was updated for 2000 to 2017 emissions using the GWPs in IPCC's AR4.[42] Based on these GWPs, California produced 424.10 $MMTCO_2e$ GHG emissions in 2017. The California Air Resources Board (CARB) categorizes GHG generation into the following seven sectors.[43]

- **Transportation.** Consists of direct tailpipe emissions from on-road vehicle and direct emissions from off-road transportation mobile sources, intrastate aviation, rail, and watercraft. Emissions are generated from the combustion of fuels in on- and off-road vehicles in addition to aviation, rail, and ships.
- **Electric.** Includes emissions from instate power generation (including the portion of cogeneration emissions attributed to electricity generation) and emissions from imported electricity.
- **Industrial.** Includes emissions primarily driven by fuel combustion from sources that include refineries, oil and gas extraction, cement plants, and the portion of cogeneration emissions attribute to thermal energy output.
- **Commercial and Residential.** Accounts for emissions generated from combustion of natural gas and other fuels for household and commercial business use, such as space heating, cooking, and hot water or steam generation. Emissions associated with electricity usage are accounted for in the Electric Sector.
- **Recycling and Waste.** Consists of emissions generated at landfills and from commercial-scale composting.

41 Intergovernmental Panel on Climate Change (IPCC). 2013. Fifth Assessment Report: Climate Change 2013. New York: Cambridge University Press. https://www.ipcc.ch/site/assets/uploads/2018/02/WG1AR5_all_final.pdf.

42 Methodology for determining the statewide GHG inventory is not the same as the methodology used to determine statewide GHG emissions under Assembly Bill 32 (2006).

43 California Air Resources Board (CARB). 2019, August 26. California Greenhouse Emissions for 2000 to 2017: Trends of Emissions and Other Indicators. https://www.arb.ca.gov/cc/inventory/data/data.htm.

- **Agriculture.** Primarily includes methane (CH_4) and nitrous oxide (N_2O) emissions generated from enteric fermentation and manure management from livestock. Also accounts for emissions associated with crop production (fertilizer use, soil preparation and disturbance, and crop residue burning) and fuel combustion associated with stationary agricultural activities (e.g., water pumping, cooling or heating buildings).
- **High Global Warming Potential Gases.** Associated with substitutes for ozone-depleting substances, emissions from electricity transmission and distribution system, and gases emitted in the semiconductor manufacturing process. Substitutes for ozone-depleting substances are used in refrigeration and air conditioning equipment, solvent cleaning, foam production, fire retardants, and aerosols.

California's transportation sector was the single largest generator of GHG emissions, producing 40.1 percent of the state's total emissions. Industrial sector emissions made up 21.1 percent, and electric power generation made up 14.7 percent of the state's emissions inventory. Other major sectors of GHG emissions include commercial and residential (9.7 percent), agriculture and forestry (7.6 percent), high GWP (4.7 percent), and recycling and waste (2.1 percent).[44]

California's GHG emissions have followed a declining trend since 2007. In 2017, emissions from routine GHG-emitting activities statewide were 424 $MMTCO_2e$, 5 $MMTCO_2e$ lower than 2016 levels. This represents an overall decrease of 14 percent since peak levels in 2004 and 7 $MMTCO_2e$ below the 1990 level and the state's 2020 GHG target. During the 2000 to 2017 period, per capita GHG emissions in California have continued to drop from a peak in 2001 of 14.0 $MTCO_2e$ per capita to 10.7 $MTCO_2e$ per capita in 2017, a 24 percent decrease. Overall trends in the inventory also demonstrate that the carbon intensity of California's economy (the amount of carbon pollution per million dollars of gross domestic product) has declined 41 percent since the 2001 peak, while the state's gross domestic product has grown 52 percent during the same period. For the first time since California started to track GHG emissions, California uses more electricity from zero-GHG sources (hydro, solar, wind, and nuclear energy).[45]

2.2 HUMAN INFLUENCE ON CLIMATE CHANGE

For approximately 1,000 years before the Industrial Revolution, the amount of GHGs in the atmosphere remained relatively constant. During the 20th century, however, scientists observed a rapid change in the climate and the quantity of climate change pollutants in the Earth's atmosphere that is attributable to human activities. The amount of CO_2 in the atmosphere has increased by more than 35 percent since preindustrial times and has increased at an average rate of 1.4 parts per million per year since 1960, mainly due to combustion of fossil fuels and deforestation.[46] These recent changes in the quantity and concentration of climate change pollutants far exceed the extremes of the ice ages, and the global mean temperature is warming at a rate that cannot be explained by natural causes alone. Human activities are directly altering the chemical composition of the atmosphere through the buildup of climate change pollutants.[47] In the past,

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[44] California Air Resources Board (CARB). 2019, August 26. 2019 Edition California Greenhouse Gas Inventory for 2000-2017: By Category as Defined in the 2008 Scoping Plan. https://www.arb.ca.gov/cc/inventory/data/data.htm.

[45] California Air Resources Board (CARB). 2019, August 26. 2019 Edition California Greenhouse Gas Inventory for 2000-2017: By Category as Defined in the 2008 Scoping Plan. https://www.arb.ca.gov/cc/inventory/data/data.htm.

[46] Intergovernmental Panel on Climate Change (IPCC). 2007. Fourth Assessment Report: Climate Change 2007. New York: Cambridge University Press.

[47] California Climate Action Team (CAT). 2006, March. Climate Action Team Report to Governor Schwarzenegger and the Legislature.

gradual changes in the earth's temperature changed the distribution of species, availability of water, etc. However, human activities are accelerating this process so that environmental impacts associated with climate change no longer occur in a geologic time frame but within a human lifetime.[48]

Like the variability in the projections of the expected increase in global surface temperatures, the environmental consequences of gradual changes in the Earth's temperature are hard to predict. Projections of climate change depend heavily upon future human activity. Therefore, climate models are based on different emission scenarios that account for historical trends in emissions and on observations of the climate record that assess the human influence of the trend and projections for extreme weather events. Climate-change scenarios are affected by varying degrees of uncertainty. For example, there are varying degrees of certainty on the magnitude of the trends for:

- Warmer and fewer cold days and nights over most land areas.
- Warmer and more frequent hot days and nights over most land areas.
- An increase in frequency of warm spells/heat waves over most land areas.
- An increase in frequency of heavy precipitation events (or proportion of total rainfall from heavy falls) over most areas.
- Larger areas affected by drought.
- Intense tropical cyclone activity increases.
- Increased incidence of extreme high sea level (excluding tsunamis).

2.3 POTENTIAL CLIMATE CHANGE IMPACTS FOR CALIFORNIA

Observed changes over the last several decades across the western United States reveal clear signs of climate change. Statewide, average temperatures increased by about 1.7°F from 1895 to 2011, and warming has been greatest in the Sierra Nevada.[49] The years from 2014 through 2016 have shown unprecedented temperatures with 2014 being the warmest.[50] By 2050, California is projected to warm by approximately 2.7°F above 2000 averages, a threefold increase in the rate of warming over the last century. By 2100, average temperatures could increase by 4.1 to 8.6°F, depending on emissions levels. [51]

In California and western North America, observations of the climate have shown: 1) a trend toward warmer winter and spring temperatures; 2) a smaller fraction of precipitation falling as snow; 3) a decrease in the amount of spring snow accumulation in the lower and middle elevation mountain zones; 4) advanced shift in the timing of snowmelt of 5 to 30 days earlier in the spring; and 5) a similar shift (5 to 30 days earlier) in the timing of spring flower blooms.[52] Overall, California has become drier over time, with five of the eight years of severe to extreme drought occurring between 2007 and 2016, with unprecedented dry years occurring in

[48] Intergovernmental Panel on Climate Change (IPCC). 2007. Fourth Assessment Report: Climate Change 2007. New York: Cambridge University Press.

[49] California Climate Change Center (CCCC). 2012, July. Our Changing Climate 2012: Vulnerability and Adaptation to the Increasing Risks from Climate Change in California.

[50] Office of Environmental Health Hazards Assessment (OEHHA). 2018, May. Indicators of Climate Change in California. https://oehha.ca.gov/media/downloads/climate-change/report/2018caindicatorsreportmay2018.pdf.

[51] California Climate Change Center (CCCC). 2012, July. Our Changing Climate 2012: Vulnerability and Adaptation to the Increasing Risks from Climate Change in California.

[52] California Climate Action Team (CAT). 2006, March. Climate Action Team Report to Governor Schwarzenegger and the Legislature.

2014 and 2015. [53] Statewide precipitation has become increasingly variable from year to year, with the driest consecutive four years occurring from 2012 to 2015.[54] According to the California Climate Action Team—a committee of state agency secretaries and the heads of agencies, boards, and departments, led by the Secretary of the California Environmental Protection Agency—even if actions could be taken to immediately curtail climate change emissions, the potency of emissions that have already built up, their long atmospheric lifetimes (see Table 5), and the inertia of the Earth's climate system could produce as much as 0.6°C (1.1°F) of additional warming. Consequently, some impacts from climate change are now considered unavoidable. Global climate change risks to California are shown in Table 6 and include impacts to public health, water resources, agriculture, coastal sea level, forest and biological resources, and energy.

Table 6 Summary of GHG Emissions Risks to California

Impact Category	Potential Risk
Public Health Impacts	Heat waves will be more frequent, hotter, and longer Fewer extremely cold nights Poor air quality made worse Higher temperatures increase ground-level ozone levels
Water Resources Impacts	Decreasing Sierra Nevada snow pack Challenges in securing adequate water supply Potential reduction in hydropower Loss of winter recreation
Agricultural Impacts	Increasing temperature Increasing threats from pests and pathogens Expanded ranges of agricultural weeds Declining productivity Irregular blooms and harvests
Coastal Sea Level Impacts	Accelerated sea level rise Increasing coastal floods Shrinking beaches Worsened impacts on infrastructure
Forest and Biological Resource Impacts	Increased risk and severity of wildfires Lengthening of the wildfire season Movement of forest areas Conversion of forest to grassland Declining forest productivity Increasing threats from pest and pathogens Shifting vegetation and species distribution Altered timing of migration and mating habits Loss of sensitive or slow-moving species
Energy Demand Impacts	Potential reduction in hydropower Increased energy demand

Sources: California Energy Commission (CEC). 2006. Our Changing Climate: Assessing the Risks to California. 2006 Biennial Report. CEC-500-2006-077. California Climate Change Center; California Energy Commission (CEC). 2009, May. The Future Is Now: An Update on Climate Change Science, Impacts, and Response Options for California. CEC-500-2008-0077; California Climate Change Center (CCCC). 2012, July. Our Changing Climate 2012: Vulnerability and Adaptation to the Increasing Risks from Climate Change in California; and California Natural Resources Agency (CNRA). 2014, July. Safeguarding California: Reducing Climate Risk: An Update to the 2009 California Climate Adaptation Strategy. https://resources.ca.gov/CNRALegacyFiles/docs/climate/Final_Safeguarding_CA_Plan_July_31_2014.pdf.

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53 Office of Environmental Health Hazards Assessment (OEHHA). 2018, May. Indicators of Climate Change in California. https://oehha.ca.gov/media/downloads/climate-change/report/2018caindicatorsreportmay2018.pdf.

54 Office of Environmental Health Hazards Assessment (OEHHA). 2018, May. Indicators of Climate Change in California. https://oehha.ca.gov/media/downloads/climate-change/report/2018caindicatorsreportmay2018.pdf.

2.1 REGULATORY FRAMEWORK

2.1.1 Federal Regulations

The US Environmental Protection Agency (EPA) announced on December 7, 2009, that GHG emissions threaten the public health and welfare of the American people and that GHG emissions from on-road vehicles contribute to that threat. The EPA's final findings respond to the 2007 US Supreme Court decision that GHG emissions fit within the Clean Air Act definition of air pollutants. The findings did not themselves impose any emission reduction requirements but allowed the EPA to finalize the GHG standards proposed in 2009 for new light-duty vehicles as part of the joint rulemaking with the Department of Transportation.[55]

To regulate GHGs from passenger vehicles, EPA was required to issue an endangerment finding. The finding identifies emissions of six key GHGs—CO_2, CH_4, N_2O, hydrofluorocarbons, perfluorocarbons, and SF_6—that have been the subject of scrutiny and intense analysis for decades by scientists in the United States and around the world. The first three are applicable to the proposed project's GHG emissions inventory because they constitute the majority of GHG emissions; they are the GHG emissions that should be evaluated as part of a project's GHG emissions inventory.

2.1.1.1 US MANDATORY REPORTING RULE FOR GREENHOUSE GASES (2009)

In response to the endangerment finding, the EPA issued the Mandatory Reporting of GHG Rule that requires substantial emitters of GHG emissions (large stationary sources, etc.) to report GHG emissions data. Facilities that emit 25,000 $MTCO_2e$ or more per year are required to submit an annual report.

2.1.1.2 UPDATE TO CORPORATE AVERAGE FUEL ECONOMY STANDARDS (2021 TO 2026)

The federal government issued new Corporate Average Fuel Economy (CAFE) standards in 2012 for model years 2017 to 2025, which required a fleet average of 54.5 miles per gallon in 2025. However, on March 30, 2020, the EPA finalized an updated CAFE and GHG emissions standards for passenger cars and light trucks and established new standards, covering model years 2021 through 2026, known as the Safer Affordable Fuel Efficient (SAFE) Vehicles Final Rule for Model Years 2021-2026. Under SAFE, the fuel economy standards will increase 1.5 percent per year compared to the 5 percent per year under the CAFE standards established in 2012. Overall, SAFE requires a fleet average of 40.4 MPG and 202 g/mi of CO_2 emissions for model year 2026 vehicles.[56] However, consortium of automakers and California have agreed on a voluntary framework to reduce emissions that can serve as an alternative path forward for clean vehicle standards nationwide. Automakers who agreed to the framework are Ford, Honda, BMW of North America, and Volkswagen Group of America. The framework supports continued annual reductions of vehicle greenhouse gas emissions through the 2026 model year, encourages innovation to accelerate the transition to electric vehicles, and provides industry the certainty needed to make investments and create jobs. This commitment means

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[55] US Environmental Protection Agency (USEPA). 2009, December. EPA: Greenhouse Gases Threaten Public Health and the Environment. Science overwhelmingly shows greenhouse gas concentrations at unprecedented levels due to human activity. https://archive.epa.gov/epapages/newsroom_archive/newsreleases/08d11a451131bca585257685005bf252.html.

[56] The Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule for Model Years 2021-2026 Passenger Cars and Light Trucks: Final Rule, Vol. 85 Federal Register, No. 84 (April 30, 2020).

that the auto companies party to the voluntary agreement will only sell cars in the United States that meet the CAFE standards established in 2021 for model years 2017 to 2025.[57]

2.1.1.3 EPA REGULATION OF STATIONARY SOURCES UNDER THE CLEAN AIR ACT (ONGOING)

Pursuant to its authority under the Clean Air Act, the EPA has been developing regulations for new, large stationary sources of emissions such as power plants and refineries. Under former President Obama's 2013 Climate Action Plan, the EPA was directed to develop regulations for existing stationary sources as well. On June 19, 2019, the EPA issued the final Affordable Clean Energy (ACE) rule which became effective on August 19, 2019. The ACE rule was crafted under the direction of President Trump's Energy Independence Executive Order. It officially rescinds the Clean Power Plan rule issued during the Obama Administration and sets emissions guidelines for states in developing plans to limit CO_2 emissions from coal-fired power plants.

2.1.2 State Regulations

Current State of California guidance and goals for reductions in GHG emissions are generally embodied in Executive Orders S-03-05 and B-30-15, Assembly Bill (AB) 32, Senate Bill (SB) 32, and SB 375.

2.1.2.1 EXECUTIVE ORDER S-03-05

Executive Order S-03-05, signed June 1, 2005. Executive Order S-03-05 set the following GHG reduction targets for the State:

- 2000 levels by 2010
- 1990 levels by 2020
- 80 percent below 1990 levels by 2050

2.1.2.2 ASSEMBLY BILL 32, THE GLOBAL WARMING SOLUTIONS ACT

State of California guidance and targets for reductions in GHG emissions are generally embodied in the Global Warming Solutions Act, adopted with passage of AB 32. AB 32 was passed by the California state legislature on August 31, 2006, to place the state on a course toward reducing its contribution of GHG emissions. AB 32 follows the 2020 emissions reduction goal established in Executive Order S-03-05.

CARB 2008 Scoping Plan

The first Scoping Plan was adopted by CARB on December 11, 2008. The 2008 Scoping Plan identified that GHG emissions in California are anticipated to be 596 $MMTCO_2e$ in 2020. In December 2007, CARB approved a 2020 emissions limit of 427 $MMTCO_2e$ (471 million tons) for the state (CARB 2008). To effectively implement the emissions cap, AB 32 directed CARB to establish a mandatory reporting system to track and monitor GHG emissions levels for large stationary sources that generate more than 25,000 $MTCO_2e$ per year, prepare a plan demonstrating how the 2020 deadline can be met, and develop appropriate regulations and programs to implement the plan by 2012.

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[57] California Air Resources Board (CARB). 2019, September 5 (accessed). California and major automakers reach groundbreaking framework agreement on clean emission standards. https://ww2.arb.ca.gov/news/california-and-major-automakers-reach-groundbreaking-framework-agreement-clean-emission.

First Update to the Scoping Plan

CARB completed a five-year update to the 2008 Scoping Plan, as required by AB 32. The First Update to the Scoping Plan, adopted May 22, 2014, highlights California's progress toward meeting the near-term 2020 GHG emission reduction goals defined in the 2008 Scoping Plan. As part of the update, CARB recalculated the 1990 GHG emission levels with the updated AR4 GWPs, and the 427 $MMTCO_2e$ 1990 emissions level and 2020 GHG emissions limit, established in response to AB 32, are slightly higher at 431 $MMTCO_2e$. [58]

As identified in the Update to the Scoping Plan, California is on track to meet the goals of AB 32. The update also addresses the state's longer-term GHG goals in a post-2020 element. The post-2020 element provides a high-level view of a long-term strategy for meeting the 2050 GHG goal, including a recommendation for the state to adopt a midterm target. According to the Update to the Scoping Plan, local government reduction targets should chart a reduction trajectory that is consistent with or exceeds the trajectory created by statewide goals.[59] CARB identified that reducing emissions to 80 percent below 1990 levels will require a fundamental shift to efficient, clean energy in every sector of the economy. Progressing toward California's 2050 climate targets will require significant acceleration of GHG reduction rates. Emissions from 2020 to 2050 will have to decline several times faster than the rate needed to reach the 2020 emissions limit. [60]

2.1.2.3 EXECUTIVE ORDER B-30-15

Executive Order B-30-15, signed April 29, 2015, sets a goal of reducing GHG emissions in the state to 40 percent below 1990 levels by year 2030. Executive Order B-30-15 also directs CARB to update the Scoping Plan to quantify the 2030 GHG reduction goal for the state and requires state agencies to implement measures to meet the interim 2030 goal as well as the long-term goal for 2050 in Executive Order S-03-05. It also requires the Natural Resources Agency to conduct triennial updates of the California adaption strategy, Safeguarding California, in order to ensure climate change is accounted for in state planning and investment decisions.

2.1.2.4 SENATE BILL 32 AND ASSEMBLY BILL 197

In September 2016, Governor Brown signed Senate Bill 32 and Assembly Bill 197, making the Executive Order goal for year 2030 into a statewide, mandated legislative target. AB 197 established a joint legislative committee on climate change policies and requires the CARB to prioritize direction emissions reductions rather than the market-based cap-and-trade program for large stationary, mobile, and other sources.

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[58] California Air Resources Board (CARB). 2014, May 15. First Update to the Climate Change Scoping Plan: Building on the Framework, Pursuant to AB 32, The California Global Warming Solutions Act of 2006. http://www.arb.ca.gov/cc/scopingplan/document/updatedscopingplan2013.htm.

[59] California Air Resources Board (CARB). 2014, May 15. First Update to the Climate Change Scoping Plan: Building on the Framework, Pursuant to AB 32, The California Global Warming Solutions Act of 2006. http://www.arb.ca.gov/cc/scopingplan/scopingplan.htm.

[60] California Air Resources Board (CARB). 2014, May 15. First Update to the Climate Change Scoping Plan: Building on the Framework, Pursuant to AB 32, The California Global Warming Solutions Act of 2006. http://www.arb.ca.gov/cc/scopingplan/document/updatedscopingplan2013.htm.

2017 Climate Change Scoping Plan Update

Executive Order B-30-15 and SB 32 required CARB to prepare another update to the Scoping Plan to address the 2030 target for the state. On December 24, 2017, CARB approved the 2017 Climate Change Scoping Plan Update, which outlines potential regulations and programs, including strategies consistent with AB 197 requirements, to achieve the 2030 target. The 2017 Scoping Plan establishes a new emissions limit of 260 $MMTCO_2e$ for the year 2030, which corresponds to a 40 percent decrease in 1990 levels by 2030.[61]

California's climate strategy will require contributions from all sectors of the economy, including enhanced focus on zero- and near-zero emission vehicle technologies; continued investment in renewables such as solar roofs, wind, and other types of distributed generation; greater use of low carbon fuels; integrated land conservation and development strategies; coordinated efforts to reduce emissions of short-lived climate pollutants (methane, black carbon, and fluorinated gases); and an increased focus on integrated land use planning to support livable, transit-connected communities and conserve agricultural and other lands. Requirements for GHG reductions at stationary sources complement local air pollution control efforts by the local air districts to tighten emissions limits for criteria air pollutants and toxic air contaminants on a broad spectrum of industrial sources. Major elements of the 2017 Scoping Plan framework include:

- Implementing and/or increasing the standards of the Mobile Source Strategy, which include increasing zero-emission (ZE) buses and trucks.
- Low Carbon Fuel Standard (LCFS), with an increased stringency (18 percent by 2030).
- Implementation of SB 350, which expands the Renewables Portfolio Standard (RPS) to 50 percent RPS and doubles energy efficiency savings by 2030.
- California Sustainable Freight Action Plan, which improves freight system efficiency by 25 percent by 2030 and utilizes near-zero emissions technology and deployment of ZE trucks.
- Implementing the proposed Short-Lived Climate Pollutant Strategy, which focuses on reducing methane and hydrofluorocarbon emissions by 40 percent and anthropogenic black carbon emissions by 50 percent by year 2030.
- Post-2020 Cap-and-Trade Program that includes declining caps.
- Continued implementation of SB 375.
- Development of a Natural and Working Lands Action Plan to secure California's land base as a net carbon sink.

In addition to these statewide strategies, the 2017 Climate Change Scoping Plan also identified local governments as essential partners in achieving the state's long-term GHG reduction goals and recommended local actions to reduce GHG emissions—for example, statewide targets of no more than 6 $MTCO_2e$ or less per capita by 2030 and 2 $MTCO_2e$ or less per capita by 2050. CARB recommends that local governments evaluate and adopt quantitative, locally appropriate goals that align with the statewide per capita targets and sustainable development objectives and develop plans to achieve the local goals. The statewide per capita goals were developed by applying the percent reductions necessary to reach the 2030 and 2050 climate goals (i.e., 40 percent and 80 percent, respectively) to the state's 1990 emissions limit established under AB 32. For CEQA projects, CARB states that lead agencies have discretion to develop evidenced-based numeric

[61] California Air Resources Board (CARB). 2017, November. California's 2017 Climate Change Scoping Plan: The Strategy for Achieving California's 2030 Greenhouse Gas Target. https://www.arb.ca.gov/cc/scopingplan/scoping_plan_2017.pdf.

thresholds (mass emissions, per capita, or per service population) consistent with the Scoping Plan and the state's long-term GHG goals. To the degree a project relies on GHG mitigation measures, CARB recommends that lead agencies prioritize on-site design features that reduce emissions, especially from vehicle miles traveled (VMT), and direct investments in GHG reductions within the project's region that contribute potential air quality, health, and economic co-benefits. Where further project design or regional investments are infeasible or not proven to be effective, CARB recommends mitigating potential GHG impacts through purchasing and retiring carbon credits.

The Scoping Plan scenario is set against what is called the "business as usual" yardstick—that is, what would the GHG emissions look like if the state did nothing at all beyond the policies that are already required and in place to achieve the 2020 limit, as shown in Table 7. It includes the existing renewables requirements, advanced clean cars, the "10 percent" LCFS, and the SB 375 program for more vibrant communities, among others. However, it does not include a range of new policies or measures that have been developed or put into statute over the past two years. Also shown in the table, the known commitments are expected to result in emissions that are 60 $MMTCO_2e$ above the target in 2030. If the estimated GHG reductions from the known commitments are not realized due to delays in implementation or technology deployment, the post-2020 Cap-and-Trade Program would deliver the additional GHG reductions in the sectors it covers to ensure the 2030 target is achieved.

Table 7 2017 Climate Change Scoping Plan Emissions Reductions Gap

Modeling Scenario	2030 GHG Emissions $MMTCO_2e$
Reference Scenario (Business-as-Usual)	389
With Known Commitments	320
2030 GHG Target	**260**
Gap to 2030 Target with Known Commitments	**60**

Source: California Air Resources Board. 2017, November. California's 2017 Climate Change Scoping Plan: The Strategy for Achieving California's 2030 Greenhouse Gas Target. https://www.arb.ca.gov/cc/scopingplan/2030sp_pp_final.pdf.

Table 8 provides estimated GHG emissions by sector compared to 1990 levels, and the range of GHG emissions for each sector estimated for 2030.

Table 8 2017 Scoping Plan Emissions Changes by Sector to Achieve the 2030 Target

Scoping Plan Sector	1990 $MMTCO_2e$	2030 Proposed Plan Ranges $MMTCO_2e$	% Change from 1990
Agricultural	26	24-25	-8% to -4%
Residential and Commercial	44	38-40	-14% to -9%
Electric Power	108	30-53	-72% to -51%
High GWP	3	8-11	267% to 367%
Industrial	98	83-90	-15% to -8%
Recycling and Waste	7	8-9	14% to 29%
Transportation (including TCU)	152	103-111	-32% to -27%
Net Sink[a]	-7	TBD	TBD
Sub Total	431	294-339	-32% to -21%
Cap-and-Trade Program	NA	24-79	NA
Total	431	260	-40%

Source: California Air Resources Board. 2017, November. California's 2017 Climate Change Scoping Plan: The Strategy for Achieving California's 2030 Greenhouse Gas Target. https://www.arb.ca.gov/cc/scopingplan/2030sp_pp_final.pdf.
Notes: TCU = Transportation, Communications, and Utilities; TBD: To Be Determined.
[a] Work is underway through 2017 to estimate the range of potential sequestration benefits from the natural and working lands sector.

2.1.2.5 SENATE BILL 375 – SUSTAINABLE COMMUNITIES STRATEGY

In 2008, SB 375, the Sustainable Communities and Climate Protection Act, was adopted to connect the GHG emissions reductions targets established in the 2008 Scoping Plan for the transportation sector to local land use decisions that affect travel behavior. Its intent is to reduce GHG emissions from light-duty trucks and automobiles (excludes emissions associated with goods movement) by aligning regional long-range transportation plans, investments, and housing allocations to local land use planning to reduce VMT and vehicle trips. Specifically, SB 375 required CARB to establish GHG emissions reduction targets for each of the 18 metropolitan planning organizations (MPOs). The Metropolitan Transportation Commission (MTC) is the MPO for the nine-county San Francisco Bay Area region. MTC's targets are a 7 percent per capita reduction in GHG emissions from 2005 by 2020, and 15 percent per capita reduction from 2005 levels by 2035.[62]

2017 Update to the SB 375 Targets

CARB is required to update the targets for the MPOs every eight years. In June 2017, CARB released updated targets and technical methodology and recently released another update in February 2018. The updated targets consider the need to further reduce VMT, as identified in the 2017 Scoping Plan Update, while balancing the need for additional and more flexible revenue sources to incentivize positive planning and action toward sustainable communities. Like the 2010 targets, the updated SB 375 targets are in units of percent per capita reduction in GHG emissions from automobiles and light trucks relative to 2005. This excludes reductions anticipated from implementation of state technology and fuels strategies and any

[62] California Air Resources Board. 2010. Staff Report, Proposed Regional Greenhouse Gas Emission Reduction Targets for Automobiles and Light Trucks Pursuant to Senate Bill 375, August.

potential future state strategies such as statewide road user pricing. The proposed targets call for greater per capita GHG emission reductions from SB 375 than are currently in place, which for 2035, translate into proposed targets that either match or exceed the emission reduction levels in the MPOs' currently adopted sustainable communities strategies (SCS). As proposed, CARB staff's proposed targets would result in an additional reduction of over 8 $MMTCO_2e$ in 2035 compared to the current targets. For the next round of SCS updates, CARB's updated targets for the MTC/ABAG region are a 10 percent per capita GHG reduction in 2020 from 2005 levels (compared to 7 percent under the 2010 target) and a 19 percent per capita GHG reduction in 2035 from 2005 levels (compared to the 2010 target of 15 percent).[63]

2.1.2.6 OTHER APPLICABLE MEASURES

Transportation

Assembly Bill 1493

California vehicle GHG emission standards were enacted under AB 1493 (Pavley I). Pavley I is a clean-car standard that reduces GHG emissions from new passenger vehicles (light-duty auto to medium-duty vehicles) from 2009 through 2016 and is anticipated to reduce GHG emissions from new passenger vehicles by 30 percent in 2016. California implements the Pavley I standards through a waiver granted to California by the EPA. In 2012, the EPA issued a Final Rulemaking that sets even more stringent fuel economy and GHG emissions standards for model years 2017 through 2025 light-duty vehicles (see also the discussion on the update to the Corporate Average Fuel Economy standards under *Federal Laws*, above). In January 2012, CARB approved the Advanced Clean Cars program (formerly known as Pavley II) for model years 2017 through 2025. The program combines the control of smog, soot, and global warming gases with requirements for greater numbers of ZE vehicles into a single package of standards. Under California's Advanced Clean Car program, by 2025 new automobiles will emit 34 percent less global warming gases and 75 percent less smog-forming emissions.

Executive Order S-1-07

On January 18, 2007, the state set a new LCFS for transportation fuels sold in the state. Executive Order S-01-07 sets a declining standard for GHG emissions measured in CO_2e gram per unit of fuel energy sold in California. The LCFS requires a reduction of 2.5 percent in the carbon intensity of California's transportation fuels by 2015 and a reduction of at least 10 percent by 2020. The standard applies to refiners, blenders, producers, and importers of transportation fuels, and would use market-based mechanisms to allow these providers to choose how they reduce emissions during the "fuel cycle" using the most economically feasible methods.

Executive Order B-16-2012

On March 23, 2012, the state identified that CARB, the California Energy Commission (CEC), the Public Utilities Commission, and other relevant agencies worked with the Plug-in Electric Vehicle Collaborative and the California Fuel Cell Partnership to establish benchmarks to accommodate ZE vehicles in major metropolitan areas, including infrastructure to support them (e.g., electric vehicle charging stations). The

[63] California Air Resources Board (CARB). 2018, February. Proposed Update to the SB 375 Greenhouse Gas Emission Reduction Targets. https://www.arb.ca.gov/cc/inventory/data/data.htm.

executive order also directed the number of ZE vehicles in California's state vehicle fleet to increase through the normal course of fleet replacement so that at least 10 percent of fleet purchases of light-duty vehicles are ZE by 2015 and at least 25 percent by 2020. The executive order also establishes a target for the transportation sector of reducing GHG emissions 80 percent below 1990 levels.

Renewables Portfolio Standard

Senate Bills 1078, 107, X1-2, and Executive Order S-14-08

A major component of California's Renewable Energy Program is the renewables portfolio standard established under Senate Bills 1078 (Sher) and 107 (Simitian). Under the RPS, certain retail sellers of electricity were required to increase the amount of renewable energy each year by at least 1 percent in order to reach at least 20 percent by December 30, 2010. Executive Order S-14-08, signed in November 2008, expanded the state's renewable energy standard to 33 percent renewable power by 2020. This standard was adopted by the legislature in 2011 (SB X1-2). Renewable sources of electricity include wind, small hydropower, solar, geothermal, biomass, and biogas. The increase in renewable sources for electricity production will decrease indirect GHG emissions from development projects because electricity production from renewable sources is generally considered carbon neutral.

Senate Bill 350

Senate Bill 350 (de Leon), was signed into law September 2015. SB 350 establishes tiered increases to the RPS of 40 percent by 2024, 45 percent by 2027, and 50 percent by 2030. SB 350 also set a new goal to double the energy efficiency savings in electricity and natural gas through energy efficiency and conservation measures.

Senate Bill 100

On September 10, 2018, Governor Brown signed SB 100, which supersedes the SB 350 requirements. Under SB 100, the RPS for public-owned facilities and retail sellers consist of 44 percent renewable energy by 2024, 52 percent by 2027, and 60 percent by 2030. Additionally, SB 100 also established a new RPS requirement of 50 percent by 2026. Furthermore, the bill establishes an overall state policy that eligible renewable energy resources and zero-carbon resources supply 100 percent of all retail sales of electricity to California end-use customers and 100 percent of electricity procured to serve all state agencies by December 31, 2045. Under the bill, the state cannot increase carbon emissions elsewhere in the western grid or allow resource shuffling to achieve the 100 percent carbon-free electricity target.

Executive Order B-55-18

Executive Order B-55-18, signed September 10, 2018, sets a goal "to achieve carbon neutrality as soon as possible, and no later than 2045, and achieve and maintain net negative emissions thereafter." Executive Order B-55-18 directs CARB to work with relevant state agencies to ensure future Scoping Plans identify and recommend measures to achieve the carbon neutrality goal. The goal of carbon neutrality by 2045 is in addition to other statewide goals, meaning not only should emissions be reduced to 80 percent below 1990 levels by 2050, but that, by no later than 2045, the remaining emissions be offset by equivalent net removals of CO_2e from the atmosphere, including through sequestration in forests, soils, and other natural landscapes.

Energy Efficiency

California Building Standards Code – Building Energy Efficiency Standards

Energy conservation standards for new residential and non-residential buildings were adopted by the California Energy Resources Conservation and Development Commission (now the CEC) in June 1977 and most recently revised in 2019 (Title 24, Part 6, of the California Code of Regulations [CCR]). Title 24 requires the design of building shells and building components to conserve energy. The standards are updated periodically to allow for consideration and possible incorporation of new energy efficiency technologies and methods. The 2019 Building Energy Efficiency Standards, which were adopted on May 9, 2018, went into effect on January 1, 2020.

The 2019 standards move towards cutting energy use in new homes by more than 50 percent and will require installation of solar photovoltaic systems for single-family homes and multi-family buildings of 3 stories and less. Four key areas the 2019 standards will focus on include 1) smart residential photovoltaic systems; 2) updated thermal envelope standards (preventing heat transfer from the interior to exterior and vice versa); 3) residential and nonresidential ventilation requirements; 4) and nonresidential lighting requirements.[64] Under the 2019 standards, nonresidential buildings and multi-family residential buildings of four stories or more will be 30 percent more energy efficient compared to the 2016 standards while single-family homes will be 7 percent more energy efficient.[65] When accounting for the electricity generated by the solar photovoltaic system, single-family homes would use 53 percent less energy compared to homes built to the 2016 standards.[66]

California Green Building Standards Code – CALGreen

On July 17, 2008, the California Building Standards Commission adopted the nation's first green building standards. The California Green Building Standards Code (24 CCR, Part 11, known as "CALGreen") was adopted as part of the California Building Standards Code. CALGreen established planning and design standards for sustainable site development, energy efficiency (in excess of the California Energy Code requirements), water conservation, material conservation, and internal air contaminants.[67] The mandatory provisions of CALGreen became effective January 1, 2011. The 2019 CALGreen standards became effective January 1, 2020.

2006 Appliance Energy Efficiency Regulations

The 2006 Appliance Efficiency Regulations (20 CCR §§ 1601–1608) were adopted by the CEC on October 11, 2006 and approved by the California Office of Administrative Law on December 14, 2006. The regulations include standards for both federally regulated appliances and non–federally regulated appliances. Though these regulations are now often viewed as "business as usual," they exceed the standards imposed by all other states, and they reduce GHG emissions by reducing energy demand.

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64 California Energy Commission (CEC). 2018. News Release: Energy Commission Adopts Standards Requiring Solar Systems for New Homes, First in Nation. https://www.energy.ca.gov/news/2018-05/energy-commission-adopts-standards-requiring-solar-systems-new-homes-first.

65 California Energy Commission (CEC). 2018. 2019 Building Energy and Efficiency Standards Frequently Asked Questions. https://www.energy.ca.gov/sites/default/files/2020-03/Title_24_2019_Building_Standards_FAQ_ada.pdf.

66 California Energy Commission (CEC). 2018. 2019 Building Energy and Efficiency Standards Frequently Asked Questions. https://www.energy.ca.gov/sites/default/files/2020-03/Title_24_2019_Building_Standards_FAQ_ada.pdf.

67 The green building standards became mandatory in the 2010 edition of the code.

Solid Waste

AB 939

California's Integrated Waste Management Act of 1989 (AB 939, Public Resources Code §§ 40050 et seq.) set a requirement for cities and counties throughout the state to divert 50 percent of all solid waste from landfills by January 1, 2000, through source reduction, recycling, and composting. In 2008, the requirements were modified to reflect a per capita requirement rather than tonnage. To help achieve this, the act requires that each city and county prepare and submit a source reduction and recycling element. AB 939 also established the goal for all California counties to provide at least 15 years of ongoing landfill capacity.

AB 341

AB 341 (Chapter 476, Statutes of 2011) increased the statewide goal for waste diversion to 75 percent by 2020 and requires recycling of waste from commercial and multifamily residential land uses. Section 5.208 of CALGreen also requires that at least 65 percent of the nonhazardous construction and demolition waste from nonresidential construction operations be recycled and/or salvaged for reuse.

AB 1327

The California Solid Waste Reuse and Recycling Access Act (AB 1327, Public Resources Code §§ 42900 et seq.) requires areas to be set aside for collecting and loading recyclable materials in development projects. The act required the California Integrated Waste Management Board to develop a model ordinance for adoption by any local agency requiring adequate areas for collection and loading of recyclable materials as part of development projects. Local agencies are required to adopt the model or an ordinance of their own.

AB 1826

In October of 2014, Governor Brown signed AB 1826 requiring businesses to recycle their organic waste on and after April 1, 2016, depending on the amount of waste they generate per week. This law also requires that on and after January 1, 2016, local jurisdictions across the state implement an organic waste recycling program to divert organic waste generated by businesses and multifamily residential dwellings with five or more units. Organic waste means food waste, green waste, landscape and pruning waste, nonhazardous wood waste, and food-soiled paper waste that is mixed with food waste.

Water Efficiency

SBX7-7

The 20x2020 Water Conservation Plan was issued by the Department of Water Resources (DWR) in 2010 pursuant to Senate Bill 7, which was adopted during the 7th Extraordinary Session of 2009–2010 and therefore dubbed "SBX7-7." SBX7-7 mandated urban water conservation and authorized the DWR to prepare a plan implementing urban water conservation requirements (20x2020 Water Conservation Plan). In addition, it required agricultural water providers to prepare agricultural water management plans, measure water deliveries to customers, and implement other efficiency measures. SBX7-7 requires urban water providers to adopt a water conservation target of 20 percent reduction in urban per capita water use by 2020 compared to 2005 baseline use.

AB 1881

The Water Conservation in Landscaping Act of 2006 (AB 1881) requires local agencies to adopt the updated DWR model ordinance or equivalent. AB 1881 also requires the Energy Commission, in consultation with the department, to adopt, by regulation, performance standards and labeling requirements for landscape irrigation equipment, including irrigation controllers, moisture sensors, emission devices, and valves to reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy or water.

Short-Lived Climate Pollutant Strategy

Senate Bill 1383

On September 19, 2016, the Governor signed SB 1383 to supplement the GHG reduction strategies in the Scoping Plan to consider short-lived climate pollutants, including black carbon and CH_4. Black carbon is the light-absorbing component of fine particulate matter produced during incomplete combustion of fuels. SB 1383 required the state board, no later than January 1, 2018, to approve and begin implementing a comprehensive strategy to reduce emissions of short-lived climate pollutants to achieve a reduction in methane by 40 percent, hydrofluorocarbon gases by 40 percent, and anthropogenic black carbon by 50 percent below 2013 levels by 2030. The bill also established targets for reducing organic waste in landfills. On March 14, 2017, CARB adopted the Short-Lived Climate Pollutant Reduction Strategy, which identifies the state's approach to reducing anthropogenic and biogenic sources of short-lived climate pollutants. Anthropogenic sources of black carbon include on- and off-road transportation, residential wood burning, fuel combustion (charbroiling), and industrial processes. According to CARB, ambient levels of black carbon in California are 90 percent lower than in the early 1960s, despite the tripling of diesel fuel use.[68] In-use on-road rules are expected to reduce black carbon emissions from on-road sources by 80 percent between 2000 and 2020.

2.1.3 Regional Regulations

Plan Bay Area, Strategy for a Sustainable Region

Plan Bay Area 2040 is the Bay Area's RTP/SCS and was adopted jointly by ABAG and MTC on July 26, 2017. It lays out a development scenario for the region, which, when integrated with the transportation network and other transportation measures and policies, would reduce GHG emissions from transportation (excluding goods movement) beyond the per capita reduction targets identified by CARB. Plan Bay Area 2040 is a limited and focused update to the 2013 Plan Bay Area, with updated planning assumptions that incorporate key economic, demographic, and financial trends from the last several years.

As part of the implementing framework for Plan Bay Area, local governments have identified Priority Development Areas (PDAs) to focus growth. PDAs are transit-oriented, infill development opportunity areas in existing communities. Overall, well over two-thirds of all regional growth in the Bay Area by 2040 is allocated in PDAs. Per the Final Plan Bay Area 2040, while the projected number of new housing units and new jobs within PDAs would increase to 629,000 units and 707,000 jobs compared to the adopted Plan Bay

[68] California Air Resources Board (CARB). 2017, March 14. Final Proposed Short-Lived Climate Pollutant Reduction Strategy. https://www.arb.ca.gov/cc/shortlived/shortlived.htm.

Area 2013, its overall share would be reduced to 77 percent and 55 percent.[69] However, Plan Bay Area 2040 remains on track to meet a 16 percent per capita reduction of GHG emissions by 2035 and a 10 percent per capita reduction by 2020 from 2005 conditions.[70] The proposed project site is not within a PDA.[71]

Bay Area Clean Air Plan

BAAQMD adopted the 2017 Clean Air Plan, Spare the Air, Cool the Climate on April 19, 2017. The 2017 Clean Air Plan also lays the groundwork for reducing GHG emissions in the Bay Area to meet the state's 2030 GHG reduction target and 2050 GHG reduction goal. It also includes a vision for the Bay Area in a post-carbon year 2050 that encompasses the following:

- Construct buildings that are energy efficient and powered by renewable energy.
- Walk, bicycle, and use public transit for the majority of trips and use electric-powered autonomous public transit fleets.
- Incubate and produce clean energy technologies.
- Live a low-carbon lifestyle by purchasing low-carbon foods and goods in addition to recycling and putting organic waste to productive use.[72]

A comprehensive multipollutant control strategy has been developed to be implemented in the next 3 to 5 years to address public health and climate change and to set a pathway to achieve the 2050 vision. The control strategy includes 85 control measures to reduce emissions of ozone, particulate matter, toxic air contaminants, and GHG from a full range of emission sources. These control measures cover the following sectors: 1) stationary (industrial) sources; 2) transportation; 3) energy; 4) agriculture; 5) natural and working lands; 6) waste management; 7) water; and 8) super-GHG pollutants. Overall, the proposed control strategy is based on the following key priorities:

- Reduce emissions of criteria air pollutants and toxic air contaminants from all key sources.
- Reduce emissions of "super-GHGs" such as methane, black carbon, and fluorinated gases.
- Decrease demand for fossil fuels (gasoline, diesel, and natural gas).
- Increase efficiency of the energy and transportation systems.
- Reduce demand for vehicle travel, and high-carbon goods and services.
- Decarbonize the energy system.
- Make the electricity supply carbon-free.
- Electrify the transportation and building sectors.

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69 Metropolitan Transportation Commission (MTC) and Association of Bay Area Governments (ABAG). 2017, March. Plan Bay Area 2040 Plan.

70 Metropolitan Transportation Commission (MTC) and Association of Bay Area Governments (ABAG). 2017, March. Plan Bay Area 2040 Plan.

71 Metropolitan Transportation Commission (MTC) and Association of Bay Area Governments (ABAG). 2020, September 24 (accessed). Priority Development Areas (Plan Bay Area 2040) ArcGIS. https://www.arcgis.com/home/webmap/viewer.html?useExisting=1&layers=56ee3b41d6a242e5a5871b043ae84dc1.

72 Bay Area Air Quality Management District, 2017. Final 2017 *Clean Air Plan*, Spare the Air, Cool the Climate: A Blueprint for Clean Air and Climate Protection in the Bay Area. http://www.baaqmd.gov/plans-and-climate/air-quality-plans/current-plans, accessed November 21, 2019.

Bay Area Commuter Benefits Program

Under Air District Regulation 14, Model Source Emissions Reduction Measures, Rule 1, Bay Area Commuter Benefits Program, employers with 50 or more full-time employees within the BAAQMD are required to register and offer commuter benefits to employees. In partnership with the BAAQMD and MTC, the rule's purpose is to improve air quality, reduce GHG emissions, and decrease the Bay Area's traffic congestion by encouraging employees to use alternative commute modes, such as transit, vanpool, carpool, bicycling, and walking. The benefits program allows employees to choose from one of four commuter benefit options including a pre-tax benefit, employer-provided subsidy, employer-provided transit, and alternative commute benefit.

2.2 ENVIRONMENTAL SETTING

2.2.1 Existing Emissions

The project site currently operates as a recreational trail, which currently generates GHG emissions from transportation.

2.3 METHODOLOGY

The BAAQMD CEQA Air Quality Guidelines were prepared to assist in the evaluation of air quality impacts of projects and plans proposed within the Bay Area. The guidelines provide recommended procedures for evaluating potential GHG emissions impacts during the environmental review process, consistent with CEQA requirements, and include recommended thresholds of significance, mitigation measures, and background information.

2.3.1 BAAQMD Standards of Significance

BAAQMD has adopted CEQA Guidelines to evaluate GHG emissions impacts from development projects.[73] Land use development projects include residential, commercial, industrial, and public land use facilities. Direct sources of emissions may include on-site combustion of energy, such as natural gas used for heating and cooking, emissions from industrial processes (not applicable for most land use development projects), and fuel combustion from mobile sources. Indirect emissions are emissions produced off-site from energy production, water conveyance due to a project's energy use and water consumption, and nonbiogenic emissions from waste disposal. Biogenic CO_2 emissions are not included in the quantification of a project's GHG emissions, because biogenic CO_2 is derived from living biomass (e.g., organic matter present in wood, paper, vegetable oils, animal fat, food, animal, and yard waste) as opposed to fossil fuels. BAAQMD is currently updating their CEQA Guidelines. Under the 2017 CEQA Guidelines, BAAQMD identified a tiered approach for assessing GHG emissions impacts of a project:

[73] Bay Area Air Quality Management Agency, 2017. California Environmental Quality Act Air Quality Guidelines. http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en, accessed April 9, 2020.

- **Consistency with a Qualified Greenhouse Gas Reduction Strategy.** If a project is within the jurisdiction of an agency that has a "qualified" GHG reduction strategy, the project can assess consistency of its GHG emissions impacts with the reduction strategy.
- **BAAQMD Screening Level Sizes.** BAAQMD has adopted screening criteria for development projects that would be applicable for the proposed project based on the square footage, units, acreage, students, and/or employees generated by a project. Typical projects that meet the screening criteria do not generate emissions greater than 1,100 $MTCO_2e$ and would not generate significant GHG emissions.
- **Brightline Screening Threshold.** BAAQMD adopted screening criteria for development projects of 1,100 $MTCO_2e$ per year that would be applicable for the proposed project. If a project exceeds the BAAQMD Guidelines' GHG screening-level sizes or screening criteria of 1,100 $MTCO_2e$.
- **Efficiency Threshold.** AB 32 requires the statewide GHG emission to be reduced to 1990 levels by 2020. On a per-capita basis, that means reducing the annual emissions of 14 tons of carbon dioxide for every person in California down to about 10 tons per person by 2020.[74] Hence, BAAQMD's per capita significance threshold is calculated based on the State's land use sector emissions inventory prepared by CARB and the demographic forecasts for the 2008 Scoping Plan. The land use sector GHG emissions for 1990 were estimated by BAAQMD, as identified in Appendix D of the BAAQMD CEQA Guidelines, to be 295.53 $MMTCO_2e$ and the 2020 California service population (SP) to be 64.3 million. Therefore, the threshold that would ensure consistency with the GHG reduction goals of AB 32 is estimated at 4.6 $MTCO_2e$ per service population per year ($MTCO_2e$/SP/yr) for year 2020.[75]

Because the proposed project would have a post-year 2020 opening year (year 2021), an interpolated brightline threshold between the 2020 brightline threshold and the GHG target of SB 32 is utilized. Based on the adopted 1,100 $MTCO_2e$ per year brightline screening threshold, and the GHG reduction target for year 2030 established under SB 32 (i.e., 40 percent 1990 levels by 2030), the interpolated brightline screening threshold of 660 $MTCO_2e$ per year is utilized for the proposed project. If project emissions are below this brightline screening threshold, GHG emissions impacts would be considered less than significant.

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[74] California Air Resources Board, 2008. Climate Change Proposed Scoping Plan, a Framework for Change.

[75] Bay Area Air Quality Management Agency, 2017. California Environmental Quality Act Air Quality Guidelines. http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en, accessed April 9, 2020.

Emissions Worksheet

Criteria Air Pollutant Emissions Summary - Construction

tons/yr	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Total Unmitigated	0.08	0.91	0.45	0.00	0.65	0.04	0.69	0.12	0.04	0.15
Total Mitigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

UNMITIGATED

tons/yr	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Total Onsite	0.08	0.87	0.43	0.00	0.12	0.04	0.16	0.06	0.04	0.10
Total Offsite	0.00	0.04	0.03	0.00	0.53	0.00	0.53	0.05	0.00	0.05
check	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

FOR CONSTRUCTION RISK ASSESSMENT - Unmitigated Run

tons/yr	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
2021 Onsite	0.08	0.87	0.43	0.00	0.12	0.04	0.16	0.06	0.04	0.10
2021 Offsite	0.00	0.04	0.03	0.00	0.53	0.00	0.53	0.05	0.00	0.05

FOR CONSTRUCTION REGIONAL EMISSIONS - Unmitigated Run

tons/yr	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Total 2021	0.08	0.91	0.45	0.00	0.65	0.04	0.69	0.12	0.04	0.15
Construction Total	0.08	0.91	0.45	0.00	0.65	0.04	0.69	0.12	0.04	0.15
Check	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.2 Site Preparation - 2021

Unmitigated Construction On-Site

Category (tons/yr)	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Fugitive Dust					0.04	0.00	0.04	0.02	0.00	0.02
Off-Road	0.03	0.31	0.14	0.00		0.01	0.01		0.01	0.01
Total	0.03	0.31	0.14	0.00	0.04	0.01	0.06	0.02	0.01	0.04

Unmitigated Construction Off-Site

Category (tons/yr)	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.03	0.00	0.03	0.00	0.00	0.00
Worker	0.00	0.00	0.00	0.00	0.11	0.00	0.11	0.01	0.00	0.01
Total	0.00	0.00	0.00	0.00	0.14	0.00	0.14	0.01	0.00	0.01

3.3 Grading - 2021

Unmitigated Construction On-Site

Category (tons/yr)	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Fugitive Dust					0.07	0.00	0.07	0.04	0.00	0.04
Off-Road	0.05	0.51	0.22	0.00		0.02	0.02		0.02	0.02
Total	0.05	0.51	0.22	0.00	0.07	0.02	0.10	0.04	0.02	0.06

Unmitigated Construction Off-Site

Category (tons/yr)	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.01	0.00	0.00	0.06	0.00	0.06	0.01	0.00	0.01
Worker	0.00	0.00	0.01	0.00	0.22	0.00	0.22	0.02	0.00	0.02
Total	0.00	0.01	0.01	0.00	0.28	0.00	0.28	0.03	0.00	0.03

3.4 Gravel Import - 2021

Unmitigated Construction On-Site

		ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Category	tons/yr										
Fugitive Dust						0.00	0.00	0.00	0.00	0.00	0.00
Off-Road		0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Unmitigated Construction Off-Site

		ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Category	tons/yr										
Hauling		0.00	0.03	0.01	0.00	0.06	0.00	0.07	0.01	0.00	0.01
Vendor		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.03	0.01	0.00	0.06	0.00	0.07	0.01	0.00	0.01

3.5 Utilities Trenching - 2021

Unmitigated Construction On-Site

		ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Category	tons/yr										
Off-Road		0.00	0.01	0.01	0.00		0.00	0.00		0.00	0.00
Total		0.00	0.01	0.01	0.00		0.00	0.00		0.00	0.00

Unmitigated Construction Off-Site

		ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Category	tons/yr										
Hauling		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker		0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00

3.6 Restroom Installation, Vista Construction, and Sign Installation - 2021

Unmitigated Construction On-Site

		ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Category	tons/yr										
Off-Road		0.00	0.04	0.06	0.00		0.00	0.00		0.00	0.00
Total		0.00	0.04	0.06	0.00		0.00	0.00		0.00	0.00

Unmitigated Construction Off-Site

		ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Category	tons/yr										
Hauling		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker		0.00	0.00	0.00	0.00	0.04	0.00	0.04	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.05	0.00	0.05	0.00	0.00	0.00

Criteria Air Pollutant Emissions Summary - Construction Unmitigated

Annual emissions divided by total construction duration to obtain average daily emissions. Average construction emissions accounts for the duration of each construction phase and the time each piece of construction equipment is onsite.

Total Construction Days	2021	Calendar Days
147	147	205

Unmigated Run - with Best Control Measures for Fugitive Dust

average lbs/day	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Total	1	12	6	0	9	1	9	2	0	2
BAAQMD Threshold	54	54	NA	NA	BMP	82	54	BMP	54	NA
Exceeds Threshold	No	No	NA	NA	NA	No	No	NA	No	NA

avg lbs/day	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
TOTAL 2021	1	12	6	0	8.88	0.53	9	1.57	0.48	2
	1									

avg lbs/day	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
Total Onsite	1.07	11.79	5.82	0.01	1.62	0.53	2.15	0.83	0.48	1.31
Total Offsite	0.03	0.54	0.36	0.00	7.26	0.00	7.26	0.74	0.00	0.74
	0	0			0	0		0	0	

FOR CONSTRUCTION RISK ASSESSMENT

Onsite Details

avg lbs/day	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
2021 Onsite	1.07	11.79	5.82	0.01	1.62	0.53	2.15	0.83	0.48	1.31
	0	0	0	0	0	0	0	0	0	0

Offsite Details

avg lbs/day	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total
2021 Offsite	0.03	0.54	0.36	0.00	7.26	0.00	7.26	0.74	0.00	0.74
	0	0	0	0	0	0	0	0	0	0

GHG Emissions Inventory

Construction*

	MTCO$_2$e Total Project**	
2021	95	
Total Construction	**95**	
30-Yr Amortized Construction Emissions***	**3**	
BAAQMD Bright-Line Screening Threshold	660	MTCO$_2$e/Year
Exceed Threshold?	**No**	

*CalEEMod, Version 2016.3.2.25.

** MTCO$_2$e=metric tons of carbon dioxide equivalent.

*** Total construction emissions are amortized over 30 years per BAAQMD methodology; International Energy Agency, 2008, Energy Efficiency Requirements in Building Codes, Energy Efficiency Policies for New Buildings, March.

Assumptions Worksheet

CalEEMod Inputs - Wavecrest Coastal Trail Phase 2 Project, Construction

Name:	Wavecrest Coastal Trail Phase 2 Project
Project Number:	CLTR-02
Project Location:	Wavecrest Rd
County:	San Mateo
Climate Zone:	5
Land Use Setting:	Urban
Operational Year:	2022
Utility Company:	PG&E,PCE
Air Basin:	SFBAAB
Air District:	Bay Area Air Quality Management District (BAAQMD)

Project Site Acreage	87.00
Disturbed Site Acreage	1.20

Project Components	SQFT	Acres
New Construction		
Restroom[1]	2,500	0.06
Gravel Parking Lot[2]	38,400	0.88
Total Hardscape[3]	11,200	0.26
Total	**52,100**	**1.20**

[1] based on Google Earth estimates of similar facilities

[2] Combined SF of staging areas

[3] assuming total hardscaped area is roughly the size of smallest staging area

CalEEMod Land Use Inputs*

Land Use Type	Land Use Subtype	Unit Amount	Size Metric	Lot Acreage	Land Use Square Feet
Parking	Parking Lot	38.400	1000 sqft	0.88	38,400
Parking**	Other Non-asphalt Surfaces	13.700	1000 sqft	0.31	13,700
				1.20	

**Modeling is conservative because the interpretive trails would not utilize offroad construction equipment. The only offroad construction equipment is associated with the installation of the gravel parking lot and portable restroom building*

*** Includes the surface area associated with the portable restroom building.*

Soil Haul [1]

Construction Activities	Haul Truck Capacity (ton)	Volume (CY)	No. of total one-way haul (trip ends)	No. of total one-way haul (trip ends/day)	Total Days
Gravel Import (CY)*	16	1,422	178	3	71

Export Haul Travel Distance (1-Way): 20

**assuming gravel layer of 1 ft*

Adjusted Travel on Paved Roads

0.625 miles traveled on unpaved path

Land Use Subtype	Worker Trip	Vendor Trip	Hauling Trip
CalEEMod Default Trip Length	10.80	7.30	20.00
CalEEMod Default Percentage	100%	100%	100%
Adjusted Percentage*	94%	91%	97%

**Based on percentage of paved road travel.*

BAAQMD Construction BMPs

Replace Ground Cover	PM10:	5	% Reduction
Replace Ground Cover	PM2.5:	5	% Reduction
Water Exposed Area	Frequency:	2	per day
	PM10:	55	% Reduction
	PM25:	55	% Reduction
Unpaved Roads	Vehicle Speed:	15	mph
	Clean Paved Road	9	% PM Reduction

Construction Activities and Schedule Assumptions: Wavecrest Coastal Trail Phase 2 Project

** CalEEMod default construction normalized to fit construction duration provided by applicant.*

CalEEMod Default Schedule

		Construction Schedule		
Construction Activities	**Phase Type**	**Start Date**	**End Date**	**CalEEMod Duration**
Site Preparation	Site Preparation	4/15/2021	4/28/2021	10
Grading	Grading	4/29/2021	5/26/2021	20
Grading Soil Haul	Grading	4/29/2021	5/26/2021	20
Utilities*	Trenching	5/27/2021	6/2/2021	5
Restroom Installation, Vista Construction, and Sign Installation*	Trenching	6/3/2021	6/16/2021	10

Normalization Calculations *

CalEEMod Defaults Construction Duration (Library)	
62	days of construction
0.17	years of construction
2.04	months of construction

Assumed Construction Duration	
4/15/2021	11/15/2021
214	days
7.04	months

Norm Factor: 3.45

CalEEMod Construction Schedule Inputs

Construction Activities	Phase Type	Start Date	End Date	CalEEMod Duration (Workday)
Site Preparation	Site Preparation	4/15/2021	6/3/2021	36
Grading	Grading	6/4/2021	9/10/2021	71
Gravel Import	Grading	6/4/2021	9/10/2021	71
Utilities*	Trenching	9/11/2021	9/17/2021	5
Restroom Installation, Vista Construction, and Sign Installation*	Trenching	9/18/2021	11/8/2021	36

CalEEMod Construction Off-Road Equipment Inputs

**Based on CalEEMod defaults, assumed equipment would not be shared for most conservative result:*

General Construction Hours: 8 hours btwn 7:00 AM to 4:00 PM (with 1 hr break), Mon-Fri

	Construction Equipment Details						
	Equipment	**model**	**# of Equipment**	**hr/day**	**hp**	**load factor***	**total trips**
Site Preparation							
	Graders		1	8	187	0.41	
	Rubber Tired Dozers		1	7	247	0.4	
	Tractors/Loaders/Backhoes		1	8	97	0.37	
	Worker Trips						8
	Vendor Trips						0
	Hauling Trips						0
	Water Truck						2
Grading							
	Graders		1	6	187	0.41	
	Rubber Tired Dozers		1	6	247	0.4	
	Tractors/Loaders/Backhoes		1	7	97	0.37	
	Worker Trips						8
	Vendor Trips						0
	Hauling Trips						0
	Water Truck						2
Gravel Import							
	no additional equipment needed for Gravel Import						
	Worker Trips						0
	Vendor Trips						0
	Hauling Trips						178
Utilities Trenching							
	Excavators		1	8	158	0.38	
	Worker Trips						3
	Vendor Trips						0
	Hauling Trips						0
Restroom Installation, Vista Construction, and Sign Installation							
	Excavators		1	8	158	0.38	
	Worker Trips						3
	Vendor Trips						0
	Hauling Trips*						10

*2 trips per prefabricated restroom, sign, wooden steps, and fencing

Construction Trips Worksheet

Phase Name	Worker Trip Ends Per Day	Vendor Trip Ends Per Day	Haul Truck Trip Ends Per Day	Total Haul Truck Trip Ends	Start Date	End Date	Workdays
Site Preparation	8	2	0	0	4/15/2021	6/3/2021	36
Grading	8	2	0	0	6/4/2021	9/10/2021	71
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Utilities	3	0	0	0	9/11/2021	9/17/2021	5
Restroom Installation, Vista Construction, and Sign Installation	3	0	1	10	9/18/2021	11/8/2021	36

CalEEMod Construction Model

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Utilities	3	0	0	0	9/11/2021	9/17/2021	5
Restroom Installation, Vista Construction, and Sign Installation	3	0	1	10	9/18/2021	11/8/2021	36

APPENDIX B:
CONSTRUCTION HEALTH RISK ASSESSMENT

1. Health Risk Assessment

1.1 CONSTRUCTION HEALTH RISK ASSESSMENT

The Coastside Land Trust (CLT) proposes to develop the Wavecrest Coastal Trail Phase 2 project (project) in the City of Half Moon Bay. The proposed project site is an 87-acre site comprised of CLT-owned and privately-owned parcels bound by the Phase 1 project site to the north, undeveloped land to the east and south, and the Pacific Ocean to the west, in the City of Half Moon Bay, San Mateo County, California. The proposed project would involve site preparation, grading, trenching, and installation of restrooms and other site improvements. The following provides the background methodology used for the construction health risk assessment for the proposed project.

The latest version of the Bay Area Air Quality Management District (BAAQMD) CEQA Air Quality Guidelines requires projects to evaluate the impacts of construction activities on sensitive receptors (BAAQMD, 2017). Project construction is anticipated to take place starting at the beginning of April 2021 and be completed by November 2021 (approximately 147 workdays). The nearest sensitive receptors to the project site include the single-family residences to the south of the site along Bayhill Road and Carnoustie Drive. The BAAQMD has developed *Screening Tables for Air Toxics Evaluation During Construction* (2017) that evaluate construction-related health risks associated with residential, commercial, and industrial projects. According to the screening tables, the residences are closer than the distance of 100 meters (328 feet) that would screen out potential health risks and, therefore, could be potentially impacted from the proposed construction activities. As a result, a site-specific construction health risk assessment (HRA) has been prepared for the proposed project. This HRA considers the health impact to off-site sensitive receptors (children at the nearby residences, day care, and high school) from construction emissions at the project site, including diesel equipment exhaust (diesel particulate matter or DPM) and particulate matter less than 2.5 microns ($PM_{2.5}$).

It should be noted that these health impacts are based on conservative (i.e., health protective) assumptions. The United States Environmental Protection Agency (USEPA, 2005) and the Office of Environmental Health Hazard Assessment (OEHHA, 2015) note that conservative assumptions used in a risk assessment are intended to ensure that the estimated risks do not underestimate the actual risks. Therefore, the estimated risks may not necessarily represent actual risks experienced by populations at or near a site. The use of conservative assumptions tends to produce upper-bound estimates of exposure and thus risk.

For residential-based receptors, the following conservative assumptions were used:

- It was assumed that maximum-exposed off-site residential receptors (both children and adults) stood outdoors and are subject to DPM at their residence for 8 hours per day, and approximately 260 construction days per year. In reality, California residents typically will spend on average 2 hours per day outdoors at their residences (USEPA, 2011). This would result in lower exposures to construction related DPM emissions and lower estimated risk values.

- The calculated risk for infants from third trimester to age 2 is multiplied by a factor of 10 to account for early life exposure and uncertainty in child versus adult exposure impacts (OEHHA, 2015).

1.2 METHODOLOGY AND SIGNIFICANCE THRESHOLDS

For this HRA, the BAAQMD significance thresholds were deemed to be appropriate and the thresholds that were used for this project are shown below:

- Excess cancer risk of more than 10 in a million
- Non-cancer hazard index (chronic or acute) greater than 1.0
- Incremental increase in average annual $PM_{2.5}$ concentration of greater than 0.3 µg/m^3

The methodology used in this HRA is consistent with the following BAAQMD and the OEHHA guidance documents:

- BAAQMD, 2017. *California Environmental Quality Act (CEQA) Air Quality Guidelines*. May 2017.
- BAAQMD, 2016. *Planning Healthy Places*. May 2016.
- BAAQMD, 2010. *Screening Tables for Air Toxics Evaluation During Construction.* May 2010.
- BAAQMD, 2012. *Recommended Methods for Screening and Modeling Local Risks and Hazards*. Version 3.0. May 2012.
- OEHHA. 2015. *Air Toxics Hot Spots Program Guidance Manual for the Preparation of Health Risk Assessments.* February, 2015.

Potential exposures to DPM and $PM_{2.5}$ from proposed project construction were evaluated for off-site sensitive receptors in close proximity to the site. Pollutant concentrations were estimated using an air dispersion model, and excess lifetime cancer risks and chronic non-cancer hazard indexes were calculated. These risks were then compared to the significance thresholds adopted for this HRA.

1.3 CONSTRUCTION EMISSIONS

Construction emissions were calculated as average daily emissions in pounds per day, using the proposed construction schedule and the latest version of California Emissions Estimation Model, known as CalEEMod Version 2016.3.2 (CAPCOA, 2016). DPM emissions were based on the CalEEMod construction runs, using annual exhaust PM_{10} construction emissions presented in pounds (lbs) per day. The $PM_{2.5}$ emissions were taken from the CalEEMod output for exhaust $PM_{2.5}$ also presented in lbs per day.

The project was assumed to take place over 7 months (147 workdays) from beginning of April 2021 to November 2021. The average daily emission rates from construction equipment used during the proposed project were determined by dividing the annual average emissions for each construction year by the number of construction days per year for each calendar year of construction (i.e., 2021). The off-site hauling emission rates were adjusted to evaluate localized emissions from the 0.50-mile haul route within 1,000 feet of the project site. The CalEEMod construction emissions output and emission rate calculations are provided in Appendix A of the HRA.

1.4 DISPERSION MODELING

Air quality modeling was performed using the AERMOD atmospheric dispersion model to assess the impact of emitted compounds on sensitive receptors near the project. The model is a steady state Gaussian plume model and is an approved model by BAAQMD for estimating ground level impacts from point and fugitive sources in simple and complex terrain. The on-site construction emissions for the project were modeled as poly-area sources. The off-site mobile sources were modeled as adjacent line volume sources. The model requires additional input parameters, including chemical emission data and local meteorology. Inputs for the construction emission rates are those described in Section 1.3. Meteorological data obtained from the BAAQMD for the nearest representative meteorological station (San Carlos Airport) with the five latest available years (2009 to 2013) of record were used to represent local weather conditions and prevailing winds.

The modeling analysis also considered the spatial distribution and elevation of each emitting source in relation to the sensitive receptors. To accommodate the model's Cartesian grid format, direction-dependent calculations were obtained by identifying the Universal Transverse Mercator (UTM) coordinates for each source location. In addition, digital elevation model (DEM) data for the area were obtained and included in the model runs to account for complex terrain. An emission release height of 4.15 meters was used as representative of the stack exhaust height for off-road construction equipment and diesel truck traffic, and an initial vertical dispersion parameter of 1.93 m was used, per California Air Resources Board (CARB) guidance (2000).

To determine contaminant impacts during construction hours, the model's Season-Hour-Day (HRDOW) scalar option was invoked to predict flagpole-level concentrations (1.5 m for ground-floor receptors, 6.1 m for 2nd-floor) for construction emissions generated between the hours of 7:00 AM and 4:00 PM with a 1-hour lunch break. In addition, a scalar factor was applied to the risk calculations to account for the number of days residents are exposed to construction emissions per year.

A unit emission rate of 1 gram per second was used for all modeling runs. The unit emission rates were proportioned over the poly-area sources for on-site construction emissions and divided between the volume sources for off-site hauling emissions. The maximum modeled concentrations from the output files were then multiplied by the emission rates calculated in Appendix A to obtain the maximum flagpole-level concentrations at the off-site maximum exposed receptors (MER). The off-site MER is a single-family residence south east of the site along Bayhill Road. The MER location is the receptor location associated with the maximum predicted AERMOD concentrations from the on-site emission source. The calculated on-site emission rates are approximately 4 orders of magnitude higher than the calculated off-site emission rates (see Appendix A). Therefore, the maximum concentrations associated with the on-site emission sources produce the highest overall ground-level MER concentrations and, consequently, highest calculated health risks.

The air dispersion model output for the emission sources is presented in Appendix B. The model output DPM and $PM_{2.5}$ concentrations from the construction emission sources are provided in Appendix C.

1.5 RISK CHARACTERIZATION

1.5.1 Carcinogenic Chemical Risk

A threshold of ten in a million ($10x10^{-6}$) has been established as a level posing no significant risk for exposures to carcinogens. Health risks associated with exposure to carcinogenic compounds can be defined in terms of the probability of developing cancer as a result of exposure to a chemical at a given concentration. The cancer risk probability is determined by multiplying the chemical's annual concentration by its cancer potency factor (CPF), a measure of the carcinogenic potential of a chemical when a dose is received through the inhalation pathway. It is an upper-limit estimate of the probability of contracting cancer as a result of continuous exposure to an ambient concentration of one microgram per cubic meter ($\mu g/m^3$) over a lifetime of 70 years.

Recent guidance from OEHHA recommends a refinement to the standard point estimate approach with the use of age-specific breathing rates and age sensitivity factors (ASFs) to assess risk for susceptible subpopulations such as children. For the inhalation pathway, the procedure requires the incorporation of several discrete variates to effectively quantify dose for each age group. Once determined, contaminant dose is multiplied by the cancer potency factor in units of inverse dose expressed in milligrams per kilogram per day $(mg/kg/day)^{-1}$ to derive the cancer risk estimate. Therefore, to accommodate the unique exposures associated with the sensitive receptors, the following dose algorithm was used.

$$\mathrm{Dose}_{\mathrm{AIR,per\ age\ group}} = (\mathrm{C}_{\mathrm{air}} \times \mathrm{EF} \times [\frac{\mathrm{BR}}{\mathrm{BW}}] \times \mathrm{A} \times \mathrm{CF})$$

Where:

$Dose_{AIR}$	=	dose by inhalation (mg/kg-day), per age group
C_{air}	=	concentration of contaminant in air ($\mu g/m^3$)
EF	=	exposure frequency (number of days/365 days)
BR/BW	=	daily breathing rate normalized to body weight (L/kg-day)
A	=	inhalation absorption factor (default = 1)
CF	=	conversion factor ($1x10^{-6}$, μg to mg, L to m^3)

The inhalation absorption factor (A) is a unitless factor that is only used if the cancer potency factor included a correction for absorption across the lung. The default value of 1 was used for this assessment. For residential receptors, the exposure frequency (EF) of 0.96 is used to represent 350 days per year to allow for a two week period away from home each year (OEHHA, 2015). The 95th percentile daily breathing rates (BR/BW), exposure duration (ED), age sensitivity factors (ASFs), and fraction of time at home (FAH) for the various age groups are provided herein:

Age Groups	BR/BW (L/kg-day)	ED	ASF	FAH
Third trimester	361	0.25	10	0.85
0-2 age group	1,090	2	10	0.85
2-9 age group	861	7	3	0.72
2-16 age group	745	14	3	0.72

16-30 age group	335	14	1	0.73
16-70 age group	290	54	1	0.73

For construction analysis, the exposure duration spans the length of construction (e.g. 147 workdays, approximately 0.58 year). As the length of construction is less than 2 years, only the third trimester and 0-2 age bins apply to the construction analysis for the off-site residential receptors.

To calculate the overall cancer risk, the risk for each appropriate age group is calculated per the following equation:

$$\text{Cancer Risk}_{\text{AIR}} = \text{Dose}_{\text{AIR}} \times \text{CPF} \times \text{ASF} \times \text{FAH} \times \frac{\text{ED}}{AT}$$

Where:

Dose_{AIR}	=	dose by inhalation (mg/kg-day), per age group
CPF	=	cancer potency factor, chemical-specific $(\text{mg/kg-day})^{-1}$
ASF	=	age sensitivity factor, per age group
FAH	=	fraction of time at home, per age group (for residential receptors only)
ED	=	exposure duration (years)
AT	=	averaging time period over which exposure duration is averaged (70 years)

The CPFs used in the assessment were obtained from OEHHA guidance. The excess lifetime cancer risks during the construction period to the maximally exposed resident were calculated based on the factors provided above. The cancer risks for each age group are summed to estimate the total cancer risk for each toxic chemical species. The final step converts the cancer risk in scientific notation to a whole number that expresses the cancer risk in "chances per million" by multiplying the cancer risk by a factor of $1\text{x}10^6$ (i.e. 1 million).

The calculated results are provided in Appendix C.

1.5.2 Non-Carcinogenic Hazards

An evaluation was also conducted of the potential non-cancer effects of chronic chemical exposures. Adverse health effects are evaluated by comparing the annual receptor level (flagpole) concentration of each chemical compound with the appropriate reference exposure limit (REL). Available RELs promulgated by OEHHA were considered in the assessment.

The hazard index approach was used to quantify non-carcinogenic impacts. The hazard index assumes that chronic sub-threshold exposures adversely affect a specific organ or organ system (toxicological endpoint). Target organs presented in regulatory guidance were used for each discrete chemical exposure. To calculate the hazard index, each chemical concentration or dose is divided by the appropriate toxicity value. This ratio is summed for compounds affecting the same toxicological endpoint. A health hazard is presumed to exist where the total equals or exceeds one.

The chronic hazard analysis for DPM is provided in Appendix C. The calculations contain the relevant exposure concentrations and corresponding reference dose values used in the evaluation of non-carcinogenic exposures.

1.5.3 Criteria Pollutants

The BAAQMD has recently incorporated $PM_{2.5}$ into the District's CEQA significance thresholds due to recent studies that show adverse health impacts from exposure to this pollutant. An incremental increase of greater than 0.3 $\mu g/m^3$ for the annual average $PM_{2.5}$ concentration is considered to be a significant impact.

1.6 CONSTRUCTION HRA RESULTS

The calculated results are provided in Appendix C and the results are summarized in Table 1.

TABLE 1. CONSTRUCTION RISK SUMMARY - UNMITIGATED

Receptor	Cancer Risk (per million)	Chronic Hazards	$PM_{2.5}$ ($\mu g/m^3$)
Maximum Exposed Receptor – Off-site Residences	2.0	0.008	0.03
BAAQMD Threshold	10	1.0	0.30
Exceeds Threshold?	**No**	**No**	**No**

Note: Cancer risk calculated using 2015 OEHHA HRA guidance.

Cancer risk for the maximum exposed receptor (MER) from project-related construction emissions was calculated to be 2.0 in a million, which would not exceed the 10 in a million significance threshold. In accordance with the latest 2015 OEHHA guidance, the calculated total cancer risk conservatively assumes that the risk for the MER consists of a pregnant woman in the third trimester that subsequently gives birth to an infant during the approximately 7-month construction period; therefore, all calculated risk values were multiplied by a factor of 10. In addition, it was conservatively assumed that the residents were outdoors 8 hours a day and exposed to all of the daily construction emissions. Additionally, the cancer risks for the other sensitive receptors would also not exceed 10 per million.

For non-carcinogenic effects, the chronic hazard index identified for each toxicological endpoint totaled less than one for all the off-site sensitive receptors. Therefore, chronic non-carcinogenic hazards are within acceptable limits. Additionally, the maximum annual $PM_{2.5}$ concentration of 0.03 $\mu g/m^3$ would not exceed the BAAQMD significance threshold of 0.3 micrograms per cubic meter ($\mu g/m^3$) for all the off-site sensitive receptors.

Therefore, the project would not expose off-site sensitive receptors to substantial concentrations of air pollutant emissions during construction and impacts would be less than significant.

2. References

Bay Area Air Quality Management District. 2017. *California Environmental Quality Act Air Quality Guidelines.*

———. 2016. *Planning Healthy Places.* Dated May 2016.

———. 2012. *Recommended Methods for Screening and Modeling Local Risks and Hazards.* Version 3.0. Dated May 2012.

———. 2010. Screening Tables for Air Toxics Evaluation During Construction. Version 1.0. Dated May 2010.

———. 2009-2013. Meteorological Data Set for San Carlos Airport.

California Air Pollution Control Officers Association (CAPCOA). 2016. California Emissions Estimator Model (CalEEMod). Version 2016.3.2. Prepared by: ENVIRON International Corporation and the California Air Districts.

California Air Resources Board (CARB). 2000. *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles.*

———. 2020. *Meteorological Files.* https://ww2.arb.ca.gov/resources/documents/harp-aermod-meteorological-files

Office of Environmental Health Hazard Assessment (OEHHA). 2015. *Air Toxics Hot Spots Program Guidance Manual for the Preparation of Health Risk Assessments.* Dated February 2015.

United States Environmental Protection Agency (USEPA). 2011. *Exposure Factors Handbook 2011 Edition (Final).* EPA/600/R-09/052F, 2011.

______. 2005. *Guideline on Air Quality Models* (Revised). EPA-450/2-78-027R.

Appendix A. Emission Rate Calculations

Construction Emissions - DPM and PM2.5
Input to Risk Tables

Average Daily Emissions and Emission Rates: Unmitigated Scenario

Onsite Construction PM10 Exhaust Emissions[1]			
Year	Average Daily Emissions (lbs/day)	Average Daily Emissions (lbs/hr)	Emission Rate (g/s)
2021	0.53	6.57E-02	8.28E-03

Onsite Construction PM2.5 Exhaust Emissions[2]		
Average Daily Emissions (lbs/day)	Average Daily Emissions (lbs/hr)	Emission Rate (g/s)
0.48	6.03E-02	7.60E-03

Offsite Construction PM10 Exhaust Emissions[1]					Offsite Construction PM2.5 Exhaust Emissions[2]			
Year	Average Daily Emissions (lbs/day)	Hauling Emissions w/in 1,000ft (lbs/day) [3]	Emission Rate (lbs/hr)	Emission Rate (g/s)	Average Daily Emissions (lbs/day)	Hauling Emissions w/in 1,000ft (lbs/day) [3]	Emission Rate (lbs/hr)	Emission Rate (g/s)
2021	1.77E-03	4.46E-05	5.57E-06	7.02E-07	1.77E-03	4.46E-05	5.57E-06	7.02E-07

Note: Emissions evenly distributed over 177 modeled volume sources.

Hauling Length (miles)	20	miles
Haul Length within 1,000 ft of Site (mile) [3]	0.50	miles
Hours per work day (7:00 AM to 4:00 PM, 1-hour of breaks) [4]	8	hours

Year	Workdays	Risk Scalar [5]
2021	147	0.56

[1] DPM emissions taken as PM_{10} exhaust emissions from CalEEMod average daily emissions.

[2] $PM_{2.5}$ emissions taken as $PM_{2.5}$ exhaust emissions from CalEEMod average daily emissions.

[3] Emissions from CalEEMod offsite average daily emissions, which is based on proportioned haul truck trip distances, are adjusted to evaluate emissions from the 0.50-mile route within 1,000 of the project site.

[4] Work hours applied in By Hour/Day (HRDOW) variable emissions module in air dispersion model (see App B - Air Dispersion Model Output).

[5] Risk scalars determined for each year of construction to adjust receptor exposures to the exposure durations for each construction year (see App C - Risk Calculations).

Appendix B. Air Dispersion Model Output

```
*** MODELOPTs:    RegDFAULT  CONC  ELEV  FLGPOL  RURAL

                              ***     MODEL SETUP OPTIONS SUMMARY       ***
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

**Model Is Setup For Calculation of Average CONCentration Values.

  --  DEPOSITION LOGIC  --
**NO GAS DEPOSITION Data Provided.
**NO PARTICLE DEPOSITION Data Provided.
**Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
**Model Uses NO WET DEPLETION.  WETDPLT  =  F

**Model Uses RURAL Dispersion Only.

**Model Uses Regulatory DEFAULT Options:
        1. Stack-tip Downwash.
        2. Model Accounts for ELEVated Terrain Effects.
        3. Use Calms Processing Routine.
        4. Use Missing Data Processing Routine.
        5. No Exponential Decay.

**Other Options Specified:
        CCVR_Sub - Meteorological data includes CCVR substitutions
        TEMP_Sub - Meteorological data includes TEMP substitutions

**Model Accepts FLAGPOLE Receptor Heights.

**The User Specified a Pollutant Type of:  OTHER

**Model Calculates PERIOD Averages Only

**This Run Includes:    178 Source(s);       2 Source Group(s); and     308 Receptor(s)

               with:      0 POINT(s), including
                          0 POINTCAP(s) and      0 POINTHOR(s)
                and:    177 VOLUME source(s)
                and:      1 AREA type source(s)
                and:      0 LINE source(s)
                and:      0 RLINE/RLINEXT source(s)
                and:      0 OPENPIT source(s)
                and:      0 BUOYANT LINE source(s) with      0 line(s)


**Model Set To Continue RUNning After the Setup Testing.

**The AERMET Input Meteorological Data Version Date:  14134
```

```
**Output Options Selected:
         Model Outputs Tables of PERIOD Averages by Receptor
         Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
         Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

**NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                m for Missing Hours
                                                                b for Both Calm and Missing Hours

**Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =     1.50 ;  Decay Coef. =    0.000     ;  Rot. Angle =     0.0
                 Emission Units = GRAMS/SEC                                ;  Emission Rate Unit Factor =   0.10000E+07
                 Output Units   = MICROGRAMS/M**3

**Approximate Storage Requirements of Model =      4.1 MB of RAM.

**Input Runstream File:          aermod.inp
**Output Print File:             aermod.out

**Detailed Error/Message File:   CLTR-02.err
**File for Summary of Results:   CLTR-02.sum
```

*** MODELOPTs: RegDFAULT CONC ELEV FLGPOL RURAL

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000001	0	0.56497E-02	549284.7	4143750.6	14.1	4.15	2.13	3.26	NO	SHRDOW
L0000002	0	0.56497E-02	549289.1	4143751.5	14.1	4.15	2.13	3.26	NO	SHRDOW
L0000003	0	0.56497E-02	549293.6	4143752.4	14.2	4.15	2.13	3.26	NO	SHRDOW
L0000004	0	0.56497E-02	549298.1	4143753.3	14.3	4.15	2.13	3.26	NO	SHRDOW
L0000005	0	0.56497E-02	549302.6	4143754.2	14.4	4.15	2.13	3.26	NO	SHRDOW
L0000006	0	0.56497E-02	549307.0	4143755.1	14.5	4.15	2.13	3.26	NO	SHRDOW
L0000007	0	0.56497E-02	549311.5	4143756.0	14.5	4.15	2.13	3.26	NO	SHRDOW
L0000008	0	0.56497E-02	549316.0	4143757.0	14.6	4.15	2.13	3.26	NO	SHRDOW
L0000009	0	0.56497E-02	549320.5	4143757.9	14.7	4.15	2.13	3.26	NO	SHRDOW
L0000010	0	0.56497E-02	549325.0	4143758.8	14.8	4.15	2.13	3.26	NO	SHRDOW
L0000011	0	0.56497E-02	549329.4	4143759.7	14.9	4.15	2.13	3.26	NO	SHRDOW
L0000012	0	0.56497E-02	549333.9	4143760.6	15.0	4.15	2.13	3.26	NO	SHRDOW
L0000013	0	0.56497E-02	549338.4	4143761.5	15.1	4.15	2.13	3.26	NO	SHRDOW
L0000014	0	0.56497E-02	549342.9	4143762.4	15.2	4.15	2.13	3.26	NO	SHRDOW
L0000015	0	0.56497E-02	549347.4	4143763.3	15.3	4.15	2.13	3.26	NO	SHRDOW
L0000016	0	0.56497E-02	549351.8	4143764.2	15.4	4.15	2.13	3.26	NO	SHRDOW
L0000017	0	0.56497E-02	549356.3	4143765.2	15.5	4.15	2.13	3.26	NO	SHRDOW
L0000018	0	0.56497E-02	549360.8	4143766.1	15.5	4.15	2.13	3.26	NO	SHRDOW
L0000019	0	0.56497E-02	549365.3	4143767.0	15.6	4.15	2.13	3.26	NO	SHRDOW
L0000020	0	0.56497E-02	549369.7	4143767.9	15.7	4.15	2.13	3.26	NO	SHRDOW
L0000021	0	0.56497E-02	549374.2	4143768.8	15.8	4.15	2.13	3.26	NO	SHRDOW
L0000022	0	0.56497E-02	549378.7	4143769.7	15.8	4.15	2.13	3.26	NO	SHRDOW
L0000023	0	0.56497E-02	549383.2	4143770.6	15.9	4.15	2.13	3.26	NO	SHRDOW
L0000024	0	0.56497E-02	549387.7	4143771.5	16.0	4.15	2.13	3.26	NO	SHRDOW
L0000025	0	0.56497E-02	549392.1	4143772.4	16.1	4.15	2.13	3.26	NO	SHRDOW
L0000026	0	0.56497E-02	549396.6	4143773.3	16.2	4.15	2.13	3.26	NO	SHRDOW
L0000027	0	0.56497E-02	549401.1	4143774.3	16.3	4.15	2.13	3.26	NO	SHRDOW
L0000028	0	0.56497E-02	549405.6	4143775.2	16.4	4.15	2.13	3.26	NO	SHRDOW
L0000029	0	0.56497E-02	549410.0	4143776.1	16.5	4.15	2.13	3.26	NO	SHRDOW
L0000030	0	0.56497E-02	549414.5	4143777.0	16.6	4.15	2.13	3.26	NO	SHRDOW
L0000031	0	0.56497E-02	549419.0	4143777.9	16.8	4.15	2.13	3.26	NO	SHRDOW
L0000032	0	0.56497E-02	549423.5	4143778.8	16.9	4.15	2.13	3.26	NO	SHRDOW
L0000033	0	0.56497E-02	549428.0	4143779.7	17.0	4.15	2.13	3.26	NO	SHRDOW
L0000034	0	0.56497E-02	549432.4	4143780.6	17.1	4.15	2.13	3.26	NO	SHRDOW
L0000035	0	0.56497E-02	549436.9	4143781.5	17.3	4.15	2.13	3.26	NO	SHRDOW
L0000036	0	0.56497E-02	549441.4	4143782.4	17.4	4.15	2.13	3.26	NO	SHRDOW
L0000037	0	0.56497E-02	549445.9	4143783.4	17.5	4.15	2.13	3.26	NO	SHRDOW
L0000038	0	0.56497E-02	549450.4	4143784.3	17.6	4.15	2.13	3.26	NO	SHRDOW
L0000039	0	0.56497E-02	549454.8	4143785.2	17.8	4.15	2.13	3.26	NO	SHRDOW
L0000040	0	0.56497E-02	549459.3	4143786.1	17.9	4.15	2.13	3.26	NO	SHRDOW

*** MODELOPTs: RegDFAULT CONC ELEV FLGPOL RURAL

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000041	0	0.56497E-02	549463.8	4143787.0	18.0	4.15	2.13	3.26	NO	SHRDOW
L0000042	0	0.56497E-02	549468.3	4143787.9	18.2	4.15	2.13	3.26	NO	SHRDOW
L0000043	0	0.56497E-02	549472.7	4143788.8	18.3	4.15	2.13	3.26	NO	SHRDOW
L0000044	0	0.56497E-02	549477.2	4143789.7	18.4	4.15	2.13	3.26	NO	SHRDOW
L0000045	0	0.56497E-02	549481.7	4143790.6	18.6	4.15	2.13	3.26	NO	SHRDOW
L0000046	0	0.56497E-02	549486.2	4143791.5	18.8	4.15	2.13	3.26	NO	SHRDOW
L0000047	0	0.56497E-02	549490.7	4143792.5	18.9	4.15	2.13	3.26	NO	SHRDOW
L0000048	0	0.56497E-02	549495.1	4143793.4	19.1	4.15	2.13	3.26	NO	SHRDOW
L0000049	0	0.56497E-02	549499.6	4143794.3	19.2	4.15	2.13	3.26	NO	SHRDOW
L0000050	0	0.56497E-02	549504.1	4143795.2	19.3	4.15	2.13	3.26	NO	SHRDOW
L0000051	0	0.56497E-02	549508.6	4143796.1	19.4	4.15	2.13	3.26	NO	SHRDOW
L0000052	0	0.56497E-02	549513.1	4143797.0	19.4	4.15	2.13	3.26	NO	SHRDOW
L0000053	0	0.56497E-02	549517.5	4143797.9	19.5	4.15	2.13	3.26	NO	SHRDOW
L0000054	0	0.56497E-02	549522.0	4143798.8	19.5	4.15	2.13	3.26	NO	SHRDOW
L0000055	0	0.56497E-02	549526.5	4143799.7	19.6	4.15	2.13	3.26	NO	SHRDOW
L0000056	0	0.56497E-02	549531.0	4143800.6	19.8	4.15	2.13	3.26	NO	SHRDOW
L0000057	0	0.56497E-02	549535.4	4143801.6	20.0	4.15	2.13	3.26	NO	SHRDOW
L0000058	0	0.56497E-02	549539.9	4143802.5	20.2	4.15	2.13	3.26	NO	SHRDOW
L0000059	0	0.56497E-02	549544.4	4143803.4	20.4	4.15	2.13	3.26	NO	SHRDOW
L0000060	0	0.56497E-02	549548.9	4143804.3	20.6	4.15	2.13	3.26	NO	SHRDOW
L0000061	0	0.56497E-02	549553.4	4143805.2	20.9	4.15	2.13	3.26	NO	SHRDOW
L0000062	0	0.56497E-02	549557.8	4143806.1	21.2	4.15	2.13	3.26	NO	SHRDOW
L0000063	0	0.56497E-02	549562.3	4143807.0	21.4	4.15	2.13	3.26	NO	SHRDOW
L0000064	0	0.56497E-02	549566.8	4143807.9	21.7	4.15	2.13	3.26	NO	SHRDOW
L0000065	0	0.56497E-02	549571.3	4143808.8	22.0	4.15	2.13	3.26	NO	SHRDOW
L0000066	0	0.56497E-02	549575.8	4143809.8	22.3	4.15	2.13	3.26	NO	SHRDOW
L0000067	0	0.56497E-02	549580.2	4143810.7	22.6	4.15	2.13	3.26	NO	SHRDOW
L0000068	0	0.56497E-02	549584.7	4143811.6	22.9	4.15	2.13	3.26	NO	SHRDOW
L0000069	0	0.56497E-02	549589.2	4143812.5	23.1	4.15	2.13	3.26	NO	SHRDOW
L0000070	0	0.56497E-02	549593.7	4143813.4	23.4	4.15	2.13	3.26	NO	SHRDOW
L0000071	0	0.56497E-02	549598.1	4143814.3	23.7	4.15	2.13	3.26	NO	SHRDOW
L0000072	0	0.56497E-02	549602.6	4143815.2	23.8	4.15	2.13	3.26	NO	SHRDOW
L0000073	0	0.56497E-02	549607.1	4143816.1	23.9	4.15	2.13	3.26	NO	SHRDOW
L0000074	0	0.56497E-02	549611.6	4143817.0	24.1	4.15	2.13	3.26	NO	SHRDOW
L0000075	0	0.56497E-02	549616.1	4143817.9	24.1	4.15	2.13	3.26	NO	SHRDOW
L0000076	0	0.56497E-02	549620.5	4143818.9	24.2	4.15	2.13	3.26	NO	SHRDOW
L0000077	0	0.56497E-02	549625.0	4143819.8	24.3	4.15	2.13	3.26	NO	SHRDOW
L0000078	0	0.56497E-02	549629.5	4143820.7	24.2	4.15	2.13	3.26	NO	SHRDOW
L0000079	0	0.56497E-02	549634.0	4143821.6	24.2	4.15	2.13	3.26	NO	SHRDOW
L0000080	0	0.56497E-02	549638.5	4143822.5	24.1	4.15	2.13	3.26	NO	SHRDOW

*** MODELOPTs: RegDFAULT CONC ELEV FLGPOL RURAL

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000081	0	0.56497E-02	549642.9	4143823.4	24.1	4.15	2.13	3.26	NO	SHRDOW
L0000082	0	0.56497E-02	549647.4	4143824.3	24.1	4.15	2.13	3.26	NO	SHRDOW
L0000083	0	0.56497E-02	549651.9	4143825.2	24.2	4.15	2.13	3.26	NO	SHRDOW
L0000084	0	0.56497E-02	549656.4	4143826.1	24.5	4.15	2.13	3.26	NO	SHRDOW
L0000085	0	0.56497E-02	549660.8	4143827.0	24.7	4.15	2.13	3.26	NO	SHRDOW
L0000086	0	0.56497E-02	549665.3	4143828.0	24.9	4.15	2.13	3.26	NO	SHRDOW
L0000087	0	0.56497E-02	549669.8	4143828.9	25.1	4.15	2.13	3.26	NO	SHRDOW
L0000088	0	0.56497E-02	549674.3	4143829.8	25.2	4.15	2.13	3.26	NO	SHRDOW
L0000089	0	0.56497E-02	549678.8	4143830.7	25.3	4.15	2.13	3.26	NO	SHRDOW
L0000090	0	0.56497E-02	549683.2	4143831.6	25.4	4.15	2.13	3.26	NO	SHRDOW
L0000091	0	0.56497E-02	549687.7	4143832.5	25.4	4.15	2.13	3.26	NO	SHRDOW
L0000092	0	0.56497E-02	549692.2	4143833.4	25.5	4.15	2.13	3.26	NO	SHRDOW
L0000093	0	0.56497E-02	549696.7	4143834.3	25.6	4.15	2.13	3.26	NO	SHRDOW
L0000094	0	0.56497E-02	549701.1	4143835.2	25.4	4.15	2.13	3.26	NO	SHRDOW
L0000095	0	0.56497E-02	549705.6	4143836.1	25.3	4.15	2.13	3.26	NO	SHRDOW
L0000096	0	0.56497E-02	549710.1	4143837.1	25.1	4.15	2.13	3.26	NO	SHRDOW
L0000097	0	0.56497E-02	549714.6	4143838.0	25.0	4.15	2.13	3.26	NO	SHRDOW
L0000098	0	0.56497E-02	549719.1	4143838.9	24.9	4.15	2.13	3.26	NO	SHRDOW
L0000099	0	0.56497E-02	549723.5	4143839.8	24.7	4.15	2.13	3.26	NO	SHRDOW
L0000100	0	0.56497E-02	549728.0	4143840.7	24.3	4.15	2.13	3.26	NO	SHRDOW
L0000101	0	0.56497E-02	549732.5	4143841.6	23.9	4.15	2.13	3.26	NO	SHRDOW
L0000102	0	0.56497E-02	549737.0	4143842.5	23.6	4.15	2.13	3.26	NO	SHRDOW
L0000103	0	0.56497E-02	549741.5	4143843.4	23.2	4.15	2.13	3.26	NO	SHRDOW
L0000104	0	0.56497E-02	549745.9	4143844.3	22.8	4.15	2.13	3.26	NO	SHRDOW
L0000105	0	0.56497E-02	549750.4	4143845.2	22.4	4.15	2.13	3.26	NO	SHRDOW
L0000106	0	0.56497E-02	549754.9	4143846.2	22.1	4.15	2.13	3.26	NO	SHRDOW
L0000107	0	0.56497E-02	549759.4	4143847.1	21.6	4.15	2.13	3.26	NO	SHRDOW
L0000108	0	0.56497E-02	549763.8	4143848.0	21.2	4.15	2.13	3.26	NO	SHRDOW
L0000109	0	0.56497E-02	549768.3	4143848.9	20.8	4.15	2.13	3.26	NO	SHRDOW
L0000110	0	0.56497E-02	549772.8	4143849.8	20.5	4.15	2.13	3.26	NO	SHRDOW
L0000111	0	0.56497E-02	549777.3	4143850.7	20.4	4.15	2.13	3.26	NO	SHRDOW
L0000112	0	0.56497E-02	549781.8	4143851.6	20.4	4.15	2.13	3.26	NO	SHRDOW
L0000113	0	0.56497E-02	549786.2	4143852.5	20.3	4.15	2.13	3.26	NO	SHRDOW
L0000114	0	0.56497E-02	549790.7	4143853.4	20.3	4.15	2.13	3.26	NO	SHRDOW
L0000115	0	0.56497E-02	549795.2	4143854.3	20.2	4.15	2.13	3.26	NO	SHRDOW
L0000116	0	0.56497E-02	549799.7	4143855.3	20.2	4.15	2.13	3.26	NO	SHRDOW
L0000117	0	0.56497E-02	549804.2	4143856.2	20.3	4.15	2.13	3.26	NO	SHRDOW
L0000118	0	0.56497E-02	549808.6	4143857.1	20.3	4.15	2.13	3.26	NO	SHRDOW
L0000119	0	0.56497E-02	549813.1	4143858.0	20.3	4.15	2.13	3.26	NO	SHRDOW
L0000120	0	0.56497E-02	549817.6	4143858.8	20.3	4.15	2.13	3.26	NO	SHRDOW

*** MODELOPTs: RegDFAULT CONC ELEV FLGPOL RURAL

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000121	0	0.56497E-02	549822.1	4143859.6	20.3	4.15	2.13	3.26	NO	SHRDOW
L0000122	0	0.56497E-02	549826.6	4143860.4	20.4	4.15	2.13	3.26	NO	SHRDOW
L0000123	0	0.56497E-02	549831.1	4143861.2	20.5	4.15	2.13	3.26	NO	SHRDOW
L0000124	0	0.56497E-02	549835.6	4143862.0	20.6	4.15	2.13	3.26	NO	SHRDOW
L0000125	0	0.56497E-02	549840.1	4143862.8	20.6	4.15	2.13	3.26	NO	SHRDOW
L0000126	0	0.56497E-02	549844.6	4143863.6	20.7	4.15	2.13	3.26	NO	SHRDOW
L0000127	0	0.56497E-02	549849.1	4143864.4	20.9	4.15	2.13	3.26	NO	SHRDOW
L0000128	0	0.56497E-02	549853.6	4143865.2	21.1	4.15	2.13	3.26	NO	SHRDOW
L0000129	0	0.56497E-02	549858.1	4143866.0	21.2	4.15	2.13	3.26	NO	SHRDOW
L0000130	0	0.56497E-02	549862.6	4143866.8	21.4	4.15	2.13	3.26	NO	SHRDOW
L0000131	0	0.56497E-02	549867.1	4143867.6	21.6	4.15	2.13	3.26	NO	SHRDOW
L0000132	0	0.56497E-02	549871.6	4143868.4	21.7	4.15	2.13	3.26	NO	SHRDOW
L0000133	0	0.56497E-02	549876.1	4143869.3	21.9	4.15	2.13	3.26	NO	SHRDOW
L0000134	0	0.56497E-02	549880.6	4143870.1	22.1	4.15	2.13	3.26	NO	SHRDOW
L0000135	0	0.56497E-02	549885.1	4143870.9	22.2	4.15	2.13	3.26	NO	SHRDOW
L0000136	0	0.56497E-02	549889.6	4143871.7	22.4	4.15	2.13	3.26	NO	SHRDOW
L0000137	0	0.56497E-02	549894.1	4143872.5	22.6	4.15	2.13	3.26	NO	SHRDOW
L0000138	0	0.56497E-02	549898.6	4143873.3	22.8	4.15	2.13	3.26	NO	SHRDOW
L0000139	0	0.56497E-02	549903.1	4143874.1	23.0	4.15	2.13	3.26	NO	SHRDOW
L0000140	0	0.56497E-02	549907.6	4143874.9	23.3	4.15	2.13	3.26	NO	SHRDOW
L0000141	0	0.56497E-02	549912.1	4143875.7	23.5	4.15	2.13	3.26	NO	SHRDOW
L0000142	0	0.56497E-02	549916.6	4143876.5	23.8	4.15	2.13	3.26	NO	SHRDOW
L0000143	0	0.56497E-02	549921.1	4143877.3	23.9	4.15	2.13	3.26	NO	SHRDOW
L0000144	0	0.56497E-02	549925.6	4143878.1	24.0	4.15	2.13	3.26	NO	SHRDOW
L0000145	0	0.56497E-02	549930.1	4143878.9	24.1	4.15	2.13	3.26	NO	SHRDOW
L0000146	0	0.56497E-02	549934.6	4143879.7	24.2	4.15	2.13	3.26	NO	SHRDOW
L0000147	0	0.56497E-02	549939.1	4143880.5	24.3	4.15	2.13	3.26	NO	SHRDOW
L0000148	0	0.56497E-02	549943.6	4143881.3	24.4	4.15	2.13	3.26	NO	SHRDOW
L0000149	0	0.56497E-02	549948.1	4143882.1	24.5	4.15	2.13	3.26	NO	SHRDOW
L0000150	0	0.56497E-02	549952.6	4143883.0	24.6	4.15	2.13	3.26	NO	SHRDOW
L0000151	0	0.56497E-02	549957.1	4143883.8	24.7	4.15	2.13	3.26	NO	SHRDOW
L0000152	0	0.56497E-02	549961.6	4143884.6	24.8	4.15	2.13	3.26	NO	SHRDOW
L0000153	0	0.56497E-02	549966.1	4143885.4	24.9	4.15	2.13	3.26	NO	SHRDOW
L0000154	0	0.56497E-02	549970.6	4143886.2	25.0	4.15	2.13	3.26	NO	SHRDOW
L0000155	0	0.56497E-02	549975.1	4143887.0	25.1	4.15	2.13	3.26	NO	SHRDOW
L0000156	0	0.56497E-02	549979.6	4143887.8	25.1	4.15	2.13	3.26	NO	SHRDOW
L0000157	0	0.56497E-02	549984.1	4143888.6	25.2	4.15	2.13	3.26	NO	SHRDOW
L0000158	0	0.56497E-02	549988.6	4143889.4	25.2	4.15	2.13	3.26	NO	SHRDOW
L0000159	0	0.56497E-02	549993.0	4143890.2	25.2	4.15	2.13	3.26	NO	SHRDOW
L0000160	0	0.56497E-02	549997.5	4143891.0	25.3	4.15	2.13	3.26	NO	SHRDOW

*** MODELOPTs: RegDFAULT CONC ELEV FLGPOL RURAL

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000161	0	0.56497E-02	550002.0	4143891.8	25.4	4.15	2.13	3.26	NO	SHRDOW
L0000162	0	0.56497E-02	550006.5	4143892.6	25.4	4.15	2.13	3.26	NO	SHRDOW
L0000163	0	0.56497E-02	550011.0	4143893.4	25.5	4.15	2.13	3.26	NO	SHRDOW
L0000164	0	0.56497E-02	550015.5	4143894.2	25.6	4.15	2.13	3.26	NO	SHRDOW
L0000165	0	0.56497E-02	550020.0	4143895.0	25.6	4.15	2.13	3.26	NO	SHRDOW
L0000166	0	0.56497E-02	550024.5	4143895.8	25.6	4.15	2.13	3.26	NO	SHRDOW
L0000167	0	0.56497E-02	550029.0	4143896.6	25.6	4.15	2.13	3.26	NO	SHRDOW
L0000168	0	0.56497E-02	550033.5	4143897.5	25.6	4.15	2.13	3.26	NO	SHRDOW
L0000169	0	0.56497E-02	550038.0	4143898.3	25.5	4.15	2.13	3.26	NO	SHRDOW
L0000170	0	0.56497E-02	550042.5	4143899.1	25.5	4.15	2.13	3.26	NO	SHRDOW
L0000171	0	0.56497E-02	550047.0	4143899.9	25.6	4.15	2.13	3.26	NO	SHRDOW
L0000172	0	0.56497E-02	550051.5	4143900.7	25.6	4.15	2.13	3.26	NO	SHRDOW
L0000173	0	0.56497E-02	550056.0	4143901.5	25.6	4.15	2.13	3.26	NO	SHRDOW
L0000174	0	0.56497E-02	550060.5	4143902.3	25.6	4.15	2.13	3.26	NO	SHRDOW
L0000175	0	0.56497E-02	550065.0	4143903.1	25.6	4.15	2.13	3.26	NO	SHRDOW
L0000176	0	0.56497E-02	550069.5	4143903.9	25.6	4.15	2.13	3.26	NO	SHRDOW
L0000177	0	0.56497E-02	550074.0	4143904.7	25.7	4.15	2.13	3.26	NO	SHRDOW

*** MODELOPTs: RegDFAULT CONC ELEV FLGPOL RURAL

*** AREAPOLY SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC /METER**2)	LOCATION OF AREA X (METERS)	LOCATION OF AREA Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	NUMBER OF VERTS.	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
1	0	0.11425E-03	549724.0	4143931.5	23.4	4.15	6	1.93	NO	SHRDOW

*** MODELOPTs: RegDFAULT CONC ELEV FLGPOL RURAL

*** SOURCE IDs DEFINING SOURCE GROUPS ***

SRCGROUP ID	SOURCE IDs							
ONSITE	1 ,							
OFFSITE	L0000001 ,	L0000002 ,	L0000003 ,	L0000004 ,	L0000005 ,	L0000006 ,	L0000007 ,	L0000008 ,
	L0000009 ,	L0000010 ,	L0000011 ,	L0000012 ,	L0000013 ,	L0000014 ,	L0000015 ,	L0000016 ,
	L0000017 ,	L0000018 ,	L0000019 ,	L0000020 ,	L0000021 ,	L0000022 ,	L0000023 ,	L0000024 ,
	L0000025 ,	L0000026 ,	L0000027 ,	L0000028 ,	L0000029 ,	L0000030 ,	L0000031 ,	L0000032 ,
	L0000033 ,	L0000034 ,	L0000035 ,	L0000036 ,	L0000037 ,	L0000038 ,	L0000039 ,	L0000040 ,
	L0000041 ,	L0000042 ,	L0000043 ,	L0000044 ,	L0000045 ,	L0000046 ,	L0000047 ,	L0000048 ,
	L0000049 ,	L0000050 ,	L0000051 ,	L0000052 ,	L0000053 ,	L0000054 ,	L0000055 ,	L0000056 ,
	L0000057 ,	L0000058 ,	L0000059 ,	L0000060 ,	L0000061 ,	L0000062 ,	L0000063 ,	L0000064 ,
	L0000065 ,	L0000066 ,	L0000067 ,	L0000068 ,	L0000069 ,	L0000070 ,	L0000071 ,	L0000072 ,
	L0000073 ,	L0000074 ,	L0000075 ,	L0000076 ,	L0000077 ,	L0000078 ,	L0000079 ,	L0000080 ,
	L0000081 ,	L0000082 ,	L0000083 ,	L0000084 ,	L0000085 ,	L0000086 ,	L0000087 ,	L0000088 ,
	L0000089 ,	L0000090 ,	L0000091 ,	L0000092 ,	L0000093 ,	L0000094 ,	L0000095 ,	L0000096 ,
	L0000097 ,	L0000098 ,	L0000099 ,	L0000100 ,	L0000101 ,	L0000102 ,	L0000103 ,	L0000104 ,
	L0000105 ,	L0000106 ,	L0000107 ,	L0000108 ,	L0000109 ,	L0000110 ,	L0000111 ,	L0000112 ,
	L0000113 ,	L0000114 ,	L0000115 ,	L0000116 ,	L0000117 ,	L0000118 ,	L0000119 ,	L0000120 ,
	L0000121 ,	L0000122 ,	L0000123 ,	L0000124 ,	L0000125 ,	L0000126 ,	L0000127 ,	L0000128 ,
	L0000129 ,	L0000130 ,	L0000131 ,	L0000132 ,	L0000133 ,	L0000134 ,	L0000135 ,	L0000136 ,
	L0000137 ,	L0000138 ,	L0000139 ,	L0000140 ,	L0000141 ,	L0000142 ,	L0000143 ,	L0000144 ,
	L0000145 ,	L0000146 ,	L0000147 ,	L0000148 ,	L0000149 ,	L0000150 ,	L0000151 ,	L0000152 ,

*** MODELOPTs: RegDFAULT CONC ELEV FLGPOL RURAL

*** SOURCE IDs DEFINING SOURCE GROUPS ***

SRCGROUP ID	SOURCE IDs
	L0000153 , L0000154 , L0000155 , L0000156 , L0000157 , L0000158 , L0000159 , L0000160 ,
	L0000161 , L0000162 , L0000163 , L0000164 , L0000165 , L0000166 , L0000167 , L0000168 ,
	L0000169 , L0000170 , L0000171 , L0000172 , L0000173 , L0000174 , L0000175 , L0000176 ,
	L0000177 ,

*** MODELOPTs: RegDFAULT CONC ELEV FLGPOL RURAL

* SOURCE EMISSION RATE SCALARS WHICH VARY SEASONALLY, DIURNALLY AND BY DAY OF WEEK (SHRDOW) *

SOURCE ID = 1 ; SOURCE TYPE = AREAPOLY :

HOUR	SCALAR	HOUR	SCALAR	HOUR	SCALAR	HOUR	SCALAR	HOUR	SCALAR	HOUR	SCALAR	HOUR	SCALAR	HOUR	SCALAR
SEASON = WINTER; DAY OF WEEK = WEEKDAY															
1	.0000E+00	2	.0000E+00	3	.0000E+00	4	.0000E+00	5	.0000E+00	6	.0000E+00	7	.0000E+00	8	.1000E+01
9	.1000E+01	10	.1000E+01	11	.1000E+01	12	.0000E+00	13	.1000E+01	14	.1000E+01	15	.1000E+01	16	.1000E+01
17	.0000E+00	18	.0000E+00	19	.0000E+00	20	.0000E+00	21	.0000E+00	22	.0000E+00	23	.0000E+00	24	.0000E+00
SEASON = SPRING; DAY OF WEEK = WEEKDAY															
1	.0000E+00	2	.0000E+00	3	.0000E+00	4	.0000E+00	5	.0000E+00	6	.0000E+00	7	.0000E+00	8	.1000E+01
9	.1000E+01	10	.1000E+01	11	.1000E+01	12	.0000E+00	13	.1000E+01	14	.1000E+01	15	.1000E+01	16	.1000E+01
17	.0000E+00	18	.0000E+00	19	.0000E+00	20	.0000E+00	21	.0000E+00	22	.0000E+00	23	.0000E+00	24	.0000E+00
SEASON = SUMMER; DAY OF WEEK = WEEKDAY															
1	.0000E+00	2	.0000E+00	3	.0000E+00	4	.0000E+00	5	.0000E+00	6	.0000E+00	7	.0000E+00	8	.1000E+01
9	.1000E+01	10	.1000E+01	11	.1000E+01	12	.0000E+00	13	.1000E+01	14	.1000E+01	15	.1000E+01	16	.1000E+01
17	.0000E+00	18	.0000E+00	19	.0000E+00	20	.0000E+00	21	.0000E+00	22	.0000E+00	23	.0000E+00	24	.0000E+00
SEASON = FALL ; DAY OF WEEK = WEEKDAY															
1	.0000E+00	2	.0000E+00	3	.0000E+00	4	.0000E+00	5	.0000E+00	6	.0000E+00	7	.0000E+00	8	.1000E+01
9	.1000E+01	10	.1000E+01	11	.1000E+01	12	.0000E+00	13	.1000E+01	14	.1000E+01	15	.1000E+01	16	.1000E+01
17	.0000E+00	18	.0000E+00	19	.0000E+00	20	.0000E+00	21	.0000E+00	22	.0000E+00	23	.0000E+00	24	.0000E+00
SEASON = WINTER; DAY OF WEEK = SATURDAY															
1	.0000E+00	2	.0000E+00	3	.0000E+00	4	.0000E+00	5	.0000E+00	6	.0000E+00	7	.0000E+00	8	.0000E+00
9	.0000E+00	10	.0000E+00	11	.0000E+00	12	.0000E+00	13	.0000E+00	14	.0000E+00	15	.0000E+00	16	.0000E+00
17	.0000E+00	18	.0000E+00	19	.0000E+00	20	.0000E+00	21	.0000E+00	22	.0000E+00	23	.0000E+00	24	.0000E+00
SEASON = SPRING; DAY OF WEEK = SATURDAY															
1	.0000E+00	2	.0000E+00	3	.0000E+00	4	.0000E+00	5	.0000E+00	6	.0000E+00	7	.0000E+00	8	.0000E+00
9	.0000E+00	10	.0000E+00	11	.0000E+00	12	.0000E+00	13	.0000E+00	14	.0000E+00	15	.0000E+00	16	.0000E+00
17	.0000E+00	18	.0000E+00	19	.0000E+00	20	.0000E+00	21	.0000E+00	22	.0000E+00	23	.0000E+00	24	.0000E+00
SEASON = SUMMER; DAY OF WEEK = SATURDAY															
1	.0000E+00	2	.0000E+00	3	.0000E+00	4	.0000E+00	5	.0000E+00	6	.0000E+00	7	.0000E+00	8	.0000E+00
9	.0000E+00	10	.0000E+00	11	.0000E+00	12	.0000E+00	13	.0000E+00	14	.0000E+00	15	.0000E+00	16	.0000E+00
17	.0000E+00	18	.0000E+00	19	.0000E+00	20	.0000E+00	21	.0000E+00	22	.0000E+00	23	.0000E+00	24	.0000E+00
SEASON = FALL ; DAY OF WEEK = SATURDAY															
1	.0000E+00	2	.0000E+00	3	.0000E+00	4	.0000E+00	5	.0000E+00	6	.0000E+00	7	.0000E+00	8	.0000E+00
9	.0000E+00	10	.0000E+00	11	.0000E+00	12	.0000E+00	13	.0000E+00	14	.0000E+00	15	.0000E+00	16	.0000E+00
17	.0000E+00	18	.0000E+00	19	.0000E+00	20	.0000E+00	21	.0000E+00	22	.0000E+00	23	.0000E+00	24	.0000E+00
SEASON = WINTER; DAY OF WEEK = SUNDAY															
1	.0000E+00	2	.0000E+00	3	.0000E+00	4	.0000E+00	5	.0000E+00	6	.0000E+00	7	.0000E+00	8	.0000E+00
9	.0000E+00	10	.0000E+00	11	.0000E+00	12	.0000E+00	13	.0000E+00	14	.0000E+00	15	.0000E+00	16	.0000E+00
17	.0000E+00	18	.0000E+00	19	.0000E+00	20	.0000E+00	21	.0000E+00	22	.0000E+00	23	.0000E+00	24	.0000E+00
SEASON = SPRING; DAY OF WEEK = SUNDAY															
1	.0000E+00	2	.0000E+00	3	.0000E+00	4	.0000E+00	5	.0000E+00	6	.0000E+00	7	.0000E+00	8	.0000E+00
9	.0000E+00	10	.0000E+00	11	.0000E+00	12	.0000E+00	13	.0000E+00	14	.0000E+00	15	.0000E+00	16	.0000E+00
17	.0000E+00	18	.0000E+00	19	.0000E+00	20	.0000E+00	21	.0000E+00	22	.0000E+00	23	.0000E+00	24	.0000E+00
SEASON = SUMMER; DAY OF WEEK = SUNDAY															

1	.0000E+00	2	.0000E+00	3	.0000E+00	4	.0000E+00	5	.0000E+00	6	.0000E+00	7	.0000E+00	8	.0000E+00
9	.0000E+00	10	.0000E+00	11	.0000E+00	12	.0000E+00	13	.0000E+00	14	.0000E+00	15	.0000E+00	16	.0000E+00
17	.0000E+00	18	.0000E+00	19	.0000E+00	20	.0000E+00	21	.0000E+00	22	.0000E+00	23	.0000E+00	24	.0000E+00

SEASON = FALL ; DAY OF WEEK = SUNDAY

1	.0000E+00	2	.0000E+00	3	.0000E+00	4	.0000E+00	5	.0000E+00	6	.0000E+00	7	.0000E+00	8	.0000E+00
9	.0000E+00	10	.0000E+00	11	.0000E+00	12	.0000E+00	13	.0000E+00	14	.0000E+00	15	.0000E+00	16	.0000E+00
17	.0000E+00	18	.0000E+00	19	.0000E+00	20	.0000E+00	21	.0000E+00	22	.0000E+00	23	.0000E+00	24	.0000E+00

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*** MODELOPTs:    RegDFAULT  CONC  ELEV  FLGPOL  RURAL

                * SOURCE EMISSION RATE SCALARS WHICH VARY SEASONALLY, DIURNALLY AND BY DAY OF WEEK (SHRDOW) *

SOURCE ID = L0000001 TO L0000177     ; SOURCE TYPE = VOLUME   :
 HOUR   SCALAR   HOUR   SCALAR   HOUR   SCALAR   HOUR   SCALAR   HOUR   SCALAR   HOUR   SCALAR   HOUR   SCALAR   HOUR   SCALAR
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
                                             SEASON = WINTER;  DAY OF WEEK = WEEKDAY
   1  .0000E+00    2  .0000E+00    3  .0000E+00    4  .0000E+00    5  .0000E+00    6  .0000E+00    7  .0000E+00    8  .1000E+01
   9  .1000E+01   10  .1000E+01   11  .1000E+01   12  .0000E+00   13  .1000E+01   14  .1000E+01   15  .1000E+01   16  .1000E+01
  17  .0000E+00   18  .0000E+00   19  .0000E+00   20  .0000E+00   21  .0000E+00   22  .0000E+00   23  .0000E+00   24  .0000E+00
                                             SEASON = SPRING;  DAY OF WEEK = WEEKDAY
   1  .0000E+00    2  .0000E+00    3  .0000E+00    4  .0000E+00    5  .0000E+00    6  .0000E+00    7  .0000E+00    8  .1000E+01
   9  .1000E+01   10  .1000E+01   11  .1000E+01   12  .0000E+00   13  .1000E+01   14  .1000E+01   15  .1000E+01   16  .1000E+01
  17  .0000E+00   18  .0000E+00   19  .0000E+00   20  .0000E+00   21  .0000E+00   22  .0000E+00   23  .0000E+00   24  .0000E+00
                                             SEASON = SUMMER;  DAY OF WEEK = WEEKDAY
   1  .0000E+00    2  .0000E+00    3  .0000E+00    4  .0000E+00    5  .0000E+00    6  .0000E+00    7  .0000E+00    8  .1000E+01
   9  .1000E+01   10  .1000E+01   11  .1000E+01   12  .0000E+00   13  .1000E+01   14  .1000E+01   15  .1000E+01   16  .1000E+01
  17  .0000E+00   18  .0000E+00   19  .0000E+00   20  .0000E+00   21  .0000E+00   22  .0000E+00   23  .0000E+00   24  .0000E+00
                                             SEASON =  FALL ;  DAY OF WEEK = WEEKDAY
   1  .0000E+00    2  .0000E+00    3  .0000E+00    4  .0000E+00    5  .0000E+00    6  .0000E+00    7  .0000E+00    8  .1000E+01
   9  .1000E+01   10  .1000E+01   11  .1000E+01   12  .0000E+00   13  .1000E+01   14  .1000E+01   15  .1000E+01   16  .1000E+01
  17  .0000E+00   18  .0000E+00   19  .0000E+00   20  .0000E+00   21  .0000E+00   22  .0000E+00   23  .0000E+00   24  .0000E+00
                                             SEASON = WINTER;  DAY OF WEEK = SATURDAY
   1  .0000E+00    2  .0000E+00    3  .0000E+00    4  .0000E+00    5  .0000E+00    6  .0000E+00    7  .0000E+00    8  .0000E+00
   9  .0000E+00   10  .0000E+00   11  .0000E+00   12  .0000E+00   13  .0000E+00   14  .0000E+00   15  .0000E+00   16  .0000E+00
  17  .0000E+00   18  .0000E+00   19  .0000E+00   20  .0000E+00   21  .0000E+00   22  .0000E+00   23  .0000E+00   24  .0000E+00
                                             SEASON = SPRING;  DAY OF WEEK = SATURDAY
   1  .0000E+00    2  .0000E+00    3  .0000E+00    4  .0000E+00    5  .0000E+00    6  .0000E+00    7  .0000E+00    8  .0000E+00
   9  .0000E+00   10  .0000E+00   11  .0000E+00   12  .0000E+00   13  .0000E+00   14  .0000E+00   15  .0000E+00   16  .0000E+00
  17  .0000E+00   18  .0000E+00   19  .0000E+00   20  .0000E+00   21  .0000E+00   22  .0000E+00   23  .0000E+00   24  .0000E+00
                                             SEASON = SUMMER;  DAY OF WEEK = SATURDAY
   1  .0000E+00    2  .0000E+00    3  .0000E+00    4  .0000E+00    5  .0000E+00    6  .0000E+00    7  .0000E+00    8  .0000E+00
   9  .0000E+00   10  .0000E+00   11  .0000E+00   12  .0000E+00   13  .0000E+00   14  .0000E+00   15  .0000E+00   16  .0000E+00
  17  .0000E+00   18  .0000E+00   19  .0000E+00   20  .0000E+00   21  .0000E+00   22  .0000E+00   23  .0000E+00   24  .0000E+00
                                             SEASON =  FALL ;  DAY OF WEEK = SATURDAY
   1  .0000E+00    2  .0000E+00    3  .0000E+00    4  .0000E+00    5  .0000E+00    6  .0000E+00    7  .0000E+00    8  .0000E+00
   9  .0000E+00   10  .0000E+00   11  .0000E+00   12  .0000E+00   13  .0000E+00   14  .0000E+00   15  .0000E+00   16  .0000E+00
  17  .0000E+00   18  .0000E+00   19  .0000E+00   20  .0000E+00   21  .0000E+00   22  .0000E+00   23  .0000E+00   24  .0000E+00
                                             SEASON = WINTER;  DAY OF WEEK = SUNDAY
   1  .0000E+00    2  .0000E+00    3  .0000E+00    4  .0000E+00    5  .0000E+00    6  .0000E+00    7  .0000E+00    8  .0000E+00
   9  .0000E+00   10  .0000E+00   11  .0000E+00   12  .0000E+00   13  .0000E+00   14  .0000E+00   15  .0000E+00   16  .0000E+00
  17  .0000E+00   18  .0000E+00   19  .0000E+00   20  .0000E+00   21  .0000E+00   22  .0000E+00   23  .0000E+00   24  .0000E+00
                                             SEASON = SPRING;  DAY OF WEEK = SUNDAY
   1  .0000E+00    2  .0000E+00    3  .0000E+00    4  .0000E+00    5  .0000E+00    6  .0000E+00    7  .0000E+00    8  .0000E+00
   9  .0000E+00   10  .0000E+00   11  .0000E+00   12  .0000E+00   13  .0000E+00   14  .0000E+00   15  .0000E+00   16  .0000E+00
  17  .0000E+00   18  .0000E+00   19  .0000E+00   20  .0000E+00   21  .0000E+00   22  .0000E+00   23  .0000E+00   24  .0000E+00
                                             SEASON = SUMMER;  DAY OF WEEK = SUNDAY
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1	.0000E+00	2	.0000E+00	3	.0000E+00	4	.0000E+00	5	.0000E+00	6	.0000E+00	7	.0000E+00	8	.0000E+00
9	.0000E+00	10	.0000E+00	11	.0000E+00	12	.0000E+00	13	.0000E+00	14	.0000E+00	15	.0000E+00	16	.0000E+00
17	.0000E+00	18	.0000E+00	19	.0000E+00	20	.0000E+00	21	.0000E+00	22	.0000E+00	23	.0000E+00	24	.0000E+00

SEASON = FALL ; DAY OF WEEK = SUNDAY

1	.0000E+00	2	.0000E+00	3	.0000E+00	4	.0000E+00	5	.0000E+00	6	.0000E+00	7	.0000E+00	8	.0000E+00
9	.0000E+00	10	.0000E+00	11	.0000E+00	12	.0000E+00	13	.0000E+00	14	.0000E+00	15	.0000E+00	16	.0000E+00
17	.0000E+00	18	.0000E+00	19	.0000E+00	20	.0000E+00	21	.0000E+00	22	.0000E+00	23	.0000E+00	24	.0000E+00

*** MODELOPTs: RegDFAULT CONC ELEV FLGPOL RURAL

*** DISCRETE CARTESIAN RECEPTORS ***
(X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)
(METERS)

```
( 549900.4, 4143839.7,      23.0,      23.0,       1.5);          ( 549916.3, 4143840.4,      23.6,      23.6,       1.5);
( 549937.9, 4143846.7,      24.2,      24.2,       1.5);          ( 549956.6, 4143850.9,      24.7,      24.7,       1.5);
( 549902.5, 4143811.4,      23.2,      23.2,       1.5);          ( 549920.4, 4143815.5,      23.9,      23.9,       1.5);
( 549941.8, 4143819.9,      24.3,      24.3,       1.5);          ( 549961.4, 4143821.0,      24.6,      24.6,       1.5);
( 549900.6, 4143838.9,      23.0,      23.0,       1.5);          ( 549973.1, 4143850.8,      25.0,      25.0,       1.5);
( 549979.2, 4143824.6,      24.7,      24.7,       1.5);          ( 549994.8, 4143854.3,      25.3,      25.3,       1.5);
( 549996.8, 4143828.1,      24.9,      24.9,       1.5);          ( 550016.9, 4143859.3,      25.3,      25.3,       1.5);
( 550021.0, 4143830.1,      25.1,      25.1,       1.5);          ( 550034.6, 4143862.9,      25.4,      25.4,       1.5);
( 550042.1, 4143834.2,      25.3,      25.3,       1.5);          ( 550052.7, 4143866.9,      25.5,      25.5,       1.5);
( 550061.2, 4143833.1,      25.4,      25.4,       1.5);          ( 550101.0, 4143880.5,      25.7,      25.7,       1.5);
( 550121.7, 4143884.5,      25.8,      25.8,       1.5);          ( 550062.7, 4143789.3,      25.0,      25.0,       1.5);
( 550044.1, 4143790.9,      25.0,      25.0,       1.5);          ( 550023.5, 4143790.3,      24.8,      24.8,       1.5);
( 549999.3, 4143787.8,      24.4,      24.4,       1.5);          ( 549979.7, 4143785.8,      24.1,      24.1,       1.5);
( 549965.1, 4143784.8,      23.9,      23.9,       1.5);          ( 549942.9, 4143776.8,      23.5,      23.5,       1.5);
( 549922.8, 4143771.2,      23.1,      23.1,       1.5);          ( 549904.1, 4143768.2,      22.3,      22.3,       1.5);
( 549884.0, 4143763.2,      21.4,      21.4,       1.5);          ( 549857.3, 4143766.7,      20.5,      20.5,       1.5);
( 549839.2, 4143758.1,      20.0,      20.0,       1.5);          ( 549866.9, 4143798.4,      21.2,      21.2,       1.5);
( 549868.0, 4143814.1,      21.5,      21.5,       1.5);          ( 549817.4, 4143748.6,      19.9,      19.9,       1.5);
( 549875.2, 4143612.7,      23.6,      23.6,       1.5);          ( 549897.5, 4143616.2,      24.5,      24.5,       1.5);
( 549914.2, 4143616.9,      24.7,      24.7,       1.5);          ( 549936.5, 4143615.5,      24.9,      24.9,       1.5);
( 549957.5, 4143609.2,      25.0,      25.0,       1.5);          ( 549910.1, 4143562.5,      25.8,      25.8,       1.5);
( 549957.5, 4143568.1,      25.9,      25.9,       1.5);          ( 549981.8, 4143566.0,      25.8,      25.8,       1.5);
( 549967.2, 4143612.0,      24.9,      24.9,       1.5);          ( 549984.6, 4143605.8,      25.0,      25.0,       1.5);
( 550007.6, 4143607.8,      24.8,      24.8,       1.5);          ( 549997.9, 4143560.5,      25.9,      25.9,       1.5);
( 550023.0, 4143566.0,      25.6,      25.6,       1.5);          ( 549915.6, 4143536.8,      26.0,      26.0,       1.5);
( 549905.2, 4143502.6,      25.5,      25.5,       1.5);          ( 549941.4, 4143520.0,      26.1,      26.1,       1.5);
( 549944.2, 4143538.2,      26.3,      26.3,       1.5);          ( 549866.9, 4143490.8,      25.4,      25.4,       1.5);
( 549910.8, 4143492.9,      25.4,      25.4,       1.5);          ( 549943.5, 4143478.2,      25.2,      25.2,       1.5);
( 549981.1, 4143478.9,      25.2,      25.2,       1.5);          ( 549982.5, 4143519.3,      26.3,      26.3,       1.5);
( 550023.7, 4143522.1,      26.6,      26.6,       1.5);          ( 550024.4, 4143541.6,      26.3,      26.3,       1.5);
( 550000.7, 4143474.0,      25.4,      25.4,       1.5);          ( 550033.4, 4143601.6,      24.9,      24.9,       1.5);
( 550043.9, 4143598.1,      25.0,      25.0,       1.5);          ( 550066.9, 4143600.9,      25.1,      25.1,       1.5);
( 550082.2, 4143596.0,      25.2,      25.2,       1.5);          ( 550097.5, 4143594.6,      25.4,      25.4,       1.5);
( 550115.6, 4143595.3,      25.7,      25.7,       1.5);          ( 550063.4, 4143547.9,      25.9,      25.9,       1.5);
( 550080.1, 4143550.0,      25.9,      25.9,       1.5);          ( 550097.5, 4143547.9,      26.1,      26.1,       1.5);
( 550118.4, 4143545.1,      26.4,      26.4,       1.5);          ( 550064.1, 4143517.2,      26.8,      26.8,       1.5);
( 550082.2, 4143511.7,      26.9,      26.9,       1.5);          ( 550092.7, 4143515.9,      26.8,      26.8,       1.5);
( 550113.6, 4143520.7,      26.7,      26.7,       1.5);          ( 550080.8, 4143470.6,      27.2,      27.2,       1.5);
( 550089.9, 4143473.3,      27.2,      27.2,       1.5);          ( 549820.6, 4143455.2,      25.0,      25.0,       1.5);
( 549820.6, 4143423.3,      23.9,      23.9,       1.5);          ( 549801.3, 4143454.3,      24.6,      24.6,       1.5);
( 549799.6, 4143411.5,      23.6,      23.6,       1.5);          ( 549762.7, 4143458.5,      23.5,      23.5,       1.5);
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(549767.7,	4143424.9,	23.2,	23.2,	1.5);	(549735.8,	4143451.8,	22.5,	22.5,	1.5);
(549737.5,	4143434.2,	22.5,	22.5,	1.5);	(549755.1,	4143377.1,	21.8,	21.8,	1.5);
(549719.9,	4143418.2,	22.1,	22.1,	1.5);	(549713.1,	4143444.3,	21.6,	21.6,	1.5);
(549730.8,	4143373.7,	21.3,	21.3,	1.5);	(549705.6,	4143366.2,	20.9,	20.9,	1.5);

*** MODELOPTs: RegDFAULT CONC ELEV FLGPOL RURAL

*** DISCRETE CARTESIAN RECEPTORS ***
(X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)
(METERS)

(549690.5,	4143408.1,	21.3,	21.3,	1.5);	(549681.2,	4143440.9,	20.9,	20.9,	1.5);
(549666.9,	4143433.3,	20.7,	20.7,	1.5);	(549669.5,	4143398.1,	20.9,	20.9,	1.5);
(549683.7,	4143358.6,	20.6,	20.6,	1.5);	(549660.2,	4143351.9,	20.1,	20.1,	1.5);
(549646.8,	4143391.3,	20.3,	20.3,	1.5);	(549638.4,	4143419.9,	20.3,	20.3,	1.5);
(549615.7,	4143403.9,	19.9,	19.9,	1.5);	(549595.6,	4143388.0,	19.4,	19.4,	1.5);
(549644.3,	4143347.7,	19.8,	19.8,	1.5);	(549604.8,	4143351.0,	19.1,	19.1,	1.5);
(549584.6,	4143343.5,	16.1,	19.4,	1.5);	(549576.2,	4143360.3,	16.8,	16.8,	1.5);
(549628.3,	4143384.6,	20.0,	20.0,	1.5);	(549303.5,	4143548.7,	15.3,	15.3,	1.5);
(549278.6,	4143547.9,	14.5,	14.5,	1.5);	(549489.8,	4143507.7,	13.7,	19.1,	1.5);
(549495.5,	4143492.4,	11.8,	19.1,	1.5);	(549496.7,	4143479.8,	10.5,	19.1,	1.5);
(549493.1,	4143445.3,	9.1,	19.1,	1.5);	(549482.1,	4143435.5,	9.1,	19.1,	1.5);
(549477.1,	4143419.8,	9.1,	19.0,	1.5);	(549850.8,	4143438.3,	24.5,	24.5,	1.5);
(549871.6,	4143450.9,	24.7,	24.7,	1.5);	(549868.7,	4143484.4,	25.3,	25.3,	1.5);
(550020.1,	4143476.9,	25.9,	25.9,	1.5);	(550051.9,	4143466.1,	26.6,	26.6,	1.5);
(550113.3,	4143468.8,	27.5,	27.5,	1.5);	(550137.6,	4143468.8,	27.7,	27.7,	1.5);
(550145.7,	4143488.7,	27.3,	27.3,	1.5);	(550145.7,	4143509.7,	27.1,	27.1,	1.5);
(550135.4,	4143542.6,	26.5,	26.5,	1.5);	(550155.9,	4143537.8,	26.7,	26.7,	1.5);
(550171.0,	4143527.5,	27.0,	27.0,	1.5);	(550134.3,	4143587.9,	25.9,	25.9,	1.5);
(550148.9,	4143584.6,	26.0,	26.0,	1.5);	(550172.6,	4143575.5,	26.2,	26.2,	1.5);
(550183.4,	4143574.4,	26.4,	26.4,	1.5);	(550207.1,	4143569.0,	26.6,	26.6,	1.5);
(550191.5,	4143521.0,	27.3,	27.3,	1.5);	(550204.9,	4143522.1,	27.4,	27.4,	1.5);
(550193.6,	4143488.7,	28.0,	28.0,	1.5);	(550176.4,	4143440.8,	28.8,	28.8,	1.5);
(550192.5,	4143438.1,	29.0,	29.0,	1.5);	(550051.9,	4143418.7,	26.3,	26.3,	1.5);
(550078.3,	4143418.7,	27.2,	27.2,	1.5);	(550105.8,	4143410.6,	28.0,	28.0,	1.5);
(550130.6,	4143406.3,	28.7,	28.7,	1.5);	(550145.1,	4143412.7,	28.9,	28.9,	1.5);
(550161.3,	4143402.5,	29.4,	29.4,	1.5);	(550176.4,	4143400.3,	29.7,	29.7,	1.5);
(550201.2,	4143403.6,	29.9,	29.9,	1.5);	(550010.4,	4143352.4,	25.7,	25.7,	1.5);
(550070.8,	4143351.3,	26.8,	26.8,	1.5);	(550188.1,	4143773.9,	25.1,	25.1,	1.5);
(550205.2,	4143788.7,	25.2,	25.2,	1.5);	(550209.5,	4143810.9,	25.4,	25.4,	1.5);
(550212.6,	4143833.5,	25.7,	25.7,	1.5);	(550207.6,	4143855.3,	25.9,	25.9,	1.5);
(550200.6,	4143873.2,	25.8,	25.8,	1.5);	(550224.3,	4143746.2,	24.9,	24.9,	1.5);
(550193.3,	4143902.7,	26.0,	26.0,	1.5);	(550226.2,	4143905.3,	26.1,	26.1,	1.5);
(549900.4,	4143839.7,	23.0,	23.0,	6.1);	(549916.3,	4143840.4,	23.6,	23.6,	6.1);
(549937.9,	4143846.7,	24.2,	24.2,	6.1);	(549956.6,	4143850.9,	24.7,	24.7,	6.1);
(549902.5,	4143811.4,	23.2,	23.2,	6.1);	(549920.4,	4143815.5,	23.9,	23.9,	6.1);

(549941.8,	4143819.9,	24.3,	24.3,	6.1);	(549961.4,	4143821.0,	24.6,	24.6,	6.1);
(549900.6,	4143838.9,	23.0,	23.0,	6.1);	(549973.1,	4143850.8,	25.0,	25.0,	6.1);
(549979.2,	4143824.6,	24.7,	24.7,	6.1);	(549994.8,	4143854.3,	25.3,	25.3,	6.1);
(549996.8,	4143828.1,	24.9,	24.9,	6.1);	(550016.9,	4143859.3,	25.3,	25.3,	6.1);
(550021.0,	4143830.1,	25.1,	25.1,	6.1);	(550034.6,	4143862.9,	25.4,	25.4,	6.1);
(550042.1,	4143834.2,	25.3,	25.3,	6.1);	(550052.7,	4143866.9,	25.5,	25.5,	6.1);
(550061.2,	4143833.1,	25.4,	25.4,	6.1);	(550101.0,	4143880.5,	25.7,	25.7,	6.1);
(550121.7,	4143884.5,	25.8,	25.8,	6.1);	(550062.7,	4143789.3,	25.0,	25.0,	6.1);
(550044.1,	4143790.9,	25.0,	25.0,	6.1);	(550023.5,	4143790.3,	24.8,	24.8,	6.1);
(549999.3,	4143787.8,	24.4,	24.4,	6.1);	(549979.7,	4143785.8,	24.1,	24.1,	6.1);

*** MODELOPTs: RegDFAULT CONC ELEV FLGPOL RURAL

*** DISCRETE CARTESIAN RECEPTORS ***
(X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)
(METERS)

(549965.1,	4143784.8,	23.9,	23.9,	6.1);	(549942.9,	4143776.8,	23.5,	23.5,	6.1);
(549922.8,	4143771.2,	23.1,	23.1,	6.1);	(549904.1,	4143768.2,	22.3,	22.3,	6.1);
(549884.0,	4143763.2,	21.4,	21.4,	6.1);	(549857.3,	4143766.7,	20.5,	20.5,	6.1);
(549839.2,	4143758.1,	20.0,	20.0,	6.1);	(549866.9,	4143798.4,	21.2,	21.2,	6.1);
(549868.0,	4143814.1,	21.5,	21.5,	6.1);	(549817.4,	4143748.6,	19.9,	19.9,	6.1);
(549875.2,	4143612.7,	23.6,	23.6,	6.1);	(549897.5,	4143616.2,	24.5,	24.5,	6.1);
(549914.2,	4143616.9,	24.7,	24.7,	6.1);	(549936.5,	4143615.5,	24.9,	24.9,	6.1);
(549957.5,	4143609.2,	25.0,	25.0,	6.1);	(549910.1,	4143562.5,	25.8,	25.8,	6.1);
(549957.5,	4143568.1,	25.9,	25.9,	6.1);	(549981.8,	4143566.0,	25.8,	25.8,	6.1);
(549967.2,	4143612.0,	24.9,	24.9,	6.1);	(549984.6,	4143605.8,	25.0,	25.0,	6.1);
(550007.6,	4143607.8,	24.8,	24.8,	6.1);	(549997.9,	4143560.5,	25.9,	25.9,	6.1);
(550023.0,	4143566.0,	25.6,	25.6,	6.1);	(549915.6,	4143536.8,	26.0,	26.0,	6.1);
(549905.2,	4143502.6,	25.5,	25.5,	6.1);	(549941.4,	4143520.0,	26.1,	26.1,	6.1);
(549944.2,	4143538.2,	26.3,	26.3,	6.1);	(549866.9,	4143490.8,	25.4,	25.4,	6.1);
(549910.8,	4143492.9,	25.4,	25.4,	6.1);	(549943.5,	4143478.2,	25.2,	25.2,	6.1);
(549981.1,	4143478.9,	25.2,	25.2,	6.1);	(549982.5,	4143519.3,	26.3,	26.3,	6.1);
(550023.7,	4143522.1,	26.6,	26.6,	6.1);	(550024.4,	4143541.6,	26.3,	26.3,	6.1);
(550000.7,	4143474.0,	25.4,	25.4,	6.1);	(550033.4,	4143601.6,	24.9,	24.9,	6.1);
(550043.9,	4143598.1,	25.0,	25.0,	6.1);	(550066.9,	4143600.9,	25.1,	25.1,	6.1);
(550082.2,	4143596.0,	25.2,	25.2,	6.1);	(550097.5,	4143594.6,	25.4,	25.4,	6.1);
(550115.6,	4143595.3,	25.7,	25.7,	6.1);	(550063.4,	4143547.9,	25.9,	25.9,	6.1);
(550080.1,	4143550.0,	25.9,	25.9,	6.1);	(550097.5,	4143547.9,	26.1,	26.1,	6.1);
(550118.4,	4143545.1,	26.4,	26.4,	6.1);	(550064.1,	4143517.2,	26.8,	26.8,	6.1);
(550082.2,	4143511.7,	26.9,	26.9,	6.1);	(550092.7,	4143515.9,	26.8,	26.8,	6.1);
(550113.6,	4143520.7,	26.7,	26.7,	6.1);	(550080.8,	4143470.6,	27.2,	27.2,	6.1);
(550089.9,	4143473.3,	27.2,	27.2,	6.1);	(549820.6,	4143455.2,	25.0,	25.0,	6.1);
(549820.6,	4143423.3,	23.9,	23.9,	6.1);	(549801.3,	4143454.3,	24.6,	24.6,	6.1);
(549799.6,	4143411.5,	23.6,	23.6,	6.1);	(549762.7,	4143458.5,	23.5,	23.5,	6.1);
(549767.7,	4143424.9,	23.2,	23.2,	6.1);	(549735.8,	4143451.8,	22.5,	22.5,	6.1);

(549737.5,	4143434.2,	22.5,	22.5,	6.1);	(549755.1,	4143377.1,	21.8,	21.8,	6.1);
(549719.9,	4143418.2,	22.1,	22.1,	6.1);	(549713.1,	4143444.3,	21.6,	21.6,	6.1);
(549730.8,	4143373.7,	21.3,	21.3,	6.1);	(549705.6,	4143366.2,	20.9,	20.9,	6.1);
(549690.5,	4143408.1,	21.3,	21.3,	6.1);	(549681.2,	4143440.9,	20.9,	20.9,	6.1);
(549666.9,	4143433.3,	20.7,	20.7,	6.1);	(549669.5,	4143398.1,	20.9,	20.9,	6.1);
(549683.7,	4143358.6,	20.6,	20.6,	6.1);	(549660.2,	4143351.9,	20.1,	20.1,	6.1);
(549646.8,	4143391.3,	20.3,	20.3,	6.1);	(549638.4,	4143419.9,	20.3,	20.3,	6.1);
(549615.7,	4143403.9,	19.9,	19.9,	6.1);	(549595.6,	4143388.0,	19.4,	19.4,	6.1);
(549644.3,	4143347.7,	19.8,	19.8,	6.1);	(549604.8,	4143351.0,	19.1,	19.1,	6.1);
(549584.6,	4143343.5,	16.1,	19.4,	6.1);	(549576.2,	4143360.3,	16.8,	16.8,	6.1);
(549628.3,	4143384.6,	20.0,	20.0,	6.1);	(549303.5,	4143548.7,	15.3,	15.3,	6.1);
(549278.6,	4143547.9,	14.5,	14.5,	6.1);	(549489.8,	4143507.7,	13.7,	19.1,	6.1);
(549495.5,	4143492.4,	11.8,	19.1,	6.1);	(549496.7,	4143479.8,	10.5,	19.1,	6.1);
(549493.1,	4143445.3,	9.1,	19.1,	6.1);	(549482.1,	4143435.5,	9.1,	19.1,	6.1);
(549477.1,	4143419.8,	9.1,	19.0,	6.1);	(549850.8,	4143438.3,	24.5,	24.5,	6.1);
(549871.6,	4143450.9,	24.7,	24.7,	6.1);	(549868.7,	4143484.4,	25.3,	25.3,	6.1);

*** DISCRETE CARTESIAN RECEPTORS ***
(X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)
(METERS)

(550020.1,	4143476.9,	25.9,	25.9,	6.1);	(550051.9,	4143466.1,	26.6,	26.6,	6.1);
(550113.3,	4143468.8,	27.5,	27.5,	6.1);	(550137.6,	4143468.8,	27.7,	27.7,	6.1);
(550145.7,	4143488.7,	27.3,	27.3,	6.1);	(550145.7,	4143509.7,	27.1,	27.1,	6.1);
(550135.4,	4143542.6,	26.5,	26.5,	6.1);	(550155.9,	4143537.8,	26.7,	26.7,	6.1);
(550171.0,	4143527.5,	27.0,	27.0,	6.1);	(550134.3,	4143587.9,	25.9,	25.9,	6.1);
(550148.9,	4143584.6,	26.0,	26.0,	6.1);	(550172.6,	4143575.5,	26.2,	26.2,	6.1);
(550183.4,	4143574.4,	26.4,	26.4,	6.1);	(550207.1,	4143569.0,	26.6,	26.6,	6.1);
(550191.5,	4143521.0,	27.3,	27.3,	6.1);	(550204.9,	4143522.1,	27.4,	27.4,	6.1);
(550193.6,	4143488.7,	28.0,	28.0,	6.1);	(550176.4,	4143440.8,	28.8,	28.8,	6.1);
(550192.5,	4143438.1,	29.0,	29.0,	6.1);	(550051.9,	4143418.7,	26.3,	26.3,	6.1);
(550078.3,	4143418.7,	27.2,	27.2,	6.1);	(550105.8,	4143410.6,	28.0,	28.0,	6.1);
(550130.6,	4143406.3,	28.7,	28.7,	6.1);	(550145.1,	4143412.7,	28.9,	28.9,	6.1);
(550161.3,	4143402.5,	29.4,	29.4,	6.1);	(550176.4,	4143400.3,	29.7,	29.7,	6.1);
(550201.2,	4143403.6,	29.9,	29.9,	6.1);	(550010.4,	4143352.4,	25.7,	25.7,	6.1);
(550070.8,	4143351.3,	26.8,	26.8,	6.1);	(550188.1,	4143773.9,	25.1,	25.1,	6.1);
(550205.2,	4143788.7,	25.2,	25.2,	6.1);	(550209.5,	4143810.9,	25.4,	25.4,	6.1);
(550212.6,	4143833.5,	25.7,	25.7,	6.1);	(550207.6,	4143855.3,	25.9,	25.9,	6.1);
(550200.6,	4143873.2,	25.8,	25.8,	6.1);	(550224.3,	4143746.2,	24.9,	24.9,	6.1);
(550193.3,	4143902.7,	26.0,	26.0,	6.1);	(550226.2,	4143905.3,	26.1,	26.1,	6.1);

*** MODELOPTs: RegDFAULT CONC ELEV FLGPOL RURAL

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
(1=YES; 0=NO)

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1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1
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NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
(METERS/SEC)

1.54,   3.09,   5.14,   8.23, 10.80,

*** MODELOPTs: RegDFAULT CONC ELEV FLGPOL RURAL

*** UP TO THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

Surface file: met data- 1.5 m\724938\724938.SFC Met Version: 14134
Profile file: met data- 1.5 m\724938\724938.PFL
Surface format: FREE
Profile format: FREE
Surface station no.: 93231 Upper air station no.: 23230
Name: UNKNOWN Name: OAKLAND/WSO_AP
Year: 2009 Year: 2009

First 24 hours of scalar data

YR	MO	DY	JDY	HR	H0	U*	W*	DT/DZ	ZICNV	ZIMCH	M-O LEN	Z0	BOWEN	ALBEDO	REF WS	WD	HT	REF TA	HT
09	01	01	1	01	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.04	0.55	1.00	999.00	999.	-9.0	999.0	-9.0
09	01	01	1	02	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.04	0.55	1.00	999.00	999.	-9.0	999.0	-9.0
09	01	01	1	03	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.04	0.55	1.00	999.00	999.	-9.0	999.0	-9.0
09	01	01	1	04	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.04	0.55	1.00	999.00	999.	-9.0	999.0	-9.0
09	01	01	1	05	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.04	0.55	1.00	999.00	999.	-9.0	999.0	-9.0
09	01	01	1	06	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.04	0.55	1.00	999.00	999.	-9.0	999.0	-9.0
09	01	01	1	07	-3.0	0.063	-9.000	-9.000	-999.	38.	7.5	0.04	0.55	1.00	1.76	5.	10.0	281.1	2.0
09	01	01	1	08	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.04	0.55	0.74	0.00	0.	10.0	280.1	2.0
09	01	01	1	09	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.04	0.55	0.38	999.00	999.	-9.0	280.1	2.0
09	01	01	1	10	5.5	0.179	0.236	0.014	87.	181.	-95.0	0.04	0.55	0.26	2.36	61.	10.0	280.1	2.0
09	01	01	1	11	12.1	-9.000	-9.000	-9.000	156.	-999.	-99999.0	0.04	0.55	0.21	0.00	0.	10.0	280.1	2.0
09	01	01	1	12	16.0	0.328	0.455	0.016	215.	451.	-201.4	0.04	0.55	0.20	4.36	336.	10.0	281.1	2.0
09	01	01	1	13	16.6	0.226	0.493	0.015	262.	263.	-63.2	0.04	0.55	0.19	2.86	293.	10.0	281.1	2.0
09	01	01	1	14	69.0	-9.000	-9.000	-9.000	402.	-999.	-99999.0	0.04	0.55	0.20	0.00	0.	10.0	282.1	2.0
09	01	01	1	15	49.6	0.205	0.847	0.017	445.	223.	-15.9	0.04	0.55	0.23	2.36	999.	10.0	283.1	2.0
09	01	01	1	16	18.0	0.192	0.607	0.016	451.	202.	-35.7	0.04	0.55	0.31	2.36	999.	10.0	283.1	2.0
09	01	01	1	17	-17.1	0.203	-9.000	-9.000	-999.	220.	44.6	0.04	0.55	0.55	3.36	999.	10.0	282.1	2.0
09	01	01	1	18	-11.3	0.104	-9.000	-9.000	-999.	86.	9.1	0.04	0.55	1.00	2.86	337.	10.0	282.1	2.0
09	01	01	1	19	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.04	0.55	1.00	0.00	0.	10.0	281.1	2.0
09	01	01	1	20	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.04	0.55	1.00	0.00	0.	10.0	281.1	2.0
09	01	01	1	21	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.04	0.55	1.00	0.00	0.	10.0	280.1	2.0
09	01	01	1	22	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.04	0.55	1.00	999.00	999.	-9.0	999.0	-9.0
09	01	01	1	23	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.04	0.55	1.00	999.00	999.	-9.0	999.0	-9.0
09	01	01	1	24	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.04	0.55	1.00	999.00	999.	-9.0	999.0	-9.0

First hour of profile data

YR	MO	DY	HR	HEIGHT	F	WDIR	WSPD	AMB_TMP	sigmaA	sigmaW	sigmaV
09	01	01	01	10.0	1	-999.	-99.00	-999.0	99.0	-99.00	-99.00

F indicates top of profile (=1) or below (=0)

*** MODELOPTs: RegDFAULT CONC ELEV FLGPOL RURAL

*** THE PERIOD (43872 HRS) AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ONSITE ***
INCLUDING SOURCE(S): 1 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC	
549900.35	4143839.74	3.23104	549916.27	4143840.40	2.79722	
549937.86	4143846.72	2.31984	549956.62	4143850.86	1.99000	
549902.53	4143811.39	3.07459	549920.41	4143815.53	2.66323	
549941.79	4143819.90	2.26379	549961.41	4143820.99	1.96262	
549900.57	4143838.94	3.22457	549973.12	4143850.77	1.76361	
549979.16	4143824.59	1.73744	549994.77	4143854.30	1.51023	
549996.78	4143828.12	1.54588	550016.92	4143859.33	1.29752	
550020.95	4143830.13	1.32821	550034.55	4143862.86	1.15768	
550042.10	4143834.16	1.16889	550052.67	4143866.89	1.03342	
550061.23	4143833.15	1.05209	550101.01	4143880.48	0.77339	
550121.65	4143884.51	0.69293	550062.74	4143789.35	1.05287	
550044.11	4143790.86	1.16179	550023.47	4143790.35	1.30149	
549999.30	4143787.84	1.49344	549979.66	4143785.82	1.67791	
549965.06	4143784.81	1.83703	549942.91	4143776.76	2.08885	
549922.77	4143771.22	2.36407	549904.14	4143768.20	2.68550	
549884.00	4143763.16	3.04310	549857.31	4143766.69	3.77610	
549839.18	4143758.13	4.12556	549866.88	4143798.41	4.05424	
549867.97	4143814.14	4.24155	549817.37	4143748.62	4.58007	(MER LOCATION)
549875.21	4143612.73	1.46762	549897.51	4143616.21	1.35796	
549914.24	4143616.91	1.27532	549936.54	4143615.52	1.16459	
549957.45	4143609.24	1.05195	549910.06	4143562.55	1.00563	
549957.45	4143568.13	0.89010	549981.84	4143566.04	0.82038	
549967.20	4143612.03	1.02792	549984.63	4143605.76	0.94371	
550007.62	4143607.85	0.87798	549997.87	4143560.46	0.76637	
550022.96	4143566.04	0.72689	549915.63	4143536.77	0.88163	
549905.18	4143502.62	0.79009	549941.42	4143520.04	0.76730	
549944.21	4143538.16	0.81766	549866.85	4143490.77	0.84496	
549910.75	4143492.86	0.74838	549943.51	4143478.23	0.65168	
549981.14	4143478.92	0.60057	549982.54	4143519.34	0.68759	
550023.65	4143522.13	0.62437	550024.35	4143541.64	0.66584	
550000.66	4143474.04	0.56468	550033.41	4143601.58	0.78637	
550043.86	4143598.09	0.75024	550066.86	4143600.88	0.69726	
550082.19	4143596.00	0.65219	550097.53	4143594.61	0.61575	
550115.64	4143595.31	0.57847	550063.38	4143547.92	0.61062	
550080.10	4143550.01	0.58457	550097.53	4143547.92	0.55149	
550118.43	4143545.13	0.51388	550064.07	4143517.25	0.55488	
550082.19	4143511.68	0.52138	550092.65	4143515.86	0.51387	

550113.55	4143520.74	0.49248	550080.80	4143470.56	0.45882
550089.86	4143473.35	0.45374	549820.63	4143455.18	0.82008
549820.63	4143423.26	0.72298	549801.31	4143454.34	0.85524

*** MODELOPTs: RegDFAULT CONC ELEV FLGPOL RURAL

*** THE PERIOD (43872 HRS) AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ONSITE ***
INCLUDING SOURCE(S): 1 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
549799.63	4143411.51	0.72060	549762.68	4143458.54	0.96105
549767.72	4143424.94	0.81765	549735.80	4143451.82	0.99583
549737.48	4143434.18	0.91175	549755.12	4143377.07	0.68652
549719.85	4143418.22	0.87148	549713.13	4143444.26	0.99920
549730.76	4143373.71	0.70288	549705.57	4143366.16	0.70245
549690.45	4143408.15	0.86345	549681.22	4143440.90	1.02474
549666.94	4143433.34	1.00012	549669.46	4143398.07	0.84088
549683.73	4143358.60	0.69571	549660.22	4143351.88	0.69009
549646.78	4143391.35	0.82983	549638.38	4143419.90	0.95489
549615.71	4143403.95	0.89114	549595.55	4143387.99	0.82623
549644.26	4143347.68	0.68564	549604.79	4143351.04	0.70583
549584.64	4143343.48	0.68031	549576.24	4143360.28	0.72467
549628.31	4143384.63	0.81278	549303.52	4143548.69	0.32761
549278.61	4143547.91	0.27578	549489.76	4143507.73	1.02117
549495.49	4143492.43	0.98535	549496.69	4143479.75	0.93971
549493.10	4143445.33	0.81044	549482.11	4143435.53	0.74823
549477.08	4143419.75	0.69501	549850.81	4143438.29	0.71819
549871.62	4143450.95	0.71528	549868.69	4143484.40	0.81910
550020.11	4143476.86	0.54425	550051.90	4143466.08	0.48856
550113.32	4143468.78	0.42539	550137.57	4143468.78	0.40351
550145.65	4143488.71	0.41595	550145.65	4143509.73	0.43533
550135.41	4143542.60	0.48512	550155.89	4143537.75	0.45138
550170.98	4143527.51	0.41862	550134.34	4143587.86	0.53425
550148.89	4143584.62	0.50563	550172.59	4143575.46	0.45998
550183.37	4143574.39	0.44353	550207.08	4143569.00	0.40824
550191.45	4143521.04	0.38899	550204.92	4143522.12	0.37419
550193.61	4143488.71	0.36492	550176.37	4143440.76	0.34406
550192.53	4143438.06	0.32984	550051.90	4143418.66	0.42175
550078.30	4143418.66	0.39409	550105.78	4143410.58	0.36354
550130.56	4143406.27	0.34181	550145.11	4143412.74	0.33897
550161.28	4143402.50	0.31956	550176.37	4143400.34	0.30926
550201.15	4143403.58	0.29822	550010.41	4143352.39	0.36914
550070.76	4143351.31	0.33218	550188.09	4143773.90	0.59454
550205.22	4143788.69	0.55486	550209.50	4143810.88	0.54121
550212.62	4143833.46	0.52488	550207.56	4143855.26	0.51855
550200.55	4143873.17	0.51294	550224.30	4143746.25	0.51489
550193.32	4143902.66	0.48278	550226.19	4143905.35	0.42305

549900.35	4143839.74	3.00161	549916.27	4143840.40	2.60446
549937.86	4143846.72	2.16866	549956.62	4143850.86	1.86586
549902.53	4143811.39	2.84853	549920.41	4143815.53	2.47246

*** MODELOPTs: RegDFAULT CONC ELEV FLGPOL RURAL

*** THE PERIOD (43872 HRS) AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ONSITE ***
INCLUDING SOURCE(S): 1 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
549941.79	4143819.90	2.11030	549961.41	4143820.99	1.83600
549900.57	4143838.94	2.99529	549973.12	4143850.77	1.65748
549979.16	4143824.59	1.63114	549994.77	4143854.30	1.42434
549996.78	4143828.12	1.45610	550016.92	4143859.33	1.22831
550020.95	4143830.13	1.25538	550034.55	4143862.86	1.09871
550042.10	4143834.16	1.10809	550052.67	4143866.89	0.98300
550061.23	4143833.15	0.99927	550101.01	4143880.48	0.73945
550121.65	4143884.51	0.66366	550062.74	4143789.35	0.99360
550044.11	4143790.86	1.09441	550023.47	4143790.35	1.22398
549999.30	4143787.84	1.40167	549979.66	4143785.82	1.57166
549965.06	4143784.81	1.71764	549942.91	4143776.76	1.94704
549922.77	4143771.22	2.19647	549904.14	4143768.20	2.51787
549884.00	4143763.16	2.87291	549857.31	4143766.69	3.59991
549839.18	4143758.13	3.95622	549866.88	4143798.41	3.82493
549867.97	4143814.14	3.97895	549817.37	4143748.62	4.38054
549875.21	4143612.73	1.35857	549897.51	4143616.21	1.25381
549914.24	4143616.91	1.17574	549936.54	4143615.52	1.07246
549957.45	4143609.24	0.96902	549910.06	4143562.55	0.92856
549957.45	4143568.13	0.81908	549981.84	4143566.04	0.75426
549967.20	4143612.03	0.94783	549984.63	4143605.76	0.87072
550007.62	4143607.85	0.81235	549997.87	4143560.46	0.70447
550022.96	4143566.04	0.67024	549915.63	4143536.77	0.81468
549905.18	4143502.62	0.73207	549941.42	4143520.04	0.71002
549944.21	4143538.16	0.75459	549866.85	4143490.77	0.78700
549910.75	4143492.86	0.69398	549943.51	4143478.23	0.60585
549981.14	4143478.92	0.55858	549982.54	4143519.34	0.63359
550023.65	4143522.13	0.57279	550024.35	4143541.64	0.61159
550000.66	4143474.04	0.52432	550033.41	4143601.58	0.72891
550043.86	4143598.09	0.69563	550066.86	4143600.88	0.64790
550082.19	4143596.00	0.60618	550097.53	4143594.61	0.57265
550115.64	4143595.31	0.53834	550063.38	4143547.92	0.56370
550080.10	4143550.01	0.54036	550097.53	4143547.92	0.51005
550118.43	4143545.13	0.47552	550064.07	4143517.25	0.50935
550082.19	4143511.68	0.47872	550092.65	4143515.86	0.47257
550113.55	4143520.74	0.45412	550080.80	4143470.56	0.42535
550089.86	4143473.35	0.42048	549820.63	4143455.18	0.76919
549820.63	4143423.26	0.68041	549801.31	4143454.34	0.80381

549799.63	4143411.51	0.68013	549762.68	4143458.54	0.90718
549767.72	4143424.94	0.77368	549735.80	4143451.82	0.94299
549737.48	4143434.18	0.86460	549755.12	4143377.07	0.65877

*** MODELOPTs: RegDFAULT CONC ELEV FLGPOL RURAL

*** THE PERIOD (43872 HRS) AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ONSITE ***
INCLUDING SOURCE(S): 1 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
549719.85	4143418.22	0.83357	549713.13	4143444.26	0.95737
549730.76	4143373.71	0.67770	549705.57	4143366.16	0.67980
549690.45	4143408.15	0.83173	549681.22	4143440.90	0.98836
549666.94	4143433.34	0.96652	549669.46	4143398.07	0.81305
549683.73	4143358.60	0.67552	549660.22	4143351.88	0.67253
549646.78	4143391.35	0.80598	549638.38	4143419.90	0.92632
549615.71	4143403.95	0.86780	549595.55	4143387.99	0.80856
549644.26	4143347.68	0.66980	549604.79	4143351.04	0.69336
549584.64	4143343.48	0.67830	549576.24	4143360.28	0.72213
549628.31	4143384.63	0.79133	549303.52	4143548.69	0.32714
549278.61	4143547.91	0.27474	549489.76	4143507.73	1.02015
549495.49	4143492.43	0.98709	549496.69	4143479.75	0.94287
549493.10	4143445.33	0.81327	549482.11	4143435.53	0.75030
549477.08	4143419.75	0.69634	549850.81	4143438.29	0.67449
549871.62	4143450.95	0.67005	549868.69	4143484.40	0.76346
550020.11	4143476.86	0.50290	550051.90	4143466.08	0.44913
550113.32	4143468.78	0.39395	550137.57	4143468.78	0.37374
550145.65	4143488.71	0.38620	550145.65	4143509.73	0.40523
550135.41	4143542.60	0.44914	550155.89	4143537.75	0.41817
550170.98	4143527.51	0.39168	550134.34	4143587.86	0.49741
550148.89	4143584.62	0.47106	550172.59	4143575.46	0.42877
550183.37	4143574.39	0.41359	550207.08	4143569.00	0.38099
550191.45	4143521.04	0.36442	550204.92	4143522.12	0.35116
550193.61	4143488.71	0.34015	550176.37	4143440.76	0.31820
550192.53	4143438.06	0.30518	550051.90	4143418.66	0.39051
550078.30	4143418.66	0.36675	550105.78	4143410.58	0.33771
550130.56	4143406.27	0.31698	550145.11	4143412.74	0.31382
550161.28	4143402.50	0.29573	550176.37	4143400.34	0.28596
550201.15	4143403.58	0.27550	550010.41	4143352.39	0.34478
550070.76	4143351.31	0.30894	550188.09	4143773.90	0.56538
550205.22	4143788.69	0.52909	550209.50	4143810.88	0.51811
550212.62	4143833.46	0.50461	550207.56	4143855.26	0.49940
550200.55	4143873.17	0.49409	550224.30	4143746.25	0.48959
550193.32	4143902.66	0.46431	550226.19	4143905.35	0.40750

*** MODELOPTs: RegDFAULT CONC ELEV FLGPOL RURAL

*** THE PERIOD (43872 HRS) AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: OFFSITE ***
INCLUDING SOURCE(S): L0000001 , L0000002 , L0000003 , L0000004 , L0000005 ,
L0000006 , L0000007 , L0000008 , L0000009 , L0000010 , L0000011 , L0000012 , L0000013 ,
L0000014 , L0000015 , L0000016 , L0000017 , L0000018 , L0000019 , L0000020 , L0000021 ,
L0000022 , L0000023 , L0000024 , L0000025 , L0000026 , L0000027 , L0000028 , . . . ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
549900.35	4143839.74	12.13465	549916.27	4143840.40	11.69038
549937.86	4143846.72	12.11776	549956.62	4143850.86	12.20680
549902.53	4143811.39	7.99590	549920.41	4143815.53	8.02881
549941.79	4143819.90	8.06363	549961.41	4143820.99	7.77317
549900.57	4143838.94	11.97429	549973.12	4143850.77	11.56471
549979.16	4143824.59	7.76758	549994.77	4143854.30	11.39211
549996.78	4143828.12	7.70608	550016.92	4143859.33	11.39433
550020.95	4143830.13	7.16509	550034.55	4143862.86	11.09206
550042.10	4143834.16	6.69321	550052.67	4143866.89	10.39538
550061.23	4143833.15	5.58085	550101.01	4143880.48	5.22067
550121.65	4143884.51	3.56819	550062.74	4143789.35	3.31189
550044.11	4143790.86	3.82439	550023.47	4143790.35	4.27444
549999.30	4143787.84	4.61351	549979.66	4143785.82	4.82099
549965.06	4143784.81	4.97344	549942.91	4143776.76	4.83430
549922.77	4143771.22	4.78233	549904.14	4143768.20	4.84965
549884.00	4143763.16	4.82551	549857.31	4143766.69	5.30809
549839.18	4143758.13	5.03916	549866.88	4143798.41	7.50808
549867.97	4143814.14	9.21811	549817.37	4143748.62	4.77015
549875.21	4143612.73	1.58609	549897.51	4143616.21	1.55242
549914.24	4143616.91	1.51420	549936.54	4143615.52	1.44352
549957.45	4143609.24	1.33734	549910.06	4143562.55	1.12991
549957.45	4143568.13	1.07077	549981.84	4143566.04	1.00721
549967.20	4143612.03	1.33150	549984.63	4143605.76	1.23442
550007.62	4143607.85	1.17799	549997.87	4143560.46	0.94388
550022.96	4143566.04	0.91291	549915.63	4143536.77	0.98670
549905.18	4143502.62	0.86315	549941.42	4143520.04	0.87719
549944.21	4143538.16	0.94572	549866.85	4143490.77	0.85942
549910.75	4143492.86	0.82180	549943.51	4143478.23	0.73675
549981.14	4143478.92	0.69039	549982.54	4143519.34	0.80707
550023.65	4143522.13	0.74338	550024.35	4143541.64	0.80914
550000.66	4143474.04	0.65037	550033.41	4143601.58	1.05878
550043.86	4143598.09	1.00776	550066.86	4143600.88	0.95055
550082.19	4143596.00	0.88354	550097.53	4143594.61	0.83479
550115.64	4143595.31	0.78772	550063.38	4143547.92	0.75481

550080.10	4143550.01	0.72699	550097.53	4143547.92	0.68550
550118.43	4143545.13	0.63829	550064.07	4143517.25	0.65893
550082.19	4143511.68	0.61547	550092.65	4143515.86	0.60971
550113.55	4143520.74	0.58916	550080.80	4143470.56	0.53053
550089.86	4143473.35	0.52431	549820.63	4143455.18	0.77440
549820.63	4143423.26	0.68805	549801.31	4143454.34	0.78577

*** MODELOPTs: RegDFAULT CONC ELEV FLGPOL RURAL

*** THE PERIOD (43872 HRS) AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: OFFSITE ***
INCLUDING SOURCE(S): L0000001 , L0000002 , L0000003 , L0000004 , L0000005 ,
L0000006 , L0000007 , L0000008 , L0000009 , L0000010 , L0000011 , L0000012 , L0000013 ,
L0000014 , L0000015 , L0000016 , L0000017 , L0000018 , L0000019 , L0000020 , L0000021 ,
L0000022 , L0000023 , L0000024 , L0000025 , L0000026 , L0000027 , L0000028 , . . . ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
549799.63	4143411.51	0.66895	549762.68	4143458.54	0.82809
549767.72	4143424.94	0.72044	549735.80	4143451.82	0.82181
549737.48	4143434.18	0.76220	549755.12	4143377.07	0.60605
549719.85	4143418.22	0.72006	549713.13	4143444.26	0.80678
549730.76	4143373.71	0.60508	549705.57	4143366.16	0.59273
549690.45	4143408.15	0.69897	549681.22	4143440.90	0.80517
549666.94	4143433.34	0.78179	549669.46	4143398.07	0.67433
549683.73	4143358.60	0.57912	549660.22	4143351.88	0.56698
549646.78	4143391.35	0.65884	549638.38	4143419.90	0.74068
549615.71	4143403.95	0.69313	549595.55	4143387.99	0.64921
549644.26	4143347.68	0.55895	549604.79	4143351.04	0.56512
549584.64	4143343.48	0.55174	549576.24	4143360.28	0.58556
549628.31	4143384.63	0.64170	549303.52	4143548.69	1.00328
549278.61	4143547.91	0.88152	549489.76	4143507.73	1.10847
549495.49	4143492.43	1.01949	549496.69	4143479.75	0.95218
549493.10	4143445.33	0.80250	549482.11	4143435.53	0.76241
549477.08	4143419.75	0.70875	549850.81	4143438.29	0.70878
549871.62	4143450.95	0.72868	549868.69	4143484.40	0.83495
550020.11	4143476.86	0.62864	550051.90	4143466.08	0.56032
550113.32	4143468.78	0.48752	550137.57	4143468.78	0.46057
550145.65	4143488.71	0.48396	550145.65	4143509.73	0.51997
550135.41	4143542.60	0.60218	550155.89	4143537.75	0.55853
550170.98	4143527.51	0.51670	550134.34	4143587.86	0.71913
550148.89	4143584.62	0.67780	550172.59	4143575.46	0.60819
550183.37	4143574.39	0.58547	550207.08	4143569.00	0.53441
550191.45	4143521.04	0.47793	550204.92	4143522.12	0.46211
550193.61	4143488.71	0.42743	550176.37	4143440.76	0.38297
550192.53	4143438.06	0.36579	550051.90	4143418.66	0.47623
550078.30	4143418.66	0.44785	550105.78	4143410.58	0.40980
550130.56	4143406.27	0.38180	550145.11	4143412.74	0.37670
550161.28	4143402.50	0.35190	550176.37	4143400.34	0.33861
550201.15	4143403.58	0.32442	550010.41	4143352.39	0.41556
550070.76	4143351.31	0.37037	550188.09	4143773.90	1.20459
550205.22	4143788.69	1.13492	550209.50	4143810.88	1.16808

550212.62	4143833.46	1.19299	550207.56	4143855.26	1.26581
550200.55	4143873.17	1.32978	550224.30	4143746.25	0.89732
550193.32	4143902.66	1.26587	550226.19	4143905.35	0.93766
549900.35	4143839.74	8.54622	549916.27	4143840.40	8.23311
549937.86	4143846.72	8.48291	549956.62	4143850.86	8.51976
549902.53	4143811.39	6.18955	549920.41	4143815.53	6.15234

*** MODELOPTs: RegDFAULT CONC ELEV FLGPOL RURAL

*** THE PERIOD (43872 HRS) AVERAGE CONCENTRATION   VALUES FOR SOURCE GROUP: OFFSITE ***
INCLUDING SOURCE(S):   L0000001   , L0000002   , L0000003   , L0000004   , L0000005   ,
L0000006   , L0000007   , L0000008   , L0000009   , L0000010   , L0000011   , L0000012   , L0000013   ,
L0000014   , L0000015   , L0000016   , L0000017   , L0000018   , L0000019   , L0000020   , L0000021   ,
L0000022   , L0000023   , L0000024   , L0000025   , L0000026   , L0000027   , L0000028   , . . .   ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF OTHER   IN MICROGRAMS/M**3   **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
549941.79	4143819.90	6.16276	549961.41	4143820.99	5.99828
549900.57	4143838.94	8.44292	549973.12	4143850.77	8.10558
549979.16	4143824.59	5.99923	549994.77	4143854.30	7.99969
549996.78	4143828.12	5.95416	550016.92	4143859.33	8.01877
550020.95	4143830.13	5.58396	550034.55	4143862.86	7.82208
550042.10	4143834.16	5.21438	550052.67	4143866.89	7.36446
550061.23	4143833.15	4.43422	550101.01	4143880.48	3.95616
550121.65	4143884.51	2.86661	550062.74	4143789.35	2.89694
550044.11	4143790.86	3.31450	550023.47	4143790.35	3.68566
549999.30	4143787.84	3.97470	549979.66	4143785.82	4.14755
549965.06	4143784.81	4.26894	549942.91	4143776.76	4.18193
549922.77	4143771.22	4.15523	549904.14	4143768.20	4.25115
549884.00	4143763.16	4.28192	549857.31	4143766.69	4.70601
549839.18	4143758.13	4.54131	549866.88	4143798.41	6.13142
549867.97	4143814.14	7.07176	549817.37	4143748.62	4.34765
549875.21	4143612.73	1.47958	549897.51	4143616.21	1.44335
549914.24	4143616.91	1.40800	549936.54	4143615.52	1.34304
549957.45	4143609.24	1.24625	549910.06	4143562.55	1.05677
549957.45	4143568.13	1.00189	549981.84	4143566.04	0.94295
549967.20	4143612.03	1.24099	549984.63	4143605.76	1.15175
550007.62	4143607.85	1.09903	549997.87	4143560.46	0.88417
550022.96	4143566.04	0.85501	549915.63	4143536.77	0.92471
549905.18	4143502.62	0.81018	549941.42	4143520.04	0.82364
549944.21	4143538.16	0.88692	549866.85	4143490.77	0.80717
549910.75	4143492.86	0.77186	549943.51	4143478.23	0.69310
549981.14	4143478.92	0.64979	549982.54	4143519.34	0.75799
550023.65	4143522.13	0.69821	550024.35	4143541.64	0.75916
550000.66	4143474.04	0.61218	550033.41	4143601.58	0.98846
550043.86	4143598.09	0.94101	550066.86	4143600.88	0.88718
550082.19	4143596.00	0.82460	550097.53	4143594.61	0.77861
550115.64	4143595.31	0.73425	550063.38	4143547.92	0.70717
550080.10	4143550.01	0.68052	550097.53	4143547.92	0.64131
550118.43	4143545.13	0.59666	550064.07	4143517.25	0.61903
550082.19	4143511.68	0.57791	550092.65	4143515.86	0.57197

550113.55	4143520.74	0.55181	550080.80	4143470.56	0.49924
550089.86	4143473.35	0.49321	549820.63	4143455.18	0.72842
549820.63	4143423.26	0.64958	549801.31	4143454.34	0.73888
549799.63	4143411.51	0.63234	549762.68	4143458.54	0.78004
549767.72	4143424.94	0.68081	549735.80	4143451.82	0.77686
549737.48	4143434.18	0.72127	549755.12	4143377.07	0.57721

*** MODELOPTs: RegDFAULT CONC ELEV FLGPOL RURAL

*** THE PERIOD (43872 HRS) AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: OFFSITE ***
INCLUDING SOURCE(S): L0000001 , L0000002 , L0000003 , L0000004 , L0000005 ,
L0000006 , L0000007 , L0000008 , L0000009 , L0000010 , L0000011 , L0000012 , L0000013 ,
L0000014 , L0000015 , L0000016 , L0000017 , L0000018 , L0000019 , L0000020 , L0000021 ,
L0000022 , L0000023 , L0000024 , L0000025 , L0000026 , L0000027 , L0000028 , . . . ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
549719.85	4143418.22	0.68301	549713.13	4143444.26	0.76520
549730.76	4143373.71	0.57742	549705.57	4143366.16	0.56667
549690.45	4143408.15	0.66531	549681.22	4143440.90	0.76632
549666.94	4143433.34	0.74494	549669.46	4143398.07	0.64341
549683.73	4143358.60	0.55475	549660.22	4143351.88	0.54438
549646.78	4143391.35	0.63039	549638.38	4143419.90	0.70763
549615.71	4143403.95	0.66424	549595.55	4143387.99	0.62409
549644.26	4143347.68	0.53739	549604.79	4143351.04	0.54518
549584.64	4143343.48	0.53893	549576.24	4143360.28	0.56997
549628.31	4143384.63	0.61515	549303.52	4143548.69	0.94231
549278.61	4143547.91	0.83149	549489.76	4143507.73	1.08376
549495.49	4143492.43	1.01025	549496.69	4143479.75	0.94984
549493.10	4143445.33	0.80335	549482.11	4143435.53	0.76267
549477.08	4143419.75	0.70851	549850.81	4143438.29	0.66782
549871.62	4143450.95	0.68599	549868.69	4143484.40	0.78455
550020.11	4143476.86	0.59157	550051.90	4143466.08	0.52741
550113.32	4143468.78	0.45842	550137.57	4143468.78	0.43266
550145.65	4143488.71	0.45363	550145.65	4143509.73	0.48664
550135.41	4143542.60	0.56262	550155.89	4143537.75	0.52161
550170.98	4143527.51	0.48263	550134.34	4143587.86	0.67024
550148.89	4143584.62	0.63172	550172.59	4143575.46	0.56687
550183.37	4143574.39	0.54572	550207.08	4143569.00	0.49813
550191.45	4143521.04	0.44633	550204.92	4143522.12	0.43131
550193.61	4143488.71	0.40047	550176.37	4143440.76	0.36046
550192.53	4143438.06	0.34444	550051.90	4143418.66	0.44861
550078.30	4143418.66	0.42165	550105.78	4143410.58	0.38592
550130.56	4143406.27	0.35971	550145.11	4143412.74	0.35498
550161.28	4143402.50	0.33215	550176.37	4143400.34	0.31953
550201.15	4143403.58	0.30598	550010.41	4143352.39	0.39171
550070.76	4143351.31	0.34890	550188.09	4143773.90	1.11397
550205.22	4143788.69	1.05395	550209.50	4143810.88	1.08497
550212.62	4143833.46	1.10765	550207.56	4143855.26	1.17061
550200.55	4143873.17	1.22380	550224.30	4143746.25	0.83722
550193.32	4143902.66	1.15344	550226.19	4143905.35	0.87162

*** MODELOPTs: RegDFAULT CONC ELEV FLGPOL RURAL

*** THE SUMMARY OF MAXIMUM PERIOD (43872 HRS) RESULTS ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG) OF TYPE	NETWORK GRID-ID
ONSITE	1ST HIGHEST VALUE IS	4.58007	AT (549817.37, 4143748.62, 19.94, 19.94, 1.50) DC	
	2ND HIGHEST VALUE IS	4.38054	AT (549817.37, 4143748.62, 19.94, 19.94, 6.10) DC	
	3RD HIGHEST VALUE IS	4.24155	AT (549867.97, 4143814.14, 21.48, 21.48, 1.50) DC	
	4TH HIGHEST VALUE IS	4.12556	AT (549839.18, 4143758.13, 20.02, 20.02, 1.50) DC	
	5TH HIGHEST VALUE IS	4.05424	AT (549866.88, 4143798.41, 21.15, 21.15, 1.50) DC	
	6TH HIGHEST VALUE IS	3.97895	AT (549867.97, 4143814.14, 21.48, 21.48, 6.10) DC	
	7TH HIGHEST VALUE IS	3.95622	AT (549839.18, 4143758.13, 20.02, 20.02, 6.10) DC	
	8TH HIGHEST VALUE IS	3.82493	AT (549866.88, 4143798.41, 21.15, 21.15, 6.10) DC	
	9TH HIGHEST VALUE IS	3.77610	AT (549857.31, 4143766.69, 20.49, 20.49, 1.50) DC	
	10TH HIGHEST VALUE IS	3.59991	AT (549857.31, 4143766.69, 20.49, 20.49, 6.10) DC	
OFFSITE	1ST HIGHEST VALUE IS	12.20680	AT (549956.62, 4143850.86, 24.66, 24.66, 1.50) DC	
	2ND HIGHEST VALUE IS	12.13465	AT (549900.35, 4143839.74, 23.01, 23.01, 1.50) DC	
	3RD HIGHEST VALUE IS	12.11776	AT (549937.86, 4143846.72, 24.19, 24.19, 1.50) DC	
	4TH HIGHEST VALUE IS	11.97429	AT (549900.57, 4143838.94, 23.03, 23.03, 1.50) DC	
	5TH HIGHEST VALUE IS	11.69038	AT (549916.27, 4143840.40, 23.60, 23.60, 1.50) DC	
	6TH HIGHEST VALUE IS	11.56471	AT (549973.12, 4143850.77, 25.00, 25.00, 1.50) DC	
	7TH HIGHEST VALUE IS	11.39433	AT (550016.92, 4143859.33, 25.33, 25.33, 1.50) DC	
	8TH HIGHEST VALUE IS	11.39211	AT (549994.77, 4143854.30, 25.26, 25.26, 1.50) DC	
	9TH HIGHEST VALUE IS	11.09206	AT (550034.55, 4143862.86, 25.39, 25.39, 1.50) DC	
	10TH HIGHEST VALUE IS	10.39538	AT (550052.67, 4143866.89, 25.48, 25.48, 1.50) DC	

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

*** MODELOPTs: RegDFAULT CONC ELEV FLGPOL RURAL

*** Message Summary : AERMOD Model Execution ***

--------- Summary of Total Messages --------

A Total of   0 Fatal Error Message(s)
A Total of   0 Warning Message(s)
A Total of   20266 Informational Message(s)

A Total of   43872 Hours Were Processed

A Total of   7316 Calm Hours Identified

A Total of   12950 Missing Hours Identified (29.52 Percent)

CAUTION!: Number of Missing Hours Exceeds 10 Percent of Total!
Data May Not Be Acceptable for Regulatory Applications.
See Section 5.3.2 of "Meteorological Monitoring Guidance
for Regulatory Modeling Applications" (EPA-454/R-99-005).

******** FATAL ERROR MESSAGES ********
*** NONE ***

********   WARNING MESSAGES   ********
*** NONE ***

****
*** AERMOD Finishes Successfully ***
****

Appendix C. Construction Risk Calculations

Table C1
Residential MER Concentrations for Risk Calculations

Contaminant (a)	Source (b)		Model Output [1] (μg/m³) (c)	Emission Rates [2] (g/s) (d)	MER Conc. (μg/m³) (e)	Total MER Conc. Annual Average (μg/m³) (f)
Residential Receptors - Unmitigated						
DPM	2021	On-Site Emissions	4.58	8.28E-03	3.79E-02	3.79E-02
		Truck Route	4.77	7.02E-07	3.35E-06	
			Total DPM concentrations used for Cancer Risk and Chronic Hazard calculations			
$PM_{2.5}$	2021	On-Site Emissions	4.58	7.60E-03	3.48E-02	3.48E-02
		Truck Route	4.77	7.02E-07	3.35E-06	
			Maximum Annual $PM_{2.5}$ Concentration			**0.03**

Maximum Exposed Receptor (MER) UTM coordinates: 549956.62E, 4143850.86N

[1] Model Output at the MER based on unit emission rates for sources (1 g/s).

[2] Emission Rates from Emission Rate Calculations (Appendix A - Construction Emissions).

Table C2
Residential MER Health Risk Calculations

Source		MER Conc. (µg/m³)	Weight Fraction	Contaminant	URF (µg/m³)⁻¹	CPF (mg/kg/day)⁻¹	Dose (by age bin) 3rd Trimester (mg/kg-day)	Dose (by age bin) 0 < 2 years (mg/kg-day)	Carcinogenic Risks (by age bin) 3rd Trimester per million	Carcinogenic Risks (by age bin) 0 < 2 years per million	Total Cancer Risk per million	Chronic Hazards [3] REL (µg/m³)	Chronic Hazards [3] RESP
(a)		(b)	(c)	(d)	(e)	(f)	(g)	(h)	(j)	(k)	(m)	(n)	(o)
Residential Receptors - Unmitigated													
2021	On & Off-Site Emission	3.79E-02	1.00E+00	DPM	3.0E-04	1.1E+00	1.31E-05	3.96E-05	4.18E-01	1.58E+00	2.0	5.0E+00	7.59E-03
										Total	**2.0**		**0.008**

Maximum Exposed Receptor (MER) UTM coordinates: 549956.62E, 4143850.86N

		3rd Trimester	0 < 2 years
	OEHHA age bin	3rd Trimester	0 < 2 years
	exposure year(s)	2021	2021
Dose Exposure Factors:	exposure frequency (days/year)	350	350
	inhalation rate (L/kg-day) [1]	361	1090
	inhalation absorption factor	1	1
	conversion factor (mg/µg; m³/L)	1.0E-06	1.0E-06
Risk Calculation Factors:	age sensitivity factor	10	10
	averaging time (years)	70	70
	per million	1.0E+06	1.0E+06
	fraction of time at home	0.85	0.85

exposure durations per age bin		exposure durations (year)	
Construction Year	Risk Scalar [2]	3rd Trimester	0 < 2 years
2021	0.56	0.25	0.31
Total	0.56	0.25	0.31

[1] Inhalation rate taken as the 95th percentile breathing rates (OEHHA, 2015).

[2] Risk scalar determined for each year of construction to adjust receptor exposures to the exposure durations for each construction year (see App A - Construction Emissions).

[3] Chronic Hazards for DPM using the chronic reference exposure level (REL) for the Respiratory Toxicological Endpoint.

Appendix C: Biological Resources Assessment

Wavecrest Coastal Trail: Southern Alignment Project
Biological Resources Evaluation

HALF MOON BAY, SAN MATEO COUNTY, CALIFORNIA

Prepared For:

Coastside Land Trust
788 Main Street
Half Moon Bay, California 94019

WRA Contact:

Leslie Lazarotti
lazarotti@wra-ca.com

Date:

June 2020

WRA Project No. 24346

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LIST OF ACRONYMS AND ABBREVIATIONS

BRE	Biological Resources Evaluation
Cal-IPC	California Invasive Plant Council
CCC	California Coastal Commission
CCR	California Code of Regulations
CCT	California Coastal Trail
CDFW	California Department of Fish and Wildlife (formerly California Department of Fish and Game [CDFG])
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CLT	Coastal Land Trust
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
Corps	U.S. Army Corps of Engineers
CRLF	California red-legged frog
ESHA	Environmentally Sensitive Habitat Area
FAC	Facultative species (equal in wetland or non-wetlands)
FACW	Facultative wetland species (usually found in wetlands)
FESA	Federal Endangered Species Act
HTL	High Tide Line
LCP	Local Coastal Program
NMFS	National Marine Fisheries Service
NRCS	Natural Resources Conservation Service
OBL	Obligate wetland species (almost always found in wetlands)
OHWM	Ordinary High Water Mark
RPW	Relatively permanent water
RWQCB	Regional Water Quality Control Board
SFGS	San Francisco garter snake
SP	Sample Point
SW	Seasonal wetland
TNW	Traditionally navigable waters
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WRA	WRA, Inc.

1.0 INTRODUCTION

On January 26 and 27 and February 9 and 16, 2016, WRA, Inc. (WRA) conducted a biological resource evaluation (BRE) of the proposed trail alignment (Project) for the Wavecrest Coastal Trail: Southern Alignment Project (Project Area) and an approximately 200-foot buffer around the Project Area. In November 2019, the Project design added stairs for beach access and the Project Area was expanded to include an approximately 0.25-mile-long portion of the right-of-way (ROW) of Redondo Beach Road for the proposed installation of a sewer lateral, utility line (water line extension) and new restroom. An approximately 200-foot buffer around this portion of the ROW (Utility Area) was preliminarily assessed. A BRE of the Utility Area was conducted by WRA on January 14, 2020. Together, the Project Area and associated 200-foot buffer (collectively referred to as the Study Area) encompass approximately 171 acres, located in Half Moon Bay, San Mateo County (Figure 1). The term "Study Area" is used to describe both the Project Area as well as the buffer area adjacent to the proposed Project Area. Privately-owned parcels, or parcels not owned by CLT, are considered "off-site" for the purposes of this BRE. The purpose of the site visit and BRE is to identify, describe, and map any sensitive habitats, including riparian and wetland areas or other Environmental Sensitive Habitat Areas (ESHAs), and determine the potential for or presence of habitat for "rare, threatened, or endangered" species that may occur in the Project Area or associated approximately 200-foot buffer. WRA performed the BRE in accordance with the City of Half Moon Bay (City) Local Coastal Program (LCP), including Section 18.38.035 of the Zoning Code LCP Implementation Plan, and Chapter 3 of the Land Use Plan. This assessment is based on site conditions observed on the dates of the site visits, related information available at the time of the study, and from reviewing past reports completed on the portions of or areas proximate to the Study Area. Additionally, a protocol-level special-status plant species survey was conducted on April 15 and June 22, 2016, within the Study Area, not including the 2019-added Utility Area, during the blooming period of all special-status plants determined to have a high or moderate potential to occur in the Study Area. This report also contains an evaluation of potential impacts to special-status species or ESHAs that may occur as a result of the proposed project and potential mitigation measures to compensate for those impacts.

1.1 Project Description

The Project will formalize a segment of the California Coastal Trail (CCT), develop spur trails to access coastal overlooks, install two separate stairs for beach access, create three staging area for vehicular and trailer parking, provide split-rail fencing and trail signage, install a flush restroom with sewage and potable water connection, restore informal trails[1] and heavily eroded areas, and improve an existing dirt service road that runs along a "paper street" identified as Park Avenue by the City. The Project includes trail and staging improvements and revegetation. In accordance with Section 18.38.070.E (Coastal Access Ways – Bluff Edge Trails) of the City's Municipal Zoning Code, the Project would improve public access while reducing erosion of the bluff edge by (1)

[1] "Informal" trails, also called social trails or desire paths, are footpaths created unintentionally by visitors repeatedly using the exact same path for crossing terrain. Informal trails form when visitors cross through an area lacking an official path, and can be problematic depending on their alignment.

creating a sufficient setback from the bluff edge and (2) revegetating/restoring the existing informal trails that are located close to the bluff edge. In addition, the proposed Project would be consistent with the intent of Municipal Code Section 18.38.070 in that:

- It would create two new stairways as a vertical beach access point between Seymour Street and Redondo Beach Road and provide connectivity to the existing beach access point located at Poplar Beach/Blufftop Park.
- It is consistent with the Access Improvements Map (1993 Local Coastal Program/ Land Use Plan). Public access, including equestrian access, within the Project Area would be limited to the formalized trail and spur trails described that constitute the Project. Horses would be allowed on the compacted shoulders located on either side of the gravel trail. Horses would not be allowed on the stairs to the beach. Signs would provide information indicating allowable uses.
- It is consistent with the City's recently adopted Bicycle and Pedestrian Master Plan.

The Project is also consistent with conceptual alignments identified by the Access Improvements Map (1993 Local Coastal Program/ Land Use Plan) and the Wavecrest Restoration Plan, and would be responsive to Wavecrest Restoration Plan's guidelines for protecting bluff edges and riparian corridors and minimizing runoff. The Project's three key components (i.e., trail development, restoration, and construction) are described in detail below.

1.1.1 Trail

The Project includes 10,527 linear feet of trail, with a 6,165-linear-foot segment of the CCT, 1,941 linear feet of spur trails to an overlook or beach access, 2,143 linear feet of Park Avenue improvements, and two sets of stairs providing beach access. Trail amenities include two trailhead signs, four hazards signs, one interpretive sign, and one bench. The Project would provide formal public access through the Project Area and would respect coastal resources by directing foot and bicycle traffic to a safe route away from wetlands and other sensitive areas or utilizing short boardwalks, or puncheons, to cross wetland areas to maintain hydrological connectivity. The Project would also focus future trail users along a formal trail network, which would reduce multiple informal footpaths currently on the site and reduce erosion caused by informal recreation. The Project features, including the trail alignment, bluff overlooks, and staging areas, are described below.

1.1.2 Trail and Stair Design

The primary trail would be a compacted rock 8-foot trail with 2-foot soft shoulders[2]. Spurs, which are shorter, narrower trail segments that branch from the main trail and lead to overlook, or loop out along the bluff or stairs would be compacted rock and 6-foot with 2-foot shoulders on either

[2] During trail construction, the contractor will be directed to excavate to a depth to reach suitable base material. This is assumed to be between 4 and 6 inches for the full width of the trail and shoulders, although onsite field observations will be required during construction. All excavated material will be spread on-site to repair ruts and subsidence at existing disturbed areas. The contractor will be advised that all soil placement or storage should occur within 100 feet minimum distance from existing wetlands.

side. Compacted rock would be used to ensure durability and provide a firm surface for the trail, while a 2-foot-wide soft shoulder will provide for equestrian use. No impervious materials would be used for trail construction. Trail features would include 42-inch tall split-rail fencing in hazardous areas, two 48- by 36-inch signs to provide directions at each trail end, mounted at eye level on redwood posts, as well as hazard signs at various locations along the trail warning of dangerous eroding cliffs. The proposed trail connection to the CCT would require minor thinning of a stand of cypress trees, but would otherwise leave the cypress stand intact. The proposed staging areas would require removing approximately 21 trees, nine of which are Heritage Trees according to the City's definition. Nine replacement trees would be planted within the Project Area.

The project includes wooden trail stairs to the beach on both the northern and southern side of Ravine 9. Informal pathways have eroded the mouth of Ravine 9 and formal stairs will direct trail users along a designated route. Trail stairs will be constructed in an interlocking crib style with wooden timbers cribbed together to form risers and backfilled with compacted native earth. The stairs will have a handrail along one side. Stair construction will require recontouring existing eroded areas and filling existing gullies with engineered fill to stabilize the bluff edge.[3] New pipes will be installed to prevent water from flowing down the trail stairs and will discharge at the bottom on Ravine 9 or along the beach. A short crib wall will be constructed along the south side of Ravine 9 to support the bottom of the stairs on this side.

1.1.3 Vista Point

The Project includes one formal vista point. The vista point would include one sign warning of dangerous eroding cliff edge mounted at a height of 4 feet, 2 inches on redwood posts that would be installed at eye level to educate trail users. The overlook will also include one interpretive sign and a bench.

1.1.4 Trail Staging

The Project will include a main staging area and two secondary staging areas. The main staging area would include one flush toilet, and a pervious surface for parking totaling 12,600 square feet. Utilities for the flush restroom will include the extension of a potable water line along Redondo Beach Road and a connection to the existing sewer along Park Avenue Paper Street. Two additional staging areas will have pervious surface for parking totaling 14,600 square feet and 11,200 square feet, respectively. The new parking areas will be gravel and have no designated parking lines, however together it is estimated that they can accommodate approximately 72 personal vehicles and two trucks with horse trailers. No formal bike parking is included at any lot. There will be a trailhead sign at the main parking lot.

1.1.5 Trail Alignment

[3] Preliminary stair designs have been completed but cut and fill estimates will be completed at a later stage. Any excess cut material will be used to repair ruts and subsidence at existing disturbed areas as described for trail excavation.

The Project would adhere to a 60-foot setback from the edges of the sea cliff and ravines, with the exception of spur trails to the bluff overlooks, restoration of heavily eroded areas, and stairs to the beach. The Project would connect to the existing trail located to the north. Where the proposed trail alignment interfaces with Ravine 9, it would cross over an existing culvert at the most eastern point along Park Avenue Paper Street. Stairs will be constructed in Ravine 9 for beach access at the most western point. Otherwise, the proposed trail would largely avoid the riparian areas adjacent to this ravine. The primary alignment would avoid seasonal wetlands to the extent possible. However, in areas where the alignment would disturb wetlands, the trail will be elevated using 12-foot-long puncheon segments (raised wooden trail), that are 6-feet wide with 7-foot total footing. The footings are 3-inches above ground and extend a minimum of 2 feet. The proposed trail would connect to staging areas along Redondo Beach Road and to an existing segment of the CCT that begins at Redondo Beach Road and Thone Avenue. All trails are located on property owned by the Coastside Land Trust or within public right-of-way owned by the City of Half Moon Bay. The trail alignment avoids private parcels.

1.1.6 Restoration

The Project Area has multiple existing informal trails that have resulted in significant erosion from lack of vegetation. In an effort to reduce erosion and correct the damaged areas, the Project would decommission and restore informal trail areas near the proposed main trail that are located on Coastside Land Trust (CLT) property or owned by the City of Half Moon Bay. The Project would also include the restoration of a bare area that is currently used for parking at the western terminus of Redondo Beach Road. Restoration of informal trails and parking areas will involve site preparation measures including topsoil treatment, soil de-compaction, erosion control, and/or other measures as appropriate. These damaged areas would be ripped and hand seeded with a native coastal seed mix to provide at least 50 percent vegetative cover within one year. The native coastal seed mix will include native plants such as blue-eyed grass (*Sisyrinchium bellum*), California sagebrush (*Artemisia californica*), California oatgrass (*Danthonia californica*), meadow barley (*Hordeum brachyantherum*), and maritime brome (*Bromus maritimus*)[4]. Seed mix shall also include seeds harvested from the Choris' popcorn flower (*Plagiobothrys chorisianus* var. *chorisianus*, CNPS Rank 1B.2) harvested by biologists and provided to the Contractor. Seeded areas will be covered by straw layer sufficient to allow germination, prevent erosion and minimize weed growth. Removal of non-native plants will be conducted by mowing, hand weeding, and raking, with minimal usage of herbicide application or burning.

1.1.7 Temporary Construction Requirements

Construction of the Project would require the establishment of temporary construction access and staging areas and the use of wildlife exclusion fencing, as discussed in Section 5.3.4 below.

[4] On April 17, 2020, Toni Corelli of California Native Plant Society, Santa Clara Valley Chapter responded by email in support of the removal of two species (*Eriophyllum confertiflorum* and *Hordeum jubatum*) from the proposed seed mix and replacement with three species that are known to co-occur with Choris' popcornflower (*Bromus maritimus*, *Danthonia californica*, and *Hordeum brachyantherum* ssp. *brachyantherum*).

Detailed mitigation measures are described in the Initial Study and will be included in the Mitigation Monitoring and Reporting Program Report for the Project.

1.1.8 Construction Access and Staging

Construction would occur in the dry season from approximately April 15 to October and may occur over the course of multiple years. Construction-related trips would come from Highway 1 and access the site from various access points depending on the phase of the Project. Construction vehicles could access the site from Wavecrest Road or Redondo Beach Road and temporary access routes that would traverse the Project Area to a designated construction staging area. At the end of the construction phase, the access route would be ripped and reseeded with a locally-sourced native coastal seed mix composed of species observed at Wavecrest (Appendix D and/or California Native Plant Society, Santa Clara Valley Chapter comment letter dated December 2016) except in areas where the trail is utilized for construction access. All staging areas are larger than 5,000 square feet and provide adequate space for two 20-foot long storage containers and up to ten parking spaces. Space will be provided for vehicles to turn around.

1.2 Description of the Study Area

The Study Area contains a portion of the CCT. The proposed trail alignment is situated on undeveloped land owned by CLT and the City of Half Moon Bay (Figure 1). The focus of this report is the approximately 87-acre Project Area. In addition, an approximately 200-foot buffer area around the Project Area was assessed. Collectively, the 87-acre Project Area and the 200-foot buffer are referred to as the Study Area (approximately 171 acres). The Study Area is situated on a terrace above scenic coastal bluffs and includes non-native grassland, disturbed and developed areas, Monterey cypress stands, eucalyptus groves, ice plant mats, beaches (active sand dunes), sea cliffs, northern coastal scrub, coyote brush/rush scrub, central coast riparian scrub, seasonal wetlands, non-wetland waters, and coastal wetlands, with elevations up to 83 feet. Northern coastal scrub, Monterey cypress stands, non-native grassland, developed/disturbed, and seasonal wetland form the northern boundary; sea cliffs, beaches, and the Pacific Ocean form the western boundary of the Study Area; northern coastal scrub, developed/disturbed areas, central coast riparian scrub, and seasonal wetlands form the eastern boundary; and coastal seasonal wetland, northern coastal scrub, eucalyptus groves, non-native grassland, and developed/disturbed areas, including Redondo Beach Road, form the southern boundary.

The Study Area is locally known as one of the most important habitat sites for wintering raptors in San Mateo County, supporting high population density and diversity of raptors (Sequoia Chapter Audubon Society 2008). The Study Area is also a popular hiking trail with easily accessible coastal bluffs and several informal overlooks. While an informal dirt ‘social’ trail makes its way along the coastal bluffs, the Project aims to re-route public access away from the eroding bluffs and improve the existing conditions to safely accommodate a formal trail, particularly during wet conditions.

The Study Area consists of CLT-owned and privately-owned parcels (Figure 2).[5] However, the proposed trail development, would occur on CLT-owned parcels and areas designated as public right-of-ways.

Off-site parcels were visually assessed for their potential to contain sensitive resources and findings are considered preliminary given the following: the parcels are not part of the larger Study Area and are included to comply with the Coastal Act, LCP, and the City's Municipal Code for ESHA and riparian buffer zones with the purpose of avoiding impacts and determining the need for ESHA buffers due to offsite, potentially sensitive resources. For instance, the areas adjoining Redondo Beach Road are within the 200-foot Project Area and Utility Area buffers; yet these areas were not traversed and examined on-foot during this evaluation. All findings within the prescribed buffer along Redondo Beach Road and outside the Project Area represent our best professional judgments based on off-site observations and are considered to be preliminary.

[5] The privately-owned parcels tie to a residential lot subdivision of the land that took place in the early-1900s.

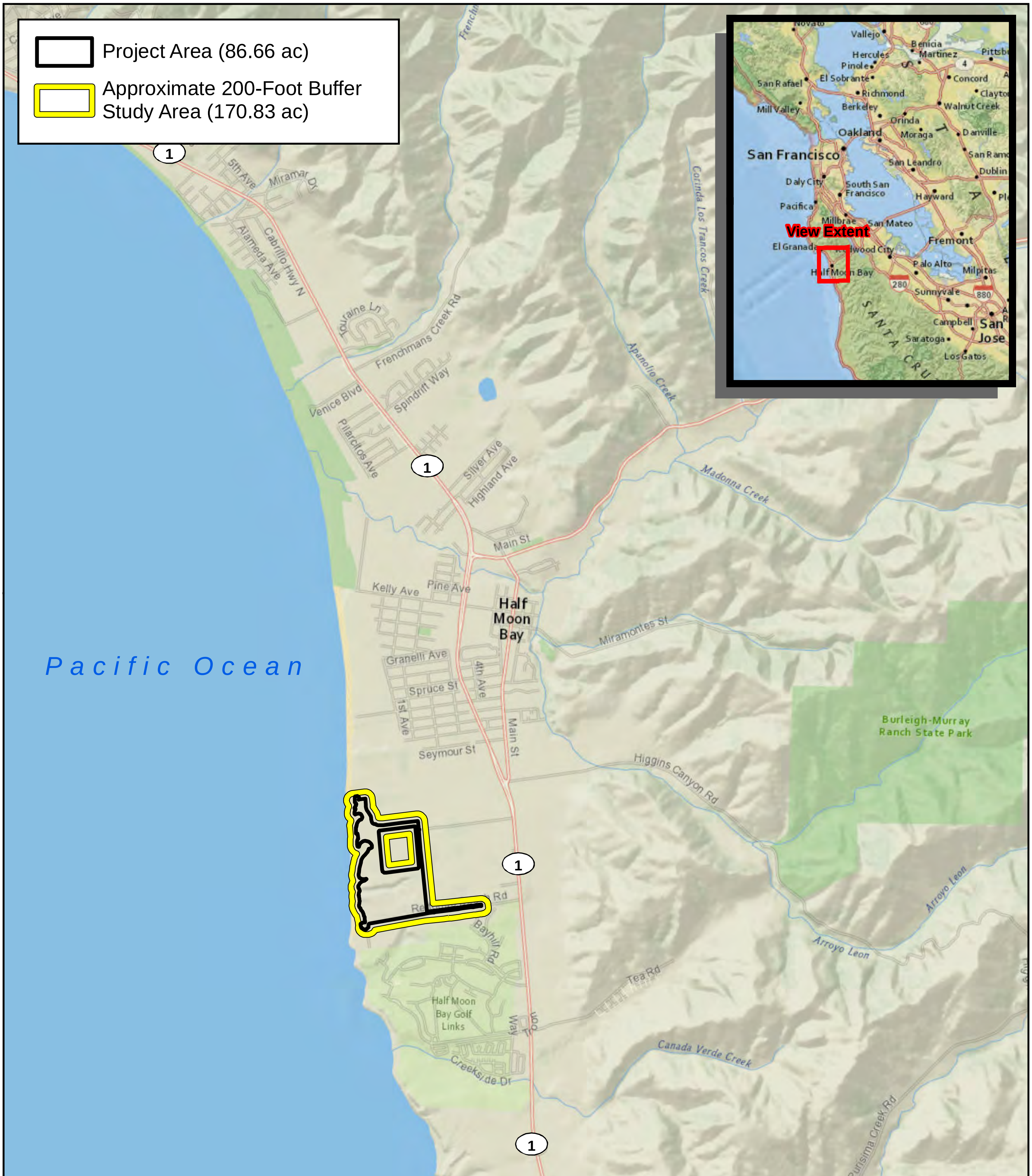

Figure 1. Location Map of Study Area

Wavecrest Coastal Trail: Southern Alignment
Half Moon Bay, California

0 0.25 0.5 1
Miles

ENVIRONMENTAL CONSULTANTS

Map Prepared Date: 1/28/2020
Map Prepared By: mweidenbach
Base Source: Esri Streaming - National Geographic
Data Source(s): WRA

Path: L:\Acad 2000 Files\24000\24346\GIS\ArcMap\2019 Update\Location_20200128.mxd

2.0 REGULATORY BACKGROUND

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

2.1 Special-Status Species

Special-status species include those plants and wildlife species that have been formally listed, are proposed as endangered or threatened, or are candidates for such listing under the federal Endangered Species Act (FESA) 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. In addition, California Department of Fish and Wildlife (CDFW) Species of Special Concern and the National Marine Fisheries Service (NMFS) Species of Concern, which are species that face extirpation if current population and habitat trends continue, U.S. Fish and Wildlife Service (USFWS) Birds of Conservation Concern, sensitive species included in USFWS Recovery Plans, and CDFW special-status invertebrates are all considered special-status species. Although CDFW Species of Special Concern generally have no special legal status, they are given special consideration under the California Environmental Quality Act (CEQA). In addition to regulations for special-status species, most birds in the United States, including non-status species, are protected by the Migratory Bird Treaty Act of 1918. Under this legislation, destroying active nests, eggs, and young is illegal. Bat species designated as "High Priority" by the Western Bat Working Group (WBWG) qualify for legal protection under Section 15380(d) of the CEQA Guidelines. Species designated "High Priority" are defined as "imperiled or are at high risk of imperilment based on available information on distribution, status, ecology and known threats" (CDFG 2006). 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 some species with a Rank of 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.

<u>City of Half Moon Bay Local Coastal Program and Land Use Plan</u>

The Half Moon Bay Land Use Policies and Map constitute the Land Use Plan of the LCP. The Zoning Code (Title 18 of the Municipal Code, including Chapter 18.20, which regulates Coastal Development Permits) together with the Zoning District Map constitutes the Implementation Plan of the LCP. The primary goal of the LCP is to ensure that the local government's land use plans, zoning ordinances, zoning maps, and implemented actions meet the requirements of the provisions and polices of the Coastal Act at the local level. Coastal Resource Conservation Standards are described in Chapter 18.38 of the LCP and define sensitive habitat and coastal resource areas for conservation to include: sand dunes; marine habitats; sea cliffs; riparian areas; wetlands, coastal tidelands and marshes, lakes, ponds, and adjacent shore habitats; coastal or off-shore migratory bird nesting sites; areas used for scientific study, refuges, and reserves; habitats containing unique or rare and endangered species; rocky intertidal zones; coastal scrub communities; wild strawberry habitat; and archaeological resources. Marine and water resources (including riparian habitats) are further defined in Chapter 3 of the Land Use Plan.

Figure 2. Protected Land and Privately-Owned Parcels within the Study Area

Wavecrest Coastal Trail: Southern Alignment
Half Moon Bay, California

wra ENVIRONMENTAL CONSULTANTS

Map Prepared Date: 1/28/2020
Map Prepared By: mweidenbach
Base Source: Esri World Imagery January 2020
Data Source(s): WRA, San Mateo County Parcels

Path: L:\Acad 2000 Files\24000\24346\GIS\ArcMap\2019 Update\Protected Land Parcels_20200128.mxd

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Critical Habitat

Critical habitat is a term defined and used in the FESA as a specific geographic area that contains features essential for the conservation of a threatened or endangered species and that may require special management and protection. The FESA 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 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 FESA "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.

2.2 Sensitive Biological Communities

Sensitive biological communities include habitats that fulfill special functions or have special values, such as wetlands, streams, and riparian habitat. These habitats are regulated 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 Tree Ordinances, Special Habitat Management Areas, applicable LCPs, and General Plan Elements). Mitigation measures for impacts to these communities are discussed in Section 5 of this report.

2.2.1 Federal Jurisdiction over Wetlands and "Other Waters"

Section 404 of the Clean Water Act

Section 404 of the Clean Water Act gives the U.S. Environmental Protection Agency ("EPA") and the U.S. Army Corps of Engineers (Corps) regulatory and permitting authority regarding discharge of dredged or fill material into "navigable waters of the United States". Section 502(7) of the Clean Water Act defines waters as "waters of the United States, including territorial seas." Section 328 of Chapter 33 in the Code of Federal Regulations (CFR) defines the term "waters of the United States" as it applies to the jurisdictional limits of the authority of the Corps under the Clean Water Act. A summary of the definition of "waters of the U.S." in 33 CFR 328.3 as published in 1986 includes:

> (1) All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
> (2) All interstate waters including interstate wetlands;
> (3) All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters: (i) which are or could be used by interstate or foreign travelers for recreational or other purposes; or (ii) from which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or (iii) which are used or could be used for industrial purpose by industries in interstate commerce;

(4) All impoundments of waters otherwise defined as waters of the United States under the definition;
(5) Tributaries of waters identified in paragraphs (a) (1)—(4) of this section:
(6) The territorial seas;
(7) Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (a) (1)—(6) of this section.

Areas not considered to be "waters of the United States" are exempted under the Preamble to the 1986 Rule and subject to a case by case analysis, including:

(a) Non-tidal drainage and irrigation ditches excavated on dry land.
(b) Artificially irrigated areas which would revert to upland if the irrigation ceased.
(c) Artificial lakes or ponds created by excavating and/or diking dry land to collect and retain water and which are used exclusively for such purposes as stock watering, irrigation, settling basins, or rice growing,
(d) Artificial reflecting or swimming pools or other small ornamental bodies of water created by excavating and/or diking dry land to retain water for primarily aesthetic reasons.
(e) Waterfilled depressions created in dry land incidental to construction activity and pits excavated in dry land for the purpose of obtaining fill, sand, or gravel unless and until the construction or excavation operation is abandoned and the resulting body of water meets the definition of waters of the United States (see 33 CFR 328.3(a)).

In the Corps Rivers and Harbors regulations (33 CFR Part 329.4), the term "navigable waters of the U.S." is defined to include all those waters that are subject to the ebb and flow of the tide, and/or presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce.

The limits of Corps jurisdiction under Section 404 as given in 33 CFR Section 328.4 are as follows: (a) *Territorial seas:* three nautical miles in a seaward direction from the baseline; (b) *Tidal waters of the U.S.:* high tide line (HTL) or to the limit of adjacent non-tidal waters; (c) *Non-tidal waters of the U.S.:* ordinary high water mark or to the limit of adjacent wetlands; (d) *Wetlands:* to the limit of the wetland.

The Corps has developed standard methods and data reporting forms contained in the *U.S. Army Corps of Engineers Wetlands Delineation Manual* (Corps Manual; Environmental Laboratory 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (Arid West Supplement; Corps 2008) to determine the presence or absence of Waters of the U.S. The procedures described in the Corps Manual were used to identify wetlands and non-wetland waters in the Study Area that are potentially subject to regulation under Section 404 of the Clean Water Act.

<u>Rapanos Guidance</u>

The Corps and EPA issued joint guidance on implementing the June 19, 2006, U.S. Supreme Court opinions resulting from *Rapanos v. United States* and *Carabell v. United States* ("Rapanos") cases. Under this guidance, the Corps will maintain jurisdiction over traditionally navigable waters

("TNW"), relatively permanent water ("RPW"), and non-relatively permanent waters that have a significant nexus to the biological, chemical, and physical characteristics of a RPW or TNW.

The first standard of the guidance evaluates jurisdiction over a water body that is a RPW (i.e., it flows year-round, or at least "seasonally") and over wetlands adjacent to such water bodies if the wetlands directly "abut" the water body (i.e., if the wetlands are not separated from the water body by an upland feature such as a berm, dike, or road). In order for the Corps to make a jurisdictional determination of Section 404 wetlands and waters, field staff must determine whether there is a significant hydrologic connection between a non-perennial RPW and a TNW. The second standard, for tributaries that are not RPWs, requires a case-by-case "significant nexus" evaluation to determine the extent of Section 404 jurisdiction.

2.2.2 Waters of the State

The Dickey Water Pollution Act of 1949 and Porter Cologne Act of 1969 established the State Water Resources Control Board (SWRCB) and nine Regional Water Quality Control Board (RWQCB) districts in the State of California. The SWRCB and each RWQCB district regulates activities in Waters of the State, which include Waters of the U.S. Waters of the State are defined by the Porter-Cologne Act as "any surface water or groundwater, including saline waters, within the boundaries of the state." In addition, the SWRCB has adopted a wetland definition that is similar to, but slightly different from, that used by the Corps of Engineers. The state definition as adopted in April 2019 and currently in effect, states that:

> *An area is wetland if, under normal circumstances, (1) the area has continuous or recurrent saturation of the upper substrate caused by groundwater, or shallow surface water, or both; (2) the duration of such saturation is sufficient to cause anaerobic conditions in the upper substrate; and (3) the area's vegetation is dominated by hydrophytes or the area lacks vegetation.*

The RWQCB regulates discharges of fill and dredged material under Section 401 of the Clean Water Act and the Porter-Cologne Water Quality Control Act through the State Water Quality Certification Program. State Water Quality Certification is necessary for all projects that require a Corps permit, or fall under other federal jurisdiction, and have the potential to impact waters of the State. In order for a Section 404 permit to be valid, Section 401 of the Clean Water Act requires a Water Quality Certification or waiver to be obtained. The Water Quality Certification (or waiver) determines that the permitted activities will not violate water quality standards individually or cumulatively over the term of the action. Water quality certification must be consistent with the requirements of the Federal Clean Water Act, the California Environmental Quality Act, the California Endangered Species Act, and Porter-Cologne Act.

If a proposed project or portion of a proposed 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 activity under its state authority in the form of Waste Discharge Requirements or Certification of Waste Discharge Requirements. In these cases, a Water Quality Certification is not necessary under Section 401 of the Clean Water Act because federal jurisdiction does not apply.

2.2.3 Streams, Lakes, and Riparian Habitat

Streams and lakes, as habitat for fish and wildlife species, are subject to jurisdiction by CDFW under Sections 1600-1616 of the State Fish and Game Code. 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 follows: "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. This includes 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;" therefore, 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 ESD 1994). Removal of riparian vegetation also requires a Section 1602 Lake and Streambed Alteration Agreement from CDFW.

2.2.4 California Coastal Commission and Half Moon Bay Local Coastal Program (LCP)

The California Coastal Commission (CCC)/LCP regulates the diking, filling, or dredging of wetlands within the coastal zone. Section 30121 of the Coastal Act defines "wetlands" as land "which may be covered periodically or permanently with shallow water and include saltwater marshes, freshwater marshes, open or closed brackish water marshes, swamps, mudflats, and fens." In addition, the Half Moon Bay LCP defines "wetlands" as an area where the water table is at, near, or above the land surface long enough to bring about the formation of hydric soils or to support the growth of plants, which normally are found to grow in water or wet ground. Wetlands do not include vernally wet areas where the soils are not hydric. The 1981 CCC Statewide Interpretive Guidelines state that hydric soils and hydrophytic vegetation "are useful indicators of wetland conditions," but the presence or absence of hydric soils and/or hydrophytes alone are not necessarily determinative when the CCC identifies wetlands under the Coastal Act.

The boundaries of areas regulated by the Corps and CCC/LCP are often not the same due to the differing goals of the respective regulatory programs and because these agencies use different definitions for determining the extent of wetland areas. For example, the Corps requires that positive indicators for the presence of wetland hydrology, hydric soils, and a predominance of hydrophytic vegetation be present for an area to meet the Corps' wetland definition. The CCC does not necessarily require that all three wetland indicators (wetland hydrology, hydric soils, and a predominance of hydrophytic vegetation) be present for an area to be determined to by a "wetland"; rather, the presence of hydric soils in the absence of a predominance of hydrophytes (or vice versa) could be sufficient for a positive wetland determination.

<u>The California Coastal Commission ESHA Definition</u>

The CCC defines an ESHA as follows:

"*Environmentally sensitive habitat area" means any area in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an* *ecosystem and which could be easily disturbed or degraded by human activities and developments.*"

The CCC Guidelines contain definitions for specific types of ESHAs, including: wetlands, estuaries, streams and rivers, lakes, open coastal waters and coastal waters, riparian habitats, other resource areas, and special-status species and their habitats. For the purposes of this report, WRA has taken into consideration any areas that may meet the definition of any ESHA defined by the CCC guidelines or the Half Moon Bay LCP.

2.2.5 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. The CDFW ranks sensitive communities as “threatened” or “very threatened” (CDFW 2019) and keeps records of their occurrences in its Natural Diversity Database (CNDDB; CDFW 2020). Impacts to sensitive natural communities identified in local or regional plans, policies, regulations or by the CDFW or 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.

2.3 Other Local Policies

2.3.1 Heritage Trees

The City of Half Moon Bay Municipal Code, Section 7.40 has regulations protecting heritage trees. A heritage tree is defined as the following:

- A tree located on public or private property, exclusive of eucalyptus (*Eucalyptus* spp.), with a trunk diameter of 12 inches or circumference of approximately 38 inches measured at 48 inches above ground level.
- A tree or stand of trees so designated by resolution of the City Council based on its finding of special historical, environmental or aesthetic value, including a resolution adopted under former Chapter 12.16.
- Any street tree located in the public right of way along the entire length of Main Street or along Kelly Avenue between San Benito Street and Highway 1.

Any person who conducts any grading, excavation, demolition or construction activity on property shall do so in such a manner as to not threaten the health or viability or cause the removal of any heritage tree. Any such grading, excavation, demolition or construction activity performed within the drip line of a heritage tree, defined as the diameter of the tree’s canopy formed by branches and/or leaves extending outward from the trunk of the tree, will require submittal of a tree protection plan prepared by a certified arborist for review and approval by the city manager prior to issuance of any permit for grading or construction.

It is unlawful for any person to remove, or cause to be removed any heritage tree from any parcel of property in the city, or prune more than one-third of the branches or roots within a twelve-month period, without obtaining a permit.

3.0 METHODS

On January 26 and 27 and February 9 and 16, 2016, the Study Area, not including the Utility Area, was traversed on foot to determine (1) plant communities present within the Study Area, (2) if existing conditions provide suitable habitat for any special-status plant or wildlife species, and (3) if sensitive habitats including ESHA are present. A delineation of potentially jurisdictional aquatic resources was conducted simultaneously on these dates. On January 14, 2020, the Utility Area was assessed in the same manner, including a delineation of jurisdictional aquatic resources. Additionally, protocol-level special-status plant surveys were conducted on April 15 and June 22, 2016, during the appropriate blooming period for all special-status plant species with a high or moderate potential to occur in the Study Area, excluding the Utility Area. All plant and wildlife species encountered were recorded and are summarized in Appendix D. Prior to the site visit, aerial photographs, local soil maps, and *A Manual of California Vegetation, Online Edition* (CNPS 2020b) were reviewed to assess the potential for sensitive biological communities to occur in the Project Area. Plant nomenclature follows Baldwin et al. (2012) and subsequent revisions by the Jepson Flora Project (2020), except where noted. Because of recent changes in classification for many of the taxa treated by Baldwin et al. and the Jepson Flora Project, relevant synonyms are provided in brackets. For cases in which regulatory agencies, CNPS, or other entities base rarity on older taxonomic treatments, precedence was given to the treatment used by those entities.

Privately owned parcels within the Study Area were only visually assessed for their potential to contain sensitive resources. During the jurisdictional delineation, soils were not examined within private parcels and only vegetation and visible signs of hydrology were assessed to make preliminary determinations discussed below.

3.1 Biological Communities

Prior to the site visit, the Soil Survey of San Mateo County, California (NRCS 2020) was examined to determine if any unique soil types that could support sensitive plant communities and/or aquatic features were present in the Study Area. Biological communities were primarily classified based on existing descriptions found in the *Preliminary Descriptions of the Terrestrial Natural Communities of California* (Holland 1986) and *A Manual of California Vegetation, Online Edition* (CNPS 2020b). However, in some cases it is necessary to identify variants of community types or to describe non-vegetated areas that are not described in the literature. Biological communities were classified as sensitive or non-sensitive as defined by CEQA and other applicable laws and regulations.

3.1.1 Non-sensitive Biological Communities

Non-sensitive biological communities are those communities that are not afforded special protection under CEQA, and other state, federal, and local laws, regulations and ordinances. These communities may, however, provide suitable habitat for some special-status plant or wildlife species and are identified or described in Section 4.1.1 below.

3.1.2 Sensitive Biological Communities

Sensitive biological communities are defined as those communities that are given special protection under CEQA and other applicable federal, state, and local laws, regulations and ordinances. Applicable laws and ordinances are discussed above in Section 2.0. Special methods used to identify sensitive biological communities are discussed below.

3.2 Corps Jurisdiction

The methods used in this study to delineate federal jurisdictional wetlands and non-wetland waters are based on the Corps Manual and Arid West Supplement. A general description of the Study Area, including plant communities present, topography, and land use was also generated during the delineation visits. The methods for evaluating the presence of wetlands and “other waters” of the U.S. employed during the site visit are described in detail below.

Prior to conducting field studies, available reference materials were reviewed, including the Soil Survey of San Mateo Area (USDA 1961), the U.S. Geological Survey (USGS) 7.5 minute Half Moon Bay quadrangle (USGS 2018), National Wetland Inventory (NWI) data (USFWS 2020a), rainfall data (NOAA 2016), WETS precipitation data (USDA 2016, 2020), aerial photos of the site (Google Earth 2020), and previous studies conducted within the Study Area.

The delineation of federal jurisdictional wetlands and non-wetland waters was performed in the Study Area, not including the Utility Area, on January 26 and 27 and February 9 and 16, 2016. The delineation of the Utility Area was conducted on January 14, 2020. The methods for evaluating the presence of wetlands and “other waters” employed during the site visit are described in detail below.

3.2.1 Potential Section 404 Jurisdictional Wetlands

The Corps has defined the term “wetlands” as follows:

> *Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.*

(33 CFR 328.3)

The three parameters listed in the Corps Manual that are used to determine the presence of wetlands are: (1) hydrophytic vegetation, (2) wetland hydrology, and (3) hydric soils. According to the Corps Manual:

> *"...[E]vidence of a minimum of one positive wetland indicator from each parameter (hydrology, soil, and vegetation) must be found in order to make a positive wetland delineation."*

Data on vegetation, hydrology, and soils collected at sample points during the delineation site visits are reported on standard Corps data forms included in Appendix B. Once an area was determined to be a potential jurisdictional wetland, its boundaries were delineated using GPS equipment with sub-meter accuracy and mapped on a geo-referenced aerial photograph. The total acreage of potential jurisdictional wetlands was measured digitally using ArcGIS software. Indicators described in the Corps Manual that were used to make wetland determinations at each sample point in the Study Area and are summarized below.

Vegetation

Plant species observed in the Study Area were identified using the Jepson Manual, Second Edition (Baldwin et al. 2012) and the Jepson eFlora (Jepson Flora Project 2020). Plants were assigned a wetland indicator status according to the National Wetland Plant List (NWPL; Lichvar et al. 2016). Where differences in nomenclature occur between the Jepson Manual or the Jepson eFlora and the NWPL, the species name as it occurred in the NWPL is listed in brackets.

Wetland indicator statuses listed in the NWPL are based on the expected frequency of occurrence in wetlands as follows:

Classification (Abbreviation)	**Definition***	**Hydrophytic Species? (Y/N)**
Obligate (OBL)	Almost always is a hydrophyte, rarely in uplands	Y
Facultative Wetland (FACW)	Usually is a hydrophyte but occasionally found in uplands	Y
Facultative (FAC)	Commonly occurs as either a hydrophyte or non-hydrophyte	Y
Facultative Upland (FACU)	Occasionally is a hydrophyte but usually occurs in uplands	N
Upland/Not Listed (UPL/NL)	Rarely is a hydrophyte, almost always in uplands	N

*See Lichvar et al. (2016)

The Arid West Supplement requires that a three-step process be conducted to determine if hydrophytic vegetation is present. The procedure first requires the delineator to apply the “50/20 rule” (Indicator 1) described in the manual. To apply the “50/20 rule”, dominant species are chosen independently from each stratum of the community. In general, dominant species are determined for each vegetation stratum from a sampling plot of an appropriate size surrounding the sample point. In general, dominants are the most abundant species that individually or collectively account for more than 50 percent of the total vegetative cover in the stratum, plus any other species that, by itself, accounts for at least 20 percent of the total cover. If greater than 50 percent of the dominant species has an OBL, FACW, or FAC status, ignoring + and - qualifiers, the sample point meets the hydrophytic vegetation criterion.

If the sample point fails Indicator 1 and both hydric soils and wetland hydrology are not present, then the sample point does not meet the hydrophytic vegetation criterion, unless the site is a problematic wetland situation. However, if the sample point fails Indicator 1 but hydric soils and wetland hydrology are both present, the delineator must apply Indicator 2.

Indicator 2 is known as the Prevalence Index. The prevalence index is a weighted average of the wetland indicator status for all plant species within the sampling plot. Each indicator status is given a numeric code (OBL = 1, FACW = 2, FAC = 3, FACU = 4, and UPL = 5). Indicator 2 requires the delineator to estimate the percent cover of each species in every stratum of the community and sum the cover estimates for any species that is present in more than one stratum. The delineator must then organize all species into groups according to their wetland indicator status and calculate the Prevalence Index using the following formula, where A equals total percent cover:

$$PI = \frac{A_{OBL} + 2A_{FACW} + 3A_{FAC} + 4A_{FACU} + 5A_{UPL}}{A_{OBL} + A_{FACW} + A_{FAC} + A_{FACU} + A_{UPL}}$$

The Prevalence Index will yield a number between 1 and 5. If the Prevalence Index is equal to or less than 3, the sample point meets the hydrophytic vegetation criterion. However, if the community fails Indicator 2, the delineator must proceed to Indicator 3.

Indicator 3 is known as Morphological Adaptations. If more than 50 percent of the individuals of a FACU species have morphological adaptations for life in wetlands, that species is considered to be a hydrophyte and its indicator status should be reassigned to FAC. If such observations are made, the delineator must recalculate Indicators 1 and 2 using a FAC indicator status for this species. The sample point meets the hydrophytic vegetation criterion if either test is satisfied.

Soils

The Natural Resource Conservation Service (NRCS) defines a hydric soil as follows:

> *"A hydric soil is a soil that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part."*

Federal Register July 13, 1994,
U.S. Department of Agriculture, NRCS

Soils formed over long periods of time under wetland (anaerobic) conditions often possess characteristics that indicate they meet the definition of hydric soils. Hydric soils can have a hydrogen sulfide (rotten egg) odor, low chroma matrix color, generally designated 0, 1, or 2, used to identify them as hydric, presence of redox concentrations, gleyed or depleted matrix, or high organic matter content.

Specific indicators that can be used to determine whether a soil is hydric for the purposes of wetland delineation are provided in the NRCS *Field Indicators of Hydric Soils in the U.S.* (USDA 2018). The Arid West Supplement provides a list of 23 of these hydric soil indicators, which are known to occur in the Arid West region. Soil samples were collected and described according to the methodology provided in the Arid West Supplement. Soil chroma and values were determined by utilizing a standard Munsell soil color chart (Munsell Color 2009).

Hydric soils were determined to be present if any of the soil samples met one or more of the 23 hydric soil indicators described in the Arid West Supplement.

Hydrology

The Corps jurisdictional wetland hydrology criterion is satisfied if an area is inundated or saturated for a period sufficient to create anoxic soil conditions during the growing season (a minimum of 14 consecutive days in the Arid West region). Evidence of wetland hydrology can include primary indicators, such as visible inundation or saturation, drift deposits, oxidized root channels, and salt crusts, or secondary indicators such as the FAC-neutral test, presence of a shallow aquitard, or crayfish burrows. The Arid West Supplement contains 16 primary hydrology indicators and 10 secondary hydrology indicators. Only one primary indicator is required to meet the wetland hydrology criterion; however, if secondary indicators are used, at least two secondary indicators must be present to conclude that an area has wetland hydrology.

The presence or absence of the primary or secondary indicators described in the Arid West Supplement was utilized to determine if sample points within the Study Area met the wetland hydrology criterion.

3.2.2 Potential Section 404 Jurisdictional "Other Waters"

The Study Area was also evaluated for the presence of "other waters". Other waters subject to Corps jurisdiction include lakes, rivers, and perennial or intermittent streams. Corps jurisdiction of other waters in non-tidal areas extends to the ordinary high water mark (OHWM), defined as:

> *The term "ordinary high water mark" means that line on the shore established by the fluctuations of water and indicated by physical characteristics such as clear, natural line impresses on the bank, shelving, changes in the characteristics of the soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.*

Federal Register Vol. 51, No. 219,
Part 328.3 (d). November 13, 1986.

Other waters are identified in the field by the presence of a defined river or streambed, a bank, and evidence of the flow of water, or by the absence of emergent vegetation in ponds or lakes. Other waters that were found within the Study Area were mapped using a GPS device with mapping grade accuracy and are described in Section 4.0 of this report. Identification of the OHWM followed *a Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the United States* (Lichvar et al. 2008).

3.3 RWQCB Jurisdiction

The RWQCB generally adheres to the same delineation protocol set forth by the Corps (Environmental Laboratory 1987) for determining Waters of the State, with the exception that state wetlands include features that naturally lack vegetation but meet hydric soil and wetland hydrology indicators. Therefore, with the above exception, the methods used to determine potential Waters of the State were the same as those described above for potential Section 404 jurisdiction.

3.4 CCC/LCP Jurisdiction

The Study Area is within the City LCP boundaries; potential wetlands within the Study Area will be analyzed in accordance with the LCP definitions.

3.4.1 Wetlands

The Coastal Act defines wetlands as:

> *Wetland means lands within the Coastal Zone which may be covered periodically or permanently with shallow water and include saltwater marshes, freshwater marshes, open or closed brackish water marshes, swamps, mudflats, and fens.*

(Public Resources Code Section 30121)

The Half Moon Bay LCP defines wetlands as:

> *…areas where the water table is at, near, or above the land surface long enough to bring about the formation of hydric soils or to support the growth of plants which normally are found to grow in water or wet ground.*

(City of Half Moon Bay Zoning Code Chapter 18.20)

CCC Administrative Regulations (Section 13577 (b)) provides a more explicit definition:

> *Wetlands are lands where the water table is at, near, or above the land surface long enough to promote the formation of hydric soils or to support the growth of hydrophytes, and shall also include those types of wetlands where vegetation is lacking and soil is poorly developed or absent as a result of frequent or drastic fluctuations of surface water levels, wave action, water flow, turbidity or high concentrations of salt or other substance in the substrate. Such wetlands can be recognized by the presence of surface water or saturated substrate at some time during each year and their location within, or adjacent to, vegetated wetlands or deepwater habitats.*

The Coastal Commission has considered this definition as requiring the observation of one diagnostic feature of a wetland such as wetland hydrology, dominance by wetland vegetation (hydrophytes), or presence of hydric soils as a basis for asserting jurisdiction under the Coastal Act.

In addition to the above definition, the *Statewide Interpretive Guidelines for Identifying and Mapping Wetlands and Other Wet Environmentally Sensitive Habitat Areas* (CCC 1981) provides technical criteria for use in identifying and delineating wetlands and other ESHAs within the Coastal Zone. The technical criteria presented in the guidelines are based on the Coastal Act definition and indicate that wetland hydrology is the most important parameter for determining a wetland, recognizing that:

> *. . . the single feature that most wetlands share is soil or substrata that is at least periodically saturated with or covered by water, and this is the feature used to describe wetlands in the Coastal Act. The water creates severe physiological problems for all plants and animals except those that are adapted for life in water or in saturated soil, and therefore only plants adapted to these wet conditions (hydrophytes) could thrive*

in these wet (hydric) soils. Thus, the presence or absence of hydrophytes and hydric soils make excellent physical parameters upon which to judge the existence of wetland habitat areas for the purposes of the Coastal Act, but they are not the sole criteria.

The technical criteria require that saturation of soil in a wetland must be at or near the surface continuously for a period of time. The meaning of "at or near the surface" generally is considered to be approximately one-foot from the surface or less (the root zone), and the saturation must be continuously present for a period of time (generally more than two weeks) in order to create the necessary soil reduction (anaerobic) processes that create wetland conditions. For example, water from rain during a storm that causes saturation near the surface but then evaporates or infiltrates to 18 inches or deeper below the surface shortly after the storm does not meet the generally accepted criteria for wetland hydrology.

The presence of wetland classified plants or the presence of hydric soils (generally referred to as the "one parameter approach") can be used to identify an area as being a wetland in the Coastal Zone. There is correlation between the presence of wetland plants, wetland hydrology, and/or hydric soils occurring together, especially in natural undisturbed areas, and in many cases where one of these parameters is found (e.g., wetland plants) the other parameters will also occur. But there are situations which can result in the presence of wetland classified plants without there being wetland conditions, and these areas are not wetlands. Where these situations occur, the delineation study must carefully scrutinize whether the wetland classified plants that are present are growing there as hydrophytes in reducing (anaerobic) conditions caused by the presence of wetland hydrology or are there for some other (non-wetland) reason. Examples may include wetland-classified plants which are also salt-tolerant (e.g., alkali heath) and may be responding to either wetland conditions or saline soil conditions, but not necessarily both, and deep-rooted trees (e.g., willows) which are able to tap into deep groundwater sources and can grow in dry surface soils, but are also found in wetland conditions where surface water is present.

Hydric soils can also occur in upland areas especially in areas where historic disturbances may have exposed substratum or in densely vegetated grasslands (mollisols). Similarly, the delineation must determine if the hydric soil indicators are a result of frequent anaerobic conditions or if they are the result of non-wetland conditions.

The Coastal Act uses a broad wetland definition in which the presence of any one of the wetland parameters may indicate presence of a wetland. CCC presumes that the area is a wetland if one of the wetland parameters is present. However, there may be exceptions to this presumption if there is strong positive evidence of upland conditions, as opposed to negative evidence of wetland conditions. Positive evidence of upland hydrology might be the observation that a given area saturates only ephemerally following significant rainfall, that the soil is very permeable with no confining layer, or that the land is steep and drains rapidly. Positive evidence of upland conditions should be obtained during the wet season. Based on these facts, this BRE identified areas within the Study Area that had wetland plants, hydric soils, or wetland hydrology indicators (See Section 3.2 for definitions). Soils, hydrology, and vegetation were examined on January 26 and 27 and February 9 and 16, 2016 as well as January 14, 2020 at locations within the Study Area that had the potential to meet the LCP's wetland definition. Sample points were taken in representative areas throughout the Study Area. Once an area was determined to be a potential jurisdictional wetland, its boundaries were delineated using sub-meter accuracy GPS equipment and overlain on a topographic map. Jurisdictional wetland acreage was measured digitally using ArcGIS software.

Areas determined to potentially support coastal seasonal wetland habitat that met at least one parameter are depicted on the jurisdictional delineation map as coastal seasonal wetlands. The vegetation, hydrology, and soil criteria used during this delineation are summarized below.

3.4.2 Streams

A stream is a natural watercourse as designated by a solid line or dash and three dots symbol shown on the USGS map most recently published, or any well-defined channel with distinguishable bed and bank that shows evidence of having contained flowing water as indicated by scour or deposit of rock, sand, gravel, soil, or debris (CCC 1981). Prior to visiting the site, WRA reviewed the most recent USGS map for the Study Area (USGS 2018).

3.4.3 Open Coastal Waters

Open coastal waters refer to the open ocean overlying the continental shelf and its associated coastline. Salinities exceed 30 parts per thousand with little or no dilution except opposite mouths of estuaries.

Other Sensitive Biological Communities

The Study Area was evaluated for the presence of other sensitive biological communities, including riparian areas, sensitive plant communities recognized by CDFW, significant areas of native plants, and other ESHAs. These sensitive biological communities were mapped and are described in Section 4.1.2 below.

3.5 Special-Status Species

3.5.1 Literature Review

Potential occurrence of special-status species in the Study Area was evaluated by first determining which special-status species occur in the vicinity of the Study Area through a literature and database search. Database searches for known occurrences of special-status species focused on the Half Moon Bay 7.5 minute USGS quadrangle and the two adjacent USGS quadrangles (Montara Mountain and San Gregorio) with similar coastal habitats. The following sources were reviewed to determine which special-status plant and wildlife species have been documented to occur in the vicinity of the Study Area:

- California Natural Diversity Database records (CDFW 2020)
- USFWS Information for Planning and Conservation Report (USFWS 2020b)
- CNPS Electronic Inventory records (CNPS 2020a)
- CDFG publication “California’s Wildlife, Volumes I-III” (Zeiner et al. 1990)
- CDFG publication “Amphibians and Reptile Species of Special Concern in California” (Jennings 1994)
- A Field Guide to Western Reptiles and Amphibians (Stebbins, R.C. 2003)

3.5.2 Site Assessment

The BRE was conducted to determine if existing conditions provide suitable habitat for any special-status plant or wildlife species. The potential for each special-status species to occur in the Study Area was evaluated according to the following criteria:

- 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).

- 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. 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 in order to determine its potential to occur in the Study Area. The BRE does 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 discussed. In addition, protocol-level special-status plant species surveys were conducted for all species with a moderate or high potential to occur within the Study Area. The protocol-level special-status plant survey took place on April 15 and June 22, 2016, during the blooming period for special-status plants with moderate or high potential to occur in the Study Area, not including the Utility Area. Appendix E presents the evaluation of 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.

4.0 RESULTS

The following sections present the results and discussion of the BRE and protocol-level special-status plant surveys within the Study Area. A delineation and BRE were conducted on January 26 and 27 and February 9 and 16, 2016 within the Study Area, not including the Utility Area. On January 14, 2020, the proposed location of the stairways area was observed and compared to prior conditions as documented in the 2016 BRE. In addition on January 14, 2020, a BRE was conducted within the Utility Area. Protocol-level special-status plant surveys were conducted on

April 15 and June 22, 2016 within the Project Area and did not include the Utility Area. A list of observed plant and wildlife species is included as Appendix D. A list of special-status plant and wildlife species known to occur in the vicinity and an assessment of their potential to occur within the Study Area is included as Appendix E. Photographs of the Study Area are included as Appendix F.

4.1 Biological Communities

Biological communities identified in the Study Area are depicted in Figure 3. Descriptions for each biological community are contained in the following sections. Acreage summations for biological communities are detailed in Table 1.

In order of prevalence, non-sensitive biological communities in the Study Area include northern coastal scrub, non-native grasslands, disturbed/developed areas, Monterey cypress stands, eucalyptus groves, coyote brush/western rush scrub, and ice plant mats. Six ESHAs are found in the Study Area: non-wetland waters, sea cliffs, central coast riparian scrub, seasonal wetland, beaches, and coastal seasonal wetlands.

Table 1. Biological Community Acreages

Biological Community	Sensitive	Area (acres)
Non-sensitive Biological Communities		
Northern coastal scrub	No	98.44
Non-native grassland	No	15.29
Developed/Disturbed	No	17.55
Monterey cypress stands	No[1]	5.22
Eucalyptus groves	No	5.55
Coyote brush/western rush scrub	No	0.88
Ice plant mats	No	0.17
Sensitive Biological Communities		
Non-wetland waters (ESHA)	Yes	8.67
Sea cliffs (ESHA)	Yes	7.65
Central coast riparian scrub (ESHA)	Yes	4.80
Seasonal wetland (ESHA)	Yes	3.46
Beaches (ESHA)	Yes	2.45
Coastal seasonal wetland (ESHA)	Yes	0.70
	STUDY AREA TOTAL	**170.83**

[1] While listed as G1 S1 (CDFW 2019), this rarity ranking only pertains to native stands, which are limited to Monterey County.

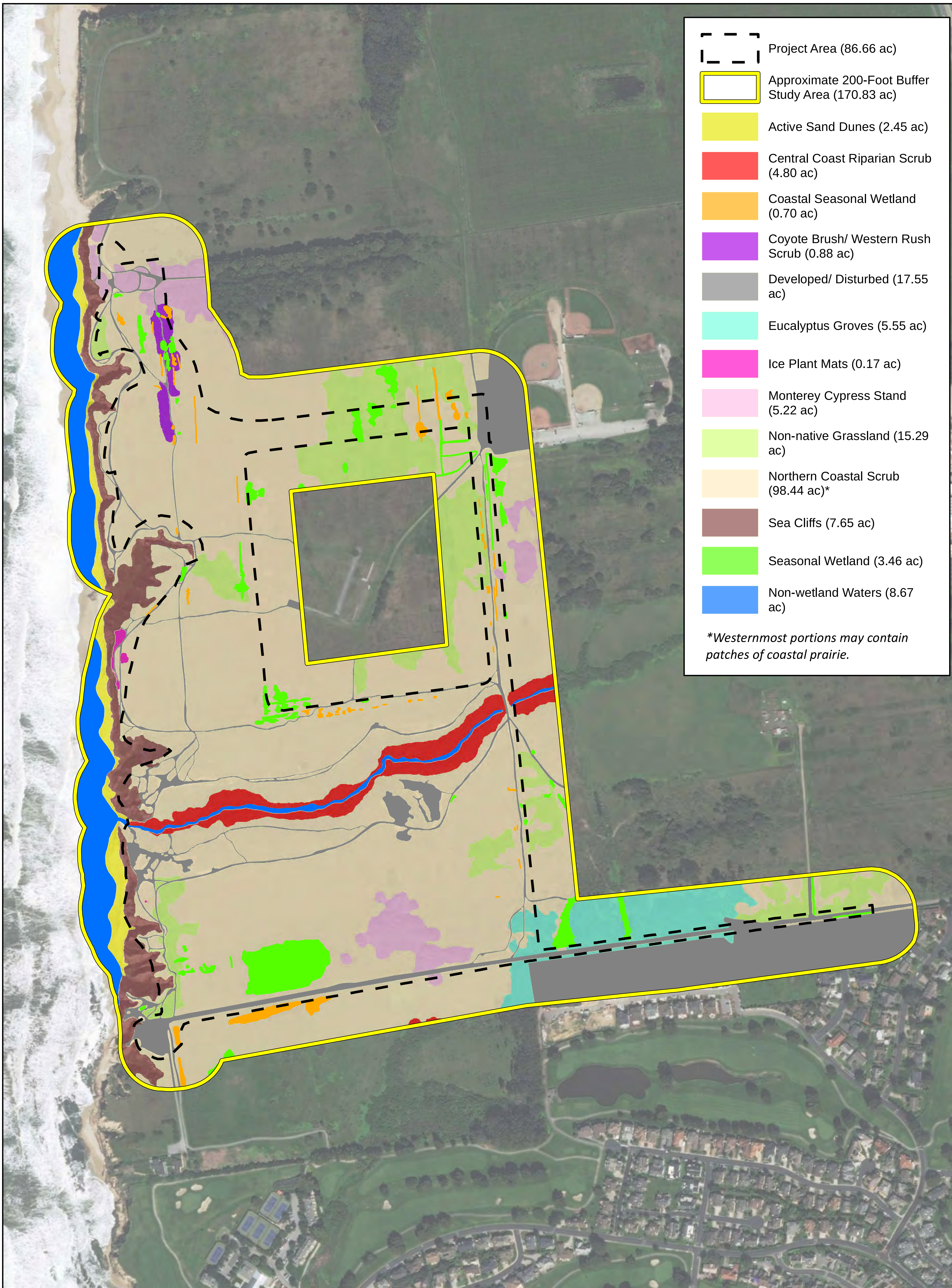

Figure 3. Biological Communities within the Study Area

N
W E
S

Wavecrest Coastal Trail: Southern Alignment
Half Moon Bay, California

0 250 500 1,000
Feet

wra
ENVIRONMENTAL CONSULTANTS

Map Prepared Date: 5/29/2020
Map Prepared By: mweidenbach
Base Source: Esri Streaming - 2010 CCC Imagery
Data Source(s): WRA

Path: L:\Acad 2000 Files\24000\24346\GIS\ArcMap\2019 Update\BioComm_20200529.mxd

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4.1.1 Non-sensitive Biological Communities

Northern Coastal Scrub

Holland describes northern coyote brush scrub as a cover type of northern (Franciscan) coastal scrub that has low, dense shrubs with scattered grassy openings, usually on windy, exposed sites with shallow, rocky soils. CNPS (2020b) describes coyote brush scrub (*Baccharis pilularis* Shrubland Alliance, Rarity Ranking G5 S5) as containing shrub cover less than 3 meters tall with variable canopy and herbaceous cover. This habitat occurs state-wide in various habitat types within coastal California. Overall, most growth and flowering occur in this community in late spring and early summer (Holland 1986).

The Study Area contains northern coastal scrub habitat. In the northern and western portions of the Study Area, northern coastal scrub is characterized by dense mats of dwarf coyote bush (*Baccharis pilularis* ssp. *pilularis*, UPL) interspersed with California horkelia (*Horkelia californica*, UPL), and soap plant (*Chlorogalum pomeridianum*, UPL). In southern and eastern portions of the Study Area, northern coyote brush scrub is characterized by more open shrub cover and is dominated by coyote brush (*B. pilularis* ssp. *consanguinea*, UPL), California blackberry (*Rubus ursinus,* FAC), beach strawberry (*Fragaria chiloensis*, FACU), and western rush (*Juncus patens*, FACW), with more non-native species interspersed throughout including Bermuda buttercup (*Oxalis pes-caprae*, UPL) and species discussed below for non-native grassland habitat. Choris' popcorn flower (OBL) was confirmed to occur within northern coastal scrub during a protocol-level special-status plant survey on April 15, 2016. Details for the special-status plant survey are provided in Section 4.3.1 below. Additionally, intermixed in the westernmost portion of the northern coastal scrub habitat are pockets of coastal prairie habitat. Species associated with coastal prairie habitat, such as California oatgrass (FAC), meadow barley (FACW), and maritime brome (NL) occur intermixed in northeastern portions of northern coastal scrub habitat within the Study Area. Given that northern coastal scrub is ranked as G5 S5, it is considered secure both globally and state-wide and is therefore not considered sensitive under CEQA.

Non-Native Grassland

The Study Area contains non-native grassland. Holland (1986) describes non-native grassland as a dense to sparse cover of non-native annual grasses with flowering culms 0.2 to 1 meter high and often associated with numerous species of showy-flowered annual forbs. This community often occurs on fine-textured, usually clay soils that are moist or saturated during the winter rainy season and very dry during the summer and fall. Within the Study Area, this community occurs in patches, the largest of which is in the northern portion of the Study Area. Non-native grassland is dominated by non-native grasses, such as rattail fescue (*Festuca myuros* [*Vulpia myuros*], FACU), velvetgrass (*Holcus lanatus*, FAC), and Italian ryegrass (*Festuca perennis [Lolium multiflorum*], FAC), and non-native forbs, including bristly ox-tongue (*Helminthotheca echioides* [*Picris echioides*], FACU), wild radish (*Raphanus sativus*, UPL), sheep sorrel (*Rumex acetosella*, FACU), and Bermuda buttercup (UPL).

Developed/Disturbed Areas

The Study Area contains developed and disturbed areas that are primarily composed of an informal trail network, Smith Field Little League Park in the east, and Redondo Beach Road and parking in the south. The informal trail network contains dirt footpaths that are stripped of vegetation due to use and are rutted in some locations. The parking area at the terminus of Redondo Beach Road also provides beach access.

Monterey Cypress Stands

The Study Area contains Monterey cypress stands along the north, south, and eastern perimeter. While Holland (1986) does not describe a habitat for Monterey cypress (*Hesperocyparis macrocarpa*, UPL), CNPS (2020b) describes Monterey cypress stands (*Hesperocyparis macrocarpa* Woodland Special Stands, Rarity Ranking G1 S1) as naturally forming in headlands and sheltered areas along the coast on soils derived from granite. However, these species are noted for their invasive tendencies along the California coast and are planted ornamentally throughout the coast for their ability to provide windbreaks (CNPS 2020b). The understory of the Monterey cypress stands within the Study Area was comprised of bare ground and contained a thick layer of leaf litter with occasional patches of non-native species such as Bermuda buttercup. The rarity ranking of G1 S1 (globally and state-wide critically imperiled) for Monterey cypress stands only pertains to the two natural stands known to occur in Monterey County, California, and this species is otherwise recognized by the California Invasive Plant Council (Cal-IPC 2020) for its ability to invade wildlands outside of its native range. Therefore, given the location of the Study Area, Monterey cypress stands are not considered sensitive under CEQA.

Eucalyptus Groves

The Study Area contains eucalyptus groves. Tree cover dominated by blue gum (*Eucalyptus globulus*, UPL) is not described by Holland (1986). However, CNPS (2020b) describes Eucalyptus groves – tree of heaven – black locust groves (*Eucalyptus* spp. – *Ailanthus altissima* – *Robinia pseudoacacia* Woodland Semi-Natural Alliance) as planted groves used for windbreaks and naturalized along stream courses and in uplands. Eucalyptus groves occurred in the southeast portion of the Study Area, along Redondo Beach Road, and contained an understory primarily composed of leaf litter. Blue gum is rated by Cal-IPC as “Moderate” for its ability to invade wildlands and this biological community therefore has no rarity ranking and is not considered sensitive under CEQA.

Coyote Brush/Western Rush Scrub

The Study Area contains coyote brush/western rush scrub, which occurs within the northern portion of Study Area. This community was dominated by coyote brush and western rush. Popcorn flower was observed scattered throughout this community and was associated with shaded micro-depressions under coyote brush and senesced western rush.

While this biological community is not discussed by Holland (1986), western rush marshes (*Juncus patens* Provisional Herbaceous Alliance, Rarity Ranking G4 S4) are described by CNPS (2020b) as appearing on drier sites than those of other forb alliances including soft rush (*Juncus effusus*, FACW), small-fruited bulrush (*Scirpus microcarpus*, OBL), and slough sedge (*Carex obnupta*, OBL). Additionally, some stands appear seral to those dominated by coyote brush (CNPS 2020b).

This biological community is rated as apparently secure, both globally and state-wide. Western rush is a facultative wetland plant that receives sufficient moisture from persistent coastal fog conditions. The species' codominance within this community is not indicative of wetland conditions and it is therefore not considered sensitive under CEQA.

Ice Plant Mats

Ice plant mats (*Mesembryanthemum* spp. – *Carpobrotus* spp. Herbaceous Semi-Natural Alliance) are described by CNPS (2020b) as occurring on bluffs, disturbed land, sand dunes along the coastline, and on coastal and alkaline terraces. Holland does not describe this community type. In the Study Area, ice plant (*Carpobrotus edulis*, UPL) mats were scattered along the western portion of the coastal field and occurred on the sea cliffs. Ice plant mats have no rarity ranking and ice plant is rated by Cal-IPC as "High" for its ability to invade wildlands. Therefore, this semi-natural herbaceous stand is not considered sensitive under CEQA.

4.1.2 Environmentally Sensitive Habitat Areas (ESHAs)

Non-Wetland Waters (ESHA)

Within the Study Area, non-wetland waters occur as an unnamed intermittent to perennial drainage (Ravine 9) located centrally, draining from east to west; and as tidal waters associated with the Pacific Ocean. Both types of non-wetland waters are regulated by the Corps, RWQCB, and the CCC. Additionally, streams are regulated by the CDFW. Therefore, non-wetland waters associated with the intermittent to perennial drainage in Ravine 9 and the Pacific Ocean are considered sensitive under CEQA. These habitats are discussed in more detail in Section 4.2 below.

Sea Cliffs (ESHA)

Within the Study Area, sea cliff occurs along the western boundary. As defined by the CCC, a sea cliff is a cliff whose toe is or may be subject to marine erosion. In addition, a sea cliff is a scarp or steep face of rock, weathered rock, sediment, or soil resulting from erosion, faulting, folding, or excavation of the land mass. The cliff or bluff may be simple planar or curved surface or it may be step-like in section. Sea cliffs occur within the Study Area along the entirety of the western boundary.

Central Coast Riparian Scrub (ESHA)

Holland (1986) describes central coast riparian scrub as a scrubby streamside thicket varying from open to impenetrable and dominated by willow (*Salix* sp.) with characteristic species including coyote brush. CNPS (2020b) treats this alliance as arroyo willow thickets (*Salix lasiolepis* Shrubland Alliance, Rarity Ranking G4 S4). This community occurs on sand and gravel bars close to groundwater.

In the Study Area, central coast riparian scrub occurs within an intermittent to perennial drainage in Ravine 9 that drains to the Pacific Ocean. Central coast riparian scrub was dominated by arroyo willow (*S. lasiolepis*, FACW) with coyote brush encroaching along the edges and filling in gaps of arroyo willow. A sample point (SP 7) was taken within the edge of riparian habitat along the western side of the Study Area to document the conditions of the riparian floodplain. Central coast riparian scrub, as the arroyo willow thickets alliance, is rated as apparently secure globally and state-wide; however, because this habitat occurs as a riparian community, it is regulated by the CDFW and RWQCB and is therefore considered sensitive under CEQA. Additionally, riparian communities are regulated under the City LCP and are therefore considered an ESHA.

Seasonal Wetland (ESHA)

Seasonal wetland is not described by CNPS (2020b) as a distinct series because it is not characterized by a single dominant plant species or a typical group of plant species. Seasonal wetlands in the Study Area included seasonally wetted depressions and swales formed from past human disturbance. Some seasonal wetland swales appear to be remnant irrigation ditches from historic agricultural practices within the Study Area from the 1940s (NETR 2020). Additionally, several areas of seasonal wetland marshes did not contain obvious concave topographical relief but were comprised of plant hummocks and undulating microtopography.

Within the Study Area, seasonal wetlands occur in association with northern coastal scrub and non-native grassland communities (CNPS 2020b). Seasonal wetlands are a type of wetland that exhibit seasonal saturation and/or inundation sufficient to meet the three-parameter definition of a wetland discussed in Section 3.2.1. Seasonal wetlands within the Study Area contained wetland hydrology including the presence of surface water in many cases. While hydric soils were not observed within many seasonal wetland features, seasonally ponded soils in depressions with shallow restrictive layers and saline conditions are known to be naturally problematic. Seasonal wetland areas are typically dominated by pennyroyal (*Mentha pulegium,* OBL), spike rush (*Eleocharis macrostachya,* OBL), popcorn flower (OBL), curly dock (*Rumex crispus,* FAC), brown headed rush (*Juncus phaeocephalus*, FACW), and rabbitsfoot grass (*Polypogon monspeliensis,* FACW), with sparse amounts of tall cyperus (C*yperus eragrostis*, FACW). Seasonal wetlands are discussed in more detail in Section 4.2 below.

Beaches (ESHA)

The Study Area includes beaches. Beaches consist of barren, mobile sand accumulations whose size and shape are determined by abiotic factors such as wind, rather than by stabilizing vegetation. CNPS (2020b) does not describe this community. The closest Holland association to beaches is active coastal dunes, which occur along the Pacific Coast where sandy beaches are present and coastal headlands are absent. The CCC and LCP regulate beaches and this community is therefore considered sensitive under CEQA.

Coastal Seasonal Wetland (ESHA)

Coastal seasonal wetlands include seasonal wetland depressions, swales, and meadows, which met one or two of the criteria outlined in the Corps Delineation manual but not all three; these areas are considered coastal wetlands as they meet the definition of a wetland pursuant to the CCC/LCP. Within the Study Area, coastal seasonal wetlands were observed. Coastal seasonal wetlands are discussed in more detail in Section 4.2 below.

4.2 Aquatic Resource Delineation

A delineation of potentially jurisdictional aquatic resources within the Study Area, not including the Utility Area, was conducted on January 26 and 27 and February 9 and 16, 2016. A delineation of the Utility Area was conducted on January 14, 2020. Potentially jurisdictional aquatic resources observed within the Study Area are shown in Appendix A, and acreages are summarized in Table 2 below. Corps delineation data sheets are included as Appendix B. CCC/LCP delineation data sheets are included as Appendix C.

4.2.1 Upland Areas

Upland areas were typically dominated by non-native ruderal vegetation including sheep sorrel (FACU), Italian ryegrass (FAC), velvetgrass (FAC), bristly ox-tongue (FACU), and wild geranium (*Geranium dissectum*, UPL). In areas of northern coastal scrub habitat, upland areas were typically dominated by a mix of the aforementioned non-native species and native species characteristic of this habitat type including coyote brush (UPL), soap plant (UPL), California horkelia (UPL), and western rush (FACW).

Soils within upland areas were comprised of dark (10YR 2-3/2, 7.5YR 3/2) silt or clay loams. Some sample points contained a clay layer at 9 inches (SP 17), 10 inches (SP 15, SP 27), or 11 inches (SP 6, SP 11). No upland sample point locations met any hydric soil indicators.

Some upland areas examined during January 26 and 27, 2016 (SP 2, SP4, SP 13, SP 17) exhibited wetland hydrology indicators including high water table of depths ranging from 4-10 inches below ground surface. However, this was reflective of approximately 2.73 inches of rain within the eight days preceding the site visit and is not indicative of wetland hydrology conditions.

4.2.2 Wetlands

All of the areas mapped as potential Section 404 jurisdictional wetlands are also considered potentially jurisdictional by the RWQCB and CCC (Appendix A). However, some mapped wetlands did not meet all three of the criteria outlined in the Corps Manual but were considered CCC/LCP wetlands if they met one or two of the Corps criteria.

4.2.2.1 Seasonal Wetlands

Seasonal Wetland Depressions

Seasonal wetland depressions occurred throughout the Study Area, typically adjacent to developed trails. Seasonal wetland depressions were observed with standing water January 26 and 27 of 2016 and in some instances on January 14, 2020. Though at the beginning of the growing season, these features met the vegetative percent cover and hydrophytic vegetation wetland indicator requirements to be considered potentially jurisdictional wetland features.

Seasonal Wetland Depressions 1, 2, 6, 8, 12, 17, 30, 48, 53, and 58

Seasonal wetland depressions characterized by sample point 1 (SP 1) included seasonal wetland 1 (SW 1), SW 2, SW 6, SW 8, SW 12, SW 17, SW 30, SW 48, SW 53, and SW 58. At the time of the January 26, 2016 site visit, seasonal wetland depressions characterized by SP 1 were dominated by tall cyperus (FACW), and Italian rye grass (FAC), with curly dock (FAC), with new growth of pennyroyal (OBL) represented in lesser amounts. All seasonal wetland depressions were dominated by facultative wetland plant species and met the dominance test indicator for hydrophytic vegetation.

Soils within SP 1 were a dark (7.5YR 2.5/1) silty loam to clay loam to approximately 8 inches and were underlain by a restrictive clay layer that contained redoximorphic features including concentrations and depletions in the matrix. During the January site visits, soil profiles were typically saturated for seasonal wetland depressions due to presence of surface water. While the sample point did not meet any primary or secondary hydric soil indicators at the time of the site visit, the sample points were taken from naturally problematic seasonally ponded soils in a ponded depression with a restrictive clay layer and lack said indicators due to limited saturation depth and saline conditions. All seasonal wetland depressions were observed with standing surface water up to depths of 16 inches during January 2016 site visits.

Table 2. Potentially Jurisdictional Features within the Study Area

POTENTIALLY JURISDICTIONAL AREA			HABITAT SIZE (acres/linear feet)
Corps (Section 404)	Seasonal Wetlands	On-site	1.73
		Off-site	1.73
	Non-wetland Waters (to OHWM[6])	On-site	0.35/1,362
		Off-site	0.34/871
Corps (Section 404/10)	Tidal Waters (to HTL[7])	On-site	7.98
		CORPS TOTAL	**12.13/2,233**
RWQCB (Section 401)	Seasonal Wetlands	On-site	1.73
		Off-site	1.73
RWQCB (Section 401)	Non-wetland Waters (to TOB[8])	On-site	1.89/1,362
		Off-site	2.80/871
RWQCB (Section 401)	Riparian	On-site/Off-site	4.80
RWQCB (Section 401)	Tidal Waters (to HTL[9])	On-site	7.98
		RWQCB TOTAL	**20.90/2,233**
CDFW (Section 1600)	Streams (to TOB[10])	On-site	1.89/1,362
		Off-site	2.80/871
CDFW (Section 1600)	Riparian	On-site/Off-site	4.80
		CDFW TOTAL	**9.37/2,233**
CCC/LCP-Only[11]	Coastal Seasonal Wetlands	On-site	0.24
		Off-site	0.45
		CCC/LCP-ONLY TOTAL	**0.69**

Seasonal Wetland Depressions 38, 97, 98, 99, 100, and 101

Seasonal wetland depressions that were representative of SP 5 included SW 38, SW 97, SW 98, SW 99, SW 100, and SW 101. Seasonal wetland depressions characterized by SP 5 were dominated by spike rush (OBL), brown headed rush (FACW), with apparent curly dock (FAC), tall cyperus (FACW), and new growth of pennyroyal (OBL). All seasonal wetland depressions were dominated by facultative wetland plant species and met the dominance test indicator for hydrophytic vegetation.

Soils within SP 5 were a dark (7.5YR 2.5/1) silty loam to clay loam to approximately 8 inches and were underlain by a restrictive clay layer that contained redoximorphic features including concentrations and depletions in the matrix. During the January site visits, soil profiles were typically saturated for seasonal wetland depressions due to presence of surface water. While the sample point did not meet any primary or secondary hydric soil indicators at the time of the site visit, the sample points were taken from naturally problematic seasonally ponded soils in a ponded depression with a restrictive clay layer and lack said indicators due to limited saturation depth and saline conditions. As previously stated, all seasonal wetland depressions were observed with standing surface water up to depths of 16 inches during January 2016 site visits. Additionally, seasonal wetland depressions associated with SP 5 contained biotic crust in the form of algal growth.

Seasonal Wetland Depressions 86, 87, 89, 90, 91, 92, 93, and 108

Seasonal wetland depressions characterized by SP 10 include SW 86, SW 87, SW 89, SW 90, SW 91, SW 92, SW 93, and SW 108. Seasonal wetland depressions represented by SP 10 were primarily dominated by pennyroyal (OBL) with other species present including brown headed rush (FACW), velvetgrass (FAC), and curly dock (FAC). All seasonal wetland depressions were dominated by facultative wetland plant species and met the dominance test indicator for hydrophytic vegetation.

Soils at SP 10 remained a dark (7.5YR 3/1) clay loam until 12 inches, underlain by a restrictive clay layer with redoximorphic features such as concentrations (5YR 6/8) in the matrix up to 15 percent. During the January site visits, soil profiles were typically saturated for seasonal wetland depressions due to presence of surface water. While the sample point did not meet any primary or secondary hydric soil indicators at the time of the site visit, the sample points were taken from naturally problematic seasonally ponded soils in a ponded depression with a restrictive clay layer

[6] Ordinary High Water Mark
[7] High Tide Line
[8] Top of Bank
[9] High Tide Line
[10] Top of Bank
[11] CCC/LCP will also have jurisdiction over Corps/RWQCB and CDFW Jurisdictional Areas listed above.

and lack said indicators due to limited saturation depth and saline conditions. All seasonal wetland depressions were observed with standing surface water up to depths of 16 inches during January 2016 site visits. Additionally, seasonal wetland depressions associated with SP 10 contained biotic crust in the form of algal growth.

Seasonal Wetland Depressions 63, 65, 66, 67, 68, 69, and 80

Seasonal wetland depressions characterized by SP 14 included SW 63, SW 65, SW 66, SW 67, SW 68, SW 69, and SW 80. Seasonal wetland depressions were observed with standing water January 26 and 27 of 2016 and while at the beginning of the growing season, these features met the vegetative percent cover and hydrophytic indicator requirements to be potentially considered wetland features. Sample point 14 was dominated by brown headed rush (FACW) and curly dock (FAC) with apparent new growth of pennyroyal (OBL) and small amounts of velvetgrass (FAC), sheep sorrel (FACU), and bristly ox-tongue (FACU) within the feature perimeter. All seasonal wetland depressions were dominated by facultative wetland plant species and met the dominance test indicator for hydrophytic vegetation.

Sample point 14 contained a dark (10YR 2/1) silt loam that was difficult to accurately observe below 8 inches due to saturated soils and soil fall back. During the January site visits, soil profiles were typically saturated for seasonal wetland depressions due to presence of surface water. While the sample point did not meet any primary or secondary hydric soil indicators at the time of the site visit, the sample points were taken from naturally problematic seasonally ponded soils in a ponded depression with a restrictive clay layer and lack said indicators due to limited saturation depth and saline conditions. As previously stated, all seasonal wetland depressions were observed with standing surface water up to depths of 16 inches during January 2016 site visits.

Seasonal Wetland Depressions 4, 9, and 102

Sample point 24 was representative of seasonal wetland features in low-lying broadly depressional settings for SW 4, SW 9, and SP 102. Shallower seasonal wetland features associated with SP 24 did not have standing water during February 2016 site visits. Seasonal wetlands characterized by SP 24 were dominated by Monterey sedge (*Carex harfordii*, OBL), pennyroyal (OBL), and western rush (FACW) and also had characteristic species including popcorn flower (OBL), velvetgrass (FAC), and rabbitsfoot grass (FACW). All seasonal wetland depressions were dominated by facultative wetland plant species and met the dominance test indicator for hydrophytic vegetation.

Sample point 24 contained brown (7.5YR 4/2) clay loam that was underlain by brown clay at 10 inches. Sample point 24, which was taken February 16, 2016, was moist. While the sample point did not meet any primary or secondary hydric soil indicators at the time of the site visit, the sample points were taken from naturally problematic seasonally ponded soils in a ponded depression with a restrictive clay layer and lack said indicators due to limited saturation depth and saline conditions. Seasonal wetland depressions associated with SP 24 contained biotic crust in the form of algal growth.

Seasonal Wetland Depressions 114 and 115

Sample point 30 was representative of seasonal wetland features located within shallow, linear, man-made ditches adjacent to roads within the Utility Area. SW 114 was adjacent to the east side of Occidental Avenue, and SW 115 was adjacent to the south side of Redondo Beach Road, east of Occidental Avenue. Standing water was observed by in SW 114 and SW 115 during the January 2020 site visit. Seasonal wetlands characterized by SP 30 were dominated by pennyroyal (OBL), tall cyperus (FACW), rabbitsfoot grass (FACW), and California blackberry (FAC).

A representative soil pit could not be excavated at sample point 24 due to unstable, saturated soils and surface water. Hydric soils were assumed based on the dominance of perennial hydrophytes and ponded water up to approximately 10 inches deep within a closed depression. Sample point 24 met the surface water and saturation primary wetland hydrology indicators and the FAC-neutral test secondary hydrology indicator.

<u>Seasonal Wetland Marsh</u>

Seasonal wetland marshes characterized by a predominance of rush (*Juncus* spp.) hummocks occur within northern, eastern, and southern portions of the Study Area.

Seasonal Wetland Marshes 103 and 104

Sample point 12 characterizes seasonal wetland marshes for SW 103 and SW 104. Seasonal wetland marshes characterized by SP 12 were dominated by brown headed rush (FACW), western rush (FACW), and velvetgrass (FAC), with areas of greater inundation containing pennyroyal (OBL) and spike rush (OBL). Soils for SP 12 exhibited a histic epipedon and were a dark (7.5YR 2.5/1) silty clay loam that was saturated and mucky. Wetland hydrology for SP 12 included surface water up to 4 inches deep, inundation and saturation visible on aerial imagery (Google Earth 2016: May 2011, March 2015), biotic crust from algal matting, and this location met the secondary indicator for the FAC-Neutral test.

Seasonal Wetland Marshes 34, 35, 36, 41, 111, 112, and 113

Sample Point 16 is representative of SW 34, SW 35, SW 36, and SW 41. Seasonal wetland marshes characterized by SP 16 were dominated by brown headed rush (FACW), western rush (FACW), and velvetgrass (FAC), with areas of greater inundation containing pennyroyal (OBL) and spike rush (OBL). Additionally, curly dock (FAC) was more prevalent in seasonal wetland marshes characterized by SP 16.

Soils for SP 16 were very dark grayish brown (10YR 3/2) silt to 4 inches, underlain by a dark brown (7.5YR 3/2) clay loam to 8 inches. This soil was underlain to 14 inches by a restrictive clay layer that contained 6 percent redox within the matrix. While SP 16 does not meet any hydric soil indicators, the feature occurs in a low-lying area that is seasonally ponded and contains a restrictive clay layer. Seasonal wetlands associated with SP 16 therefore contain naturally problematic seasonally ponded soils that lack hydric soil indicators due to limited saturation depth and saline conditions. Sample point 16 was observed with surface water up to 6 inches deep and also met the secondary indicator for the FAC-Neutral test.

Seasonal Wetland Marshes 19, 20, 21, 22, 46, 47, 61, 62, and 64

Sample Point 22 is representative of SW 19, SW 20, SW 21, SW 22, SW 46, SW 47, SW 61, SW 62, and SW 64. Similarly, seasonal wetlands characterized by SP 22 were dominated by brown headed rush (FACW), patches of Monterey sedge (OBL), and velvetgrass (FAC), with curly dock (FAC), and bristly ox-tongue (FACU) around the wetland fringe.

Soils displaying a depleted matrix were observed at SP 22 and were a brown (7.5YR 4/2) clay with concentrations observed along pore linings and in the matrix at 15 percent underlain at 6 inches with dark gray (7.5YR 4/1) clay soils with 5 percent concentrations along pore linings and within the matrix.

Indicators of wetland hydrology at SP 22 included a high water table at 6 inches below ground surface, biotic crust in the form of algal matting, oxidized rhizospheres along living roots, and met the secondary indicator for the FAC-Neutral test.

Seasonal Wetland Swales

Seasonal Wetland Swales 25, 43, 44, and 45

Seasonal wetland swales were observed along the eastern portion of the Study Area. Seasonal wetland swales, SW 25, SW 43, SW 44, and SW 45 were characterized by SP 8. Seasonal wetland swales typically appeared to have formed from historic tire tracks. During the January 27, 2016 site visit, SP 8 was inundated with 4 inches of water and vegetation was at the beginning of its growth cycle. The swale was observed to be dominated by brown headed rush (FACW), curly dock (FAC), and had new growth of pennyroyal at low percent cover.

Soils were a very dark brown (10YR 2/2) clay loam that was underlain at 12 inches by a dark grayish brown (2.5Y 4/2) clay loam with 15 percent redoximorphic concentrations in the matrix. This soil profile was saturated due to presence of surface water. While this sample point did not meet any primary or secondary hydric soil indicators at the time of the site visit, the sample point was taken from naturally problematic seasonally ponded soils in a ponded depression with a restrictive clay layer and lacks said indicators due to limited saturation depth and saline conditions.

All seasonal wetland swales characterized by SP 8 were observed with standing water during the January and February site visits. Hydrology observed at SP 8 included surface water present up to 4 inches deep, biotic crust in the form of algal matting, and the secondary indicator was met for the FAC-Neutral test.

4.2.2.2 Coastal Seasonal Wetlands

Coastal Seasonal Wetland Depressions

Coastal Seasonal Wetland Depressions 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 81, 82, 83, 84, and 85

Shallow coastal seasonal wetland depressions were identified adjacent to the informal trail network throughout the Study Area. Sample point 28 represents coastal seasonal wetland depressions including SW 70, SW 71, SW 72, SW 73, SW 74, SW 75, SW 76, SW 77, SW 78, SW 79, SW 81, SW 82, SW 83, SW 84, and SW 85.

Sample point 28 was dominated by Italian ryegrass (FAC), popcorn flower (OBL), and rabbitsfoot grass (FACW). Other plants typically observed in coastal seasonal wetland depressions included curly dock (FAC), tall cyperus (FACW), and velvetgrass (FAC). This coastal seasonal wetland depression was dominated by facultative wetland plants and meets the dominance test for hydrophytic vegetation. Soils within the coastal seasonal wetland depression for SP 28 and were a dark (7.5YR 2.5/1) clay loam to 14 inches, with trace fine sand and did not meet any indicators for hydric soils. Wetland hydrology observed within SP 28 included biotic crust in the form of algal matting and the secondary indicator was met for the FAC-Neutral Test.

Features determined to be coastal seasonal wetland depressions were observed with surface water during the January 26, 2016 site visit and were observed to be dry 14 days later during the February 9, 2016 site visit. Given that 2.73 inches of rainfall occurred within the eight days prior to the January 26 and 27, 2016 site visits, the presence of surface water in January was likely due to recent precipitation and was not indicative of conditions of wetland hydrology. However, because these features meet one or two wetland parameters including the presence of hydrophytic vegetation and wetland hydrology such as biotic crust, they were determined to function as coastal seasonal wetlands.

<u>Coastal Seasonal Wetland Swales</u>

Coastal seasonal wetland swales occurred within portions of the Study Area that have prior human disturbance, typically from previous vehicular use. Coastal seasonal wetland swales met one or two wetland parameters and occurred in a topographic position within the Study Area to function as coastal wetlands.

Coastal Seasonal Wetland Swales 18, 23, and 33

Sample point 3 is representative of SW 18, SW 23, and SW 33. Vegetation present within SP 3 did not meet any indicators for hydrophytic vegetation and was dominated by rabbitsfoot grass (FACW), sheep sorrel (FACU), curly dock (FAC), and bristly ox-tongue (FACU) with sparing vegetative cover of velvetgrass (FAC), Italian ryegrass (FAC), Italian thistle (*Carduus pycnocephalus* ssp. *pycnocephalus*, UPL), wild geranium (UPL), pennyroyal (OBL), and spring vetch (*Vicia sativa*, UPL). Soils for SP 3 contained a depleted dark surface and met hydric soil conditions with a dark (7.5YR 2.5/1) silt clay layer to 4 inches, underlain by a dark (2.5Y 2.5/1) clay layer that contained 35 percent depletions and 5 percent concentrations in the matrix. Observed wetland hydrology included for SP 3 included surface water 2 inches in depth and biotic crust in the form of algal matting

Coastal Seasonal Wetland Swale 23

Sample point 18 is representative of SW 23. Vegetation present within SP 18 did not meet any indicators for hydrophytic vegetation and was dominated by rabbitsfoot grass (FACW), sheep sorrel (FACU), curly dock (FAC), and bristly ox-tongue (FACU) with sparing vegetative cover of velvetgrass (FAC), Italian ryegrass (FAC), Italian thistle (UPL), wild geranium (UPL), pennyroyal (OBL), and spring vetch (UPL). Hydric soil indicators were not met for SP 18, which contained a dark silty loam to 14 inches. Wetland hydrology observed SP 18 included a water table present at 3 inches below ground surface and biotic crust in the form of algal matting.

Coastal Seasonal Wetland Swales 49, 50, 51, 52, 54, 55, 56, 57, 60, 88, 94, 95, 96, 105, 106, 107, 108, 109, 110

Sample Point 26 characterizes conditions at SW 49, SW 50, SW 51, SW 52, SW 54, SW 55, SW 56, SW 57, SW 60, SW 88, SW 94, SW 95, SW 96, SW 105, SW 106, SW 107, SW 108, SW 109, and SW 110. Sample point 26 was dominated by hydrophytic vegetation including Italian ryegrass (FAC), Monterey sedge (OBL), and brown headed rush (FACW) with more sparse vegetative cover including bristly ox-tongue (FACU), wild geranium (UPL), sheep sorrel (FACU), curly dock (FAC), and scarlet pimpernel (*Lysimachia arvensis*, FAC). Hydric soil indicators were not met for SP 26, which contained a dark brown clay loam that was underlain by a dark brown clay starting at 10 inches. No indicators of wetland hydrology were observed for SP 26.

<u>Coastal Seasonal Wetland Meadows</u>

Coastal seasonal wetland meadows within the Study Area occurred in the northern coastal scrub, coyote brush/western rush scrub, and in non-native grassland habitats and met at least one wetland parameter.

Coastal Seasonal Wetland Meadows 26, 27, and 28

Sample point 21 represents characteristic conditions of SW 26, SW 27, and SW 28. Coastal seasonal wetland meadows characterized by SP 21 were dominated by Monterey sedge (OBL) and bristly ox-tongue (FACU), with vegetative cover by other species including wild geranium (UPL), velvetgrass (FAC), and curly dock (FAC). While SP 21 did not meet hydrophytic vegetation wetland indicators, Monterey sedge dominated central areas of the associated coastal seasonal wetland features.

No hydric soils indicators were observed for SP 21 and soils were a dark brown (7.5YR 3/2) clay loam and were underlain by dark brown clay at 10 inches. Wetland hydrology was observed for SP 21, including a high water table at 10 inches below ground surface, and the secondary indicator was met for FAC-Neutral test.

Coastal Seasonal Wetland Meadows 3, 5, 7, 10, 13, 14, 15, 16, 29, 31, 32, 37, 39, and 40

Sample point 25 represents SW 3, SW 5, SW 7, SW 10, SW 13, SW 14, SW 15, SW 16, SW 29, SW 31, SW 32, SW 37, SW 39, and SW 40. Vegetation at SP 25 was characterized by facultative wetland vegetation including popcorn flower (OBL), western rush (FACW), and rabbitsfoot grass (FACW), with sparse amounts of pennyroyal (OBL). Coastal seasonal wetlands characterized by SP 25 were typically dominated by popcorn flower (OBL) with other codominant species shifting between the other species noted.

No hydric soils indicators were observed for SP 25 and soils were a brown (7.5YR 4/2) clay loam transitioning to a brown clay at 10 inches. No indicators of wetland hydrology were observed for SP 25.

4.2.3 Non-Wetland Waters

Two potential Section 404 jurisdictional non-wetland waters occur within the Study Area: an intermittent to perennial stream feature in Ravine 9 and tidal waters associated with the Pacific Ocean.

<u>Intermittent to Perennial Stream</u>

The intermittent to perennial stream is associated with a ravine or gully area that runs from east to west and likely forms upstream from overland sheetflow. Approximately 2,233 linear feet (0.69 acre) of non-wetland waters potentially jurisdictional by the Corps was mapped during the January 26, 2016, site visit by mapping points for OHWM and correlating this to topographical survey data for the Study Area. Signs of OHWM observed included vegetation bent in the direction of flow, drift deposits, a break in grade, and water staining.

Approximately 2,233 linear feet (4.69 acres) of intermittent to perennial stream potentially jurisdictional by the RWQCB, CDFW, and CCC was mapped during the January 26, 2016, site visit based on the top of bank (TOB) of the ravine. TOB was determined using topographic survey data to differentiate a clear break in grade.

Non-wetland Tidal Waters

A total of 7.98 acres of non-wetland tidal waters associated with the Pacific Ocean were mapped during the January 27, 2016, site visit based on a visual determination of the high tide line (HTL) and correlating it to topographical survey data of the Study Area. Signs of HTL included a clear deposit of fine shell or debris, a slight break in grade, and apparent water staining from recent high tides. Non-wetland tidal waters are potentially jurisdictional by the Corps, RWQCB, and CCC.

4.2.4 Soils

Mapped soil mapping in the Study Area are depicted in Figure 4. The Study Area has relatively level macro-topography with an overall gentle slope to the west and northwest. The site exhibits human disturbance to soils through compaction where informal trails exist and tire ruts exist throughout the northern coastal scrub and non-native grassland habitat in the central and eastern portions of the Study Area.

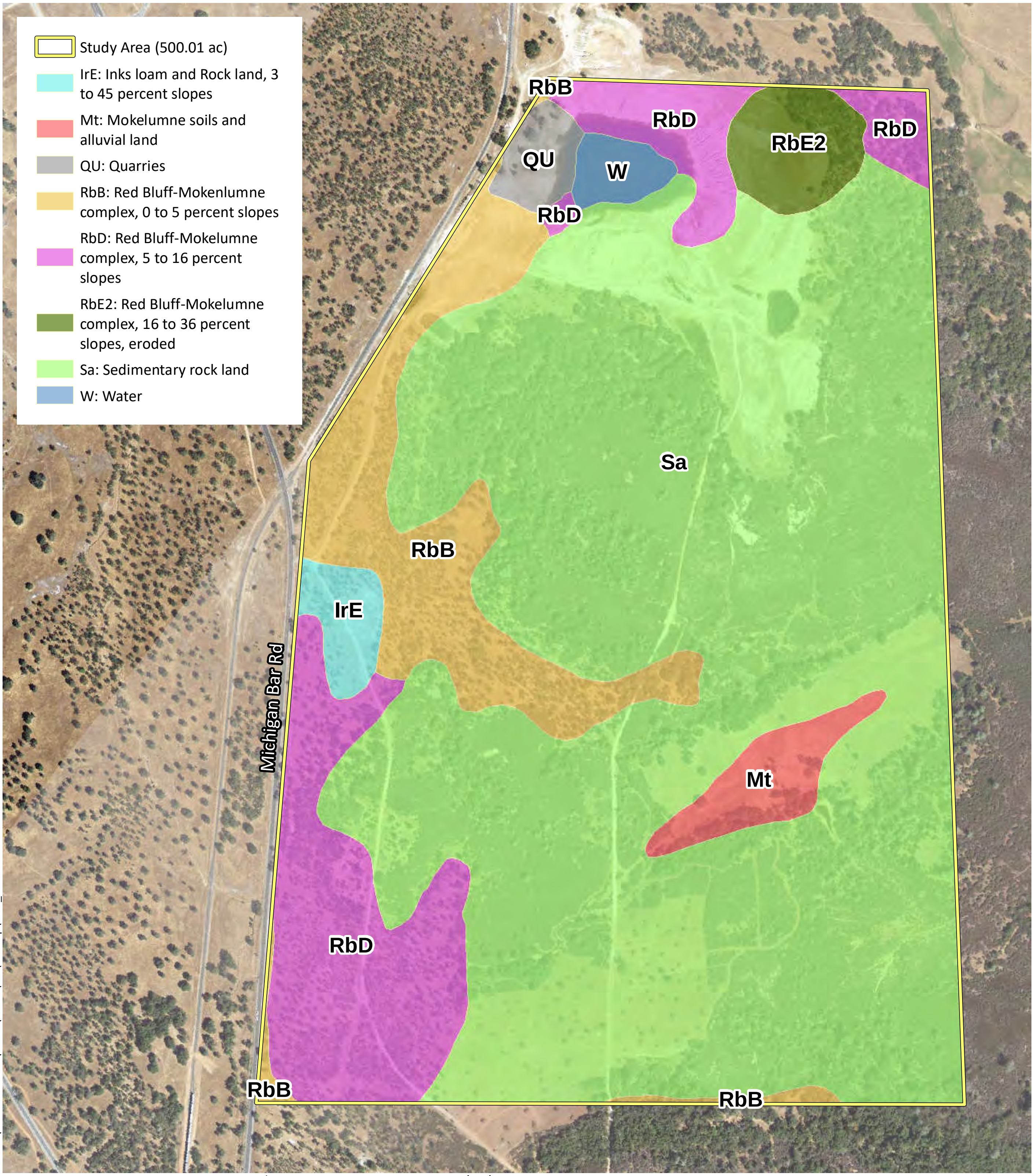
Based on the Soil Survey of San Mateo County, Western Part (NRCS 2016), the Study Area is underlain primarily by seven soil mapping units: Colma sandy loam, moderately steep, Watsonville sandy loam, gently sloping; Watsonville sandy loam, gently sloping, eroded; Watsonville sandy loam, sloping; Watsonville loam, nearly level; terrace escarpments; gullied land, and beaches.

Watsonville Units.

The Watsonville map unit consists of deep, somewhat poorly drained soils derived from sedimentary alluvium. The Watsonville series is located on old coastal terraces and valleys with slopes ranging from 0 to 50 percent. A typical profile includes eight soil horizons: Ap, E, Bt1, Bt2, Bt3, C1, C2 and C3.

The Ap horizon is a very dark greyish brown (10YR 3/2), slightly acidic (pH 6.5) loam from 0-12 inches. Beneath this is an E horizon from 12-18 inches containing a slightly acidic (pH 6.5), light gray (10YR 7/2) sandy loam. This is underlain by three Bt horizons; the first Bt horizon (Bt1) is a slightly acidic (pH 6.4), pale brown (10YR6/3) and dark grayish brown (10YR 4/2) clay from 18-26 inches. The second Bt horizon, from 26-33 inches and contains a slightly acidic (pH 6.3), light gray (10YR 7/2) and very pale brown (10YR 7/3) clay. The third Bt horizon is from 33-39 inches and contains a slightly acidic (pH 6.3), light gray (10YR 7/2) and very pale brown (10YR 7/3) clay. The Bt horizons are underlain by three C horizons; the first is from 39-45 inches and contains a slightly acidic (pH 6.2), light gray (10YR 7/2) and very pale brown (10YR 7/3) sandy clay loam. This is underlain by the second C horizon from 45-57 inches, containing a moderately acidic (pH 6.0), variegated light gray (10YR 7/2), very pale brown (10YR 7/3) and yellow (10YR 7/6) sandy clay loam.

The third C horizon, from 57-63 inches, contains moderately acidic (pH 6.0), variegated light gray (10YR 7/2), very pale brown (10YR 7/3), and yellow (10YR 7/6) sandy clay loam.



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Sources: NAIP 2018 Aerial Imagery, WRA | Prepared By: mweidenbach, 5/29/2020

Figure 2. Study Area Soils Map

Ione Landfill Project
Amador County, California

0 500 1,000 Feet

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wra ENVIRONMENTAL CONSULTANTS

Watsonville sandy loam, gently sloping

The gently sloping Watsonville sandy loam map unit is a hydric consociation of the Watsonville soil series described above. The Watsonville soil series is the major component comprising 85 percent of the map unit while Elkhorn (10 percent), Tierra (4 percent), and an unnamed series (1 percent) make up the rest. The unnamed soil series is located within depressions within this map unit.

Watsonville sandy loam, gently sloping, eroded

The gently sloping, eroded Watsonville sandy loam map unit is a hydric consociation of the Watsonville soil series described above. The Watsonville soil series is the major component comprising 85 percent of the map unit while Elkhorn (5 percent), Tierra (5 percent), and Baywood (5 percent) make up the rest.

Watsonville sandy loam, sloping

The sloping Watsonville sandy loam map unit is a hydric consociation of the Watsonville soil series described above. The Watsonville soil series is the majority component comprising 85 percent of the map unit while Elkhorn (10 percent), Tierra (4 percent), and an unnamed series (1 percent) make up the rest. The unnamed soil series is located in swales within this map unit.

Watsonville loam, nearly level

The nearly level Watsonville sandy loam map unit is a hydric consociation of the Watsonville soil series described above. The Watsonville soil series is the majority component comprising 85 percent of the map unit with Elkhorn (5 percent), Tierra (5 percent), and an unnamed series (5 percent) make up the rest. The unnamed soil series is located in depressions within this map unit.

Colma Sandy Loam

The Colma map unit consists of deep, well drained soils that formed in material weathering from softly consolidated or weakly consolidated marine sediments. Colma series soils are located on foothills and have slopes ranging from 9 percent to 75 percent. A typical profile includes 6 soil horizons: A11, A12, A3, B21t, B22t and C. The first A horizon is from 0-4 inches, containing a slightly acidic (pH 6.5), very dark gray (10YR 3/1) loam. The second A horizon is from 4-10 inches and contains a slightly acidic (pH 6.2), very dark gray (10YR 3/1) loam. Beneath this is the third A horizon from 10-17 inches containing slightly acidic (pH 6.2), very dark gray (10YR 3/1) loam. This is underlain by 2 Bt horizons, the first being from 17-28 inches and containing a moderately acidic (pH 6.0), light yellowish brown (10YR 6/4) loam. The second Bt horizon is from 28-39 inches and contains a moderately acidic (pH 5.8), brown (10YR 5/3), heavy loam. The final horizon in the soil profile is a C horizon from 39-60 inches and contains a moderately acidic (pH 5.9), light yellowish brown (10YR 6/4), fine sandy loam.

Gullied Land

The gullied land map unit is non hydric consociation of three soil components. Gullied land is the majority component comprising 85 percent of the map unit with unnamed (5 percent), Watsonville (5 percent) and Tierra (5 percent) making up the rest.

Beaches

The beach series is an entirely hydric soil that occurs along the coastal boundary of the Study Area. Typically, this soil type does not support woody vegetation and is not suitable for agriculture uses.

Terrace escarpments

Terrace escarpments consist of long, narrow, rocky areas that rise abruptly from the mean tide line to the coastal plain terraces or plateaus. This land type consists of steep faces that separate the terraces from the lower lying land. The faces are composed of soft coastal sandstone, hard shale, or hard, weather-resistant, fine-grained sandstone. Vegetation is sparse and is made up of dwarfed shrubs, a few patches of grass, lichens, and moss. In seepage areas water grasses, a few cypress, and various weathered conifers can also grow. Areas of terrace escarpments are used mainly for watershed and as wildlife habitat.

4.2.5 Hydrology

Hydrology in the Study Area is provided through precipitation and overland runoff from adjacent areas. An unnamed intermittent to perennial drainage extends from east to west within the gully of the Study Area. Additionally, tidal waters occur along the western portion of the Study Area. Precipitation for Half Moon Bay was normal for the 3-month periods preceding the January and February 2016 (NOAA 2016, USDA 2020) and January 2020 site visits (USDA 2020).

4.3 Special-Status Species

4.3.1 Plants

Based upon a review of the resources and databases given in Section 3.5.1, 48 special-status plant species had been documented in the vicinity of the Study Area (CDFW 2020, CNPS 2020a).

In 2016, not including the Utility Area, one special-status plant species, Choris' popcorn flower, was observed within the Study Area. Sixteen special-status plant species were determined to have moderate potential to occur in the Study Area but were not observed during appropriately-timed, protocol-level surveys and therefore are presumed absent from the Study Area.

Within the Utility Area specifically, no special-status plant species were observed on January 14, 2020, and one species was determined to have high potential to occur: Choris' popcornflower.

Appendix E summarizes the potential for occurrence for each special-status plant species occurring in the Half Moon Bay, Montara Mountain, and San Gregorio USGS 7.5 minute quadrangles. Figure 5 depicts Choris' popcorn flower locations within the Study Area known in 2016 but is not representative of presence or absence within the Utility Area that was added in 2019.

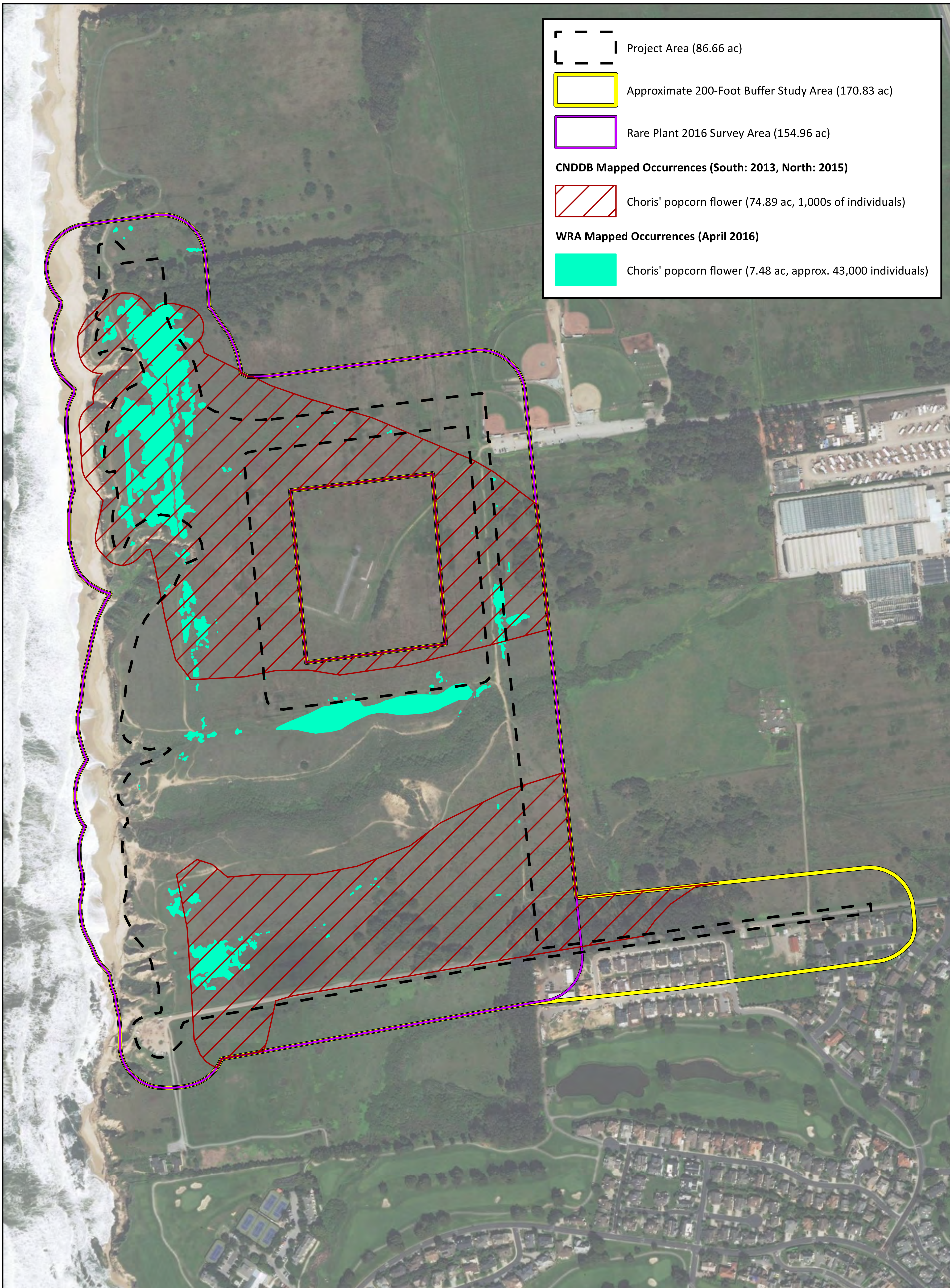

Figure 5. Special-Status Plants Observed within Study Area

N W E S

0 250 500 1,000

Feet

wra ENVIRONMENTAL CONSULTANTS

Wavecrest Coastal Trail: Southern Alignment
Half Moon Bay, California

Map Prepared Date: 1/31/2020
Map Prepared By: mweidenbach
Base Source: Esri World Imagery January 2020
Data Source(s): WRA, CDFW CNDDB January 2020

Path: L:\Acad 2000 Files\24000\24346\GIS\ArcMap\2019 Update\Rare Plants_20200128.mxd

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The remaining species documented to occur in the general vicinity of the Study Area are unlikely or have no potential to occur due to lack of suitable habitat within the Study Area. Additionally, some species were determined to have unlikely potential to occur within the Study Area due to lack of proximate occurrence information.

The protocol-level special-status plant surveys occurred during the blooming period of all special-status plant species with potential to occur in the Study Area. Aside from Choris' popcorn flower, no other special-status plants were observed. Plants observed during the site visits are listed in Appendix D.

Present/High Potential

Choris' popcorn flower (*Plagiobothrys chorisianus var. chorisianus*), CNPS Rank 1B.2. Choris' popcorn flower is an annual herbaceous species in the family Boraginaceae. This species blooms between March and June. Typical habitat for this species includes chaparral, coastal prairie, and coastal scrub. Choris' popcorn flower has been recorded in Alameda, San Francisco, San Mateo, and Santa Cruz counties at elevations ranging from 15 to 160 meters and blooms from March through June. Choris' popcornflower was documented within the Study Area in 1995, 2004, 2013, and 2015, with reported population size estimates in the hundreds in 1995, 85 in 2013, and 3,000 in 2015 (CNPS 2020a, CDFW 2020, Corelli 2015).

Choris' popcornflower was observed during a protocol-level special-status plant survey within the Study Area, not including the Utility Area, on April 15, 2016. It was observed in northern coastal scrub, coyote brush/western rush scrub, seasonal wetland, and coastal wetland habitats. Based on 2016 survey estimates, the Study Area, not including the Utility Area, contains approximately 43,000 individuals of Choris' popcorn flower within 7.5 acres. The Choris' popcorn flower extent from this survey as well as the 1995 mapped extent is depicted in Figure 5.

Choris' popcornflower has high potential to occur in seasonal wetland habitat within the Utility Area. The January 2020 surveys in the Utility Area were not conducted during the appropriate bloom period to determine this species' presence or absence.

Moderate Potential (Not Observed)

Blasdale's bent grass (*Agrostis blasdalei*) CNPS Rank 1B.2. Blasdale's bentgrass is a perennial graminoid in the grass family (Poaceae) that typically occurs in bare or sparsely vegetated areas in coastal dune, coastal bluff scrub, and coastal prairie habitat at elevations ranging from 0 to 150 meters. This species blooms from May to July and is known from Mendocino, Monterey, Marin, San Mateo, Santa Cruz, and Sonoma counties (CDFW 2020, CNPS 2020a). Soil survey data at known locations suggest that this species is typically located on moderately strongly acid (pH 5.0) to slightly acid sandy (pH 6.5) loams and sands derived from sedimentary rock (CDFW 2020, CSRL 2020). The nearest documented occurrence is located approximately 7 miles northwest of the Study Area in Moss Beach, from May 2015. Blasdale's bent grass has moderate potential to occur in the Project Area due to the presence of potentially suitable bluff edge habitat. This species was not observed in the Study Area during the April and June 2016 protocol-level special-status plant surveys. No additional surveys for this species are recommended.

Ocean bluff milk-vetch (*Astragalus nuttallii* var. *nuttallii*), CNPS Rank 4.2. Ocean bluff milk-vetch is a perennial herb in the Fabaceae family that occurs in coastal bluff scrub and coastal dunes at elevations ranging from 3 to 120 meters. This species blooms from January to November and is known in Alameda, Monterey, Marin, Santa Barbara, San Francisco, San Luis Obispo, and San Mateo counties. The nearest documented occurrence is located approximately 6.5 miles from the Study Area in San Gregorio in 2007 and is presumed extant at that location. Given that the Study Area contains coastal scrub and sea cliff, this species was determined to have a moderate potential to be present. Ocean bluff milk-vetch was not observed in the Study Area during the April and June 2016 protocol-level special-status plant surveys. No additional surveys for this species are recommended.

Coastal marsh milk-vetch (*Astragalus pycnostachyus* var. *pycnostachyus*), CNPS Rank 1B.2. Coastal marsh milk-vetch is a perennial herb in Fabaceae family that occurs in the coastal dunes (mesic), coastal scrub, coastal salt and streamside marshes and swamps. This species typically occurs at elevations ranging from 0 to 30 meters in Humboldt, Marin, and San Mateo counties. Coastal marsh milk-vetch blooms between April and October. The nearest documented occurrence is located 4.97 miles from the Study Area at Pillar Point and was recorded in 1902, but is presumed extant at that location. This species has a moderate potential to occur in the Study Area due to the presence of suitable coastal habitat. Coastal marsh milk-vetch was not observed in the Study Area during the April and June 2016 protocol-level special-status plant surveys. No additional surveys for this species are recommended.

Johnny-nip (*Castilleja ambigua* var. *ambigua*), CNPS Rank 4.2. Johnny-nip is an annual (hemiparasitic) herb in the Orobanchaceae family that occurs in coastal bluff scrub, coastal prairie, coastal scrub, marshes and swamps, valley and foothill grassland, and along vernal pools margins. It can be found at elevation ranges typically from (0 to 435 meters during its bloom period between March and August. The Study Area was determined to have moderate potential to support this species due to the presence of suitable coastal scrub habitat. Johnny-nip was not observed in the Study Area during the April and June 2016 protocol-level special-status plant surveys. No additional surveys for this species are recommended.

San Francisco Bay spineflower (*Chorizanthe cuspidata* var. *cuspidata*), CNPS Rank 1B.2. San Francisco Bay spineflower is an annual herbaceous species in the family Polygonaceae. It occurs in coastal bluff scrub, coastal dunes, coastal prairie, coastal scrub, often on sandy soils. It is recorded from 3 to 215 meters in elevation in Alameda, Marin, San Francisco, San Mateo, and possibly Sonoma counties, and blooms between April and August. The nearest documented occurrence of this species is greater than 5 miles from the Study Area and is presumed extant at that location. This species has moderate potential to occur within the Study Area since suitable coastal scrub habitat for this species is present. San Francisco Bay spineflower was not observed in the Study Area during the April and June 2016 protocol-level special-status plant surveys. No additional surveys for this species are recommended.

San Francisco gumplant (*Grindelia hirsutula* var. *maritima*), CNPS Rank 3.2. San Francisco gumplant is a perennial herb in the family Asteraceae. It occurs on bluffs or in sandy or serpentine soils in coastal scrub, coastal bluff scrub, and valley and foothill grassland communities. It is recorded from 15 to 400 meters in elevation in Marin, San Francisco, San Luis Obispo, and San Mateo counties, with possible additional occurrences in Monterey and Santa Cruz counties. It blooms between June and September. The nearest documented occurrence is over 7 miles north of the Study Area from 1985 and is presumed extant. Within the Study Area, this species could occur within coastal scrub or grassland communities and therefore has moderate potential to occur. San Francisco gumplant was not observed in the Study Area during the April and June 2016 protocol-level special-status plant surveys. No additional surveys for this species are recommended.

Short-leaved evax (*Hesperevax sparsiflora* var. *brevifolia*), CNPS Rank 1B.2. Short-leaved evax is a small annual herb in the family Asteraceae. It occurs in sandy or rocky bluffs and flats in coastal bluff scrub and coastal dunes. Short-leaved evax is recorded from 0 to 200 meters in elevation in all coastal counties from Del Norte to Santa Cruz County, but is presumed extirpated from San Francisco County. It blooms between March and June. The nearest documented occurrence is from 1970 and is located over 7 miles northeast from the Study Area, and has never been verified at this location. The Study Area contains sandy coastal scrub habitat that has moderate potential to support this species. Short-leaved evax was not observed in the Study Area during the April and June 2016 protocol-level special-status plant surveys. No additional surveys for this species are recommended.

Kellogg's horkelia (*Horkelia cuneata* var. *sericea*), CNPS Rank 1B.1. Kellogg's horkelia is a perennial herb in the family Rosaceae. It occurs on gravelly or sandy soils in closed-cone coniferous forest, maritime chaparral, and openings in coastal scrub habitat. It is recorded from 10 to 200 meters in elevation in Alameda, Monterey, Santa Barbara, Santa Cruz, San Mateo, and San Luis Obispo counties, and is presumed extirpated from Marin and San Francisco counties. Kellogg's horkelia blooms between April and September. The nearest documented occurrence is from 2000 and was mapped 3 miles northeast of the Study Area on a ridgetop in Half Moon Bay and is presumed extant at that location. The Study Area has moderate potential to provide suitable habitat for this species within coastal scrub habitat. Kellogg's horkelia was not observed in the Study Area during the April and June 2016 protocol-level special-status plant surveys. No additional surveys for this species are recommended.

Point Reyes horkelia (*Horkelia marinensis*), CNPS Rank 1B.2. Point Reyes horkelia is a perennial herb in the family Rosaceae. It occurs in sandy flats, coastal prairie, and coastal scrub. It is recorded from 5 to 30 meters in elevation in Mendocino, Marin, Santa Cruz, San Mateo, and Sonoma counties. It blooms between May and September. The nearest documented occurrence is from 1962 and is located approximately 11.5 miles from the Study Area in Junipero Serra Park and is presumed extant at that location. Within the Study Area, this species has moderate potential to occur within the coastal scrub community. Point Reyes horkelia was not observed in the Study Area during the April and June 2016 protocol-level special-status plant surveys. No additional surveys for this species are recommended.

Perennial goldfields (*Lasthenia californica* ssp. *macrantha*), CNPS Rank 1B.2. Perennial goldfields is a perennial herb in the Asteraceae family. This species typically occurs in coastal bluff scrub, coastal dunes, and coastal scrub communities at elevations ranging between five and 520 meters. It blooms between January and November. Perennial goldfields has been recorded in Mendocino, Marin, San Luis Obispo, San Mateo, and Sonoma counties. The nearest documented occurrence from 1921 is located 12.5 miles from the Study Area at Pescadero State Beach is presumed extant. Within the Study Area, this species could occur within coastal scrub habitat. Perennial goldfields were not observed in the Study Area during the April and June 2016 protocol-level special-status plant surveys. No additional surveys for this species are recommended.

Coast yellow leptosiphon (*Leptosiphon croceus*), State Endangered Candidate, CNPS Rank 1B.1. Coast yellow leptosiphon is an annual herb in the Polemoniaceae family that grows in coastal bluff scrub and coastal prairie habitats at elevations ranging from 10 to 150 meters. This species blooms between April and June. The nearest documented occurrence is from 2015 and is located 10.8 miles from the Study Area in Moss Beach. This species was determined to have moderate potential to occur within the Study Area due to known nearby populations and given that suitable coastal scrub habitat is present. Coast yellow leptosiphon was not observed in the Study Area during the April and June 2016 protocol-level special-status plant surveys. No additional surveys for this species are recommended.

San Mateo tree lupine (*Lupinus arboreus* var. *eximius*), CNPS Rank 3.2. San Mateo tree lupine is a perennial evergreen shrub that occurs in the Fabaceae family. This species typically occurs in chaparral and coastal scrub habitats at elevations ranging from 90 to 550 meters. It blooms between April and July and has been recorded in San Mateo and Sonoma counties. There limited occurrence information for this species. San Mateo tree lupine was determined to have moderate potential to occur within the Study Area due to the presence of coastal scrub habitat and sandy soils that may be suitable for this species. San Mateo tree lupine was not observed in the Study Area during the April and June 2016 protocol-level special-status plant surveys. No additional surveys for this species are recommended.

Davidson's bushmallow (*Malacothamnus davidsonii*), CNPS Rank 1B.2. Davidson's bushmallow is a perennial deciduous shrub from the Malvaceae family. This species typically occurs in chaparral, cismontane woodland, coastal scrub, and riparian woodland communities at elevations ranging from 185 to 855 meters. Davidson's bushmallow blooms between June and January and has been recorded in Los Angeles, Monterey, Santa Clara, San Luis Obispo, and San Mateo counties. The nearest documented occurrence is from Crystal Spring Reservoir from 1912. Within the Study Area, this species could occur within the coastal scrub community. Davidson's bushmallow was not observed in the Study Area during the April and June 2016 protocol-level special-status plant surveys. No additional surveys for this species are recommended.

Marsh microseris (*Microseris paludosa*), CNPS Rank 1B.2. Marsh microseris is a perennial herb in the family Asteraceae. It occurs in closed-cone coniferous forest, cismontane woodland, coastal scrub, and valley and foothill grassland, often where grasses are low-growing. It is recorded from 5 to 300 meters in elevation in Mendocino, Monterey, Marin, San Benito, Santa Cruz, San Luis Obispo, and Sonoma counties, and is presumed extirpated from San Francisco and San Mateo counties. It blooms between April and June. The nearest documented occurrence is from 2004 and is located 14 miles from the Study Area in Pescadero State Beach. Within the Study Area, this species could occur within coastal scrub or grassland communities. Marsh microseris was not observed in the Study Area during the April and June 2016 protocol-level special-status plant surveys. No additional surveys for this species are recommended.

Oregon polemonium (*Polemonium carneum*), CNPS Rank 2B.2. Oregon polemonium is a perennial herb in the family Polemoniaceae. It occurs in coastal prairie, coastal scrub, and lower montane coniferous forest. Oregon polemonium is recorded from 0 to 1830 meters in elevation in Del Norte, Siskiyou, Humboldt, Sonoma, Marin, Alameda, San Francisco, and San Mateo counties. It blooms between April and September. The nearest documented occurrence is from 1916 and is located 7.23 miles from the Study Area in Pilarcitos Dam and is presumed extant at that location. Within the Study Area, this species could occur within the coastal scrub community. Oregon polemonium was not observed in the Study Area during the April and June 2016 protocol-level special-status plant surveys. No additional surveys for this species are recommended.

Hickman's cinquefoil *(Potentilla hickmanii)*, FE, SE, CNPS Rank 1B.2. Hickman's cinquefoil is a perennial herb in the family Rosaceae. It occurs in coastal bluff scrub, closed-cone coniferous forest, vernally mesic meadows and seeps, and freshwater marshes and swamps. It is recorded from 10 to 149 meters in elevation in Monterey, San Mateo, and Sonoma counties. It blooms between April and August. The nearest documented occurrence of this species is from 2008 over 7.8 miles north from the Study Area at Moss Beach. Within the Study Area, this species could occur in the coastal scrub community. Hickman's cinquefoil was not observed in the Study Area during the April and June 2016 protocol-level special-status plant surveys. No additional surveys for this species are recommended.

San Francisco campion (*Silene verecunda* ssp. *verecunda*), CNPS Rank 1B.2. San Francisco campion is a perennial herb in the family Caryophyllaceae. It occurs in sandy soils in coastal bluff scrub, chaparral, coastal prairie, coastal scrub, and valley and foothill grassland. It is recorded from 30 to 645 meters in elevation in San Francisco, San Mateo, Santa Cruz, and Sutter counties. San Francisco campion blooms between March and August. The nearest documented occurrence is from 1994 and is located 6.6 miles from the Study Area on Montara Mountain and is presumed extant at that location. Within the Study Area, this species could occur within coastal scrub or grassland communities. San Francisco campion was not observed in the Study Area during the April and June 2016 protocol-level special-status plant surveys. No additional surveys for this species are recommended.

4.3.2 Wildlife

Based upon a review of the resources and databases given in Section 3.4.1, 64 special-status wildlife species have been documented in the vicinity of the Study Area. Appendix E summarizes the potential for each of these species to occur in the Study Area. Of the 64 special-status wildlife species, nine special-status wildlife species have a moderate or high potential to occur within the

Study Area. The majority of species have no potential or are unlikely to occur because of a lack of suitable habitat such as serpentine, tidal marsh, stream, or pond habitats. Species may have been omitted due to lack of available habitat or the distance of the Study Area from documented occurrences. The special-status wildlife species with a moderate or high potential to occur in the Study Area are discussed further below. The remaining species documented to occur in the vicinity are unlikely or have no potential to occur due to lack of suitable habitat within the Study Area.

Following the discussion of the species that have a high or moderate potential to occur is a discussion of Federal-listed species that are unlikely to occur, but may require additional avoidance and minimization measures to avoid take.

San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*), CDFW Species of Special Concern. San Francisco 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 Monterey cypress stands within the Study Area do not have understory vegetation and are unlikely to be used by woodrats based upon lack of suitable vegetation and high disturbance by humans and off-leash pets. No woodrat houses were observed in the Monterey cypress stands during the BRE site visits. The dense central coast riparian scrub habitat is suitable for woodrat and a house was observed within the 200-foot buffer during the BRE site visit in central coast riparian scrub along the western portion of the existing informal trail crossing. No woodrat houses were observed within the Project Area. Therefore this species has moderate potential to establish in the riparian scrub habitats within the Project Area.

Western red bat (*Lasiurus blossevillii*), CDFW Species of Special Concern, WBWG High Priority. Western red bat 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 (WBWG 2016). They are typically solitary, roosting primarily in the foliage of 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 habitat (particularly willows, cottonwoods, and sycamores; WBWG 2016). 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. The Monterey cypress present within the Study Area may provide suitable roost habitat for this species; however, the density of the willow branches reduces the potential for the riparian scrub habitat to be used for roost sites because of obstruction to initiation of flight (WBWG 2016). The Study Area does not provide suitable conditions for hibernating bats because of location at the coastline and lack of hibernacula. The Study Area has a moderate potential to support western red bat roosting in the Monterey cypress during the active season.

Hoary bat (*Lasiurus cinereus*), WBWG Medium Priority. Hoary bats are highly associated with forested habitats in the western United States, particularly in the Pacific Northwest. They are a solitary species and roost primarily in foliage of both coniferous and deciduous trees, near the ends of branches, usually at the edge of a clearing. Roosts are typically 10 to 30 feet above the ground.

They have also been documented roosting in caves, beneath rock ledges, in woodpecker holes, in grey squirrel nests, under driftwood, and clinging to the side of buildings, though this behavior is not typical. Hoary bats are thought to be highly migratory, however, wintering sites and migratory routes have not been well documented. This species tolerates a wide range of temperatures and has been captured at air temperatures between 0 and 22 degrees Celsius. Hoary bats probably mate in the fall, with delayed implantation leading to birth in May through July. They usually emerge late in the evening to forage, typically from just over one hour after sunset to after midnight. This species reportedly has a strong preference for moths, but is also known to eat beetles, flies, grasshoppers, termites, dragonflies, and wasps (WBWG 2016). The Monterey cypress and willows in the riparian habitat within the Study Area may provide suitable roost habitat for this species. The Study Area does not provide suitable conditions for hibernating bats because of location at the coastline and lack of hibernacula. The Study Area has a moderate potential to support hoary bat roosting in the Monterey cypress and willow trees during the active season.

White-tailed kite (*Elanus leucurus*), CDFW Fully Protected Species, LCP Unique Species. Kites occur in low elevation grassland, agricultural, wetland, oak woodland, and savannah habitats. Riparian zones adjacent to open areas are also used. Vegetative structure and prey availability seem to be more important than specific associations with plant species or vegetative communities. Lightly grazed or ungrazed fields generally support large prey populations and are often preferred to other habitats. Kite primarily feed on small mammals, although, birds, reptiles, amphibians, and insects are also taken. Nest trees range from single isolated trees to trees within large contiguous forests. Preferred nest trees are extremely variable, ranging from small shrubs (less than 10 ft. tall), to large trees (greater than 150 ft. tall) (Dunk 1995). Suitable foraging habitat is present and trees in the Study Area provide potential nesting habitat. White-tailed kite was observed within the Study Area during the January 27, 2016 and the January 14, 2020 site visit and Monterey cypress stands provide suitable sites where this species has a moderate potential to nest.

Olive-sided flycatcher (*Contopus cooperi)*, CDFW Species of Special Concern. Olive-sided flycatcher is found within the coniferous forest biome, most often associated with forest openings, forest edges near natural openings (e.g. meadows, canyons, rivers) or human-made openings (e.g., harvest units), or open to semi-open forest stands (Altman 2000). Although this species typically nests at higher elevations and more protected areas from the coastline, the Monterey cypress in Study Area provide suitable nesting habitat. There is a moderate potential for this species to nest in the Monterey cypress stands within the Study Area.

Loggerhead shrike (*Lanius ludovicianus*), CDFW Species of Special Concern. Loggerhead shrike is a common resident and winter visitor in lowlands and foothills throughout California. It prefers open habitats with scattered trees, shrubs, posts, fences, utility lines or other perches. Nests are usually built on a stable branch in a densely-foliaged shrub or small tree and are usually well-concealed. The highest densities occur in open-canopied valley foothill hardwood, valley foothill hardwood-conifer, valley foothill, riparian, pinyon-juniper, juniper, and desert riparian habitats. While this species eats mostly arthropods, they also take amphibians, small to medium-sized reptiles, small mammals, and birds. They are also known to scavenge on carrion. Suitable foraging habitat is present and suitable nesting habitat may be present in the trees and shrubs within the Study Area. Therefore, this species has a moderate potential to occur within the Study Area.

San Francisco (saltmarsh) common yellowthroat (*Geothlypis trichas sinuosa*), CDFW Species of Special Concern. San Francisco (saltmarsh) common yellowthroat is found in freshwater marshes, coastal swales, riparian thickets, brackish marshes, and saltwater marshes. Their breeding range extends from Tomales Bay in the north, Carquinez Strait to the east, and Santa Cruz County to the south. This species requires thick, continuous cover such as tall grasses, tule patches, or riparian vegetation down to the water surface for foraging and prefers willows for nesting (Shuford and Gardali 2008). Although this species is more typically associated with nesting near open water, the willow riparian habitat is suitable for nesting by this species. There is a moderate potential for this species to nest within the riparian habitat in the Study Area.

(Brewster's) Yellow warbler (*Setophaga petechia brewsteri*), CDFW Species of Special Concern. Yellow warbler is a neotropical migrant bird that is widespread in North America, but has declined throughout much of its California breeding range. The Brewster's (*brewsteri*) subspecies is a summer resident and represents the vast majority of yellow warblers that breed in California. West of the Central Valley, typical yellow warbler breeding habitat consists of dense riparian vegetation along watercourses, including wet meadows, with willow growth especially being favored (Shuford and Gardali 2008). Insects comprise the majority of the diet. The riparian scrub habitat within the Study Area is suitable for nesting by this species, and this species is known to nest in the vicinity of the Study Area. There is a high potential for this species to nest within the riparian habitat within the Study Area.

Bryant's savannah sparrow *(Passerculus sandwichensis alaudinus),* CDFW Species of Special Concern. Bryant's is a savannah sparrow subspecies and California endemic whose range extends along the fog belt from Monterey County north to Del Norte County. It is most often associated with salt marsh habitat, but will also use moist grasslands. Suitable foraging habitat is present and suitable nesting habitat may be present in the grassland habitat within the Study Area. This species was observed on the January 27, 2016 site visit, and based upon location and habitat, it is assumed to be the protected subspecies *P. s. alaudinus*. The moist grassland habitat with scattered shrubs within the Study Area provide suitable nesting habitat for this species. This subspecies is present and has a high potential to nest within the Study Area.

The following species are known in the vicinity but unlikely to occur within the Study Area, and are discussed here further.

San Francisco Garter Snake (*Thamnophis sirtalis tetrataenia*), Federal Endangered, State Endangered, CDFW Fully Protected, LCP Rare Species. Historically, San Francisco garter snake (SFGS) occurred in scattered wetland areas on the San Francisco Peninsula from approximately the San Francisco County line south along the eastern and western bases of the Santa Cruz Mountains, at least to the Upper Crystal Springs Reservoir, and along the coast south to Año Nuevo Point, San Mateo County, and Waddell Creek, Santa Cruz County. The preferred habitat of the SFGS is a densely vegetated pond near an open hillside where they can sun themselves, feed, and find cover in rodent burrows; however, considerably less ideal habitats can be successfully occupied (USFWS 2006). Temporary ponds and other seasonal freshwater bodies are also used. Emergent and bankside vegetation such as cattails (*Typha* spp.), bulrushes (*Scirpus* spp.) and spike rushes (*Juncus* spp. and *Eleocharis* spp.) apparently are preferred and used for cover. The area between stream and pond habitats and grasslands or bank sides is used for basking; while nearby dense vegetation or water often provide escape cover. Snakes also use floating algal or rush mats, if available.

There are two significant components to SFGS habitat: 1) ponds that support California red-legged frog (*Rana draytonii,* CRLF), American bullfrog (*Lithobates catesbeiana*), or the Pacific treefrog (*Pseudacris regilla*) and 2) surrounding upland that supports Botta's pocket gopher *(Thomomys bottae)* and the California meadow vole *(Microtus californicus)* (USFWS 2006). Ranid frogs are an obligate component of the SFGS's diet (USFWS 2006).

Specific information on the home range of SFGS documents this species to travel much shorter distances than other gartersnake species, many of which travel over several kilometers between winter and summer sites. Studies at Año Nuevo State Reserve found the mean distance of female hibernacula to the Visitor Center Pond was 459 feet, with a maximum distance of 637 feet. Distances of greater than 637 feet have been reported, including an unconfirmed distance of approximately 1000 feet (McGinnis et al. 1987, Larson 1994). However, more recent studies at Año Nuevo State Reserve continue to confirm SFGS are regularly within 300 and 650 feet of foraging (pond) habitats and upland sites. Dispersal is rarely greater than this distance although not impossible if dispersal occurs in pursuit of prey (USFWS 2006), and during periods of heavy rain or shortly after, SFGS may make long-distance movements of up to 1.25 miles along drainages within the dense riparian cover; however, SFGS have not been documented to travel over open terrain (McGinnis 2001).

The seasonal wetland depressions and swales within the Study Area are only inundated for brief periods immediately after storm events and do not support a population of ranid frog species. Two seasonal wetlands and ditches do support Pacific tree frogs; however, these ditches do not support prey items beyond winter and early spring and distance to potentially occupied habitats by SFGS are of sufficient distance to greatly reduce the potential for SFGS to use the habitats within the Study Area even on a seasonal basis. In the late spring through fall months, the Study Area is unlikely to support any prey items of SFGS, especially CRLF which are more heavily depended upon as a food source of SFGS during the late spring and summer months (USFWS 2006). The nearest potential year-round suitable habitat for SFGS is 0.75 mile east and Highway 1 is present between the Study Area and this potential habitat. A potential early season pond is present northeast of the Study Area; however, this pond is over 1,000 feet from the Study Area and unlikely to be inhabited by SFGS. Currently, there is no suitable aquatic habitat for SFGS within or in proximity to the Study Area. Longer travel distances by SFGS have potential only when SFGS are most probably following prey items, and there is no riparian linkage to provide a likely dispersal pathway in this situation. This species is unlikely to occur within the Study Area.

California red-legged frog (*Rana draytonii*), Federal Threatened, CDFW Species of Special Concern, LCP Unique Species. The historic range of California red-legged frog (CRLF) extended along the coast from the vicinity of Point Reyes National Seashore, Marin County, California and inland from Redding, Shasta County southward to northwestern Baja California, Mexico (Jennings and Hayes 1994, Hayes and Krempels 1986). The current distribution of this species includes only isolated localities in the Sierra Nevada, northern Coast and Northern Traverse Ranges. It is still common in the San Francisco Bay Area and along the Central Coast and it is now believed extirpated from the southern Transverse and Peninsular Ranges (USFWS 2002).

There are four physical and biological features that are considered to be essential for the conservation or survival of this species. The features for CRLF include: aquatic breeding habitat; non-breeding aquatic habitat; upland habitat; and dispersal habitat (USFWS 2010). Aquatic breeding habitat consists of low-gradient fresh water bodies including natural and manmade (e.g., stock) ponds and pools in perennial streams (Jennings and Hayes 1994), marshes, lagoons, and dune ponds. Aquatic breeding habitat must hold water for a minimum of 20 weeks in most years. This is the average amount of time needed for egg, larvae, and tadpole development and metamorphosis so that juveniles can become capable of surviving in upland habitats (USFWS 2010). Optimal habitat is characterized by dense, shrubby riparian vegetation associated with deep (less than 2.3 feet), still, or slow-moving water (Hayes and Jennings 1986). Arroyo willow (*Salix lasiolepis*) seems to provide the most suitable riparian habitat structurally, although cattails and bulrushes also can provide suitable habitat. Although CRLF are found in ephemeral streams and ponds, populations cannot be maintained where all surface water disappears (Jennings and Hayes 1994).

Aquatic non-breeding habitat may or may not hold water long enough for this species to hatch and complete its aquatic life cycle, but it provides shelter, foraging, predator avoidance, and aquatic dispersal for juvenile and adult CRLF. These waterbodies include plunge pools within intermittent creeks; seeps; quiet water refugia during high water flows; and springs of sufficient flow to withstand the summer dry period. CRLF can use large cracks in the bottom of dried ponds as refugia to maintain moisture and avoid heat and solar exposure (Alvarez 2004). Non-breeding aquatic features enable CRLF to survive drought periods, and disperse to other aquatic breeding habitat (USFWS 2010).

Upland habitats include areas within 200 to 300 feet of aquatic and riparian habitat and are comprised of grasslands, woodlands, and/or vegetation that provide shelter, forage, and predator avoidance. These upland features provide breeding, non-breeding, feeding, and sheltering habitat for juvenile and adult frogs (e.g., shelter, shade, moisture, cooler temperatures, a prey base, foraging opportunities, and areas for predator avoidance). Upland habitat can include structural features such as boulders, rocks and organic debris (e.g. downed trees, logs), as well as small mammal burrows and moist leaf litter (USFWS 2010). Dispersal habitat includes accessible upland or riparian habitats between occupied locations within 0.7 miles of each other that allow for movement between these sites (USFWS 2002).

Dispersal habitat includes various natural and altered habitats such as agricultural fields, which do not contain barriers to dispersal. Moderate to high-density urban or industrial developments, large reservoirs and heavily traveled roads without bridges or culverts are considered barriers to dispersal (USFWS 2010). Short-distance dispersal movements are generally straight-line movements (Bulger et al. 2003). Overland dispersal movements through upland habitats typically occur at night during wet weather (USFWS 2002, Bulger et al. 2003, Fellers and Kleeman 2007). During dry weather, CRLF tend to remain very close to a water source; however, overland dispersal may occur in response to receding water (USFWS 2002). California red-legged frog has been documented to disperse up to 1.8 miles (Fellers and Kleeman 2007), although more typical distances are within 0.7 mile (USFWS 2002).

The nearest documented occurrences of CRLF are an agricultural ditch over 1,000 feet north and 0.9 mile south of the Study Area. Based on the description of the habitat for the nearest occurrence to the northeast, it is likely that the observed frog was a dispersing individual. Only one individual was observed at this location and no subsequent observations at this location have been made since 2004. There is also a pond on a golf course 630 feet south of the Study Area with potential to support CRLF.

The seasonal wetland depressions and swales within the Study Area are only inundated for brief periods immediately after storm events and do not support a population of ranid frog species. Two seasonal wetlands and ditches do support Pacific tree frog breeding; however, these wetlands and ditches are not of sufficient depth or maintain a sufficient inundation period to support CRLF breeding. The maximum potential depth of these features is 18 inches, and the average depth was 12 inches or less at the time of the January 27, 2016 site visit. This is at the lower limit of potential depths for CRLF to breed within (Alvarez et al. 2013), and these are small wetlands and ditches which do not remain inundated for a suitable length to support larval development. The Study Area is greater than 600 feet from all potential breeding habitat; therefore, the Study Area is unlikely to be used as upland refugia by CRLF and almost no burrows of suitable sized were observed within the Study Area. In addition, the riparian scrub habitat is not connected to habitats to the east nor does it appear to contain potential breeding habitat based upon a review of the areas in the vicinity of the existing trail and at the beach. There was only a minimal amount of flow despite recent heavy rains in the area in previous weeks. Although the Study Area is unlikely to be used by CRLF for breeding or upland refugia, the Study Area is within 0.6 mile of breeding habitats. CRLF dispersing from nearby breeding habitats to the north and south of the Study Area may occasionally use the riparian habitat, ditches, and seasonal wetlands; however, CRLF are only likely to use the Study Area when these habitats are inundated or during rain events because CRLF are unlikely to travel over dry land (USFWS 2002, Bulger et al. 2003, Fellers and Kleeman 2007). Therefore, CRLF is not likely to occur within the Study Area except on rare occasion during fall or winter rain events.

Monarch butterfly (*Danaus plexippus*). CDFW Roost Protected. Winter roost sites extend along the coast from northern Mendocino to Baja California, Mexico. Roosts are located in wind protected tree groves, with nectar and water sources nearby, and are often on south, southwest, or west facing slopes which may provide more favorable temperature regimes and wind protection (Leong et al. 2004). Monarch butterflies typically arrive in mid-October to overwintering sites along the California coast and remain until late February or March (Jepsen et al. 2015). No documented roosts are known within the Study Area, which contains ample public open space with a high number of daily visitors. Potentially suitable winter roost sites exist for this species in the Monterey cypress stands within the Study Area; however, roost sites are typically in more sheltered locations from the coastline. Monarch butterflies were not observed within the Study Area or adjacent eucalyptus groves during the January 26 and 27, 2016 site visit; however, monarch butterflies were observed in small numbers foraging within the Study Area during February 9 and 16, 2016 site visits. No roosting by monarchs was observed in the Monterey cypress stands within the Study Area, and areas of eucalyptus adjacent to and within the Study Area are not sufficiently sheltered from coastal weather systems to provide a wind block. Foraging habitat is present. However, because the Monterey cypress stands and eucalyptus groves are exposed and no monarchs were observed roosting during the BRE site visits, monarch butterflies are considered unlikely to establish winter roost sites on the Study Area.

5.0 PROJECT IMPACTS, AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES

The following sections present Project impacts and measures that have been incorporated into the Project Design that will avoid or reduce impacts to special-status species and sensitive habitats. Additional details for Project avoidance, minimization, and mitigation measures are provided in the CEQA Initial Study completed for the Project. Figure 6 depicts the Project permanent impacts to seasonal wetland, coastal seasonal wetland, and non-wetland water habitats.

5.1 Biological Communities

The CCC and LCP generally prohibit land use or development, which would have significant adverse impact on ESHAs. The LCP defines specific criteria for allowable development areas in ESHAs, requires ESHA impacts to be minimized to the maximum extent feasible through siting and design, and requires that mitigation measures implemented where impacts to ESHAs may occur. However, permitted uses allowed within ESHAs include the following: education and research, trails and scenic overlooks on public lands, and fish and wildlife management. As stated previously, ESHAs within the Study Area include non-wetland waters in Ravine 9 and tidal waters associated with the Pacific Ocean; sea cliffs; central coast riparian scrub, seasonal wetlands, beaches, and coastal seasonal wetlands.

5.1.1 Wetlands and Non-Wetland Waters

The Project has been designed to the maximum extent feasible to avoid impacts to seasonal wetland, coastal seasonal wetland, and non-wetland waters habitats. In areas where the trail design was confined to locations containing seasonal wetland and coastal seasonal wetland habitats, the trail spans overtop of the habitat via decking supported by footings to reduce the area of sensitive habitat that will be permanently impacted.

Consequently, the Project will result in 503 square feet (sf; 0.01 acre) of permanent fill impacts to seasonal wetlands regulated by the Corps/RWQCB/CCC through trenching the utility line connection along Redondo Beach Road and construction of the trail shoulder and fence footings. Additionally, approximately 4,822 sf (0.11 acre) of temporary impacts will occur to seasonal wetlands regulated by the Corps/RWQCB/CCC through construction access. The Project will also permanently impact 49 sf (<0.01 acre) of coastal seasonal wetlands regulated by the CCC through the construction of the Park Avenue Paper Street improvements, the footings that will support the trail decking, and through shading from trail decking. Approximately 2,598 sf (0.06 acre) of temporary impacts to coastal seasonal wetlands regulated by the CCC would occur through construction access.

Additionally, Project work at the unnamed intermittent to perennial drainage in Ravine 9 will result in no permanent impacts to non-wetland waters below OHWM regulated by the Corps. Temporary impacts to 371 sf (0.01 acre; 41 linear feet) of non-wetlands waters below OHWM regulated by Corps may occur from construction access.

The following standards shall be implemented to minimize adverse effects of development or other activity near wetland and non-wetland waters areas:

1. The removal of vegetation shall be minimized;
2. To compensate for the permanent impacts to the aquatic features, habitat will be enhanced or replaced as defined by required agency permits;
3. Development conforms to natural topography and that erosion potential is minimized;
4. Provisions have been made to keep runoff and sedimentation from exceeding predevelopment levels;
5. Native and non-invasive exotic vegetation is used for replanting, where appropriate; and

6. Any discharge of toxic substances, such as fertilizers and pesticides, is prevented.

5.1.2 Sea Cliffs

The Project has been designed to the maximum extent feasible to avoid impacts to sea cliffs. However, a portion of the trail and stairs overlaps with small portions of this habitat at Ravine 9. As a result, a portion of sea cliff will be permanently impacted but will focus and limit pedestrian access to a specific, well-defined location and is consistent with the LCP Land Use Plan Section 3-19 “limited foot paths” use. Consequently, the Project will result in 562 sf (0.01 acre) of permanent impacts to sea cliffs regulated by the CCC/LCP resulting from vegetation removal, trail grading, stair/railing/cribwall installation, rock-lining a swale, erosional gully restoration (which will entail grading and backfill), and ripping and restoring degraded areas. An additional 604 sf (0.01 acre) of temporary impacts to sea cliffs regulated by the CCC/LCP will occur from construction access.

The following standards shall be implemented to minimize adverse effects of development, public access, erosional forces or other activity near sea cliff areas:

1. All activities that require substantial ground disturbance should take place only during the summer months (generally April 15 through October 31) to minimize potential erosion and sedimentation;
2. Development standards in the LCP Land Use Plan require restricting pedestrian traffic to well-defined trails to avoid seabird nesting and roosting sites and providing signage to protect natural vegetation and roosting sites;
3. The removal of vegetation shall be minimized to maximum extent feasible;
4. Development conforms to natural topography so that erosion potential is minimized;
5. Provisions have been made to keep runoff and sedimentation from exceeding predevelopment levels;
6. Native and non-invasive exotic vegetation is used for replanting, where appropriate;
7. Any discharge of toxic substances, such as fertilizers and pesticides, is prevented; and
8. Solid materials, including wood, masonry/rock, glass, paper, or other materials should not be stored in sea cliff locations, solid waste materials should be properly disposed of offsite.

5.1.3 Central Coast Riparian Scrub

The Project has been designed to the maximum extent feasible to avoid impacts to central coast riparian scrub habitat and areas above OHWM but inside TOB at Ravine 9. However, on the eastern crossing at Ravine 9 contains a rock-lined ditch and the work at the western stairs overlap with portions of this habitat. As a result, portions of central coast riparian scrub and areas inside TOB will be impacted.

Up to 209 sf (<0.01 acre; 97 linear feet) of permanent impacts to this feature below TOB and additional 736 sf (0.02 acre) of riparian habitat outside TOB regulated by RWQCB/CCC/CDFW would occur from Park Avenue Paper Street improvements, southern beach stairs/handrail/cribwall construction, gully restoration, and construction and improvements to drainage features including a slope drain by the south stairs as well as rock lined swales and ditches. An additional 3,474 sf (0.07 acre; 146 linear feet) of temporary impacts to areas below TOB and 4,092 sf (0.09 acre) of riparian habitat outside TOB through construction access would occur. Consequently, the Project will result in 945 sf (0.02 acre) of permanent impacts and 7,566 sf (0.17 acre) of temporary impacts to central coast riparian scrub habitat regulated by the CDFW/RWQCB/CCC resulting from work at the eastern portion (crossing) and western portion (stairs) of Ravine 9 in the Project area.

The following standards shall be implemented to minimize adverse effects of development or other activity near central coast riparian scrub and areas below TOB:

1. The removal of vegetation shall be minimized;
2. To compensate for the permanent impacts to the habitat, habitat will be enhanced or replaced as defined by required agency permits;
3. Development conforms to natural topography and that erosion potential is minimized;
4. Provisions have been made to keep runoff and sedimentation from exceeding predevelopment levels;
5. Native and non-invasive exotic vegetation is used for replanting, where appropriate; and
6. Any discharge of toxic substances, such as fertilizers and pesticides, is prevented.

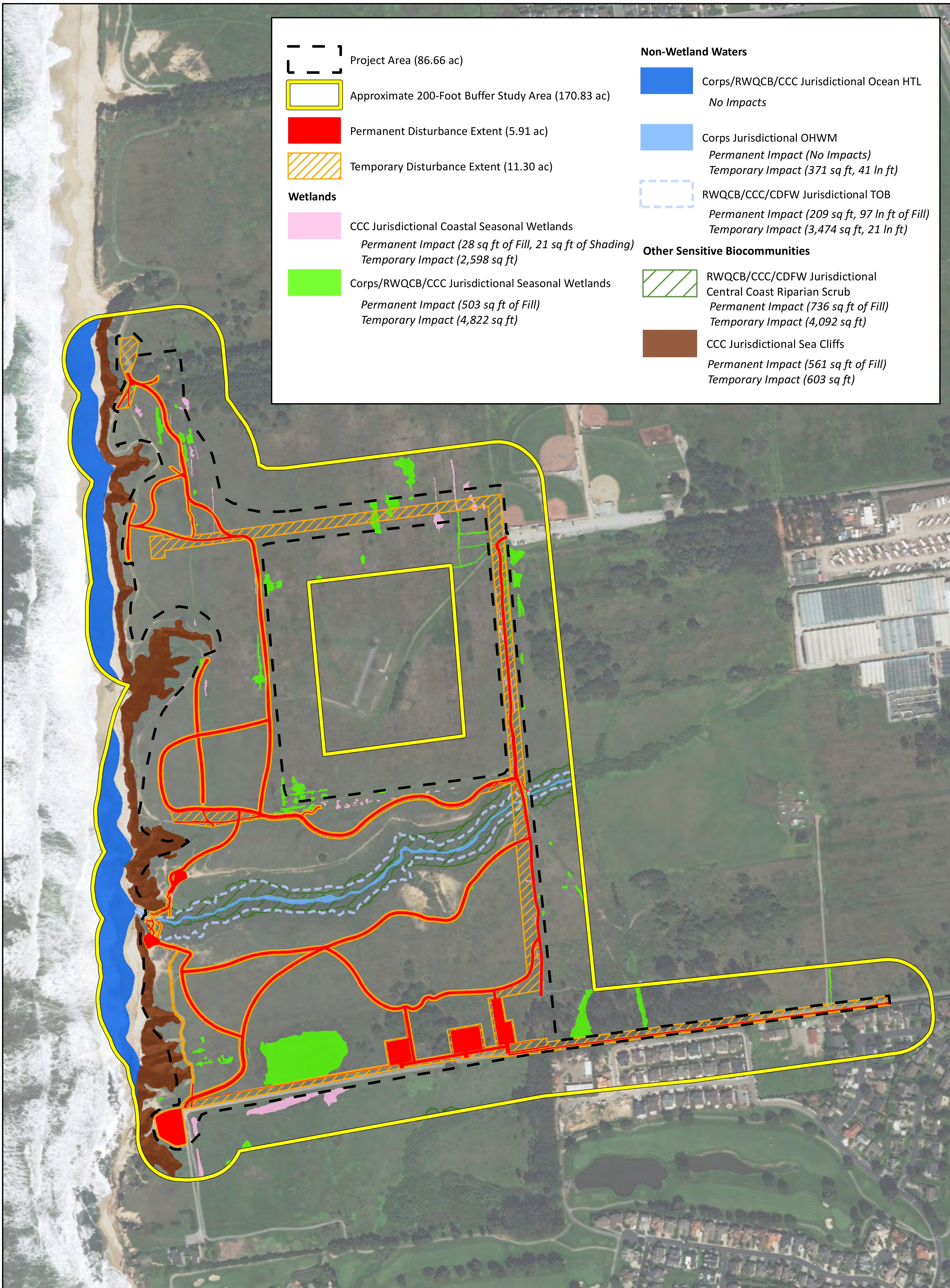

Figure 6. Project Impacts to Corps, RWQCB, CCC/LCP, and CDFW Jurisdictional Features

Wavecrest Coastal Trail: Southern Alignment
Half Moon Bay, California

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ENVIRONMENTAL CONSULTANTS

Map Prepared Date: 1/31/2020
Map Prepared By: mweidenbach
Base Source: Esri World Imagery January 2020
Data Source(s): WRA

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General Avoidance Measures

Below, general avoidance measures that have been incorporated into the Project design to reduce potential impacts to sensitive habitats. Specific performance criteria for ESHAs are described:

- Any site grading activities shall be restricted between approximately April 15 and October 15. Site grading during these dryer months will reduce the possibility of soil erosion and sediments flowing into natural habitats.
- Soil disturbance around wetland areas shall be minimized as much as possible. This will reduce the impact to existing soils and vegetation that will remain as natural habitat and reduce the potential for soil erosion. Perimeter erosion and sediment control measures (i.e. straw wattles) shall be installed as an extra precaution to reduce the possibility of sediments entering adjacent ESHAs. Solid materials, including wood, masonry/rock, glass, paper, or other materials shall not be stored or placed near wetland areas to the extent practicable. Solid waste materials shall be properly disposed of off-site. Fluid materials, including concrete, wash water, fuels, lubricants, or other fluid materials used during construction shall not be disposed of on-site and should be stored or confined as necessary to prevent spillage into natural habitats. If a spill of such materials occurs, the area shall be cleaned and contaminated materials disposed of properly. The affected area shall be restored to its natural condition.

5.2 Special-Status Plant Species

Of the 48 special-status plant species known to occur in the vicinity of the Study Area, one has been documented within the Study Area and 16 were determined to have a moderate or high potential to occur in the Study Area. Protocol-level special-status plant surveys were conducted in April and June 2016, during the blooming periods for species with a moderate or high potential to occur in the Study Area. The Study Area, excluding the Utility Area, was found to contain approximately 43,000 Choris' popcorn flower individuals within 7.48 acres. Of these documented individuals, current site plans would result in permanent impacts to approximately 2,062 individual plants within 0.37 acre from trail construction and the ripping, grading, and restoration actions. This represents an impact of approximately 5 percent of the occupied habitat and 5 percent of the individuals known from the 2016 Study Area survey. There would be temporary impacts to approximately 5,105 individual plants within in 0.70 acre for construction access. Figure 7 depicts proposed impacts to Choris' popcorn flower within the Project Area (excluding the Utility Area).

In addition, Choris' popcornflower has high potential to occur within seasonal wetland habitat within the Utility Area, and thus the Project work could result in potential permanent impacts to this species and it's occupied habitat through trenching a utility connection or temporary impacts for worker access.

Prior to construction activity within the Project Area, not including the Utility Area, Choris' popcorn flower seeds shall be collected from areas that will be impacted from the trail alignment and added to the seed mix to be used to revegetate and decommission informal trails within other portions of the Project Area. Following the completion of the project, areas within the CLT lands that are outside of the public rights-of-way will be preserved.

Prior to construction activities in the Utility Area, appropriately timed surveys for Choris' popcorn flower shall be conducted within the Utility Area. If Choris' popcorn flower is observed there, its seeds shall be collected from areas that will be impacted from the utility installation and added to the seed mix to be used to revegetate the Utility Area. Following the completion of the project, areas within the CLT lands that are outside of the public rights-of-way will be preserved.

5.3 Special-Status Wildlife Species

Of the 73 special-status wildlife species known to occur within the vicinity of the Study Area, eleven species were determined to have a moderate or high potential to occur within the Study Area. Of these ten species, one is the San Francisco dusky-footed woodrat, two are bat species, and seven are special-status bird species. Two Federal-listed species were determined to be unlikely to inhabit the Study Area, but may occasionally disperse or migrate through the Study Area. Recommendations to avoid take of these species is included in Section 5.3.4 below.

5.3.1 San Francisco Dusky-Footed Woodrat

The riparian habitat in the Study Area has the potential to support the San Francisco dusky-footed woodrat. A pre-construction survey for woodrat houses shall be conducted by a qualified biologist within 30 days prior to the start of work. If houses are observed during surveys, they shall be avoided if possible. If avoidance is not feasible, the houses shall be dismantled by hand under the supervision of a biologist.

If young are encountered during the dismantling process, the material shall be placed back on the house and the house shall remain unmolested for two to three weeks in order to give the young enough time to mature and leave the house. After two to three weeks, the nest dismantling process may begin again. Nest material shall be moved to suitable adjacent areas (riparian, woodland, scrub) that will not be impacted.

5.3.2 Special-Status and Non-Special-Status Nesting Birds

Nearly all the habitats within the Study Area have the potential to support nesting birds, and the LCP considers raptors unique species. In addition, the nests of most native birds are protected under the MBTA. Vegetation removal or other ground disturbance activities have the potential to directly or indirectly impact nesting birds. The following measures shall be implemented to avoid take of special-status birds and non-special-status nesting birds protected by the MBTA.

<u>Non-breeding Season: September 1 through January 31</u>

If Project work is scheduled to occur in between September and October, no pre-construction nesting bird surveys are required. However, if the Project schedule changes such that ground disturbance or removal of vegetation occurs outside of the non-breeding season work window, pre-construction surveys shall be required. If ground disturbance or removal of vegetation occurs between February 1 and June 30, pre-construction surveys should be performed by a qualified biologist no more than 14 days prior to commencement of such activities to determine the presence and location of nesting bird species. If ground disturbance or removal of vegetation occurs between July 1 and August 31, pre-construction surveys should be performed within 30 days prior to such activities. If active nests are present, establishment of temporary protective breeding season buffers will avoid direct mortality of these birds, nests, or young. The appropriate buffer distance is dependent on the species, surrounding vegetation, and topography and should be determined by a qualified biologist as appropriate to prevent nest abandonment and direct mortality during construction.

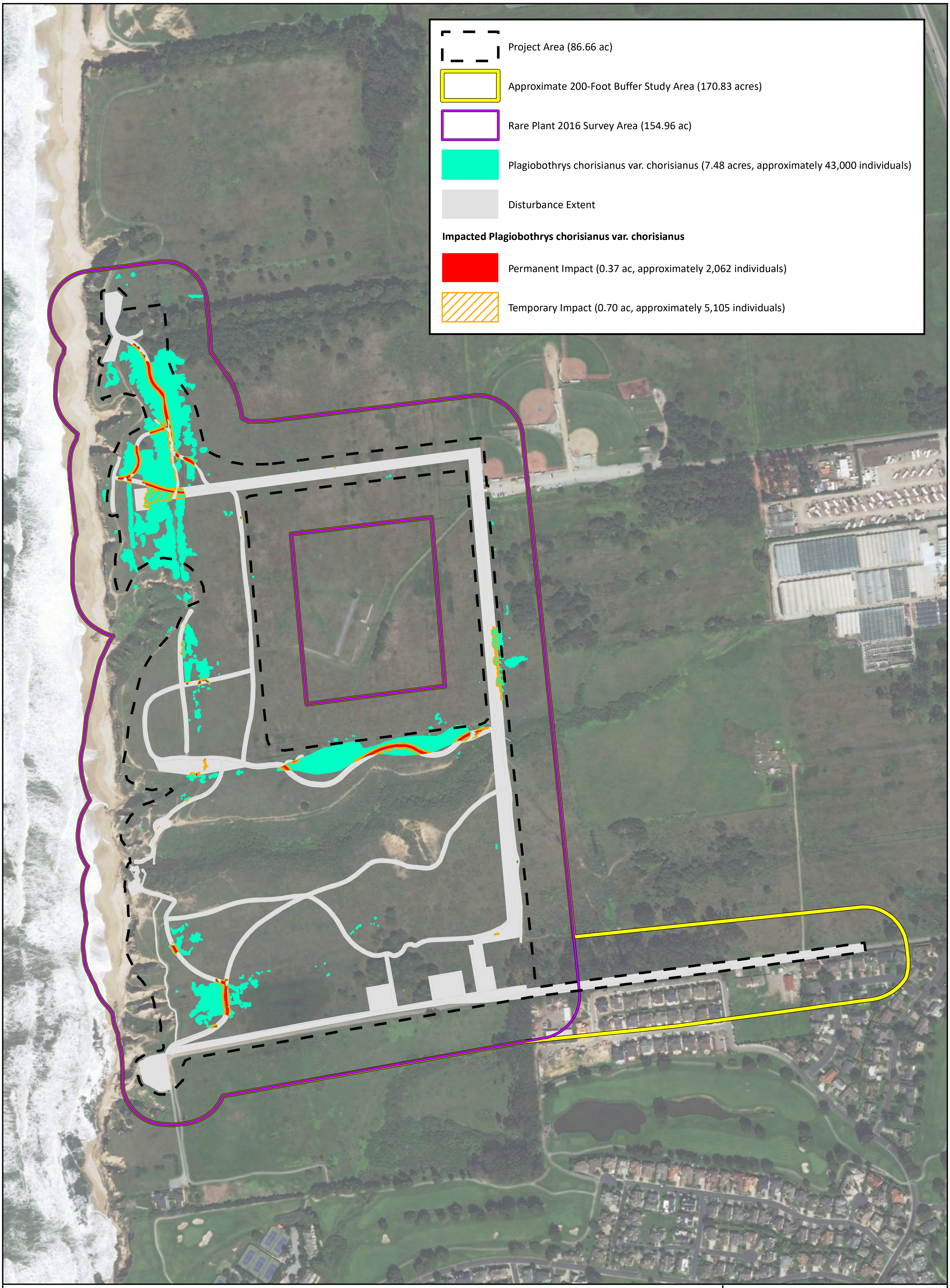

Figure 7. Rare Plant Impacts

Wavecrest Coastal Trail: Southern Alignment
Half Moon Bay, California

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Feet

WRA ENVIRONMENTAL CONSULTANTS

Map Prepared Date: 1/31/2020
Map Prepared By: mweidenbach
Base Source: Esri World Imagery January 2020
Data Source(s): WRA

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5.3.3 Bats

Two special-status bat species, western red bat and hoary bat, may utilize trees within the Study Area for roosting during the non-hibernation season. If Project work is scheduled to occur in between September and October, no pre-construction maternity roosting surveys are required. However, if the Project schedule changes such that removal of vegetation occurs outside of this work window, the following measures shall be implemented to avoid take of special-status bat species.

- If project activities have the potential to disturb trees within the Project Area during the maternity roosting season (April 1 through August 31), then preconstruction surveys for bats shall take place. Surveys shall be conducted by a qualified biologist no less than 14 days prior to these activities, which have the potential to disturb bat roosting and foraging habitats within the Study Area. Ultrasonic acoustic surveys and/or other site appropriate survey method should be performed to determine the presence or absence of bats utilizing the Study Area as roosting or foraging habitat.
- If special-status bat species are detected during surveys, appropriate, species and roost specific mitigation measures will be developed. Such measures may include postponing removal of trees, snags, or structures until the end of the maternity roosting season or construction of species appropriate roosting habitat within the Study Area.
- Consultation with CDFW may be warranted to determine appropriate mitigation measures if roosts are disturbed or destroyed.
  Trees may be removed outside of the maternity roosting season without performing preconstruction bat surveys.

5.3.4 CRLF and SFGS

California red-legged frog and SFGS are unlikely to inhabit the Study Area because of the absence of preferred habitat components and distance from suitable and/or occupied habitats. However, because of the suitability of nearby habitats, these species may on occasion disperse through the Study Area under certain conditions; therefore, they are discussed further. No suitable breeding habitat is found within the Study Area; however, CRLF may occasionally disperse through the Study Area. WRA recommends the following measures be implemented to avoid take of CRLF and SFGS.

- All ground disturbance activities shall be restricted to the dry season (April 15 through October 15) or when all habitats have dried and reduce potential for CRLF and SFGS to disperse through the Study Area.
- A qualified biologist shall survey the work site immediately before the onset of vegetation clearing or ground disturbance activities to verify if species are present and all habitats are dry. If CRLF are found and do not move out of the work area on their own, USFWS shall be contacted to determine if relocation is appropriate. In making this determination, the USFWS will consider if an appropriate relocation site exists. If the USFWS approves moving animals, a USFWS-approved biologist will be allowed sufficient time to move them from the work site before work activities begin. Any SFGS shall be allowed to leave the work area on their own, and shall be monitored as practical by the biologist to ensure they do not reenter the work area.

- Prior to the start of groundbreaking activities, all construction personnel will receive training on listed species and their habitats by a qualified biologist. The importance of these species and their habitat will be described to all employees as well as the minimization and avoidance measures that are to be implemented as part of the project. An educational brochure containing color photographs of all listed species in the work area will be distributed to all employees working within the Project Area. The original list of employees who attend the training sessions will be maintained by the contractor and be made available for review by the USFWS and the CDFW upon request.
- The contractor shall designate a person or employee to monitor on-site compliance with all minimization measures. The on-site monitor(s) will be on-site daily for the duration of the Project, including vegetation removal, grading and clean-up activities.
- All vehicles and equipment associated with work-activities will be parked or staged only within designated staging areas at the end of each workday or when not in use to minimize habitat disturbance and water quality degradation.
- Wildlife exclusion fencing would be erected and maintained around the project construction staging areas to prevent SFGS and CRLF from entering staging areas overnight.
- Installation of fencing will be performed under the supervision of a qualified biologist.
- No work shall occur within 48 hours following a rain event (over 0.25 inch in a 24-hour period). Following a rain event, a qualified biologist shall survey the work site immediately before reinitiation of ground disturbance activities to verify if species are present. If CRLF or SFGS are observed, then the steps previously described for the initial pre-construction survey shall be followed.
- Any erosion control materials used shall be made of tightly woven fiber netting or similar material to ensure that the CRLF and SFGS do not get trapped. This limitation will be communicated to the contractor. Plastic mono-filament netting (erosion control matting), rolled erosion control products or similar material shall not be used at the Project Area because CRLF, SFGS, and other species may become entangled or trapped in it.
- No trash shall be deposited on the site during construction activities. All trash shall be placed in trash receptacles with secure lids stored in vehicles and removed nightly from the Project Area.
- Any fueling and maintenance of equipment shall be conducted off-site and at least 50 feet from any wetland or designated ESHA.
- CRLF and SFGS may take refuge in cavity-like and den-like structures such as pipes and may enter stored pipes and become trapped. Therefore, all construction pipes, culverts, or similar structures that are stored at the site for one or more overnight periods will be either securely capped prior to storage or thoroughly inspected by the on-site monitor and/or the construction foreman/manager for these animals before the pipe is subsequently buried, capped, or otherwise used or moved in any way. It is also recommended these structures, if stored, are kept within the staging areas either in developed areas or within wildlife exclusion fencing. If CRLF are found and do not move out of the work area on their own, USFWS shall be contacted to determine if relocation is appropriate. In making this determination, the USFWS will consider if an appropriate relocation site exists. If the USFWS approves moving animals, a USFWS-approved biologist will be allowed sufficient time to move them from the work site before work activities begin. If SFGS is found, it shall be allowed to passively leave the work area on its own, as determined by the on-site monitor, unless in circumstances where the animal is determined to be trapped as discussed below.

- To prevent CRLF and SFGS from taking refuge and becoming trapped in cavity-like and den-like structures such as pipes and stored pipes, all construction pipes, culverts, or similar structures that are stored at the site for one or more overnight periods would be either securely capped prior to storage or thoroughly inspected by the on-site monitor and/or the construction foreman/manager for these animals before the pipe is subsequently buried, capped, or otherwise used or moved in any way.
- Furthermore, to prevent inadvertent entrapment of CRLF or SFGS during construction, the on-site monitor and/or construction foreman/manager shall ensure that all excavated, steep-walled holes or trenches more than one foot deep are completely covered at the close of each working day by plywood or similar materials, or provided with one or more escape ramps constructed of earth fill or wooden planks and inspected by the on-site biologist. Before such holes or trenches are filled, they will be thoroughly inspected for trapped animals by the on-site biologist and/or construction foreman/manager.
- If at any time a trapped CRLF or SFGS is discovered by the on-site biologist or anyone else, the animal shall be allowed to passively leave the work area on its own, as determined by the onsite biologist. If a CRLF or SFGS is trapped, only a USFWS-approved biologist shall move the individual under the direction of USFWS and CDFW. The biologist will also report these findings, as required, to appropriate the agencies.

5.4 Other Local Policies

5.4.1 Heritage Trees

In general, removal or pruning more than one third of the branch or root system of a heritage is a violation of the City's heritage tree ordinance and would be considered a significant impact under CEQA. Parking lot construction will result in removal of 21 trees. Nine of these trees to be removed are designated as potential heritage trees. To reduce this impact to a less than significant level, any removal or pruning beyond one third amount, will require a permit from the City Manager and/or the City Council. Permit conditions typically include 1:1 replacement of the heritage tree at a minimum 24-inch box size. The Project includes planting of 9 replacement trees to compensate for the heritage tree removal.

In addition, any grading, excavation, demolition, or other construction activity conducted inside the dripline of a heritage tree requires submittal of a tree protection plan for review and approval by the City Manager prior to issuance of any grading or construction permit.

6.0 REFERENCES

Altman, B., and R. Sallabanks. 2000. Olive-sided Flycatcher (*Contopus cooperi*). In The Birds of North America, No. 502 (A. Poole and F. Gill, eds.). The Birds of North America, Inc., Philadelphia, PA.

Alvarez, J. A. 2004. *Rana aurora draytonii* (California red-legged frog) Microhabitat. Herpetological Review 35:162-163.

Alvarez, J.A., D.G. Cook, J.L. Yee, M.G. van Hattem, D.R. Fong, and R.N. Fisher. 2013. Comparative microhabitat characteristics at oviposition sites of the California red-legged frog (*Rana draytonii*). Herpetological Conservation and Biology 8(3):539-551.

Baldwin, BG, DH Goldman, DJ Keil, R Patterson, TJ Rosatti, and DH Wilken (eds.). 2012. The Jepson Manual: Vascular Plants of California, second edition. University of California Press, Berkeley, CA.

Bulger, J.B., Scott, N.J., and Seymour, R.B. 2003. Terrestrial activity and conservation of adult California red-legged frogs *Rana aurora draytonii* in coastal forests and grasslands. Biological Conservation 110:85–95.

California Coastal Commission (CCC). 1981. Statewide interpretive guidelines for wetlands and other wet environmentally sensitive habitat areas.

California Department of Fish and Game (CDFG). 1994. A Field Guide to Lake and Streambed Alteration Agreements, Sections 1600-1607, California Fish and Game Code.

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

California Department of Fish and Wildlife (CDFW). 2020. California Natural Diversity Database. Biogeographic Data Branch, Vegetation Classification and Mapping Program, Sacramento, California. Available online at: http://www.dfg.ca.gov/biogeodata/cnddb/mapsanddata.asp; most recently accessed: January 2020.

California Invasive Plant Council (Cal-IPC). 2020. California Invasive Plant Inventory Database. California Invasive Plant Council, Berkeley, CA. Online at: http://www.cal-ipc.org/paf/; most recently accessed: January 2020.

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

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

California Soil Resources Lab (CSRL). 2020. Online Soil Survey. Online at: http://casoilresource.lawr.ucdavis.edu/drupal/; most recently accessed: January 2020.

City of Half Moon Bay, 1993. Certified Local Coastal Program Land Use Plan.

City of Half Moon Bay. 2011. Coastal Resource Conservation Standards, Zoning Code, Title 18. October 18, 2011.

Corelli, Toni. 2015. CNPS Rare Plant Treasure Hunt Field Survey Form. Date of Field work: March 28, 2015.

Dunk, J. R. 1995. White-tailed Kite (*Elanus leucurus*). In The Birds of North America, No. 178 (A. Poole and F. Gill, eds.). The Academy of Natural Sciences, Philadelphia, and The American Ornithologists' Union, Washington, D.C.

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

Fellers, G. and P.M. Kleeman. 2007. California red-legged frog (*Rana draytonii*) movement and habitat use: Implications for conservation. Journal of Herpetology 41(2): 276-286.

Google Earth. 2020. Aerial Imagery 1991-2018. Most recently accessed: January 2020.

Hayes, M. P. and D. M. Krempels. 1986. Vocal sac variation among frogs of the genus Rana from western North America. Copeia 1986(4):927-936.

Hayes, M. P. and M. R. Jennings. 1986. Decline of ranid frog species in western North America: Are bullfrogs (*Rana catesbeiana*) responsible? Journal of Herpetology 20(4):490-509.

Nationwide Environmental Title Research (NETR). 2020. Historic Aerials. Available online at: http://www.historicaerials.com/; most recently accessed: January 2020.

Holland, R. F. 1986. Preliminary Descriptions of the Terrestrial Natural Communities of California. Prepared for the California Department of Fish and Game, Sacramento, California.

Jennings, M. R. and M. P. Hayes. 1994. Amphibian and Reptile Species of Special Concern in California. Final report submitted to the California Department of Fish and Game, Inland Fisheries Division, Rancho Cordova, California. Contract No. 8023.

Jennings, M. R. and M. P. Hayes. 1994. Amphibian and Reptile Species of Special Concern in California. Final report submitted to the California Department of Fish and Game, Inland Fisheries Division, Rancho Cordova, California. Contract No. 8023.

Jepsen, S., D.F. Schweitzer, B. Young, N. Sears, M. Omes, and S. Hoffman Black. 2015. Conservation Status and Ecology of the Monarch Butterfly in the United States. Prepared for the U.S. Forest Service. Xerces Society for Invertebrate Conservation , Portland, OR.

Jepson Flora Project (eds.). 2020. Jepson eFlora. Online at: http://ucjeps.berkeley.edu/IJM.html; most recently accessed January 2020.

Larsen, S.S. 1994. Life history aspects of the San Francisco garter snake at the Millbrae habitat site. Master's Thesis. California State University, Hayward, California. 105 pp.

Leong, K.L.H., W.H. Sakai, W. Bremer, D. Feuerstein, and G. Yoshimura. 2004. Analysis of the pattern of distribution and abundance of monarch overwintering sites along the California coastline. Pages 177-185 in *The Monarch Butterfly: Biology and Conservation*, K. Oberhauser and M. Solensky (eds). Cornell University Press, Ithaca, NY.

Lichvar, Robert W., and Shawn M. McColley. 2008. A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States. Cold Regions Research and Engineering Laboratory, U.S. Army Engineer Research and Development Center. Prepared for the U.S. Army Corps of Engineers Wetland Regulatory Assistance Program. 84 pp.

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. Published 28 April 2016. ISSN 2153 733X.

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

McGinnis, S. M. 2001. Past and Present Habitats for the San Francisco Garter Snake and California Red-Legged Frog on the Original Cascade Ranch Property, With Additional Comments on Potential Movement Pathways and Suggestions for Critical Habitat Enhancement Measures. Unpublished. January.

McGinnis, S., P. Keel, and E, Burko. 1987. The use of upland habitats by snake species at AnoNuevo State Reserve. Report to California Department of Fish and Game, Sacramento, California. 13 pp.

Mitchell, D. E. 2000. Allen's Hummingbird (*Selasphorus sasin*). In The Birds of North America, No. 501(A. Poole and F. Gill, eds.). Philadelphia: The Academy of Natural Sciences; Washington, D.C.: The American Ornithologists' Union.

Munsell Color. 2009. Munsell Soil Color Charts. Grand Rapids, MI.

National Oceanic and Atmospheric Administration (NOAA). 2016. National Centers for Environmental Information. Accessed online January and February 2016 at: http://www.ncdc.noaa.gov/cdo-web/

Natural Resources Conservation Service (NRCS). 2020. Web Soil Survey: San Mateo County. Available online: http://websoilsurvey.nrcs.usda.gov/. Accessed January 2020.

Sequoia Chapter Audubon Society. 2008. Sequoia Needles. Bulletin of the Sequoia Audubon Society, San Mateo County. Volume 59, No. 2. November-January 2008-2009.

Shuford, W.D. and Gardali, T., 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 California Department of Fish and Game, Sacramento.

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

U.S. Army Corps of Engineers (Corps). 2008. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0), ed. J.S. Wakeley, R.W. Lichvar, and C.V. Noble. ERDC/EL TR-08-28. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

U.S. Department of Agriculture (USDA). 1961. Soil Survey - San Mateo Area, California. Series 1954 No 13, Issued May 1961.

U.S. Department of Agriculture (USDA). 2016. WETS Station Half Moon Bay 1971-2000 analysis. Natural Resources Conservation Service. Online at: http://agacis.rcc-acis.org/06111/wets/results. Accessed: February 2016.

U.S. Department of Agriculture (USDA). 2018. Field Indicators of Hydric Soils in the United States: A Guide for Identifying and Delineating Hydric Soils, Version 8.2. L.M. Vasilas, G.W. Hurt, and J.F. Berkowitz (eds.). Natural Resources Conservation Service. In cooperation with the National Technical Committee for Hydric Soils, Fort Worth, TX.

U.S. Department of Agriculture (USDA). 2020. WETS Station Half Moon Bay 1990-2019 analysis. Natural Resources Conservation Service. Online at: http://agacis.rcc-acis.org/?fips=06081. Accessed: January 2020.

U.S. Fish and Wildlife Service (USFWS). 2002. Recovery plan for the California red-legged frog (*Rana aurora draytonii*). U.S. Fish and Wildlife Service, Portland, OR.

U.S. Fish and Wildlife Service (USFWS). 2006. Critical habitat CRLF.

U.S. Fish and Wildlife Service (USFWS). 2006. San Francisco Garter Snake (*Thamnophis sirtalis tetrataenia*) 5-Year Review: Summary and Evaluation. Sacramento Fish and Wildlife Office. September.

U.S. Fish and Wildlife Service (USFWS). 2010. Endangered and Threatened Wildlife and Plants: Revised Designation of Critical Habitat for California Red-legged Frog; Final Rule. Federal Register, Vol. 75, No. 51. 12815-12959.

U.S. Fish and Wildlife Service (USFWS). 2020a. National Wetlands Inventory (NWI) website. U.S. Department of the Interior, USFWS, Washington D.C. Available at: http://www.fws.gov/nwi/. Accessed: January 2016.

U.S. Fish and Wildlife Service (USFWS). 2020b. IPaC - Information for Planning and Conservation Trust Resource Report. Sacramento Fish and Wildlife Office. Available online: http://ecos.fws.gov/ipac/

U.S. Geological Survey (USGS). 2018. Half Moon Bay 7.5 minute topographic map.

Western Bat Working Group (WBWG). 2016. Species accounts. Prepared by: Betsy C. Bolster. Available online at: http://wbwg.org/western-bat-species/

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

PRELIMINARY JURISDICTIONAL DETERMINATION MAP

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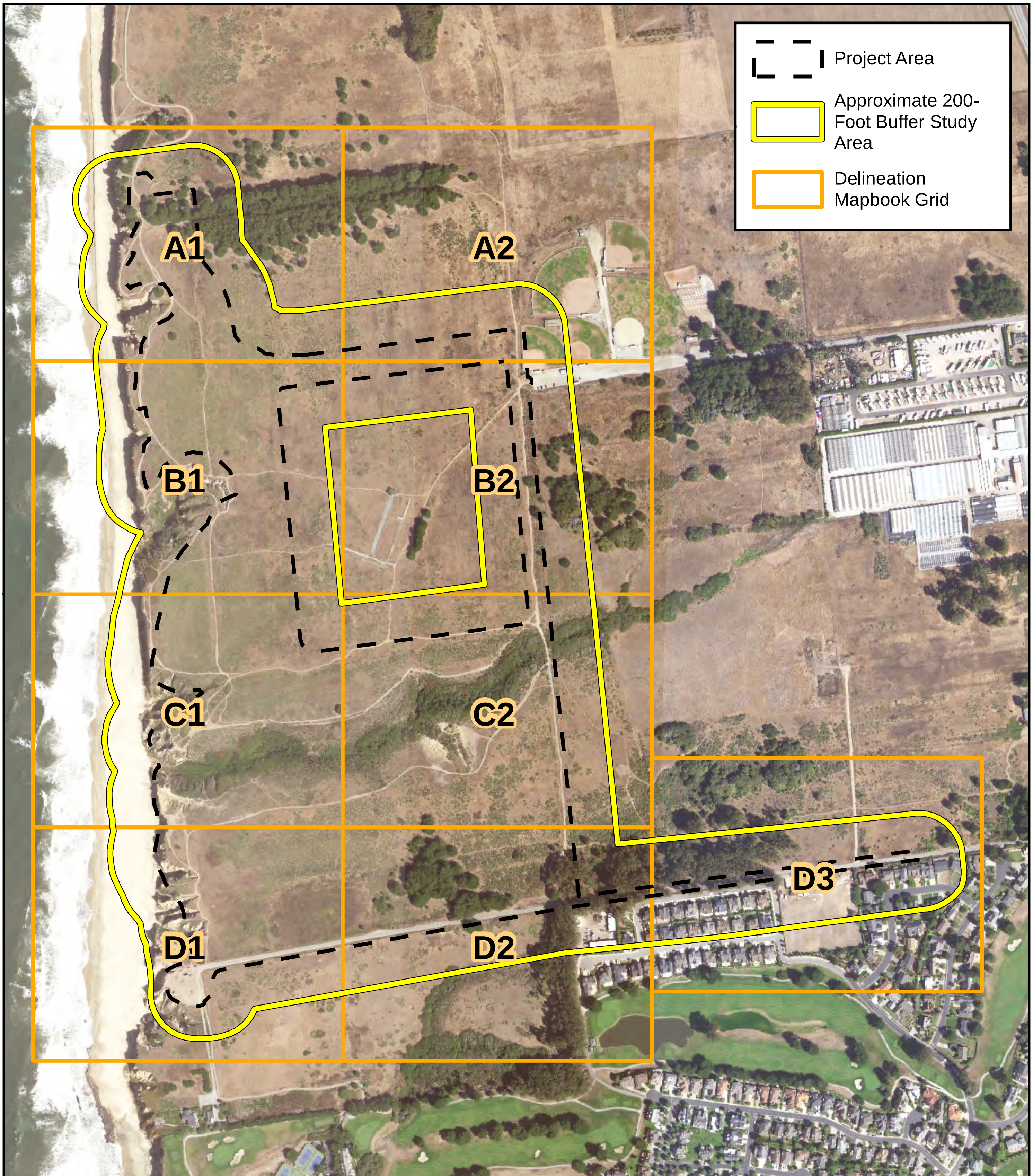

Appendix A. Delineation Mapbook Grid

N
W E
S

1 inch = 600 feet

0 250 500
Feet

Wavecrest Coastal Trail: Southern Alignment
Half Moon Bay, California

wra
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Map Prepared Date: 2/4/2020
Map Prepared By: mweidenbach
Base Source: NAIP 2018
Data Source(s): WRA

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Appendix A. Grid - A1

Preliminary Jurisdictional Determination

Wavecrest Coastal Trail: Southern Alignment Half Moon Bay, California

Project Area (86.66 ac)

Approximate 200-Foot Buffer Study Area (170.83 ac)

Sample Points

Contours - 1' Interval (NAVD88 Vertical Datum)

Control Points

Wetlands

Corps/RWQCB/CCC Jurisdictional Features

On-Site Seasonal Wetlands (1.73 ac)

Off-Site Seasonal Wetlands (1.73 ac)

CCC Jurisdictional Features

On-Site Coastal Seasonal Wetland (0.24 ac)

Off-Site Coastal Seasonal Wetland (0.45 ac)

Non-Wetland Waters

Corps/RWQCB/CCC Jurisdictional Features

Ocean - To HTL (observed in field) (7.98 ac)

Corps

On-Site Stream - To OHWM (0.35 ac, 1,362 linear ft)

Off-Site Stream - To OHWM (0.34 ac, 871 linear ft)

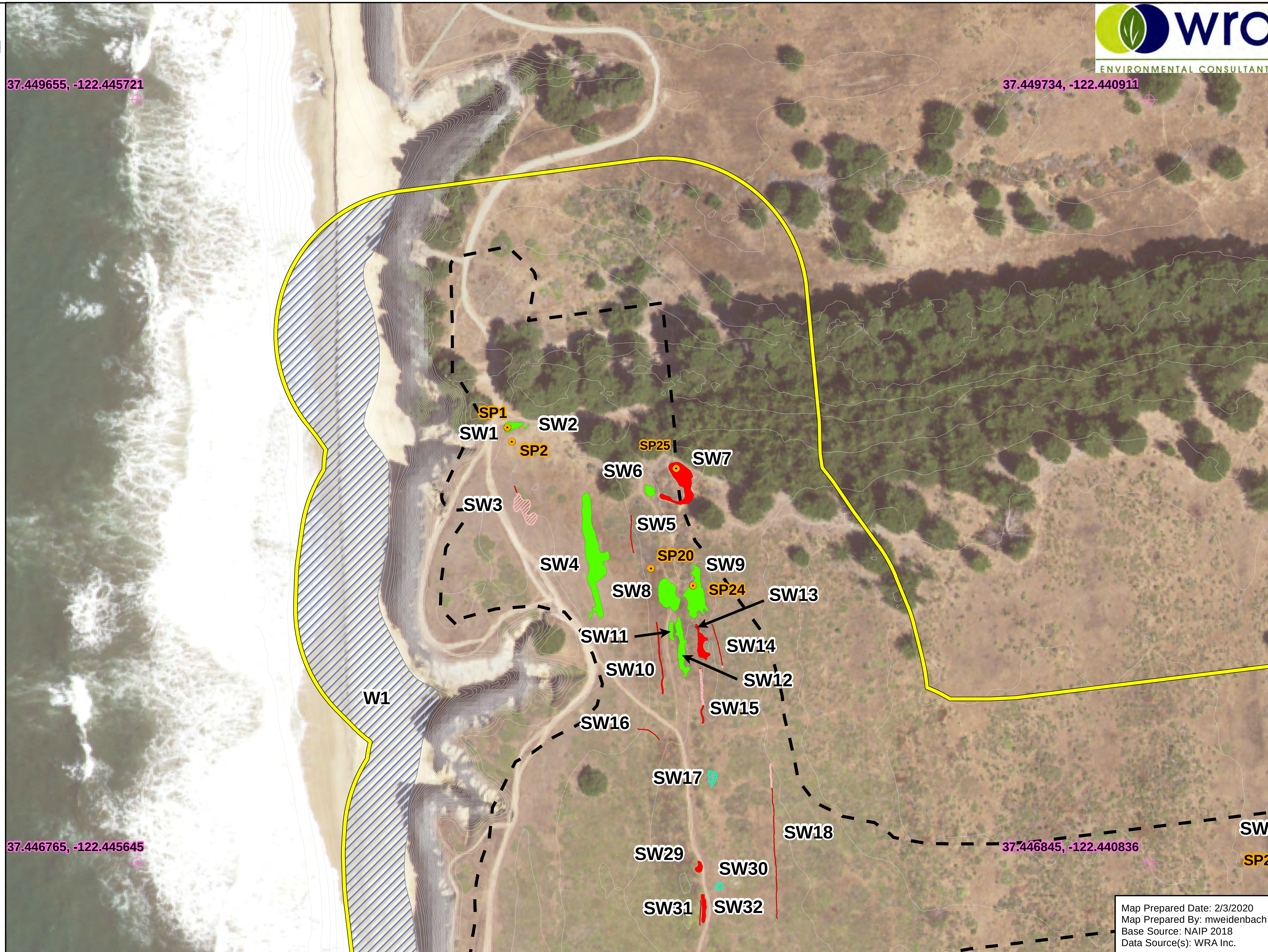
RWQCB/CCC/CDFW Jurisdictional Features

On-Site Stream - To TOB (1.89 ac, 1,362 linear ft)

Off-Site Stream - To TOB (2.80 ac, 871 linear ft)

1 inch = 125 feet

0 50 100 200 Feet



Map Prepared Date: 2/3/2020
Map Prepared By: mweidenbach
Base Source: NAIP 2018
Data Source(s): WRA Inc.

Appendix A. Grid - A2

Preliminary Jurisdictional Determination

Wavecrest Coastal Trail: Southern Alignment Half Moon Bay, California

Project Area (86.66 ac)

Approximate 200-Foot Buffer Study Area (170.83 ac)

Sample Points

Contours - 1' Interval (NAVD88 Vertical Datum)

Control Points

Wetlands

Corps/RWQCB/CCC Jurisdictional Features

On-Site Seasonal Wetlands (1.73 ac)

Off-Site Seasonal Wetlands (1.73 ac)

CCC Jurisdictional Features

On-Site Coastal Seasonal Wetland (0.24 ac)

Off-Site Coastal Seasonal Wetland (0.45 ac)

Non-Wetland Waters

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Corps

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Off-Site Stream - To OHWM (0.34 ac, 871 linear ft)

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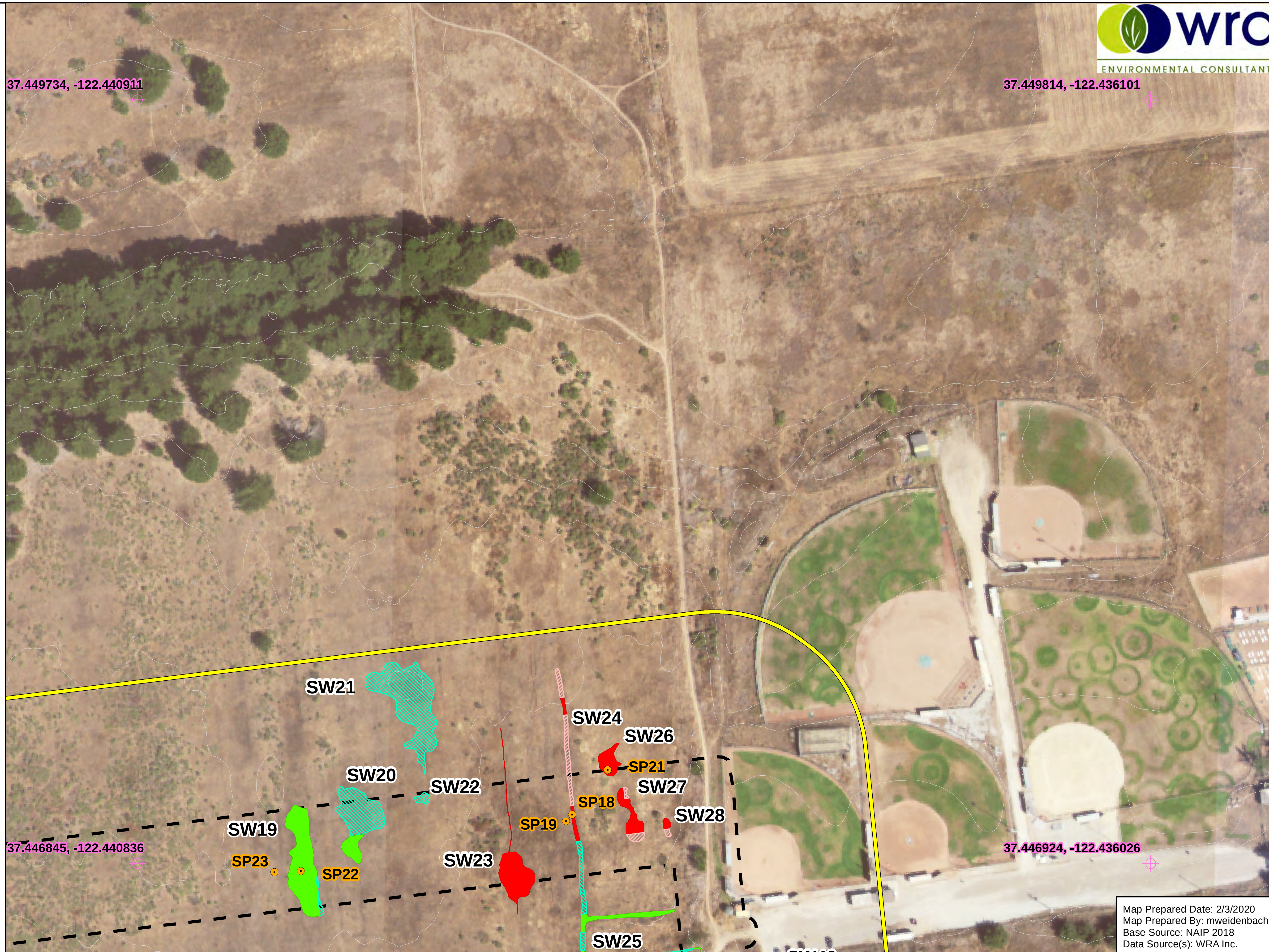
On-Site Stream - To TOB (1.89 ac, 1,362 linear ft)

Off-Site Stream - To TOB (2.80 ac, 871 linear ft)

1 inch = 125 feet

0 50 100 200 Feet



Map Prepared Date: 2/3/2020
Map Prepared By: mweidenbach
Base Source: NAIP 2018
Data Source(s): WRA Inc.

Appendix A. Grid - B1

Preliminary Jurisdictional Determination

Wavecrest Coastal Trail: Southern Alignment Half Moon Bay, California

Project Area (86.66 ac)

Approximate 200-Foot Buffer Study Area (170.83 ac)

Sample Points

Contours - 1' Interval (NAVD88 Vertical Datum)

Control Points

Wetlands

Corps/RWQCB/CCC Jurisdictional Features

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Off-Site Seasonal Wetlands (1.73 ac)

CCC Jurisdictional Features

On-Site Coastal Seasonal Wetland (0.24 ac)

Off-Site Coastal Seasonal Wetland (0.45 ac)

Non-Wetland Waters

Corps/RWQCB/CCC Jurisdictional Features

Ocean - To HTL (observed in field) (7.98 ac)

Corps

On-Site Stream - To OHWM (0.35 ac, 1,362 linear ft)

Off-Site Stream - To OHWM (0.34 ac, 871 linear ft)

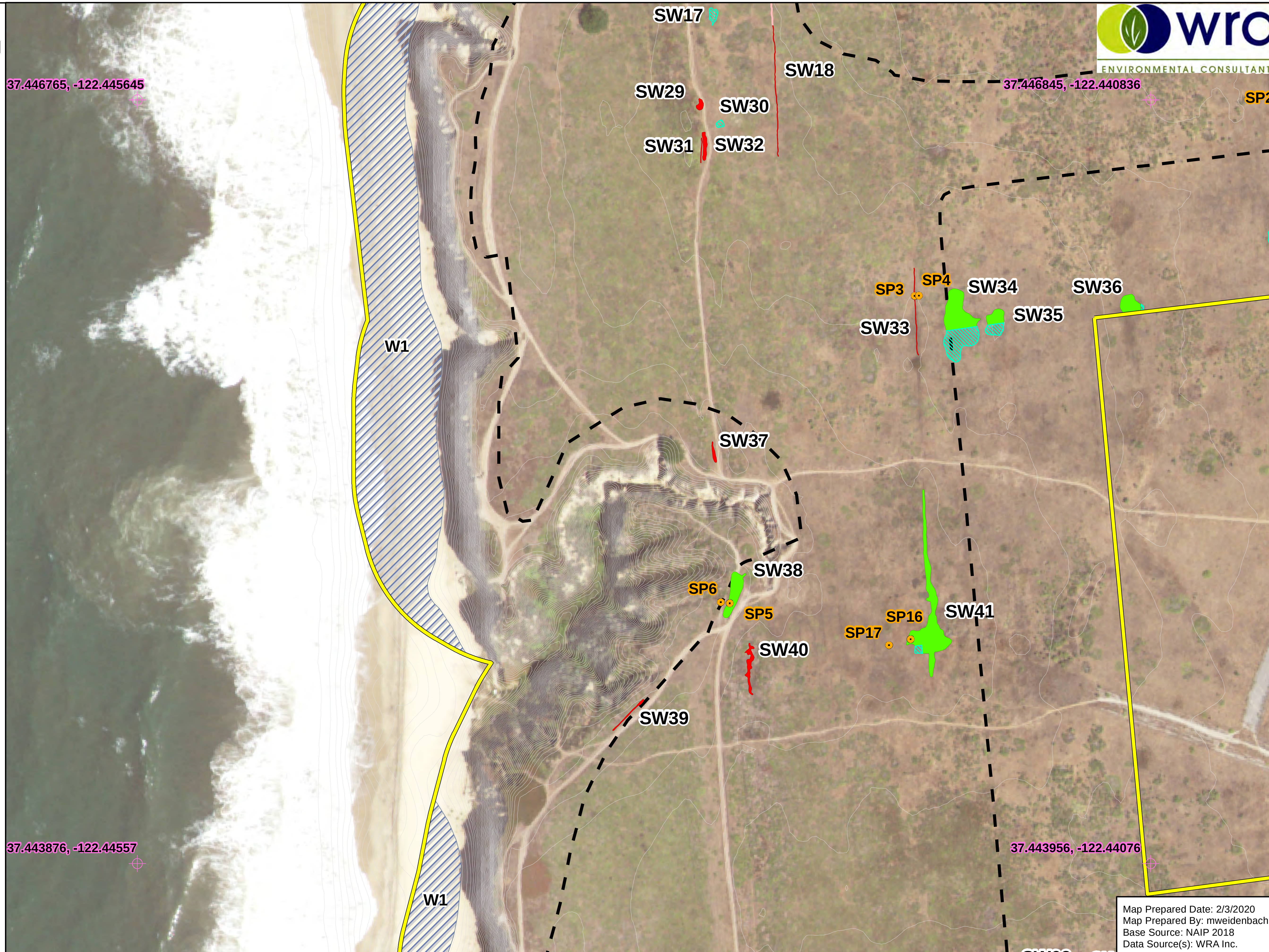
RWQCB/CCC/CDFW Jurisdictional Features

On-Site Stream - To TOB (1.89 ac, 1,362 linear ft)

Off-Site Stream - To TOB (2.80 ac, 871 linear ft)

1 inch = 125 feet

0 50 100 200 Feet



Map Prepared Date: 2/3/2020
Map Prepared By: mweidenbach
Base Source: NAIP 2018
Data Source(s): WRA Inc.

Appendix A. Grid - B2

Preliminary Jurisdictional Determination

Wavecrest Coastal Trail: Southern Alignment Half Moon Bay, California

Project Area (86.66 ac)

Approximate 200-Foot Buffer Study Area (170.83 ac)

Sample Points

Contours - 1' Interval (NAVD88 Vertical Datum)

Control Points

Wetlands

Corps/RWQCB/CCC Jurisdictional Features

On-Site Seasonal Wetlands (1.73 ac)

Off-Site Seasonal Wetlands (1.73 ac)

CCC Jurisdictional Features

On-Site Coastal Seasonal Wetland (0.24 ac)

Off-Site Coastal Seasonal Wetland (0.45 ac)

Non-Wetland Waters

Corps/RWQCB/CCC Jurisdictional Features

Ocean - To HTL (observed in field) (7.98 ac)

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On-Site Stream - To OHWM (0.35 ac, 1,362 linear ft)

Off-Site Stream - To OHWM (0.34 ac, 871 linear ft)

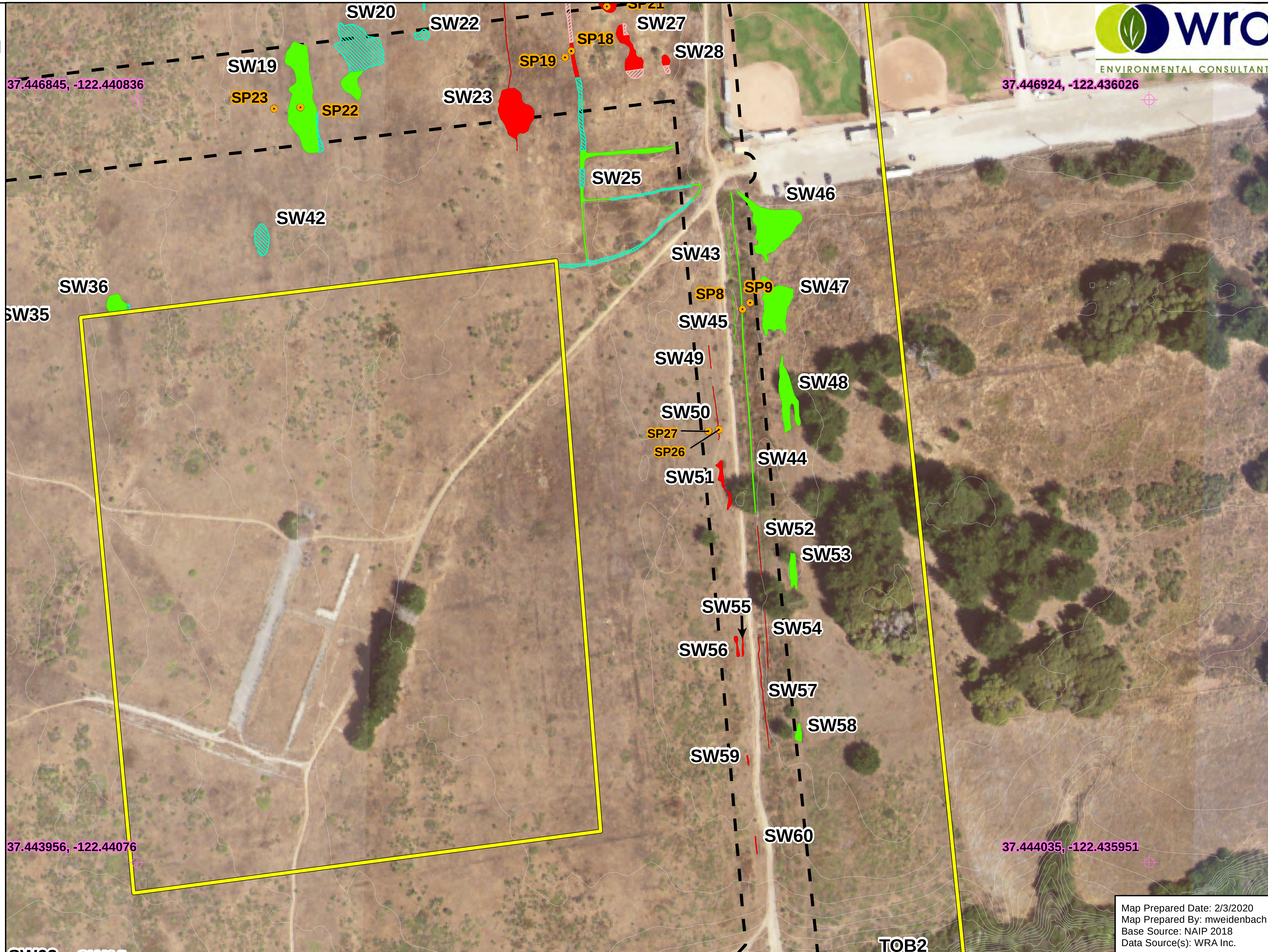
RWQCB/CCC/CDFW Jurisdictional Features

On-Site Stream - To TOB (1.89 ac, 1,362 linear ft)

Off-Site Stream - To TOB (2.80 ac, 871 linear ft)

1 inch = 125 feet

0 50 100 200 Feet



Appendix A. Grid - C1

Preliminary Jurisdictional Determination

Wavecrest Coastal Trail: Southern Alignment Half Moon Bay, California

Project Area (86.66 ac)

Approximate 200-Foot Buffer Study Area (170.83 ac)

Sample Points

Contours - 1' Interval (NAVD88 Vertical Datum)

Control Points

Wetlands

Corps/RWQCB/CCC Jurisdictional Features

On-Site Seasonal Wetlands (1.73 ac)

Off-Site Seasonal Wetlands (1.73 ac)

CCC Jurisdictional Features

On-Site Coastal Seasonal Wetland (0.24 ac)

Off-Site Coastal Seasonal Wetland (0.45 ac)

Non-Wetland Waters

Corps/RWQCB/CCC Jurisdictional Features

Ocean - To HTL (observed in field) (7.98 ac)

Corps

On-Site Stream - To OHWM (0.35 ac, 1,362 linear ft)

Off-Site Stream - To OHWM (0.34 ac, 871 linear ft)

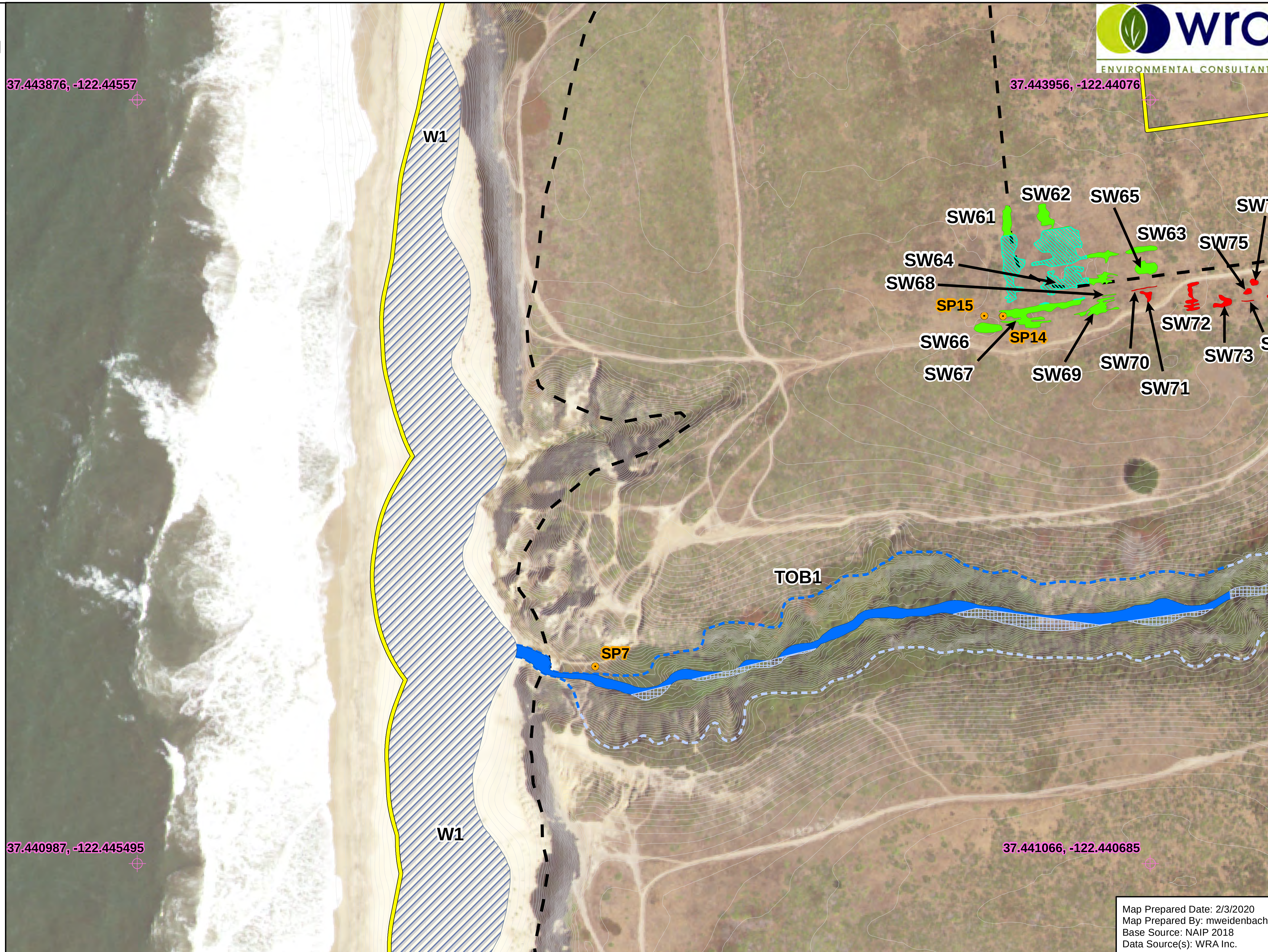
RWQCB/CCC/CDFW Jurisdictional Features

On-Site Stream - To TOB (1.89 ac, 1,362 linear ft)

Off-Site Stream - To TOB (2.80 ac, 871 linear ft)

1 inch = 125 feet

0 50 100 200 Feet



Appendix A. Grid - C2

Preliminary Juridisdictional Determination

Wavecrest Coastal Trail: Southern Alignment Half Moon Bay, California

Project Area (86.66 ac)

Approximate 200-Foot Buffer Study Area (170.83 ac)

Sample Points

Contours - 1' Interval (NAVD88 Vertical Datum)

Control Points

Wetlands

Corps/RWQCB/CCC Jurisdictional Features

On-Site Seasonal Wetlands (1.73 ac)

Off-Site Seasonal Wetlands (1.73 ac)

CCC Jurisdictional Features

On-Site Coastal Seasonal Wetland (0.24 ac)

Off-Site Coastal Seasonal Wetland (0.45 ac)

Non-Wetland Waters

Corps/RWQCB/CCC Jurisdictional Features

Ocean - To HTL (observed in field) (7.98 ac)

Corps

On-Site Stream - To OHWM (0.35 ac, 1,362 linear ft)

Off-Site Stream - To OHWM (0.34 ac, 871 linear ft)

RWQCB/CCC/CDFW Jurisdictional Features

On-Site Stream - To TOB (1.89 ac, 1,362 linear ft)

Off-Site Stream - To TOB (2.80 ac, 871 linear ft)

1 inch = 125 feet

0 50 100 200 Feet

Appendix A. Grid - D1

Preliminary Jurisdictional Determination

Wavecrest Coastal Trail: Southern Alignment Half Moon Bay, California

Project Area (86.66 ac)

Approximate 200-Foot Buffer Study Area (170.83 ac)

Sample Points

Contours - 1' Interval (NAVD88 Vertical Datum)

Control Points

Wetlands

Corps/RWQCB/CCC Jurisdictional Features

On-Site Seasonal Wetlands (1.73 ac)

Off-Site Seasonal Wetlands (1.73 ac)

CCC Jurisdictional Features

On-Site Coastal Seasonal Wetland (0.24 ac)

Off-Site Coastal Seasonal Wetland (0.45 ac)

Non-Wetland Waters

Corps/RWQCB/CCC Jurisdictional Features

Ocean - To HTL (observed in field) (7.98 ac)

Corps

On-Site Stream - To OHWM (0.35 ac, 1,362 linear ft)

Off-Site Stream - To OHWM (0.34 ac, 871 linear ft)

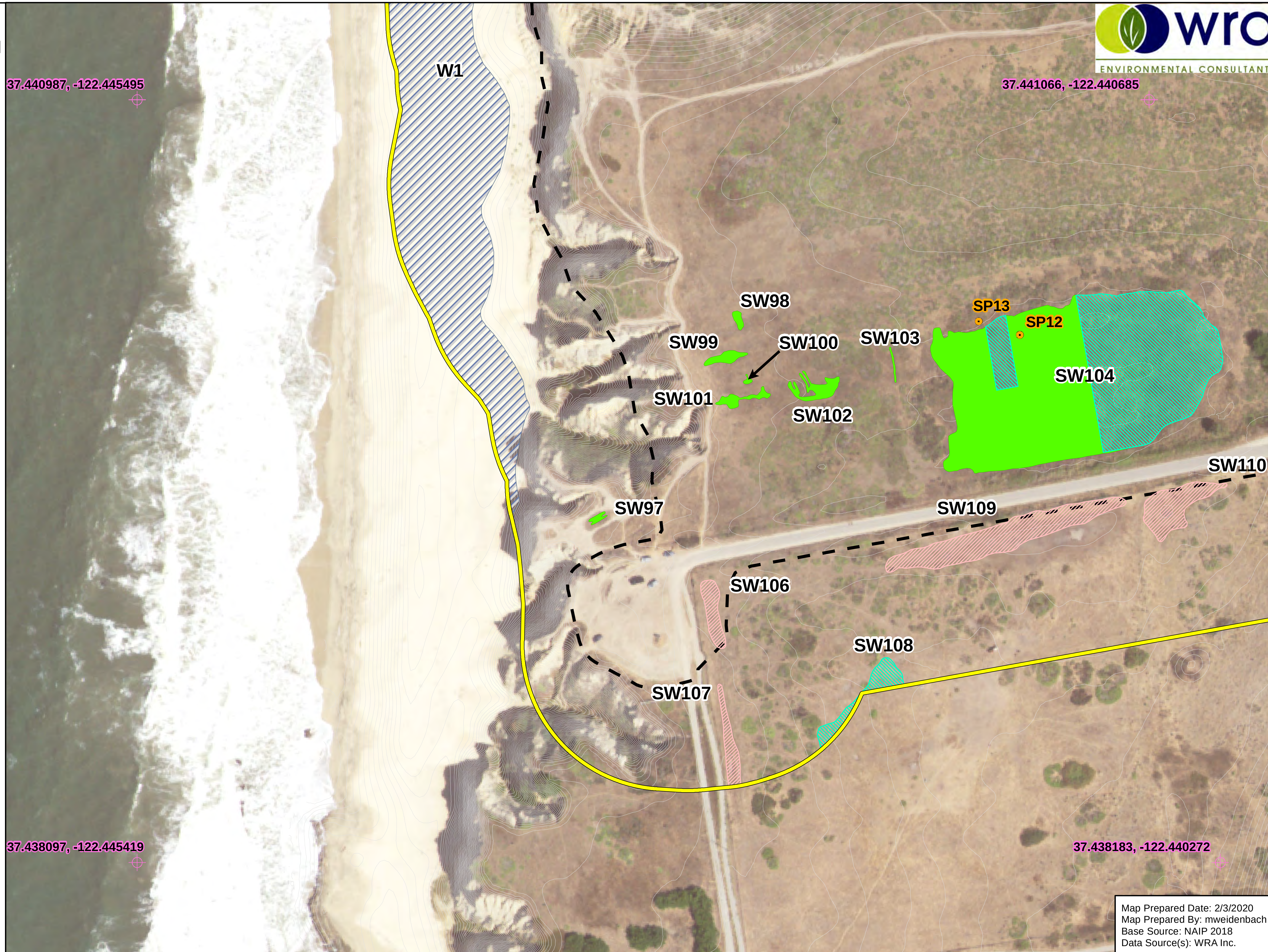
RWQCB/CCC/CDFW Jurisdictional Features

On-Site Stream - To TOB (1.89 ac, 1,362 linear ft)

Off-Site Stream - To TOB (2.80 ac, 871 linear ft)

1 inch = 125 feet

0 50 100 200 Feet



wra ENVIRONMENTAL CONSULTANTS

Map Prepared Date: 2/3/2020
Map Prepared By: mweidenbach
Base Source: NAIP 2018
Data Source(s): WRA Inc.

Appendix A. Grid - D2

Preliminary Jurisdictional Determination

Wavecrest Coastal Trail: Southern Alignment
Half Moon Bay, California

Project Area (86.66 ac)

Approximate 200-Foot Buffer Study Area (170.83 ac)

Sample Points

Contours - 1' Interval (NAVD88 Vertical Datum)

Control Points

Wetlands

Corps/RWQCB/CCC Jurisdictional Features

On-Site Seasonal Wetlands (1.73 ac)

Off-Site Seasonal Wetlands (1.73 ac)

CCC Jurisdictional Features

On-Site Coastal Seasonal Wetland (0.24 ac)

Off-Site Coastal Seasonal Wetland (0.45 ac)

Non-Wetland Waters

Corps/RWQCB/CCC Jurisdictional Features

Ocean - To HTL (observed in field) (7.98 ac)

Corps

On-Site Stream - To OHWM (0.35 ac, 1,362 linear ft)

Off-Site Stream - To OHWM (0.34 ac, 871 linear ft)

RWQCB/CCC/CDFW Jurisdictional Features

On-Site Stream - To TOB (1.89 ac, 1,362 linear ft)

Off-Site Stream - To TOB (2.80 ac, 871 linear ft)

1 inch = 125 feet

0 50 100 200 Feet

WRA ENVIRONMENTAL CONSULTANTS

Map Prepared Date: 2/3/2020
Map Prepared By: mweidenbach
Base Source: NAIP 2018
Data Source(s): WRA Inc.

Appendix A. Grid - D3

Preliminary Jurisdictional Determination

Wavecrest Coastal Trail: Southern Alignment Half Moon Bay, California

- Project Area (86.66 ac)
- Approximate 200-Foot Buffer Study Area (170.83 ac)
- Sample Points
- Contours - 1' Interval (NAVD88 Vertical Datum)
- Control Points

Wetlands

Corps/RWQCB/CCC Jurisdictional Features

- On-Site Seasonal Wetlands (1.73 ac)
- Off-Site Seasonal Wetlands (1.73 ac)

CCC Jurisdictional Features

- On-Site Coastal Seasonal Wetland (0.24 ac)
- Off-Site Coastal Seasonal Wetland (0.45 ac)

Non-Wetland Waters

Corps/RWQCB/CCC Jurisdictional Features

- Ocean - To HTL (observed in field) (7.98 ac)

Corps

- On-Site Stream - To OHWM (0.35 ac, 1,362 linear ft)
- Off-Site Stream - To OHWM (0.34 ac, 871 linear ft)

RWQCB/CCC/CDFW Jurisdictional Features

- On-Site Stream - To TOB (1.89 ac, 1,362 linear ft)
- Off-Site Stream - To TOB (2.80 ac, 871 linear ft)

1 inch = 125 feet

0 50 100 200 Feet

wra ENVIRONMENTAL CONSULTANTS

Map Prepared Date: 2/3/2020
Map Prepared By: mweidenbach
Base Source: NAIP 2018
Data Source(s): WRA Inc.

APPENDIX B

CORPS JURISDICTIONAL DELINEATION DATA SHEETS

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WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Wavecrest Southern Alignment City/County: Half Moon Bay Sampling Date: 1-26-16

Applicant/Owner: Coastside Land Trust State: CA Sampling Point: SP 1

Investigator(s): Stephanie Freed, David Zwick Section, Township, Range: Section 5, Township 65, Range 5w

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): Concave Slope (%): 0-2

Subregion (LRR): Mediterranean California LRRC Lat: ___ Long: ___ Datum: ___

Soil Map Unit Name: Watsonville Sandy Loam NWI classification: ___

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ✓, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ___
Hydric Soil Present?	Yes ✓	No ___
Wetland Hydrology Present?	Yes ✓	No ___

Is the Sampled Area within a Wetland? **Yes ✓** **No ___**

Remarks:

Sample point located within wetland depression on a coastal field and was inundated during site visit. The sample point was observed with indicators of hydrophytic vegetation, hydric soils, and wetland hydrology, including inundation up to 16" deep. Wetland boundary determined based on grade break, shift from Rumex acetocella to Rumex crispus and Cyperus eragrostis, and presence of surface water. Sample point taken within 18 hours after last rain event. Sample point paired with SP 2.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ___)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: ___)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 5'x 10')			
1. Cyperus eragrostis	5	Y	FACW
2. Festuca perennis	3	Y	FAC
3. Rumex crispus	2	N	FAC
4. Mentha pulegium	1	N	OBL
5.			
6.			
7.			
8.			
	11 = Total Cover		
Woody Vine Stratum (Plot size: ___)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 89 % Cover of Biotic Crust ___

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ___	x 1 = ___
FACW species ___	x 2 = ___
FAC species ___	x 3 = ___
FACU species ___	x 4 = ___
UPL species ___	x 5 = ___
Column Totals: ___ (A)	___ (B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:

- ✓ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓** **No ___**

Remarks:

Sample point is dominated by FAC & FACW species and was determined to contain hydrophytic vegetation, as it meets the dominance test.

SOIL

Sampling Point: SP 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-4	7.5YR 2.5/1						Silt Loam	
4-8	7.5YR 2.5/1						Silt Loam	
8-14	2.5YR 2.5/1	60	5Y 5/2	25	D	M	Clay	
			7.5YR 4/6	5	C	M	Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ✓ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ✓ **No** ______

Remarks:

While no hydric soil indicators were observed, this sample point contains naturally problematic seasonally ponded soils. Sample point occurs in a seasonally ponded depression with a restrictive clay layer and lacks hydric soil indicators due to limited saturation depth and saline conditions.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ✓ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No ______ Depth (inches): 16"

Water Table Present? Yes ✓ No ______ Depth (inches): 0"

Saturation Present? (includes capillary fringe) Yes ✓ No ______ Depth (inches): 0"

Wetland Hydrology Present? Yes ✓ **No** ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Wetland hydrology indicators observed at the sample point included surface water (16" deep) and sample point meets secondary indicator D5, FAC-Neutral test.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Wavecrest Southern Alignment City/County: Half Moon Bay Sampling Date: 1-26-16

Applicant/Owner: Coastside Land Trust State: CA Sampling Point: SP 2

Investigator(s): Stephanie Freed, David Zwick Section, Township, Range: Section 5, Township 65, Range 5w

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): 0

Subregion (LRR): Mediterranean California LRRC Lat: ______ Long: ______ Datum: ______

Soil Map Unit Name: Watsonville Sandy Loam NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		✓
Hydric Soil Present?		✓
Wetland Hydrology Present?	✓	

Is the Sampled Area within a Wetland? **Yes** ____ **No** ✓

Remarks:

Sample point located within upland coastal field. The sample point did not meet wetland indicators for hydrophytic vegetation, hydric soils or hydrology. Sample point taken within 48 hours after last rain event. Sample point paired with SP 1.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: 10' x 10')			
1. Festuca perennis	35	Y	FAC
2. Rumex acetosella	20	Y	FACU
3. Geranium dissectum	15	N	UPL
4. Holcus lanatus	15	N	FAC
5. Helminthotheca echioides	5	N	FACU
6. Carduus pycnocephalus	2	N	UPL
7. Sonchus asper	1	N	FAC
8. Lysimachia arvensis	1	N	FAC
= Total Cover	100		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum ______ % Cover of Biotic Crust ______

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	______	x 1 = ______
FACW species	______	x 2 = ______
FAC species	______	x 3 = ______
FACU species	______	x 4 = ______
UPL species	______	x 5 = ______
Column Totals:	______ (A)	______ (B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ____

Remarks:

Sample point is dominated by FAC and FACU species and does not meet any hydrophytic vegetation indicators.

SOIL

Sampling Point: SP 2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 3/2	100					Silt Loam	Moist
3-10	10YR 2/2	100					Silt Loam	Moist

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ______ No ✓

Remarks:

Sample point does not meet any hydric soil indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
✓ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No ✓ Depth (inches): ______

Water Table Present? Yes ✓ No ______ Depth (inches): 10"

Saturation Present? (includes capillary fringe) Yes ______ No ✓ Depth (inches): ______

Wetland Hydrology Present? Yes ✓ No ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

While the water table present at 10" below ground surface, this is likely reflective of approximately 2.97 inches of rain within the eight days proceeding the site visit and is not indicative of wetland hydrology conditions.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Wavecrest Southern Alignment City/County: Half Moon Bay Sampling Date: 1-26-16

Applicant/Owner: Coastside Land Trust State: CA Sampling Point: SP 3

Investigator(s): Stephanie Freed, David Zwick Section, Township, Range: Section 5, Township 65, Range 5w

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): Concave Slope (%): 0-2

Subregion (LRR): Mediterranean California LRRC Lat: ______ Long: ______ Datum: ______

Soil Map Unit Name: Watsonville Sandy Loam NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		✓
Hydric Soil Present?	✓	
Wetland Hydrology Present?	✓	

Is the Sampled Area within a Wetland? Yes ____ No ✓

Remarks:

Sample point located within upland swale and was inundated during site visit. The sample point did not meet indicators for hydrophytic vegetation, but met wetland indicators for hydric soils and wetland hydrology including inundation up to 2" deep. Sample point taken 48 hours after last rain event. Sample point paired with SP 4.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: 1' x 10')			
1. Polypogon monospeliensis	40	Y	FACW
2. Rumex acetosella	35	Y	FACU
3. Holcus lanatus	15	N	FAC
4. Carduus pycnocephalus	3	N	UPL
5. Rumex crispus	2	N	FAC
6. Geranium dissectum	+	N	UPL
7. Vicia sativa	+	N	FACU
8.			
= Total Cover	95		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 5 % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species	40	x 2 = 80
FAC species	17	x 3 = 51
FACU species	35	x 4 = 140
UPL species	3	x 5 = 15
Column Totals:	95 (A)	286 (B)

Prevalence Index = B/A = 3.01

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No ✓

Remarks:

Sample point is dominated by FACW and FACU species and does not meet any hydrophytic vegetation indicators. For absolute % cover. "+" indicates a trace occurrence.

SOIL

Sampling Point: SP 3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-4	7.5YR 2.5/1	100					Silt Clay	
4-8	2.5Y 2.5/1	60	5Y 5/2	35	D	M	Clay	Mottled
			7.5YR 4/6	5	C	M	Clay	
8-14	7.5YR 2.5/1	100					Clay Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
✓ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):
Type: ______
Depth (inches): ______

Hydric Soil Present? Yes ✓ No ______

Remarks:

Sample point meets hydric soil indicator for depleted dark surface (F7).

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

✓ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
✓ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No ______ Depth (inches): 2"
Water Table Present? Yes ✓ No ______ Depth (inches): 0"
Saturation Present? (includes capillary fringe) Yes ✓ No ______ Depth (inches): 0"

Wetland Hydrology Present? Yes ✓ No ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Wetland hydrology indicators observed at the sample point included surface water 2" deep and biotic crust.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Wavecrest Southern Alignment City/County: Half Moon Bay Sampling Date: 1-26-16

Applicant/Owner: Coastside Land Trust State: CA Sampling Point: SP 4

Investigator(s): Stephanie Freed, David Zwick Section, Township, Range: Section 5, Township 65, Range 5w

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): 0

Subregion (LRR): Mediterranean California LRRC Lat: ______ Long: ______ Datum: ______

Soil Map Unit Name: Watsonville Sandy Loam NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No ✓
Hydric Soil Present?	Yes ___	No ✓
Wetland Hydrology Present?	Yes ✓	No ___

Is the Sampled Area within a Wetland? Yes ___ No ✓

Remarks:

Sample point located within upland swale (SP 3). The sample point did not meet indicators of hydrophytic vegetation, hydric soils, or wetland hydrology. Sample point taken 48 hours after last rain event.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: 10' x 10')			
1. Rumex acetosella	35	Y	FACU
2. Holcus lanatus	33	Y	FAC
3. Baccharis pilularis	25	Y	UPL
4. Carduus pycnocephalus	5	N	UPL
5. Geranium dissectum	2	N	UPL
6.			
7.			
8.			
= Total Cover	100		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum ______ % Cover of Biotic Crust ______

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	______	x 1 = ______
FACW species	______	x 2 = ______
FAC species	______	x 3 = ______
FACU species	______	x 4 = ______
UPL species	______	x 5 = ______
Column Totals:	______ (A)	______ (B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks:

Sample point is dominated by FAC, FACU, and UPL species and does not meet any hydrophytic vegetation indicators.

SOIL

Sampling Point: SP 4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-14	10YR 3/2	97	7.5YR 4/6	3	C	M	Silt Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ______ No ✓

Remarks:

Sample point does not meet any hydric soil indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ✓ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No ✓ Depth (inches): ______

Water Table Present? Yes ✓ No ______ Depth (inches): 4"

Saturation Present? (includes capillary fringe) Yes ✓ No ______ Depth (inches): 0"

Wetland Hydrology Present? Yes ✓ No ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

While water table present up to 4" below ground surface, this is likely reflective of approximately 2.97 inches of rain within the eight days proceeding the site visit and is not indicative of wetland hydrology conditions.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Wavecrest Southern Alignment City/County: Half Moon Bay Sampling Date: 1-26-16

Applicant/Owner: Coastside Land Trust State: CA Sampling Point: SP 5

Investigator(s): Stephanie Freed, David Zwick Section, Township, Range: Section 5, Township 65, Range 5w

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): Concave Slope (%): 0-2

Subregion (LRR): Mediterranean California LRRC Lat: ____ Long: ____ Datum: ____

Soil Map Unit Name: Watsonville Sandy Loam NWI classification: ____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ✓, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____
Hydric Soil Present?	Yes ✓	No ____
Wetland Hydrology Present?	Yes ✓	No ____

Is the Sampled Area within a Wetland? Yes ✓ No ____

Remarks:

Sample point located within wetland depression on a coastal field and was inundated during site visit. The sample point met wetland indicators for hydrophytic vegetation, hydric soils, and wetland hydrology including inundation up to 2" deep. The wetland boundary was determined based on grade break, shift from Rumex acetocella to Eleocharis macrostachya and Juncus phaeocephalus, and presence of surface water. Sample point taken 48 hours after last rain event. Sample point paired with SP 6.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: 10' x 5')			
1. Eleocharis macrostachya	30	Y	OBL
2. Juncus phaeocephalus	20	Y	FACW
3. Rumex crispis	5	N	FAC
4. Cyperus eragrostis	3	N	FACW
5. Mentha pulegium	1	N	OBL
6.			
7.			
8.			
= Total Cover	59		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 61 % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	____	x 1 = ____
FACW species	____	x 2 = ____
FAC species	____	x 3 = ____
FACU species	____	x 4 = ____
UPL species	____	x 5 = ____
Column Totals:	____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ✓ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks:

Sample point is dominated by OBL & FACW species and was determined to contain hydrophytic vegetation, as it meets the dominance test.

SOIL

Sampling Point: SP 5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-4	7.5YR 2.5/1	100					Silty Clay	Saturated
4-8	2.5Y 2.5/1	60	5Y 5/2	35	D	M	Clay	
			7.5YR 4/6	5	C	M	Clay	
8-14	7.5YR 2.5/1	100					Clay Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ✓ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ✓ No ______

Remarks:

While no hydric soil indicators were observed, this sample point contains naturally problematic seasonally ponded soils. Sample point occurs in a seasonally ponded depression with a restrictive clay layer and lacks hydric soil indicators due to limited saturation depth and saline conditions.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ✓ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ✓ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No ______ Depth (inches): 2"

Water Table Present? Yes ✓ No ______ Depth (inches): 0"

Saturation Present? (includes capillary fringe) Yes ✓ No ______ Depth (inches): 0"

Wetland Hydrology Present? Yes ✓ No ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Wetland hydrology indicators observed at the sample point included surface water at 2" deep, biotic crust, and sample point meets secondary indicator D5, FAC-Neutral Test.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Wavecrest Southern Alignment City/County: Half Moon Bay Sampling Date: 1-26-16

Applicant/Owner: Coastside Land Trust State: CA Sampling Point: SP 6

Investigator(s): Stephanie Freed, David Zwick Section, Township, Range: Section 5, Township 65, Range 5w

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): Convex Slope (%): 0-2

Subregion (LRR): Mediterranean California LRRC Lat: ______ Long: ______ Datum: ______

Soil Map Unit Name: Terrace escarpments NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		✓
Hydric Soil Present?		✓
Wetland Hydrology Present?		✓

Is the Sampled Area within a Wetland? Yes ___ No ✓

Remarks:

Sample point located within upland field adjacent to wetland depression (SP 5). The sample point did not meet wetland indicators for hydrophytic vegetation, hydric soils, or wetland hydrology. Sample point taken 48 hours after last rain event.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: 10' x 10')			
1. Chlorogalum pomeridianum	20	Y	UPL
2. Baccharis pilularis	20	Y	UPL
3. Achillea millefolium	10	N	FACU
4. Holcus lanatus	10	N	FAC
5. Fragaria chiloensis	2	N	FACU
6. Juncus phaeocephalus	1	N	FACW
7. Juncus bufonius	1	N	FACW
8.		N	
= Total Cover	64		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 36 % Cover of Biotic Crust ______

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks:

Sample point is dominated by UPL species and does not meet any hydrophytic vegetation indicators.

SOIL

Sampling Point: SP 6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-9	7.5YR 3/2	100					Clay Loam	
9-11	10YR 3/2	100					Clay Loam	
11-14	7.5YR 2.5/1	85	7.5YR 5/8	6	C	M	Clay	
			10YR 5/6	9	C	M	Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ______ No ✓

Remarks:

Sample point does not meet any criteria for hydric soil indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ______	No ✓	Depth (inches): ______
Water Table Present?	Yes ______	No ✓	Depth (inches): ______
Saturation Present? (includes capillary fringe)	Yes ______	No ✓	Depth (inches): ______

Wetland Hydrology Present? Yes ______ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Sample point does not meet criteria for hydrology indicators.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Wavecrest Southern Alignment City/County: Half Moon Bay Sampling Date: 1-26-16

Applicant/Owner: Coastside Land Trust State: CA Sampling Point: SP 7

Investigator(s): Stephanie Freed, David Zwick Section, Township, Range: Section 5, Township 65, Range 5w

Landform (hillslope, terrace, etc.): Ravine Local relief (concave, convex, none): Concave Slope (%): 5

Subregion (LRR): Mediterranean California LRRC Lat: ____ Long: ____ Datum: ____

Soil Map Unit Name: Tierra and Watsonville Soil Materials NWI classification: ____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	✓	
Hydric Soil Present?		✓
Wetland Hydrology Present?	✓	
Is the Sampled Area within a Wetland?		✓

Remarks:

Sample point located within ravine above OHWM. The sample point met wetland indicators for hydrophytic vegetation and wetland hydrology but did not meet any indicators for hydric soils. Sample point taken 48 hours after last rain event.

VEGETATION – Use scientific names of plants.

Stratum / Species	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: 10' x 10')			
1. Salix lasiolepis	50	Y	FACW
2.			
3.			
4.			
5.			
= Total Cover	50		
Herb Stratum (Plot size: 10' x 10')			
1. Juncus phaeocephalus	80	Y	FACW
2. Rubus ursinus	5	N	FAC
3. Baccharis pilularis	5	N	UPL
4. Rumex crispis	5	N	FAC
5. Chlorogalum pomeridianum	1	N	UPL
6. Geranium dissectum	1	N	UPL
7. Cirsium vulgare	1	N	FACU
8. Galium aparine	+	N	FACU
= Total Cover	98		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 2 % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

__ Prevalence Index is ≤3.0[1]

__ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks:

Sample point is dominated by FACW species and was determined to contain hydrophytic vegetation, as it meets the dominance test. For absolute % cover. "+" indicates a trace occurrence.

SOIL

Sampling Point: SP 7

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-9	2.5Y 5/3	80	5Y 4/1	10	C	M	Sand	
9-14	2.5Y 5/3	99	7.5YR 4/4	11	C	M	Sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

__ Histosol (A1)
__ Histic Epipedon (A2)
__ Black Histic (A3)
__ Hydrogen Sulfide (A4)
__ Stratified Layers (A5) (**LRR C**)
__ 1 cm Muck (A9) (**LRR D**)
__ Depleted Below Dark Surface (A11)
__ Thick Dark Surface (A12)
__ Sandy Mucky Mineral (S1)
__ Sandy Gleyed Matrix (S4)
__ Sandy Redox (S5)
__ Stripped Matrix (S6)
__ Loamy Mucky Mineral (F1)
__ Loamy Gleyed Matrix (F2)
__ Depleted Matrix (F3)
__ Redox Dark Surface (F6)
__ Depleted Dark Surface (F7)
__ Redox Depressions (F8)
__ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

__ 1 cm Muck (A9) (**LRR C**)
__ 2 cm Muck (A10) (**LRR B**)
__ Reduced Vertic (F18)
__ Red Parent Material (TF2)
__ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ________

Depth (inches): ________

Hydric Soil Present? Yes ____ No ✓

Remarks:

Sample point does not meet criteria for hydric soil indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

__ Surface Water (A1)
__ High Water Table (A2)
__ Saturation (A3)
__ Water Marks (B1) (**Nonriverine**)
__ Sediment Deposits (B2) (**Nonriverine**)
__ Drift Deposits (B3) (**Nonriverine**)
__ Surface Soil Cracks (B6)
__ Inundation Visible on Aerial Imagery (B7)
__ Water-Stained Leaves (B9)
__ Salt Crust (B11)
✓ Biotic Crust (B12)
__ Aquatic Invertebrates (B13)
__ Hydrogen Sulfide Odor (C1)
__ Oxidized Rhizospheres along Living Roots (C3)
__ Presence of Reduced Iron (C4)
__ Recent Iron Reduction in Tilled Soils (C6)
__ Thin Muck Surface (C7)
__ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

__ Water Marks (B1) (**Riverine**)
__ Sediment Deposits (B2) (**Riverine**)
__ Drift Deposits (B3) (**Riverine**)
__ Drainage Patterns (B10)
__ Dry-Season Water Table (C2)
__ Crayfish Burrows (C8)
__ Saturation Visible on Aerial Imagery (C9)
__ Shallow Aquitard (D3)
✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): ____
Water Table Present? Yes ____ No ✓ Depth (inches): ____
Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches): ____

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Wetland hydrology indicators observed at the sample point included biotic crust and FAC-Neutral Test.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Wavecrest Southern Alignment City/County: Half Moon Bay Sampling Date: 1-27-16

Applicant/Owner: Coastside Land Trust State: CA Sampling Point: SP 8

Investigator(s): Stephanie Freed, David Zwick Section, Township, Range: Section 5, Township 65, Range 5w

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): Concave Slope (%): 0-2

Subregion (LRR): Mediterranean California LRRC Lat: ______ Long: ______ Datum: ______

Soil Map Unit Name: Watsonville Loam NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ✓, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No ___	Is the Sampled Area within a Wetland? Yes ✓ No ___
Hydric Soil Present?	Yes ✓ No ___	
Wetland Hydrology Present?	Yes ✓ No ___	

Remarks:

Sample point located within wetland swale on a coastal field and was inundated during site visit. Sample point met wetland indicators for hydrophytic vegetation, hydric soils, and wetland hydrology including inundation up to 4" deep. Wetland boundary based on vegetative shift from Juncus phaeocephalus to upland species such as Horkelia california and Baccharis pilularis, grade break, and absence of surface water. Sample point taken 48 hours after last rain event. Paired with SP 9.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: 2' x 10')			
1. Juncus phaeocephalus	10	Y	FACW
2. Rumex crispis	5	Y	FAC
3. Mentha pulegium	2	N	OBL
4.			
5.			
6.			
7.			
8.			
= Total Cover	17		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 83 % Cover of Biotic Crust ______

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ______	x 1 = ______
FACW species ______	x 2 = ______
FAC species ______	x 3 = ______
FACU species ______	x 4 = ______
UPL species ______	x 5 = ______
Column Totals: ______ (A)	______ (B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks:

Sample point is dominated by FAC & FACW species and was determined to contain hydrophytic vegetation, as it meets the dominance test.

SOIL

Sampling Point: SP 8

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 2/2	100					Clay Loam	Saturated
12-14	2.5Y 4/2	85	7.5YR 6/8	15	C	M	Clay Loam	Saturated

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
✓ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? Yes ✓ No ______

Remarks:

While no hydric soil indicators were observed, this sample point contains naturally problematic seasonally ponded soils. Sample point occurs in a seasonally ponded depression with a restrictive clay layer and lacks hydric soil indicators due to limited saturation depth and saline conditions.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

✓ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
✓ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No ______ Depth (inches): 4"

Water Table Present? Yes ✓ No ______ Depth (inches): 0"

Saturation Present? (includes capillary fringe) Yes ✓ No ______ Depth (inches): 0"

Wetland Hydrology Present? Yes ✓ No ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Wetland hydrology indicators observed at the sample point included surface water 4" deep, biotic crust, and sample point meets secondary indicator D5, FAC-Neutral Test.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Wavecrest Southern Alignment City/County: Half Moon Bay Sampling Date: 1-27-16

Applicant/Owner: Coastside Land Trust State: CA Sampling Point: SP 9

Investigator(s): Stephanie Freed, David Zwick Section, Township, Range: Section 5, Township 65, Range 5w

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): 0

Subregion (LRR): Mediterranean California LRRC Lat: ______ Long: ______ Datum: ______

Soil Map Unit Name: Watsonville Loam NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		✓
Hydric Soil Present?		✓
Wetland Hydrology Present?		✓
Is the Sampled Area within a Wetland?		✓

Remarks:

Sample point located within upland field adjacent to wetland swale (SP 8) on a coastal terrace. The sample point did not meet wetland indicators for hydrophytic vegetation, hydric soils, and wetland hydrology. Sample point taken 48 hours after last rain event.

VEGETATION – Use scientific names of plants.

Stratum / Species	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: 10' X 10')			
1. Baccharis pilularis	60	Y	UPL
2.			
3.			
4.			
5.			
= Total Cover	60		
Herb Stratum (Plot size: 10' x 10')			
1. Horkelia californica	40	Y	UPL
2. Conium maculatum	15	Y	FACW
3. Scrophularia californica	10	N	FAC
4. Galium aparine	1	N	FACU
5.			
6.			
7.			
8.			
= Total Cover	66		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum ______ % Cover of Biotic Crust ______

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No ✓

Remarks:

Sample point is dominated by UPL and FACW species and does not meet any hydrophytic vegetation indicators.

SOIL

Sampling Point: SP 9

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 3/2	100					Loam	Moist
10-14	10YR 4/2	100					Clay Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ___ No ✓

Remarks:

Sample point does not meet criteria for hydric soil indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ______

Water Table Present? Yes ___ No ✓ Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ______

Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No wetland hydrology indicators were observed at the sample point.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Wavecrest Southern Alignment City/County: Half Moon Bay Sampling Date: 1-27-16

Applicant/Owner: Coastside Land Trust State: CA Sampling Point: SP 10

Investigator(s): Stephanie Freed, David Zwick Section, Township, Range: Section 5, Township 65, Range 5w

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): Concave Slope (%): 0-2

Subregion (LRR): Mediterranean California LRRC Lat: ______ Long: ______ Datum: ______

Soil Map Unit Name: Watsonville Sandy Loam NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ✓, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ___
Hydric Soil Present?	Yes ✓	No ___
Wetland Hydrology Present?	Yes ✓	No ___

Is the Sampled Area within a Wetland? Yes ✓ No ___

Remarks:

Sample point located within wetland depression on a coastal field and was inundated during site visit. The sample point met wetland indicators for hydrophytic vegetation, hydric soils, and wetland hydrology including inundation up to 6" deep. Wetland boundary based on grade break, shift from Baccharis pilularis to Mentha pulegium and Juncus phaeocephalus and presence of surface water. Sample point taken 48 hours after last rain event. Sample point paired with SP 11.

VEGETATION – Use scientific names of plants.

Stratum	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ___)			
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ___)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: 10' x 4')			
1. Mentha pulegium	30	Y	OBL
2. Juncus phaeocephalus	10	N	FACW
3. Holcus lanatus	10	N	FAC
4. Rumex crispis	2	N	FAC
5.			
6.			
7.			
8.			
= Total Cover	52		
Woody Vine Stratum (Plot size: ___)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 48 % Cover of Biotic Crust ___

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%
___ Prevalence Index is ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks:

Sample point is dominated by OBL species and was determined to contain hydrophytic vegetation, as it meets the dominance test.

SOIL

Sampling Point: SP 10

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	7.5YR 3/1	100					Clay Loam	Saturated
12-14	10YR 3/2	85	5YR 6/8	15	C	M	Clay	Mg deposits

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ✓ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ✓ No ___

Remarks:

While no hydric soil indicators were observed, this sample point contains naturally problematic seasonally ponded soils. Sample point occurs in a seasonally ponded depression with a restrictive clay layer and lacks hydric soil indicators due to limited saturation depth and saline conditions.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ✓ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ✓ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No ___	Depth (inches): 6"
Water Table Present?	Yes ✓	No ___	Depth (inches): 0"
Saturation Present? (includes capillary fringe)	Yes ✓	No ___	Depth (inches): 0"

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Wetland hydrology indicators observed at the sample point included surface water up to 6" deep, biotic crust, and sample point meets secondary indicator D5, FAC-Neutral test.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Wavecrest Southern Alignment City/County: Half Moon Bay Sampling Date: 1-27-16

Applicant/Owner: Coastside Land Trust State: CA Sampling Point: SP 11

Investigator(s): Stephanie Freed, David Zwick Section, Township, Range: Section 5, Township 65, Range 5w

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): 0

Subregion (LRR): Mediterranean California LRRC Lat: ______ Long: ______ Datum: ______

Soil Map Unit Name: Watsonville Sandy Loam NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		✓
Hydric Soil Present?		✓
Wetland Hydrology Present?		✓
Is the Sampled Area within a Wetland?		✓

Remarks:

Sample point located within upland field adjacent to wetland depression (SP 10) on a coastal terrace. The sample point did not meet wetland indicators for hydrophytic vegetation, hydric soils, and wetland hydrology. Sample point taken 48 hours after last rain event.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: 10' x 10')			
1. Baccharis pilularis	30	Y	UPL
2.			
3.			
4.			
5.			
= Total Cover	30		
Herb Stratum (Plot size: 10 x 10')			
1. Holcus lanatus	80	Y	FAC
2. Rubus ursinus	4	N	FAC
3. Geranium dissectum	1	N	UPL
4. Juncus phaeocephalus	1	N	FACW
5. Rumex acetosella	1	N	FACU
6. Helminthotheca echioides	1	N	FACU
7. Lysimachia arvensis	1	N	FACW
8.			
= Total Cover	89		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 11 % Cover of Biotic Crust ______

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks:

Sample point is dominated by FAC and UPL species and does not meet any hydrophytic vegetation indicators.

SOIL

Sampling Point: SP 11

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-11	10YR 2/2	100					Loam	Moist
11-14	10YR 4/2	98	7.5YR 5/6	2	C	M	Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ______ No ✓

Remarks:

Sample point does not meet criteria for hydric soil indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No ✓ Depth (inches): ______
Water Table Present? Yes ✓ No ______ Depth (inches): 13"
Saturation Present? (includes capillary fringe) Yes ______ No ✓ Depth (inches): ______

Wetland Hydrology Present? Yes ______ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

While water table present 13" below ground surface, this is reflective of the approximately 2.97 inches of rain fall within the eight days proceeding the site visit and is not indicative of wetland hydrology.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Wavecrest Southern Alignment City/County: Half Moon Bay Sampling Date: 1-27-16

Applicant/Owner: Coastside Land Trust State: CA Sampling Point: SP 12

Investigator(s): Stephanie Freed, David Zwick Section, Township, Range: Section 5, Township 65, Range 5w

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): Concave Slope (%): 0-2

Subregion (LRR): Mediterranean California LRRC Lat: ______ Long: ______ Datum: ______

Soil Map Unit Name: Watsonville Sandy Loam NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No ______	**Is the Sampled Area within a Wetland?** **Yes** ✓ **No** ______
Hydric Soil Present?	Yes ✓ No ______	
Wetland Hydrology Present?	Yes ✓ No ______	

Remarks:

Sample point located within large undulating topographical feature with plant hummocks on a coastal field. Sample point met wetland indicators for hydrophytic vegetation, hydric soils, and wetland hydrology was observed including inundation up to 6 inches. Wetland boundary determined by shift from Baccharis pilularis, Rumex acetocella, and Helminthotheca echiodes to Juncus patens and Juncus phaeocephalus and presence of surface water. Sample point taken 48 hours after last rain event. Sample point paired with SP 13.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: ______)			
1. Juncus phaeocephalus	50	Y	FACW
2. Juncus patens	40	Y	FACW
3. Holcus lanatus	10	N	FAC
4. Rumex crispus	+	N	FAC
5.			
6.			
7.			
8.			
= Total Cover	100		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum ______ % Cover of Biotic Crust ______

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

__ Prevalence Index is ≤3.0[1]

__ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ______

Remarks:

Sample point is dominated by FACW species and was determined to contain hydrophytic vegetation, as it meets the dominance test. For absolute % cover. "+" indicates a trace occurrence.

SOIL

Sampling Point: SP 12

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-8	7.5YR 2.5/1	100					Clay Loam	Silty, Inundated, mucky

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ✓ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ✓ No ______

Remarks:

Sample point meets criteria for hydric soil indicator A2 (histic epipedon).

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ✓ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ✓ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ✓ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ✓ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No ______ Depth (inches): 4"

Water Table Present? Yes ✓ No ______ Depth (inches): 0"

Saturation Present? (includes capillary fringe) Yes ✓ No ______ Depth (inches): 0"

Wetland Hydrology Present? Yes ✓ No ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Visible inundation on Google Earth May 2011 and saturation visible on Google Earth March 2015.

Remarks:

Wetland hydrology indicators observed at the sample point included surface water 4" deep, inundation and saturation visible on aerial imagery, biotic crust, and sample point meets D5, FAC-Neutral test.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Wavecrest Southern Alignment City/County: Half Moon Bay Sampling Date: 1-27-16

Applicant/Owner: Coastside Land Trust State: CA Sampling Point: SP 13

Investigator(s): Stephanie Freed, David Zwick Section, Township, Range: Section 5, Township 65, Range 5w

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): 0

Subregion (LRR): Mediterranean California LRRC Lat: ______ Long: ______ Datum: ______

Soil Map Unit Name: Watsonville Sandy Loam NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		✓
Hydric Soil Present?		✓
Wetland Hydrology Present?	✓	

Is the Sampled Area within a Wetland? Yes ___ No ✓

Remarks:

Sample point located within upland field adjacent to wetland feature (SP 12) on a coastal field. Sample point did not meet wetland indicators for hydrophytic vegetation, hydric soils, and wetland hydrology. Sample point taken 48 hours after last rain event. Sample point paired with SP 12.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: 10' x 10')			
1. Baccharis pilularis	60	Y	UPL
2.			
3.			
4.			
5.			
= Total Cover	60		
Herb Stratum (Plot size: 10' x 10')			
1. Juncus patens	20	Y	FACW
2. Rumex acetosella	5	N	FACU
3. Rubus ursinus	5	N	FAC
4. Holcus lanatus	5	N	FAC
5. Carduus pycnocephalus	5	N	UPL
6. Raphanus sativus	+		UPL
7.			
8.			
= Total Cover	40		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 15 % Cover of Biotic Crust ______

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks:

Sample point is dominated by FACW and UPL species, and does not meet any hydrophytic vegetation indicators. For absolute % cover. "+" indicates a trace occurrence.

SOIL

Sampling Point: SP 13

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-14	7.5YR 3/1	100					Silt Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ____

Depth (inches): ____

Hydric Soil Present? Yes ___ No ✓

Remarks:

Sample point does not meet any hydric soil indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ✓ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No ✓	Depth (inches): ___
Water Table Present?	Yes ✓	No ___	Depth (inches): 6"
Saturation Present? (includes capillary fringe)	Yes ✓	No ___	Depth (inches): 0"

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

While water table present 6" below ground surface, this is reflective of approximately 2.97 inches of rain within the eight days proceeding the site visit and is not indicative of wetland hydrology conditions.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Wavecrest Southern Alignment City/County: Half Moon Bay Sampling Date: 1-27-16

Applicant/Owner: Coastside Land Trust State: CA Sampling Point: SP 14

Investigator(s): Stephanie Freed, David Zwick Section, Township, Range: Section 5, Township 65, Range 5w

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): Concave Slope (%): 0-2

Subregion (LRR): Mediterranean California LRRC Lat: ______ Long: ______ Datum: ______

Soil Map Unit Name: Watsonville Sandy Loam NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ✓, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____
Hydric Soil Present?	Yes ✓	No ____
Wetland Hydrology Present?	Yes ✓	No ____

Is the Sampled Area within a Wetland? Yes ✓ No ____

Remarks:

Sample point located within wetland depression on a coastal field. The sample point met wetland indicators for hydrophytic vegetation, hydric soils, and wetland hydrology including inundation up to 8". The wetland upland boundary was determined based on grade break, shift from Baccharis pilularis to Juncus phaeocephalus and Rumex crispus and presence of surface water. Sample point taken 48 hours after last rain event. Sample point paired with SP 15.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: 10' x 6')			
1. Juncus phaeocephalus	30	Y	FACW
2. Rumex crispis	10	Y	FAC
3. Mentha pulegium	5	N	OBL
4. Holcus lanatus	1	N	FAC
5. Rumex acetosella	1	N	FACU
6. Helminthotheca echioides	+	N	FACU
7.			
8.			
= Total Cover	47		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 53 % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	____	x 1 = ____
FACW species	____	x 2 = ____
FAC species	____	x 3 = ____
FACU species	____	x 4 = ____
UPL species	____	x 5 = ____
Column Totals:	____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

__ Prevalence Index is ≤3.0[1]

__ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks:

Sample point is dominated by FACW and FAC species and was determined to contain hydrophytic vegetation, as it meets the dominance test."+" indicates a trace occurrence.

SOIL

Sampling Point: SP 14

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 2/1	100					Silt Loam	Saturated

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
✓ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Soil falling in on itself

Depth (inches): ________

Hydric Soil Present? Yes ✓ No ______

Remarks:

While no hydric soil indicators were observed, this sample point contains naturally problematic seasonally ponded soils. Sample point occurs in a seasonally ponded depression with a restrictive clay layer and lacks hydric soil indicators due to limited saturation depth and saline conditions.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

✓ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No ______ Depth (inches): 8"
Water Table Present? Yes ✓ No ______ Depth (inches): ________
Saturation Present? (includes capillary fringe) Yes ✓ No ______ Depth (inches): ________

Wetland Hydrology Present? Yes ✓ No ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Wetland hydrology indicators observed at the sample point included surface water 8" deep and sample point meets secondary indicator D5, FAC-Neutral test.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Wavecrest Southern Alignment City/County: Half Moon Bay Sampling Date: 1-27-16

Applicant/Owner: Coastside Land Trust State: CA Sampling Point: SP 15

Investigator(s): Stephanie Freed, David Zwick Section, Township, Range: Section 5, Township 65, Range 5w

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): 0

Subregion (LRR): Mediterranean California LRRC Lat: ______ Long: ______ Datum: ______

Soil Map Unit Name: Watsonville Sandy Loam NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are “Normal Circumstances” present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		✓
Hydric Soil Present?		✓
Wetland Hydrology Present?		✓

Is the Sampled Area within a Wetland? **Yes** ___ **No** ✓

Remarks:

Sample point located adjacent to wetland depression (SP 14) within an upland field. The sample point did not meet wetland indicators for hydrophytic vegetation, hydric soils, and wetland hydrology. Sample point taken 48 hours after last rain event.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: ______)			
1. Rumex acetosella	80	Y	FACU
2. Holcus lanatus	10	N	FAC
3. Helminthotheca echioides	5	N	FACU
4. Juncus phaeocephalus	5	N	FACW
5.			
6.			
7.			
8.			
= Total Cover	100		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum ______ % Cover of Biotic Crust ______

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ___ **No** ✓

Remarks:

Sample point is dominated by FACU species and does not meet any hydrophytic vegetation indicators.

SOIL

Sampling Point: SP 15

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 3/2	100					Silt Loam	
10-14	7.5YR 2.5/1	99	5YR 3/4	1	C	M	Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ___ No ✓

Remarks:

Sample point does not meet any hydric soil indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___
Water Table Present? Yes ✓ No ___ Depth (inches): 14"
Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): ___

Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

While water table present at 14" below ground surface, this is likely reflective of approximately 2.97 inches of rain within the eight days proceeding the site visit and is not indicative of wetland hydrology conditions.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Wavecrest Southern Alignment City/County: Half Moon Bay Sampling Date: 1-27-16

Applicant/Owner: Coastside Land Trust State: CA Sampling Point: SP 16

Investigator(s): Stephanie Freed, David Zwick Section, Township, Range: Section 5, Township 65, Range 5w

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): 0

Subregion (LRR): Mediterranean California LRRC Lat: ______ Long: ______ Datum: ______

Soil Map Unit Name: Watsonville Sandy Loam NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ✓, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	✓	
Hydric Soil Present?	✓	
Wetland Hydrology Present?	✓	

Is the Sampled Area within a Wetland? Yes ✓ No ___

Remarks:

Sample point located within undulating topographical feature with plant hummocks in low-lying area and no obvious depression on a coastal field. Sample met wetland indicators for hydrophytic vegetation, hydric soils, and wetland hydrology including inundation up to 6" deep. Wetland boundary based on shift from Geranium dissectum to Mentha pulegium and Juncus phaeocephalus and presence of surface water. Sample point taken 48 hours after last rain event. Sample point paired with SP 17.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: 10' x 10')			
1. Juncus phaeocephalus	40	Y	FACW
2. Mentha pulegium	10	N	OBL
3. Holcus lanatus	5	N	FAC
4. Rumex crispus	5	N	FAC
5.			
6.			
7.			
8.			
= Total Cover	60		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 40 % Cover of Biotic Crust ______

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ______	x 1 = ______
FACW species ______	x 2 = ______
FAC species ______	x 3 = ______
FACU species ______	x 4 = ______
UPL species ______	x 5 = ______
Column Totals: ______ (A)	______ (B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks:

Sample point is dominated by FACW species and was determined to contain hydrophytic vegetation, as it meets the dominance test.

SOIL

Sampling Point: SP 16

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 3/2	100					Silt	Saturated
4-8	7.5YR 3/2	100					Clay Loam	
8-14	7.5YR 3/2	94	5YR 4/6	6	C	M	Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ✓ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ✓ No ______

Remarks:

While no hydric soil indicators were observed, this sample point contains naturally problematic seasonally ponded soils. Sample point occurs in a seasonally ponded in a low-lying area with a restrictive clay layer and lacks hydric soil indicators due to limited saturation depth and saline conditions.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ✓ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No ______ Depth (inches): 6"

Water Table Present? Yes ✓ No ______ Depth (inches): 0"

Saturation Present? (includes capillary fringe) Yes ✓ No ______ Depth (inches): 0"

Wetland Hydrology Present? Yes ✓ No ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Wetland hydrology indicators observed at the sample point included surface water 6" deep and sample point meets secondary indicator D5, FAC-Neutral test.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Wavecrest Southern Alignment City/County: Half Moon Bay Sampling Date: 1-27-16

Applicant/Owner: Coastside Land Trust State: CA Sampling Point: SP 17

Investigator(s): Stephanie Freed, David Zwick Section, Township, Range: Section 5, Township 65, Range 5w

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): 0

Subregion (LRR): Mediterranean California LRRC Lat: ______ Long: ______ Datum: ______

Soil Map Unit Name: Watsonville Sandy Loam NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ___
Hydric Soil Present?	Yes ___	No ✓
Wetland Hydrology Present?	Yes ✓	No ___

Is the Sampled Area within a Wetland? Yes ___ No ✓

Remarks:

Sample point located within upland field. The sample point met wetland indicators for hydrophytic vegetation, but did not meet wetland indicators for hydric soils or wetland hydrology. Sample point taken 48 hours after last rain event. Sample point paired with SP 16.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: ______)			
1. Holcus lanatus	60	Y	FAC
2. Geranium dissectum	10	N	UPL
3. Helminthotheca echioides	5	N	FACU
4.			
5.			
6.			
7.			
8.			
= Total Cover	75		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 25 % Cover of Biotic Crust ______

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks:

While sample point is dominated by FAC species and meets dominance test for hydrophytic vegetation, Holcus lanatus is invasive in nature and is ubiquitous throughout coastal California due to moisture from coastal fog and is therefore not indicative of wetland conditions.

SOIL

Sampling Point: SP 17

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-9	7.5YR 4/2	100					Silt Loam	
9-14	7.5YR 4/2	93	5YR 4/6	6	C	M	Silt Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ______ No ✓

Remarks:

Sample point does not meet any hydric soil indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ✓ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No ✓ Depth (inches): ______

Water Table Present? Yes ✓ No ______ Depth (inches): 5"

Saturation Present? (includes capillary fringe) Yes ______ No ✓ Depth (inches): ______

Wetland Hydrology Present? Yes ✓ No ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

While water table present at 5" below ground surface, this is likely reflective of approximately 2.97 inches of rain within the eight days proceeding the site visit and is not indicative of wetland hydrology conditions.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Wavecrest Southern Alignment City/County: Half Moon Bay Sampling Date: 2-9-16

Applicant/Owner: Coastside Land Trust State: CA Sampling Point: SP 18

Investigator(s): Stephanie Freed Section, Township, Range: Section 5, Township 65, Range 5w

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): Concave Slope (%): 0-2

Subregion (LRR): Mediterranean California LRRC Lat: ______ Long: ______ Datum: ______

Soil Map Unit Name: Watsonville loam, nearly level NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		✓
Hydric Soil Present?		✓
Wetland Hydrology Present?	✓	

Is the Sampled Area within a Wetland? Yes ____ No ✓

Remarks:

Sample point located within swale on a coastal field. The sample point did not meet wetland indicators for hydrophytic vegetation or hydric soils but contained wetland indicator for wetland hydrology including water table present at 3" below ground surface. Sample point taken 6 days after last rain event. Sample point paired with SP 19.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: 1' x 10')			
1. Rumex crispus	30	Y	FAC
2. Helminthotheca echioides	30	Y	FACU
3. Festuca perennis	10	N	FAC
4. Geranium dissectum	5	N	UPL
5. Mentha pulegium	5	N	OBL
6.			
7.			
8.			
= Total Cover	80		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No ✓

Remarks:

Sample point is dominated by FAC and FACU species and does not meet any hydrophytic vegetation indicators.

SOIL

Sampling Point: SP 18

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 2/2	100					Silt Loam	Saturated, mucky
2-14	10YR 3/2	100					Silt Loam	Saturated, mucky

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? Yes ______ No ✓

Remarks:

Sample point does not meet any hydric soil indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ✓ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ✓ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ______	No ✓	Depth (inches): ______
Water Table Present?	Yes ✓	No ______	Depth (inches): 3"
Saturation Present? (includes capillary fringe)	Yes ✓	No ______	Depth (inches): 0"

Wetland Hydrology Present? Yes ✓ No ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Wetland hydrology indicators observed at the sample point included high water table at 3" below ground surface and biotic crust.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Wavecrest Southern Alignment City/County: Half Moon Bay Sampling Date: 2-9-16

Applicant/Owner: Coastside Land Trust State: CA Sampling Point: SP 19

Investigator(s): Stephanie Freed Section, Township, Range: Section 5, Township 65, Range 5w

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): 0

Subregion (LRR): Mediterranean California LRR C Lat: ______ Long: ______ Datum: ______

Soil Map Unit Name: Watsonville loam, nearly level NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		✓
Hydric Soil Present?		✓
Wetland Hydrology Present?	✓	
Is the Sampled Area within a Wetland?		✓

Remarks:

Sample point located adjacent to upland swale (SP 18). The sample point did not contain wetland indicators for hydrophytic vegetation, hydric soils; however, indicators of wetland hydrology were observed including water table at 4" below ground surface. Sample point taken 6 days after last rain event. Sample point paired with SP 18.

VEGETATION – Use scientific names of plants.

Stratum	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: ______)			
1. Helminthotheca echioides	60	Y	FACU
2. Geranium dissectum	20	Y	UPL
3. Rumex crispus	2	N	FAC
4.			
5.			
6.			
7.			
8.			
= Total Cover	82		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 18 % Cover of Biotic Crust ______

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks:

Sample point is dominated by FACU and UPL species and does not meet any hydrophytic vegetation indicators.

SOIL

Sampling Point: SP 19

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-12	7.5YR 3/1	100					Loam	moist starting at 6"
12-14	7.5YR 3/1	100					Silt Loam	Saturated, some gravel

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ______ No ✓

Remarks:

Sample point does not meet any hydric soil indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ✓ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No ✓ Depth (inches): ______

Water Table Present? Yes ✓ No ______ Depth (inches): 4"

Saturation Present? (includes capillary fringe) Yes ✓ No ______ Depth (inches): 6"

Wetland Hydrology Present? Yes ✓ No ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Wetland hydrology indicators observed at the sample point included high water table present at 4" below ground surface.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Wavecrest Southern Alignment   City/County: Half Moon Bay   Sampling Date: 2-9-16

Applicant/Owner: Coastside Land Trust   State: CA   Sampling Point: SP 20

Investigator(s): Stephanie Freed   Section, Township, Range: Section 5, Township 65, Range 5w

Landform (hillslope, terrace, etc.): Terrace   Local relief (concave, convex, none): None   Slope (%): 0

Subregion (LRR): Mediterranean California LRRC   Lat: ____   Long: ____   Datum: ____

Soil Map Unit Name: Watsonville, sandy loam, gently sloping   NWI classification: ____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed?   Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic?   (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		✓
Hydric Soil Present?		✓
Wetland Hydrology Present?		✓
Is the Sampled Area within a Wetland?		✓

Remarks:

Sample point located within upland field. Sample point did not meet wetland indicators for hydrophytic vegetation, hydric soils, and wetland hydrology. Sample point taken 6 days after last rain event.

VEGETATION – Use scientific names of plants.

Stratum / Species	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: 10' x 10')			
1. Baccharis pilularis	30	Y	UPL
2.			
3.			
4.			
5.			
= Total Cover	30		
Herb Stratum (Plot size: 10' x 10')			
1. Juncus patens	70	Y	FACW
2. Scrophularia californica	+	N	FAC
3. Galium aparine	+	N	FACU
4. Plagiobothrys chorisianus	+	N	OBL
5.			
6.			
7.			
8.			
= Total Cover	70		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum ____   % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No ✓

Remarks:

Sample point is dominated by FACW and UPL species and does not meet any hydrophytic vegetation indicators. For absolute % cover. "+" indicates a trace occurrence.

SOIL

Sampling Point: SP 20

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-14	7.5YR 3/2	100					Silt Loam	traces of fine sand, moist

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ________

Depth (inches): ________

Hydric Soil Present? **Yes** ____ **No** ✓

Remarks:

Sample point does not meet any hydric soil indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): ____

Water Table Present? Yes ____ No ✓ Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Sample point does not meet criteria for hydrology indicators.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Wavecrest Southern Alignment City/County: Half Moon Bay Sampling Date: 2-16-16

Applicant/Owner: Coastside Land Trust State: CA Sampling Point: SP 21

Investigator(s): Stephanie Freed Section, Township, Range: Section 5, Township 65, Range 5w

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): 0

Subregion (LRR): Mediterranean California LRRC Lat: ______ Long: ______ Datum: ______

Soil Map Unit Name: Watsonville loam, nearly level NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		✓
Hydric Soil Present?		✓
Wetland Hydrology Present?	✓	
Is the Sampled Area within a Wetland?		✓

Remarks:

Sample point located within coastal field with no topographical feature. The sample point did not meet wetland indicators for hydrophytic vegetation or hydric soils but indicators of wetland hydrology were observed including water table at 10" below ground surface. Sample point taken 13 days after last rain event.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: 10' x 10')			
1. Carex harfordii	50	Y	OBL
2. Helminthotheca echioides	25	Y	FACU
3. Geranium dissectum	15	N	UPL
4. Holcus lanatus	10	N	FAC
5. Vicea sativa	+	N	FACU
6. Rumex crispus	+	N	FAC
7.			
8.			
= Total Cover	100		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum ______ % Cover of Biotic Crust ______

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ✓ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks:

Sample Point is dominated by OBL and FACU species and does not meet any hydrophytic vegetation indicators."+" indicates a trace occurrence.

SOIL

Sampling Point: SP 21

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-10	7.5YR 3/2	100					Clay Loam	Moist, silty
10-14	7.5YR 3/2	100					Clay	Saturated

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

__ Histosol (A1)
__ Histic Epipedon (A2)
__ Black Histic (A3)
__ Hydrogen Sulfide (A4)
__ Stratified Layers (A5) (**LRR C**)
__ 1 cm Muck (A9) (**LRR D**)
__ Depleted Below Dark Surface (A11)
__ Thick Dark Surface (A12)
__ Sandy Mucky Mineral (S1)
__ Sandy Gleyed Matrix (S4)
__ Sandy Redox (S5)
__ Stripped Matrix (S6)
__ Loamy Mucky Mineral (F1)
__ Loamy Gleyed Matrix (F2)
__ Depleted Matrix (F3)
__ Redox Dark Surface (F6)
__ Depleted Dark Surface (F7)
__ Redox Depressions (F8)
__ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

__ 1 cm Muck (A9) (**LRR C**)
__ 2 cm Muck (A10) (**LRR B**)
__ Reduced Vertic (F18)
__ Red Parent Material (TF2)
__ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ________

Depth (inches): ________

Hydric Soil Present? Yes ___ No ✓

Remarks:

Sample point does not meet any indicators for hydric soils.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

__ Surface Water (A1)
✓ High Water Table (A2)
__ Saturation (A3)
__ Water Marks (B1) (**Nonriverine**)
__ Sediment Deposits (B2) (**Nonriverine**)
__ Drift Deposits (B3) (**Nonriverine**)
__ Surface Soil Cracks (B6)
__ Inundation Visible on Aerial Imagery (B7)
__ Water-Stained Leaves (B9)
__ Salt Crust (B11)
__ Biotic Crust (B12)
__ Aquatic Invertebrates (B13)
__ Hydrogen Sulfide Odor (C1)
__ Oxidized Rhizospheres along Living Roots (C3)
__ Presence of Reduced Iron (C4)
__ Recent Iron Reduction in Tilled Soils (C6)
__ Thin Muck Surface (C7)
__ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

__ Water Marks (B1) (**Riverine**)
__ Sediment Deposits (B2) (**Riverine**)
__ Drift Deposits (B3) (**Riverine**)
__ Drainage Patterns (B10)
__ Dry-Season Water Table (C2)
__ Crayfish Burrows (C8)
__ Saturation Visible on Aerial Imagery (C9)
__ Shallow Aquitard (D3)
✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ____

Water Table Present? Yes ✓ No ___ Depth (inches): 10"

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 10"

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Wetland hydrology indicators observed at the sample point included high water table at 10" below ground surface and FAC-Neutral Test.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Wavecrest Southern Alignment City/County: Half Moon Bay Sampling Date: 2-16-16

Applicant/Owner: Coastside Land Trust State: CA Sampling Point: SP 22

Investigator(s): Stephanie Freed Section, Township, Range: Section 5, Township 65, Range 5w

Landform (hillslope, terrace, etc.): ______ Local relief (concave, convex, none): ______ Slope (%): ______

Subregion (LRR): Mediterranean California LRRC Lat: ______ Long: ______ Datum: ______

Soil Map Unit Name: Watsonville loam, nearly level NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ______
Hydric Soil Present?	Yes ✓	No ______
Wetland Hydrology Present?	Yes ✓	No ______

Is the Sampled Area within a Wetland? **Yes** ✓ **No** ______

Remarks:

Sample point located within hummocky coastal field. The sample point met wetland indicators for hydrophytic vegetation, hydric soils, and wetland hydrology. The wetland upland boundary was determined based on grade break, shift from Juncus phaeocephalus and Carex harfordii to Helminthotheca echioides and Holcus lanatus. Sample point taken more than 14 days after last rain event. Sample point paired with SP 23.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: ______)			
1. Juncus phaeocephalus	80	Y	FACW
2. Carex harfordii	10	N	OBL
3. Holcus lanatus	5	N	FAC
4. Helminthotheca echioides	3	N	FACU
5. Rumex crispus	2	N	FAC
6.			
7.			
8.			
= Total Cover	100		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum ______ % Cover of Biotic Crust ______

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ______	x 1 = ______
FACW species ______	x 2 = ______
FAC species ______	x 3 = ______
FACU species ______	x 4 = ______
UPL species ______	x 5 = ______
Column Totals: ______ (A)	______ (B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ______

Remarks:

Sample Point is dominated by FACW species and was determined to contain hydrophytic vegetation, as it meets the dominance test.

SOIL

Sampling Point: SP 22

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-6	7.5YR 4/2	85	5Y 4/6	15	C	M,PL	Clay	Saturated
6-14	7.5YR 4/1	95	7.5YR 4/4	5	C	M,PL	Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
✓ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______________

Depth (inches): ______________

Hydric Soil Present? Yes ✓ No ______

Remarks:

Sample point meets criteria for hydric soil indicator F3 (Depleted Matrix).

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
✓ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
✓ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
✓ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No ✓ Depth (inches): ______
Water Table Present? Yes ✓ No ______ Depth (inches): 6"
Saturation Present? (includes capillary fringe) Yes ✓ No ______ Depth (inches): 6"

Wetland Hydrology Present? Yes ✓ No ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Wetland hydrology indicators observed at the sample point included high water table at 6" below ground surface, oxidized rhizospheres along living roots, biotic crust, and the FAC-Neutral test.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Wavecrest Southern Alignment City/County: Half Moon Bay Sampling Date: 2-16-16

Applicant/Owner: Coastside Land Trust State: CA Sampling Point: SP 23

Investigator(s): Stephanie Freed Section, Township, Range: Section 5, Township 65, Range 5w

Landform (hillslope, terrace, etc.): ______ Local relief (concave, convex, none): ______ Slope (%): ______

Subregion (LRR): Mediterranean California LRRC Lat: ______ Long: ______ Datum: ______

Soil Map Unit Name: Watsonville loam, nearly level NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ______	No ✓
Hydric Soil Present?	Yes ______	No ✓
Wetland Hydrology Present?	Yes ______	No ✓

Is the Sampled Area within a Wetland? **Yes** ______ **No** ✓

Remarks:

Sample point located within upland field adjacent to hummocky wetland feature (SP 22). Sample point did not meet wetland indicators for hydrophytic vegetation, hydric soils, or wetland hydrology. Sample point taken more than 14 days after last rain event.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 10' x 10')			
1. Helminthotheca echioides	30	Y	FACU
2. Holcus lanatus	30	Y	FAC
3. Geranium dissectum	20	Y	UPL
4. Rumex acetosell	10	N	FACU
5. Carex harfordii	5	N	OBL
6. Juncas patens	3	N	FACW
7. Cirsium vulgare	2	N	FACU
8. Rubus ursinus	+	N	FAC
	100	= Total Cover	
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum ______ % Cover of Biotic Crust ______

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	1	(A)
Total Number of Dominant Species Across All Strata:	3	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	33	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	______	x 1 = ______
FACW species	______	x 2 = ______
FAC species	______	x 3 = ______
FACU species	______	x 4 = ______
UPL species	______	x 5 = ______
Column Totals:	______ (A)	______ (B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ______ **No** ✓

Remarks:

Sample Point is dominated by FAC, FACU, and UPL species and does not meet any hydrophytic vegetation indicators."+" indicates a trace occurrence.

SOIL

Sampling Point: SP 23

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-14	10YR 4/2	100					Clay Loam	Moist

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No ✓

Remarks:

Sample point does not meet any hydric soil indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___
Water Table Present? Yes ___ No ✓ Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Sample point does not meet criteria for hydrology indicators.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Wavecrest Southern Alignment City/County: Half Moon Bay Sampling Date: 2-16-16

Applicant/Owner: Coastside Land Trust State: CA Sampling Point: SP 24

Investigator(s): Stephanie Freed Section, Township, Range: Section 5, Township 65, Range 5w

Landform (hillslope, terrace, etc.): ______ Local relief (concave, convex, none): ______ Slope (%): ______

Subregion (LRR): Mediterranean California LRRC Lat: ______ Long: ______ Datum: ______

Soil Map Unit Name: Watsonville, sandy loam, gently sloping NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ✓, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ___
Hydric Soil Present?	Yes ✓	No ___
Wetland Hydrology Present?	Yes ✓	No ___

Is the Sampled Area within a Wetland? **Yes** ✓ **No** ___

Remarks:

Sample point located within low-lying area on a coastal field. The sample point met wetland indicators for hydrophytic vegetation, hydric soils, and wetland hydrology. The wetland upland boundary was determined based on grade break, shift from Baccharis pilularis and Juncus patens to Mentha pulegium and Carex harfordii, and presence of biotic crust. Sample point taken more than 14 days after last rain event. Sample point paired with SP 20 from 2-9-16.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: 10' x 10')			
1. Carex harfordii	20	Y	OBL
2. Mentha pulegium	20	Y	OBL
3. Juncus patens	20	Y	FACW
4. Holcus lanatus	15	N	FAC
5. Polypogon monspeliensis	10	N	FACW
6. Plagiobothrys chorisianus	2	N	OBL
7.			
8.			
= Total Cover	87		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 13 % Cover of Biotic Crust ______

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks:

Sample Point is dominated by FACW and OBL species and was determined to contain hydrophytic vegetation, as it meets the dominance test.

SOIL

Sampling Point: SP 24

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-10	7.5YR 4/2	100					Clay Loam	Moist
10-14	7.5YR 4/2	100					Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ✓ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? Yes ✓ **No** ______

Remarks:

While no hydric soil indicators were observed, this sample point contains naturally problematic seasonally ponded soils. Sample point occurs in a seasonally ponded low-lying area with a restrictive clay layer and lacks hydric soil indicators due to limited saturation depth and saline conditions.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ✓ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ______	No ✓	Depth (inches): ______
Water Table Present?	Yes ______	No ✓	Depth (inches): ______
Saturation Present? (includes capillary fringe)	Yes ______	No ✓	Depth (inches): ______

Wetland Hydrology Present? Yes ✓ **No** ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Wetland hydrology indicators observed at the sample point included biotic crust and FAC-Neutral Test.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Wavecrest Southern Alignment City/County: Half Moon Bay Sampling Date: 2-16-16
Applicant/Owner: Coastside Land Trust State: CA Sampling Point: SP 25
Investigator(s): Stephanie Freed Section, Township, Range: Section 5, Township 65, Range 5w
Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): none Slope (%): ______
Subregion (LRR): Mediterranean California LRR C Lat: ______ Long: ______ Datum: ______
Soil Map Unit Name: Watsonville sandy loam, gently sloping NWI classification: ______
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ___
Hydric Soil Present?	Yes ___	No ✓
Wetland Hydrology Present?	Yes ___	No ✓

Is the Sampled Area within a Wetland? Yes ___ No ✓

Remarks:

Sample point located within coastal field. The sample point met wetland indicators for hydrophytic vegetation, but did not meet indicators for hydric soils or wetland hydrology. Sample point taken more than 14 days after last rain event.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: 10' x 10')			
1. Plagiobothrys chorisianus	50	Y	OBL
2. Juncus patens	20	Y	FACW
3. Polypogon monspeliensis	10	Y	FACW
4. Mentha pulegium	1	N	OBL
5. Baccharis pilularis	1	N	UPL
6.			
7.			
8.			
= Total Cover	82		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 18 % Cover of Biotic Crust ______

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	______	x 1 = ______
FACW species	______	x 2 = ______
FAC species	______	x 3 = ______
FACU species	______	x 4 = ______
UPL species	______	x 5 = ______
Column Totals:	______ (A)	______ (B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

- ✓ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks:

Sample Point is dominated by FACW and OBL species and was determined to contain hydrophytic vegetation, as it meets the dominance test.

SOIL

Sampling Point: SP 25

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-10	7.5YR 4/2	100					Clay Loam	Moist
10-14	7.5YR 4/2	100					Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No ✓

Remarks:

No hydric soil indicators were observed at this sample point location.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Wetland hydrology indicators observed at the sample point included FAC-Neutral Test.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Wavecrest Southern Alignment City/County: Half Moon Bay Sampling Date: 2-16-16

Applicant/Owner: Coastside Land Trust State: CA Sampling Point: SP 26

Investigator(s): Stephanie Freed Section, Township, Range: Section 5, Township 65, Range 5w

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): none Slope (%): ____

Subregion (LRR): Mediterranean California LRR C Lat: ____ Long: ____ Datum: ____

Soil Map Unit Name: Watsonville sandy loam, gently sloping NWI classification: ____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	✓	
Hydric Soil Present?		✓
Wetland Hydrology Present?		✓
Is the Sampled Area within a Wetland?		✓

Remarks:

Sample point located within former tire rut in coastal field. The sample point met wetland indicators for hydrophytic vegetation, but did not meet indicators for hydric soils or wetland hydrology. Taken more than 14 days after last rain event. Sample point paired with SP 27.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: 2' x 10')			
1. Festuca perennis	30	Y	FAC
2. Carex harfordii	20	Y	OBL
3. Juncus phaeocephalus	20	Y	FACW
4. Helminthotheca echioides	10	N	FACU
5. Geranium dissectum	5	N	UPL
6. Rumex acetosella	5	N	FACU
7. Rumex crispus	2	N	FAC
8. Lysimachia arvensis	+	N	FAC
= Total Cover	92		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 8 % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ✓ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks:

Sample Point is dominated by FAC, FACW, and OBL species and was determined to contain hydrophytic vegetation, as it meets the dominance test.

SOIL

Sampling Point: SP 26

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-10	7.5YR 3/2	100					Clay Loam	Moist, gravelly
10-14	7.5YR 3/2	100					Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ______ No ✓

Remarks:

No hydric soil indicators were observed at this sample point location.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No ✓ Depth (inches): ______

Water Table Present? Yes ______ No ✓ Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ______ No ✓ Depth (inches): ______

Wetland Hydrology Present? Yes ______ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Wetland hydrology indicators observed at the sample point included FAC-Neutral Test.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Wavecrest Southern Alignment   City/County: Half Moon Bay   Sampling Date: 2-16-16

Applicant/Owner: Coastside Land Trust   State: CA   Sampling Point: SP 27

Investigator(s): Stephanie Freed   Section, Township, Range: Section 5, Township 65, Range 5w

Landform (hillslope, terrace, etc.): Terrace   Local relief (concave, convex, none): none   Slope (%): ______

Subregion (LRR): Mediterranean California LRR C   Lat: ______   Long: ______   Datum: ______

Soil Map Unit Name: Watsonville loam, nearly level   NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed?   Are "Normal Circumstances" present? Yes ✓ No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic?   (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ______	No ✓	Is the Sampled Area within a Wetland?	Yes ______ No ✓
Hydric Soil Present?	Yes ______	No ✓		
Wetland Hydrology Present?	Yes ______	No ✓		

Remarks:

Sample point located adjacent to former tire rut (SP 26) in coastal field. Sample point did not meet indicators for hydrophytic vegetation, hydric soils, or wetland hydrology. Sample point taken more than 14 days after last rain event.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	______ = Total Cover		
Sapling/Shrub Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
5.			
	______ = Total Cover		
Herb Stratum (Plot size: 10' x 10')			
1. Festuca perennis	35	Y	FAC
2. Helminthotheca echioides	25	Y	FACU
3. Juncus phaeocephalus	10	N	FACW
4. Geranium dissectum	10	N	UPL
5. Carex harfordii	+	N	OBL
6. Rumex acetosella	+	N	FACU
7.			
8.			
	80 = Total Cover		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
	______ = Total Cover		

% Bare Ground in Herb Stratum 20   % Cover of Biotic Crust ______

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	______	x 1 = ______
FACW species	______	x 2 = ______
FAC species	______	x 3 = ______
FACU species	______	x 4 = ______
UPL species	______	x 5 = ______
Column Totals:	______ (A)	______ (B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ______ No ✓

Remarks:

Sample Point is dominated by FAC and FACU species and did not meet any indicators for hydrophytic vegetation.

SOIL

Sampling Point: SP 27

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-10	7.5YR 3/2	100					Clay Loam	Moist, gravelly
10-14	7.5YR 3/2	85	7.5YR 4/4	8	C	M	Clay	
			7.5YR 4/1	7	D	M	Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ___ No ✓

Remarks:

No indicators of hydric soils were met for this sampling point.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ______

Water Table Present? Yes ___ No ✓ Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ______

Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No wetland hydrology indicators were observed at the sample point.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Wavecrest Southern Alignment City/County: Half Moon Bay Sampling Date: 2-16-16

Applicant/Owner: Coastside Land Trust State: CA Sampling Point: SP 28

Investigator(s): Stephanie Freed Section, Township, Range: Section 5, Township 65, Range 5w

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): none Slope (%): ______

Subregion (LRR): Mediterranean California LRR C Lat: ______ Long: ______ Datum: ______

Soil Map Unit Name: Watsonville sandy loam, gently sloping NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ______
Hydric Soil Present?	Yes ______	No ✓
Wetland Hydrology Present?	Yes ✓	No ______

Is the Sampled Area within a Wetland? **Yes** ______ **No** ✓

Remarks:

Sample point located within depression in coastal field. The sample point met wetland indicators for hydrophytic vegetation and wetland hydrology but did not meet indicators for hydric soils. Sample point taken more than 14 days after last rain event. Sample point paired with SP 29.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: 4' x 2')			
1. Festuca perennis	10	Y	FAC
2. Plagiobothrys chorisianus	10	Y	OBL
3. Polypogon monspeliensis	10	Y	FACW
4.			
5.			
6.			
7.			
8.			
= Total Cover	30		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 70 % Cover of Biotic Crust ______

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	______	x 1 = ______
FACW species	______	x 2 = ______
FAC species	______	x 3 = ______
FACU species	______	x 4 = ______
UPL species	______	x 5 = ______
Column Totals:	______ (A)	______ (B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ______

Remarks:

Sample Point is dominated by FAC, FACW, and OBL species and met the dominance test indicator for hydrophytic vegetation.

SOIL

Sampling Point: SP 28

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-14	7.5YR 2.5/1	100					Clay Loam	trace fine sand

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ______ No ✓

Remarks:

This sample point did not meet any indicators for hydric soils.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
✓ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No ✓ Depth (inches): ______

Water Table Present? Yes ______ No ✓ Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ______ No ✓ Depth (inches): ______

Wetland Hydrology Present? Yes ✓ No ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Wetland hydrology indicators observed include biotic crust and the FAC-Neutral Test.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Wavecrest Southern Alignment City/County: Half Moon Bay Sampling Date: 2-16-16

Applicant/Owner: Coastside Land Trust State: CA Sampling Point: SP 29

Investigator(s): Stephanie Freed Section, Township, Range: Section 5, Township 65, Range 5w

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): none Slope (%): ____

Subregion (LRR): Mediterranean California LRR C Lat: ____ Long: ____ Datum: ____

Soil Map Unit Name: Watsonville sandy loam, gently sloping NWI classification: ____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		✓
Hydric Soil Present?		✓
Wetland Hydrology Present?		✓

Is the Sampled Area within a Wetland? Yes ____ No ✓

Remarks:

Sample point located adjacent to depression (SP 28) in coastal field. The sample point did not meet wetland indicators for hydrophytic vegetation, hydric soils, or wetland hydrology. Sample point taken more than 14 days after last rain event.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: 10' x 10')			
1. Baccharis pilularis	60	Y	UPL
2.			
3.			
4.			
5.			
= Total Cover	60		
Herb Stratum (Plot size: 10' x 10')			
1. Juncus patens	20	Y	FACW
2. Chlorogalum pomeridianum	15	Y	UPL
3. Rubus ursinus	5	N	FAC
4. Festuca perennis	3	N	FAC
5. Scrophularia californica	2	N	FAC
6. Horkelia californica	2	N	UPL
7. Taraxia ovata	2	N	UPL
8.			
= Total Cover	54		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No ✓

Remarks:

Sample Point is dominated by UPL and FACW species and did not meet any indicators for hydrophytic vegetation.

SOIL

Sampling Point: SP 29

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-14	7.5YR 2.5/1	100					Clay Loam	trace fine sand

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No ✓

Remarks:

This sample point did not meet any indicators for hydric soils.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___
Water Table Present? Yes ___ No ✓ Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No wetland hydrology indicators were observed at sample point location.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Wavecrest Southern Alignment City/County: Half Moon Bay Sampling Date: 1-14-20

Applicant/Owner: Coastside Land Trust State: CA Sampling Point: SP30

Investigator(s): Scott Batiuk Section, Township, Range: ______

Landform (hillslope, terrace, etc.): ditch Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR): Mediterranean California LRR C Lat: 37.440854 Long: -122.431879 Datum: WGS84

Soil Map Unit Name: Watsonville loam, nearly level NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____
Hydric Soil Present?	Yes ✓	No ____
Wetland Hydrology Present?	Yes ✓	No ____

Is the Sampled Area within a Wetland? Yes ✓ No ____

Remarks:

Sample point located in roadside ditch adjacent to the south side of Redondo Beach Road. The sample point met indicators for hydrophytic vegetation, hydric soil, and wetland hydrology. Paired with SP31.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: 3' x 8')			
1. Mentha pulegium	15	yes	OBL
2. Cyperus eragrostis	10	yes	FACW
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	25		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

__ Prevalence Index is ≤3.0[1]

__ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks:

Additional cover: open water, 75%

Sample point met the Dominance Test hydrophytic vegetation indicator.

SOIL

Sampling Point: SP30

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ✓ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** ✓ **No** ___

Remarks:

Soils assumed based on deep inundation, vegetation dominated by perennial hydrophytes, and depressional landform.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ✓ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No ___ Depth (inches): 10

Water Table Present? Yes ___ No ___ Depth (inches): ?

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): ___

Wetland Hydrology Present? **Yes** ✓ **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Unable to determine whether a water table is present because of surface water. Water table below saturated layer assumed based on deep inundation and vegetation dominated by perennial hydrophytes. Sample point meets the Surface Water (A1) and Saturation (A3) primary wetland hydrology indicators and the FAC-Neutral Test (D5) secondary indicator.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Wavecrest Southern Alignment City/County: Half Moon Bay Sampling Date: 1-14-20

Applicant/Owner: Coastside Land Trust State: CA Sampling Point: SP31

Investigator(s): Scott Batiuk Section, Township, Range: ______

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 1

Subregion (LRR): Mediterranean California LRR C Lat: 37.440854 Long: -122.431879 Datum: WGS84

Soil Map Unit Name: Watsonville loam, nearly level NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No ✓
Hydric Soil Present?	Yes ___	No ✓
Wetland Hydrology Present?	Yes ___	No ✓

Is the Sampled Area within a Wetland? Yes ___ No ✓

Remarks:

Sample point located in narrow strip of land adjacent to roadside ditch on south side of Redondo Beach Road and north of fence line. The sample point did not meet indicators for hydrophytic vegetation, hydric soils, or wetland hydrology. Paired with SP30.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
	___ = Total Cover		
Sapling/Shrub Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
5.			
	___ = Total Cover		
Herb Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	___ = Total Cover		
Woody Vine Stratum (Plot size: 5' radius)			
1. Rubus ursinus	60	yes	FAC
2. Hedera helix	40	yes	FACU
	100 = Total Cover		

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	___	x 1 = ___
FACW species	___	x 2 = ___
FAC species	___	x 3 = ___
FACU species	___	x 4 = ___
UPL species	___	x 5 = ___
Column Totals:	___ (A)	___ (B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks:

Sample point did not meet any indicators for wetland hydrology.

SOIL

Sampling Point: SP31

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/2	100					clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

__ Histosol (A1)
__ Histic Epipedon (A2)
__ Black Histic (A3)
__ Hydrogen Sulfide (A4)
__ Stratified Layers (A5) (**LRR C**)
__ 1 cm Muck (A9) (**LRR D**)
__ Depleted Below Dark Surface (A11)
__ Thick Dark Surface (A12)
__ Sandy Mucky Mineral (S1)
__ Sandy Gleyed Matrix (S4)
__ Sandy Redox (S5)
__ Stripped Matrix (S6)
__ Loamy Mucky Mineral (F1)
__ Loamy Gleyed Matrix (F2)
__ Depleted Matrix (F3)
__ Redox Dark Surface (F6)
__ Depleted Dark Surface (F7)
__ Redox Depressions (F8)
__ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

__ 1 cm Muck (A9) (**LRR C**)
__ 2 cm Muck (A10) (**LRR B**)
__ Reduced Vertic (F18)
__ Red Parent Material (TF2)
__ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? Yes ____ No ✓

Remarks:

The sample point did not meet hydric soil indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

__ Surface Water (A1)
__ High Water Table (A2)
__ Saturation (A3)
__ Water Marks (B1) (**Nonriverine**)
__ Sediment Deposits (B2) (**Nonriverine**)
__ Drift Deposits (B3) (**Nonriverine**)
__ Surface Soil Cracks (B6)
__ Inundation Visible on Aerial Imagery (B7)
__ Water-Stained Leaves (B9)
__ Salt Crust (B11)
__ Biotic Crust (B12)
__ Aquatic Invertebrates (B13)
__ Hydrogen Sulfide Odor (C1)
__ Oxidized Rhizospheres along Living Roots (C3)
__ Presence of Reduced Iron (C4)
__ Recent Iron Reduction in Tilled Soils (C6)
__ Thin Muck Surface (C7)
__ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

__ Water Marks (B1) (**Riverine**)
__ Sediment Deposits (B2) (**Riverine**)
__ Drift Deposits (B3) (**Riverine**)
__ Drainage Patterns (B10)
__ Dry-Season Water Table (C2)
__ Crayfish Burrows (C8)
__ Saturation Visible on Aerial Imagery (C9)
__ Shallow Aquitard (D3)
__ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): ____
Water Table Present? Yes ____ No ✓ Depth (inches): ____
Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches): ____

Wetland Hydrology Present? Yes ____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

The sample point did not meet wetland hydrology indicators.

APPENDIX C

CCC/LCP JURISDICTIONAL DELINEATION DATA SHEETS

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California Coastal Act Wetland Data Sheet

Project Name: Wavecrest Southern Alignment
County: San Mateo
City/Location: Half Moon Bay
LCP (if applicable): Half Moon Bay
Applicant/Owner: Coastside Land Trust
☐ LRR A (Western Mts., Valley, and Coast [WMVC])
WRA Investigator(s): Stephanie Freed, David Zwick
☑ LRR C (Arid West)
Date: 1.26.16
SAMPLE POINT ID: SP 1
HABITAT:

CCC/LCP WETLAND DETERMINATION

Meets CCC or LCP vegetation criteria? ☑ Yes ☐ No
Meets CCC or LCP hydric soil criteria? ☑ Yes ☐ No
Meets CCC or LCP hydrology criteria? ☑ Yes ☐ No
CCC/LCP WETLAND? ☑ Yes ☐ No

Comments: Sample point located in wetland depression on a coastal field. Sample point observed with hydrophytic vegetation, hydric soils, and wetland hydrology, including inundation up to 16" deep. Wetland boundary based on grade break, shift from Festuca perennis and Rumex acetocella to Rumex crispus and Cyperus eragrostis, and presence of surface water. Sample point taken 48 hours after last rain event. Sample point paired with SP 2.

VEGETATION

*indicator status from the USFWS 1996 National List of wetland species

TREES - Plot size: 30x30	% Cover	Status*	Dominant?
TOTAL			

50% of stratum cover = *20% =*

SAPLING/SHRUBS - Plot size: 30x30	% Cover	Status*	Dominant?
TOTAL			

50% of stratum cover = *20% =*

HERBACEOUS - Plot size: 5x10	% Cover	Status*	Dominant?
Cyperus eragrostis	5	FACW	Y
Festuca perennis	3	FAC	Y
Rumex crispus	2	FAC	N
Mentha pulegium	1	OBL	N
TOTAL	11.0		0

50% of stratum cover = 5.5 *20% = 2.2*

Dominance Test:

Total # of dominant species across all strata: 2

Total # of dominants that are hydrophytic (status of OBL, FACW, or FAC): 2

Percentage of dominants that are hydrophytic: 100%

[Meets dominance test if >50%]

Prevalence Index:

Total % cover of species across all strata:

OBL: ____ x 1 = ____
FACW: ____ x 2 = ____
FAC: ____ x 3 = ____
FACU: ____ x 4 = ____
UPL: ____ x 5 = ____

Total: ____ (A) ____ (B)

Prevalence Index (B/A) =

[Hydrophytic vegetation dominant if B/A ≤ 3.0]

Meets CCC or LCP hydrophytic vegetation criteria? ☑ Yes ☐ No

Comments: Sample point is dominated by FAC & FACW species and was determined to contain hydrophytic vegetation, as it meets the dominance test.

Project Name: ______Wavecrest South______________________________ Sample Point ID: ____SP 1__________

SOILS Slope (%): 0-2 Soil map unit: Watsonville Sandy Loam

SOIL PROFILE

Depth	Matrix Color	Redox Color	% and contrast	Redox type	Texture	Comments
0-4	7.5YR 2.5/1				Silt Loam	
4-8	7.5YR 2.5/1				Silt Loam	
8-14	2.5YR 2.5/1	5Y 5/2	25	D	Clay	
		7.5YR 4/6	5		Clay	

All soils:

- [ ] Histosol (A1)
- [ ] Histic Epipedon (A2)
- [ ] Black Histic (A3)
- [ ] Hydrogen Sulfide (A4)
- [ ] Stratified Layers (A5) *[Arid West only]*
- [ ] Depleted Below Dark Surface (A11)
- [ ] Thick Dark Surface (A12)
- [x] **Other (explain below)**

Loamy and clayey soils only:

- [ ] Loamy Mucky Mineral (F1)
- [ ] Loamy Gleyed Matrix (F2)
- [ ] Depleted Matrix (F3)
- [ ] Redox Dark Surface (F6)
- [ ] Depleted Dark Surface (F7)
- [ ] Redox Depressions (F8)
- [ ] Vernal Pools (F9) *[Arid West only]*

Sandy soils only:

- [ ] Sandy Mucky Mineral (S1)
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)
- [ ] Stripped Matrix (S6)

Test indicators (NRCS v7):

- [ ] 2 cm Muck (A10) *[WMVC only]*
- [ ] Very Shallow Dark Surface (TF12)

Meets CCC or LCP hydric soil criteria? [x] Yes [ ] No

Comments: While no hydric soil indicators were observed, this sample point contains naturally problematic seasonally ponded soils. Sample point occurs in a seasonally ponded depression with a restrictive clay layer and lacks hydric soil indicators due to limited saturation depth and saline conditions.

HYDROLOGY (indicators from Corps Regional Supplements, applicable to coastal California only)

Primary indicators (only 1 needed to meet criteria):

- [x] Surface water (A1) *Depth (in.):* 16"
- [ ] High water table (A2) *Depth (in.):* 0"
- [ ] Soil saturation (A3) *Depth (in.):* 0"
- [ ] Water marks (B1) *[if in Arid West: Nonriverine only]*
- [ ] Sediment deposits (B2) *[if in Arid West: Nonriverine only]*
- [ ] Drift deposits (B3) *[if in Arid West: Nonriverine only]*
- [ ] Algal mat or crust (B4) *[WMVC only; see B12]*
- [ ] Iron deposits (B5) *[WMVC only]*
- [ ] Surface soil cracks (B6)
- [ ] Inundation visible on aerial imagery (B7)
- [ ] Sparsely vegetated concave surface (B8) *[WMVC only]*
- [ ] Water-stained leaves (B9) *[Arid West and MLRA 5 only]*
- [ ] Salt crust (B11)
- [ ] Biotic Crust (B12) *[Arid West only; see B4]*
- [ ] Aquatic invertebrates (B13)
- [ ] Hydrogen sulfide odor (C1)
- [ ] Oxidized rhizospheres (C3)
- [ ] Presence of reduced iron (C4)
- [ ] Recent iron reduction in tilled soils (C6)
- [ ] Stunted or stressed plants (D1) *[WMVC only]*

Secondary indicators (need 2+ to meet criteria):

- [ ] Water marks (B1) *[Arid West riverine only]*
- [ ] Sediment deposits (B2) *[Arid West riverine only]*
- [ ] Drift deposits (B3) *[Arid West riverine only]*
- [ ] Water-stained leaves (B9) *[WMVC:MLRA 4B only]*
- [ ] Drainage patterns (B10)
- [ ] Dry-season water table (C2)
- [ ] Thin muck surface (C7) *[Arid West only]*
- [ ] Crayfish burrows (C8) *[Arid West only]*
- [ ] Saturation visible on aerial imagery (C9)
- [ ] Geomorphic position (D2) *[WMVC only]*
- [ ] Shallow aquitard (D3)
- [ ] Frost-heave hummocks (D4) *[WMVC only]*
- [ ] Raised ant mounds (D6) *[WMVC only]*
- [x] **FAC-neutral test (D5)** [ ] (Does not meet test)

- [ ] **Other (explain below)**

Meets CCC or LCP wetland hydrology criteria? [x] Yes [ ] No

Comments: Wetland hydrology indicators observed at the sample point included surface water (16" deep) and sample point meets secondary indicator D5, FAC-Neutral test.

Project Name: ______Wavecrest South________________________________Sample Point ID: ____SP 2__________

Project Name:	Wavecrest Southern Alignment	County:	San Mateo
City/Location:	Half Moon Bay	LCP (if applicable):	Half Moon Bay
Applicant/Owner:	Coastside Land Trust	☐ LRR A (Western Mts., Valley, and Coast [WMVC])	
WRA Investigator(s):	Stephanie Freed, David Zwick	☑ LRR C (Arid West)	
Date:	1.26.16	**SAMPLE POINT ID:**	SP 2
		HABITAT:	

CCC/LCP WETLAND DETERMINATION

	Yes	No
Meets CCC or LCP vegetation criteria?	☐	☑
Meets CCC or LCP hydric soil criteria?	☐	☑
Meets CCC or LCP hydrology criteria?	☐	☑
CCC/LCP WETLAND?	☐	☑

Comments: Sample point located within upland field adjacent to wetland depression on a coastal field. The sample point did not meet wetland indicators for hydrophytic vegetation, hydric soils, or hydrology. Sample point taken 48 hours after last rain event. Sample point paired with SP 1.

VEGETATION

*indicator status from the USFWS 1996 National List of wetland species

TREES - Plot size: 30x30	% Cover	Status*	Dominant?
TOTAL			
50% of stratum cover =		*20% =*	

SAPLING/SHRUBS - Plot size: 30x30	% Cover	Status*	Dominant?
TOTAL			
50% of stratum cover =		*20% =*	

HERBACEOUS - Plot size: 1x10	% Cover	Status*	Dominant?
Festuca perennis	35	FAC	Y
Rumex acetosella	20	FACU	Y
Geranium dissectum	15	UPL	N
Holcus lanatus	15	FAC	N
Helminthotheca echioides	5	FACU	N
Carduus pycnocephalus	2	UPL	N
Sonchus asper	1	FAC	N
Lysimachia arvensis	1	FAC	N
TOTAL	94.0		0
50% of stratum cover =	*47.0*	*20% =*	*18.8*

Dominance Test:

Total # of dominant species across all strata: 2

Total # of dominants that are hydrophytic (status of OBL, FACW, or FAC): 1

Percentage of dominants that are hydrophytic: 50%

[Meets dominance test if >50%]

Prevalence Index:

Total % cover of species across all strata:

OBL:		x 1 =	
FACW:		x 2 =	
FAC:		x 3 =	
FACU:		x 4 =	
UPL:		x 5 =	
Total:	(A)		(B)

Prevalence Index (B/A) =

[Hydrophytic vegetation dominant if B/A ≤ 3.0]

Meets CCC or LCP hydrophytic vegetation criteria? ☐ Yes ☑ No

Comments: Sample point is dominated by FAC and FACU species and does not meet any hydrophytic vegetation indicators.

California Coastal Act Wetland Data Sheet

SOILS Slope (%): 0 Soil map unit: Watsonville Sandy Loam

SOIL PROFILE

Depth	Matrix Color	Redox Color	% and contrast	Redox type	Texture	Comments
0-3	10YR 3/2	100			Silt Loam	Moist
3-10	10YR 2/2	100			Silt Loam	Moist

All soils:
- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) *[Arid West only]*
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ **Other (explain below)**

Loamy and clayey soils only:
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9) *[Arid West only]*

Sandy soils only:
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)

Test indicators (NRCS v7):
- ☐ 2 cm Muck (A10) *[WMVC only]*
- ☐ Very Shallow Dark Surface (TF12)

Meets CCC or LCP hydric soil criteria? ☐ Yes ☑ No

Comments: Sample point does not meet any hydric soil indicators.

HYDROLOGY (indicators from Corps Regional Supplements, applicable to coastal California only)

Primary indicators (only 1 needed to meet criteria):
- ☐ Surface water (A1) *Depth (in.):*
- ☐ High water table (A2) *Depth (in.):* 10"
- ☐ Soil saturation (A3) *Depth (in.):* 0"
- ☐ Water marks (B1) *[if in Arid West: Nonriverine only]*
- ☐ Sediment deposits (B2) *[if in Arid West: Nonriverine only]*
- ☐ Drift deposits (B3) *[if in Arid West: Nonriverine only]*
- ☐ Algal mat or crust (B4) *[WMVC only; see B12]*
- ☐ Iron deposits (B5) *[WMVC only]*
- ☐ Surface soil cracks (B6)
- ☐ Inundation visible on aerial imagery (B7)
- ☐ Sparsely vegetated concave surface (B8) *[WMVC only]*
- ☐ Water-stained leaves (B9) *[Arid West and MLRA 5 only]*
- ☐ Salt crust (B11)
- ☐ Biotic Crust (B12) *[Arid West only; see B4]*
- ☐ Aquatic invertebrates (B13)
- ☐ Hydrogen sulfide odor (C1)
- ☐ Oxidized rhizospheres (C3)
- ☐ Presence of reduced iron (C4)
- ☐ Recent iron reduction in tilled soils (C6)
- ☐ Stunted or stressed plants (D1) *[WMVC only]*

Secondary indicators (need 2+ to meet criteria):
- ☐ Water marks (B1) *[Arid West riverine only]*
- ☐ Sediment deposits (B2) *[Arid West riverine only]*
- ☐ Drift deposits (B3) *[Arid West riverine only]*
- ☐ Water-stained leaves (B9) *[WMVC:MLRA 4B only]*
- ☐ Drainage patterns (B10)
- ☐ Dry-season water table (C2)
- ☐ Thin muck surface (C7) *[Arid West only]*
- ☐ Crayfish burrows (C8) *[Arid West only]*
- ☐ Saturation visible on aerial imagery (C9)
- ☐ Geomorphic position (D2) *[WMVC only]*
- ☐ Shallow aquitard (D3)
- ☐ Frost-heave hummocks (D4) *[WMVC only]*
- ☐ Raised ant mounds (D6) *[WMVC only]*
- ☐ **FAC-neutral test (D5)** ☐ (Does not meet test)

☐ **Other (explain below)**

Meets CCC or LCP wetland hydrology criteria? ☐ Yes ☑ No

Comments: While water table present at 10" below ground surface, this is likely reflective of approximately 2.73 inches of rain within the eight days preceeding the site visit and is not indicative of wetland hydrology conditions.

California Coastal Act Wetland Data Sheet

Project Name: Wavecrest Southern Alignment
County: San Mateo
City/Location: Half Moon Bay
LCP (if applicable): Half Moon Bay
Applicant/Owner: Coastside Land Trust
☐ LRR A (Western Mts., Valley, and Coast [WMVC])
WRA Investigator(s): Stephanie Freed, David Zwick
☑ LRR C (Arid West)
Date: 1.26.16
SAMPLE POINT ID: SP 3
HABITAT:

CCC/LCP WETLAND DETERMINATION

	Yes	No
Meets CCC or LCP vegetation criteria?	☐	☑
Meets CCC or LCP hydric soil criteria?	☑	☐
Meets CCC or LCP hydrology criteria?	☑	☐
CCC/LCP WETLAND?	☑	☐

Comments: Sample point located within coastal seaonal wetland swale on a coastal field and was inundated during site visit. The sample point did not meet indicators for hydrophytic vegetation but contained hydric soils and wetland hydrology including inundation up to 2" deep. Sample point taken 48 hours after last rain event. Paired with SP 4.

VEGETATION

*indicator status from the USFWS 1996 National List of wetland species

TREES - Plot size: 30x30	% Cover	Status*	Dominant?
TOTAL			
50% of stratum cover =		*20% =*	

SAPLING/SHRUBS - Plot size: 30x30	% Cover	Status*	Dominant?
TOTAL			
50% of stratum cover =		*20% =*	

HERBACEOUS - Plot size: 10x10	% Cover	Status*	Dominant?
Polypogon monospeliensis	40	FACW	Y
Rumex acetosella	35	FACU	Y
Holcus lanatus	15	FAC	N
Carduus pycnocephalus	3	UPL	N
Rumex crispus	2	FAC	N
Geranium dissectum	+	UPL	N
Vicia sativa	+	FACU	N
TOTAL	95.0		0
50% of stratum cover =	*47.5*	*20% =*	*19.0*

Dominance Test:

Total # of dominant species across all strata: 2

Total # of dominants that are hydrophytic (status of OBL, FACW, or FAC): 1

Percentage of dominants that are hydrophytic: 50%

[Meets dominance test if >50%]

Prevalence Index: 0-4

Total % cover of species across all strata:

OBL:		x 1 =	
FACW	40	x 2 =	80
FAC:	2	x 3 =	6
FACU:	35	x 4 =	140
UPL:	3	x 5 =	15
Total:	80 (A)		241 (B)

Prevalence Index (B/A) = 3.01

[Hydrophytic vegetation dominant if B/A ≤ 3.0]

Meets CCC or LCP hydrophytic vegetation criteria? ☐ Yes ☑ No

Comments: Sample point is dominated by FACW and FACU species and does not meet any hydrophytic vegetation indicators. For absolute % cover. "+" indicates a trace occurrence.

Project Name: ______Wavecrest South______________________________ Sample Point ID: ____SP 3__________

SOILS Slope (%): 0-2 Soil map unit: Watsonville Sandy Loam

SOIL PROFILE

Depth	Matrix Color	Redox Color	% and contrast	Redox type	Texture	Comments
0-4	7.5YR 2.5/1				Silty Clay	
4-8	2.5Y 2.5/1	5Y 5/2	35	D	Clay	Mottled
		7.5YR 4/6	5	C	Clay	
8-14	7.5YR 2.5/1				Clay Loam	

All soils:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) *[Arid West only]*
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ **Other (explain below)**

Loamy and clayey soils only:

- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☑ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9) *[Arid West only]*

Sandy soils only:

- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)

Test indicators (NRCS v7):

- ☐ 2 cm Muck (A10) *[WMVC only]*
- ☐ Very Shallow Dark Surface (TF12)

Meets CCC or LCP hydric soil criteria? ☑ Yes ☐ No

Comments: Sample point meets hydric soil indicator for depleted dark surface (F7).

HYDROLOGY (indicators from Corps Regional Supplements, applicable to coastal California only)

Primary indicators (only 1 needed to meet criteria):

- ☑ Surface water (A1) *Depth (in.):* 2"
- ☐ High water table (A2) *Depth (in.):* ______
- ☐ Soil saturation (A3) *Depth (in.):* ______
- ☐ Water marks (B1) *[if in Arid West: Nonriverine only]*
- ☐ Sediment deposits (B2) *[if in Arid West: Nonriverine only]*
- ☐ Drift deposits (B3) *[if in Arid West: Nonriverine only]*
- ☐ Algal mat or crust (B4) *[WMVC only; see B12]*
- ☐ Iron deposits (B5) *[WMVC only]*
- ☐ Surface soil cracks (B6)
- ☐ Inundation visible on aerial imagery (B7)
- ☐ Sparsely vegetated concave surface (B8) *[WMVC only]*
- ☐ Water-stained leaves (B9) *[Arid West and MLRA 5 only]*
- ☐ Salt crust (B11)
- ☑ Biotic Crust (B12) *[Arid West only; see B4]*
- ☐ Aquatic invertebrates (B13)
- ☐ Hydrogen sulfide odor (C1)
- ☐ Oxidized rhizospheres (C3)
- ☐ Presence of reduced iron (C4)
- ☐ Recent iron reduction in tilled soils (C6)
- ☐ Stunted or stressed plants (D1) *[WMVC only]*

Secondary indicators (need 2+ to meet criteria):

- ☐ Water marks (B1) *[Arid West riverine only]*
- ☐ Sediment deposits (B2) *[Arid West riverine only]*
- ☐ Drift deposits (B3) *[Arid West riverine only]*
- ☐ Water-stained leaves (B9) *[WMVC:MLRA 4B only]*
- ☐ Drainage patterns (B10)
- ☐ Dry-season water table (C2)
- ☐ Thin muck surface (C7) *[Arid West only]*
- ☐ Crayfish burrows (C8) *[Arid West only]*
- ☐ Saturation visible on aerial imagery (C9)
- ☐ Geomorphic position (D2) *[WMVC only]*
- ☐ Shallow aquitard (D3)
- ☐ Frost-heave hummocks (D4) *[WMVC only]*
- ☐ Raised ant mounds (D6) *[WMVC only]*
- ☐ **FAC-neutral test (D5)** ☐ (Does not meet test)

☐ **Other (explain below)**

Meets CCC or LCP wetland hydrology criteria? ☑ Yes ☐ No

Comments: Wetland hydrology indicators observed at the sample point included surface water 2" deep and biotic crust.

Project Name:	Wavecrest Southern Alignment	County:	San Mateo
City/Location:	Half Moon Bay	LCP (if applicable):	Half Moon Bay
Applicant/Owner:	Coastside Land Trust	☐	LRR A (Western Mts., Valley, and Coast [WMVC])
WRA Investigator(s):	Stephanie Freed, David Zwick	☑	LRR C (Arid West)
Date:	1.26.16	**SAMPLE POINT ID:**	SP 4
		HABITAT:	

CCC/LCP WETLAND DETERMINATION

	Yes	No
Meets CCC or LCP vegetation criteria?	☐	☑
Meets CCC or LCP hydric soil criteria?	☐	☑
Meets CCC or LCP hydrology criteria?	☐	☑
CCC/LCP WETLAND?	☐	☑

Comments: Sample point located within upland field adjacent to coastal seasonal wetland swale (SP 3) on a coastal field. The sample point did not meet indicators of hydrophytic vegetation, hydric soils, or wetland hydrology. Sample point taken 48 hours after last rain event.

VEGETATION

*indicator status from the USFWS 1996 National List of wetland species

TREES - Plot size: 30x30	% Cover	Status*	Dominant?
TOTAL			

50% of stratum cover = *20% =*

SAPLING/SHRUBS - Plot size: 30x30	% Cover	Status*	Dominant?
TOTAL			

50% of stratum cover = *20% =*

HERBACEOUS - Plot size: 10x10	% Cover	Status*	Dominant?
Rumex acetosella	35	FACU	Y
Holcus lanatus	33	FAC	Y
Baccharis pilularis	25	UPL	Y
Carduus pycnocephalus	5	UPL	N
Geranium dissectum	2	UPL	N
TOTAL	100.0		0

50% of stratum cover = 50.0 *20% = 20.0*

Dominance Test:

Total # of dominant species across all strata: 3

Total # of dominants that are hydrophytic (status of OBL, FACW, or FAC): 1

Percentage of dominants that are hydrophytic: 33%

[Meets dominance test if >50%]

Prevalence Index:

Total % cover of species across all strata:

OBL:		x 1 =	
FACW:		x 2 =	
FAC:		x 3 =	
FACU:		x 4 =	
UPL:		x 5 =	
Total:	(A)		(B)

Prevalence Index (B/A) =

[Hydrophytic vegetation dominant if B/A ≤ 3.0]

Meets CCC or LCP hydrophytic vegetation criteria? ☐ Yes ☑ No

Comments: Sample point is dominated by FAC, FACU, and UPL species and does not meet any hydrophytic vegetation indicators.

California Coastal Act Wetland Data Sheet

SOILS Slope (%): 0 Soil map unit: Watsonville Sandy Loam

SOIL PROFILE

Depth	Matrix Color	Redox Color	% and contrast	Redox type	Texture	Comments
0-14	10YR 3/2	7.5YR 4/6	3	C	Silt Loam	

All soils:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) *[Arid West only]*
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ **Other (explain below)**

Loamy and clayey soils only:

- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9) *[Arid West only]*

Sandy soils only:

- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)

Test indicators (NRCS v7):

- ☐ 2 cm Muck (A10) *[WMVC only]*
- ☐ Very Shallow Dark Surface (TF12)

Meets CCC or LCP hydric soil criteria? ☐ Yes ☑ No

Comments: Sample point does not meet any hydric soil indicators.

HYDROLOGY (indicators from Corps Regional Supplements, applicable to coastal California only)

Primary indicators (only 1 needed to meet criteria):

- ☐ Surface water (A1) *Depth (in.):*
- ☐ High water table (A2) *Depth (in.):* 4"
- ☐ Soil saturation (A3) *Depth (in.):* 0"
- ☐ Water marks (B1) *[if in Arid West: Nonriverine only]*
- ☐ Sediment deposits (B2) *[if in Arid West: Nonriverine only]*
- ☐ Drift deposits (B3) *[if in Arid West: Nonriverine only]*
- ☐ Algal mat or crust (B4) *[WMVC only; see B12]*
- ☐ Iron deposits (B5) *[WMVC only]*
- ☐ Surface soil cracks (B6)
- ☐ Inundation visible on aerial imagery (B7)
- ☐ Sparsely vegetated concave surface (B8) *[WMVC only]*
- ☐ Water-stained leaves (B9) *[Arid West and MLRA 5 only]*
- ☐ Salt crust (B11)
- ☐ Biotic Crust (B12) *[Arid West only; see B4]*
- ☐ Aquatic invertebrates (B13)
- ☐ Hydrogen sulfide odor (C1)
- ☐ Oxidized rhizospheres (C3)
- ☐ Presence of reduced iron (C4)
- ☐ Recent iron reduction in tilled soils (C6)
- ☐ Stunted or stressed plants (D1) *[WMVC only]*

Secondary indicators (need 2+ to meet criteria):

- ☐ Water marks (B1) *[Arid West riverine only]*
- ☐ Sediment deposits (B2) *[Arid West riverine only]*
- ☐ Drift deposits (B3) *[Arid West riverine only]*
- ☐ Water-stained leaves (B9) *[WMVC:MLRA 4B only]*
- ☐ Drainage patterns (B10)
- ☐ Dry-season water table (C2)
- ☐ Thin muck surface (C7) *[Arid West only]*
- ☐ Crayfish burrows (C8) *[Arid West only]*
- ☐ Saturation visible on aerial imagery (C9)
- ☐ Geomorphic position (D2) *[WMVC only]*
- ☐ Shallow aquitard (D3)
- ☐ Frost-heave hummocks (D4) *[WMVC only]*
- ☐ Raised ant mounds (D6) *[WMVC only]*
- ☐ **FAC-neutral test (D5)** ☐ (Does not meet test)

☐ **Other (explain below)**

Meets CCC or LCP wetland hydrology criteria? ☐ Yes ☑ No

Comments: While the water table present up to 4" below ground surface, this is likely reflective of approximately 2.73 inches of rain within the eight days preceding the site visit and is not indicative of wetland hydrology conditions.

California Coastal Act Wetland Data Sheet

Project Name: Wavecrest Southern Alignment
County: San Mateo
City/Location: Half Moon Bay
LCP (if applicable): Half Moon Bay
Applicant/Owner: Coastside Land Trust
☐ LRR A (Western Mts., Valley, and Coast [WMVC])
WRA Investigator(s): Stephanie Freed, David Zwick
☑ LRR C (Arid West)
Date: 1.26.16
SAMPLE POINT ID: SP 5
HABITAT:

CCC/LCP WETLAND DETERMINATION

Meets CCC or LCP vegetation criteria? ☑ Yes ☐ No
Meets CCC or LCP hydric soil criteria? ☑ Yes ☐ No
Meets CCC or LCP hydrology criteria? ☑ Yes ☐ No
CCC/LCP WETLAND? ☑ Yes ☐ No

Comments: Sample point located within wetland depression and met wetland indicators for hydrophytic vegetation, hydric soils, and wetland hydrology. Wetland boundary determined based on grade break, shift from Rumex acetocella to Eleocharis macrostachya and Juncus phaeocephalus, and presence of surface water. Sample point taken 48 hours after last rain event. Sample point paired with SP 6.

VEGETATION

*indicator status from the USFWS 1996 National List of wetland species

TREES - Plot size: 30x30	% Cover	Status*	Dominant?
TOTAL			

50% of stratum cover = *20% =*

SAPLING/SHRUBS - Plot size: 30x30	% Cover	Status*	Dominant?
TOTAL			

50% of stratum cover = *20% =*

HERBACEOUS - Plot size: 10x5	% Cover	Status*	Dominant?
Eleocharis macrostachya	30	OBL	Y
Juncus phaeocephalus	20	FACW	Y
Rumex crispis	5	FAC	N
Cyperus eragrostis	3	FACW	N
Mentha pulegium	1	OBL	N
TOTAL	59.0		0

50% of stratum cover = *29.5* *20% =* *11.8*

Dominance Test:

Total # of dominant species across all strata: 2

Total # of dominants that are hydrophytic (status of OBL, FACW, or FAC): 2

Percentage of dominants that are hydrophytic: 100%

[Meets dominance test if >50%]

Prevalence Index:

Total % cover of species across all strata:

OBL: ____ x 1 = ____
FACW: ____ x 2 = ____
FAC: ____ x 3 = ____
FACU: ____ x 4 = ____
UPL: ____ x 5 = ____

Total: ____ (A) ____ (B)

Prevalence Index (B/A) =

[Hydrophytic vegetation dominant if B/A ≤ 3.0]

Meets CCC or LCP hydrophytic vegetation criteria? ☑ Yes ☐ No

Comments: Sample point is dominated by OBL & FACW species and was determined to contain hydrophytic vegetation, as it meets the dominance test.

Project Name: ______Wavecrest South______________________________ Sample Point ID: ____SP 5 __________

SOILS Slope (%): 0-2 Soil map unit: Watsonville Sandy Loam

SOIL PROFILE

Depth	Matrix Color	Redox Color	% and contrast	Redox type	Texture	Comments
0-4	7.5YR 2.5/1				Silty Clay	Saturated
4-8	2.5Y 2.5/1	5Y 5/2	35	D	Clay	
		7.5YR 4/6	5	C	Clay	
8-14	7.5YR 2.5/1				Clay Loam	

All soils:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) *[Arid West only]*
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ **Other (explain below)**

Loamy and clayey soils only:

- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☑ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9) *[Arid West only]*

Sandy soils only:

- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)

Test indicators (NRCS v7):

- ☐ 2 cm Muck (A10) *[WMVC only]*
- ☐ Very Shallow Dark Surface (TF12)

Meets CCC or LCP hydric soil criteria? ☑ Yes ☐ No

Comments: Sample point meets hydric soil indicator for depleted dark surface (F7).

HYDROLOGY (indicators from Corps Regional Supplements, applicable to coastal California only)

Primary indicators (only 1 needed to meet criteria):

- ☑ Surface water (A1) *Depth (in.):* 2"
- ☐ High water table (A2) *Depth (in.):* 0"
- ☐ Soil saturation (A3) *Depth (in.):* 0"
- ☐ Water marks (B1) *[if in Arid West: Nonriverine only]*
- ☐ Sediment deposits (B2) *[if in Arid West: Nonriverine only]*
- ☐ Drift deposits (B3) *[if in Arid West: Nonriverine only]*
- ☐ Algal mat or crust (B4) *[WMVC only; see B12]*
- ☐ Iron deposits (B5) *[WMVC only]*
- ☐ Surface soil cracks (B6)
- ☐ Inundation visible on aerial imagery (B7)
- ☐ Sparsely vegetated concave surface (B8) *[WMVC only]*
- ☐ Water-stained leaves (B9) *[Arid West and MLRA 5 only]*
- ☐ Salt crust (B11)
- ☑ Biotic Crust (B12) *[Arid West only; see B4]*
- ☐ Aquatic invertebrates (B13)
- ☐ Hydrogen sulfide odor (C1)
- ☐ Oxidized rhizospheres (C3)
- ☐ Presence of reduced iron (C4)
- ☐ Recent iron reduction in tilled soils (C6)
- ☐ Stunted or stressed plants (D1) *[WMVC only]*

Secondary indicators (need 2+ to meet criteria):

- ☐ Water marks (B1) *[Arid West riverine only]*
- ☐ Sediment deposits (B2) *[Arid West riverine only]*
- ☐ Drift deposits (B3) *[Arid West riverine only]*
- ☐ Water-stained leaves (B9) *[WMVC:MLRA 4B only]*
- ☐ Drainage patterns (B10)
- ☐ Dry-season water table (C2)
- ☐ Thin muck surface (C7) *[Arid West only]*
- ☐ Crayfish burrows (C8) *[Arid West only]*
- ☐ Saturation visible on aerial imagery (C9)
- ☐ Geomorphic position (D2) *[WMVC only]*
- ☐ Shallow aquitard (D3)
- ☐ Frost-heave hummocks (D4) *[WMVC only]*
- ☐ Raised ant mounds (D6) *[WMVC only]*
- ☑ **FAC-neutral test (D5)** ☐ (Does not meet test)

☐ **Other (explain below)**

Meets CCC or LCP wetland hydrology criteria? ☑ Yes ☐ No

Comments: Wetland hydrology indicators observed at the sample point included surface water 2" deep, biotic crust, and sample point meets secondary indicator D5, FAC-Neutral test.

Project Name: ______Wavecrest South________________________Sample Point ID: ____SP 6 __________

Project Name:	Wavecrest Southern Alignment	County:	San Mateo
City/Location:	Half Moon Bay	LCP (if applicable):	Half Moon Bay
Applicant/Owner:	Coastside Land Trust	☐	LRR A (Western Mts., Valley, and Coast [WMVC])
WRA Investigator(s):	Stephanie Freed, David Zwick	☑	LRR C (Arid West)
Date:	1.26.16	**SAMPLE POINT ID:**	SP 6
		HABITAT:	

CCC/LCP WETLAND DETERMINATION

	Yes	No
Meets CCC or LCP vegetation criteria?	☐	☑
Meets CCC or LCP hydric soil criteria?	☐	☑
Meets CCC or LCP hydrology criteria?	☐	☑
CCC/LCP WETLAND?	☐	☑

Comments: Sample point located within upland field on a coastal field adjacent to wetland depression (SP 5). The sample point did not meet wetland indicators for hydrophytic vegetation, hydric soils, or wetland hydrology. Sample point taken 48 hours after last rain event.

VEGETATION

*indicator status from the USFWS 1996 National List of wetland species

TREES - Plot size: 30x30	% Cover	Status*	Dominant?
TOTAL			
50% of stratum cover =		*20% =*	

SAPLING/SHRUBS - Plot size: 30x30	% Cover	Status*	Dominant?
TOTAL			
50% of stratum cover =		*20% =*	

HERBACEOUS - Plot size: 10x10	% Cover	Status*	Dominant?
Chlorogalum pomeridianum	20	Y	UPL
Baccharis pilularis	20	Y	UPL
Achillea millefolium	10	N	FACU
Holcus lanatus	10	N	FAC
Fragaria chiloensis	2	N	FACU
Juncus phaeocephalus	1	N	FACW
Juncus bufonius	1	N	FACW
TOTAL	64.0		0
50% of stratum cover =	*32.0*	*20% =*	*12.8*

Dominance Test:

Total # of dominant species across all strata:	2
Total # of dominants that are hydrophytic (status of OBL, FACW, or FAC):	0
Percentage of dominants that are hydrophytic:	0%

[Meets dominance test if >50%]

Prevalence Index:

Total % cover of species across all strata:

OBL:		x 1 =	
FACW:		x 2 =	
FAC:		x 3 =	
FACU:		x 4 =	
UPL:		x 5 =	
Total:	(A)		(B)

Prevalence Index (B/A) =

[Hydrophytic vegetation dominant if B/A ≤ 3.0]

Meets CCC or LCP hydrophytic vegetation criteria? ☐ Yes ☑ No

Comments: Sample point is dominated by UPL species and does not meet any hydrophytic vegetation indicators.

California Coastal Act Wetland Data Sheet

SOILS Slope (%): 0-2 Soil map unit: Terrace escarpments

SOIL PROFILE

Depth	Matrix Color	Redox Color	% and contrast	Redox type	Texture	Comments
0-9	7.5YR 3/2				Clay Loam	
9-11	10YR 3/2				Clay Loam	
11-14	7.5YR 2.5/1	7.5YR 5/8	6	C	Clay	
		10YR 5/6	9	C	Clay	

All soils:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) *[Arid West only]*
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ **Other (explain below)**

Loamy and clayey soils only:

- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9) *[Arid West only]*

Sandy soils only:

- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)

Test indicators (NRCS v7):

- ☐ 2 cm Muck (A10) *[WMVC only]*
- ☐ Very Shallow Dark Surface (TF12)

Meets CCC or LCP hydric soil criteria? ☐ Yes ☑ No

Comments: Sample point does not meet any criteria for hydric soil indicators.

HYDROLOGY (indicators from Corps Regional Supplements, applicable to coastal California only)

Primary indicators (only 1 needed to meet criteria):

- ☐ Surface water (A1) *Depth (in.):* ______
- ☐ High water table (A2) *Depth (in.):* ______
- ☐ Soil saturation (A3) *Depth (in.):* ______
- ☐ Water marks (B1) *[if in Arid West: Nonriverine only]*
- ☐ Sediment deposits (B2) *[if in Arid West: Nonriverine only]*
- ☐ Drift deposits (B3) *[if in Arid West: Nonriverine only]*
- ☐ Algal mat or crust (B4) *[WMVC only; see B12]*
- ☐ Iron deposits (B5) *[WMVC only]*
- ☐ Surface soil cracks (B6)
- ☐ Inundation visible on aerial imagery (B7)
- ☐ Sparsely vegetated concave surface (B8) *[WMVC only]*
- ☐ Water-stained leaves (B9) *[Arid West and MLRA 5 only]*
- ☐ Salt crust (B11)
- ☐ Biotic Crust (B12) *[Arid West only; see B4]*
- ☐ Aquatic invertebrates (B13)
- ☐ Hydrogen sulfide odor (C1)
- ☐ Oxidized rhizospheres (C3)
- ☐ Presence of reduced iron (C4)
- ☐ Recent iron reduction in tilled soils (C6)
- ☐ Stunted or stressed plants (D1) *[WMVC only]*

Secondary indicators (need 2+ to meet criteria):

- ☐ Water marks (B1) *[Arid West riverine only]*
- ☐ Sediment deposits (B2) *[Arid West riverine only]*
- ☐ Drift deposits (B3) *[Arid West riverine only]*
- ☐ Water-stained leaves (B9) *[WMVC:MLRA 4B only]*
- ☐ Drainage patterns (B10)
- ☐ Dry-season water table (C2)
- ☐ Thin muck surface (C7) *[Arid West only]*
- ☐ Crayfish burrows (C8) *[Arid West only]*
- ☐ Saturation visible on aerial imagery (C9)
- ☐ Geomorphic position (D2) *[WMVC only]*
- ☐ Shallow aquitard (D3)
- ☐ Frost-heave hummocks (D4) *[WMVC only]*
- ☐ Raised ant mounds (D6) *[WMVC only]*
- ☐ **FAC-neutral test (D5)** ☐ (Does not meet test)

☐ **Other (explain below)**

Meets CCC or LCP wetland hydrology criteria? ☐ Yes ☑ No

Comments: Sample point does not meet criteria for hydrology indicators.

California Coastal Act Wetland Data Sheet

Project Name: Wavecrest Southern Alignment
County: San Mateo
City/Location: Half Moon Bay
LCP (if applicable): Half Moon Bay
Applicant/Owner: Coastside Land Trust
☐ LRR A (Western Mts., Valley, and Coast [WMVC])
WRA Investigator(s): Stephanie Freed, David Zwick
☑ LRR C (Arid West)
Date: 1.26.16
SAMPLE POINT ID: SP 7
HABITAT:

CCC/LCP WETLAND DETERMINATION

	Yes	No
Meets CCC or LCP vegetation criteria?	☑	☐
Meets CCC or LCP hydric soil criteria?	☐	☑
Meets CCC or LCP hydrology criteria?	☑	☐
CCC/LCP WETLAND?	☑	☐

Comments: Sample point located within ravine above OHWM. The sample point met wetland indicators for hydrophytic vegetation and wetland hydrology but did not meet any indicators for hydric soils. Sample point taken 48 hours after last rain event.

VEGETATION

*indicator status from the USFWS 1996 National List of wetland species

TREES - Plot size: 30x30	% Cover	Status*	Dominant?
TOTAL			
50% of stratum cover =		*20% =*	

SAPLING/SHRUBS - Plot size: 10x10	% Cover	Status*	Dominant?
Salix lasiolepis	50	FACW	Y
TOTAL	50.0		0
50% of stratum cover =	*25.0*	*20% =*	*10.0*

HERBACEOUS - Plot size: 10x10	% Cover	Status*	Dominant?
Juncus mexicanus	80	FACW	Y
Rubus ursinus	5	FAC	N
Baccharis pilularis	5	UPL	N
Rumex crispis	5	FAC	N
Chlorogalum pomeridianum	1	UPL	N
Geranium dissectum	1	UPL	N
Cirsium vulgare	1	FACU	N
Galium aparine	+	FACU	N
TOTAL	98.0		0
50% of stratum cover =	*49.0*	*20% =*	*19.6*

Dominance Test:

Total # of dominant species across all strata: 2

Total # of dominants that are hydrophytic (status of OBL, FACW, or FAC): 2

Percentage of dominants that are hydrophytic: 100%

[Meets dominance test if >50%]

Prevalence Index:

Total % cover of species across all strata:

	(A)		(B)
OBL:		x 1 =	
FACW:		x 2 =	
FAC:		x 3 =	
FACU:		x 4 =	
UPL:		x 5 =	
Total:			

Prevalence Index (B/A) =

[Hydrophytic vegetation dominant if B/A ≤ 3.0]

Meets CCC or LCP hydrophytic vegetation criteria? ☐ Yes ☐ No

Comments: Sample point is dominated by FACW species and was determined to contain hydrophytic vegetation, as it meets the dominance test. For absolute % cover. "+" indicates a trace occurrence.

Project Name: ______Wavecrest South______________________________ Sample Point ID: ____SP 7 __________

SOILS Slope (%): 5 Soil map unit: Tierra and Watsonville Soil Materials

SOIL PROFILE

Depth	Matrix Color	Redox Color	% and contrast	Redox type	Texture	Comments
0-9	2.5Y 5/3	5Y 4/1	10	C	Sand	
9-14	2.5Y 5/3	7.5YR 4/4	11	C	Sand	

All soils:
- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) *[Arid West only]*
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ **Other (explain below)**

Loamy and clayey soils only:
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9) *[Arid West only]*

Sandy soils only:
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)

Test indicators (NRCS v7):
- ☐ 2 cm Muck (A10) *[WMVC only]*
- ☐ Very Shallow Dark Surface (TF12)

Meets CCC or LCP hydric soil criteria? ☐ Yes ☑ No

Comments: Sample point does not meet criteria for hydric soil indicators.

HYDROLOGY (indicators from Corps Regional Supplements, applicable to coastal California only)

Primary indicators (only 1 needed to meet criteria):
- ☐ Surface water (A1) *Depth (in.):* ________
- ☐ High water table (A2) *Depth (in.):* ________
- ☐ Soil saturation (A3) *Depth (in.):* ________
- ☐ Water marks (B1) *[if in Arid West: Nonriverine only]*
- ☐ Sediment deposits (B2) *[if in Arid West: Nonriverine only]*
- ☐ Drift deposits (B3) *[if in Arid West: Nonriverine only]*
- ☐ Algal mat or crust (B4) *[WMVC only; see B12]*
- ☐ Iron deposits (B5) *[WMVC only]*
- ☐ Surface soil cracks (B6)
- ☐ Inundation visible on aerial imagery (B7)
- ☐ Sparsely vegetated concave surface (B8) *[WMVC only]*
- ☐ Water-stained leaves (B9) *[Arid West and MLRA 5 only]*
- ☐ Salt crust (B11)
- ☑ Biotic Crust (B12) *[Arid West only; see B4]*
- ☐ Aquatic invertebrates (B13)
- ☐ Hydrogen sulfide odor (C1)
- ☐ Oxidized rhizospheres (C3)
- ☐ Presence of reduced iron (C4)
- ☐ Recent iron reduction in tilled soils (C6)
- ☐ Stunted or stressed plants (D1) *[WMVC only]*

Secondary indicators (need 2+ to meet criteria):
- ☐ Water marks (B1) *[Arid West riverine only]*
- ☐ Sediment deposits (B2) *[Arid West riverine only]*
- ☐ Drift deposits (B3) *[Arid West riverine only]*
- ☐ Water-stained leaves (B9) *[WMVC:MLRA 4B only]*
- ☐ Drainage patterns (B10)
- ☐ Dry-season water table (C2)
- ☐ Thin muck surface (C7) *[Arid West only]*
- ☐ Crayfish burrows (C8) *[Arid West only]*
- ☐ Saturation visible on aerial imagery (C9)
- ☐ Geomorphic position (D2) *[WMVC only]*
- ☐ Shallow aquitard (D3)
- ☐ Frost-heave hummocks (D4) *[WMVC only]*
- ☐ Raised ant mounds (D6) *[WMVC only]*
- ☑ **FAC-neutral test (D5)** ☐ (Does not meet test)

☐ **Other (explain below)**

Meets CCC or LCP wetland hydrology criteria? ☑ Yes ☐ No

Comments: Wetland hydrology indicators observed at the sample point included biotic crust and FAC-Neutral Test.

Project Name: ______Wavecrest South______________________________Sample Point ID: ____SP 8 __________

Project Name:	Wavecrest Southern Alignment	County:	San Mateo
City/Location:	Half Moon Bay	LCP (if applicable):	Half Moon Bay
Applicant/Owner:	Coastside Land Trust	☐	LRR A (Western Mts., Valley, and Coast [WMVC])
WRA Investigator(s):	Stephanie Freed, David Zwick	☑	LRR C (Arid West)
Date:	1.27.16	**SAMPLE POINT ID:**	SP 8
		HABITAT:	

CCC/LCP WETLAND DETERMINATION

	Yes	No
Meets CCC or LCP vegetation criteria?	☑	☐
Meets CCC or LCP hydric soil criteria?	☑	☐
Meets CCC or LCP hydrology criteria?	☑	☐
CCC/LCP WETLAND?	☑	☐

Comments: Sample point located within wetland swale on a coastal field. Sample point met wetland indicators for hydrophytic vegetation, hydric soils, and wetland hydrology including inundation up to 4" deep. Wetland boundary based on vegetative shift from Juncus phaeocephalus to upland species such as Horkelia california and Baccharis pilularis, grade break, and absence of surface water. Sample point taken 48 hours after last rain event. Paired with SP 9.

VEGETATION

*indicator status from the USFWS 1996 National List of wetland species

TREES - Plot size: 30x30	% Cover	Status*	Dominant?
TOTAL			

50% of stratum cover = *20% =*

SAPLING/SHRUBS - Plot size: 30x30	% Cover	Status*	Dominant?
TOTAL			

50% of stratum cover = *20% =*

HERBACEOUS - Plot size: 10x10	% Cover	Status*	Dominant?
Juncus phaeocephalus	10	FACW	Y
Rumex crispis	5	FAC	Y
Mentha pulegium	2	OBL	N
TOTAL	17.0		0

50% of stratum cover = 8.5 *20% = 3.4*

Dominance Test:

Total # of dominant species across all strata: 2

Total # of dominants that are hydrophytic (status of OBL, FACW, or FAC): 2

Percentage of dominants that are hydrophytic: 100%

[Meets dominance test if >50%]

Prevalence Index:

Total % cover of species across all strata:

OBL:		x 1 =	
FACW:		x 2 =	
FAC:		x 3 =	
FACU:		x 4 =	
UPL:		x 5 =	
Total:	(A)		(B)

Prevalence Index (B/A) =

[Hydrophytic vegetation dominant if B/A ≤ 3.0]

Meets CCC or LCP hydrophytic vegetation criteria? ☑ Yes ☐ No

Comments: Sample point is dominated by FAC & FACW species and was determined to contain hydrophytic vegetation, as it meets the dominance test.

California Coastal Act Wetland Data Sheet

SOILS Slope (%): 0-2 Soil map unit: Watsonville Loam

SOIL PROFILE

Depth	Matrix Color	Redox Color	% and contrast	Redox type	Texture	Comments
0-12	10YR 2/2				Clay Loam	Saturated
12-14	2.5Y 4/2	7.5YR 6/8	15	C	Clay Loam	Saturated

All soils:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) *[Arid West only]*
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☑ **Other (explain below)**

Loamy and clayey soils only:

- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9) *[Arid West only]*

Sandy soils only:

- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)

Test indicators (NRCS v7):

- ☐ 2 cm Muck (A10) *[WMVC only]*
- ☐ Very Shallow Dark Surface (TF12)

Meets CCC or LCP hydric soil criteria? ☑ Yes ☐ No

Comments: While no hydric soil indicators were observed, this sample point contains naturally problematic seasonally ponded soils. Sample point occurs in a seasonally ponded depression with a restrictive clay layer and lacks hydric soil indicators due to limited saturation depth and saline conditions.

HYDROLOGY (indicators from Corps Regional Supplements, applicable to coastal California only)

Primary indicators (only 1 needed to meet criteria):

- ☑ Surface water (A1) *Depth (in.):* 4"
- ☐ High water table (A2) *Depth (in.):* 0"
- ☐ Soil saturation (A3) *Depth (in.):* 0"
- ☐ Water marks (B1) *[if in Arid West: Nonriverine only]*
- ☐ Sediment deposits (B2) *[if in Arid West: Nonriverine only]*
- ☐ Drift deposits (B3) *[if in Arid West: Nonriverine only]*
- ☐ Algal mat or crust (B4) *[WMVC only; see B12]*
- ☐ Iron deposits (B5) *[WMVC only]*
- ☐ Surface soil cracks (B6)
- ☐ Inundation visible on aerial imagery (B7)
- ☐ Sparsely vegetated concave surface (B8) *[WMVC only]*
- ☐ Water-stained leaves (B9) *[Arid West and MLRA 5 only]*
- ☐ Salt crust (B11)
- ☑ Biotic Crust (B12) *[Arid West only; see B4]*
- ☐ Aquatic invertebrates (B13)
- ☐ Hydrogen sulfide odor (C1)
- ☐ Oxidized rhizospheres (C3)
- ☐ Presence of reduced iron (C4)
- ☐ Recent iron reduction in tilled soils (C6)
- ☐ Stunted or stressed plants (D1) *[WMVC only]*

Secondary indicators (need 2+ to meet criteria):

- ☐ Water marks (B1) *[Arid West riverine only]*
- ☐ Sediment deposits (B2) *[Arid West riverine only]*
- ☐ Drift deposits (B3) *[Arid West riverine only]*
- ☐ Water-stained leaves (B9) *[WMVC:MLRA 4B only]*
- ☐ Drainage patterns (B10)
- ☐ Dry-season water table (C2)
- ☐ Thin muck surface (C7) *[Arid West only]*
- ☐ Crayfish burrows (C8) *[Arid West only]*
- ☐ Saturation visible on aerial imagery (C9)
- ☐ Geomorphic position (D2) *[WMVC only]*
- ☐ Shallow aquitard (D3)
- ☐ Frost-heave hummocks (D4) *[WMVC only]*
- ☐ Raised ant mounds (D6) *[WMVC only]*
- ☑ **FAC-neutral test (D5)** ☐ (Does not meet test)
- ☐ **Other (explain below)**

Meets CCC or LCP wetland hydrology criteria? ☑ Yes ☐ No

Comments: Wetland hydrology indicators observed at the sample point included surface water 4" deep, biotic crust, and sample point meets secondary indicator D5, FAC-Neutral test.

California Coastal Act Wetland Data Sheet

Project Name: Wavecrest Southern Alignment
County: San Mateo
City/Location: Half Moon Bay
LCP (if applicable): Half Moon Bay
Applicant/Owner: Coastside Land Trust
☐ LRR A (Western Mts., Valley, and Coast [WMVC])
WRA Investigator(s): Stephanie Freed, David Zwick
☑ LRR C (Arid West)
Date: 1.27.16
SAMPLE POINT ID: SP 9
HABITAT:

CCC/LCP WETLAND DETERMINATION

Meets CCC or LCP vegetation criteria? ☐ Yes ☑ No
Meets CCC or LCP hydric soil criteria? ☐ Yes ☑ No
Meets CCC or LCP hydrology criteria? ☐ Yes ☑ No
CCC/LCP WETLAND? ☐ Yes ☑ No

Comments: Sample point located within upland field adjacent to wetland swale (SP 8) on a coastal field. The sample point did not meet wetland indicators for hydrophytic vegetation, hydric soils, and wetland hydrology. Sample point taken 48 hours after last rain event.

VEGETATION

*indicator status from the USFWS 1996 National List of wetland species

TREES - Plot size: 30x30	% Cover	Status*	Dominant?
TOTAL			
50% of stratum cover =		*20% =*	

SAPLING/SHRUBS - Plot size: 10x10	% Cover	Status*	Dominant?
Baccharis pilularis	60	UPL	Y
TOTAL	60.0		0
50% of stratum cover =	*30.0*	*20% =*	*12.0*

HERBACEOUS - Plot size: 10x10	% Cover	Status*	Dominant?
Horkelia californica	40	UPL	Y
Conium maculatum	15	FACW	Y
Scrophularia californica	10	FAC	N
Galium aparine	1	FACU	N
TOTAL	66.0		0
50% of stratum cover =	*33.0*	*20% =*	*13.2*

Dominance Test:

Total # of dominant species across all strata: 3

Total # of dominants that are hydrophytic (status of OBL, FACW, or FAC): 1

Percentage of dominants that are hydrophytic: 33%

[Meets dominance test if >50%]

Prevalence Index:

Total % cover of species across all strata:

OBL:		x 1 =	
FACW:		x 2 =	
FAC:		x 3 =	
FACU:		x 4 =	
UPL:		x 5 =	
Total:	(A)		(B)

Prevalence Index (B/A) =

[Hydrophytic vegetation dominant if B/A ≤ 3.0]

Meets CCC or LCP hydrophytic vegetation criteria? ☐ Yes ☐ No

Comments: Sample point is dominated by UPL and FACW species and does not meet any hydrophytic vegetation indicators.

Project Name: ______Wavecrest South______________________________ Sample Point ID: ____SP 9 __________

SOILS Slope (%): ____0____ Soil map unit: ____Watsonville Loam____

SOIL PROFILE

Depth	Matrix Color	Redox Color	% and contrast	Redox type	Texture	Comments
0-10	10YR 3/2				Loam	Moist
10-14	10YR 4/2				Clay Loam	

All soils:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) *[Arid West only]*
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ **Other (explain below)**

Loamy and clayey soils only:

- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9) *[Arid West only]*

Sandy soils only:

- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)

Test indicators (NRCS v7):

- ☐ 2 cm Muck (A10) *[WMVC only]*
- ☐ Very Shallow Dark Surface (TF12)

Meets CCC or LCP hydric soil criteria? ☐ Yes ☑ No

Comments: Sample point does not meet criteria for hydric soil indicators.

HYDROLOGY (indicators from Corps Regional Supplements, applicable to coastal California only)

Primary indicators (only 1 needed to meet criteria):

- ☐ Surface water (A1) *Depth (in.):* ________
- ☐ High water table (A2) *Depth (in.):* ________
- ☐ Soil saturation (A3) *Depth (in.):* ________
- ☐ Water marks (B1) *[if in Arid West: Nonriverine only]*
- ☐ Sediment deposits (B2) *[if in Arid West: Nonriverine only]*
- ☐ Drift deposits (B3) *[if in Arid West: Nonriverine only]*
- ☐ Algal mat or crust (B4) *[WMVC only; see B12]*
- ☐ Iron deposits (B5) *[WMVC only]*
- ☐ Surface soil cracks (B6)
- ☐ Inundation visible on aerial imagery (B7)
- ☐ Sparsely vegetated concave surface (B8) *[WMVC only]*
- ☐ Water-stained leaves (B9) *[Arid West and MLRA 5 only]*
- ☐ Salt crust (B11)
- ☐ Biotic Crust (B12) *[Arid West only; see B4]*
- ☐ Aquatic invertebrates (B13)
- ☐ Hydrogen sulfide odor (C1)
- ☐ Oxidized rhizospheres (C3)
- ☐ Presence of reduced iron (C4)
- ☐ Recent iron reduction in tilled soils (C6)
- ☐ Stunted or stressed plants (D1) *[WMVC only]*

Secondary indicators (need 2+ to meet criteria):

- ☐ Water marks (B1) *[Arid West riverine only]*
- ☐ Sediment deposits (B2) *[Arid West riverine only]*
- ☐ Drift deposits (B3) *[Arid West riverine only]*
- ☐ Water-stained leaves (B9) *[WMVC:MLRA 4B only]*
- ☐ Drainage patterns (B10)
- ☐ Dry-season water table (C2)
- ☐ Thin muck surface (C7) *[Arid West only]*
- ☐ Crayfish burrows (C8) *[Arid West only]*
- ☐ Saturation visible on aerial imagery (C9)
- ☐ Geomorphic position (D2) *[WMVC only]*
- ☐ Shallow aquitard (D3)
- ☐ Frost-heave hummocks (D4) *[WMVC only]*
- ☐ Raised ant mounds (D6) *[WMVC only]*
- ☐ **FAC-neutral test (D5)** ☐ (Does not meet test)
- ☐ **Other (explain below)**

Meets CCC or LCP wetland hydrology criteria? ☐ Yes ☑ No

Comments: No wetland hydrology indicators were observed at the sample point.

Project Name: ______Wavecrest South______________________________ Sample Point ID: ____SP 10 __________

Project Name:	Wavecrest Southern Alignment	County:	San Mateo
City/Location:	Half Moon Bay	LCP (if applicable):	Half Moon Bay
Applicant/Owner:	Coastside Land Trust	☐	LRR A (Western Mts., Valley, and Coast [WMVC])
WRA Investigator(s):	Stephanie Freed, David Zwick	☑	LRR C (Arid West)
Date:	1.27.16	**SAMPLE POINT ID:**	SP 10
		HABITAT:	

CCC/LCP WETLAND DETERMINATION

	Yes	No
Meets CCC or LCP vegetation criteria?	☑	☐
Meets CCC or LCP hydric soil criteria?	☑	☐
Meets CCC or LCP hydrology criteria?	☑	☐
CCC/LCP WETLAND?	☑	☐

Comments: Sample point located within wetland depression. The sample point met wetland indicators for hydrophytic vegetation, hydric soils, and wetland hydrology including inundation up to 6" deep. Wetland boundary based on grade break, shift from Baccharis pilularis to Mentha pulegium and Juncus phaeocephalus and presence of surface water. Sample point taken 48 hours after last rain event. Paired with SP 11.

VEGETATION

*indicator status from the USFWS 1996 National List of wetland species

TREES - Plot size: 30x30	% Cover	Status*	Dominant?
TOTAL			
50% of stratum cover =		*20% =*	

SAPLING/SHRUBS - Plot size: 30x30	% Cover	Status*	Dominant?
TOTAL			
50% of stratum cover =		*20% =*	

HERBACEOUS - Plot size: 10x4	% Cover	Status*	Dominant?
Mentha pulegium	30	OBL	Y
Juncus phaeocephalus	10	FACW	N
Holcus lanatus	10	FAC	N
Rumex crispis	2	FAC	N
TOTAL	52.0		0
50% of stratum cover =	*26.0*	*20% =*	*10.4*

Dominance Test:

Total # of dominant species across all strata: 1

Total # of dominants that are hydrophytic (status of OBL, FACW, or FAC): 1

Percentage of dominants that are hydrophytic: 100%

[Meets dominance test if >50%]

Prevalence Index:

Total % cover of species across all strata:

OBL: ________ x 1 = ________

FACW: ________ x 2 = ________

FAC: ________ x 3 = ________

FACU: ________ x 4 = ________

UPL: ________ x 5 = ________

Total: ________ (A) ________ (B)

Prevalence Index (B/A) =

[Hydrophytic vegetation dominant if B/A ≤ 3.0]

Meets CCC or LCP hydrophytic vegetation criteria? ☑ Yes ☐ No

Comments: Sample point is dominated by OBL species and was determined to contain hydrophytic vegetation, as it meets the dominance test.

California Coastal Act Wetland Data Sheet

SOILS Slope (%): 0-2 Soil map unit: Watsonville Sandy Loam

SOIL PROFILE

Depth	Matrix Color	Redox Color	% and contrast	Redox type	Texture	Comments
0-12	7.5YR 3/1				Clay Loam	Saturated
12-14	10YR 3/2	5YR 6/8	15	C	Clay	Mg deposits

All soils:

- [ ] Histosol (A1)
- [ ] Histic Epipedon (A2)
- [ ] Black Histic (A3)
- [ ] Hydrogen Sulfide (A4)
- [ ] Stratified Layers (A5) *[Arid West only]*
- [ ] Depleted Below Dark Surface (A11)
- [ ] Thick Dark Surface (A12)
- [x] **Other (explain below)**

Loamy and clayey soils only:

- [ ] Loamy Mucky Mineral (F1)
- [ ] Loamy Gleyed Matrix (F2)
- [ ] Depleted Matrix (F3)
- [ ] Redox Dark Surface (F6)
- [ ] Depleted Dark Surface (F7)
- [ ] Redox Depressions (F8)
- [ ] Vernal Pools (F9) *[Arid West only]*

Sandy soils only:

- [ ] Sandy Mucky Mineral (S1)
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)
- [ ] Stripped Matrix (S6)

Test indicators (NRCS v7):

- [ ] 2 cm Muck (A10) *[WMVC only]*
- [ ] Very Shallow Dark Surface (TF12)

Meets CCC or LCP hydric soil criteria? [x] Yes [ ] No

Comments: While no hydric soil indicators were observed, this sample point contains naturally problematic seasonally ponded soils. Sample point occurs in a seasonally ponded depression with a restrictive clay layer and lacks hydric soil indicators due to limited saturation depth and saline conditions.

HYDROLOGY (indicators from Corps Regional Supplements, applicable to coastal California only)

Primary indicators (only 1 needed to meet criteria):

- [x] Surface water (A1) *Depth (in.):* 6"
- [ ] High water table (A2) *Depth (in.):* 0"
- [ ] Soil saturation (A3) *Depth (in.):* 0"
- [ ] Water marks (B1) *[if in Arid West: Nonriverine only]*
- [ ] Sediment deposits (B2) *[if in Arid West: Nonriverine only]*
- [ ] Drift deposits (B3) *[if in Arid West: Nonriverine only]*
- [ ] Algal mat or crust (B4) *[WMVC only; see B12]*
- [ ] Iron deposits (B5) *[WMVC only]*
- [ ] Surface soil cracks (B6)
- [ ] Inundation visible on aerial imagery (B7)
- [ ] Sparsely vegetated concave surface (B8) *[WMVC only]*
- [ ] Water-stained leaves (B9) *[Arid West and MLRA 5 only]*
- [ ] Salt crust (B11)
- [x] Biotic Crust (B12) *[Arid West only; see B4]*
- [ ] Aquatic invertebrates (B13)
- [ ] Hydrogen sulfide odor (C1)
- [ ] Oxidized rhizospheres (C3)
- [ ] Presence of reduced iron (C4)
- [ ] Recent iron reduction in tilled soils (C6)
- [ ] Stunted or stressed plants (D1) *[WMVC only]*

Secondary indicators (need 2+ to meet criteria):

- [ ] Water marks (B1) *[Arid West riverine only]*
- [ ] Sediment deposits (B2) *[Arid West riverine only]*
- [ ] Drift deposits (B3) *[Arid West riverine only]*
- [ ] Water-stained leaves (B9) *[WMVC:MLRA 4B only]*
- [ ] Drainage patterns (B10)
- [ ] Dry-season water table (C2)
- [ ] Thin muck surface (C7) *[Arid West only]*
- [ ] Crayfish burrows (C8) *[Arid West only]*
- [ ] Saturation visible on aerial imagery (C9)
- [ ] Geomorphic position (D2) *[WMVC only]*
- [ ] Shallow aquitard (D3)
- [ ] Frost-heave hummocks (D4) *[WMVC only]*
- [ ] Raised ant mounds (D6) *[WMVC only]*
- [x] **FAC-neutral test (D5)** [ ] (Does not meet test)

- [ ] **Other (explain below)**

Meets CCC or LCP wetland hydrology criteria? [x] Yes [ ] No

Comments: Wetland hydrology indicators observed at the sample point included surface water up to 6" deep, biotic crust, and sample point meets secondary indicator D5, FAC-Neutral test.

California Coastal Act Wetland Data Sheet

Project Name: Wavecrest Southern Alignment
County: San Mateo
City/Location: Half Moon Bay
LCP (if applicable): Half Moon Bay
Applicant/Owner: Coastside Land Trust
☐ LRR A (Western Mts., Valley, and Coast [WMVC])
WRA Investigator(s): Stephanie Freed, David Zwick
☑ LRR C (Arid West)
Date: 1.27.16
SAMPLE POINT ID: SP 11
HABITAT:

CCC/LCP WETLAND DETERMINATION

Meets CCC or LCP vegetation criteria?	☐ Yes	☑ No
Meets CCC or LCP hydric soil criteria?	☐ Yes	☑ No
Meets CCC or LCP hydrology criteria?	☐ Yes	☑ No
CCC/LCP WETLAND?	☐ Yes	☑ No

Comments: Sample point located within upland field adjacent to wetland depression (SP 10) on a coastal field. The sample point did not meet wetland indicators for hydrophytic vegetation, hydric soils, and wetland hydrology. Sample point taken 48 hours after last rain event.

VEGETATION

*indicator status from the USFWS 1996 National List of wetland species

TREES - Plot size: 30x30	% Cover	Status*	Dominant?
TOTAL			
50% of stratum cover =		*20% =*	

SAPLING/SHRUBS - Plot size: 30x30	% Cover	Status*	Dominant?
Baccharis pilularis	30	UPL	Y
TOTAL	30.0		0
50% of stratum cover =	*15.0*	*20% =*	*6.0*

HERBACEOUS - Plot size: 10x10	% Cover	Status*	Dominant?
Holcus lanatus	80	FAC	Y
Rubus ursinus	4	FAC	N
Geranium dissectum	1	UPL	N
Juncus phaeocephalus	1	FACW	N
Rumex acetosella	1	FACU	N
Helminthotheca echioides	1	FACU	N
Lysimachia arvensis	1	FACU	N
TOTAL	89.0		0
50% of stratum cover =	*44.5*	*20% =*	*17.8*

Dominance Test:

Total # of dominant species across all strata: 2

Total # of dominants that are hydrophytic (status of OBL, FACW, or FAC): 1

Percentage of dominants that are hydrophytic: 50%

[Meets dominance test if >50%]

Prevalence Index:

Total % cover of species across all strata:

OBL:		x 1 =	
FACW:		x 2 =	
FAC:		x 3 =	
FACU:		x 4 =	
UPL:		x 5 =	
Total:	(A)		(B)

Prevalence Index (B/A) =

[Hydrophytic vegetation dominant if B/A ≤ 3.0]

Meets CCC or LCP hydrophytic vegetation criteria? ☐ Yes ☑ No

Comments: Sample point is dominated by FAC and UPL species and does not meet any hydrophytic vegetation indicators.

Project Name: ______Wavecrest South______________________________ Sample Point ID: ____SP 11 __________

SOILS Slope (%): 0 Soil map unit: Watsonville Sandy Loam

SOIL PROFILE

Depth	Matrix Color	Redox Color	% and contrast	Redox type	Texture	Comments
0-11	10YR 2/2				Loam	Mosit
11-14	10YR 4/2	7.5YR 5/6	2	C	Clay	

All soils:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) *[Arid West only]*
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ **Other (explain below)**

Loamy and clayey soils only:

- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9) *[Arid West only]*

Sandy soils only:

- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)

Test indicators (NRCS v7):

- ☐ 2 cm Muck (A10) *[WMVC only]*
- ☐ Very Shallow Dark Surface (TF12)

Meets CCC or LCP hydric soil criteria? ☐ Yes ☑ No

Comments: Sample point does not meet criteria for hydric soil indicators.

HYDROLOGY (indicators from Corps Regional Supplements, applicable to coastal California only)

Primary indicators (only 1 needed to meet criteria):

- ☐ Surface water (A1) *Depth (in.):* ________
- ☐ High water table (A2) *Depth (in.):* 13"
- ☐ Soil saturation (A3) *Depth (in.):* ________
- ☐ Water marks (B1) *[if in Arid West: Nonriverine only]*
- ☐ Sediment deposits (B2) *[if in Arid West: Nonriverine only]*
- ☐ Drift deposits (B3) *[if in Arid West: Nonriverine only]*
- ☐ Algal mat or crust (B4) *[WMVC only; see B12]*
- ☐ Iron deposits (B5) *[WMVC only]*
- ☐ Surface soil cracks (B6)
- ☐ Inundation visible on aerial imagery (B7)
- ☐ Sparsely vegetated concave surface (B8) *[WMVC only]*
- ☐ Water-stained leaves (B9) *[Arid West and MLRA 5 only]*
- ☐ Salt crust (B11)
- ☐ Biotic Crust (B12) *[Arid West only; see B4]*
- ☐ Aquatic invertebrates (B13)
- ☐ Hydrogen sulfide odor (C1)
- ☐ Oxidized rhizospheres (C3)
- ☐ Presence of reduced iron (C4)
- ☐ Recent iron reduction in tilled soils (C6)
- ☐ Stunted or stressed plants (D1) *[WMVC only]*

Secondary indicators (need 2+ to meet criteria):

- ☐ Water marks (B1) *[Arid West riverine only]*
- ☐ Sediment deposits (B2) *[Arid West riverine only]*
- ☐ Drift deposits (B3) *[Arid West riverine only]*
- ☐ Water-stained leaves (B9) *[WMVC:MLRA 4B only]*
- ☐ Drainage patterns (B10)
- ☐ Dry-season water table (C2)
- ☐ Thin muck surface (C7) *[Arid West only]*
- ☐ Crayfish burrows (C8) *[Arid West only]*
- ☐ Saturation visible on aerial imagery (C9)
- ☐ Geomorphic position (D2) *[WMVC only]*
- ☐ Shallow aquitard (D3)
- ☐ Frost-heave hummocks (D4) *[WMVC only]*
- ☐ Raised ant mounds (D6) *[WMVC only]*
- ☐ **FAC-neutral test (D5)** ☐ (Does not meet test)

☐ **Other (explain below)**

Meets CCC or LCP wetland hydrology criteria? ☐ Yes ☑ No

Comments: While water table present 13" below ground surface, this is reflective of the approximately 2.73 inches of rain fall within the eight days preceding the site visit and is not indicative of wetland hydrology.

Project Name: ______Wavecrest South______________________________ Sample Point ID: ____SP 12 __________

Project Name:	Wavecrest Southern Alignment	County:	San Mateo
City/Location:	Half Moon Bay	LCP (if applicable):	Half Moon Bay
Applicant/Owner:	Coastside Land Trust	☐ LRR A (Western Mts., Valley, and Coast [WMVC])	
WRA Investigator(s):	Stephanie Freed, David Zwick	☑ LRR C (Arid West)	
Date:	1.27.16	**SAMPLE POINT ID:**	SP 12
		HABITAT:	

CCC/LCP WETLAND DETERMINATION

	Yes	No
Meets CCC or LCP vegetation criteria?	☑	☐
Meets CCC or LCP hydric soil criteria?	☑	☐
Meets CCC or LCP hydrology criteria?	☑	☐
CCC/LCP WETLAND?	☑	☐

Comments: Sample point located in large undulating wetland with plant hummocks on a coastal field. Sample point met wetland indicators for hydrophytic vegetation, hydric soils, and wetland hydrology. Wetland boundary based on shift from Rumex acetocella/Helminthotheca echiodes to Juncus phaeocephalus and surface water. Sample point taken 48 hours after last rain event. Paired with SP 13.

VEGETATION

*indicator status from the USFWS 1996 National List of wetland species

TREES - Plot size: 30x30	% Cover	Status*	Dominant?
TOTAL			

50% of stratum cover = *20% =*

SAPLING/SHRUBS - Plot size: 30x30	% Cover	Status*	Dominant?
TOTAL			

50% of stratum cover = *20% =*

HERBACEOUS - Plot size: 10x10	% Cover	Status*	Dominant?
Juncus phaeocephalus	50	Y	FACW
Juncus patens	40	Y	FACW
Holcus lanatus	10	N	FAC
Rumex crispus	+	N	FAC
TOTAL	100.0		0

50% of stratum cover = 50.0 *20% = 20.0*

Dominance Test:

Total # of dominant species across all strata: 2

Total # of dominants that are hydrophytic (status of OBL, FACW, or FAC): 2

Percentage of dominants that are hydrophytic: 100%

[Meets dominance test if >50%]

Prevalence Index:

Total % cover of species across all strata:

OBL:		x 1 =	
FACW:		x 2 =	
FAC:		x 3 =	
FACU:		x 4 =	
UPL:		x 5 =	
Total:	(A)		(B)

Prevalence Index (B/A) =

[Hydrophytic vegetation dominant if B/A ≤ 3.0]

Meets CCC or LCP hydrophytic vegetation criteria? ☑ Yes ☐ No

Comments: Sample point is dominated by FACW species and was determined to contain hydrophytic vegetation, as it meets the dominance test. For absolute % cover. "+" indicates a trace occurrence.

California Coastal Act Wetland Data Sheet

SOILS Slope (%): 0-2 Soil map unit: Watsonville Sandy Loam

SOIL PROFILE

Depth	Matrix Color	Redox Color	% and contrast	Redox type	Texture	Comments
0-8	7.5YR 2.5/1				Clay Loam	Silty, inundated, mucky

All soils:
- ☐ Histosol (A1)
- ☑ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) *[Arid West only]*
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ **Other (explain below)**

Loamy and clayey soils only:
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9) *[Arid West only]*

Sandy soils only:
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)

Test indicators (NRCS v7):
- ☐ 2 cm Muck (A10) *[WMVC only]*
- ☐ Very Shallow Dark Surface (TF12)

Meets CCC or LCP hydric soil criteria? ☑ Yes ☐ No

Comments: Sample point meets criteria for hydric soil indicator A2 (histic epipedon).

HYDROLOGY (indicators from Corps Regional Supplements, applicable to coastal California only)

Primary indicators (only 1 needed to meet criteria):
- ☑ Surface water (A1) *Depth (in.):* 4"
- ☐ High water table (A2) *Depth (in.):* 0"
- ☐ Soil saturation (A3) *Depth (in.):* 0"
- ☐ Water marks (B1) *[if in Arid West: Nonriverine only]*
- ☐ Sediment deposits (B2) *[if in Arid West: Nonriverine only]*
- ☐ Drift deposits (B3) *[if in Arid West: Nonriverine only]*
- ☐ Algal mat or crust (B4) *[WMVC only; see B12]*
- ☐ Iron deposits (B5) *[WMVC only]*
- ☐ Surface soil cracks (B6)
- ☑ Inundation visible on aerial imagery (B7)
- ☐ Sparsely vegetated concave surface (B8) *[WMVC only]*
- ☐ Water-stained leaves (B9) *[Arid West and MLRA 5 only]*
- ☐ Salt crust (B11)
- ☑ Biotic Crust (B12) *[Arid West only; see B4]*
- ☐ Aquatic invertebrates (B13)
- ☐ Hydrogen sulfide odor (C1)
- ☐ Oxidized rhizospheres (C3)
- ☐ Presence of reduced iron (C4)
- ☐ Recent iron reduction in tilled soils (C6)
- ☐ Stunted or stressed plants (D1) *[WMVC only]*

Secondary indicators (need 2+ to meet criteria):
- ☐ Water marks (B1) *[Arid West riverine only]*
- ☐ Sediment deposits (B2) *[Arid West riverine only]*
- ☐ Drift deposits (B3) *[Arid West riverine only]*
- ☐ Water-stained leaves (B9) *[WMVC:MLRA 4B only]*
- ☐ Drainage patterns (B10)
- ☐ Dry-season water table (C2)
- ☐ Thin muck surface (C7) *[Arid West only]*
- ☐ Crayfish burrows (C8) *[Arid West only]*
- ☑ Saturation visible on aerial imagery (C9)
- ☐ Geomorphic position (D2) *[WMVC only]*
- ☐ Shallow aquitard (D3)
- ☐ Frost-heave hummocks (D4) *[WMVC only]*
- ☐ Raised ant mounds (D6) *[WMVC only]*
- ☑ **FAC-neutral test (D5)** ☐ (Does not meet test)
- ☐ **Other (explain below)**

Meets CCC or LCP wetland hydrology criteria? ☑ Yes ☐ No

Comments: Wetland hydrology indicators observed at the sample point included surface water 4" deep, inundation and saturation visible on aerial imagery, biotic crust, and sample point meets D5, FAC-Neutral test.

California Coastal Act Wetland Data Sheet

Project Name: Wavecrest Southern Alignment
County: San Mateo
City/Location: Half Moon Bay
LCP (if applicable): Half Moon Bay
Applicant/Owner: Coastside Land Trust
☐ LRR A (Western Mts., Valley, and Coast [WMVC])
WRA Investigator(s): Stephanie Freed, David Zwick
☑ LRR C (Arid West)
Date: 1.27.16
SAMPLE POINT ID: SP 13
HABITAT:

CCC/LCP WETLAND DETERMINATION

	Yes	No
Meets CCC or LCP vegetation criteria?	☐	☑
Meets CCC or LCP hydric soil criteria?	☐	☑
Meets CCC or LCP hydrology criteria?	☐	☑
CCC/LCP WETLAND?	☐	☑

Comments: Sample point located within upland coastal field adajcent to wetland feature (SP 12). Sample point did not meet wetland indicators for hydrophytic vegetation, hydric soils, and wetland hydrology. Sample point taken 48 hours after last rain event.

VEGETATION

*indicator status from the USFWS 1996 National List of wetland species

TREES - Plot size: 30x30	% Cover	Status*	Dominant?
TOTAL			
50% of stratum cover =	*0.0*	*20% =*	*0.0*

SAPLING/SHRUBS - Plot size: 30x30	% Cover	Status*	Dominant?
Baccharis pilularis	60	UPL	Y
TOTAL	60.0		0
50% of stratum cover =	*30.0*	*20% =*	*12.0*

HERBACEOUS - Plot size: 10x10	% Cover	Status*	Dominant?
Juncus patens	20	FACW	Y
Rumex acetosella	5	FACU	N
Rubus ursinus	5	FAC	N
Holcus lanatus	5	FAC	N
Carduus pycnocephalus	5	UPL	N
Raphanus sativus	+	UPL	N
TOTAL	40.0		0
50% of stratum cover =	*20.0*	*20% =*	*8.0*

Dominance Test:

Total # of dominant species across all strata: 2

Total # of dominants that are hydrophytic (status of OBL, FACW, or FAC): 1

Percentage of dominants that are hydrophytic: 50%

[Meets dominance test if >50%]

Prevalence Index:

Total % cover of species across all strata:

OBL: ______ x 1 = ______
FACW: ______ x 2 = ______
FAC: ______ x 3 = ______
FACU: ______ x 4 = ______
UPL: ______ x 5 = ______

Total: ______ (A) ______ (B)

Prevalence Index (B/A) =

[Hydrophytic vegetation dominant if B/A ≤ 3.0]

Meets CCC or LCP hydrophytic vegetation criteria? ☐ Yes ☑ No

Comments: Sample point is dominated by FACW and UPL species, and does not meet any hydrophytic vegetation indicators. For absolute % cover. "+" indicates a trace occurrence.

Project Name: ______Wavecrest South______________________________ Sample Point ID: ____SP 13__________

SOILS Slope (%): 0 Soil map unit: Watsonville Sandy Loam

SOIL PROFILE

Depth	Matrix Color	Redox Color	% and contrast	Redox type	Texture	Comments
0-14	7.5YR 3/1				Silt Loam	

All soils:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) *[Arid West only]*
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ **Other (explain below)**

Loamy and clayey soils only:

- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9) *[Arid West only]*

Sandy soils only:

- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)

Test indicators (NRCS v7):

- ☐ 2 cm Muck (A10) *[WMVC only]*
- ☐ Very Shallow Dark Surface (TF12)

Meets CCC or LCP hydric soil criteria? ☐ Yes ☑ No

Comments: Sample point does not meet any hydric soil indicators.

HYDROLOGY (indicators from Corps Regional Supplements, applicable to coastal California only)

Primary indicators (only 1 needed to meet criteria):

- ☐ Surface water (A1) *Depth (in.):* ________
- ☐ High water table (A2) *Depth (in.):* ________
- ☐ Soil saturation (A3) *Depth (in.):* ________
- ☐ Water marks (B1) *[if in Arid West: Nonriverine only]*
- ☐ Sediment deposits (B2) *[if in Arid West: Nonriverine only]*
- ☐ Drift deposits (B3) *[if in Arid West: Nonriverine only]*
- ☐ Algal mat or crust (B4) *[WMVC only; see B12]*
- ☐ Iron deposits (B5) *[WMVC only]*
- ☐ Surface soil cracks (B6)
- ☐ Inundation visible on aerial imagery (B7)
- ☐ Sparsely vegetated concave surface (B8) *[WMVC only]*
- ☐ Water-stained leaves (B9) *[Arid West and MLRA 5 only]*
- ☐ Salt crust (B11)
- ☐ Biotic Crust (B12) *[Arid West only; see B4]*
- ☐ Aquatic invertebrates (B13)
- ☐ Hydrogen sulfide odor (C1)
- ☐ Oxidized rhizospheres (C3)
- ☐ Presence of reduced iron (C4)
- ☐ Recent iron reduction in tilled soils (C6)
- ☐ Stunted or stressed plants (D1) *[WMVC only]*

Secondary indicators (need 2+ to meet criteria):

- ☐ Water marks (B1) *[Arid West riverine only]*
- ☐ Sediment deposits (B2) *[Arid West riverine only]*
- ☐ Drift deposits (B3) *[Arid West riverine only]*
- ☐ Water-stained leaves (B9) *[WMVC:MLRA 4B only]*
- ☐ Drainage patterns (B10)
- ☐ Dry-season water table (C2)
- ☐ Thin muck surface (C7) *[Arid West only]*
- ☐ Crayfish burrows (C8) *[Arid West only]*
- ☐ Saturation visible on aerial imagery (C9)
- ☐ Geomorphic position (D2) *[WMVC only]*
- ☐ Shallow aquitard (D3)
- ☐ Frost-heave hummocks (D4) *[WMVC only]*
- ☐ Raised ant mounds (D6) *[WMVC only]*
- ☐ **FAC-neutral test (D5)** ☐ (Does not meet test)

☐ **Other (explain below)**

Meets CCC or LCP wetland hydrology criteria? ☐ Yes ☑ No

Comments: While water table present 6" below ground surface, this is reflective of approximately 2.73 inches of rain within the eight days preceding the site visit and is not indicative of wetland hydrology conditions.

Project Name: ______Wavecrest South__________________________Sample Point ID: ____SP 14 __________

Project Name:	Wavecrest Southern Alignment	County:	San Mateo
City/Location:	Half Moon Bay	LCP (if applicable):	Half Moon Bay
Applicant/Owner:	Coastside Land Trust	☐ LRR A (Western Mts., Valley, and Coast [WMVC])	
WRA Investigator(s):	Stephanie Freed, David Zwick	☑ LRR C (Arid West)	
Date:	1.27.16	**SAMPLE POINT ID:**	SP 14
		HABITAT:	

CCC/LCP WETLAND DETERMINATION

Meets CCC or LCP vegetation criteria?	☑ Yes	☐ No
Meets CCC or LCP hydric soil criteria?	☑ Yes	☐ No
Meets CCC or LCP hydrology criteria?	☑ Yes	☐ No
CCC/LCP WETLAND?	☑ Yes	☐ No

Comments: Sample point located within wetland depression on a coastal field. Sample point met wetland indicators for hydrophytic vegetation, hydric soils, and wetland hydrology including inundation up to 8". Wetland boundary based on grade break, shift from Baccharis pilularis to Juncus phaeocephalus/Rumex crispus and presence of surface water. Sample point taken 48 hours after last rain event. Paired with SP 15.

VEGETATION

*indicator status from the USFWS 1996 National List of wetland species

TREES - Plot size: 30x30	% Cover	Status*	Dominant?
TOTAL			
50% of stratum cover =		*20% =*	

SAPLING/SHRUBS - Plot size: 30x30	% Cover	Status*	Dominant?
TOTAL			
50% of stratum cover =		*20% =*	

HERBACEOUS - Plot size: 10x6	% Cover	Status*	Dominant?
Juncus phaeocephalus	30	FACW	Y
Rumex crispis	10	FAC	Y
Mentha pulegium	5	OBL	N
Holcus lanatus	1	FAC	N
Rumex acetosella	1	FACU	N
Helminthotheca echioides	+	FACU	N
TOTAL	47.0		0
50% of stratum cover =	*23.5*	*20% =*	*9.4*

Dominance Test:

Total # of dominant species across all strata: 2

Total # of dominants that are hydrophytic (status of OBL, FACW, or FAC): 2

Percentage of dominants that are hydrophytic: 100%

[Meets dominance test if >50%]

Prevalence Index:

Total % cover of species across all strata:

OBL:		x 1 =	
FACW:		x 2 =	
FAC:		x 3 =	
FACU:		x 4 =	
UPL:		x 5 =	
Total:	(A)		(B)

Prevalence Index (B/A) =

[Hydrophytic vegetation dominant if B/A ≤ 3.0]

Meets CCC or LCP hydrophytic vegetation criteria? ☑ Yes ☐ No

Comments: Sample point is dominated by FACW and FAC species and was determined to contain hydrophytic vegetation, as it meets the dominance test."+" indicates a trace occurrence.

California Coastal Act Wetland Data Sheet

SOILS Slope (%): 0-2 Soil map unit: Watsonville Sandy Loam

SOIL PROFILE

Depth	Matrix Color	Redox Color	% and contrast	Redox type	Texture	Comments
0-8	10YR 2/1				Silt Loam	Saturated

All soils:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) *[Arid West only]*
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☑ **Other (explain below)**

Loamy and clayey soils only:

- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9) *[Arid West only]*

Sandy soils only:

- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)

Test indicators (NRCS v7):

- ☐ 2 cm Muck (A10) *[WMVC only]*
- ☐ Very Shallow Dark Surface (TF12)

Meets CCC or LCP hydric soil criteria? ☑ Yes ☐ No

Comments: While no hydric soil indicators were observed, this sample point contains naturally problematic seasonally ponded soils. Sample point occurs in a seasonally ponded depression with a restrictive clay layer and lacks hydric soil indicators due to limited saturation depth and saline conditions.

HYDROLOGY (indicators from Corps Regional Supplements, applicable to coastal California only)

Primary indicators (only 1 needed to meet criteria):

- ☑ Surface water (A1) *Depth (in.):* 8"
- ☐ High water table (A2) *Depth (in.):*
- ☐ Soil saturation (A3) *Depth (in.):*
- ☐ Water marks (B1) *[if in Arid West: Nonriverine only]*
- ☐ Sediment deposits (B2) *[if in Arid West: Nonriverine only]*
- ☐ Drift deposits (B3) *[if in Arid West: Nonriverine only]*
- ☐ Algal mat or crust (B4) *[WMVC only; see B12]*
- ☐ Iron deposits (B5) *[WMVC only]*
- ☐ Surface soil cracks (B6)
- ☐ Inundation visible on aerial imagery (B7)
- ☐ Sparsely vegetated concave surface (B8) *[WMVC only]*
- ☐ Water-stained leaves (B9) *[Arid West and MLRA 5 only]*
- ☐ Salt crust (B11)
- ☐ Biotic Crust (B12) *[Arid West only; see B4]*
- ☐ Aquatic invertebrates (B13)
- ☐ Hydrogen sulfide odor (C1)
- ☐ Oxidized rhizospheres (C3)
- ☐ Presence of reduced iron (C4)
- ☐ Recent iron reduction in tilled soils (C6)
- ☐ Stunted or stressed plants (D1) *[WMVC only]*

Secondary indicators (need 2+ to meet criteria):

- ☐ Water marks (B1) *[Arid West riverine only]*
- ☐ Sediment deposits (B2) *[Arid West riverine only]*
- ☐ Drift deposits (B3) *[Arid West riverine only]*
- ☐ Water-stained leaves (B9) *[WMVC:MLRA 4B only]*
- ☐ Drainage patterns (B10)
- ☐ Dry-season water table (C2)
- ☐ Thin muck surface (C7) *[Arid West only]*
- ☐ Crayfish burrows (C8) *[Arid West only]*
- ☐ Saturation visible on aerial imagery (C9)
- ☐ Geomorphic position (D2) *[WMVC only]*
- ☐ Shallow aquitard (D3)
- ☐ Frost-heave hummocks (D4) *[WMVC only]*
- ☐ Raised ant mounds (D6) *[WMVC only]*
- ☑ **FAC-neutral test (D5)** ☐ (Does not meet test)

☐ **Other (explain below)**

Meets CCC or LCP wetland hydrology criteria? ☑ Yes ☐ No

Comments: Wetland hydrology indicators observed at the sample point included surface water 8" deep and sample point meets secondary indicator D5, FAC-Neutral test.

California Coastal Act Wetland Data Sheet

Project Name: Wavecrest Southern Alignment
County: San Mateo
City/Location: Half Moon Bay
LCP (if applicable): Half Moon Bay
Applicant/Owner: Coastside Land Trust
☐ LRR A (Western Mts., Valley, and Coast [WMVC])
WRA Investigator(s): Stephanie Freed, David Zwick
☑ LRR C (Arid West)
Date: 1.27.16
SAMPLE POINT ID: SP 15
HABITAT:

CCC/LCP WETLAND DETERMINATION

	Yes	No
Meets CCC or LCP vegetation criteria?	☐	☑
Meets CCC or LCP hydric soil criteria?	☐	☑
Meets CCC or LCP hydrology criteria?	☐	☑
CCC/LCP WETLAND?	☐	☑

Comments: Sample point located adjacent to wetland depression (SP 14) within upland coastal field. The sample point did not meet wetland indicators for hydrophytic vegetation, hydric soils, and wetland hydrology. Sample point taken 48 hours after last rain event.

VEGETATION

*indicator status from the USFWS 1996 National List of wetland species

TREES - Plot size: 30x30	% Cover	Status*	Dominant?
TOTAL			

50% of stratum cover = *20% =*

SAPLING/SHRUBS - Plot size: 30x30	% Cover	Status*	Dominant?
TOTAL			

50% of stratum cover = *20% =*

HERBACEOUS - Plot size: 10x10	% Cover	Status*	Dominant?
Rumex acetosella	80	FACU	Y
Holcus lanatus	10	FAC	N
Helminthotheca echioides	5	FACU	N
Juncus phaeocephalus	5	FACW	N
TOTAL	100.0		0

50% of stratum cover = *50.0* *20% =* *20.0*

Dominance Test:

Total # of dominant species across all strata: 1

Total # of dominants that are hydrophytic (status of OBL, FACW, or FAC): 0

Percentage of dominants that are hydrophytic: 0%

[Meets dominance test if >50%]

Prevalence Index:

Total % cover of species across all strata:

	(A)		(B)
OBL:		x 1 =	
FACW:		x 2 =	
FAC:		x 3 =	
FACU:		x 4 =	
UPL:		x 5 =	
Total:			

Prevalence Index (B/A) =

[Hydrophytic vegetation dominant if B/A ≤ 3.0]

Meets CCC or LCP hydrophytic vegetation criteria? ☐ Yes ☑ No

Comments: Sample point is dominated by FACU species and does not meet any hydrophytic vegetation indicators.

Project Name: ______Wavecrest South______________________________ Sample Point ID: ____SP 15 ___________

SOILS Slope (%): 0 Soil map unit: Watsonville sandy loam, gently sloping

SOIL PROFILE

Depth	Matrix Color	Redox Color	% and contrast	Redox type	Texture	Comments
0-10	10YR 3/2				Silt Loam	
10-14	7.5YR 2.5/1	5YR 3/4	1	C	Clay	

All soils:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) *[Arid West only]*
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ **Other (explain below)**

Loamy and clayey soils only:

- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9) *[Arid West only]*

Sandy soils only:

- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)

Test indicators (NRCS v7):

- ☐ 2 cm Muck (A10) *[WMVC only]*
- ☐ Very Shallow Dark Surface (TF12)

Meets CCC or LCP hydric soil criteria? ☐ Yes ☑ No

Comments: Sample point does not meet any hydric soil indicators.

HYDROLOGY (indicators from Corps Regional Supplements, applicable to coastal California only)

Primary indicators (only 1 needed to meet criteria):

- ☐ Surface water (A1) *Depth (in.):* ____________
- ☐ High water table (A2) *Depth (in.):* ____________
- ☐ Soil saturation (A3) *Depth (in.):* ____________
- ☐ Water marks (B1) *[if in Arid West: Nonriverine only]*
- ☐ Sediment deposits (B2) *[if in Arid West: Nonriverine only]*
- ☐ Drift deposits (B3) *[if in Arid West: Nonriverine only]*
- ☐ Algal mat or crust (B4) *[WMVC only; see B12]*
- ☐ Iron deposits (B5) *[WMVC only]*
- ☐ Surface soil cracks (B6)
- ☐ Inundation visible on aerial imagery (B7)
- ☐ Sparsely vegetated concave surface (B8) *[WMVC only]*
- ☐ Water-stained leaves (B9) *[Arid West and MLRA 5 only]*
- ☐ Salt crust (B11)
- ☐ Biotic Crust (B12) *[Arid West only; see B4]*
- ☐ Aquatic invertebrates (B13)
- ☐ Hydrogen sulfide odor (C1)
- ☐ Oxidized rhizospheres (C3)
- ☐ Presence of reduced iron (C4)
- ☐ Recent iron reduction in tilled soils (C6)
- ☐ Stunted or stressed plants (D1) *[WMVC only]*

Secondary indicators (need 2+ to meet criteria):

- ☐ Water marks (B1) *[Arid West riverine only]*
- ☐ Sediment deposits (B2) *[Arid West riverine only]*
- ☐ Drift deposits (B3) *[Arid West riverine only]*
- ☐ Water-stained leaves (B9) *[WMVC:MLRA 4B only]*
- ☐ Drainage patterns (B10)
- ☐ Dry-season water table (C2)
- ☐ Thin muck surface (C7) *[Arid West only]*
- ☐ Crayfish burrows (C8) *[Arid West only]*
- ☐ Saturation visible on aerial imagery (C9)
- ☐ Geomorphic position (D2) *[WMVC only]*
- ☐ Shallow aquitard (D3)
- ☐ Frost-heave hummocks (D4) *[WMVC only]*
- ☐ Raised ant mounds (D6) *[WMVC only]*
- ☐ **FAC-neutral test (D5)** ☐ (Does not meet test)
- ☐ **Other (explain below)**

Meets CCC or LCP wetland hydrology criteria? ☐ Yes ☑ No

Comments: While water table present at 14" below ground surface, this is likely reflective of approximately 2.73 inches of rain within the eight days preceding the site visit and is not indicative of wetland hydrology conditions.

Project Name: ______Wavecrest South____________________________ Sample Point ID: ____SP 16 __________

Project Name:	Wavecrest Southern Alignment	County:	San Mateo
City/Location:	Half Moon Bay	LCP (if applicable):	Half Moon Bay
Applicant/Owner:	Coastside Land Trust	☐ LRR A (Western Mts., Valley, and Coast [WMVC])	
WRA Investigator(s):	Stephanie Freed, David Zwick	☑ LRR C (Arid West)	
Date:	1.27.16	**SAMPLE POINT ID:**	SP 16
		HABITAT:	

CCC/LCP WETLAND DETERMINATION

Meets CCC or LCP vegetation criteria? ☑ Yes ☐ No
Meets CCC or LCP hydric soil criteria? ☑ Yes ☐ No
Meets CCC or LCP hydrology criteria? ☑ Yes ☐ No
CCC/LCP WETLAND? ☑ Yes ☐ No

Comments: Sample point located within undulating topographical feature in low-lying area with plant hummocks and no obvious depression on a coastal field. SP met wetland indicators for hydrophytic vegetation, hydric soils, and wetland hydrology. Wetland boundary based on shift from Geranium dissectum to Mentha pulegium/Juncus phaeocephalus and presence of surface water. Sample point taken 48 hours after last rain event. Paired with SP 17.

VEGETATION

*indicator status from the USFWS 1996 National List of wetland species

TREES - Plot size: 30x30	% Cover	Status*	Dominant?
TOTAL			
50% of stratum cover =		*20% =*	

SAPLING/SHRUBS - Plot size: 30x30	% Cover	Status*	Dominant?
TOTAL			
50% of stratum cover =		*20% =*	

HERBACEOUS - Plot size: 10x10	% Cover	Status*	Dominant?
Juncus phaeocephalus	40	FACW	Y
Mentha pulegium	10	OBL	N
Holcus lanatus	5	FAC	N
Rumex crispus	5	FAC	N
TOTAL	60.0		0
50% of stratum cover =	*30.0*	*20% =*	*12.0*

Dominance Test:

Total # of dominant species across all strata: 1

Total # of dominants that are hydrophytic (status of OBL, FACW, or FAC): 1

Percentage of dominants that are hydrophytic: 100%

[Meets dominance test if >50%]

Prevalence Index:

Total % cover of species across all strata:

OBL:		x 1 =	
FACW:		x 2 =	
FAC:		x 3 =	
FACU:		x 4 =	
UPL:		x 5 =	
Total:	(A)		(B)

Prevalence Index (B/A) =

[Hydrophytic vegetation dominant if B/A ≤ 3.0]

Meets CCC or LCP hydrophytic vegetation criteria? ☑ Yes ☐ No

Comments: Sample point is dominated by FACW species and was determined to contain hydrophytic vegetation, as it meets the dominance test.

California Coastal Act Wetland Data Sheet

SOILS Slope (%): 0 Soil map unit: Watsonville Sandy Loam

SOIL PROFILE

Depth	Matrix Color	Redox Color	% and contrast	Redox type	Texture	Comments
0-4	10YR 3/2				Silt	Saturated
4-8	7/5YR 3/2				Clay Loam	
8-14	7/5YR 3/2	5YR 4/6	6	C	Clay	

All soils:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) *[Arid West only]*
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☑ **Other (explain below)**

Loamy and clayey soils only:

- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9) *[Arid West only]*

Sandy soils only:

- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)

Test indicators (NRCS v7):

- ☐ 2 cm Muck (A10) *[WMVC only]*
- ☐ Very Shallow Dark Surface (TF12)

Meets CCC or LCP hydric soil criteria? ☑ Yes ☐ No

Comments: While no hydric soil indicators were observed, this sample point contains naturally problematic seasonally ponded soils. Sample point occurs in a seasonally ponded low-lying area with a restrictive clay layer and lacks hydric soil indicators due to limited saturation depth and saline conditions.

HYDROLOGY (indicators from Corps Regional Supplements, applicable to coastal California only)

Primary indicators (only 1 needed to meet criteria):

- ☑ Surface water (A1) *Depth (in.):* 6"
- ☐ High water table (A2) *Depth (in.):*
- ☐ Soil saturation (A3) *Depth (in.):*
- ☐ Water marks (B1) *[if in Arid West: Nonriverine only]*
- ☐ Sediment deposits (B2) *[if in Arid West: Nonriverine only]*
- ☐ Drift deposits (B3) *[if in Arid West: Nonriverine only]*
- ☐ Algal mat or crust (B4) *[WMVC only; see B12]*
- ☐ Iron deposits (B5) *[WMVC only]*
- ☐ Surface soil cracks (B6)
- ☐ Inundation visible on aerial imagery (B7)
- ☐ Sparsely vegetated concave surface (B8) *[WMVC only]*
- ☐ Water-stained leaves (B9) *[Arid West and MLRA 5 only]*
- ☐ Salt crust (B11)
- ☐ Biotic Crust (B12) *[Arid West only; see B4]*
- ☐ Aquatic invertebrates (B13)
- ☐ Hydrogen sulfide odor (C1)
- ☐ Oxidized rhizospheres (C3)
- ☐ Presence of reduced iron (C4)
- ☐ Recent iron reduction in tilled soils (C6)
- ☐ Stunted or stressed plants (D1) *[WMVC only]*

Secondary indicators (need 2+ to meet criteria):

- ☐ Water marks (B1) *[Arid West riverine only]*
- ☐ Sediment deposits (B2) *[Arid West riverine only]*
- ☐ Drift deposits (B3) *[Arid West riverine only]*
- ☐ Water-stained leaves (B9) *[WMVC:MLRA 4B only]*
- ☐ Drainage patterns (B10)
- ☐ Dry-season water table (C2)
- ☐ Thin muck surface (C7) *[Arid West only]*
- ☐ Crayfish burrows (C8) *[Arid West only]*
- ☐ Saturation visible on aerial imagery (C9)
- ☐ Geomorphic position (D2) *[WMVC only]*
- ☐ Shallow aquitard (D3)
- ☐ Frost-heave hummocks (D4) *[WMVC only]*
- ☐ Raised ant mounds (D6) *[WMVC only]*
- ☑ **FAC-neutral test (D5)** ☐ (Does not meet test)
- ☐ **Other (explain below)**

Meets CCC or LCP wetland hydrology criteria? ☑ Yes ☐ No

Comments: Wetland hydrology indicators observed at the sample point included surface water 6" deep and sample point meets secondary indicator D5, FAC-Neutral test.

California Coastal Act Wetland Data Sheet

Project Name: Wavecrest Southern Alignment
County: San Mateo
City/Location: Half Moon Bay
LCP (if applicable): Half Moon Bay
Applicant/Owner: Coastside Land Trust
☐ LRR A (Western Mts., Valley, and Coast [WMVC])
WRA Investigator(s): Stephanie Freed, David Zwick
☑ LRR C (Arid West)
Date: 1.27.16
SAMPLE POINT ID: SP 17
HABITAT:

CCC/LCP WETLAND DETERMINATION

	Yes	No
Meets CCC or LCP vegetation criteria?	☑	☐
Meets CCC or LCP hydric soil criteria?	☐	☑
Meets CCC or LCP hydrology criteria?	☐	☑
CCC/LCP WETLAND?	☐	☑

Comments: Sample point located within upland coastal field. While SP point met wetland indicators for hydrophytic vegetation, dominant vegetation is invasive grass ubiquitous within California landscape, especially coastal areas with fog influence. SP did not meet wetland indicators for hydric soils or wetland hydrology. Sample point taken 48 hours after last rain event. SP paired with SP 16.

VEGETATION

*indicator status from the USFWS 1996 National List of wetland species

TREES - Plot size: 30x30	% Cover	Status*	Dominant?
TOTAL			

50% of stratum cover = *20% =*

SAPLING/SHRUBS - Plot size: 30x30	% Cover	Status*	Dominant?
TOTAL			

50% of stratum cover = *20% =*

HERBACEOUS - Plot size: 10x10	% Cover	Status*	Dominant?
Holcus lanatus	60	FAC	Y
Geranium dissectum	10	UPL	N
Helminthotheca echioides	5	FACU	N
TOTAL	75.0		0

50% of stratum cover = *37.5* *20% =* *15.0*

Dominance Test:

Total # of dominant species across all strata: 1

Total # of dominants that are hydrophytic (status of OBL, FACW, or FAC): 1

Percentage of dominants that are hydrophytic: 100%

[Meets dominance test if >50%]

Prevalence Index:

Total % cover of species across all strata:

OBL: ______ x 1 = ______
FACW: ______ x 2 = ______
FAC: ______ x 3 = ______
FACU: ______ x 4 = ______
UPL: ______ x 5 = ______

Total: ______ (A) ______ (B)

Prevalence Index (B/A) =

[Hydrophytic vegetation dominant if B/A ≤ 3.0]

Meets CCC or LCP hydrophytic vegetation criteria? ☑ Yes ☐ No

Comments: Sample point is dominated by FAC species and meets dominance test for hydrophytic vegetation. However, Holcus lanatus is an invasive grass ubiquitous within California landscape, especially coastal areas with fog influence, and is not indicative of wetland conditions.

Project Name: ______Wavecrest South________________________ Sample Point ID: ____SP 17 __________

SOILS Slope (%): 0 Soil map unit: Watsonville Sandy Loam

SOIL PROFILE

Depth	Matrix Color	Redox Color	% and contrast	Redox type	Texture	Comments
0-9	7.5YR 4/2				Silty Loam	
9-14	7.5YR 4/2	5YR 4/6	6	c	Silty Clay	

All soils:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) *[Arid West only]*
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ **Other (explain below)**

Loamy and clayey soils only:

- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9) *[Arid West only]*

Sandy soils only:

- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)

Test indicators (NRCS v7):

- ☐ 2 cm Muck (A10) *[WMVC only]*
- ☐ Very Shallow Dark Surface (TF12)

Meets CCC or LCP hydric soil criteria? ☐ Yes ☑ No

Comments: Sample point does not meet any hydric soil indicators.

HYDROLOGY (indicators from Corps Regional Supplements, applicable to coastal California only)

Primary indicators (only 1 needed to meet criteria):

- ☐ Surface water (A1) *Depth (in.):* ________
- ☐ High water table (A2) *Depth (in.):* ________
- ☐ Soil saturation (A3) *Depth (in.):* ________
- ☐ Water marks (B1) *[if in Arid West: Nonriverine only]*
- ☐ Sediment deposits (B2) *[if in Arid West: Nonriverine only]*
- ☐ Drift deposits (B3) *[if in Arid West: Nonriverine only]*
- ☐ Algal mat or crust (B4) *[WMVC only; see B12]*
- ☐ Iron deposits (B5) *[WMVC only]*
- ☐ Surface soil cracks (B6)
- ☐ Inundation visible on aerial imagery (B7)
- ☐ Sparsely vegetated concave surface (B8) *[WMVC only]*
- ☐ Water-stained leaves (B9) *[Arid West and MLRA 5 only]*
- ☐ Salt crust (B11)
- ☐ Biotic Crust (B12) *[Arid West only; see B4]*
- ☐ Aquatic invertebrates (B13)
- ☐ Hydrogen sulfide odor (C1)
- ☐ Oxidized rhizospheres (C3)
- ☐ Presence of reduced iron (C4)
- ☐ Recent iron reduction in tilled soils (C6)
- ☐ Stunted or stressed plants (D1) *[WMVC only]*

Secondary indicators (need 2+ to meet criteria):

- ☐ Water marks (B1) *[Arid West riverine only]*
- ☐ Sediment deposits (B2) *[Arid West riverine only]*
- ☐ Drift deposits (B3) *[Arid West riverine only]*
- ☐ Water-stained leaves (B9) *[WMVC:MLRA 4B only]*
- ☐ Drainage patterns (B10)
- ☐ Dry-season water table (C2)
- ☐ Thin muck surface (C7) *[Arid West only]*
- ☐ Crayfish burrows (C8) *[Arid West only]*
- ☐ Saturation visible on aerial imagery (C9)
- ☐ Geomorphic position (D2) *[WMVC only]*
- ☐ Shallow aquitard (D3)
- ☐ Frost-heave hummocks (D4) *[WMVC only]*
- ☐ Raised ant mounds (D6) *[WMVC only]*
- ☐ **FAC-neutral test (D5)** ☐ (Does not meet test)

☐ **Other (explain below)**

Meets CCC or LCP wetland hydrology criteria? ☐ Yes ☑ No

Comments: While water table present at 5" below ground surface, this is likely reflective of approximately 2.73 inches of rain within the eight days preceding the site visit and is not indicative of wetland hydrology conditions.

Project Name: ______Wavecrest South______________________________Sample Point ID: ____SP 18__________

Project Name:	Wavecrest Southern Alignment	County:	San Mateo
City/Location:	Half Moon Bay	LCP (if applicable):	Half Moon Bay
Applicant/Owner:	Coastside Land Trust	[ ] LRR A (Western Mts., Valley, and Coast [WMVC])	
WRA Investigator(s):	Stephanie Freed	[x] LRR C (Arid West)	
Date:	2.9.16	**SAMPLE POINT ID:**	SP 18
		HABITAT:	

CCC/LCP WETLAND DETERMINATION

Meets CCC or LCP vegetation criteria? [ ] Yes [x] No
Meets CCC or LCP hydric soil criteria? [ ] Yes [x] No
Meets CCC or LCP hydrology criteria? [x] Yes [ ] No
CCC/LCP WETLAND? [x] Yes [ ] No

Comments: Sample point located within swale on a coastal field. The sample point did not meet wetland indicators for hydrophytic vegetation or hydric soils but contained wetland indicator for wetland hydrology including water table present at 3" below ground surface. Sample point taken 14 days after last rain event. Sample point paired with SP 19.

VEGETATION

*indicator status from the USFWS 1996 National List of wetland species

TREES - Plot size: 30x30	% Cover	Status*	Dominant?
TOTAL			

50% of stratum cover = *20% =*

SAPLING/SHRUBS - Plot size: 30x30	% Cover	Status*	Dominant?
TOTAL			

50% of stratum cover = *20% =*

HERBACEOUS - Plot size: 1x10	% Cover	Status*	Dominant?
Rumex crispus	30	FAC	Y
Helminthotheca echioides	30	FACU	Y
Festuca perennis	10	FAC	N
Geranium dissectum	5	UPL	N
Mentha pulegium	5	OBL	N
TOTAL	80.0		0

50% of stratum cover = 40.0 *20% = 16.0*

Dominance Test:

Total # of dominant species across all strata: 2

Total # of dominants that are hydrophytic (status of OBL, FACW, or FAC): 1

Percentage of dominants that are hydrophytic: 50%

[Meets dominance test if >50%]

Prevalence Index:

Total % cover of species across all strata:

OBL:		x 1 =	
FACW:		x 2 =	
FAC:		x 3 =	
FACU:		x 4 =	
UPL:		x 5 =	
Total:	(A)		(B)

Prevalence Index (B/A) =

[Hydrophytic vegetation dominant if B/A ≤ 3.0]

Meets CCC or LCP hydrophytic vegetation criteria? [ ] Yes [x] No

Comments: Sample point is dominated by FAC and FACU species and does not meet any hydrophytic vegetation indicators.

California Coastal Act Wetland Data Sheet

SOILS Slope (%): 0-2 Soil map unit: Watsonville loam, nearly level

SOIL PROFILE

Depth	Matrix Color	Redox Color	% and contrast	Redox type	Texture	Comments
0-2	10YR 2/2				Silt Loam	Saturated, mucky
2-14	10YR 3/2				Silt Loam	Saturated, mucky

All soils:
- [ ] Histosol (A1)
- [ ] Histic Epipedon (A2)
- [ ] Black Histic (A3)
- [ ] Hydrogen Sulfide (A4)
- [ ] Stratified Layers (A5) *[Arid West only]*
- [ ] Depleted Below Dark Surface (A11)
- [ ] Thick Dark Surface (A12)
- [ ] **Other (explain below)**

Loamy and clayey soils only:
- [ ] Loamy Mucky Mineral (F1)
- [ ] Loamy Gleyed Matrix (F2)
- [ ] Depleted Matrix (F3)
- [ ] Redox Dark Surface (F6)
- [ ] Depleted Dark Surface (F7)
- [ ] Redox Depressions (F8)
- [ ] Vernal Pools (F9) *[Arid West only]*

Sandy soils only:
- [ ] Sandy Mucky Mineral (S1)
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)
- [ ] Stripped Matrix (S6)

Test indicators (NRCS v7):
- [ ] 2 cm Muck (A10) *[WMVC only]*
- [ ] Very Shallow Dark Surface (TF12)

Meets CCC or LCP hydric soil criteria? [ ] Yes [x] No

Comments: Sample point does not meet any hydric soil indicators.

HYDROLOGY (indicators from Corps Regional Supplements, applicable to coastal California only)

Primary indicators (only 1 needed to meet criteria):
- [ ] Surface water (A1) *Depth (in.):*
- [x] High water table (A2) *Depth (in.):* 3"
- [ ] Soil saturation (A3) *Depth (in.):*
- [ ] Water marks (B1) *[if in Arid West: Nonriverine only]*
- [ ] Sediment deposits (B2) *[if in Arid West: Nonriverine only]*
- [ ] Drift deposits (B3) *[if in Arid West: Nonriverine only]*
- [ ] Algal mat or crust (B4) *[WMVC only; see B12]*
- [ ] Iron deposits (B5) *[WMVC only]*
- [ ] Surface soil cracks (B6)
- [ ] Inundation visible on aerial imagery (B7)
- [ ] Sparsely vegetated concave surface (B8) *[WMVC only]*
- [ ] Water-stained leaves (B9) *[Arid West and MLRA 5 only]*
- [ ] Salt crust (B11)
- [x] Biotic Crust (B12) *[Arid West only; see B4]*
- [ ] Aquatic invertebrates (B13)
- [ ] Hydrogen sulfide odor (C1)
- [ ] Oxidized rhizospheres (C3)
- [ ] Presence of reduced iron (C4)
- [ ] Recent iron reduction in tilled soils (C6)
- [ ] Stunted or stressed plants (D1) *[WMVC only]*

Secondary indicators (need 2+ to meet criteria):
- [ ] Water marks (B1) *[Arid West riverine only]*
- [ ] Sediment deposits (B2) *[Arid West riverine only]*
- [ ] Drift deposits (B3) *[Arid West riverine only]*
- [ ] Water-stained leaves (B9) *[WMVC:MLRA 4B only]*
- [ ] Drainage patterns (B10)
- [ ] Dry-season water table (C2)
- [ ] Thin muck surface (C7) *[Arid West only]*
- [ ] Crayfish burrows (C8) *[Arid West only]*
- [ ] Saturation visible on aerial imagery (C9)
- [ ] Geomorphic position (D2) *[WMVC only]*
- [ ] Shallow aquitard (D3)
- [ ] Frost-heave hummocks (D4) *[WMVC only]*
- [ ] Raised ant mounds (D6) *[WMVC only]*
- [ ] **FAC-neutral test (D5)** [ ] (Does not meet test)

- [ ] **Other (explain below)**

Meets CCC or LCP wetland hydrology criteria? [x] Yes [ ] No

Comments: Wetland hydrology indicators observed at the sample point included high water table at 3" below ground surface and biotic crust.

California Coastal Act Wetland Data Sheet

Project Name:	Wavecrest Southern Alignment	County:	San Mateo
City/Location:	Half Moon Bay	LCP (if applicable):	Half Moon Bay
Applicant/Owner:	Coastside Land Trust	☐ LRR A (Western Mts., Valley, and Coast [WMVC])	
WRA Investigator(s):	Stephanie Freed	☑ LRR C (Arid West)	
Date:	2.09.16	**SAMPLE POINT ID:**	SP 19
		HABITAT:	

CCC/LCP WETLAND DETERMINATION

	Yes	No
Meets CCC or LCP vegetation criteria?	☐	☑
Meets CCC or LCP hydric soil criteria?	☐	☑
Meets CCC or LCP hydrology criteria?	☑	☐
CCC/LCP WETLAND?	☑	☐

Comments: Sample point located adjacent to upland swale (SP 18) within upland coastal field. The sample point did not contain wetland indicators for hydrophytic vegetation, hydric soils; however, indicators of wetland hydrology were observed including water table at 4" below ground surface. Sample point taken 14 days after last rain event. Sample point paired with SP 18.

VEGETATION

*indicator status from the USFWS 1996 National List of wetland species

TREES - Plot size: 30x30	% Cover	Status*	Dominant?
TOTAL			SP

50% of stratum cover = *20% =*

SAPLING/SHRUBS - Plot size: 30x30	% Cover	Status*	Dominant?
TOTAL			

50% of stratum cover = *20% =*

HERBACEOUS - Plot size: 10x10	% Cover	Status*	Dominant?
Helminthotheca echioides	60	FACU	Y
Geranium dissectum	20	UPL	Y
Rumex crispus	2	FAC	N
TOTAL	82.0		0

50% of stratum cover = *41.0* *20% =* *16.4*

Dominance Test:

Total # of dominant species across all strata: 2

Total # of dominants that are hydrophytic (status of OBL, FACW, or FAC): 0

Percentage of dominants that are hydrophytic: 0%

[Meets dominance test if >50%]

Prevalence Index:

Total % cover of species across all strata:

OBL:		x 1 =	
FACW:		x 2 =	
FAC:		x 3 =	
FACU:		x 4 =	
UPL:		x 5 =	
Total:	(A)		(B)

Prevalence Index (B/A) =

[Hydrophytic vegetation dominant if B/A ≤ 3.0]

Meets CCC or LCP hydrophytic vegetation criteria? ☐ Yes ☑ No

Comments: Sample point is dominated by FACU and UPL species and does not meet any hydrophytic vegetation indicators.

Project Name: ______Wavecrest South________________________ Sample Point ID: ____SP 19 __________

SOILS Slope (%): 0 Soil map unit: Watsonville loam, nearly level

SOIL PROFILE

Depth	Matrix Color	Redox Color	% and contrast	Redox type	Texture	Comments
0-12	7.5YR 3/1				Loam	moist starting at 6"
12-14	7.5YR 3/1				Silt Loam	Saturated, some gravel

All soils:
- [ ] Histosol (A1)
- [ ] Histic Epipedon (A2)
- [ ] Black Histic (A3)
- [ ] Hydrogen Sulfide (A4)
- [ ] Stratified Layers (A5) *[Arid West only]*
- [ ] Depleted Below Dark Surface (A11)
- [ ] Thick Dark Surface (A12)
- [ ] **Other (explain below)**

Loamy and clayey soils only:
- [ ] Loamy Mucky Mineral (F1)
- [ ] Loamy Gleyed Matrix (F2)
- [ ] Depleted Matrix (F3)
- [ ] Redox Dark Surface (F6)
- [ ] Depleted Dark Surface (F7)
- [ ] Redox Depressions (F8)
- [ ] Vernal Pools (F9) *[Arid West only]*

Sandy soils only:
- [ ] Sandy Mucky Mineral (S1)
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)
- [ ] Stripped Matrix (S6)

Test indicators (NRCS v7):
- [ ] 2 cm Muck (A10) *[WMVC only]*
- [ ] Very Shallow Dark Surface (TF12)

Meets CCC or LCP hydric soil criteria? [ ] Yes [x] No

Comments: Sample point does not meet any hydric soil indicators.

HYDROLOGY (indicators from Corps Regional Supplements, applicable to coastal California only)

Primary indicators (only 1 needed to meet criteria):
- [ ] Surface water (A1) *Depth (in.):* ______
- [x] High water table (A2) *Depth (in.):* 4"
- [ ] Soil saturation (A3) *Depth (in.):* ______
- [ ] Water marks (B1) *[if in Arid West: Nonriverine only]*
- [ ] Sediment deposits (B2) *[if in Arid West: Nonriverine only]*
- [ ] Drift deposits (B3) *[if in Arid West: Nonriverine only]*
- [ ] Algal mat or crust (B4) *[WMVC only; see B12]*
- [ ] Iron deposits (B5) *[WMVC only]*
- [ ] Surface soil cracks (B6)
- [ ] Inundation visible on aerial imagery (B7)
- [ ] Sparsely vegetated concave surface (B8) *[WMVC only]*
- [ ] Water-stained leaves (B9) *[Arid West and MLRA 5 only]*
- [ ] Salt crust (B11)
- [ ] Biotic Crust (B12) *[Arid West only; see B4]*
- [ ] Aquatic invertebrates (B13)
- [ ] Hydrogen sulfide odor (C1)
- [ ] Oxidized rhizospheres (C3)
- [ ] Presence of reduced iron (C4)
- [ ] Recent iron reduction in tilled soils (C6)
- [ ] Stunted or stressed plants (D1) *[WMVC only]*

Secondary indicators (need 2+ to meet criteria):
- [ ] Water marks (B1) *[Arid West riverine only]*
- [ ] Sediment deposits (B2) *[Arid West riverine only]*
- [ ] Drift deposits (B3) *[Arid West riverine only]*
- [ ] Water-stained leaves (B9) *[WMVC:MLRA 4B only]*
- [ ] Drainage patterns (B10)
- [ ] Dry-season water table (C2)
- [ ] Thin muck surface (C7) *[Arid West only]*
- [ ] Crayfish burrows (C8) *[Arid West only]*
- [ ] Saturation visible on aerial imagery (C9)
- [ ] Geomorphic position (D2) *[WMVC only]*
- [ ] Shallow aquitard (D3)
- [ ] Frost-heave hummocks (D4) *[WMVC only]*
- [ ] Raised ant mounds (D6) *[WMVC only]*
- [ ] **FAC-neutral test (D5)** [ ] (Does not meet test)

- [ ] **Other (explain below)**

Meets CCC or LCP wetland hydrology criteria? [x] Yes [ ] No

Comments: Wetland hydrology indicators observed at the sample point included high water table present at 4" below ground surface.

Project Name: ______Wavecrest South________________________________Sample Point ID: ____SP 20 __________

Project Name:	Wavecrest Southern Alignment	County:	San Mateo
City/Location:	Half Moon Bay	LCP (if applicable):	Half Moon Bay
Applicant/Owner:	Coastside Land Trust	☐ LRR A (Western Mts., Valley, and Coast [WMVC])	
WRA Investigator(s):	Stephanie Freed	☑ LRR C (Arid West)	
Date:	2.09.16	**SAMPLE POINT ID:**	SP 20
		HABITAT:	

CCC/LCP WETLAND DETERMINATION

	Yes	No
Meets CCC or LCP vegetation criteria?	☐	☑
Meets CCC or LCP hydric soil criteria?	☐	☑
Meets CCC or LCP hydrology criteria?	☐	☑
CCC/LCP WETLAND?	☐	☑

Comments: Sample point located within upland coastal field. Sample point did not meet wetland indicators for hydrophytic vegetation, hydric soils, and wetland hydrology. Sample point taken 14 days after last rain event.

VEGETATION

*indicator status from the USFWS 1996 National List of wetland species

TREES - Plot size: 30x30	% Cover	Status*	Dominant?
TOTAL			
50% of stratum cover =		*20% =*	

SAPLING/SHRUBS - Plot size: 10x10	% Cover	Status*	Dominant?
Baccharis pilularis	30	UPL	Y
TOTAL	30.0		0
50% of stratum cover =	*15.0*	*20% =*	*6.0*

HERBACEOUS - Plot size: 10x10	% Cover	Status*	Dominant?
Juncus patens	70	FACW	Y
Scrophularia californica	+	FAC	N
Galium aparine	+	FACU	N
Plagiobothrys chorisianus	+	OBL	N
TOTAL	70.0		0
50% of stratum cover =	*35.0*	*20% =*	*14.0*

Dominance Test:

Total # of dominant species across all strata: 2

Total # of dominants that are hydrophytic (status of OBL, FACW, or FAC): 1

Percentage of dominants that are hydrophytic: 50%

[Meets dominance test if >50%]

Prevalence Index:

Total % cover of species across all strata:

OBL:		x 1 =	
FACW:		x 2 =	
FAC:		x 3 =	
FACU:		x 4 =	
UPL:		x 5 =	
Total:	(A)		(B)

Prevalence Index (B/A) =

[Hydrophytic vegetation dominant if B/A ≤ 3.0]

Meets CCC or LCP hydrophytic vegetation criteria? ☐ Yes ☑ No

Comments: Sample point is dominated by FACW and UPL species and does not meet any hydrophytic vegetation indicators. For absolute % cover. "+" indicates a trace occurrence.

California Coastal Act Wetland Data Sheet

SOILS Slope (%): 0 Soil map unit: Watsonville, sandy loam, gently sloping

SOIL PROFILE

Depth	Matrix Color	Redox Color	% and contrast	Redox type	Texture	Comments
0-14	7.5YR 3/2	100			Silt Loam	traces of fine sand, moist

All soils:
- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) *[Arid West only]*
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ **Other (explain below)**

Loamy and clayey soils only:
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9) *[Arid West only]*

Sandy soils only:
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)

Test indicators (NRCS v7):
- ☐ 2 cm Muck (A10) *[WMVC only]*
- ☐ Very Shallow Dark Surface (TF12)

Meets CCC or LCP hydric soil criteria? ☐ Yes ☑ No

Comments: Sample point does not meet any hydric soil indicators.

HYDROLOGY (indicators from Corps Regional Supplements, applicable to coastal California only)

Primary indicators (only 1 needed to meet criteria):
- ☐ Surface water (A1) *Depth (in.):* ______
- ☐ High water table (A2) *Depth (in.):* ______
- ☐ Soil saturation (A3) *Depth (in.):* ______
- ☐ Water marks (B1) *[if in Arid West: Nonriverine only]*
- ☐ Sediment deposits (B2) *[if in Arid West: Nonriverine only]*
- ☐ Drift deposits (B3) *[if in Arid West: Nonriverine only]*
- ☐ Algal mat or crust (B4) *[WMVC only; see B12]*
- ☐ Iron deposits (B5) *[WMVC only]*
- ☐ Surface soil cracks (B6)
- ☐ Inundation visible on aerial imagery (B7)
- ☐ Sparsely vegetated concave surface (B8) *[WMVC only]*
- ☐ Water-stained leaves (B9) *[Arid West and MLRA 5 only]*
- ☐ Salt crust (B11)
- ☐ Biotic Crust (B12) *[Arid West only; see B4]*
- ☐ Aquatic invertebrates (B13)
- ☐ Hydrogen sulfide odor (C1)
- ☐ Oxidized rhizospheres (C3)
- ☐ Presence of reduced iron (C4)
- ☐ Recent iron reduction in tilled soils (C6)
- ☐ Stunted or stressed plants (D1) *[WMVC only]*
- ☐ **Other (explain below)**

Secondary indicators (need 2+ to meet criteria):
- ☐ Water marks (B1) *[Arid West riverine only]*
- ☐ Sediment deposits (B2) *[Arid West riverine only]*
- ☐ Drift deposits (B3) *[Arid West riverine only]*
- ☐ Water-stained leaves (B9) *[WMVC:MLRA 4B only]*
- ☐ Drainage patterns (B10)
- ☐ Dry-season water table (C2)
- ☐ Thin muck surface (C7) *[Arid West only]*
- ☐ Crayfish burrows (C8) *[Arid West only]*
- ☐ Saturation visible on aerial imagery (C9)
- ☐ Geomorphic position (D2) *[WMVC only]*
- ☐ Shallow aquitard (D3)
- ☐ Frost-heave hummocks (D4) *[WMVC only]*
- ☐ Raised ant mounds (D6) *[WMVC only]*
- ☐ **FAC-neutral test (D5)** (Does not meet test)

Meets CCC or LCP wetland hydrology criteria? ☐ Yes ☑ No

Comments: Sample point does not meet criteria for hydrology indicators.

Project Name: ______Wavecrest South______________________ Sample Point ID: ____SP _21_________

Project Name:	Wavecrest Southern Alignment	County:	San Mateo
City/Location:	Half Moon Bay	LCP (if applicable):	Half Moon Bay
Applicant/Owner:	Coastside Land Trust	☐	LRR A (Western Mts., Valley, and Coast [WMVC])
WRA Investigator(s):	Stephanie Freed	☑	LRR C (Arid West)
Date:	2.16.16	**SAMPLE POINT ID:**	SP 21
		HABITAT:	

CCC/LCP WETLAND DETERMINATION

	Yes	No
Meets CCC or LCP vegetation criteria?	☐	☑
Meets CCC or LCP hydric soil criteria?	☐	☑
Meets CCC or LCP hydrology criteria?	☑	☐
CCC/LCP WETLAND?	☑	☐

Comments: Sample point located within coastal field with no topographical feature. The sample point did not meet wetland indicators for hydrophytic vegetation or hydric soils but indicators of wetland hydrology were observed including water table at 10" below ground surface. Sample point taken 13 days after last rain event.

VEGETATION

*indicator status from the USFWS 1996 National List of wetland species

TREES - Plot size: 30x30	% Cover	Status*	Dominant?
TOTAL			
50% of stratum cover =		*20% =*	

SAPLING/SHRUBS - Plot size: 30x30	% Cover	Status*	Dominant?
TOTAL			
50% of stratum cover =		*20% =*	

HERBACEOUS - Plot size: 10x10	% Cover	Status*	Dominant?
Carex harfordii	50	OBL	Y
Helminthotheca echioides	25	FACU	Y
Geranium dissectum	15	UPL	N
Holcus lanatus	10	FAC	N
Vicea sativa	+	FACU	N
Rumex crispus	+	FAC	N
TOTAL	100.0		0
50% of stratum cover =	*50.0*	*20% =*	*20.0*

Dominance Test:

Total # of dominant species across all strata: 2

Total # of dominants that are hydrophytic (status of OBL, FACW, or FAC): 1

Percentage of dominants that are hydrophytic: 50%

[Meets dominance test if >50%]

Prevalence Index:

Total % cover of species across all strata:

OBL:		x 1 =	
FACW:		x 2 =	
FAC:		x 3 =	
FACU:		x 4 =	
UPL:		x 5 =	
Total:	(A)		(B)

Prevalence Index (B/A) =

[Hydrophytic vegetation dominant if B/A ≤ 3.0]

Meets CCC or LCP hydrophytic vegetation criteria? ☐ Yes ☑ No

Comments: Sample Point is dominated by OBL and FACU species and does not meet any hydrophytic vegetation indicators."+" indicates a trace occurrence.

California Coastal Act Wetland Data Sheet

SOILS Slope (%): ____ Soil map unit: Watsonville loam, nearly level

SOIL PROFILE

Depth	Matrix Color	Redox Color	% and contrast	Redox type	Texture	Comments
0-10	7.5YR 3/2				Silty Clay Loam	Moist
10-14	7.5YR 3/2				Clay	Saturated

All soils:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) *[Arid West only]*
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ **Other (explain below)**

Loamy and clayey soils only:

- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9) *[Arid West only]*

Sandy soils only:

- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)

Test indicators (NRCS v7):

- ☐ 2 cm Muck (A10) *[WMVC only]*
- ☐ Very Shallow Dark Surface (TF12)

Meets CCC or LCP hydric soil criteria? ☐ Yes ☑ No

Comments: Sample point does not meet any indicators for hydric soils.

HYDROLOGY (indicators from Corps Regional Supplements, applicable to coastal California only)

Primary indicators (only 1 needed to meet criteria):

- ☐ Surface water (A1) *Depth (in.):* ____
- ☑ High water table (A2) *Depth (in.):* 10"
- ☑ Soil saturation (A3) *Depth (in.):* 10"
- ☐ Water marks (B1) *[if in Arid West: Nonriverine only]*
- ☐ Sediment deposits (B2) *[if in Arid West: Nonriverine only]*
- ☐ Drift deposits (B3) *[if in Arid West: Nonriverine only]*
- ☐ Algal mat or crust (B4) *[WMVC only; see B12]*
- ☐ Iron deposits (B5) *[WMVC only]*
- ☐ Surface soil cracks (B6)
- ☐ Inundation visible on aerial imagery (B7)
- ☐ Sparsely vegetated concave surface (B8) *[WMVC only]*
- ☐ Water-stained leaves (B9) *[Arid West and MLRA 5 only]*
- ☐ Salt crust (B11)
- ☐ Biotic Crust (B12) *[Arid West only; see B4]*
- ☐ Aquatic invertebrates (B13)
- ☐ Hydrogen sulfide odor (C1)
- ☐ Oxidized rhizospheres (C3)
- ☐ Presence of reduced iron (C4)
- ☐ Recent iron reduction in tilled soils (C6)
- ☐ Stunted or stressed plants (D1) *[WMVC only]*

Secondary indicators (need 2+ to meet criteria):

- ☐ Water marks (B1) *[Arid West riverine only]*
- ☐ Sediment deposits (B2) *[Arid West riverine only]*
- ☐ Drift deposits (B3) *[Arid West riverine only]*
- ☐ Water-stained leaves (B9) *[WMVC:MLRA 4B only]*
- ☐ Drainage patterns (B10)
- ☐ Dry-season water table (C2)
- ☐ Thin muck surface (C7) *[Arid West only]*
- ☐ Crayfish burrows (C8) *[Arid West only]*
- ☐ Saturation visible on aerial imagery (C9)
- ☐ Geomorphic position (D2) *[WMVC only]*
- ☐ Shallow aquitard (D3)
- ☐ Frost-heave hummocks (D4) *[WMVC only]*
- ☐ Raised ant mounds (D6) *[WMVC only]*
- ☐ **FAC-neutral test (D5)** ☐ (Does not meet test)

☐ **Other (explain below)**

Meets CCC or LCP wetland hydrology criteria? ☑ Yes ☐ No

Comments: Wetland hydrology indicators observed at the sample point included high water table and saturation at 10" below ground surface.

Project Name: ______Wavecrest South______________________________ Sample Point ID: ____SP 22 __________

Project Name:	Wavecrest Southern Alignment	County:	San Mateo
City/Location:	Half Moon Bay	LCP (if applicable):	Half Moon Bay
Applicant/Owner:	Coastside Land Trust	☐ LRR A (Western Mts., Valley, and Coast [WMVC])	
WRA Investigator(s):	Stephanie Freed	☑ LRR C (Arid West)	
Date:	2.16.16	**SAMPLE POINT ID:**	SP 22
		HABITAT:	

CCC/LCP WETLAND DETERMINATION

Meets CCC or LCP vegetation criteria? ☑ Yes ☐ No
Meets CCC or LCP hydric soil criteria? ☑ Yes ☐ No
Meets CCC or LCP hydrology criteria? ☑ Yes ☐ No
CCC/LCP WETLAND? ☑ Yes ☐ No

Comments: Sample point located within hummocky coastal field. The sample point met wetland indicators for hydrophytic vegetation, hydric soils, and wetland hydrology. The wetland upland boundary was determined based on grade break, shift from Juncus phaeocephalus and Carex harfordii to Helminthotheca echioides and Holcus lanatus. Sample point taken more than 14 days after last rain event. Sample point paired with SP 23.

VEGETATION

*indicator status from the USFWS 1996 National List of wetland species

TREES - Plot size: 30x30	% Cover	Status*	Dominant?
TOTAL			
50% of stratum cover =		*20% =*	

SAPLING/SHRUBS - Plot size: 30x30	% Cover	Status*	Dominant?
TOTAL			
50% of stratum cover =		*20% =*	

HERBACEOUS - Plot size: 10x10	% Cover	Status*	Dominant?
Juncus phaeocephalus	80	FACW	Y
Carex harfordii	10	OBL	N
Holcus lanatus	5	FAC	N
Helminthotheca echioides	3	FACU	N
Rumex crispus	2	FAC	N
TOTAL	100.0		0
50% of stratum cover =	*50.0*	*20% =*	*20.0*

Dominance Test:

Total # of dominant species across all strata: 1

Total # of dominants that are hydrophytic (status of OBL, FACW, or FAC): 1

Percentage of dominants that are hydrophytic: 100%

[Meets dominance test if >50%]

Prevalence Index:

Total % cover of species across all strata:

OBL:		x 1 =	
FACW:		x 2 =	
FAC:		x 3 =	
FACU:		x 4 =	
UPL:		x 5 =	
Total:	(A)		(B)

Prevalence Index (B/A) =

[Hydrophytic vegetation dominant if B/A ≤ 3.0]

Meets CCC or LCP hydrophytic vegetation criteria? ☑ Yes ☐ No

Comments: Sample Point is dominated by FACW species and was determined to contain hydrophytic vegetation, as it meets the dominance test.

California Coastal Act Wetland Data Sheet

SOILS Slope (%): ______ Soil map unit: Watsonville loam, nearly level

SOIL PROFILE

Depth	Matrix Color	Redox Color	% and contrast	Redox type	Texture	Comments
0-6	7.5YR 4/2	5Y 4/6	15	C	Clay	Saturated
6-14	7.5YR 4/1	7.5YR 4/4	5	C	Clay	

All soils:
- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) *[Arid West only]*
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ **Other (explain below)**

Loamy and clayey soils only:
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9) *[Arid West only]*

Sandy soils only:
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)

Test indicators (NRCS v7):
- ☐ 2 cm Muck (A10) *[WMVC only]*
- ☐ Very Shallow Dark Surface (TF12)

Meets CCC or LCP hydric soil criteria? ☑ Yes ☐ No

Comments: Sample point meets criteria for hydric soil indicator F3 (Depleted Matrix).

HYDROLOGY (indicators from Corps Regional Supplements, applicable to coastal California only)

Primary indicators (only 1 needed to meet criteria):
- ☐ Surface water (A1) *Depth (in.):* ______
- ☑ High water table (A2) *Depth (in.):* 6"
- ☐ Soil saturation (A3) *Depth (in.):* ______
- ☐ Water marks (B1) *[if in Arid West: Nonriverine only]*
- ☐ Sediment deposits (B2) *[if in Arid West: Nonriverine only]*
- ☐ Drift deposits (B3) *[if in Arid West: Nonriverine only]*
- ☐ Algal mat or crust (B4) *[WMVC only; see B12]*
- ☐ Iron deposits (B5) *[WMVC only]*
- ☐ Surface soil cracks (B6)
- ☐ Inundation visible on aerial imagery (B7)
- ☐ Sparsely vegetated concave surface (B8) *[WMVC only]*
- ☐ Water-stained leaves (B9) *[Arid West and MLRA 5 only]*
- ☐ Salt crust (B11)
- ☐ Biotic Crust (B12) *[Arid West only; see B4]*
- ☑ Aquatic invertebrates (B13)
- ☐ Hydrogen sulfide odor (C1)
- ☑ Oxidized rhizospheres (C3)
- ☐ Presence of reduced iron (C4)
- ☐ Recent iron reduction in tilled soils (C6)
- ☐ Stunted or stressed plants (D1) *[WMVC only]*

Secondary indicators (need 2+ to meet criteria):
- ☐ Water marks (B1) *[Arid West riverine only]*
- ☐ Sediment deposits (B2) *[Arid West riverine only]*
- ☐ Drift deposits (B3) *[Arid West riverine only]*
- ☐ Water-stained leaves (B9) *[WMVC:MLRA 4B only]*
- ☐ Drainage patterns (B10)
- ☐ Dry-season water table (C2)
- ☐ Thin muck surface (C7) *[Arid West only]*
- ☐ Crayfish burrows (C8) *[Arid West only]*
- ☐ Saturation visible on aerial imagery (C9)
- ☐ Geomorphic position (D2) *[WMVC only]*
- ☐ Shallow aquitard (D3)
- ☐ Frost-heave hummocks (D4) *[WMVC only]*
- ☐ Raised ant mounds (D6) *[WMVC only]*
- ☐ **FAC-neutral test (D5)** ☐ (Does not meet test)

☐ **Other (explain below)**

Meets CCC or LCP wetland hydrology criteria? ☑ Yes ☐ No

Comments: Wetland hydrology indicators observed at the sample point included high water table at 6" below ground surface, oxidized rhizospheres along living roots and aquatic invertebrates.

California Coastal Act Wetland Data Sheet

Project Name:	Wavecrest Southern Alignment	County:	San Mateo
City/Location:	Half Moon Bay	LCP (if applicable):	Half Moon Bay
Applicant/Owner:	Coastside Land Trust	☐ LRR A (Western Mts., Valley, and Coast [WMVC])	
WRA Investigator(s):	Stephanie Freed	☑ LRR C (Arid West)	
Date:	2.16.16	**SAMPLE POINT ID:**	SP 23
		HABITAT:	

CCC/LCP WETLAND DETERMINATION

	Yes	No
Meets CCC or LCP vegetation criteria?	☐	☑
Meets CCC or LCP hydric soil criteria?	☐	☑
Meets CCC or LCP hydrology criteria?	☐	☑
CCC/LCP WETLAND?	☐	☑

Comments: Sample point located within upland field adjacent to hummocky wetland feature (SP 22). Sample point did not meet wetland indicators for hydrophytic vegetation, hydric soils, or wetland hydrology. Sample point taken more than 14 days after last rain event.

VEGETATION

*indicator status from the USFWS 1996 National List of wetland species

TREES - Plot size: 30x30	% Cover	Status*	Dominant?
TOTAL			
50% of stratum cover =		*20% =*	

SAPLING/SHRUBS - Plot size: 30x30	% Cover	Status*	Dominant?
TOTAL			
50% of stratum cover =		*20% =*	

HERBACEOUS - Plot size: 10x10	% Cover	Status*	Dominant?
Helminthotheca echioides	30	FACU	Y
Holcus lanatus	30	FAC	Y
Geranium dissectum	20	UPL	Y
Rumex acetosell	10	FACU	N
Carex harfordii	5	OBL	N
Juncas patens	3	FACW	N
Cirsium vulgare	1	FACU	N
Rubus ursinus	+	FAC	N
TOTAL	99.0		0
50% of stratum cover =	*49.5*	*20% =*	*19.8*

Dominance Test:

Total # of dominant species across all strata: 3

Total # of dominants that are hydrophytic (status of OBL, FACW, or FAC): 1

Percentage of dominants that are hydrophytic: 33%

[Meets dominance test if >50%]

Prevalence Index:

Total % cover of species across all strata:

OBL:		x 1 =	
FACW:		x 2 =	
FAC:		x 3 =	
FACU:		x 4 =	
UPL:		x 5 =	
Total:	(A)		(B)

Prevalence Index (B/A) =

[Hydrophytic vegetation dominant if B/A ≤ 3.0]

Meets CCC or LCP hydrophytic vegetation criteria? ☐ Yes ☑ No

Comments: Sample Point is dominated by FAC, FACU and UPL species and does not meet any hydrophytic vegetation indicators."+" indicates a trace occurrence.

Project Name: ______Wavecrest South______________________________ Sample Point ID: ____SP 23 ___________

SOILS Slope (%): ___________ Soil map unit: Watsonville loam, nearly level

SOIL PROFILE

Depth	Matrix Color	Redox Color	% and contrast	Redox type	Texture	Comments
0-14	10YR 4/2				Clay Loam	Moist

All soils:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5) *[Arid West only]*
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ **Other (explain below)**

Loamy and clayey soils only:

☐ Loamy Mucky Mineral (F1)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Vernal Pools (F9) *[Arid West only]*

Sandy soils only:

☐ Sandy Mucky Mineral (S1)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)

Test indicators (NRCS v7):

☐ 2 cm Muck (A10) *[WMVC only]*
☐ Very Shallow Dark Surface (TF12)

Meets CCC or LCP hydric soil criteria? ☐ Yes ☑ No

Comments: Sample point does not meet any hydric soil indicators.

HYDROLOGY (indicators from Corps Regional Supplements, applicable to coastal California only)

Primary indicators (only 1 needed to meet criteria):

☐ Surface water (A1) *Depth (in.):* ___________
☐ High water table (A2) *Depth (in.):* ___________
☐ Soil saturation (A3) *Depth (in.):* ___________
☐ Water marks (B1) *[if in Arid West: Nonriverine only]*
☐ Sediment deposits (B2) *[if in Arid West: Nonriverine only]*
☐ Drift deposits (B3) *[if in Arid West: Nonriverine only]*
☐ Algal mat or crust (B4) *[WMVC only; see B12]*
☐ Iron deposits (B5) *[WMVC only]*
☐ Surface soil cracks (B6)
☐ Inundation visible on aerial imagery (B7)
☐ Sparsely vegetated concave surface (B8) *[WMVC only]*
☐ Water-stained leaves (B9) *[Arid West and MLRA 5 only]*
☐ Salt crust (B11)
☐ Biotic Crust (B12) *[Arid West only; see B4]*
☐ Aquatic invertebrates (B13)
☐ Hydrogen sulfide odor (C1)
☐ Oxidized rhizospheres (C3)
☐ Presence of reduced iron (C4)
☐ Recent iron reduction in tilled soils (C6)
☐ Stunted or stressed plants (D1) *[WMVC only]*

Secondary indicators (need 2+ to meet criteria):

☐ Water marks (B1) *[Arid West riverine only]*
☐ Sediment deposits (B2) *[Arid West riverine only]*
☐ Drift deposits (B3) *[Arid West riverine only]*
☐ Water-stained leaves (B9) *[WMVC:MLRA 4B only]*
☐ Drainage patterns (B10)
☐ Dry-season water table (C2)
☐ Thin muck surface (C7) *[Arid West only]*
☐ Crayfish burrows (C8) *[Arid West only]*
☐ Saturation visible on aerial imagery (C9)
☐ Geomorphic position (D2) *[WMVC only]*
☐ Shallow aquitard (D3)
☐ Frost-heave hummocks (D4) *[WMVC only]*
☐ Raised ant mounds (D6) *[WMVC only]*
☐ **FAC-neutral test (D5)** ☐ (Does not meet test)

☐ **Other (explain below)**

Meets CCC or LCP wetland hydrology criteria? ☐ Yes ☑ No

Comments: Sample point does not meet criteria for hydrology indicators.

Project Name: ______Wavecrest South______________________________ Sample Point ID: ____SP 24__________

Project Name:	Wavecrest Southern Alignment	County:	San Mateo
City/Location:	Half Moon Bay	LCP (if applicable):	Half Moon Bay
Applicant/Owner:	Coastside Land Trust	☐	LRR A (Western Mts., Valley, and Coast [WMVC])
WRA Investigator(s):	Stephanie Freed	☑	LRR C (Arid West)
Date:	2.16.16	**SAMPLE POINT ID:**	SP 24
		HABITAT:	

CCC/LCP WETLAND DETERMINATION

Meets CCC or LCP vegetation criteria?	☑ Yes	☐ No
Meets CCC or LCP hydric soil criteria?	☑ Yes	☐ No
Meets CCC or LCP hydrology criteria?	☑ Yes	☐ No
CCC/LCP WETLAND?	☑ Yes	☐ No

Comments: Sample point located within low-lying area on a coastal field. Sample point met wetland indicators for hydrophytic vegetation, hydric soils, and wetland hydrology including biotic crust. The wetland upland boundary was determined based on grade break and shift from Baccharis pilularis/Juncus patens to Mentha pulegium/Carex harfordii. Sample point taken more than 14 days after last rain event. Sample point paired with SP 20 from 2-9-16.

VEGETATION

*indicator status from the USFWS 1996 National List of wetland species

TREES - Plot size: 30x30	% Cover	Status*	Dominant?
TOTAL			
50% of stratum cover =		*20% =*	

SAPLING/SHRUBS - Plot size: 30x30	% Cover	Status*	Dominant?
TOTAL			
50% of stratum cover =		*20% =*	

HERBACEOUS - Plot size: 10x10	% Cover	Status*	Dominant?
Carex harfordii	20	OBL	Y
Mentha pulegium	20	OBL	Y
Juncas patens	20	FACW	Y
Holcus lanatus	15	FAC	N
Polypogon monspeliensis	10	FACW	N
Plagiobothrys chorisianus	2	OBL	N
TOTAL	87.0		0
50% of stratum cover =	*43.5*	*20% =*	*17.4*

Dominance Test:

Total # of dominant species across all strata: 3

Total # of dominants that are hydrophytic (status of OBL, FACW, or FAC): 3

Percentage of dominants that are hydrophytic: 100%

[Meets dominance test if >50%]

Prevalence Index:

Total % cover of species across all strata:

OBL:		x 1 =	
FACW:		x 2 =	
FAC:		x 3 =	
FACU:		x 4 =	
UPL:		x 5 =	
Total:	(A)		(B)

Prevalence Index (B/A) =

[Hydrophytic vegetation dominant if B/A ≤ 3.0]

Meets CCC or LCP hydrophytic vegetation criteria? ☑ Yes ☐ No

Comments: Sample Point is dominated by FACW and OBL species and was determined to contain hydrophytic vegetation, as it meets the dominance test.

California Coastal Act Wetland Data Sheet

SOILS Slope (%): ____________ Soil map unit: Watsonville, sandy loam, gently sloping

SOIL PROFILE

Depth	Matrix Color	Redox Color	% and contrast	Redox type	Texture	Comments
0-10	7.5YR 4/2				Clay Loam	Moist
10-14	7.5YR 4/2				Clay	

All soils:
- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) *[Arid West only]*
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☑ **Other (explain below)**

Loamy and clayey soils only:
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9) *[Arid West only]*

Sandy soils only:
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)

Test indicators (NRCS v7):
- ☐ 2 cm Muck (A10) *[WMVC only]*
- ☐ Very Shallow Dark Surface (TF12)

Meets CCC or LCP hydric soil criteria? ☑ Yes ☐ No

Comments: While no hydric soil indicators were observed, this sample point contains naturally problematic seasonally ponded soils. Sample point occurs in a seasonally ponded depression with a restrictive clay layer and lacks hydric soil indicators due to limited saturation depth and saline conditions.

HYDROLOGY (indicators from Corps Regional Supplements, applicable to coastal California only)

Primary indicators (only 1 needed to meet criteria):
- ☐ Surface water (A1) *Depth (in.):* ____________
- ☐ High water table (A2) *Depth (in.):* ____________
- ☐ Soil saturation (A3) *Depth (in.):* ____________
- ☐ Water marks (B1) *[if in Arid West: Nonriverine only]*
- ☐ Sediment deposits (B2) *[if in Arid West: Nonriverine only]*
- ☐ Drift deposits (B3) *[if in Arid West: Nonriverine only]*
- ☐ Algal mat or crust (B4) *[WMVC only; see B12]*
- ☐ Iron deposits (B5) *[WMVC only]*
- ☐ Surface soil cracks (B6)
- ☐ Inundation visible on aerial imagery (B7)
- ☐ Sparsely vegetated concave surface (B8) *[WMVC only]*
- ☐ Water-stained leaves (B9) *[Arid West and MLRA 5 only]*
- ☐ Salt crust (B11)
- ☑ Biotic Crust (B12) *[Arid West only; see B4]*
- ☐ Aquatic invertebrates (B13)
- ☐ Hydrogen sulfide odor (C1)
- ☐ Oxidized rhizospheres (C3)
- ☐ Presence of reduced iron (C4)
- ☐ Recent iron reduction in tilled soils (C6)
- ☐ Stunted or stressed plants (D1) *[WMVC only]*

Secondary indicators (need 2+ to meet criteria):
- ☐ Water marks (B1) *[Arid West riverine only]*
- ☐ Sediment deposits (B2) *[Arid West riverine only]*
- ☐ Drift deposits (B3) *[Arid West riverine only]*
- ☐ Water-stained leaves (B9) *[WMVC:MLRA 4B only]*
- ☐ Drainage patterns (B10)
- ☐ Dry-season water table (C2)
- ☐ Thin muck surface (C7) *[Arid West only]*
- ☐ Crayfish burrows (C8) *[Arid West only]*
- ☐ Saturation visible on aerial imagery (C9)
- ☐ Geomorphic position (D2) *[WMVC only]*
- ☐ Shallow aquitard (D3)
- ☐ Frost-heave hummocks (D4) *[WMVC only]*
- ☐ Raised ant mounds (D6) *[WMVC only]*
- ☑ **FAC-neutral test (D5)** ☐ (Does not meet test)

☐ **Other (explain below)**

Meets CCC or LCP wetland hydrology criteria? ☑ Yes ☐ No

Comments: Wetland hydrology indicators observed at the sample point included biotic crust and FAC-Neutral Test.

California Coastal Act Wetland Data Sheet

Project Name: Wavecrest Southern Alignment
County: San Mateo
City/Location: Half Moon Bay
LCP (if applicable): Half Moon Bay
Applicant/Owner: Coastside Land Trust
☐ LRR A (Western Mts., Valley, and Coast [WMVC])
WRA Investigator(s): Stephanie Freed
☑ LRR C (Arid West)
Date: 2.16.16
SAMPLE POINT ID: SP 25
HABITAT:

CCC/LCP WETLAND DETERMINATION

	Yes	No
Meets CCC or LCP vegetation criteria?	☑	☐
Meets CCC or LCP hydric soil criteria?	☐	☑
Meets CCC or LCP hydrology criteria?	☐	☑
CCC/LCP WETLAND?	☑	☐

Comments: Sample point located within coastal field. The sample point met wetland indicators for hydrophytic vegetation, but did not meet indicators for hydric soils or wetland hydrology. Sample point taken more than 14 days after last rain event. Sample point paired with SP 20 from 2-9-16.

VEGETATION

*indicator status from the USFWS 1996 National List of wetland species

TREES - Plot size: 30x30	% Cover	Status*	Dominant?
TOTAL			

50% of stratum cover = *20% =*

SAPLING/SHRUBS - Plot size: 30x30	% Cover	Status*	Dominant?
TOTAL			

50% of stratum cover = *20% =*

HERBACEOUS - Plot size: 10x10	% Cover	Status*	Dominant?
Plagiobothrys chorisianus	50	OBL	Y
Juncus patens	20	FACW	Y
Polypogon monspeliensis	10	FACW	Y
Mentha pulegium	1	OBL	N
Baccharis pilularis	1	UPL	N
TOTAL	82.0		0

50% of stratum cover = *41.0* *20% =* *16.4*

Dominance Test:

Total # of dominant species across all strata: 2

Total # of dominants that are hydrophytic (status of OBL, FACW, or FAC): 2

Percentage of dominants that are hydrophytic: 100%

[Meets dominance test if >50%]

Prevalence Index:

Total % cover of species across all strata:

OBL: ____ x 1 = ____
FACW: ____ x 2 = ____
FAC: ____ x 3 = ____
FACU: ____ x 4 = ____
UPL: ____ x 5 = ____

Total: ____ (A) ____ (B)

Prevalence Index (B/A) =

[Hydrophytic vegetation dominant if B/A ≤ 3.0]

Meets CCC or LCP hydrophytic vegetation criteria? ☑ Yes ☐ No

Comments: Sample Point is dominated by FACW and OBL species and was determined to contain hydrophytic vegetation, as it meets the dominance test.

Project Name: ______Wavecrest South________________________ Sample Point ID: ____SP 25__________

SOILS Slope (%): ___________ Soil map unit: Watsonville sandy loam, gently sloping

SOIL PROFILE

Depth	Matrix Color	Redox Color	% and contrast	Redox type	Texture	Comments
0-10	7.5YR 4/2				Clay Loam	Moist
10-14	7.5YR 4/2				Clay	

All soils:
- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) *[Arid West only]*
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ **Other (explain below)**

Loamy and clayey soils only:
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9) *[Arid West only]*

Sandy soils only:
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)

Test indicators (NRCS v7):
- ☐ 2 cm Muck (A10) *[WMVC only]*
- ☐ Very Shallow Dark Surface (TF12)

Meets CCC or LCP hydric soil criteria? ☐ Yes ☑ No

Comments: No hydric soil indicators were observed at this sample point location.

HYDROLOGY (indicators from Corps Regional Supplements, applicable to coastal California only)

Primary indicators (only 1 needed to meet criteria):
- ☐ Surface water (A1) *Depth (in.):* ____________
- ☐ High water table (A2) *Depth (in.):* ____________
- ☐ Soil saturation (A3) *Depth (in.):* ____________
- ☐ Water marks (B1) *[if in Arid West: Nonriverine only]*
- ☐ Sediment deposits (B2) *[if in Arid West: Nonriverine only]*
- ☐ Drift deposits (B3) *[if in Arid West: Nonriverine only]*
- ☐ Algal mat or crust (B4) *[WMVC only; see B12]*
- ☐ Iron deposits (B5) *[WMVC only]*
- ☐ Surface soil cracks (B6)
- ☐ Inundation visible on aerial imagery (B7)
- ☐ Sparsely vegetated concave surface (B8) *[WMVC only]*
- ☐ Water-stained leaves (B9) *[Arid West and MLRA 5 only]*
- ☐ Salt crust (B11)
- ☐ Biotic Crust (B12) *[Arid West only; see B4]*
- ☐ Aquatic invertebrates (B13)
- ☐ Hydrogen sulfide odor (C1)
- ☐ Oxidized rhizospheres (C3)
- ☐ Presence of reduced iron (C4)
- ☐ Recent iron reduction in tilled soils (C6)
- ☐ Stunted or stressed plants (D1) *[WMVC only]*

Secondary indicators (need 2+ to meet criteria):
- ☐ Water marks (B1) *[Arid West riverine only]*
- ☐ Sediment deposits (B2) *[Arid West riverine only]*
- ☐ Drift deposits (B3) *[Arid West riverine only]*
- ☐ Water-stained leaves (B9) *[WMVC:MLRA 4B only]*
- ☐ Drainage patterns (B10)
- ☐ Dry-season water table (C2)
- ☐ Thin muck surface (C7) *[Arid West only]*
- ☐ Crayfish burrows (C8) *[Arid West only]*
- ☐ Saturation visible on aerial imagery (C9)
- ☐ Geomorphic position (D2) *[WMVC only]*
- ☐ Shallow aquitard (D3)
- ☐ Frost-heave hummocks (D4) *[WMVC only]*
- ☐ Raised ant mounds (D6) *[WMVC only]*
- ☑ **FAC-neutral test (D5)** ☐ (Does not meet test)

☐ **Other (explain below)**

Meets CCC or LCP wetland hydrology criteria? ☑ Yes ☐ No

Comments: Wetland hydrology indicators observed at the sample point included FAC-Neutral Test.

Project Name: ______Wavecrest South__________________________Sample Point ID: ____SP 26__________

Project Name:	Wavecrest Southern Alignment	County:	San Mateo
City/Location:	Half Moon Bay	LCP (if applicable):	Half Moon Bay
Applicant/Owner:	Coastside Land Trust	☐	LRR A (Western Mts., Valley, and Coast [WMVC])
WRA Investigator(s):	Stephanie Freed	☑	LRR C (Arid West)
Date:	2.16.16	**SAMPLE POINT ID:**	SP 26
		HABITAT:	

CCC/LCP WETLAND DETERMINATION

Meets CCC or LCP vegetation criteria?	☑ Yes	☐ No
Meets CCC or LCP hydric soil criteria?	☑ Yes	☐ No
Meets CCC or LCP hydrology criteria?	☑ Yes	☐ No
CCC/LCP WETLAND?	☑ Yes	☐ No

Comments: Sample point located within former tire rut in coastal field. The sample point met wetland indicators for hydrophytic vegetation, but did not meet indicators for hydric soils or wetland hydrology. Wetland boundary based on grade break and shift from Carex harfordii to Helminthotheca echioides domninated vegetation. Sample point taken more than 14 days after last rain event. Sample point paired with SP 27.

VEGETATION

*indicator status from the USFWS 1996 National List of wetland species

TREES - Plot size: 30x30	% Cover	Status*	Dominant?
TOTAL			
50% of stratum cover =		*20% =*	

SAPLING/SHRUBS - Plot size: 30x30	% Cover	Status*	Dominant?
TOTAL			
50% of stratum cover =		*20% =*	

HERBACEOUS - Plot size: 10x10	% Cover	Status*	Dominant?
Festuca perennis	30	FAC	Y
Carex harfordii	20	OBL	Y
Juncus phaeocephalus	20	FACW	Y
Helminthotheca echioides	10	FACU	N
Geranium dissectum	5	UPL	N
Rumex acetosella	5	FACU	N
Rumex crispus	2	FAC	N
Lysimachia arvensis	+	FAC	N
TOTAL	92.0		0
50% of stratum cover =	*46.0*	*20% =*	*18.4*

Dominance Test:

Total # of dominant species across all strata:	3
Total # of dominants that are hydrophytic (status of OBL, FACW, or FAC):	3
Percentage of dominants that are hydrophytic:	100%

[Meets dominance test if >50%]

Prevalence Index:

Total % cover of species across all strata:

OBL:		x 1 =	
FACW:		x 2 =	
FAC:		x 3 =	
FACU:		x 4 =	
UPL:		x 5 =	
Total:	(A)		(B)

Prevalence Index (B/A) =

[Hydrophytic vegetation dominant if B/A ≤ 3.0]

Meets CCC or LCP hydrophytic vegetation criteria? ☑ Yes ☐ No

Comments: Sample Point is dominated by FAC, FACW, and OBL species and was determined to contain hydrophytic vegetation, as it meets the dominance test.

California Coastal Act Wetland Data Sheet

SOILS Slope (%): ________ Soil map unit: Watsonville loam, nearly level

SOIL PROFILE

Depth	Matrix Color	Redox Color	% and contrast	Redox type	Texture	Comments
0-10	7.5YR 3/2				Clay Loam	Moist, gravelly
10-14	7.5YR 3/2				Clay	

All soils:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) *[Arid West only]*
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ **Other (explain below)**

Loamy and clayey soils only:

- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9) *[Arid West only]*

Sandy soils only:

- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)

Test indicators (NRCS v7):

- ☐ 2 cm Muck (A10) *[WMVC only]*
- ☐ Very Shallow Dark Surface (TF12)

Meets CCC or LCP hydric soil criteria? ☑ Yes ☐ No

Comments: No hydric soil indicators were observed at this sample point location.

HYDROLOGY (indicators from Corps Regional Supplements, applicable to coastal California only)

Primary indicators (only 1 needed to meet criteria):

- ☐ Surface water (A1) *Depth (in.):* ________
- ☐ High water table (A2) *Depth (in.):* ________
- ☐ Soil saturation (A3) *Depth (in.):* ________
- ☐ Water marks (B1) *[if in Arid West: Nonriverine only]*
- ☐ Sediment deposits (B2) *[if in Arid West: Nonriverine only]*
- ☐ Drift deposits (B3) *[if in Arid West: Nonriverine only]*
- ☐ Algal mat or crust (B4) *[WMVC only; see B12]*
- ☐ Iron deposits (B5) *[WMVC only]*
- ☐ Surface soil cracks (B6)
- ☐ Inundation visible on aerial imagery (B7)
- ☐ Sparsely vegetated concave surface (B8) *[WMVC only]*
- ☐ Water-stained leaves (B9) *[Arid West and MLRA 5 only]*
- ☐ Salt crust (B11)
- ☐ Biotic Crust (B12) *[Arid West only; see B4]*
- ☐ Aquatic invertebrates (B13)
- ☐ Hydrogen sulfide odor (C1)
- ☐ Oxidized rhizospheres (C3)
- ☐ Presence of reduced iron (C4)
- ☐ Recent iron reduction in tilled soils (C6)
- ☐ Stunted or stressed plants (D1) *[WMVC only]*

Secondary indicators (need 2+ to meet criteria):

- ☐ Water marks (B1) *[Arid West riverine only]*
- ☐ Sediment deposits (B2) *[Arid West riverine only]*
- ☐ Drift deposits (B3) *[Arid West riverine only]*
- ☐ Water-stained leaves (B9) *[WMVC:MLRA 4B only]*
- ☐ Drainage patterns (B10)
- ☐ Dry-season water table (C2)
- ☐ Thin muck surface (C7) *[Arid West only]*
- ☐ Crayfish burrows (C8) *[Arid West only]*
- ☐ Saturation visible on aerial imagery (C9)
- ☐ Geomorphic position (D2) *[WMVC only]*
- ☐ Shallow aquitard (D3)
- ☐ Frost-heave hummocks (D4) *[WMVC only]*
- ☐ Raised ant mounds (D6) *[WMVC only]*
- ☑ **FAC-neutral test (D5)** ☐ (Does not meet test)
- ☐ **Other (explain below)**

Meets CCC or LCP wetland hydrology criteria? ☑ Yes ☐ No

Comments: Wetland hydrology indicators observed at the sample point included FAC-Neutral Test.

California Coastal Act Wetland Data Sheet

Project Name: Wavecrest Southern Alignment
City/Location: Half Moon Bay
Applicant/Owner: Coastside Land Trust
WRA Investigator(s): Stephanie Freed
Date: 2.16.16

County: San Mateo
LCP (if applicable): Half Moon Bay
☐ LRR A (Western Mts., Valley, and Coast [WMVC])
☑ LRR C (Arid West)
SAMPLE POINT ID: SP 27
HABITAT:

CCC/LCP WETLAND DETERMINATION

Meets CCC or LCP vegetation criteria? ☐ Yes ☑ No
Meets CCC or LCP hydric soil criteria? ☐ Yes ☑ No
Meets CCC or LCP hydrology criteria? ☐ Yes ☑ No
CCC/LCP WETLAND? ☐ Yes ☑ No

Comments: Sample point located adjacent to former tire rut (SP 26) in coastal field. Sample point did not meet indicators for hydrophytic vegetation, hydric soils, or wetland hydrology. Sample point taken more than 14 days after last rain event.

VEGETATION

*indicator status from the USFWS 1996 National List of wetland species

TREES - Plot size: 30x30	% Cover	Status*	Dominant?
TOTAL			

50% of stratum cover = *20% =*

SAPLING/SHRUBS - Plot size: 30x30	% Cover	Status*	Dominant?
TOTAL			

50% of stratum cover = *20% =*

HERBACEOUS - Plot size: 10x10	% Cover	Status*	Dominant?
Festuca perennis	35	FAC	Y
Helminthotheca echioides	25	FACU	Y
Juncus phaeocephalus	10	FACW	Y
Geranium dissectum	10	UPL	N
Carex harfordii	+	OBL	N
Rumex acetosella	+	FACU	N
TOTAL	80.0		0

50% of stratum cover = 40.0 *20% = 16.0*

Dominance Test:

Total # of dominant species across all strata: 2

Total # of dominants that are hydrophytic (status of OBL, FACW, or FAC): 1

Percentage of dominants that are hydrophytic: 50%

[Meets dominance test if >50%]

Prevalence Index:

Total % cover of species across all strata:

OBL: ____ x 1 = ____
FACW: ____ x 2 = ____
FAC: ____ x 3 = ____
FACU: ____ x 4 = ____
UPL: ____ x 5 = ____

Total: ____ (A) ____ (B)

Prevalence Index (B/A) =

[Hydrophytic vegetation dominant if B/A ≤ 3.0]

Meets CCC or LCP hydrophytic vegetation criteria? ☐ Yes ☑ No

Comments: Sample Point is dominated by FAC and FACU species and does meet any hydrophytic vegetation indicators.

Project Name: ______Wavecrest South_________________________ Sample Point ID: ____SP 27__________

SOILS Slope (%): ___________ Soil map unit: Watsonville loam, nearly level

SOIL PROFILE

Depth	Matrix Color	Redox Color	% and contrast	Redox type	Texture	Comments
0-10	7.5YR 3/2				Clay Loam	Moist, gravelly
10-14	7.5YR 3/2	7.5YR 4/4	8, C	M	Clay	
		7.5YR 4/1	7, D	M	Clay	

All soils:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) *[Arid West only]*
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ **Other (explain below)**

Loamy and clayey soils only:

- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9) *[Arid West only]*

Sandy soils only:

- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)

Test indicators (NRCS v7):

- ☐ 2 cm Muck (A10) *[WMVC only]*
- ☐ Very Shallow Dark Surface (TF12)

Meets CCC or LCP hydric soil criteria? ☐ Yes ☑ No

Comments: No indicators of hydric soils were met for this sampling point.

HYDROLOGY (indicators from Corps Regional Supplements, applicable to coastal California only)

Primary indicators (only 1 needed to meet criteria):

- ☐ Surface water (A1) *Depth (in.):* ___________
- ☐ High water table (A2) *Depth (in.):* ___________
- ☐ Soil saturation (A3) *Depth (in.):* ___________
- ☐ Water marks (B1) *[if in Arid West: Nonriverine only]*
- ☐ Sediment deposits (B2) *[if in Arid West: Nonriverine only]*
- ☐ Drift deposits (B3) *[if in Arid West: Nonriverine only]*
- ☐ Algal mat or crust (B4) *[WMVC only; see B12]*
- ☐ Iron deposits (B5) *[WMVC only]*
- ☐ Surface soil cracks (B6)
- ☐ Inundation visible on aerial imagery (B7)
- ☐ Sparsely vegetated concave surface (B8) *[WMVC only]*
- ☐ Water-stained leaves (B9) *[Arid West and MLRA 5 only]*
- ☐ Salt crust (B11)
- ☐ Biotic Crust (B12) *[Arid West only; see B4]*
- ☐ Aquatic invertebrates (B13)
- ☐ Hydrogen sulfide odor (C1)
- ☐ Oxidized rhizospheres (C3)
- ☐ Presence of reduced iron (C4)
- ☐ Recent iron reduction in tilled soils (C6)
- ☐ Stunted or stressed plants (D1) *[WMVC only]*

Secondary indicators (need 2+ to meet criteria):

- ☐ Water marks (B1) *[Arid West riverine only]*
- ☐ Sediment deposits (B2) *[Arid West riverine only]*
- ☐ Drift deposits (B3) *[Arid West riverine only]*
- ☐ Water-stained leaves (B9) *[WMVC:MLRA 4B only]*
- ☐ Drainage patterns (B10)
- ☐ Dry-season water table (C2)
- ☐ Thin muck surface (C7) *[Arid West only]*
- ☐ Crayfish burrows (C8) *[Arid West only]*
- ☐ Saturation visible on aerial imagery (C9)
- ☐ Geomorphic position (D2) *[WMVC only]*
- ☐ Shallow aquitard (D3)
- ☐ Frost-heave hummocks (D4) *[WMVC only]*
- ☐ Raised ant mounds (D6) *[WMVC only]*
- ☐ **FAC-neutral test (D5)** ☑ (Does not meet test)
- ☐ **Other (explain below)**

Meets CCC or LCP wetland hydrology criteria? ☐ Yes ☑ No

Comments: No wetland hydrology indicators were observed at the sample point.

Project Name:	Wavecrest Southern Alignment	County:	San Mateo
City/Location:	Half Moon Bay	LCP (if applicable):	Half Moon Bay
Applicant/Owner:	Coastside Land Trust	☐ LRR A (Western Mts., Valley, and Coast [WMVC])	
WRA Investigator(s):	Stephanie Freed	☑ LRR C (Arid West)	
Date:	2.16.16	**SAMPLE POINT ID:**	SP 28
		HABITAT:	

CCC/LCP WETLAND DETERMINATION

	Yes	No
Meets CCC or LCP vegetation criteria?	☑	☐
Meets CCC or LCP hydric soil criteria?	☐	☑
Meets CCC or LCP hydrology criteria?	☑	☐
CCC/LCP WETLAND?	☑	☐

Comments: Sample point located within depression in coastal field. The sample point met wetland indicators for hydrophytic vegetation and wetland hydrology but did not meet indicators for hydric soils. Wetland boundary based on grade break and shift from Plagiobothrys chorisianus to upland species. Sample point taken more than 14 days after last rain event. Sample point paired with SP 29.

VEGETATION

*indicator status from the USFWS 1996 National List of wetland species

TREES - Plot size: 30x30	% Cover	Status*	Dominant?
TOTAL			
50% of stratum cover =		*20% =*	

SAPLING/SHRUBS - Plot size: 30x30	% Cover	Status*	Dominant?
TOTAL			
50% of stratum cover =		*20% =*	

HERBACEOUS - Plot size: 10x10	% Cover	Status*	Dominant?
Festuca perennis	30	FAC	Y
Plagiobothrys chorisianus	30	OBL	Y
Polypogon monspeliensis	30	FACW	Y
TOTAL	90.0		0
50% of stratum cover =	*45.0*	*20% =*	*18.0*

Dominance Test:

Total # of dominant species across all strata: 3

Total # of dominants that are hydrophytic (status of OBL, FACW, or FAC): 3

Percentage of dominants that are hydrophytic: 100%

[Meets dominance test if >50%]

Prevalence Index:

Total % cover of species across all strata:

OBL:		x 1 =	
FACW:		x 2 =	
FAC:		x 3 =	
FACU:		x 4 =	
UPL:		x 5 =	
Total:	(A)		(B)

Prevalence Index (B/A) =

[Hydrophytic vegetation dominant if B/A ≤ 3.0]

Meets CCC or LCP hydrophytic vegetation criteria? ☑ Yes ☐ No

Comments: Sample Point is dominated by FAC, FACW, and OBL species and was determined to contain hydrophytic vegetation, as it meets the dominance test.

California Coastal Act Wetland Data Sheet

SOILS Slope (%): ____________ Soil map unit: Watsonville sandy loam, gently sloping

SOIL PROFILE

Depth	Matrix Color	Redox Color	% and contrast	Redox type	Texture	Comments
0-14	7.5YR 2.5/1				Clay Loam	trace fine sand

All soils:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) *[Arid West only]*
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ **Other (explain below)**

Loamy and clayey soils only:

- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9) *[Arid West only]*

Sandy soils only:

- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)

Test indicators (NRCS v7):

- ☐ 2 cm Muck (A10) *[WMVC only]*
- ☐ Very Shallow Dark Surface (TF12)

Meets CCC or LCP hydric soil criteria? ☐ Yes ☑ No

Comments: This sample point did not meet any indicators for hydric soils.

HYDROLOGY (indicators from Corps Regional Supplements, applicable to coastal California only)

Primary indicators (only 1 needed to meet criteria):

- ☐ Surface water (A1) *Depth (in.):* ____________
- ☐ High water table (A2) *Depth (in.):* ____________
- ☐ Soil saturation (A3) *Depth (in.):* ____________
- ☐ Water marks (B1) *[if in Arid West: Nonriverine only]*
- ☐ Sediment deposits (B2) *[if in Arid West: Nonriverine only]*
- ☐ Drift deposits (B3) *[if in Arid West: Nonriverine only]*
- ☐ Algal mat or crust (B4) *[WMVC only; see B12]*
- ☐ Iron deposits (B5) *[WMVC only]*
- ☐ Surface soil cracks (B6)
- ☐ Inundation visible on aerial imagery (B7)
- ☐ Sparsely vegetated concave surface (B8) *[WMVC only]*
- ☐ Water-stained leaves (B9) *[Arid West and MLRA 5 only]*
- ☐ Salt crust (B11)
- ☐ Biotic Crust (B12) *[Arid West only; see B4]*
- ☐ Aquatic invertebrates (B13)
- ☐ Hydrogen sulfide odor (C1)
- ☐ Oxidized rhizospheres (C3)
- ☐ Presence of reduced iron (C4)
- ☐ Recent iron reduction in tilled soils (C6)
- ☐ Stunted or stressed plants (D1) *[WMVC only]*

Secondary indicators (need 2+ to meet criteria):

- ☐ Water marks (B1) *[Arid West riverine only]*
- ☐ Sediment deposits (B2) *[Arid West riverine only]*
- ☐ Drift deposits (B3) *[Arid West riverine only]*
- ☐ Water-stained leaves (B9) *[WMVC:MLRA 4B only]*
- ☐ Drainage patterns (B10)
- ☐ Dry-season water table (C2)
- ☐ Thin muck surface (C7) *[Arid West only]*
- ☐ Crayfish burrows (C8) *[Arid West only]*
- ☐ Saturation visible on aerial imagery (C9)
- ☐ Geomorphic position (D2) *[WMVC only]*
- ☐ Shallow aquitard (D3)
- ☐ Frost-heave hummocks (D4) *[WMVC only]*
- ☐ Raised ant mounds (D6) *[WMVC only]*
- ☑ **FAC-neutral test (D5)** ☐ (Does not meet test)

- ☐ **Other (explain below)**

Meets CCC or LCP wetland hydrology criteria? ☐ Yes ☑ No

Comments: Wetland hydrology indicators observed include the FAC-Neutral Test.

California Coastal Act Wetland Data Sheet

Project Name:	Wavecrest Southern Alignment	County:	San Mateo
City/Location:	Half Moon Bay	LCP (if applicable):	Half Moon Bay
Applicant/Owner:	Coastside Land Trust	☐ LRR A (Western Mts., Valley, and Coast [WMVC])	
WRA Investigator(s):	Stephanie Freed	☑ LRR C (Arid West)	
Date:	2.16.16	**SAMPLE POINT ID:**	SP 29
		HABITAT:	

CCC/LCP WETLAND DETERMINATION

	Yes	No
Meets CCC or LCP vegetation criteria?	☐	☑
Meets CCC or LCP hydric soil criteria?	☐	☑
Meets CCC or LCP hydrology criteria?	☐	☑
CCC/LCP WETLAND?	☐	☑

Comments: Sample point located adjacent to depression in coastal field. The sample point did not meet wetland indicators for hydrophytic vegetation, hydric soils, or wetland hydrology. Sample point taken more than 14 days after last rain event. Sample point taken more than 14 days after last rain event. Sample point paired with SP 28.

VEGETATION

*indicator status from the USFWS 1996 National List of wetland species

TREES - Plot size: 30x30	% Cover	Status*	Dominant?
TOTAL			
50% of stratum cover =		*20% =*	

SAPLING/SHRUBS - Plot size: 30x30	% Cover	Status*	Dominant?
Baccharis pilularis	60	UPL	Y
TOTAL	60.0		0
50% of stratum cover =	*30.0*	*20% =*	*12.0*

HERBACEOUS - Plot size: 10x10	% Cover	Status*	Dominant?
Juncus patens	20	FACW	Y
Chlorogalum pomeridianum	15	UPL	Y
Rubus ursinus	5	FAC	N
Festuca perennis	3	FAC	N
Scrophularia californica	2	FAC	N
Horkelia californica	2	UPL	N
Taraxia ovata	2	UPL	N
TOTAL	49.0		0
50% of stratum cover =	*24.5*	*20% =*	*9.8*

Dominance Test:

Total # of dominant species across all strata: 3

Total # of dominants that are hydrophytic (status of OBL, FACW, or FAC): 1

Percentage of dominants that are hydrophytic: 33%

[Meets dominance test if >50%]

Prevalence Index:

Total % cover of species across all strata:

	(A)		(B)
OBL:		x 1 =	
FACW:		x 2 =	
FAC:		x 3 =	
FACU:		x 4 =	
UPL:		x 5 =	
Total:			

Prevalence Index (B/A) =

[Hydrophytic vegetation dominant if B/A ≤ 3.0]

Meets CCC or LCP hydrophytic vegetation criteria? ☐ Yes ☑ No

Comments: Sample Point is dominated by UPL and FACW species and did not meet any indicators for wetland hydrology.

Project Name: ______Wavecrest South____________________________ Sample Point ID: ____SP 29__________

SOILS Slope (%): ___________ Soil map unit: Watsonville sandy loam, gently sloping

SOIL PROFILE

Depth	Matrix Color	Redox Color	% and contrast	Redox type	Texture	Comments
0-14	7.5YR 2.5/1				Clay Loam	trace fine sand

All soils:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) *[Arid West only]*
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ **Other (explain below)**

Loamy and clayey soils only:

- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9) *[Arid West only]*

Sandy soils only:

- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)

Test indicators (NRCS v7):

- ☐ 2 cm Muck (A10) *[WMVC only]*
- ☐ Very Shallow Dark Surface (TF12)

Meets CCC or LCP hydric soil criteria? ☐ Yes ☑ No

Comments: This sample point did not meet any indicators for hydric soils.

HYDROLOGY (indicators from Corps Regional Supplements, applicable to coastal California only)

Primary indicators (only 1 needed to meet criteria):

- ☐ Surface water (A1) *Depth (in.):* ___________
- ☐ High water table (A2) *Depth (in.):* ___________
- ☐ Soil saturation (A3) *Depth (in.):* ___________
- ☐ Water marks (B1) *[if in Arid West: Nonriverine only]*
- ☐ Sediment deposits (B2) *[if in Arid West: Nonriverine only]*
- ☐ Drift deposits (B3) *[if in Arid West: Nonriverine only]*
- ☐ Algal mat or crust (B4) *[WMVC only; see B12]*
- ☐ Iron deposits (B5) *[WMVC only]*
- ☐ Surface soil cracks (B6)
- ☐ Inundation visible on aerial imagery (B7)
- ☐ Sparsely vegetated concave surface (B8) *[WMVC only]*
- ☐ Water-stained leaves (B9) *[Arid West and MLRA 5 only]*
- ☐ Salt crust (B11)
- ☐ Biotic Crust (B12) *[Arid West only; see B4]*
- ☐ Aquatic invertebrates (B13)
- ☐ Hydrogen sulfide odor (C1)
- ☐ Oxidized rhizospheres (C3)
- ☐ Presence of reduced iron (C4)
- ☐ Recent iron reduction in tilled soils (C6)
- ☐ Stunted or stressed plants (D1) *[WMVC only]*

Secondary indicators (need 2+ to meet criteria):

- ☐ Water marks (B1) *[Arid West riverine only]*
- ☐ Sediment deposits (B2) *[Arid West riverine only]*
- ☐ Drift deposits (B3) *[Arid West riverine only]*
- ☐ Water-stained leaves (B9) *[WMVC:MLRA 4B only]*
- ☐ Drainage patterns (B10)
- ☐ Dry-season water table (C2)
- ☐ Thin muck surface (C7) *[Arid West only]*
- ☐ Crayfish burrows (C8) *[Arid West only]*
- ☐ Saturation visible on aerial imagery (C9)
- ☐ Geomorphic position (D2) *[WMVC only]*
- ☐ Shallow aquitard (D3)
- ☐ Frost-heave hummocks (D4) *[WMVC only]*
- ☐ Raised ant mounds (D6) *[WMVC only]*
- ☐ **FAC-neutral test (D5)** ☑ (Does not meet test)

☐ **Other (explain below)**

Meets CCC or LCP wetland hydrology criteria? ☐ Yes ☑ No

Comments: No wetland hydrology indicators were observed at sample point location.

APPENDIX D

LIST OF OBSERVED PLANT AND ANIMAL SPECIES WITHIN THE STUDY AREA

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Appendix D. Plant and wildlife species observed in the Study Area on January 26 and 27, February 9 and 16, April 15 and June 22, 2016 as well as January 14, 2020.

SCIENTIFIC NAME	COMMON NAME	STATUS	WETLAND STATUS[1]
Plants			
Acacia melanoxylon	Blackwood acacia	--	UPL
Angelica hendersonii	Henderson's angelica	--	UPL
Athyrium filix-femina var. *cyclosorum*	Western lady fern	--	FAC
Avena barbata	Slim oat	--	UPL
Baccharis pilularis ssp. *consanguinea*	Coyote brush	--	UPL
Baccharis pilularis ssp. *pilularis*	Prostrate coyote brush	--	UPL
Bellis perennis	English lawn daisy	--	UPL
Brassica nigra	Black mustard	--	UPL
Brassica rapa	Common mustard	--	FACU
Briza minor	Little rattlesnake grass	--	FAC
Bromus catharticus	Rescue grass	--	UPL
Bromus diandrus	Ripgut brome	--	UPL
Bromus hordeaceus	Soft chess	--	FACU
Bromus maritimus	Maritime brome	--	UPL
Cakile maritima	Sea rocket	--	FAC
Carduus pycnocephalus ssp. *pycnocephalus*	Italian thistle	--	UPL
Carex harfordii	Monterey sedge	--	OBL
Carex obnupta	Slough sedge	--	OBL
Carpobrotus edulis	Ice plant	--	UPL
Castilleja wightii	Wight's paintbrush	--	UPL
Cirsium brevistylum	Indian thistle	--	UPL
Cirsium quercetorum	Brownie thistle	--	UPL
Chlorogalum pomeridianum	Soap plant	--	UPL

SCIENTIFIC NAME	COMMON NAME	STATUS	WETLAND STATUS[1]
Clarkia rubicunda	Ruby chalice clarkia	--	UPL
Convolvulus arvensis	Field bindweed	--	UPL
Cortaderia jubata	Andean pampas grass	--	FACU
Cotoneaster sp.	Cotoneaster	--	UPL
Cyperus eragrostis	Tall cyperus	--	FACW
Danthonia californica	California oatgrass	--	FAC
Daucus pusillus	American wild carrot	--	UPL
Deinandra corymbosa	Coastal tarweed	--	UPL
Dipsacus sativus	Indian teasel	--	UPL
Dudleya farinosa	Sea lettuce	--	UPL
Echium candicans	Pride of madeira	--	UPL
Eleocharis macrostachya	Spike rush	--	OBL
Elymus glaucus	Blue wildrye	--	FACU
Epilobium ciliatum	Slender willow herb	--	FACW
Epilobium densiflorum	Willow herb	--	FACW
Erigeron canadensis	Canada horseweed	--	FACU
Erigeron glaucus	Seaside daisy	--	FACU
Eriogonum latifolium	Coast buckwheat	--	UPL
Eriophyllum staechadifolium	Lizard tail	--	UPL
Erodium cicutarium	Coastal heron's bill	--	UPL
Eucalyptus globulus	Blue gum	--	UPL
Festuca arundinacea	Reed fescue	--	FACU
Festuca bromoides	Brome fescue	--	FACU
Festuca myuros	Rattail fescue	--	FACU
Festuca perennis	Italian ryegrass	--	FAC
Fragaria chiloensis	Beach strawberry	--	FACU
Frangula californica	California coffeeberry	--	UPL
Gastridium phleoides	Nit grass	--	FACU

SCIENTIFIC NAME	COMMON NAME	STATUS	WETLAND STATUS[1]
Geranium dissectum	Wild geranium	--	UPL
Grindelia stricta	Gumweed	--	FACW
Helenium bigelovii	Bigelow's sneezeweed	--	FACW
Heliotropium curassavicum var. *oculatum*	Seaside heliotrope	--	FACU
Helminthotheca echiodes	Bristly ox-tongue	--	FAC
Hesperevax sparsiflora var. *sparsiflora*	Few flowered evax	--	FACU
Hesperocyparis macrocarpa	Monterey cypress	--	UPL
Holcus lanatus	Velvetgrass	--	FAC
Hordeum brachyantherum	Meadow barley	--	FACW
Hordeum marinum ssp. *gussoneanum*	Barley	--	FAC
Hordeum murinum	Foxtail barley	--	FACU
Horkelia californica	California horkelia	--	UPL
Juncus effusus ssp. *effusus*	Common rush	--	FACW
Juncus mexicanus	Mexican rush	--	FACW
Juncus patens	Westetrn rush	--	FACW
Juncus phaeocephalus	Brown-headed rush	--	FACW
Juncus tenuis	Slender rush	--	FACW
Juncus xiphioides	Iris leaved rush	--	OBL
Lepidium strictum	Peppergrass	--	UPL
Linum bienne	Flax	--	UPL
Logfia gallica	Narrowleaf cottonrose	--	UPL
Lonicera involucrata	Coast twinberry	--	FAC
Lotus corniculatus	Bird's foot trefoil	--	FAC
Lysimachia arvensis	Scarlet pimpernel	--	FAC
Lythrum hyssopifolia	Hyssop loosestrife	--	OBL
Madia sativa	Coastal tarweed	--	UPL

SCIENTIFIC NAME	COMMON NAME	STATUS	WETLAND STATUS[1]
Malva nicaeensis	Bull mallow	--	UPL
Matricaria discoidea	Pineapple weed	--	FACU
Medicago polymorpha	California burclover	--	FACU
Mentha pulegium	Pennyroyal	--	OBL
Navarretia squarrosa	Skunkweed	--	FACU
Oxalis pes-caprae	Bermuda buttercup	--	UPL
Parentucellia viscosa	Yellow glandweed	--	FAC
Pentagramma triangularis	Gold back fern	--	UPL
Persicaria punctata	Dotted smartweed	--	OBL
Pinus radiata	Monterey pine	Rank 1B.1	UPL
Plagiobothrys chorisianus var. *chorisianus*	Choris's popcorn flower	Rank 1B.2	OBL
Plantago coronopus	Cut leaf plantain	--	FAC
Plantago lanceolata	Ribwort	--	FAC
Polypodium californicum	California polypody	--	UPL
Polypogon monspeliensis	Annual beard grass	--	FACW
Pseudognaphalium luteoalbum	Jersey cudweed	--	FAC
Raphanus raphanistrum	Jointed charlock	--	UPL
Raphanus sativus	Wildradish	--	UPL
Rosa sp.	Rose	--	UPL
Rubus armeniacus	Himalayan blackberry	--	FAC
Rubus ursinus	California blackberry	--	FAC
Rumex acetosella	Sheep sorrel	--	FACU
Rumex crispus	Curly dock	--	FAC
Rumex fueginus	Golden dock	--	FACW
Rumex pulcher	Fiddleleaf dock	--	FAC
Salix lasiolepis	Arroyo willow	--	FACW
Sanicula crassicaulis	Pacific sanicle	--	UPL

SCIENTIFIC NAME	COMMON NAME	STATUS	WETLAND STATUS[1]
Scirpus microcarpus	Small-fruited bulrush	--	OBL
Scrophularia californica	California bee plant	--	FAC
Sonchus asper ssp. *asper*	Sow thistle	--	FAC
Sonchus oleraceus	Sow thistle	--	UPL
Spergularia macrotheca	Sticky sand spurry	--	FAC
Stellaria media	Chickweed	--	FACU
Stipa pulchra	Purple needle grass	--	UPL
Symphyotrichum chilense	Pacific aster	--	FAC
Taraxia ovata	Sun cup	--	UPL
Toxicodendron diversilobum	Poison oak	--	FACU
Trifolium angustifolium	Narrow leaved clover	--	UPL
Trifolium dubium	Shamrock	--	UPL
Trifolium fucatum	Bull clover	--	FACU
Trifolium subterraneum	Subterranean clover	--	UPL
Typha angustifolia	Narrow leaf cattail	--	OBL
Vicia sativa	Spring vetch	--	FACU
Zeltnera muehlenbergii	Muehlenberg's centaury	--	FAC
Birds			
Calypte anna	Anna’s hummingbird	--	--
Cathartes aura	turkey vulture	LCP	--
Buteo lineatus	red-shouldered hawk	LCP	--
Buteo jamaicensis	red-tailed hawk	LCP	--
Circus cyaneus	northern harrier	SSC, LCP	--
Elanus leucurus	white-tailed kite	CFP, LCP	--
Colaptes auratus	northern flicker	--	--
Corvus brachyrhynchos	American crow	--	--
Larus occidentalis	western gull	--	--
Poecile rufescens	chestnut-backed chickadee	--	--

SCIENTIFIC NAME	COMMON NAME	STATUS	WETLAND STATUS[1]
Oreothlypis celata	orange-crowned warbler	--	--
Sayornis nigricans	black phoebe	--	--
Columba livia	rock pigeon	--	--
Zenaida macroura	mourning dove	--	--
Carpodacus mexicanus	house finch	--	--
Melozone crissalis	California towhee	--	--
Passerculus sandwichensis (alaudinus)	savannah sparrow (Bryant's)	SSC (subspecies)	--
Melospiza melodia	song sparrow	--	--
Zonotrichia atricapilla	golden-crowned sparrow	--	--
Zonotrichia leucophrys	white-crowned sparrow	--	--
Reptiles			
Thamnophis elegans terrestris	coast gartersnake	--	--
Amphibians			
Pseudacris sierra	Sierran tree frog (adults and egg masses)	--	--
Mammals			
Lepus californicus	black-tailed jackrabbit	--	--
Invertebrates			
Danaus plexippus	monarch butterfly	SSI (winter roost sites)	--

[1]*Based on Arid West, Lichvar 2014.*

*** Key to status codes:**

CFP	California Department of Fish and Wildlife (CDFW) Fully Protected Animal
LCP	City of Half Moon Bay Local Coastal Program Rare, Endangered, or Unique Species
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	CNPS Rank 1B.2: Plants rare, threatened, or endangered in California and elsewhere (moderately threatened in California)
SSC	CDFW Species of Special Concern
SSI	CDFW Special Status Invertebrate Species

APPENDIX E

POTENTIAL FOR SPECIAL-STATUS PLANT AND WILDLIFE SPECIES TO OCCUR IN THE STUDY AREA

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Appendix E. 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 2016), U.S. Fish and Wildlife Service (USFWS) Species Lists, and California Native Plant Society (CNPS) Electronic Inventory search of the Half Moon Bay, Montara Mountain, and San Gregorio USGS 7.5' quadrangles and a review of other CDFW lists and publications (Shuford and Gardali 2008, Jennings and Hayes 1994, Zeiner et al. 1990).

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS
Plants				
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.	**Moderate Potential.** This species has moderate potential to occur on and near coastal bluffs in northern coastal scrub and grassland habitats within the Study Area, not including the Utility Area.	**Not Observed.** This species was not observed during the April 15 or June 22, 2016 special-status plant species surveys. Project activities are not anticipated to result in impacts to this species, and no further actions are recommended.
Franciscan onion *Allium peninsulare* var. *franciscanum*	Rank 1B.2	Cismontane woodland, valley and foothill grassland/clay, volcanic, often serpentine. Elevation ranges from 170 to 980 feet (52 to 300 meters). Blooms (Apr), May-Jun.	**Unlikely.** The Study Area does not contain volcanic or serpentine clay substrates. Therefore, the Study Area has unlikely potential to support this species.	No further surveys or mitigation measures are recommended.
Bent-flowered fiddleneck *Amsinckia lunaris*	Rank 1B.2	Coastal bluff scrub, cismontane woodland, valley and foothill grassland. Elevation ranges from 10 to 1640 feet (3 to 500 meters). Blooms Mar-Jun.	**Unlikely.** This species often occurs on thin, rocky substrates, often serpentine, such substrate is absent from the Study Area. Therefore, the Study Area has unlikely potential to support this species.	No further surveys or mitigation measures are recommended.
Coast rockcress *Arabis blepharophylla*	Rank 4.3	Broadleaved upland forest, coastal bluff scrub, coastal prairie, coastal scrub/rocky. Elevation ranges from 10 to 3610 feet (3 to 1100 meters). Blooms Feb-May.	**Unlikely.** The Study Area does not contain suitable habitat such as rocky substrates. Therefore, the Study Area has unlikely potential to support this species.	No further surveys or mitigation measures are recommended.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS
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 contains suitable habitat such as coastal scrub, but it more typically occurs on hillslopes and ridges, not flat terraces. This species is a woody perennial and was not observed during several site visits in January and February 2016.	No further surveys or mitigation measures are recommended.
Kings Mountain manzanita *Arctostaphylos regismontana*	Rank 1B.2	Broadleaved upland forest, chaparral, north coast coniferous forest/granitic or sandstone. Elevation ranges from 1000 to 2400 feet (305 to 730 meters). Blooms Jan-Apr.	**Unlikely.** The Study Area does not contain suitable habitat such as broadleaved upland forest, chaparral, north coast coniferous forest or thin, granitic or sandstone substrate. Additionally, this species is a woody perennial and was not observed during several site visits in January and February 2016.	No further surveys or mitigation measures are recommended.
Ocean bluff milk-vetch *Astragalus nuttallii* var. *nuttallii*	Rank 4.2	Coastal bluff scrub, coastal dunes. Elevation ranges from 10 to 390 feet (3 to 120 meters). Blooms Jan-Nov.	**Moderate.** The Study Area, not including the Utility Area, contains coastal habitats that may be considered suitable for this species such as coastal dunes and scrub. The nearest documented occurrence is located 6.63 miles from the Study Area in San Gregorio and is from 2007 and presumed extant at that location.	**Not Observed.** This species was not observed during the April 15 or June 22, 2016 special-status plant species surveys. Project activities are not anticipated to result in impacts to this species, and no further actions are recommended.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS
Coastal marsh milk-vetch *Astragalus pycnostachyus* var. *pycnostachyus*	Rank 1B.2	Coastal dunes (mesic), coastal scrub, marshes and swamps (coastal salt, streamside's). Elevation ranges from 0 to 100 feet (0 to 30 meters). Blooms Apr-Oct.	**Moderate.** The Study Area, not including the Utility Area, contains coastal habitats that may be considered suitable for this species, such as coastal dunes and scrub. The nearest documented occurrence is located 5 miles from the Study Area at Pillar Point and was recorded in 1902 but is presumed extant at that location.	**Not Observed.** This species was not observed during the April 15 or June 22, 2016 special-status plant species surveys. Project activities are not anticipated to result in impacts to this species, and no further actions are recommended.
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 1430 feet (0 to 435 meters). Blooms Mar-Aug.	**Moderate.** The Study Area, not including the Utility Area, contains suitable habitat such as coastal scrub near coastal bluffs.	**Not Observed.** This species was not observed during the April 15 or June 22, 2016 special-status plant species surveys. Project activities are not anticipated to result in impacts to this species, and no further actions are recommended.
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)/often alkaline. Elevation ranges from 0 to 1380 feet (0 to 420 meters). Blooms May-Nov.	**Unlikely.** The Study Area does not contain suitable habitat such as chaparral, coastal prairie, meadows and seeps, and marshes and swamps. This species often occurs in alkaline substrate, which is absent from the Study Area. Therefore, the Study Area has unlikely potential to support this species.	No further surveys or mitigation measures are recommended.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS
San Francisco Bay spineflower *Chorizanthe cuspidata* var. *cuspidata*	Rank 1B.2	Coastal bluff scrub, coastal dunes, coastal prairie, coastal scrub/sandy. Elevation ranges from 10 to 710 feet (3 to 215 meters). Blooms Apr-Jul (Aug).	**Moderate.** The Study Area, not including the Utility Area, contains suitable habitat such as sandy coastal scrub and coastal dunes. However, the nearest documented occurrence of this species is greater than 5 miles from the Study Area and is presumed extant at that location.	**Not Observed.** This species was not observed during the April 15 or June 22, 2016 special-status plant species surveys. Project activities are not anticipated to result in impacts to this species, and no further actions are recommended.
Franciscan thistle *Cirsium andrewsii*	Rank 1B.2	Broadleaved upland forest, coastal bluff scrub, coastal prairie, coastal scrub/mesic, sometimes serpentine. Elevation ranges from 0 to 490 feet (0 to 150 meters). Blooms Mar-Jul.	**Unlikely.** The Study Area does not contain suitable habitat such as serpentine substrates and the nearest documented occurrence of this species is greater than 5 miles from the Study Area. Therefore, the Study Area has unlikely potential to support this species.	No further surveys or mitigation measures are recommended.
San Francisco collinsia *Collinsia multicolor*	Rank 1B.2	Closed-cone coniferous forest, coastal scrub/sometimes serpentine. Elevation ranges from 100 to 820 feet (30 to 250 meters). Blooms (Feb), Mar-May.	**Unlikely.** The Study Area does not contain serpentine or shale substrates. Additionally, the nearest documented occurrence of this species is greater than 5 miles from the Study Area. Therefore, the Study Area has unlikely potential to support this species.	No further surveys or mitigation measures are recommended.
Clustered lady's-slipper *Cypripedium fasciculatum*	Rank 4.2	Lower montane coniferous forest, north coast coniferous forest/usually serpentine seeps, and streambanks. Elevation ranges from 330 to 7990 feet (100 to 2435 meters). Blooms Mar-Aug.	**Unlikely**. The Study Area does not contain suitable habitat such as lower montane coniferous forest, north coast coniferous forest and does not contain serpentine seeps. Therefore, the Study Area has unlikely potential to support this species.	No further surveys or mitigation measures are recommended.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS
Western leatherwood *Dirca occidentalis*	Rank 1B.2	Broadleaved upland forest, closed-cone coniferous forest, chaparral, cismontane woodland, north coast coniferous forest, riparian forest, riparian woodland/mesic. Elevation ranges from 80 to 1390 feet (25 to 425 meters). Blooms Jan-Mar (Apr).	**Unlikely.** The Study Area does not contain suitable chaparral, north coast coniferous forest, or riparian forest. Broadleafed forest (eucalyptus) and closed cone coniferous forest (Monterey cypress) within the Study Area are planted or are spreading from the planted trees and are not native habitat. Therefore, the Study Area has unlikely potential to support this species.	No further surveys or mitigation measures are recommended.
California bottle-brush grass *Elymus californicus*	Rank 4.3	Broadleaved upland forest, cismontane woodland, north coast coniferous forest, riparian woodland. Elevation ranges from 50 to 1540 feet (15 to 470 meters). Blooms May-Aug (Nov).	**Unlikely.** The Study Area does not contain riparian woodland or north coast coniferous forest. Forested areas within the Study Area are planted or are spreading from plantings and are not native habitat. Therefore, the Study Area has unlikely potential to support this species.	No further surveys or mitigation measures are recommended.
San Mateo woolly sunflower *Eriophyllum latilobum*	FE, SE, Rank 1B.1	Cismontane woodland (often serpentine, on road cuts). Elevation ranges from 150 to 490 feet (45 to 150 meters). Blooms May-Jun.	**Unlikely.** This species is known from oak woodland, often on serpentine substrate, and such habitat is absent from the Study Area. Forested areas within the Study Area are planted or are spreading from plantings and are not native habitat. Therefore, the Study Area has unlikely potential to support this species.	No further surveys or mitigation measures are recommended.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS
San Francisco wallflower *Erysimum franciscanum*	Rank 4.2	Chaparral, coastal dunes, coastal scrub, valley and foothill grassland/often serpentine or granitic, sometimes roadsides. Elevation ranges from 0 to 1800 feet (0 to 550 meters). Blooms Mar-Jun.	**Unlikely.** This species typically known from dune scrub or from rocky slopes, often on granitic or serpentine substrate, and such habitat is absent from the Study Area. Therefore, the Study Area has unlikely potential to support this species.	No further surveys or mitigation measures are recommended.
Hillsborough chocolate lily *Fritillaria biflora* var. *ineziana*	Rank 1B.1	Cismontane woodland, valley and foothill grassland/serpentine. Elevation ranges from 490 to 490 feet (150 to 150 meters). Blooms Mar-Apr.	**No Potential.** The Study Area does not contain serpentine substrate.	No further surveys or mitigation measures are recommended.
Marin checker lily *Fritillaria lanceolata* var. *tristulis*	Rank 1B.1	Coastal bluff scrub, coastal prairie, coastal scrub. Elevation ranges from 50 to 490 feet (15 to 150 meters). Blooms Feb-May.	**Unlikely.** While the Study Area contains coastal habitats that may be considered suitable for the species, the nearest documented occurrence is from 1963 and is located 32.9 miles from the Study Area in Stinson Beach. Therefore, the Study Area has unlikely potential to support this species.	No further surveys or mitigation measures are recommended.
Fragrant fritillary *Fritillaria liliacea*	Rank 1B.2	Cismontane woodland, coastal prairie, coastal scrub, valley and foothill grassland/often serpentine. Elevation ranges from 10 to 1350 feet (3 to 410 meters). Blooms Feb-Apr.	**Unlikely.** The Study Area does not contain serpentine or heavy clay substrates. Therefore, the Study Area has unlikely potential to support this species.	No further surveys or mitigation measures are recommended.

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/sandy or serpentine. Elevation ranges from 50 to 1310 feet (15 to 400 meters). Blooms Jun-Sep.	**Moderate**. The Study Area, not including the Utility Area, contains suitable coastal habitats to support this species. The nearest documented occurrence is over 7 miles north of the Study Area from 1985 and is presumed extant.	**Not Observed.** This species was not observed during the April 15 or June 22, 2016 special-status plant species surveys. Project activities are not anticipated to result in impacts to this species, and no further actions are recommended.
Short-leaved evax *Hesperevax sparsiflora* var. *brevifolia*	Rank 1B.2	Coastal bluff scrub (sandy), coastal dunes, coastal prairie. Elevation ranges from 0 to 710 feet (0 to 215 meters). Blooms Mar-Jun.	**Moderate.** While the Study Area, not including the Utility Area, contains sandy coastal scrub habitat that may be suitable to support this species, the nearest documented occurrence is from 1970 and is located over 7 miles northeast from the Study Area, and has never been verified at this location.	**Not Observed.** This species was not observed during the April 15 or June 22, 2016 special-status plant species surveys. Project activities are not anticipated to result in impacts to this species, and no further actions are recommended.
Kellogg's horkelia *Horkelia cuneata* var. *sericea*	Rank 1B.1	Closed-cone coniferous forest, chaparral (maritime), coastal dunes, coastal scrub/sandy or gravelly, openings. Elevation ranges from 30 to 660 feet (10 to 200 meters). Blooms Apr-Sep.	**Moderate.** The Study Area, not including the Utility Area, contains suitable habitat such as coastal scrub. The nearest documented occurrence is from 2000 and was mapped 3 miles northeast of the Study Area on a ridgetop in Half Moon Bay and is presumed extant at that location.	**Not Observed.** This species was not observed during the April 15 or June 22, 2016 special-status plant species surveys. Project activities are not anticipated to result in impacts to this species, and no further actions are recommended.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS
Point Reyes horkelia *Horkelia marinensis*	Rank 1B.2	Coastal dunes, coastal prairie, coastal scrub/sandy. Elevation ranges from 20 to 2480 feet (5 to 755 meters). Blooms May-Sep.	**Moderate.** The Study Area, not including the Utility Area, contains suitable habitat such as coastal scrub. The nearest documented occurrence is from 1962 and is located approximately 11.5 miles from the Study Area in Junipero Serra Park and is presumed extant at that location.	**Not Observed.** This species was not observed during the April 15 or June 22, 2016 special-status plant species surveys. Project activities are not anticipated to result in impacts to this species, and no further actions are recommended.
island rock lichen *Hypogymnia schizidiata*	Rank 1B.3	Closed-cone coniferous forest, chaparral. Elevation ranges from 1180 to 1330 feet (360 to 405 meters).	**Unlikely.** The Study Area does not contain closed-cone coniferous forest (Monterey cypress stands are historically planted or are volunteers from the planted trees and are not native habitat) or chaparral habitats. All occurrences in the vicinity of the Study Area occur in maritime chaparral habitat (CDFW 2020). Therefore, the Study Area has unlikely potential to support this species.	No further surveys or mitigation measures are recommended.
Coast iris *Iris longipetala*	Rank 4.2	Coastal prairie, lower montane coniferous forest, meadows and seeps/mesic. Elevation ranges from 0 to 1970 feet (0 to 600 meters). Blooms Mar-May.	**Unlikely.** The Study Area does not contain suitable habitat such as lower montane coniferous forest, meadows and seeps, and coastal prairie or heavy soils. Therefore, the Study Area has unlikely potential to support this species.	No further surveys or mitigation measures are recommended.

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 20 to 1710 feet (5 to 520 meters). Blooms Jan-Nov.	**Moderate.** The Study Area, not including the Utility Area, contains suitable habitat such as coastal scrub. The nearest documented occurrence from 1921 is located 12.5 miles from the Study Area at Pescadero State Beach is presumed extant.	**Not Observed.** This species was not observed during the April 15 or June 22, 2016 special-status plant species surveys. Project activities are not anticipated to result in impacts to this species, and no further actions are recommended.
Coast yellow leptosiphon *Leptosiphon croceus*	SC, Rank 1B.1	Coastal bluff scrub, coastal prairie. Elevation ranges from 30 to 490 feet (10 to 150 meters). Blooms Apr-Jun.	**Moderate.** The Study Area, not including the Utility Area, contains suitable habitat such as coastal scrub. However, the nearest documented occurrence is from 2015 and is located 10.8 miles from the Study Area in Moss Beach.	**Not Observed.** This species was not observed during the April 15 or June 22, 2016 special-status plant species surveys. Project activities are not anticipated to result in impacts to this species, and no further actions are recommended.
Rose leptosiphon *Leptosiphon rosaceus*	Rank 1B.1	Coastal bluff scrub. Elevation ranges from 0 to 330 feet (0 to 100 meters). Blooms Apr-Jul.	**Unlikely.** The Study Area does not contain coastal bluff scrub and is therefore unlikely to support this species.	No further surveys or mitigation measures are recommended.
Crystal Springs lessingia *Lessingia arachnoidea*	Rank 1B.2	Cismontane woodland, coastal scrub, valley and foothill grassland/serpentine, often roadsides. Elevation ranges from 200 to 660 feet (60 to 200 meters). Blooms Jul-Oct.	**No Potential.** The Study Area does not contain serpentine substrate.	No further surveys or mitigation measures are recommended.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS
Woolly-headed lessingia *Lessingia hololeuca*	Rank 3	Broadleaved upland forests, coastal scrub, lower montane coniferous forest, valley and foothill grassland/clay, serpentine. Elevation ranges from 50 to 1000 feet (15 to 305 meters). Blooms Jun-Oct.	**Unlikely**. While the Study Area contains coastal scrub, this species is more typical of undisturbed native grassland and serpentine soils. All proximate documented occurrences are associated with higher elevation areas over 5 miles east of the Study Area. Therefore, the Study Area has unlikely potential to support this species.	No further surveys or mitigation measures are recommended.
Ornduff's meadowfoam *Limnanthes douglasii* ssp. *ornduffii*	Rank 1B.1	Meadows and seeps/agricultural fields. Elevation ranges from 30 to 70 feet (10 to 20 meters). Blooms Nov-May.	**Unlikely.** The Study Area does not contain suitable habitat such as meadows and seeps/ agricultural fields. Therefore, the Study Area has unlikely potential to support this species.	No further surveys or mitigation measures are recommended.
San Mateo tree lupine *Lupinus arboreus* var. *eximius*	Rank 3.2	Chaparral, coastal scrub. Elevation ranges from 300 to 1800 feet (90 to 550 meters). Blooms Apr-Jul.	**Moderate.** The Study Area, not including the Utility Area, contains coastal scrub habitat and sandy soils that may be suitable for this species. There limited occurrence information for this species.	**Not Observed.** This species was not observed during the April 15 or June 22, 2016 special-status plant species surveys. Project activities are not anticipated to result in impacts to this species, and no further actions are recommended.
Indian Valley bush-mallow *Malacothamnus aboriginum*	Rank 1B.2	Chaparral, cismontane woodland/rocky, granitic, often in burned areas. Elevation ranges from 490 to 5580 feet (150 to 1700 meters). Blooms Apr-Oct.	**No Potential.** The Study Area does not contain rocky, granitic substrates, or burned areas. Therefore, the Study Area has unlikely potential to support this species.	No further surveys or mitigation measures are recommended.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS
Arcuate bush-mallow *Malacothamnus arcuatus*	Rank 1B.2	Chaparral, cismontane woodland. Elevation ranges from 50 to 1160 feet (15 to 355 meters). Blooms Apr-Sep.	**Unlikely.** The Study Area does not contain chaparral habitat. Forested areas within the Study Area are planted or are spreading from plantings and are not native habitat. Therefore, the Study Area has unlikely potential to support this species.	No further surveys or mitigation measures are recommended.
Davidson's bush-mallow *Malacothamnus davidsonii*	Rank 1B.2	Chaparral, cismontane woodland, coastal scrub, riparian woodland. Elevation ranges from 610 to 2810 feet (185 to 855 meters). Blooms Jun-Jan.	**Moderate.** The Study Area, not including the Utility Area, contains suitable habitat such as sandy coastal scrub. The nearest documented occurrence is from Crystal Spring Reservoir from 1912.	**Not Observed.** This species was not observed during the April 15 or June 22, 2016 special-status plant species surveys. Project activities are not anticipated to result in impacts to this species, and no further actions are recommended.
Hall's bush-mallow *Malacothamnus hallii*	Rank 1B.2	Chaparral, coastal scrub. Elevation ranges from 30 to 2490 feet (10 to 760 meters). Blooms May-Sep (Oct).	**Unlikely.** The Study Area contains suitable habitat such as coastal scrub. However, the nearest documented occurrence is from 1993 and is located 29.8 miles from the Study Area in San Jose and is possibly extirpated. Therefore, the Study Area has unlikely potential to support this species.	No further surveys or mitigation measures are recommended.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS
Marsh microseris *Microseris paludosa*	Rank 1B.2	Closed-cone coniferous forest, cismontane woodland, coastal scrub, valley and foothill grassland. Elevation ranges from 20 to 1160 feet (5 to 355 meters). Blooms Apr-Jun (Jul).	**Moderate.** The Study Area, not including the Utility Area, contains suitable habitat such as coastal scrub. The nearest documented occurrence is from 2004 and is located 14 miles from the Study Area in Pescadero State Beach.	**Not Observed.** This species was not observed during the April 15 or June 22, 2016 special-status plant species surveys. Project activities are not anticipated to result in impacts to this species, and no further actions are recommended.
Woodland woolythreads *Monolopia gracilens*	Rank 1B.2	Broadleaved upland forest (openings), chaparral (openings), cismontane woodland, north coast coniferous forest (openings), valley and foothill grassland/serpentine. Elevation ranges from 330 to 3940 feet (100 to 1200 meters). Blooms (Feb), Mar-Jul.	**Unlikely.** This species often occurs on thin soils on serpentine substrate, and such substrate is absent from the Study Area. Therefore, the Study Area has unlikely potential to support this species.	No further surveys or mitigation measures are recommended.
White-rayed pentachaeta *Pentachaeta bellidiflora*	FE, SE, Rank 1B.1	Cismontane woodland, valley and foothill grassland (often serpentine). Elevation ranges from 110 to 2030 feet (35 to 620 meters). Blooms Mar-May.	**Unlikely**. This species typically occurs on serpentine substrate, often on dry, rocky slopes, and such habitat is absent from the Study Area. Therefore, the Study Area has unlikely potential to support this species.	No further surveys or mitigation measures are recommended.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS
Choris' popcorn flower *Plagiobothrys chorisianus* var. *chorisianus*	Rank 1B.2	Chaparral, coastal prairie, coastal scrub/mesic. Elevation ranges from 50 to 520 feet (15 to 160 meters). Blooms Mar-Jun.	**Present.** Choris' popcornflower was observed during a protocol-level special-status plant survey within the Study Area, not including the Utility Area, on April 15, 2016. It was observed in northern coastal scrub, coyote brush/western rush scrub, seasonal wetland, and coastal wetland habitats. Based on 2016 survey estimates, the Study Area, not including the Utility Area, contains approximately 43,000 individuals of Choris' popcorn flower within 7.5 acres. In addition, Choris' popcorn flower has high potential to occur in seasonal wetland habitat within the Utility Area.	**Observed.** Approximately 7.5 acres or 43,000 individual plants were observed throughout the Study Area. Project activities will result in impacts to approximately 0.37 acre or 2,400 individual plants. Measures to mitigate for these potential impacts include seed collection prior to Project construction to revegetate decommissioned trails. See Section 5.2 for details.
Oregon polemonium *Polemonium carneum*	Rank 2B.2	Coastal prairie, coastal scrub, lower montane coniferous forest. Elevation ranges from 0 to 6000 feet (0 to 1830 meters). Blooms Apr-Sep.	**Moderate.** The Study Area, not including the Utility Area, contains suitable habitat such as coastal scrub. The nearest documented occurrence is from 1916 and is located 7.23 miles from the Study Area in Pilarcitos Dam and is presumed extant at that location.	**Not Observed.** This species was not observed during the April 15 or June 22, 2016 special-status plant species surveys. Project activities are not anticipated to result in impacts to this species, and no further actions are recommended.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS
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.	**Moderate.** The Study Area, not including the Utility Area, contains suitable coastal bluff habitat by sea cliffs. The nearest documented occurrence of this species is from 2008 over 7.8 miles north from the Study Area at Moss Beach.	**Not Observed.** This species was not observed during the April 15 or June 22, 2016 special-status plant species surveys. Project activities are not anticipated to result in impacts to this species, and no further actions are recommended.
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.** This species is known in San Mateo County from thin, rocky soils, and such substrate is absent from the Study Area.	No further surveys or mitigation measures are recommended.
San Francisco campion *Silene verecunda* ssp. *verecunda*	Rank 1B.2	Coastal bluff scrub, chaparral, coastal prairie, coastal scrub, valley and foothill grassland/sandy. Elevation ranges from 100 to 2120 feet (30 to 645 meters). Blooms (Feb), Mar-Jun (Aug).	**Moderate.** Suitable coastal scrub habitat is present within the Study Area, not including the Utility Area. The nearest documented occurrence is from 1994 and is located 6.6 miles from the Study Area on Montara Mountain and is presumed extant at that location.	**Not Observed.** This species was not observed during the April 15 or June 22, 2016 special-status plant species surveys. Project activities are not anticipated to result in impacts to this species, and no further actions are recommended.
San Francisco owl's-clover *Triphysaria floribunda*	Rank 1B.2	Coastal prairie, coastal scrub, valley and foothill grassland/usually serpentine. Elevation ranges from 30 to 520 feet (10 to 160 meters). Blooms Apr-Jun.	**Unlikely.** In the vicinity of the Study Area, this species is known from serpentine substrate, which is absent from the Study Area. Therefore, the Study Area has unlikely potential to support this species.	No further surveys or mitigation measures are recommended.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS
Coastal triquetrella *Triquetrella californica*	Rank 1B.2	Coastal bluff scrub, coastal scrub/soil. Elevation ranges from 30 to 330 feet (10 to 100 meters).	**Unlikely.** This species occurs on thin, often gravelly soils with little competition from other herbs in openings in coastal scrub, and such habitat is absent from the Study Area.	No further surveys or mitigation measures are recommended.
Mammals				
fringed myotis *Myotis thysanodes*	WBWG	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.	**Unlikely.** The Monterey cypress in the northern and southern portions of the Study Area do not contain snags or analogous cavities capable of providing roosting habitat for this species. Fringed myotis may occasionally forage over the Study Area.	No further actions are recommended for this species.
big free-tailed bat *Nyctinomops macrotis*	SSC, WBWG	Occurs rarely in low-lying arid areas. Requires high cliffs or rocky outcrops for roosting sites.	**No Potential.** The Study Area does not contain any high cliffs or rock outcroppings suitable for roosting. This species may migrate over the Study Area.	No further actions are recommended for this species
Townsend's big-eared bat *Corynorhinus townsendii*	SC, SSC, WBWG	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 Monterey cypress in the Study Area do not contain snags or analogous cavities capable of providing roosting habitat for this species. This species may occasionally forage over the Study Area.	No further actions are recommended for this species

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS
pallid bat *Antrozous pallidus*	SSC, WBWG	Occupies a variety of habitats at low elevation including grasslands, shrublands, woodlands, and forests. Roost sites include crevices in rocky outcrops and cliffs, caves, mines, trees and various human structures such as bridges, barns, and buildings (including occupied buildings). Roosts must protect bats from high temperatures. Very sensitive to disturbance of roosting sites.	**Unlikely.** The Monterey cypress in the Study Area do not contain snags or analogous cavities capable of providing roosting habitat for this species. No buildings or rocky outcrops are present. This species may occasionally forage over the Study Area.	No further actions are recommended for this species.
western red bat *Lasiurus blossevillii*	SSC, WBWG	This species is highly migratory and is typically solitary, roosting primarily in the foliage of trees or shrubs. It is associated with broad-leaved tree species including cottonwoods, sycamores, alders, and maples. Day roosts are commonly in edge habitats adjacent to streams or open fields, in orchards, and sometimes in urban areas.	**Moderate Potential.** The Study Area does not contain broad-leaved riparian trees typical of roosting sites for western red bat. The dense willows in the riparian habitat are unlikely to be used for roosting by this species; however, the Monterey cypress may be used for roosting by this species. This species may occasionally forage or migrate over the Study Area.	Avoidance of Monterey cypress stands, work windows, or pre-construction surveys.
hoary bat *Lasiurus cinereus*	WBWG Medium	Prefers open 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. Requires water.	**Moderate Potential.** The Monterey Cypress stands and willows in the riparian habitat may provide suitable roosting habitat for the species. This species may occasionally forage or migrate over the Study Area.	Avoidance of Monterey cypress stands and riparian habitat, work windows, or pre-construction surveys.
saltmarsh harvest mouse *Reithrodontomys raviventris*	FE, SE, CFP	Occurs in pickleweed habitats in tidal, muted-tidal, and diked areas.	**No Potential.** The Study Area does not contain saltmarsh habitat and is outside the range for this species.	No further actions are recommended for this species.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS
San Francisco dusky-footed woodrat *Neotoma fuscipes annectens*	SSC	Typically occurs in forest habitats of moderate canopy and moderate to dense understory. Also found in chaparral habitats. Feeds mainly on woody plants, such as live oak, maple, coffeeberry, alder, and elderberry.	**Moderate Potential.** The riparian habitat is suitable for this species. The Monterey cypress is unlikely to support this species because it lacks understory. Eucalyptus groves along Redondo Beach Road may provide sufficient litter and understory for the construction of houses. No houses were observed during the January 14, 2020 site visit.	Avoidance of willow-riparian habitat or pre-construction surveys in riparian habitat and areas with dense understory/building materials. See Section 5.0 for a description of avoidance and minimization measures.
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.	**Unlikely.** Urban development and habitat fragmentation have extirpated badger from the northern San Francisco Peninsula (CDFW 2016). The Study Area also lacks suitable dry habitat and receives a high level of disturbance from humans and off-leash pets.	No further actions are recommended for this species.
Guadalupe fur seal *Arctocephalus townsendi*	FT, ST, CFP, LCP	Breed on Isla de Guadalupe off the coast of Mexico, occasionally found on San Miguel, San Nicolas, and San Clemente islands. Prefers shallow, nearshore island water with cool and sheltered rocky areas for haul-outs.	**No Potential.** The Study Area does not contain shore or ocean habitat.	No further actions are recommended for this species.
southern sea otter *Enhydra lutris nereis*	FT, CFP, MMC SSC, LCP	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 shore or ocean habitat.	No further actions are recommended for this species.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS
Birds				
California brown pelican *Pelecanus occidentalis californicus*	FD, SD, CFP, LCP	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.	**Unlikely.** Does not breed in the region, but may roost in or be observed flying over areas adjacent to the Study Area.	No further actions are recommended for this species.
white-tailed kite *Elanus leucurus*	CFP, LCP	Year-long resident of coastal and valley lowlands. Preys on small diurnal mammals and occasional birds, insects, reptiles, and amphibians.	**Moderate Potential.** Much of the Study Area is open grassland which is the preferred foraging habitat for the species. The Monterey cypress and tall shrubs in the Study Area are suitable for nesting. Additionally, this species was observed foraging in the Study Area during the January 27, 2016 and January 14, 2020 site visits.	Work windows or pre-construction nesting bird survey within 14 days of initiation of Project activities.
northern harrier *Circus cyaneus*	SSC, LCP	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; nest built of a large mound of sticks in wet areas.	**Unlikely.** A majority of the Study Area does not contain grassland of suitable height for nesting by this species, and there is a high level of disturbance from humans and off-leash pets which reduce the potential for nesting by this species in the Study Area. This species likely nests in nearby habitats, and this species was observed foraging in the Study Area on the January 27, 2016 and January 14, 2020 site visits.	No further actions are recommended for this species.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS
golden eagle *Aquila chrysaetos*	CFP, BGEPA, LCP	Year-round resident in rolling foothills with open grasslands, scattered trees, and cliff-walled canyons.	**Unlikely.** The Study Area lacks suitable nesting sites for this species but this species may be observed foraging over the grassland habitat.	No further actions are recommended for this species.
bald eagle *Haliaeetus leucocephalus*	FD, SE, CFP, BGEPA, LCP	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. Shows a preference for ponderosa pine. Roosts communally in winter.	**Unlikely.** The Monterey cypress trees in the Study Area are not suitable nest sites for bald eagles, and no foraging habitat is present. This species may on rare occasion fly over the Study Area.	No further actions are recommended for this species.
peregrine falcon *Falco peregrinus*	FD, SD, CFP, LCP	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.	**Unlikely.** The Study Area lacks cliffs, banks or tall buildings suitable of supporting nesting peregrines, and no foraging habitat is present. This species may occasionally fly over the Study Area.	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.** There is no salt marsh habitat in the Study Area, and is outside the documented range of this species.	No further actions are recommended for this species.
California black rail *Laterallus jamaicensis coturniculus*	ST, CFP, LCP	Occurs in tidal salt marsh with dense stands of pickleweed as well as freshwater to brackish marshes.	**No Potential.** There is no marsh habitat in the Study Area. The Study Area is outside the documented range of this species.	No further actions are recommended for this species.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS
western snowy plover *Charadrius nivosus (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.** The Study Area does not contain suitable beaches, salt ponds, or alkali flats capable of supporting this species. The adjacent beach habitat is not known to support nesting by this species.	No further actions are recommended for this species.
California least tern *Sterna antillarum browni*	FE, SE, CFP, LCP	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.** The Study Area does not contain suitable beaches, salt ponds, or alkali flats. Additionally the Study Area is outside the documented nesting range of this species.	No further actions are recommended for this species.
short-tailed albatross *Diomedea albatrus*	FE	Nests on Japanese islands. Very rare winter visitor to offshore California waters.	**No Potential.** This Study Area is not located within the known breeding range of this species and is inset from the coast where they primarily forage.	No further actions are recommended for this species.
Xantu's murrelet *Synthliborampus hypoleucus*	SSC	Generally rare post-breeding disperser to the region. Pelagic, breeding on offshore islands in rock crevices or under bushes. Does not breed north of the Channel Islands.	**No Potential.** This Study Area is not located within the known breeding range of this species and is inset from the coast where they primarily forage.	No further actions are recommended for this species.
Cassin's auklet *Ptychoramphus aleuticus*	SSC	Pelagic species, nesting colonially in burrows on coastal and offshore islands.	**No Potential.** This Study Area is not located within the known breeding range of this species and is inset from the coast where they primarily forage.	No further actions are recommended for this species.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS
marbled murrelet *Brachyramphus marmoratus*	FT, SE	Breed in old-growth redwood stands containing platform-like branches along the coast. Winters in coastal waters.	**Unlikely.** This Study Area does not contain old-growth redwood or fir habitats capable of providing nesting for marbled murrelets. Foraging occurs off-shore, though this species may fly-over the Study Area during daily commute between foraging and nesting grounds.	No further actions are recommended for this species.
burrowing owl *Athene cunicularia*	SSC, LCP	Year-round resident and winter visitor. Occurs in open, dry grasslands and scrub habitats with low-growing vegetation, perches and abundant mammal burrows. Preys upon insects and small vertebrates. Nests and roosts in old mammal burrows, most commonly those of ground squirrels.	**Unlikely.** The Study Area does not contain suitable burrow habitat and no ground squirrels or ground squirrel burrows were observed on the January 27 site visit. Burrowing owls are not known to breed in coastal San Mateo County (Shuford and Gardali 2008), but may winter where suitable burrows exist.	No further actions are recommended for this species.
short-eared owl *Asio flammeus*	SSC, LCP	Resident and mostly winter visitor to the region. Found in swamp lands, both fresh and salt; lowland meadows; irrigated alfalfa fields. Tule patches/tall grass needed for nesting/daytime seclusion. Nests on dry ground in depression concealed in vegetation.	**No Potential.** Short-eared owls are not known to breed in coastal San Mateo County (Shuford and Gardali 2008). Grasslands within the Study Area do not provide vegetation tall enough for nesting sites or cover from predators and the Study Area receives a high level of disturbance from humans and off-leash pets.	No further actions are recommended for this species.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS
olive-sided flycatcher *Contopus cooperi*	SSC	Summer resident. Typical breeding habitat is montane coniferous forests. At lower elevations, also occurs in wooded canyons and mixed forests and woodlands. Often associated with forest edges. Arboreal nest sites located well off the ground.	**Moderate Potential.** This species does not typically nest in such close proximity to the coast; however, the Monterey cypress in the Study Area provide suitable nesting habitat for olive-sided flycatchers.	Avoidance of Monterey cypress woodlands, work windows, or pre-construction nesting bird survey within 14 days of initiation of Project activities.
little willow flycatcher *Empidonax traillii brewsteri*	SE	Summer resident in the Sierra Nevada and Cascades, breeding in extensive thickets of low, dense willows adjacent to wet meadows, ponds, or backwaters at 2,000 to 8,000 feet elevation. Current breeding population small and declining.	**Unlikely.** The Study Area is outside of the known breeding range of this species. This species may be observed during migration.	No further actions are recommended for this species.
purple martin *Progne subis*	SSC	Inhabits woodlands and low elevation coniferous forests. Nests in old woodpecker cavities and human-made structures. Nest is often located in tall, isolated tree or snag.	**Unlikely.** The Monterey cypress in the Study Area provide insufficient cavities to support breeding purple martins. Breeding in San Mateo County is localized to mid-elevation coastal woodlands. This species may occasionally be seen within the Study Area during migration or as pre and post-breeding dispersers.	No further actions are recommended for this species.
bank swallow *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.	**No Potential.** The Study Area has no cliffs or suitable riparian areas that would provide banks for nesting.	No further actions are recommended for this species.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS
loggerhead shrike *Lanius ludovicianus*	SSC	Prefers open habitats with scattered shrubs, trees, posts, or other perches. Eats mostly large insects.	**Moderate Potential.** Trees and shrubs in the Study Area provide suitable nesting and foraging habitat for loggerhead shrikes. Though suitable habitat is present, no loggerhead shrikes were observed during the January 27, 2016 or January 14, 2020 site visit.	Work windows or pre-construction nesting bird survey within 14 days of initiation of Project activities. See Section 5.0 for measures.
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.	**Moderate Potential.** The willow riparian habitat in the Study Area is suitable to support nesting common yellowthroats. Though suitable habitat is present, no common yellowthroats were observed during the January 27, 2016 and January 14, 2020 site visit.	Avoidance of riparian habitat, work windows, or pre-construction nesting bird survey within 14 days of initiation of Project activities.
yellow-breasted chat *Icteria virens*	SSC	Summer resident; inhabits riparian thickets of willow and other brushy tangles near watercourses. Nests in low, dense riparian thickets consisting of willow, blackberry, wild grape	**No Potential.** The Study Area is outside the documented breeding range of this species (Shuford and Gardali 2008).	No further actions are recommended for this species.
yellow warbler *Dendroica petechia*	SSC	Summer resident in the region. Nests in riparian stands of aspens, sycamores, and alders with a dense understory of willows. Also nests in montane shrubbery in open conifer forests.	**Moderate Potential.** The willow riparian habitat in the Study Area is suitable to support nesting yellow warblers.	Avoidance of riparian habitat, work windows, or pre-construction nesting bird survey within 14 days of initiation of Project activities.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS
grasshopper sparrow *Ammodramus savannarum*	SSC	Frequents dense tall, dry or well-drained grasslands, especially native grasslands with mixed grasses and forbs for foraging and nesting. Nests on ground at base of overhanging clumps of vegetation.	**Unlikely.** The Study Area contains extremely limited suitable dry, tall grassland habitat and the area receives a high level of disturbance from humans and off-leash pets. It is unlikely this species nests in the Study Area.	No further actions are recommended for this species.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS
Bryant's savannah sparrow *Passerculus sandwichensis alaudinus*	SSC	Year-round resident associated with the coastal fog belt, primarily between Humboldt and northern Monterey Counties. Occupies low tidally influenced habitats and adjacent areas; often found where wetland communities merge into grassland. May also occur in drier grasslands. Nests near the ground in taller vegetation, including along roads, levees, and canals.	**High Potential.** The Study Area contains grassland and wetland habitats capable of supporting nesting and foraging savannah sparrows. This species was observed during the January 27, 2016 site visit, and has a high potential to nest within the Study Area.	Work windows or pre-construction nesting bird survey within 14 days of initiation of Project activities.
Alameda song sparrow *Melospiza melodia pusillula*	SSC	Year-round resident in tidal-influenced marshes along the eastern and southern portions of San Francisco Bay.	**No Potential.** Alameda song sparrows are known to occur in marshes associated with the southern San Francisco Bay. This subspecies is not documented to occur on the Pacific Coast side of the San Francisco Peninsula.	No further actions are recommended for this species.
tricolored blackbird *Agelaius tricolor*	SSC	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.	**Unlikely.** The Study Area does not contain riparian or marsh habitat typical for tricolored blackbird nesting. The willow riparian habitat does not contain open water habitat in or near the willows which is preferred for nesting colonies to provide ample prey items (Shuford and Gardali 2008).	No further actions are recommended for this species.
Reptiles and Amphibians				

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS
Western pond turtle *Actinemys 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.	**No Potential.** There is no suitable aquatic habitat within the Study Area. The drainage in the Study Area does not provide a permanent water source for this species and it is not known in the vicinity.	No further actions are recommended for this species.
San Francisco garter snake *Thamnophis sirtalis tetrataenia*	FE, SE, CFP, LCP	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. Upland areas near water are also very important.	**Unlikely.** The Study Area does not contain suitable aquatic habitat. The drainage in the Study Area does not provide a permanent water source for this species or its prey items and it is not known in the vicinity. The nearest potential habitat is 0.5 mile east of the Study Area across Highway 1.	No further actions are recommended for this species.
California red-legged frog *Rana draytonii*	FT, SSC, LCP	Associated with quiet perennial to intermittent ponds, stream pools, and wetlands. Prefers shorelines with extensive vegetation. Documented to disperse through upland habitats after rains.	**Unlikely.** The Study Area does not contain suitable aquatic habitat. The drainage, seasonal wetlands, and irrigation ditches within the Study Area do not provide a permanent water source for this species. No seasonal features are of suitable depth to support CRLF breeding, though they may occasionally be used by dispersing individuals from nearby occupied habitat. The nearest potential breeding habitat is over 600 feet from the Study Area and suitable burrows were not observed; therefore the Study Area does not support upland refugia of CRLF.	Implement prescribed avoidance and mitigation measures discussed in Section 5.0.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS
Fish				
river lamprey *Lampetra ayresi*	SSC	Lower Sacramento River, San Joaquin River and Russian River. May occur in coastal streams north of San Francisco Bay. Adults need clean, gravelly riffles, ammocoetes need sandy backwaters or stream edges, good water quality and temps < 25 degrees C.	**No Potential.** None of the aquatic features within the Study Area are anadromous or perennial. The Study Area is also outside of the range of this species.	No further actions are recommended for this species.
green sturgeon *Acipenser medirostris*	FT, SSC	Spawn in the Sacramento River and the Klamath River. Spawn at temperatures between 8-14 degrees C. Preferred spawning substrate is large cobble, but can range from clean sand to bedrock.	**No Potential.** None of the aquatic features within the Study Area are anadromous or perennial. The Study Area is also outside of the spawning range of this species.	No further actions are recommended for this species.
Pacific herring *Clupea pallasii*	None	Pacific herring is a coastal marine fish that uses large estuaries for spawning and early rearing habitat.	**No Potential.** None of the aquatic features within the Study Area are anadromous or perennial. The Study Area is also outside of the spawning range of this species.	No further actions are recommended for this species.
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.** None of the aquatic features within the Study Area are anadromous or perennial. They are therefore unsuitable to support any life stage of tidewater goby.	No further actions are recommended for this species.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	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.** None of the aquatic features within the Study Area are anadromous or perennial.	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.	**No Potential.** The Study Area lacks suitable estuarine habitat and is outside of the range of this species.	No further actions are recommended for this species.
steelhead - Central CA Coast ESU *Oncorhynchus mykiss irideus*	FT	Occurs from the Russian River south to Soquel Creek and Pajaro River, San Francisco and San Pablo Bay Basins. Populations in the Sacramento and San Joaquin Rivers and their tributaries. 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.	**No Potential.** None of the aquatic features within the Study Area are anadromous or perennial. They are therefore unsuitable to support any life stage of steelhead.	No further actions are recommended for this species.
Chinook salmon – Sacramento winter-run ESU *Oncorhynchus tshawytscha*	FE, SE, RP	Occurs in the Sacramento River below Keswick Dam. Spawns in the Sacramento River but not in tributary streams. Adults migrate upstream to spawn in cool, clear, well-oxygenated streams. Juveniles typically migrate to the ocean soon after emergence from the gravel.	**No Potential.** None of the aquatic features within the Study Area are anadromous or perennial, and the Study Area is outside the spawning range of this species.	No further actions are recommended for this species.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS
Chinook salmon - central valley spring-run ESU *Oncorhynchus tshawytscha*	FT, ST	Populations spawning in the Sacramento and San Joaquin Rivers and their tributaries. 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.	**No Potential.** None of the aquatic features within the Study Area are anadromous or perennial, and the Study Area is outside the spawning range of this species.	No further actions are recommended for this species.
Chinook salmon - central valley fall/late fall-run ESU *Oncorhynchus tshawytscha*	SSC, RP	Populations spawning in the Sacramento and San Joaquin Rivers and their tributaries. 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.	**No Potential.** None of the aquatic features within the Study Area are anadromous or perennial, and the Study Area is outside the spawning range of this species.	No further actions are recommended for this species.
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.	**No Potential.** None of the aquatic features within the Study Area are anadromous or perennial. They are therefore unsuitable to support any life stage of coho salmon.	No further actions are recommended for this species.
Invertebrates				

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS
white abalone *Haliotes sorenseni*	FE	White abalone is the first marine invertebrate to be listed under the ESA and are reported to be most abundant between 25-30 m (80-100 ft depth).	**No Potential.** The Study Area does not contain shoreline or ocean habitats.	No further actions are recommended for this species.
black abalone *Haliotes cracherodii*	FE	Ranges from Cabo San Lucas to Mendocino County. Found in intertidal and shallow subtidal areas.	**No Potential.** The Study Area does not contain shoreline or ocean habitats.	No further actions are recommended for this species.
San Bruno elfin butterfly *Callophrys mossii bayensis*	FE, LCP	Limited to the vicinity of San Bruno Mountain, San Mateo County. Colonies are located on in rocky outcrops and cliffs in coastal scrub habitat on steep, north-facing slopes within the fog belt. Species range is tied to the distribution of the larval host plant, *Sedum spathulifolium*.	**No Potential.** The Study Area is out of the known range of this species and does not contain its larval host plant.	No further actions are recommended for this species.
Myrtle's silverspot butterfly *Speyeria zerene myrtleae*	FE	Restricted to the foggy, coastal dunes/hills of the Point Reyes peninsula; extirpated from coastal San Mateo County. Larval foodplant thought to be *Viola adunca*.	**No Potential.** No suitable habitat is present, and the Study Area is outside of the current range for this species. Extirpated from San Mateo County (CNDDB 2016).	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.** No serpentine or suitable habitat is present for this species. This species was extirpated from San Mateo County (USFWS 2009), and the only known population in San Mateo County is from a reintroduction plan at Edgewood County Park started in 2011.	No further action recommended for this species.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS
monarch butterfly *Danaus plexippus*	winter roosts monitored by CDFW	Winter roost sites located in wind-protected tree groves (Eucalyptus, Monterey pine, cypress), with nectar and water sources nearby.	**Unlikely.** The trees within the Study Area do not comprise groves typical of winter roost sites for this species. Groves tend to be set in more protected areas from the immediate coastline and no monarch butterflies were observed in the Study Area or adjacent eucalyptus groves on the January 27 site visit. Though monarchs have been observed foraging in adjacent areas, roost sites are unlikely to establish on the Study Area.	No further action recommended for this species.
vernal pool fairy shrimp *Branchinecta lynchi*	FT, RP	Endemic to the grasslands of the central valley, central coast mountain, and south coast mountains. Inhabit small, clear-water sandstone-depression pools and grassed swale, earth slump, or basalt-flow depression pools.	**No Potential.** The Study Area does not contain vernal pool or suitable habitat for this species.	No further actions are recommended for this species.
longhorn fairy shrimp *Branchinecta longiantenna*	FE, RP	Endemic to the eastern margin of the central coast mountains in seasonally astatic grassland vernal pools. Inhabit small, clear-water depressions in sandstone and clear-to-turbid clay/grass-bottomed pools in shallow swales.	**No Potential.** The Study Area does not contain vernal pool or suitable habitat for this species.	No further actions are recommended for this species.
San Francisco tree lupine moth *Grapholita edwardsiana*	LCP	Occurs only on sandy northern peninsula sites. Tree lupine (*Lupinus arboreus*) host the larvae of this species. This species is addressed in the City of Half Moon Bay LCP.	**Unlikely**. No tree lupine observed near the Study Area.	No further actions are recommended for this species.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**	RECOMMENDATIONS
mimic tryonia (California brackish water snail) *Tryonia imitator*	LCP	Occurs in brackish water, such as Pescadero Marsh. This species is addressed in the City of Half Moon Bay LCP.	**Unlikely.** The Study Area does not contain brackish water or marsh habitat suitable for this species.	No further actions are recommended for this species.
globose dune beetle *Coelus globosus*	LCP	Inhabitant of coastal sand dune habitat, from Bodega Head in Sonoma County south to Ensenada, Mexico. Inhabits foredunes and sand hummocks; it burrows beneath the sand surface and is most common beneath dune vegetation. This species is addressed in the City of Half Moon Bay LCP.	**Unlikely**. No dune habitat within the proposed Project.	No further action recommendations for this species.

*** Key to status codes:**

BGEPA	Bald and Golden Eagle Protection Act
CFP	California Department of Fish and Wildlife (CDFW) Fully Protected Animal
FC	Federal Candidate
FE	Federal Endangered
FT	Federal Threatened
LCP	City of Half Moon Bay Local Coastal Program Rare, Endangered, or Unique Species
SE	State Endangered
SC	State Candidate
SSC	California Department of Fish and Wildlife (CDFW) Species of Special Concern
ST	State Threatened
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)
WBWG	Western Bat Working Group High Priority Species

WL	CDFW Watch List

****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 F

STUDY AREA PHOTOGRAPHS

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View of one of the many developed/disturbed areas from informal trails that traverse the Study Area. Photo taken in northwest corner of Study Area, with northern coastal scrub depicted on the right.

View of Eucalyptus grove in southeast corner of Study Area.

View of Monterey cypress stand near the southeast corner of the Study Area.

View of representative vegetation in non-native grassland in the northwest portion of the Study Area.

View of dense ice plant mats along sea cliffs in western portion of the Study Area.

Representative view of northern coastal scrub in habitat central portion of the Study Area.

View of Sample Point 20 in coyote brush/western rush scrub located in north central portion of Study Area.

View of sea cliffs in southwest portion of the Study Area.

View of main ravine with unnamed intermittent to perennial drainage in southwest portion of Study Area.

View of high tide line from the beach.

View of ravine with central coast riparian scrub facing northeast from the top of southern slope.

View of ravine with central coast riparian scrub facing east from the top of its northern slope.

View of SP 7 located in central coast riparian scrub habitat within ravine in southwestern portion of Study Area.

View of ordinary high water mark for non-wetland waters associated with unnamed intermittent to perennial drainage.


View of intermittent to perennial drainage connection to tidal waters from the beach.


View of existing trail crossing through central coast riparian scrub in eastern portion of Study Area.

View of seasonal wetland depression SW 1, associated with Sample Point 1. Photograph taken on January 26, 2016

View of coastal seasonal swale, SW33, where Sample Point 3 was taken on January 26, 2016.


View of a seasonal wetland marsh dominated by located in the north-central portion of the Study Area, associated with Sample Point 16.


View of a seasonal wetland depression, SW 38, on January 26, 2016.

View of algal growth in seasonal wetland depression, SW 38.

View of seasonal wetland swale, SW44, taken on January 27, 2016.

Representative view of algal matting and surface water present at in seasonal wetland depression, SW 93, taken on January 27, 2016.

Representative view of seasonal wetland marsh, SW 104, in southern portion of Study Area on January 27, 2016.

View facing west of surface water present in seasonal wetland depression SW 101 on January 27, 2016.

View facing west of seasonal wetland depression SW 101 on February 9, 2016.


View of algal growth within SW 101 taken on February 9, 2016.


View of chorus frog egg masses and algal growth observed at seasonal wetland depression, SW 67.

View of larger seasonal wetland depression, SW 67, taken on January 27, 2016.

View of representative soil profile taken from upland adjacent to SW 67 associated with Sample Point 15.

Representative view of coastal seasonal wetland depressions during the January 27, 2016 site visit. SW 83 pictured.

View facing north of coastal seasonal wetland depressions SW 77, SW 78, and SW 79, observed with no surface water and no high water table on the February 8, 2016 site visit.


View of algal growth within seasonal wetland marsh SW 19, taken on February 16, 2016.


View of Sample Point 22, taken within SW 19, with representative species dominated by brown headed rush (*Juncus phaeocephalus*, FACW).

Redoximorphic concentrations observed within depleted matrix, observed at Sample Point 22 on February 16, 2016.

Representative view of upland Sample Point 23.

Representative view of coastal seasonal wetland meadow, SW 7, dominated by popcorn flower (*Plagiobothrys chorisianus*, OBL).

Representative view of coastal seasonal wetland meadow, SW 28, dominated by Monterey sedge (*Carex harfordii*, OBL) and bristly ox-tongue (*Helminthotheca echioides*, FACU).

A portion of the Utility Area, showing Redondo Beach Road and adjacent eucalyptus grove on both sides of the road and ruderal/developed on the left in the background. View facing west.

Appendix D:
Cultural Resources Survey

A Cultural Resources Study of the Wavecrest Coastal Trail Project Phase 2 Half Moon Bay, San Mateo County, California

Eileen Barrow, M.A.
Registered Professional Archaeologist (#989269)

February 26, 2016

A Cultural Resources Study of the
Wavecrest Coastal Trail Project Phase 2
Half Moon Bay, San Mateo County, California

Prepared by:

Eileen Barrow

Eileen Barrow, M.A.
Registered Professional Archaeologist (#989269)

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Requested by:

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February 26, 2016

ABSTRACT

Tom Origer & Associates conducted a cultural resources survey for the Wavecrest Coastal Trail, Phase 2 Project, Half Moon Bay, San Mateo County. The study was requested by John Hykes, PlaceWorks. The study area consists of an approximately two miles of trail routes and alternative trail routes, and an approximately 0.25-mile construction access route along the coastal bluff, between Phase 1 of the Wavecrest Coastal Trail and Redondo Beach Drive. This study was designed to satisfy California Environmental Quality Act requirements of the City of Half Moon Bay.

This study included archival research at the Northwest Information Center, Sonoma State University (NWIC File No. 15-1108), examination of the library and files of Tom Origer & Associates, field inspection of the study area, and contact with the Native American community. No cultural resources were discovered within the study area. Documentation pertaining to this study is on file at the offices of Tom Origer & Associates (File No. 2016-011S).

Synopsis

Project:	Wavecrest Coastal Trail, Phase 2
Location:	just south of the City of Half Moon Bay, San Mateo County, California
Quadrangle:	Half Moon Bay, 7.5' series
Study Type:	Intensive survey
Scope:	~2 miles of trail route and alternative trail routes and approximately 0.20 miles of construction access
Finds:	None

PROJECT PERSONNEL

Eileen Barrow conducted all aspects of this study. Mrs. Barrow has been with Tom Origer & Associates since 2005. She holds a Master of Arts in cultural resources management from Sonoma State University. Mrs. Barrow's experience includes work that has been completed in compliance with local ordinances, CEQA, NEPA, and Section 106 (NHPA) requirements. Her professional affiliations include the Society for American Archaeology, the Society for California Archaeology, the Cotati Historical Society, the Sonoma County Historical Society, and the Western Obsidian Focus Group.

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FIGURES

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INTRODUCTION

This report describes a cultural resources study for the Wavecrest Coastal Trail, Phase 2 project, just south of Half Moon Bay, in San Mateo County, California. The study area is located between Wavecrest Coastal Trail, Phase 1 at Poplar Beach, and Redondo Beach Road, Half Moon Bay, San Mateo County (Figure 1). The study area consisted of approximately two miles of trail route and alternative trail routes and 0.25 miles of construction access. This study was prepared at the request of John Hykes of PlaceWorks, in compliance with requirements of the City of Half Moon Bay and the California Environmental Quality Act. Documentation pertaining to this study is on file at Tom Origer & Associates (File No. 2016-011S).

REGULATORY CONTEXT

The California Environmental Quality Act (CEQA) requires that historical resources be considered during the environmental review process. This is accomplished by an inventory of resources within a study area and by assessing the potential that historical resources could be affected by development. The term “Historical Resources’ encompasses prehistoric and historical archaeological sites and built environment resources (e.g., buildings, bridges, canals). An additional category of resources is defined in CEQA under the term “Tribal Cultural Resources” (Public Resources Code Section 21074). They are not addressed in this report. Tribal cultural resources are resources that are of specific concern to California Native American tribes, and knowledge of such resources is limited to tribal people. Pursuant to revisions to CEQA enacted in July of 2015, such resources are to be identified by tribal people in direct, confidential consultation with the lead agency (PRC §21080.3.1).

This cultural resources survey was designed to satisfy environmental issues specified in the CEQA and its guidelines (Title 14 CCR §15064.5) by: (1) identifying all cultural resources within the project area; (2) offering a preliminary significance evaluation of the identified cultural resources;

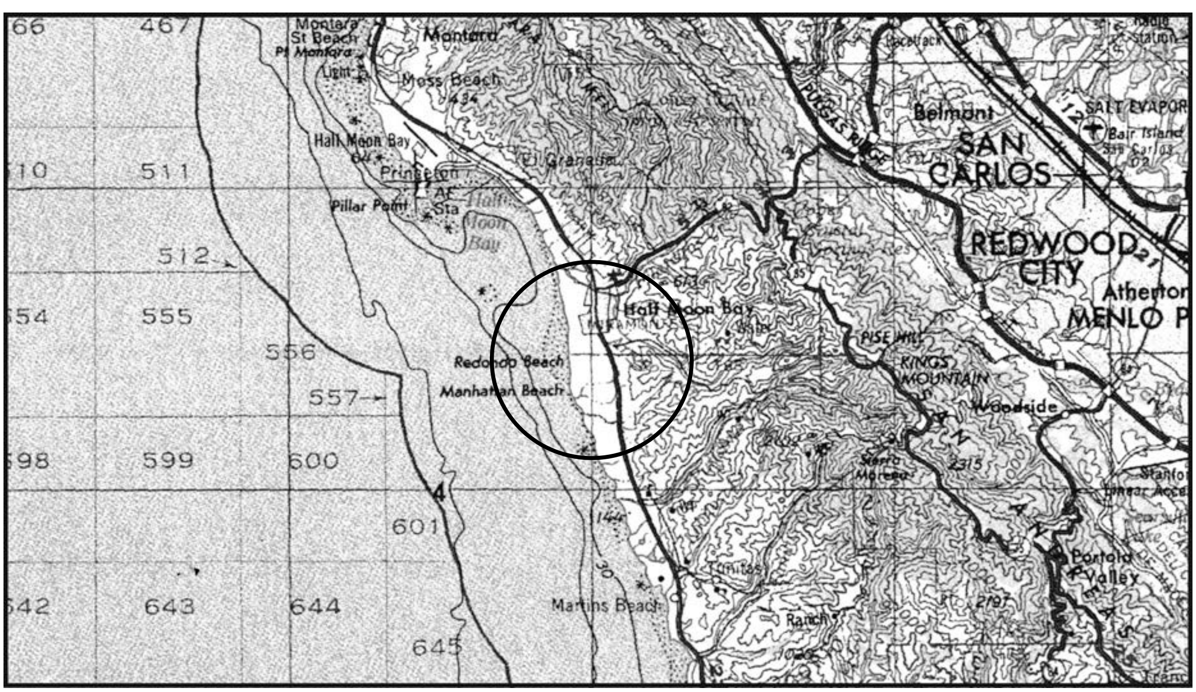

Figure 1. Project vicinity (adapted from the 1980 San Francisco 1:250,000-scale USGS map).

(3) assessing resource vulnerability to effects that could arise from project activities; and (4) offering suggestions designed to protect resource integrity, as warranted.

Resource Definitions

Cultural resources are classified by the State Office of Historic Preservation (OHP) as sites, buildings, structures, objects and districts, and each is described by OHP (1995) as follows.

> **Site.** A site is the location of a significant event, a prehistoric or historic occupation or activity, or a building or structure, whether standing, ruined, or vanished, where the location itself possesses historic, cultural, or archaeological value regardless of the value of any existing structure.
>
> **Building.** A building, such as a house, barn, church, hotel, or similar construction, is created principally to shelter any form of human activity. "Building" may also be used to refer to a historically and functionally related unit, such as a courthouse and jail, or a house and barn.
>
> **Structure.** The term "structure" is used to distinguish from buildings those functional constructions made usually for purposes other than creating human shelter.
>
> **Object.** The term "object" is used to distinguish from buildings and structures those constructions that are primarily artistic in nature or are relatively small in scale and simply constructed. Although it may be, by nature or design, movable, an object is associated with a specific setting or environment.
>
> **District.** A district possesses a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development.

Significance Criteria

When a project might affect a cultural resource, the project proponent is required to conduct an assessment to determine whether the effect may be one that is significant. Consequently, it is necessary to determine the importance of resources that could be affected. The importance of a resource is measured in terms of criteria for inclusion on the California Register of Historical Resources (Title 14 CCR, §4852(a)) as listed below. A resource may be important if it meets any one of the criteria below, or if it is already listed on the California Register of Historical Resources or a local register of historical resources.

An important historical resource is one which:

1. Is associated with events that have made a significant contribution to the broad patterns of local or regional history, or the cultural heritage of California or the United States.

2. Is associated with the lives of persons important to local, California, or national history.

3. Embodies the distinctive characteristics of a type, period, region or method of construction, or represents the work of a master or possesses high artistic values.

4. Has yielded, or may be likely to yield, information important to the pre-history or history of the local area, California, or the nation.

In addition to meeting one or more of the above criteria, eligibility for the California Register requires that a resource retains sufficient integrity to convey a sense of its significance or importance. Seven elements are considered key in considering a property's integrity: location, design, setting, materials, workmanship, feeling, and association.

Additionally, the OHP advocates that all historical resources over 45 years old be recorded for inclusion in the OHP filing system (OHP 1995:2), although the use of professional judgment is urged in determining whether a resource warrants documentation.

PROJECT SETTING

Study Area Location and Description

The study area is located in west-central San Mateo County, approximately 1.25 miles southwest of downtown Half Moon Bay, as shown on the Half Moon Bay 7.5' USGS topographic quadrangle (Figure 2). It consists of approximately two miles of preferred trail and alternative trail routes, and 0.25 mile of construction access route located on the bluff above the Pacific Ocean.

The nearest year-round fresh water source is Arroyo León, a tributary to Pilarcitas Creek that lies about a mile east of the study area. Soils mapped for this location are of the Watsonville series (Wagner and Nelson 1961:Sheet 11). Drainage of these soils ranges greatly. Some Watsonville soils are well-drained while others are very poorly drained. Within the study area, the terrain is hummocky and water tends to collect in low areas. Coyote brush and grasses are the chief vegetation supported by Watsonville soils, and historically, parcels with these soils have been used to grow truck crops, for grain production, and as pasture (Wagner and Nelson 1961:70-71).

Geology within the study area is made up of Pleistocene (11,700 to 2.55 million years ago) marine and marine terrace deposits of the Colma Formation. This formation is comprised of sand and clay (Jennings and Burnett 1961.

The study area is in a location with well-drained soils that could have supported a variety of plants that in turn could have served as food and cover for animals. The presence of these natural attributes suggest that the project location could have been a desirable place for prehistoric people to live and gather resources.

Cultural Setting

Archaeological evidence indicates that human occupation of California began at least 11,000 years ago (Erlandson *et al.* 2007). Early occupants appear to have had an economy based largely on hunting, with limited exchange, and social structures based on extended family units. Later, milling technology and an inferred acorn economy were introduced. This diversification of economy appears coeval with the development of sedentism, population growth, and expansion. Sociopolitical complexity and status distinctions based on wealth are also observable in the archaeological record, as evidenced by an increased range and distribution of trade goods (e.g., shell beads, obsidian tool stone), which are possible indicators of both status and increasingly complex exchange systems.

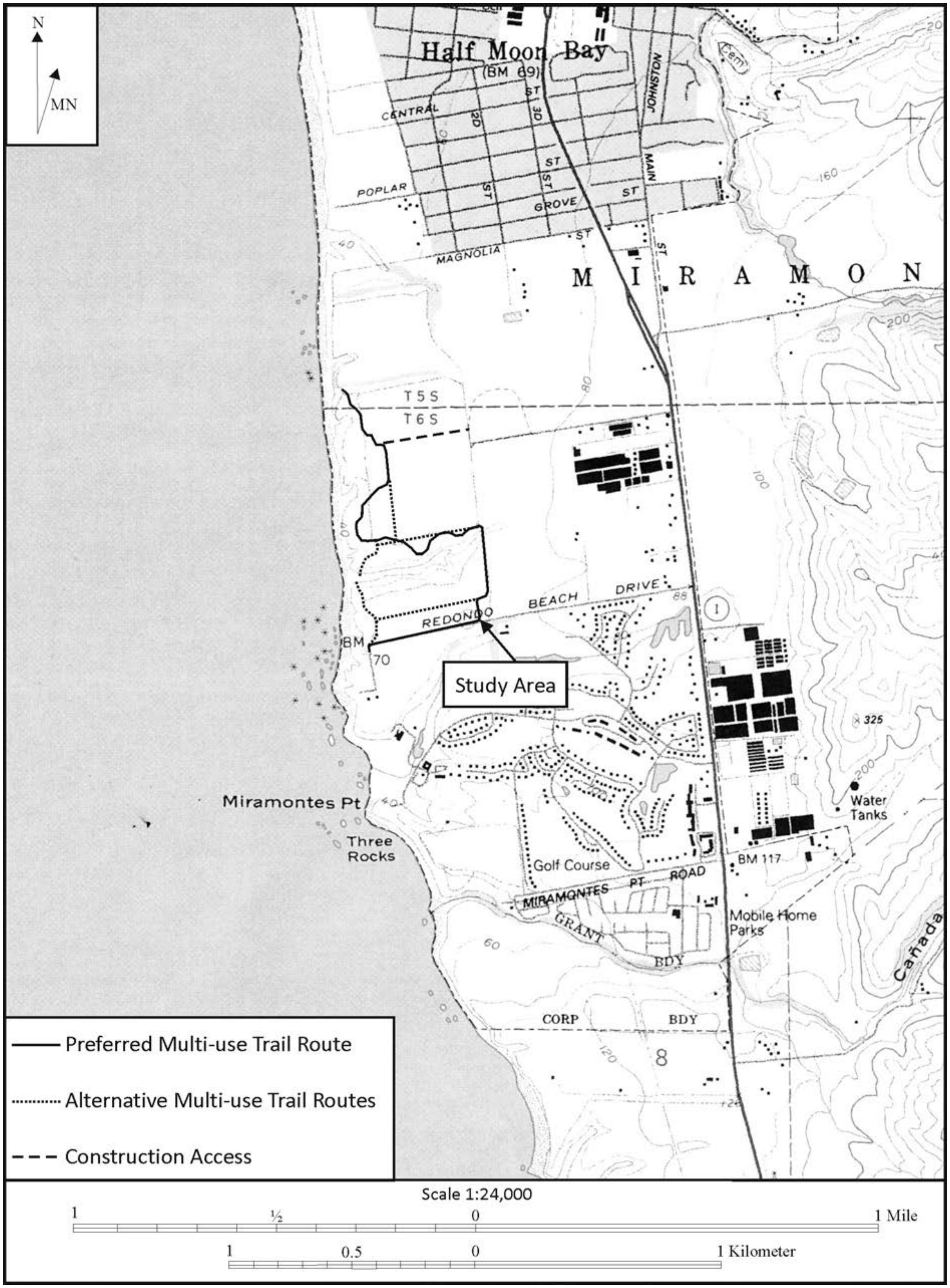

Figure 2. Study location (adapted from the 1997 Half Moon Bay 7.5' USGS topographic map).

At the time of European settlement, the study area was included in the territory controlled by the Ohlone, who are also referred to as Costanoans (Levy 1978:485-495). The Ohlone were hunter-gatherers who lived in rich environments that allowed for dense populations with complex social structures (Levy 1978:485-495; Kroeber 1925:462-473). They settled in large, permanent villages about which were distributed seasonal camps and task-specific sites. Primary village sites were occupied throughout the year and other sites were visited in order to procure particular resources that were especially abundant or available only during certain seasons. Sites often were situated near fresh water sources and in ecotones where plant life and animal life were diverse and abundant.

Historically, the study area is within the Rancho Miramontes granted to Juan Jose Candelario Miramontes in 1841. In 1853, Scottish immigrant James Johnston purchased nearly 1,200 acres of the 4,424-acre rancho where he and his brothers establish a successful cattle ranch. Historical maps show no specific historical use of the study area.

STUDY PROCEDURES AND RESULTS

Native American Contact Procedures

The State of California's Native American Heritage Commission, members of the Amah Mutsun Tribal Band of Mission San Juan Bautista, Costanoan Rumsen Carmel Tribe, Indian Canyon Mutsun Band of Costanoan, Muwekma Ohlone Indian Tribe of the SF Bay Area, The Ohlone Indian Tribe, Trina Marine Ruano Family, and Jakki Kehl and Linda G. Yamane were contacted in writing. A log of contact efforts is provided at the end of this report (Appendix A).

Native American Contact Results

The Native American Heritage Commission responded stating that a search of their sacred land files found no record of cultural resources within the study area. A list of additional contacts was provided. No other responses have been received as of the date of this report.

Archival Study Procedures

Archival research included examination of the library and project files at Tom Origer & Associates. A review (NWIC File No. 15-1108) was completed of the archaeological site base maps and records, survey reports, and other materials on file at the Northwest Information Center (NWIC), Sonoma State University, Rohnert Park. Sources of information included but were not limited to the current listings of properties on the National Register of Historic Places (National Register), California Historical Landmarks, California Register of Historical Resources (California Register), and California Points of Historical Interest as listed in the Office of Historic Preservation's *Historic Property Directory* (OHP 2012).

The Office of Historic Preservation has determined that structures older than 45 years should be considered potentially important historical resources, and former building and structure locations could be potentially important historic archaeological sites. Archival research included an examination of historical maps to gain insight into the nature and extent of historical development in the general vicinity, and especially within the study area. Maps ranged from hand-drawn maps of the 1800s (e.g., GLO plats) to topographic maps issued by the United States Geological Survey (USGS) and the Army Corps of Engineers (USACE) from the early to the middle 20th century.

Ethnographic literature that describes appropriate Native American groups, county histories, and other primary and secondary sources were reviewed. Sources reviewed are listed in the "Materials Consulted" section of this report.

In addition, a paleontological database records check request was made to the University of California's Museum of Paleontology (UCMP).

Archival Study Results

Archival research found that the study area has been previously surveyed (Cartier 2002; Clark 1988). This survey covered a much larger area than the current survey and did not result in the finding of any cultural resources within the current study area. Surveys conducted adjacent to the current study area also did not result in the finding of any cultural resources (Beard 2012; LSA Associates, Inc. 2001).

There are no cultural resources recorded within one-half mile of the study area.

There are no reported ethnographic sites within one mile of the study location (Kroeber 1925; Levy 1978).

Review of historical maps found no evidence of buildings or structures on the project parcel (USACE 1940; USCS 1861; USCGS 1863, 1931; USGS 1952, 1961a, 1961b).

A review of the paleontological database at the UCMP showed the presence of three vertebrate localities. These localities are all located over 2000 feet from the southern edge of the study area (Table 1).

Table 1. Results of the UCMP database search.

Location	Epoch	Formation	Age	Lat	Long
V82002	Miocene	Purisima	Hemphillian	37.430556	-122.45
V83053	Miocene	Purisima	Hemphillian	37.428611	-122.438611
V83098	Pleistocene		Rancholabrean	37.433611	-122.441667

Based on the distribution of known cultural resources and their environmental settings, it was anticipated that prehistoric or historical archaeological sites could be found within the study area. Prehistoric archaeological site indicators expected to be found in the region include but are not limited to: obsidian and chert flakes and chipped stone tools; grinding and mashing implements such as slabs and handstones, and mortars and pestles; bedrock outcrops and boulders with mortar cups; and locally darkened midden soils containing some of the previously listed items plus fragments of bone, shellfish, and fire affected stones. Historic period site indicators generally include: fragments of glass, ceramic, and metal objects; milled and split lumber; and structure and feature remains such as building foundations and discrete trash deposits (e.g., wells, privy pits, dumps)

Field Survey Procedures

A field survey of the trail routes and the construction access was completed by Eileen Barrow on February 17, 2016. Trail routes were surveyed in 50-foot (15 meter) zig-zagging corridors so that an additional 25 feet (7.5 meters) on either side of the center of the trail routes and construction access was surveyed as well. Visibility was excellent to poor, with asphalt, grass, and duff being the primary hindrances. A hoe was used, as needed, to clear small patches of grass and duff so that the ground surface could be inspected.

Field Survey Results

No cultural resources were found during the course of this survey.

RECOMMENDATIONS

Known Resources

Because no cultural resources were found during the course of this study no further study is recommended.

Paleontological deposits were found over 2000 feet from the study area. No recommendations are warranted at this time.

Accidental Discovery

The geology of the study area consists of Pleistocene deposits. These deposits predate accepted dates for human occupation of California; therefore, there is a very low likelihood of there being buried prehistoric deposits found within these geologic deposits.

In keeping with the CEQA guidelines, if archaeological remains are uncovered, work at the place of discovery should be halted immediately until a qualified archaeologist can evaluate the finds (§15064.5 [f]). Prehistoric archaeological site indicators include: obsidian and chert flakes and chipped stone tools; grinding and mashing implements (e.g., slabs and handstones, and mortars and pestles); bedrock outcrops and boulders with mortar cups; and locally darkened midden soils. Midden soils may contain a combination of any of the previously listed items with the possible addition of bone and shell remains, and fire affected stones. Historic period site indicators generally include: fragments of glass, ceramic, and metal objects; milled and split lumber; and structure and feature remains such as building foundations and discrete trash deposits (e.g., wells, privy pits, dumps).

The following actions are promulgated in Public Resources Code 5097.98 and Health and Human Safety Code 7050.5, and pertain to the discovery of human remains. If human remains are encountered, excavation or disturbance of the location must be halted in the vicinity of the find, and the county coroner contacted. If the coroner determines the remains are Native American, the coroner will contact the Native American Heritage Commission. The Native American Heritage Commission will identify the person or persons believed to be most likely descended from the deceased Native American. The most likely descendent makes recommendations regarding the treatment of the remains with appropriate dignity.

SUMMARY

Tom Origer & Associates completed a cultural resources survey for the Wavecrest Coastal Trail, Phase 2 project, just south of Half Moon Bay, in San Mateo County, California. The study was requested by John Hykes of PlaceWorks, in compliance with requirements of the City of Half Moon

Bay and the California Environmental Quality Act. The study area consists of approximately two miles of trail route and alternative trail routes and 0.25 miles of construction access. No cultural resources were discovered; therefore, no further recommendations are warranted. Documentation pertaining to this study is on file at the offices of Tom Origer & Associates (File No. 2016-011S).

MATERIALS CONSULTED

Alexander, P.
1916 *History of San Mateo County.* Burlingame Publishing, Burlingame.

Alley, B.
1883 *History of San Mateo County, California.* B.F. Alley, San Francisco.

Bean, L. (Editor)
1994 *The Ohlone Past and Present.* Ballena Press, Menlo Park.

Beard, V.
2012 *A Cultural Resources Survey for the Wavecrest Coastal Trail project, Half Moon Bay, San Mateo County, California.* Document S-44526 on file at the Northwest Information Center, Rohnert Park.

Bromfield, D.
1894 *Official Map of San Mateo County.* Schmidt Label & Lith. Co. San Francisco.

Cartier, R.
2002 *Cultural Resource Evaluation for the Coastside Trail Project in the County of San Mateo.* Document S-26160 on file at the Northwest Information Center, Rohnert Park.

Clark, M.
1988 *Archaeological Reconnaissance of the "North Project Area" of the Wavecrest Restoration Project in the City of Half Moon Bay, San Mateo, County, California.* Document S-9779 on file at the Northwest Information Center, Rohnert Park.

2001 *An Archaeological Reconnaissance of the "Carnoustie Project Area" on Redondo Beach Road, in the City of Half Moon Bay, San Mateo County, California*. Document S-24407 on file at the Northwest Information Center, Rohnert Park.

General Land Office
1860 *Plat of the Miramontes Rancho* finally confirmed to Vicente Miramontes and others. Department of the Interior, Washington, D.C.

Erlandson, J., T. Rick, T. Jones, and J. Porcasi
2007 One if by Land, Two if by Sea: Who Where the First Californians? In *California Prehistory: Colonization, Culture, and Complexity*. Edited by T. Jones and K. Klar, Altamira Press.

Hoover, M., H. Rensch, E. Rensch, W. Abeloe
1966 *Historic Spots in California.* 3rd edition. Stanford University Press. Stanford.

Hoover, M., H. Rensch, E. Rensch, W. Abeloe, and D. Kyle

1990 *Historic Spots in California.* 4th edition, Stanford University Press. Stanford.

2002 *Historic Spots in California.* 5th edition, Stanford University Press. Stanford.

Jennings, C. and J. Burnett
1961 Geologic Map of California, San Francisco Sheet (1:250,000-scale). Olaf P. Jenkins edition. Division of Mines and Geology, Williams & Heintz Map Corporation, Washington, D.C.

King, J.
2004 Archaeological Sensitivity Maps. In *Landscape Evolution and the Archaeological Record: A Geoarchaeological Study of the Southern Santa Clara Valley and Surrounding Region*, Edited by J. Rosenthal and J. Meyer. Center for Archaeological Research at Davis, University of California

Kroeber, A.
1925 *Handbook of the Indians of California.* Bureau of American Ethnology, Bulletin 78, Smithsonian Institution, Washington, D.C.

Levy, R.
1978 Costanoan. In *California* edited by R. Heizer, pp. 485-495. Handbook of North American Indians, Vol. 8, W. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

Margolin, M.
1978 *The Ohlone Way.* Heyday Books, Berkeley.

Moratto, M.
1984 *California Archaeology.* Academic Press, San Francisco.

Moore and DePue
1878 *Moore and DePue's Illustrated History of San Mateo County, California.* G.T. Brown, San Francisco.

Office of Historic Preservation (OHP)
1995 *Instructions for Recording Historic Resources*. Office of Historic Preservation, Sacramento.

2012 *Historic Property Directory*. Office of Historic Preservation, Sacramento.

State of California Department of Parks and Recreation
1976 *California Inventory of Historic Resources.* Department of Parks and Recreation, Sacramento.

United States Army Corps of Engineers
1940 Half Moon Bay, California. 15' map series. War Department, Washington, D.C.

United States Coast Survey
1861 Map of the Coast of California in the Vicinity of Half Moon Bay. Register No. T993. Department of the Interior, Washington, D.C.

United States Coast and Geodetic Survey
1863 Half Moon Bay, California. Chart 984. Department of the Interior, Washington, D.C.

1931 Half Moon Bay, Purisima to Pillar Point. Survey No. T4786. Department of the Interior, Washington, D.C.

United States Geological Survey
1952 Half Moon Bay, California. 7.5’ map series. Geological Survey, Washington, D.C.

1961a Half Moon Bay, California. 15’ map series. Geological Survey, Washington, D.C.

1961b Half Moon Bay, California. 7.5’ map series. Geological Survey, Washington, D.C.

Wagner, R. and R. Nelson
1961 *Soil Survey of the San Mateo Area, California.* U.S. Department of Agriculture in co-operation with the University of California Agricultural Experiment Station.

APPENDIX A: Native American Contact

Native American Contact Efforts
Wavecrest Coast Trail, Phase 2, Half Moon Bay, San Mateo County

Organization	Contact	Letters	Results
Native American Heritage Commission		1/26/16	Response received on 2/4/16. A search of the sacred land files did not show cultural resources within the study area. The NAHC provided a list of recommended contacts in regard to the current project.
Amah Mutsun Tribal Band of Mission San Juan Bautista	Irene Zwierlein	2/4/16	No response received as of the date of this report
Costanoan Rumsen Carmel Tribe	Tony Cerda	2/4/16	No response received as of the date of this report
Indian Canyon Mutsun Band of Costanoan	Ann Marie Sayers	2/4/16	No response received as of the date of this report.
Muwekma Ohlone Indian Tribe of the SF Bay Area	Rosemary Cambra	2/4/16	No response received as of the date of this report.
The Ohlone Indian Tribe	Andrew Galvan	2/4/16	No response received as of the date of this report.
Trina Marine Ruano Family	Ramona Garibay	2/4/16	No response received as of the date of this report.
	Jakki Kehl	2/4/16	No response received as of the date of this report.
	Linda G. Yamane	2/4/16	No response received as of the date of this report.

Sacred Lands File & Native American Contacts List Request

NATIVE AMERICAN HERITAGE COMMISSION
1550 Harbor Blvd., Suite 100
West Sacramento, CA 95691
(916) 373-3710
(916) 373-5471 – Fax
nahc@nahc.ca.gov

Information Below is Required for a Sacred Lands File Search

Project: Wavecrest Trail
County: San Mateo

USGS Quadrangles
Name: Half Moon Bay
Township T5S and T6S Range R5W Section(s) N/A MDBM (within the Miramontes land grant

Date: January 29, 2016

Company/Firm/Agency: Tom Origer & Associates
Contact Person: Eileen Barrow

Address: PO Box 1531
City: Rohnert Park Zip: 94927
Phone: (707) 584-8200 Fax: (707) 584-8300
Email: eileen@origer.com

Project Description:
The project proponent is planning on developing an approximately 1.5 mile coastal trail.

STATE OF CALIFORNIA Edmund G. Brown, Jr., Governor

NATIVE AMERICAN HERITAGE COMMISSION
1550 Harbor Blvd., Suite 100
West Sacramento, CA 95691
(916) 373-3710
Fax (916) 373-5471

February 4, 2016

Eileen Barrow
Tom Origer & Associates

Sent by Email: eileen@origer.com
Number of Pages: 2

RE: Wavecrest Trail, San Mateo County

Dear Ms. Barrow:

A record search of the Native American Heritage Commission (NAHC) *Sacred Lands File* was completed for the area of potential project effect (APE) referenced above with negative results. Please note that the absence of specific site information in the *Sacred Lands File* does not indicate the absence of Native American cultural resources in any APE.

I suggest you contact all of those listed, if they cannot supply information, they might recommend others with specific knowledge. The list should provide a starting place to locate areas of potential adverse impact within the APE. By contacting all those on the list, your organization will be better able to respond to claims of failure to consult. If a response has not been received within two weeks of notification, the NAHC requests that you follow-up with a telephone call to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from any of these individuals or groups, please notify me. With your assistance we are able to assure that our lists contain current information. If you have any questions or need additional information, please contact via email: Sharaya.souza@nahc.ca.gov.

Sincerely,

Sharaya Souza

Sharaya Souza
Staff Services Analyst

Native American Contact
San Mateo County
February 4, 2016

Amah MutsunTribal Band of Mission San Juan Bautista
Irenne Zwierlein, Chairperson
789 Canada Road — Ohlone/Costanoan
Woodside , CA 94062
amahmutsuntribal@gmail.com
(650) 400-4806 Cell

(650) 332-1526 Fax

Coastanoan Rumsen Carmel Tribe
Tony Cerda, Chairperson
240 E. 1st Street — Ohlone/Costanoan
Pomona , CA 91766
rumsen@aol.com
(909) 524-8041 Cell
(909) 629-6081

Indian Canyon Mutsun Band of Costanoan
Ann Marie Sayers, Chairperson
P.O. Box 28 — Ohlone/Costanoan
Hollister , CA 95024
ams@indiancanyon.org
(831) 637-4238

Muwekma Ohlone Indian Tribe of the SF Bay Area
Rosemary Cambra, Chairperson
P.O. Box 360791 — Ohlone / Costanoan
Milpitas , CA 95036
muwekma@muwekma.org
(408) 314-1898
(510) 581-5194

The Ohlone Indian Tribe
Andrew Galvan
P.O. Box 3152 — Ohlone/Costanoan
Fremont , CA 94539 — Bay Miwok
chochenyo@AOL.com — Plains Miwok
(510) 882-0527 Cell — Patwin

(510) 687-9393 Fax

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code

This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed Wavecrest Trail, Half Moon Bay, San Mateo County.

February 4, 2016

Irene Zwierlein
Amah Mutsun Tribal Band of Mission San Juan Bautista
789 Canada Road
Woodside, CA 94062

RE: Wavecrest Coastal Trail Project Phase 2, Half Moon Bay, San Mateo County

Dear Ms. Zwierlein:

I write to notify you of a proposed project within San Mateo County, for which our firm is conducting a cultural resources study. The Wavecrest Coastal Trail Project Phase 2 is a proposal to construct an approximately 1.5 mile trail along the coastal bluff. As part of this study, there is nearly one mile in alternative routes. The city of Half Moon Bay is reviewing this project for CEQA compliance.

Enclosed is a portion of the Half Moon Bay, Calif. 7.5' USGS topographic quadrangle showing the project location.

Sincerely,

Eileen Barrow

Eileen Barrow
Senior Associate

Tom Origer & Associates
Archaeology / Historical Research

February 4, 2016

Tony Cerda
Costanoan Rumsen Carmel Tribe
244 East 1st Street
Pomona, CA 91766

RE: Wavecrest Coastal Trail Project Phase 2, Half Moon Bay, San Mateo County

Dear Mr. Cerda:

I write to notify you of a proposed project within San Mateo County, for which our firm is conducting a cultural resources study. The Wavecrest Coastal Trail Project Phase 2 is a proposal to construct an approximately 1.5 mile trail along the coastal bluff. As part of this study, there is nearly one mile in alternative routes. The city of Half Moon Bay is reviewing this project for CEQA compliance.

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Sincerely,

Eileen Barrow

Eileen Barrow
Senior Associate

P.O. Box 1531, Rohnert Park, California 94927 ♦ www.origer.com Phone (707) 584-8200

Tom Origer & Associates
Archaeology / Historical Research

February 4, 2016

Ann Marie Sayers
Indian Canyon Mutsun Band of Costanoan
P.O. Box 28
Hollister, CA 95024

RE: Wavecrest Coastal Trail Project Phase 2, Half Moon Bay, San Mateo County

Dear Ms. Sayers:

I write to notify you of a proposed project within San Mateo County, for which our firm is conducting a cultural resources study. The Wavecrest Coastal Trail Project Phase 2 is a proposal to construct an approximately 1.5 mile trail along the coastal bluff. As part of this study, there is nearly one mile in alternative routes. The city of Half Moon Bay is reviewing this project for CEQA compliance.

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Sincerely,

Eileen Barrow
Senior Associate

Tom Origer & Associates
Archaeology / Historical Research

February 4, 2016

Rosemary Cambra
Muwekma Ohlone Indian Tribe of the SF Bay Area
P.O. Box 360791
Milpitas, CA 95036

RE: Wavecrest Coastal Trail Project Phase 2, Half Moon Bay, San Mateo County

Dear Ms. Cambra:

I write to notify you of a proposed project within San Mateo County, for which our firm is conducting a cultural resources study. The Wavecrest Coastal Trail Project Phase 2 is a proposal to construct an approximately 1.5 mile trail along the coastal bluff. As part of this study, there is nearly one mile in alternative routes. The city of Half Moon Bay is reviewing this project for CEQA compliance.

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Sincerely,

Eileen Barrow

Eileen Barrow
Senior Associate

P.O. Box 1531, Rohnert Park, California 94927 ♦ www.origer.com Phone (707) 584-8200

February 4, 2016

Andrew Galvan
The Ohlone Indian Tribe
P.O. Box 3152
Fremont, CA 94539

RE: Wavecrest Coastal Trail Project Phase 2, Half Moon Bay, San Mateo County

Dear Mr. Galvan:

I write to notify you of a proposed project within San Mateo County, for which our firm is conducting a cultural resources study. The Wavecrest Coastal Trail Project Phase 2 is a proposal to construct an approximately 1.5 mile trail along the coastal bluff. As part of this study, there is nearly one mile in alternative routes. The city of Half Moon Bay is reviewing this project for CEQA compliance.

Enclosed is a portion of the Half Moon Bay, Calif. 7.5' USGS topographic quadrangle showing the project location.

Sincerely,

Eileen Barrow
Senior Associate

Tom Origer & Associates
Archaeology / Historical Research

February 4, 2016

Ramona Garibay
Trina Marine Ruano Family
30940 Watkins St
Union City, CA 94587

RE: Wavecrest Coastal Trail Project Phase 2, Half Moon Bay, San Mateo County

Dear Ms. Garibay:

I write to notify you of a proposed project within San Mateo County, for which our firm is conducting a cultural resources study. The Wavecrest Coastal Trail Project Phase 2 is a proposal to construct an approximately 1.5 mile trail along the coastal bluff. As part of this study, there is nearly one mile in alternative routes. The city of Half Moon Bay is reviewing this project for CEQA compliance.

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Sincerely,

Eileen Barrow

Eileen Barrow
Senior Associate

P.O. Box 1531, Rohnert Park, California 94927 ♦ www.origer.com Phone (707) 584-8200

Tom Origer & Associates
Archaeology / Historical Research

February 4, 2016

Jakki Kehl
720 North 2nd Street
Patterson, CA 95363

RE: Wavecrest Coastal Trail Project Phase 2, Half Moon Bay, San Mateo County

Dear Ms. Kehl:

I write to notify you of a proposed project within San Mateo County, for which our firm is conducting a cultural resources study. The Wavecrest Coastal Trail Project Phase 2 is a proposal to construct an approximately 1.5 mile trail along the coastal bluff. As part of this study, there is nearly one mile in alternative routes. The city of Half Moon Bay is reviewing this project for CEQA compliance.

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Sincerely,

Eileen Barrow

Eileen Barrow
Senior Associate

February 4, 2016

Linda G. Yamane
1585 Mira Mar Ave
Seaside, CA 93955

RE: Wavecrest Coastal Trail Project Phase 2, Half Moon Bay, San Mateo County

Dear Ms. Yamane:

I write to notify you of a proposed project within San Mateo County, for which our firm is conducting a cultural resources study. The Wavecrest Coastal Trail Project Phase 2 is a proposal to construct an approximately 1.5 mile trail along the coastal bluff. As part of this study, there is nearly one mile in alternative routes. The city of Half Moon Bay is reviewing this project for CEQA compliance.

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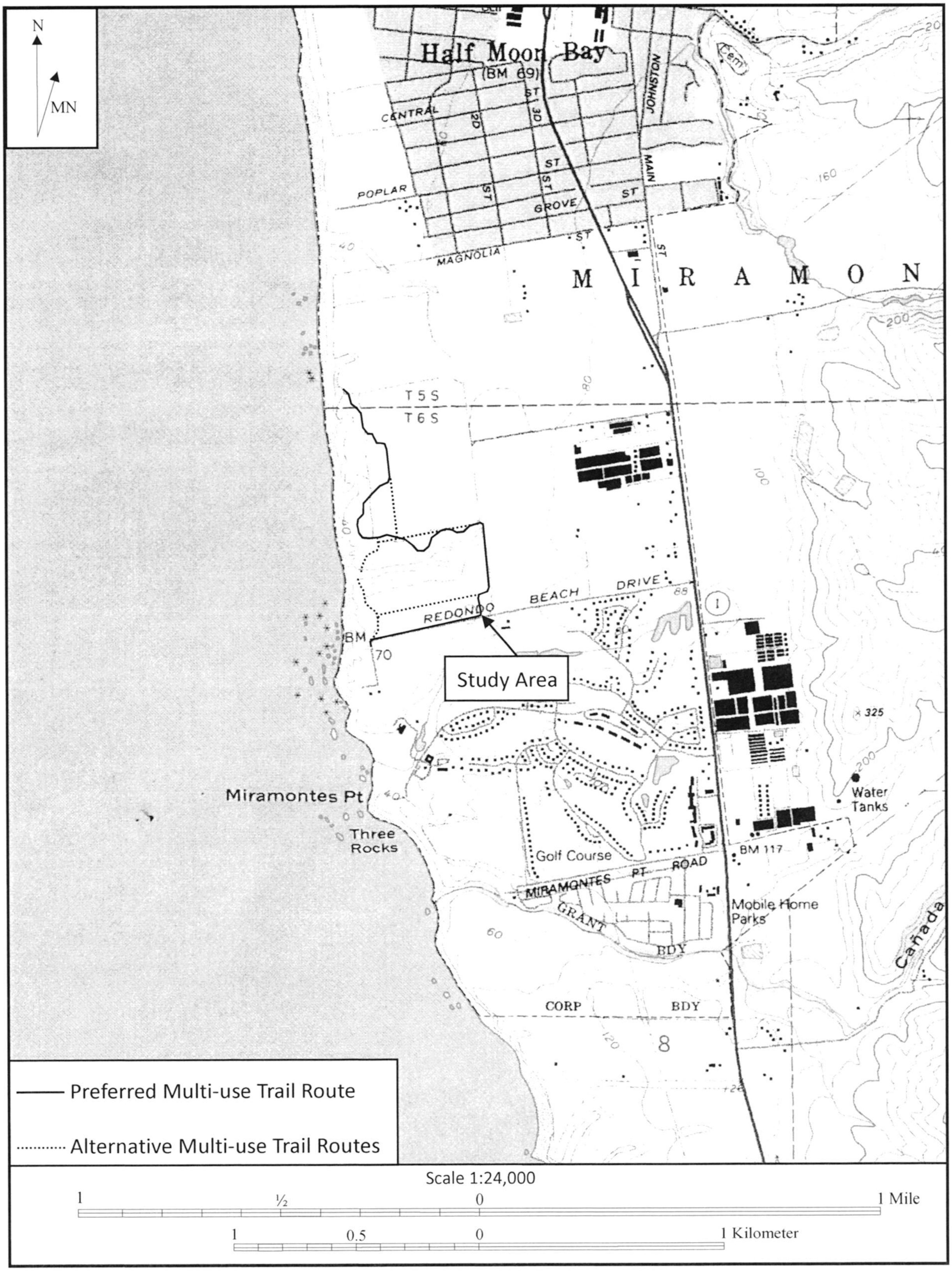
Sincerely,

Eileen Barrow

Eileen Barrow
Senior Associate



N
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Half Moon Bay
(BM 69)
CENTRAL
2D
3D
ST
JOHNSTON
MAIN
POPLAR
1ST
GROVE
ST
MAGNOLIA
M I R A M O N
T 5 S
T 6 S
REDONDO
BEACH
DRIVE
BM
70
Study Area
Miramontes Pt
Three Rocks
Golf Course
MIRAMONTES PT ROAD
BM 117
Water Tanks
Mobile Home Parks
GRANT
BDY
CORP
BDY
Cañada
× 325
Preferred Multi-use Trail Route
Alternative Multi-use Trail Routes
Scale 1:24,000
1 ½ 0 1 Mile
1 0.5 0 1 Kilometer

Appendix E:
Engineering geologic review

Appendix C:
Engineering geologic review

ENGINEERING GEOLOGIC REVIEW
WAVECREST COASTAL TRAIL
PHASE II PROJECT

San Mateo County, CA

March 19, 2017 (revised)

Job: CLT-WAVECREST-584

Prepared for:
PLACEWORKS
1625 Shattuck Avenue, Suite 300
Berkeley CA 94709

TIMOTHY C. BEST, CEG
ENGINEERING GEOLOGY AND HYDROLOGY
1002 Columbia Street, Santa Cruz, CA 95060 • Tel (831) 425-5832 • Fax: (831) 425-5830 e-mail: timbest@coastgeo.com

TABLE OF CONTENTS

1.0 INTRODUCTION

This revised report provides an Engineering Geologic Review of the proposed Phase II Wavecrest Coastal Trail, located along the outer edge of a steep coastal bluff in San Mateo County, about 4 miles south of Half Moon Bay. This report is an update of my January 28, 2012 report focusing on the Phase II portion of the project.

The Wavecrest Coastal Trail is to be a 2.4-mile long 4 to 8- foot wide multi-use trail that is to extend 2.5 miles from Poplar Beach south to Redondo Beach Road (Figure 1). The Phase I portion of the project is a 1-mile long segment of the trail in the northern portion of project area. Construction of this phase of the project was completed in 2015. The Phase II portion of the trail is to extend 1.4 miles from the end of Phase I to Redondo Beach Road with much of the trail located well back from the edge of the bluff.

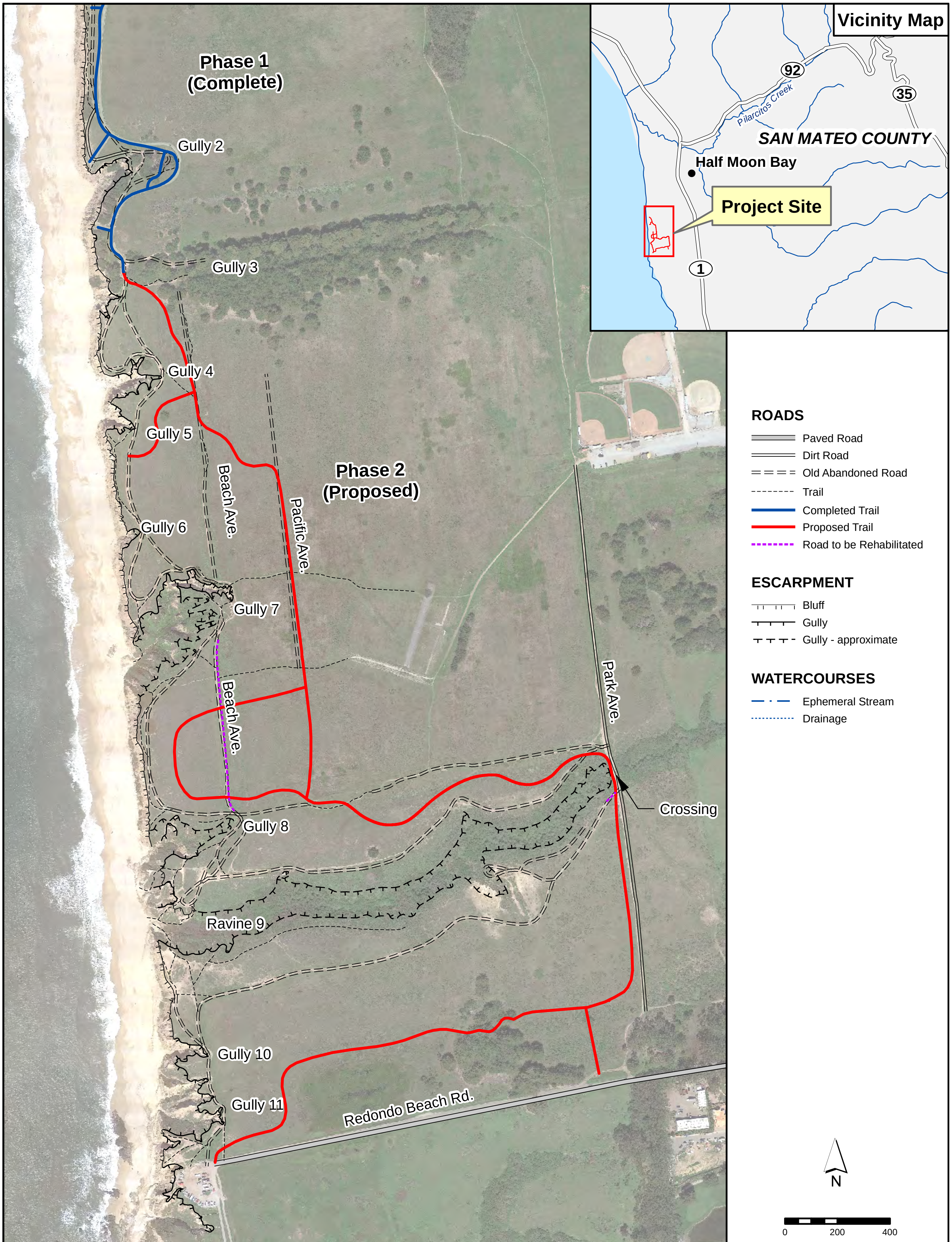
1.1 PURPOSE AND SCOPE

The purpose of this study was to evaluate the geologic conditions along the Phase II portion of the property and assess the implications of the proposed project with respect to erosion and coastal buff stability. Included in this report are recommendations to mitigate the potential geologic and erosional risks associated with the proposed trail to an acceptable level for the intended recreational use. Recommendations are specific to the construction of the southern portion of the trail except for an alternate trail segment that will drop down to the beach at Ravine 9. Additional work will be required to develop final prescriptions for the southern trail segment.

Work performed during this investigation includes:

1. Review of available published and unpublished geologic literature for the area
2. Review of six sets of stereo aerial photographs
3. Field reconnaissance of the proposed trail
4. Evaluation of field and air photo data to develop recommendations for trail design and siting
5. Preparation of this report and the accompanying graphics

This assessment relied on the visual recognition of landscape and geologic features. Subsurface exploration was not undertaken and was outside the scope of this study.



TIMOTHY C. BEST, CEG
ENGINEERING GEOLOGY AND HYDROLOGY
1002 Columbia Street, Santa Cruz, CA 95060
(831) 425 5832 (831) 425 5830 (fax)

OVERVIEW MAP

WAVECREST COASTAL TRAIL: PHASE II
COASTSIDE LAND TRUST

FIGURE: 1
Job: CLT-WAVECREST-584
Date:3/19/2017 (revised)

2.0 PHYSICAL ENVIRONMENT

2.1 GEOMORPHIC SETTING

The project site is characterized by a broad gently sloping marine terrace that slopes seaward at about 4%. The terrace is fronted by a linear 50± foot high, steep, actively eroding coastal bluff with loose talus and a narrow beach found at its base (Figure 1, Photos 1 and 2). The bluff face is inclined at 70 to 80 degrees from horizontal. The bluff is indented by several steep sided coastal gullies and ravines, many of which have enlarged in recent years in part due to changes in surface drainage patterns. A topographic map derived from 2009 - 2011 CA Coastal Conservancy Coastal Lidar Project: Hydro-flattened Bare Earth DEM is found in Figure 1. Based on our field review of the site this topographic map accurately depicts topographic conditions.

The project area is crossed by remnants of several old roads and a series of informal trails. An old agricultural road is located along the bluff edge and remnants of several other roads paralleling the coastline along the right of way of the paper subdivision. These other roads include Beach Avenue, Pacific Avenue and Park Avenue. Portions of these old roads were constructed with shallow ditches on their landward side presumably to prevent surface storm runoff from flowing over the road. Over time many of these roads have become entrenched which has allowed runoff to concentrate, resulting in ponding, erosion of the roadbed and contributing to the formation and growth of the coastal bluff gullies.

Photo 1: Coastal bluff and gullies fronting the Wavecrest property (2015). Remnants of old agricultural roads paralleling the coastline are visible inland. (from California Coastal Records Project, www.californiacoastline.org)

Photo 2: Coastal bluff north of Redondo Beach showing Ravine 9. The proposed trail will need to cross this ravine on an existing road located 1,700 feet back from the beach (from California Coastal Records Project, www.californiacoastline.org)

The project area was historically subdivided into multiple small parcels and paper subdivision roads. The property is presently undeveloped and vegetated with non-native grassland, northern coastal scrub, seasonal wetlands, and Monterey cypress forest habitat.

2.1.1 Climate

Half Moon Bay is characterized by a coastal fog-belt Mediterranean climate with cool, rainy winters and mild, foggy summers. Prevailing onshore winds often result in winter low clouds and mist, and summer fog. Mean annual rainfall averages 18 inches.

2.2 GEOLOGY AND SOILS

The site lies along the Central California coast on the western flank of the Santa Cruz Mountains, in the central portion of the Coast Range physiographic province of California. This portion of the Coast Range is formed by a series of rugged, linear ridges and valleys following the pronounced northwest to southeast structural grain of central California geology. The Santa Cruz Mountains are mostly underlain by a large, elongate prism of granitic and metamorphic basement rocks, known collectively as the Salinian Block. These rocks are separated from contrasting basement rock types to the northeast and southwest by the San Andreas and San Gregorio-Nacimiento strike-slip fault systems, respectively. Overlying the granitic basement rocks is a sequence of dominantly marine sedimentary rocks of Paleocene (65 to 55 million years ago) to Pliocene (5.3 to 1.6 million years ago) age and non-marine sediments of Pliocene to Pleistocene (1.6 million to 11,500 years ago) age (Figure 2).

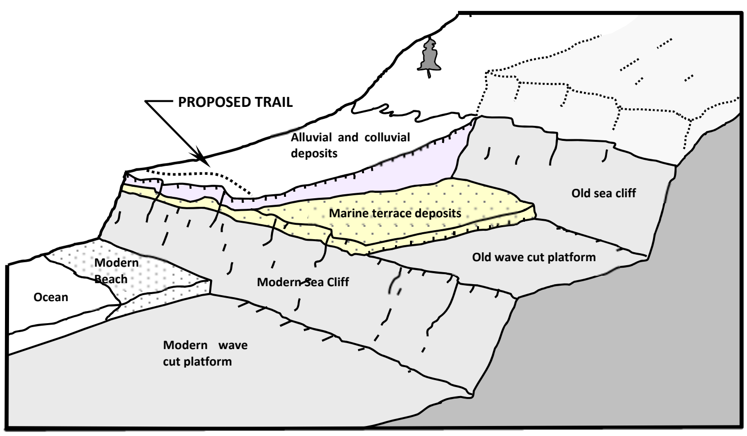


Diagram 1: Schematic of marine terrace deposits.

This portion of California forms the boundary of the Pacific and North American lithospheric plates that are separated by a broad system of northwest-southeast trending strike slip faults that includes the San Andreas (SAF) and San Gregorio (SGF) faults. For the past 15 million years (mid -Miocene) the Pacific Plate has been slipping northwest with respect to the North American Plate (Atwater, 1970) (Figure 2). Compression along this fault system has resulted in tectonic uplift reflected by the Santa Cruz Mountains, which follow the pronounced structural grain of the central California geology. Along the coast, ongoing tectonic activity is evident in the formation of a series of uplifted marine terraces. The Loma Prieta earthquake of 1989 and its continuing aftershocks are the most recent reminders of the geologic unrest in the region.

The marine terraces were formed in the last few hundred thousand years when sea level was higher, relative to the land surface, than at present. At that time, the ocean carved a sea cliff comparable to the modern day cliff. When sea level fell due to the onset of continental glaciation, it left behind a wave-cut bench covered by beach and near shore marine deposits. That bench has further been covered to varying degrees by alluvial and colluvial sediments.

Tectonic uplift has elevated the terrace surfaces to their current position, about 50 feet above the ocean. A narrow, steep sand beach fronts the sea cliff.

2.2.1 Bedrock Geology

Bedrock is not exposed at the project site or along the coastal bluff; it has been buried by a thick layer of marine terrace deposits and by modern beach sands. Based on regional mapping by Brabb et al. (1998) the site is underlain at depth by Purisima Sandstone which is described as a locally highly fractured, well indurated (hard) marine fine-grained sandstone, siltstone and mudstone. Bedrock is mapped dipping moderately to the west and south.

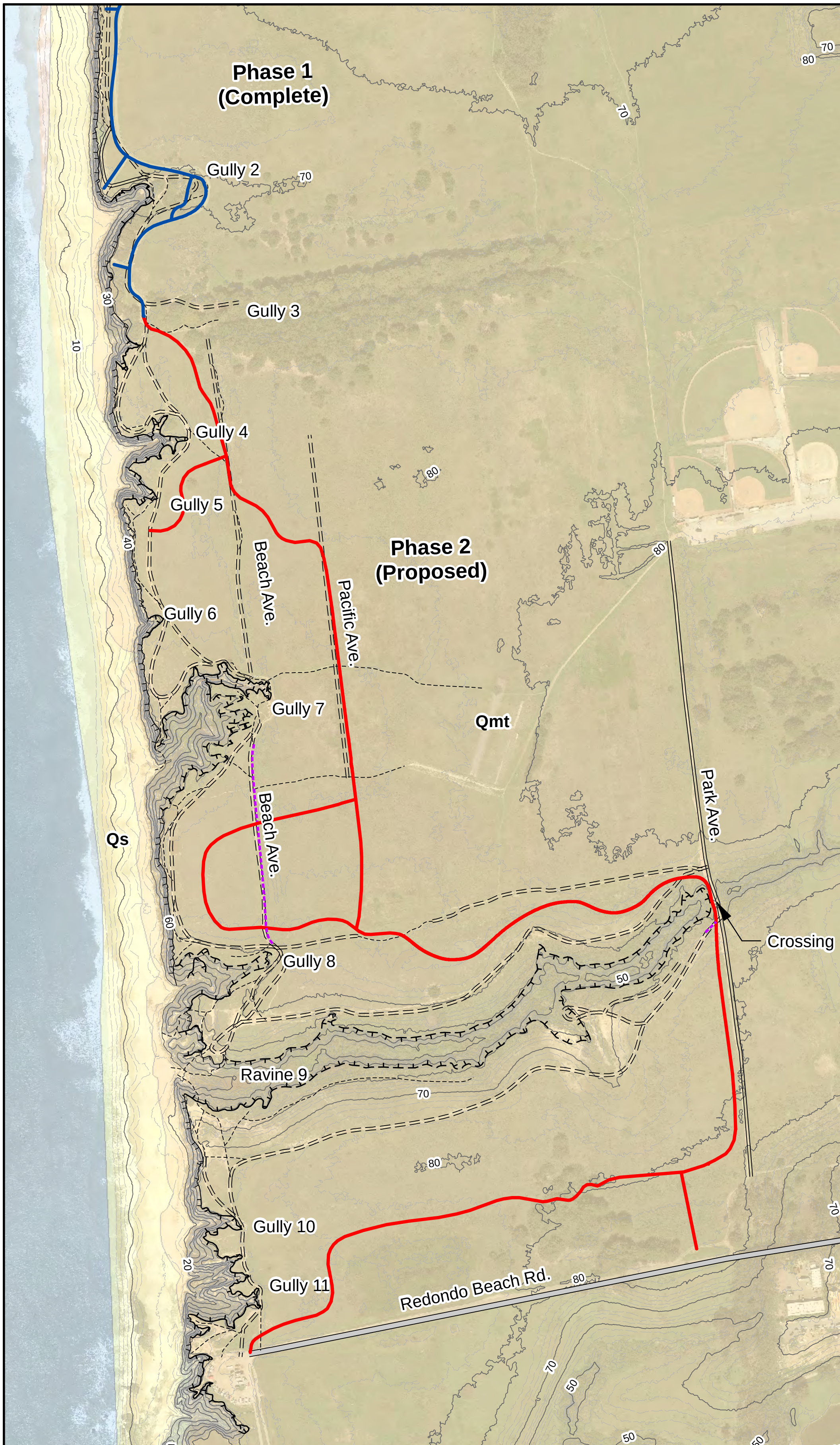
2.2.2 Surficial Geology

Overlying bedrock is a 50± foot thick mantle of Quaternary-age marine terrace sediments (Qmt). This material is well exposed in the coastal bluff where it consists primarily of weakly lithified beach and alluvial sand, gravel, and silt. The marine terraces likely correspond to a high sea level stand about 83,000 year ago (Kennedy et al., 1982). Thin dune sands locally cap the terrace deposits. This dune material forms a near continuous low berm along the top edge of the bluff.

A seasonal perched water table likely develops within the terrace deposits between layers of more and less permeable materials. Evidence of seasonal groundwater seepage was observed locally along the coastal bluff and may be a contributing factor in the formation and enlargement of some gullies.

2.2.3 Soils

Surficial soils are mapped by NRCS (2003) as Watsonville loam (WmA and WsB). From field observations this material consists primarily of loose to medium dense clayey SILT to silty SAND (ML – SM). These soils can be prone to erosion from runoff where runoff is concentrated and by wind where bare ground is exposed. The breakdown of soils along trails from use and the subsequent erosion of the loose material by water and wind causes the trails to become deeply rutted in some areas. When wet, the soils can become slick.



ROADS

- Paved Road
- Dirt Road
- Old Abandoned Road
- Trail
- Completed Trail
- Proposed Trail
- Road to be Rehabilitated

ESCARPMENT

- Bluff
- Gully
- Gully - approximate

WATERCOURSES

- Ephemeral Stream
- Drainage

GEOLOGIC UNITS

- Qs: Beach Sand
- Qmt: Marine Terrace Dep.
- Tp: Purisima Formation

Contours derived from
NOAA 2010 Coastal LiDAR DEM

N

0 200 400
Feet

TIMOTHY C. BEST, CEG
ENGINEERING GEOLOGY AND HYDROLOGY
1002 Columbia Street, Santa Cruz, CA 95060
(831) 425 5832 (831) 425 5830 (fax)

GEOLOGIC MAP
WAVECREST COASTAL TRAIL: PHASE II
COASTSIDE LAND TRUST

FIGURE: 2
Job: CLT-WAVECREST-584
Date:3/19/2017 (revised)

2.3 REGIONAL FAULTS AND SEISMICITY

The subject property is located within a highly seismically-active region of California. A broad system of inter-related northwest-southeast trending strike-slip faults represents a segment of the boundary between the Pacific and North American crustal plates (Figure 3). For approximately the past 15 million years (mid-Miocene) the Pacific plate has been slipping northwestward with respect to the North American plate (Atwater, 1970; Graham and Dickinson, 1978). The majority of movement has been taken up by the San Andreas Fault itself; however, there are other faults within this broad system that have also experienced movement at one time or another. The regional faults of significance include the San Andreas and San Gregorio faults. There are no mapped faults transecting the project area.

2.3.1 San Andreas Fault

The San Andreas Fault is an active, northwest-trending right lateral strike-slip fault zone located about 6.5 miles northeast of the project site. The main trace of the fault trends northeast-southwest and extends over 700 miles from the Gulf of California though the Coast Range to Point Arena, where the fault extends offshore. The San Andreas Fault was responsible for the 1906 San Francisco earthquake (M_w 7.9) and the 1989 Loma Prieta earthquake (M_w 7.0).

The San Andreas Fault system can be divided into segments with earthquakes of different magnitudes and recurrence intervals (WGOCEP, 1996). The great 1906 earthquake, the predominant historic seismic event of the San Andreas Fault system in northern California, ruptured all currently locked segments of the fault (from near the Mendocino triple junction to San Juan Bautista). The 1906 rupture overlaps the independent subsegments (Peninsula segment and Santa Cruz Mountains segment). Current research into prehistoric events along the northern San Andreas Fault indicates that a similar great event probably occurred most recently in the 17th century (Schwartz et al., 1986).

The San Francisco Peninsula segment is the closest segment of the fault to the site. This segment of the San Andreas Fault has been assigned a slip rate that results in a M_w 7.3 earthquake with a recurrence interval of 400 years (WGOCEP, 1996). The 1906 segment of the fault has been assigned a slip rate that results in a larger M_w 7.9 earthquake with a recurrence interval of 210 years.

2.3.2 San Gregorio Fault

The San Gregorio Fault is an active, northwest-trending right lateral strike-slip fault zone located less than a mile offshore of the project area. The San Gregorio Fault is part of a coastal system of parallel strike slip faults extending from Point Conception in the south to the Marin Peninsula in the north (Greene, 1977; Weber and Nolan, 1995). The fault zone is located mainly offshore, west of San Francisco and Monterey Bays, with onshore locations at promontories, such as Moss Beach, Pillar Point, Pescadero Point, and Point Año Nuevo.

The landward extension of the San Gregorio Fault shows evidence of late Pleistocene and Holocene movement at both Point Año Nuevo (Jennings, 1994; Weber and Nolan, 1995) and

Pillar Point (Koehler et al., 2005; Simpson et al., 1997). Quaternary and Holocene slip rates along the San Gregorio Fault have been difficult to constrain narrowly, partly because much of the fault is offshore and because much of the fault has highly complex geometry. Koehler et al. (2005) reports the most recent earthquake occurred within the past 500 years. The San Gregorio fault has been assigned a slip rate that results in a M_w 7.3 earthquake with a recurrence interval of 400 years (WGOCEP, 1999; WGOCEP, 2003).

2.3.3 Seismicity

Strong ground movement from a major earthquake on a nearby fault could affect the project during the next 30 years. The intensity of ground movement during an earthquake can vary depending on the overall magnitude, distance from the fault, focus of earthquake energy, and type of geologic material. A common measure of the intensity of ground shaking is the Modified Mercalli Intensity Scale, which is a qualitative measure of the effect of shaking on the ground surface and structures. The scale ranges from I (not felt) to XII (total destruction). At the site, Modified Mercalli Intensities of up to IX (Violent) are possible.

3.0 DISCUSSION OF GEOLOGIC HAZARDS

3.1 COASTAL BLUFF EROSION

The steep coastal bluff at the project site is roughly 50 feet high, and is fronted by a narrow beach. Because a protective beach is largely absent, the relatively weak marine terrace deposits that form the coastal bluffs are subjected to wave impact and coastal erosion during periods of high surf.

Rates of coastal bluff retreat are governed by the ability of large storm waves to attack the base of the cliff and the relative ease with which cliff material can be dislodged, either directly by wave attack, or through secondary processes such as block falls and slumping occurring higher on the cliff face. Failure deposits material onto the back edge of the beach, which temporarily buffers the bluff from wave erosion. Sea cliff retreat is an episodic process, in which failure events are often linked to individual storms or seismic disturbances (Best and Griggs, 1991; Hampton and Dingler, 1998; Hampton et al., 2004).

Review of historic aerial photographs dating back to 1928 finds the principal mechanism of bluff retreat is from wave attack, which undercuts the bluff resulting in periodic shallow block falls. These failures incorporate less than 50 linear feet of the bluff and extend less than 5 feet back in from the top edge of the bluff. Large-scale landslides are not present at the project site but are found elsewhere along the San Mateo Coast in similar earth materials. Based on field observation and review of historical aerial photographs, the risk of large-scale landslides impacting the trail is low.

3.1.1 Coastal Bluff Erosion Rates

Rates of bluff retreat over the past 70 years were calculated from a comparison of time-sequential stereoscopic aerial photographs dating back to 1943, which are on file at U.C. Santa Cruz Map library. The method used involved measurements of the position of the seacliff edge to specific fixed reference points visible in each of the photos. Oblique photographs of the coastal bluff taken offshore extend back to 1972 and are available on-line at California Coastal Records Project (www.californiacoastline.org).

Review of aerial photographs found less than 20 feet of erosion had occurred over the past 70 years. This averages to less than 4 inches per year. Most of the observed failures were small block falls that extended only a few feet into the bluff face. No significant failures were observed. The measured erosion rate is less than the 6 inches/year erosion rate reported by Griggs and Savoy (2005) along this segment of coast or the 9 inches/year reported by BAGG (2006) at Half Moon Bay Golf Links located ½ miles south of the project area.

Due to an expected rise in sea level, future erosion will likely occur at a slightly higher rate than the measured 6 to 8 inches per year. In addition, large slope failures that could extend up to 20 feet or more into the bluff face may be possible as a result of a large earthquake along the nearby San Gregorio Fault. A detailed slope stability analysis would be required to evaluate earthquake related bluff instability, however, such an analysis is not warranted for recreational trails.

3.1.2 Bluff top setback

For short and long-term trail stability, the trail will need to be set back from the top edge of the bluff. The setback distance is dependent upon the design life of the trail and the desired level of long-term stability, but also needs to consider visitor expectations of being close to the bluff edge. The trail should be set back far enough as to provide a reasonable level of stability and safety. However, setting the trail too far back may simply result in visitors avoiding the new trail and using the existing informal trails that are located closer to the bluff edge.

For reasonable long-term stability the proposed trail should be located a minimum of 30 feet from the top edge of the coastal bluff. The setback is based on a 50-year design life, an average erosion rate of 4” per year with an additional 10-foot buffer to address uncertainties. Additional erosion or slope failures could occur in the event of a large earthquake. If erosion does undermine or encroach onto the trail at some future time, the trail can be easily relocated inboard and away from the bluff edge with minimal grading. Alternatively, the trail can be set closer to the bluff edge if a shorter life expectancy is acceptable.

3.2 RAVINE AND GULLY EROSION

Within the project area, the coastal bluff is incised by seven narrow and steep sided gullies (Gullies 4, 5, 6, 7, 8, 10 and 11) and one larger ravine (Ravine 9) (Figure 1). The difference between a gully and a ravine is simply size. A gully is a small local erosional feature whereas a ravine is larger and receives off site drainage.

The ravine and gullies are a result of concentrated surface runoff draining off the fields, ditches, roads and trails and from groundwater emerging out of the gully face. A contributing factor in some areas is runoff through rodent burrows that has resulted in soil piping and the formation of several "sinkholes". Continued collapse of the resulting soil pipe can lead to the formation of a gully.

At several locations, the active gully has encroached part way into the existing trail forcing the trail to be relocated. To prevent future gully erosion from impacting the trail, the proposed trail is to be offset from these features and constructed so that runoff is not concentrated.

Photo 3: Aerial view of Gullies 4 and 5
(from California Coastal Records Project, www.californiacoastline.org)

Photo 4: Aerial view of Gully 7
(from California Coastal Records Project, www.californiacoastline.org)

Photo 5: Aerial view of Gullies 8 and Ravine 9
(from California Coastal Records Project, www.californiacoastline.org)

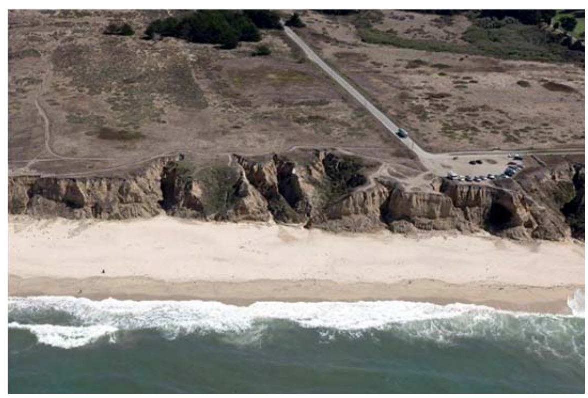


Photo 6: Aerial view of Gullies 10 and 11 at Redondo Beach Drive
(from California Coastal Records Project, www.californiacoastline.org)

The following is a brief discussion of the more pertinent gullies and ravines within the project area.

3.2.1 Gully 4, 5, 6, 8, 10 and 11

These are six relatively small gullies that do not extend very far inland and the proposed trail will be located well away from them. As a result, these features do no present a significant hazard to the proposed trail. No recommendations are warranted.

3.2.2 Gully 7

Gully 7 is a 600-foot long active gully/ravine located in the southern portion of the project area. The ravine is a natural feature located in an area where water draining off the gently sloping coastal terrace tends to naturally concentrate. Significant recent headward gully growth (approximately 310 feet) has occurred in a 45-year time period between 1970 and 2015 (photo 7 and 8) due to the additional concentration of runoff by an old (pre 1948) agricultural road being discharged into the head of the gully.

Photo 7: Gully 7 - 2011
Photo shows location of the gully head over a 41 year period.
(from Google Maps)

The old agricultural road is aligned north-south along a “paper road” depicted on San Mateo County Parcel Maps and is identified as “Beach Avenue” in the County GIS database. In the early photos, the road on the south side of the ravine appears to be slightly elevated with a shallow broad ditch evident on the landward side of the road. Elevating the road and constructing the ditch was probably done to prevent runoff from the agricultural fields from draining onto the road. However, this caused runoff that had sheeted across a broad area of coastal terrace surface to concentrate then be directed into the gully resulting in the observed gully erosion.

Between 1970 and 1993 the gully eroded very rapidly until it intersected and bypassed the old road. In this 23-year time period there was about 210+ feet of gully growth resulting in an average growth rate of 9.1 ft/yr. After intersecting the old road in 1993, the gully turned south and eroded at a slower rate roughly following the broad inland road ditch. In the 23 years after 1993 there has been about 100 feet of additional headward gully erosion resulting in an average rate of gully growth of 4.3 ft/yr. There are several factors that may have contributed to the current lower rate of headward erosion and gully growth. These include storm history and differences in subsurface conditions, though possibly also because as the gully enlarges, the area draining into the gully head has decreased.

Photo 8: Erosion at the head of Gully 7 where it intersects Beach Avenue. The proposed trail will be located over 200 feet from this feature.

If left untreated and runoff is allowed to continue to concentrate and drain to the gully head, continued gully erosion should be expected. The rate of headward gully growth would most likely be similar to what has occurred in the past 23 years, at about 4.3 ft/year.

The proposed trail will need to be offset from the head of the gully, with the setback distance dependent upon the design life of the trail and the desired level of long-term stability. For a 50-year design life and assuming an average gully growth rate of 4.3 ft per year, the proposed trail would need to be offset a minimum of 215 feet from the head of the gully. Alternatively, the trail could be situated much closer to the gully head with the understanding that once the gully encroached within close proximity of the trail the trail would be either relocated or the gully stabilized to prevent further growth.

3.2.3 Ravine 9:

Ravine 9 is a narrow and steep sided ravine draining a 100± acre area in the southern portion of the project area. The ravine is up to 170 feet wide and over 40± feet deep; sideslopes range between 50 to 85 percent grade. The ravine walls are indented by a series of shallow swales that likely formed over time by gullying and shallow landslide processes. Most of the ravine is vegetated with coastal brush along the walls and riparian vegetation along the valley bottom. The ravine is crossed by a series of informal trails at its mouth and by a Park Avenue (county service road) about 1800 feet inland.

It is our understanding that the main trail is to cross Ravine 9 along Park Avenue. Park Avenue was constructed sometime between 1968 and 1980 and follows an underground storm water drain. The Ravine 9 crossing consists of an ~24 inch diameter by ~90 foot long culvert (CMP) capped by 10+ feet of fill. The culvert appears functional though the inlet is partially plugged with sediment and the pipe may be rusted. The structural integrity of the culvert is unknown. Based on field observations the existing road is suitable for trail use through road drainage will need to be improved. See **5.3.4 SITE D5: Park Avenue at Ravine** 9 (Page 23) for a discussion of drainage issues at Park Avenue.

3.3 DRAINAGE

The project site is drained by primarily by sheet flow across the terrace with concentrated flow occurring within the bottom of the ravines and gullies. Figure 3 is a topographic map of the project site depicting existing drainage patterns and seasonally wet areas. The topographic map is based on 2009 - 2011 CA Coastal Conservancy Coastal Lidar Project: Hydro-flattened Bare Earth DEM

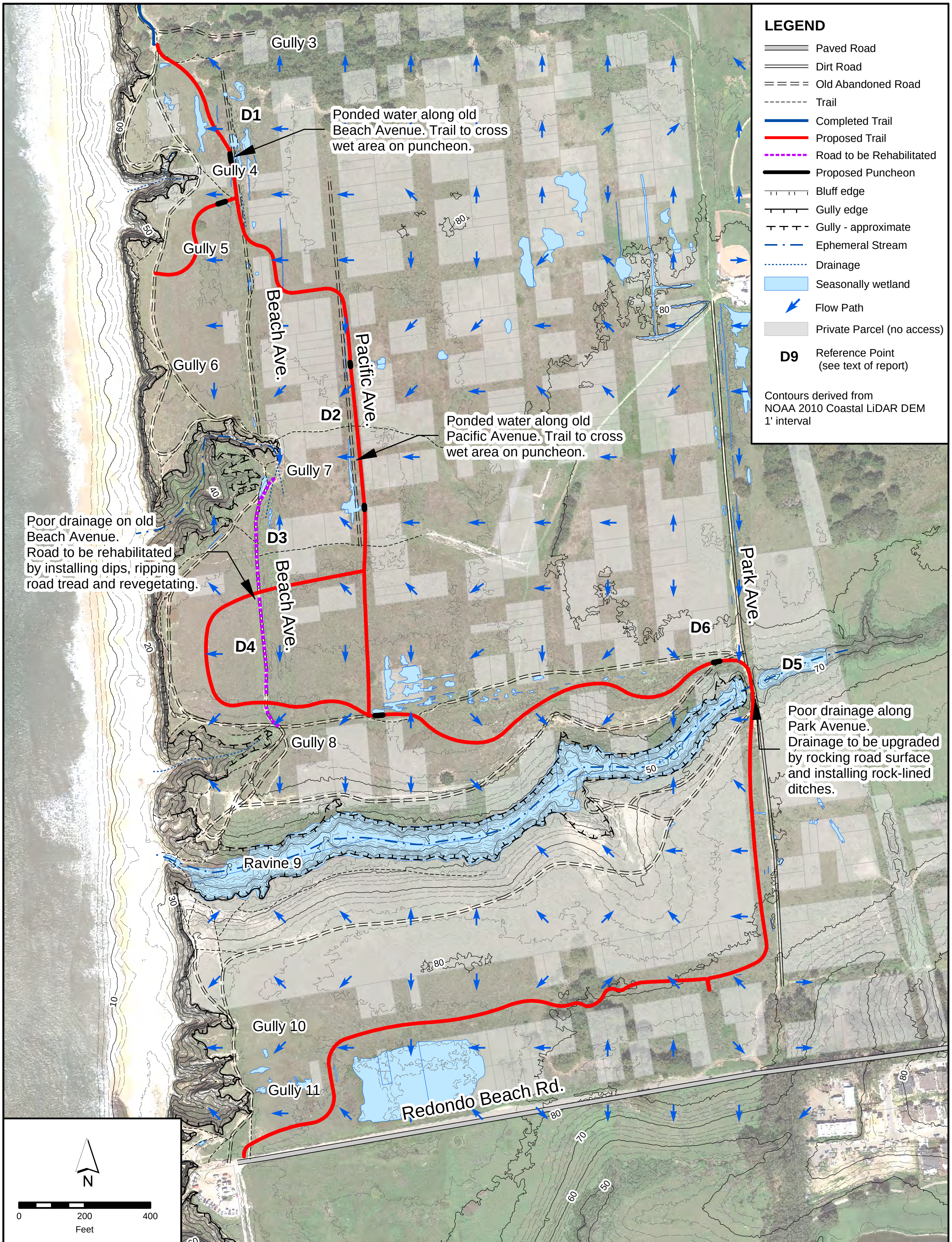
Drainage patterns are modified by the remnants of several old paper subdivision roads including Beach Avenue, Pacific Avenue and Park Avenue that parallel the coastline. These old roads were constructed shallow ditches and/or berms on their landward side presumably to prevent surface storm runoff from flowing over the road. Construction of the dirt roads and associated roadside ditches, and the subsequent entrenchment from use has altered the natural drainage pattern allowing surface runoff to both concentrated and locally pond. This in turn results in the erosion and continued degradation of the roads and trails and contributes to the formation and growth of the coastal bluff gullies where flow is ultimately discharged.

The proposed trail will need to be properly drained with frequent cross drains prevent runoff from concentrating which could lead to erosion. The majority of the trail can be adequately drain with broad drain dips (rolling dips), which is the standard of practice on unpaved trails. The trail should also be constructed so that the majority tread surface is level with the surrounding ground to minimize the risk of water being collected and diverted down the trail.

Where the trail crosses seasonal wet areas, the trail will need to be elevated on puncheons (boardwalks) to maintain a dry trail tread and to prevent impeding natural drainage.

Because the underlying soils are easily eroded, the trail tread will need to be armored with rock aggregate separated from native soils with soil stabilization fabric. Rocking the trail tread will require excavation of underlying unsuitable earth materials and replaced with rock aggregate. Soils shall be spread onsite in approved stable locations

On existing roads that are entrenched and poorly drained (e.g. portions of Beach Avenue and Park Avenue), approved spoils may be used to infill the ruts and level the tread surface with the surrounding ground for the purpose of restoring native drainage patterns.



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DRAINAGE MAP
WAVECREST COASTAL TRAIL: PHASE II
COASTSIDE LAND TRUST

FIGURE: 3
Job: CLT-WAVECREST-584
Date:3/19/2017

The following is a brief discussion of the more pertinent road segments where poor drainage patterns were observed and which could affect the proposed trail.

3.3.1 SITE D1: Beach Avenue above Gully 4

At this site approximately 300 feet of trail is aligned along Beach Avenue about 100 feet inland from the head of Gully 4. In this area Beach Avenue is poorly drained with seasonal ponding occurring along portions of the old roadbed and road ditch (See Photo 9).

Photo 9: Ponded water along remnants of Beach Drive. The proposed trail will be constructed on low puncheon to avoid impacting drainage in these areas

To avoid affecting existing drainage patterns and to avoid crossing seasonally wet areas the trail should be designed to incorporate low puncheons (boardwalks) to allow for uninterrupted drainage flow.

3.3.2 SITE D2: Pacific Avenue above Gully 7

At this site approximately 800 feet of trail is to be located along the alignment of Pacific Avenue, an old paper road. There is some local rutting along the remnants of this old road, from either old agricultural activities or more recent informal trail use. Drainage is primarily by sheet wash with shallow seasonal ponding of water resulting in local (See Photo 10).

Photo 11: Ponded water along remnants of Pacific Drive. The proposed trail will be constructed outside the wet areas and will incorporate broad drain dips to minimize impacting exiting drainage pattern.

Most of the proposed trail can be located on native grade and be drained with broad dips to minimize impacting existing drainage patterns. Puncheons should be installed to cross seasonally wet areas

3.3.3 SITE D3: Beach Avenue at Gully 7

Beach Avenue Crosses the head of Gully 7 where it contributes to very rapid headward retreat of the gully. See Section 3.2.2 Gully 7 for a more in depth discussion. The proposed trail will be located over 220 feet from the gully head and therefore will not be impacted by it.

To minimize the impact of road drainage on Gully 7 we recommended that the segment of Beach Drive draining into the gully be rehabilitated by installing small drain dips at roughly 75 foot spacings to disperse runoff, ripping the road to decompact the road tread, and revegeate exposed soils. This work may preclude vehicle access. If vehicle access is required along this road then additional drainage provisions may be required.

3.3.4 SITE D4: Beach Avenue near Gully 8

The proposed trail will cross Beach Avenue about 90 feet north of Gully 8. At this location about 300 linear feet of Beach Avenue is entrenched below grade interception sheet flow and allowing water to concentrate along the roadway. This results in erosion of the lower portion of the road (See Photo 12) and contributes to ongoing erosion of a branch of Gully 8 (See Photo 13).

Photo 12: Photo of erosion caused by runoff collected along Beach Avenue and draining toward Gully 8. The project proposes to rehabilitate this segment of road by ripping the road tread and reseeding. Small dips will also be installed to disperse runoff.

Photo 13: Photo of the head of Gully and adjacent informal trail. A contributing factor in gully erosion is the concentration of runoff along Beach Avenue.

To minimize the impact of road drainage on Gully 8 we recommended that the segment of Beach Drive draining into the gully be abandoned by installing small drain dips at roughly 75 foot spacings to disperse runoff, ripping the road to decompact the road tread, and revegeate exposed soils. This work may preclude vehicle access. If vehicle access is required along this road then additional drainage provisions may be required. Where the proposed trail crosses Beach Avenue, a rocked drain dip will be required to convey any runoff from the road across the trail.

3.3.5 D5: Park Avenue at Ravine 9

Park Avenue is an unimproved (dirt) county service road that follows an underground storm water drain about 1800 feet back from the ocean. The road crosses Ravine 9 where there is a ~24 inch diameter by ~90 foot long culvert (CMP) capped by 10+ feet of fill. The culvert appears functional though the inlet is partially plugged with sediment and the pipe may be rusted. The structural integrity of the culvert is unknown.

Photo 14: Erosion of Park Avenue on the south side of Ravine 9 due to poor road drainage. This photo was taken before the large dips were installed at the base of the road. For long term stability additional dips will need to be installed, the road surface rocked and a rocked road ditch constructed.

The road drops into the crossing on both sides at a roughly 6% grade for distance of about 250 to 300 feet. Branching off the service road are several older dirt agricultural roads that extend west to the coast along the top edge of the ravine.

Park Avenue and the adjacent side roads are poorly drained with few effective cross drains. As a result, runoff concentrates down the roads for long distances resulting in erosion and degradation of the road tread (Photo 14). Repeated grading of Park Avenue has further entrenched the road making it near impossible to drain adequately. Runoff eventually drains off the road at the Ravine 9 crossing where it had eroded a 30+ foot long by 2 to 3 foot deep gully into the downstream fill embankment. In about 2013 the gully was repaired with rock riprap and in 2016 several drain dips were installed on the south side of the crossing to direct runoff off the road before reaching the fill embankment.

There are a couple of problems with these recent dips. First, the dips do not correct drainage problems further up the road and therefore runoff is still concentrated for long distances. Though the problem at the crossing has been remediated erosion will still occur along the road.

The second problem is the recent dips are constructed using partially burring 8” to 12” diameter logs placed at an oblique angle to the road and then capped with base rock. While effective, at least in the short term, these types of structure are often abrupt and not suitable for bicycle trail use.

To correct exiting drainage problems and to upgrade the road for trail use, we recommend that road drainage be improved to prevent the concentration of runoff that is currently leading to erosion. These improvements will need to include reshaping the road prism to infill eroded road segments, armoring the road tread with rock aggregate, installing of rock lined road ditches, and installing additional drain dips to direct flow off the roads.

3.3.6 D5: Wet area near Park Avenue

At this site about 50 to 100 feet of trail will need to cross a seasonally wet area that receives water collected along upslope trails. Where runoff discharged over the edge of Ravine 9 it has resulted in a small gully where flow drains into Ravine 9.

To construct a stable trail and maintain current drainage patterns, we recommend the new trail be elevated above the wet ground on base rock and a puncheon installed to convey runoff below the trail tread. Correcting drainage along the upslope trails is not feasible since the trails extend onto private properties.

3.4 RODENT BURROWS

There is a high density of rodent burrows in the project area. These have the potential to impact the proposed trail though the development of sinkholes and the expansion of gullies. Experience at the Cowell-Purisima Farms Coastal Trail, located south of the project area, found rodents are able to burrow through compacted base rock and affect the trail tread. This problem tended to be most prevalent in the first year following construction and along trail segments were there was no underlying geotechnical stabilizing fabric. Placing the recommended soil stabilization fabric will minimize the impact of rodent burrows but not prevent it. The only way to prevent burrows would be to install wire mesh or pave the trail.

4.0 CONCLUSIONS

I am of the opinion that the proposed trail is acceptable from a geologic and erosional standpoint if all recommendations outlined in this report and accompanying plan set are properly implemented and maintained. The users of the trail, if exercising reasonable common sense, should not be subject to risks from naturally occurring geologic hazards beyond a reasonable level of risk. Although some damage to the trail or trail structures may occur during adverse geologic events (e.g. intense storms and high ground accelerations during earthquakes) it is unlikely that those geologic hazards will result in significant harm to hikers and recreational users provided that the trail and trail structures are routinely inspected, maintained and repaired as needed.

5.0 RECOMMENDATIONS

The following are recommendations to address geologic issues associated with Phase 2 construction of the trail.

5.1 LAYOUT

5.1.1 General

- The proposed trail shall be constructed along the alignment as shown on Figure 1 and plans. Minor modifications to the alignment may be made based on conditions encountered during construction and as directed by the project engineering geologist.
- We recommend that to the extent feasible the trail avoid flat ground, areas of ponded water, and fall line orientations (where the trail drops directly down the fall line of the hillside), as these areas are more difficult to drain and require a higher level of maintenance.
- Any modifications to the alignment shall be reviewed and approved by the project engineering geologist and District representative prior to the commencement of that work.

5.1.2 Coastal Bluff Setback

- We recommend for long-term stability the proposed trail should setback a minimum of 32 feet from the top edge of the coastal bluff. The current alignment conforms to this recommendation.

5.1.3 Gully 7 Setback

- We recommend for a 50-year design life that the proposed trail be setback a minimum of 215 feet from the gully head. The current alignment conforms to this recommendation.

5.2 GRADING

- Trail shall be constructed at 6 to 8 -foot max width as shown on plans and on typical design specifications
- Strip and remove all vegetation, roots, brush, highly organic soils and other unsuitable earth materials from trail tread and shoulders. Depth of stripping is assumed 4 to 6 inches. Over excavation may be required in limited areas as directed by the project engineering geologist.
    - Separate clean excavated soils from deleterious soils and vegetation
    - Deleterious soils including topsoil, fat clay soils, organic rich soils, decayed woody debris rich soils, and other material, as identified by the CEG, shall be placed in an approved stable location as directed by the CEG or District representative. These soils may be used to backfill entrenched portions of Beach

    - Avenue and other trails to level of the native ground for the purpose of restoring native drainage patterns.
    - Approved clean granular soils may be used as compacted fill along Park Avenue to infill the ruts and level the tread surface with the surrounding ground for restoring native drainage patterns.
- Compact subgrade to minimum 90% relative compaction. In areas where expansive subgrade is encountered, the subgrade should be moisture conditioned to between 2 and 4 percent over optimum moisture.
- Rock full length of trail tread a minimum of 6 inches thick.
    - Rock aggregate shall consist of approved ¾" Class II Lime-Treated aggregate base rock, unless otherwise approved by the project engineering geologist and District representative. Aggregate base rock from Stevens Creek Quarry conforms to this recommendation.
    - Compact rock aggregate to minimum 95% relative compaction
    - Separate rock aggregate from native soils with approved geotextile fabric (Mirifi 500X or equivalent).
- Cuts shall be laid back to 2H:1V or flatter

5.3 DRAINAGE

5.3.1 General

- The proposed trail shall be properly drained with frequent cross drains prevent runoff from collecting and concentrating. Cross drains shall be installed at 50 to 100 foot spacings as site conditions permit and as directed in field by geotechnical consultant.
- Collected water shall be discharged in a way so as not to induce erosion.
- Where cuts expose seepage then provisions must be made for its control and discharge in a way so as not to cause erosion.
- **Rolling Dips:**
    - The majority of the trail shall be drained by broad rolling dips installed at 50 to 100 foot spacings as site conditions dictate and as directed by project engineering district. Approximate locations of rolling dips are shown on the plan sheets. Install dips per standard design specifications as shown on Placeworks plans. Location of drain dips shall be confirmed by project engineering geologist prior to installation.
- **Ditch Relief Culverts:**
    - Ditch relief culverts may be installed in areas where a rolling dip is not feasible due to the potential for ponding water. These locations are to be identified by the project engineering geologist or design at the time of trail construction based on site conditions. At present no ditch relief culverts are anticipated, though may be required in unanticipated wet conditions are encountered during construction. The need for ditch relief culverts shall be confirmed by project engineering geologist prior to installation.

  - Culverts shall consist of 12 inch diameter pipes installed per standard specification
- **Puncheons:**
  - Where the trail crosses seasonally wet or ponded water, wetlands and/or as directed by project geotechnical consultant, the trail shall be elevated on puncheons (boardwalks) to maintain a dry trail tread and to prevent impeding natural drainage. Puncheon locations are shown on Figure 3. See Place works plans for typical puncheon design specifications.
- **Tread Surface:**
  - Where natural grades are greater than 2% and absent of seasonally ponded water the trail shall be constructed with the majority tread surface level with the surrounding ground. This is to minimize the risk of water being collected and diverted down the trail. See standard specification 3/LD1 on Placeworks plans.
  - Where natural grade is less than 2% and absent of seasonally ponded water the trail may be constructed with tread elevated no more than 4 inches above native grade provided effective cross drains (rolling dips, puncheons or ditch relief culverts) are installed at specified spacings standard specifications. See standard specification 3/LD1 on Placeworks plans.

5.3.2 SITE D3: Beach Avenue at Gully 7

- Rehabilitate / decommission 300 feet of Beach Avenue draining into Gully 7
- Rip and decompact tread surface minimum 6 inches deep
- Import organic rich soils from trail construction elsewhere on the property to backfill entrenched portions of the road to the level of native ground for the purpose of restoring native drainage patterns
- Install drain dips at maximum 75 foot spacing to disperse runoff. Dips may be constructed using spoils generated elsewhere on the project
- Revegetate exposed soils per standard specifications

5.3.3 SITE D4: Beach Avenue at Gully 8

- Rehabilitate / decommission 350+ feet of Beach Avenue draining into Gully 8
- Rip and decompact tread surface minimum 6 inches deep
- Import organic rich soils from trail construction elsewhere on the property to backfill entrenched portions of the road to the level of native ground for the purpose of restoring native drainage patterns
- Install drain dips at maximum 75 foot spacing to disperse runoff. Dips may be constructed using spoils generated elsewhere on the project
- Revegetate exposed soils per standard specifications
- Install drain dip where trail crosses the abandoned segment of Gully 8.

5.3.4 SITE D5: Park Avenue at Ravine 9

- Regrade and rock 580+ feet of Park Avenue to eliminate ruts and erosion features

- Build road tread up on 6” to 12” compacted fill to level the road tread to existing native grade. Approve clean granular soils obtained from grading elsewhere on the project may be used for compacted fill. Compact subgrade and any fill material to minimum 90% relative compaction.
- Apply rock aggregate per standard specifications

- Install 3+ drain dips on Park Avenue and 3+ drain dips on adjacent side roads to disperse runoff collected along the roadways as shown on plans
- Install 360 linear feet of rocked lined ditch along Park Avenue. Extend ditch to base of the crossing fill embankment.
- Protect underground utilities

5.3.5 SITE D6: Wet area near Park Avenue

- Construct trail across wet area as shown on plans
- Build up approximately 50 feet of trail tread on compacted base rock.
- Cross wet area low puncheon aligned with downslope side gully.

5.4 OTHER

5.4.1 Erosion Control

- Erosion control specifications shall be provided by Placeworks

5.4.2 Underground Utilities

- Contractor shall assume all responsibility for location and avoidance or repair of all utilities, including, but not limited to water lines. Contractor shall verify location of all utilities whether shown on the drawings or not. If the contractor fails to adequately protect the utilities, any resulting damage shall be repaired at contractor's cost.

5.4.3 Maintenance

- The prescribed improvements are designed and implemented to establish a stable all-season trail for recreational use. The trail by nature is subject to degradation with use and therefore will need to be monitored and maintained over time to ensure that all drainage structures are functioning as designed and that the trail tread is stable. This is the standard of practice on all trails.
- First year inspections and “tune up”: We recommend the trail be periodically monitored through the first winter and any problem areas correct as needed. Because it is common on newly graded trails for some fine sediment to wash off the trail, some tune-ups may be required to clear dips and ditches of any sediment or debris that may have accumulated. In addition, any areas of the road tread that have broken down or settled should be re-compacted. Unanticipated problems areas that may develop should be corrected as needed.
- Standard trail maintenance activities include clearing of dips, puncheons and ditches of sediment and debris that may have accumulated. Regrading the trail to remove ruts and

potholes as needed to maintain trail function and drainage. Resurface all-season trails may be needed overtime as the tread degrades with use.

5.5 INSPECTIONS

- The project engineering geologist (CEG) shall be provided an opportunity to review project plans with the contractor during the pre-construction meeting to evaluate if recommendations have been properly interpreted. We shall also provide earthwork observations and testing during construction. This allows us to confirm anticipated soil conditions and evaluate conformance with our recommendations and project plans. If we do not review the plans and provide observation and testing services during the earthwork phase of the project, we assume no responsibility for misinterpretation of the recommendations.
- Regulatory Agencies may require a final grading compliance letter. We can only offer this letter if we are called to the site to observe and test, as necessary, any grading and excavation operations **from the start of construction**. We cannot prepare a letter if we are not afforded the opportunity of observation from the **beginning of the grading operation**. The contractor must be made aware of this and earthwork testing and observation must be scheduled accordingly. Please contact our office: Tim Best (831) 425-5832 (office) (831) 332-7791 (mobile)

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6.0 REFERENCES

Aerial Photographs

1943: Flight DDB, Frames 2B-170, 171 and 172. Date 10/11/1943. Black and White, 1:20,000 nominal scale. On file at UCSC Map Library, 1943-A

1956: Flight --, Frames 76-5-176, 177, 178. Date4/2/1970. Black and White, 1:20,000 nominal scale. On file at UCSC Map Library, 1956-D

1970: Flight DDB, Frames 1R-54, 55 and 56. Date 5/27/56. Black and White, 1:12,000 nominal scale. On file at UCSC Map Library, 1970

1977: Flight DNOD-AFU-C, Frames 260, 261, and 262. Date 5/4/1977. Color, 1:12,000 nominal scale. On file at UCSC Map Library, 1976-77

1986: Flight CBDW-APU-C, Frames 310, 311, and 312. Date 3/26/86. Color, 1:12,000 nominal scale. On file at UCSC Map Library, 1986-87

2001: Flight CCC-BQK-C, Frames 129-1, 2 and 3. Date 6/7/2001. Color, 1:12,000 nominal scale. On file at UCSC Map Library, 2001B

Documents

Atwater, T., 1970. Implications of Plate Tectonics for the Cenozoic Tectonic Evolution of Western North America. Geological Society of America Bulletin, 81(12): 3513-3536.

BAGG, 2006. Geotechnical Consultation, Proposed beach access pathways, north of the west end of Redondo Beach Road, Half Moon Bay, CA, Unpublished technical report prepared by Bay Area Geotechnical Group, Palo Alto, CA; for Ocean Colony partners, LLC.

Best, T.C. and Griggs, G.B., 1991. A sediment budget for the Santa Cruz Littoral Cell, California. In: R.H. Osborne (Editor), From Shoreline to Abyss: Contributions in Marine Geology in Honor of Francis Parker Shepard. Society for Sedimentary Geology, Tulsa, OK, pp. 35-50.

Brabb, E.E., Graymer, R.W. and Jones, D.L., 1998. Geology of onshore part of San Mateo County: A digital data base. USGS Open File Report 98-137.

Graham, S.A. and Dickinson, W.R., 1978. Apparent offset of on-land geologic features across the San Gregorio-Hosgri fault trend. In: E.A. Silver and W.R. Normark (Editors), San Gregorio-Hosgri fault zone, California. California Division of Mines and Geology Special Report 137, p 13-23.

Greene, H.G., 1977. Geology of the Monterey Bay region. U. S. Geological Survey, Open-File Report: page 50.

Griggs, G.B.P., K. and Savoy, L., 2005. Living with the changing California coast. University of California Press, Berkeky, California, 540 pp.

Hampton, M.A. and Dingler, J., 1998. Short term evolution of three coastal cliffs in San Mateo County, California. Shore and Beach 66(4): 24-30.

Hampton, M.A., Griggs, G.B., Edll, T., Guy, D., Kelly, J.E., Komar, P., Mickelson, D. and Shipman, H. (Editors), 2004. Processes that govern the formation and evolution of coastal cliffs. Formation, evolution, and stability of coastal cliffs - status and trends. U.S. Geologic Survey Professional Paper 1693, 123 pp.

Jennings, C.W., 1994. Fault Activity Map of California and Adjacent Areas. California Department of Conservation, Department of Conservation, California Geologic Data Map Series: Map No. 6, Scale: 1,750,000.

Kennedy, G.L., Lajoie, K.R., Blunt, D.J. and Mathieson, S.A., 1982. Half Moon Bay terrace, California, and the age of its Pleistocene invertebrate faunas. Western Society of Malacologists Annual Report, 14: 2.

Koehler, R.D., Witter, R.C., Simpson, G.D., Hemphill-Haley, E. and Lettis, W.R., 2005. Final Technical Report: Paleoseismic Investigation of the Northern San Gregorio Fault, Half Moon Bay, California, U.S.G.S. National Earthquake Hazards Reduction Program: Award No. 04HQGR0045.

NRCS, 2003. Soil Survey: San Clara Area, California, Western Part. U.S. Dept. of Agriculture, Soil Conservation Service. Online database.

Schwartz, D.P., Pantosti, D., Okumura, K., Powers, T. and Hamilton, J., 1986. Recurrence of large magnitude earthquakes in the Santa Cruz Mountains, California--Implications for behavior of the San Andreas Fault. Journal of Geophysical Research (in review, to be submitted). - Referenced in WGCEP (1996).

Simpson, G.D., Thompson, S.C., Noller, J.S. and Lettis, W.R., 1997. The Northern San Gregorio Fault Zone: Evidence for the timing of late Holocene earthquakes near Seal Cove, California. Bulletin of the Seismological Society of America, 87(5): 1158-1170.

Weber, G.E. and Nolan, J.M., 1995. Determination of late Pleistocene-Holocene slip rates along the San Gregorio fault zone, San Mateo County, California. U.S. Geological Survey Open-File Report 95-210: 805-807.

WGOCEP, 1996. Database of Potential Sources For Earthquakes Larger than Magnitude 6 in Northern California, by The Working Group on Northern California Earthquake Potential. U.S. Geological Survey Open-File Report 96-705 (http://quake.wr.usgs.gov/hazprep/NCEP/).

WGOCEP, 1999. Working Group on California Earthquake Probabilities: Earthquake Probabilities in the San Francisco Bay Region: 2000 to 2030 - A Summary of Findings, U.S. Geological Survey Open-File Report 99-517: Online Version 1.0.

WGOCEP, 2003. Working Group on California Earthquake Probabilities: Earthquake Probabilities in the San Francisco Bay Region: 2002 to 2031, U.S. Geological Survey Open-File Report03-214.

7.0 LIMITATIONS

1. The interpretations and conclusions presented in this report are based on a study of inherently limited scope. Observations were qualitatively limited to surface expressions and limited natural and artificial exposures of subsurface materials at and adjacent to the project area. Subsurface sampling and slope stability modeling are beyond the scope of this investigation. For this reason, the conclusions should be considered limited in extent.
2. Recommendations outlined in this report are based on qualitative observations and are designed to minimize the level of potential risk associated with the identified geologic hazards. Any “engineered” structure identified or recommended in this report should be reviewed by a licensed civil or geotechnical engineer as deemed necessary by the landowner. The conclusions and recommendations noted in this report are based on probability and do not imply the site will not possibly be subjected to rainfall, ground failure or seismic shaking so intense that structures or roads will be severely damaged or destroyed.
3. This written report comprises all our professional opinions, conclusions and recommendations. This report supersedes any previous oral or written communications concerning our opinions, conclusions and recommendations.
4. This report is issued with the understanding that it is the duty and responsibility of the client, or his or her representative or agent, to ensure that the recommendations contained herein are fully implemented.
5. The findings of this report are valid as of the present date. However, changes in the conditions of a property or landform can occur with the passage of time, whether due to natural processes or to the works of man, on this or adjacent properties. In addition, changes in applicable or appropriate standards occur whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated, wholly or partially, by changes outside my control.

I would like to thank you for this opportunity to assist you in your land use planning. If you have any questions or desire additional clarification, please do not hesitate to contact me.

Sincerely,

Timothy C. Best
Engineering Geologist #1682

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